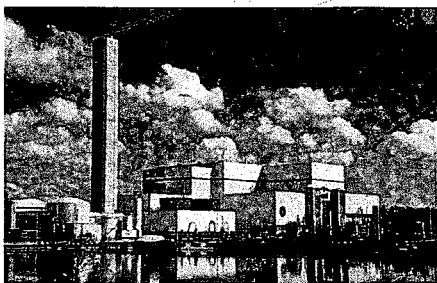


LEE COUNTY, FLORIDA

SOLID WASTE ENERGY RECOVERY FACILITY



SUPPLEMENTAL APPLICATION FOR POWER PLANT SITE CERTIFICATION

VOLUME I APPLICATION



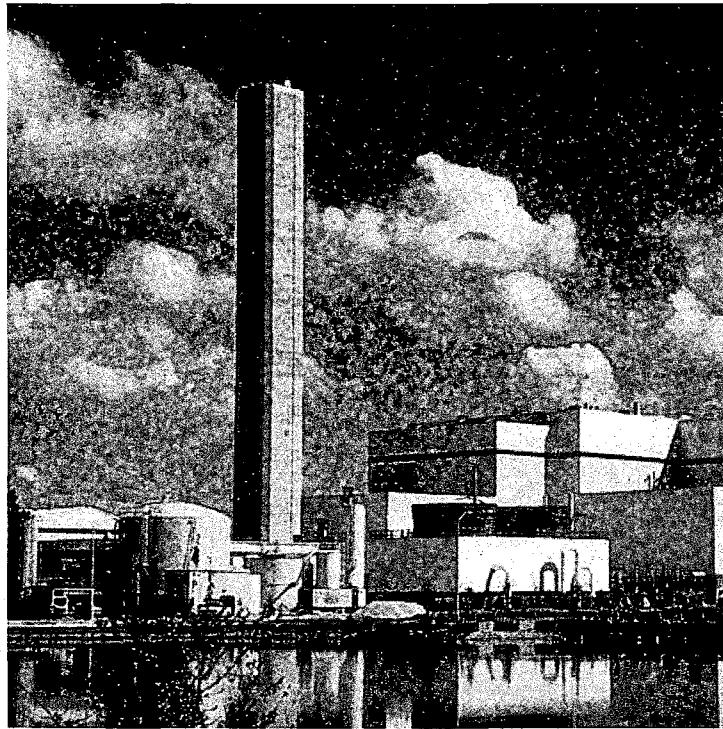
**SUBMITTED BY:
THE LEE COUNTY
BOARD OF
COUNTY
COMMISSIONERS**

NOVEMBER 7, 2002

PREPARED BY:

**MALCOLM
PIRNIE**

**LEE COUNTY, FLORIDA
SOLID WASTE ENERGY RECOVERY**



**SUPPLEMENTAL APPLICATION
POWER PLANT SITE CERTIFICATION**

VOLUME I – APPLICATION



**SUBMITTED BY:
THE LEE COUNTY
BOARD OF
COUNTY COMMISSIONERS**

NOVEMBER 7, 2007

PREPARED BY:

**MALCOLM
PIRNIE**

November 7, 2002

Hamilton S. Oven, Jr., P.E.
Administrator, Office of Siting Coordination
Department Of Environmental Protection
2600 Blair Stone Road, MS:48
Tallahassee, FL 32399

Re: Lee County Solid Waste Energy Recovery Facility
Supplemental Application for Power Plant Site Certification PA-90-30C

Dear Mr. Oven,

Please find enclosed Lee County's Supplemental Application for Power Plant Site Certification (Application), which addresses the construction and operation of an additional 600 tons per day (nominal) municipal waste combustion unit (Unit 3) at the County's existing Solid Waste Energy Recovery Facility (Facility). The County has prepared this Application to satisfy the requirements set forth in the Florida Electrical Power Plant Siting Act (PPSA), Sections 403.501-.518, F.S., and the PPSA rules adopted by the Florida Department of Environmental Protection (DEP) in Chapter 62-17, F.A.C.

The Facility, which has been in commercial operation since 1994, is owned by Lee County and operated by Covanta Lee, Inc. The Facility will continue to provide Lee and Hendry counties with solid waste disposal capacity. The Facility is in compliance with its current Conditions of Certification and its environmental permits and continues to be one of the most efficiently operated facilities in North America. The expansion of the Facility will result in a beneficial environmental and economic impact on solid waste disposal in Lee and Hendry Counties.

As part of the Application process, the County completed an environmental justice audit that found no environmental justice impacts as defined by Executive Order 12898. Additionally:

- The air quality analysis completed by the County determined that the expanded Facility's emissions would be indistinguishable from background concentrations and are considered to be negligible.
- The County proposes emission limits that are at or below New Source Performance Standards (NSPS) under 40 CFR 60, Subpart Eb.
- The human health and ecological risk assessment completed by the County demonstrated that the potential risks from the expanded Facility are below

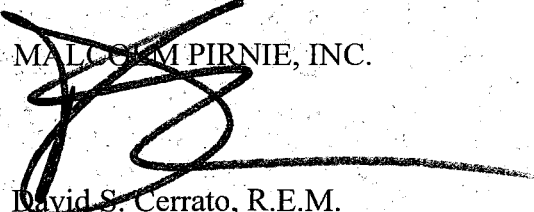
regulatory and other risk levels and concluded that the proposed expanded Facility is not anticipated to have an adverse impact on human health or the environment.

- The expansion of the Facility is consistent with the County's Comprehensive Plan to increase recycling and reduce dependence on the landfilling of solid waste.

Lee County transmitted, under separate cover, check no. 354552 in the amount of \$50,000.00 for payment of the Application Fee (copy attached). We eagerly await the Department's review and the County looks forward to working with the Department to continue to improve the health and welfare of the citizens in Lee and Hendry counties.

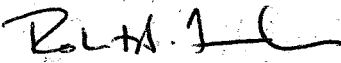
If you should have any questions concerning this Application submittal or require additional information or copies, please do not hesitate to contact us.

Very truly yours,


MALCOLM PIRNIE, INC.

David S. Cerrato, R.E.M.
Vice President

Supervising Engineer of Record



11-7-02
Robert H. French, P.E.
Associate
FL P.E. No. 22054

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Applicant Information

Applicant's Official Name: **Lee County, Florida**

Address: **Board of County Commissioners**

2120 Main Street, PO Box 398

Ft. Myers, Florida 33901

Address of Official Headquarters:

Lee County Solid Waste Division

10500 Buckingham Road, Suite 200

Fort Myers, Florida 33905

Business Entity (corporation, partnership, co-operative): **Lee County Government**

Names, Owners, etc.: **Lee County Board of County Commissioners**

Name and Title of Chief Executive Officer: **Bob Janes, Chair, Lee County Board of County Commissioners**

Name, Address, and Phone Number of Official Representative Responsible for Obtaining Certification: **Lindsey J. Sampson, P.E., Division Director**

Site Location (County): **Lee County, Florida**

Nearest Incorporated City: **Fort Myers, Florida**

Latitude and Longitude: **26° 37' 54" and 81° 45' 41"**

UTM's Northerly: **2,945,865**

Easterly: **424,252**

Section, Township, Range **Section 24, Township 44S, Range 25E**

Location of any Directly Associated Transmission Facilities (Counties): **N/A**

Existing grid interconnect: **Buckingham Substation NW Quadrant S24 T44S R25E**

Name Plate Generating Capacity: **Existing 39.7 Mw, Proposed 20 Mw**

Capacity of Proposed Additions and Ultimate Site Capacity: **The proposed additional capacity is 20 Mw. The Ultimate Site Capacity is 60-65 Mw.**

Remarks: **Existing Facility Information: Conditions of Certification DEP Case No. PA90-30; Title V Air Operation Permit No. 0110119-001-AV; PSD Permit Nos. PSD-FL-151, PSD-FL-151A, and PSD-FL-151B.**

TABLE OF CONTENTS

VOLUME I - APPLICATION

SECTION OF PPSA APPLICATION	Page
EXECUTIVE SUMMARY	ES-1
1.0 NEED FOR POWER AND THE PROPOSED FACILITIES.....	1-1
2.0 SITE AND VICINITY CHARACTERIZATION.....	2-1
2.1 Site and Associated Facilities Delineation.....	2-1
2.1.1 Site Location	2-1
2.1.2 Existing Uses	2-2
2.1.3 Site Modification	2-2
2.1.4 100-Year Flood Zone.....	2-4
2.2 Socio-Political Environment.....	2-4
2.2.1 Governmental Jurisdictions	2-4
2.2.2 Zoning and Land Use Plans	2-6
2.2.3 Demography and Ongoing Land Use	2-12
2.2.4 Easements, Title, Agency Works.....	2-15
2.2.5 Regional Scenic, Cultural and Natural Landmarks.....	2-15
2.2.6 Archaeological and Historic Sites.....	2-15
2.2.7 Socioeconomics and Public Services.....	2-16
2.3 Biophysical Environment.....	2-46
2.3.1 Geology and Soils.....	2-46
2.3.2 Groundwater Hydrology	2-56
2.3.3 Site Water Budget and Area Uses.....	2-62
2.3.4 Surficial Hydrology	2-63
2.3.5 Vegetation/Land Use	2-64
2.3.6 Ecology	2-69
2.3.7 Meteorology and Ambient Air Quality.....	2-79
2.3.8 Noise	2-91
3.0 THE PLANT AND DIRECTLY ASSOCIATED FACILITIES.....	3-1
3.1 Background.....	3-1
3.1.1 Facility Siting.....	3-1
3.1.2 Existing and Proposed Facilities.....	3-2
3.2 Site Layout.....	3-5
3.2.1 Building Dimensions	3-5
3.2.2 Visual Impact	3-6
3.3 Fuel	3-7
3.3.1 Fuel Supply	3-7
3.3.2 Fuel Storage	3-7
3.4 Air Emissions and Controls	3-9

3.4.1	Air Emission Types and Sources	3-9
3.4.2	Air Emission Controls	3-10
3.4.3	Best Available Control Technology	3-10
3.4.4	Design Data for Control Equipment	3-11
3.5	Plant Water Use	3-11
3.5.1	Heat Dissipation System	3-12
3.5.2	Domestic/Sanitary Wastewater	3-14
3.5.3	Process Water Systems	3-15
3.6	Chemical and Biocide Wastes	3-15
3.7	Solid and Hazardous Waste	3-16
3.7.1	Solid Waste	3-16
3.7.2	Hazardous Waste	3-17
3.8	On-site Drainage System	3-17
3.9	Materials Handling	3-18
4.0	EFFECTS OF SITE PREPARATION, AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION	4-1
4.1	Land Impact	4-1
4.1.1	General Construction Impacts	4-1
4.1.2	Roads	4-2
4.1.3	Flood zones	4-3
4.1.4	Topography and Soils	4-3
4.2	Impact on Surface Water Bodies and Uses	4-4
4.2.1	Impact Assessment	4-4
4.2.2	Measuring and Monitoring Programs	4-4
4.3	Groundwater Impacts	4-5
4.3.1	Impact Assessment	4-5
4.3.2	Measuring and Monitoring Programs	4-5
4.4	Ecological Impacts	4-6
4.4.1	Impact Assessment	4-6
4.4.2	Measuring and Monitoring Programs	4-7
4.5	Air Impact	4-7
4.5.1	Emission Rates	4-7
4.6	Impact on Human Populations	4-8
4.6.1	Sensitive Receptors	4-8
4.6.2	Work Force	4-9
4.6.3	Traffic Associated with Construction	4-10
4.7	Impact on Landmarks and Sensitive Areas	4-10
4.8	Impact on Archaeological and Historic Sites	4-11
4.9	Special Features	4-11
4.10	Summary of Impacts and Benefits from Construction	4-11
4.11	Variances	4-12
5.0	EFFECTS OF FACILITY OPERATION	5-1
5.1	Effects of the Operation of the Heat Dissipation System	5-1

5.1.1	Temperature Effect on Receiving Water Body.....	5-1
5.1.2	Effects on Aquatic Life.....	5-1
5.1.3	Biological Effects of Modified Circulation.....	5-1
5.1.4	Effects of Offstream Cooling.....	5-2
5.1.5	Measurement Program.....	5-3
5.2	Effects of Chemical and Biocide Discharges.....	5-3
5.2.1	Industrial Wastewater Discharges.....	5-3
5.2.2	Cooling Tower Blowdown.....	5-3
5.2.3	Measurement Programs.....	5-4
5.3	Impacts on Water Supplies.....	5-4
5.3.1	Surface Water.....	5-4
5.3.2	Groundwater.....	5-4
5.3.3	Drinking Water.....	5-6
5.3.4	Leachate and Runoff.....	5-6
5.3.5	Groundwater Modeling and Monitoring.....	5-6
5.4	Solid/Hazardous Waste Disposal Impacts.....	5-7
5.4.1	Solid Waste.....	5-7
5.4.2	Hazardous Waste.....	5-8
5.5	Sanitary and Other Waste Discharges.....	5-9
5.6	Air Quality Impacts.....	5-9
5.6.1	Impact Assessment.....	5-9
5.6.2	Monitoring Program.....	5-12
5.7	Noise.....	5-13
5.8	Changes in Non-Aquatic Species Populations.....	5-15
5.8.1	Impact.....	5-15
5.8.2	Monitoring.....	5-15
5.9	Other Facility Operation Effects.....	5-15
5.10	Archaeological Sites.....	5-16
5.11	Resources Committed.....	5-16
5.12	Variances.....	5-17
6.0	TRANSMISSION LINES AND OTHER LINEAR FACILITIES.....	6-1
6.1	Transmission Lines.....	6-1
6.2	Associated Linear Facilities.....	6-2
7.0	ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION AND OPERATION.....	7-1
7.1	Socioeconomic Benefits.....	7-1
7.2	Socioeconomic Costs.....	7-3
8.0	SITE AND FACILITY DESIGN ALTERNATIVES.....	8-1
8.1	Site Alternatives.....	8-1
8.2	Alternative Water Source.....	8-1
9.0	COORDINATION.....	9-1

TABLE OF CONTENTS

VOLUME II - APPENDICES

- 1.0 SITE AND ABUTTING PROPERTY OWNERSHIP**
 - 1.1 Abutting Property Owners
 - 1.2 Governmental Properties
- 2.0 ZONING AND LAND USE PLANS**
 - 2.1 Proof of Zoning
 - 2.2 Lee County Ordinance 94-30
 - 2.3 Future Land Use
 - 2.4 Special Treatment Areas/Overlay Descriptions
 - 2.5 Zoning Categories
- 3.0 MATERIALS SEPARATION PLAN**
 - 3.1 Materials Separation Plan
- 4.0 REQUIREMENTS FOR NEW WASTE-TO-ENERGY FACILITY CAPACITY**
 - 4.1 Section 403.7061 Requirements for New Waste-to-Energy Facility Capacity
- 5.0 INTERLOCAL AGREEMENTS**
 - 5.1 Lee County/Hendry County Interlocal Agreement
 - 5.2 Lee County/City of Fort Myers Interlocal Wastewater Agreement
- 6.0 FEDERAL PERMIT APPLICATIONS AND APPROVALS**
 - 6.1 Florida Public Service Commission Declaratory Statement and Additional Background Information
 - 6.2 NPDES General Permit Coverage Notice
- 7.0 STATE PERMIT APPLICATIONS AND APPROVALS**
 - 7.1 Conditions of Certification as Modified
 - 7.2 Title V Air Operation Permit
 - 7.3 PSD Permit
 - 7.4 Discontinuance of Surface Water Monitoring Requirements
 - 7.5 Grant of Perpetual Conservation Easement and Agreement
 - 7.6 Revised Stormwater Calculations
 - 7.7 Ground Water and Surface Water Monitoring Plan
 - 7.8 Consumptive Use Report
 - 7.9 Water Conservation Plan

- 8.0 CORRESPONDENCE FROM FEDERAL, STATE, AND LOCAL AGENCIES**
 - 8.1 Correspondence From Federal, State, and Local Agencies
 - 8.2 Correspondence From South Florida Water Management District
- 9.0 GROUNDWATER WELL INVENTORY**
 - 9.1 Permitted Wells (>500,000 gpd)
 - 9.2 Permitted Wells (<500,000 gpd)
- 10.0 GEOTECHNICAL REPORTS AND ARCHAEOLOGICAL REPORT**
 - 10.1 Geotechnical Reports
 - 10.2 Archaeological Report
- 11.0 NOISE STUDIES AND TRAFFIC IMPACT STUDY**
 - 11.1 Noise Impact Study
 - 11.2 Operational Noise Study Report
 - 11.3 Traffic Impact Study
- 12.0 RISK ASSESSMENT**
 - 12.1 Human Health and Ecological Risk Assessment 2002
 - 12.2 Human Health and Ecological Risk Assessment 1992
- 13.0 MISCELLANEOUS REPORTS AND STUDIES**
 - 13.1 Household Trend Report
 - 13.2 Environmental Justice Overview and Audit
 - 13.3 Wetland Mitigation Monitoring Report
- 14.0 MONITORING PLANS**
 - 14.1 Exotic Species Control Plan
 - 14.2 Oil Pollution Prevention Plan
 - 14.3 Stormwater Pollution Prevention Plan
- 15.0 RESERVED**

TABLE OF CONTENTS – ABBREVIATED*

VOLUME III - AIR QUALITY

INTRODUCTION

- 1.0 EXECUTIVE SUMMARY**
- 2.0 REGULATORY REVIEW**
- 3.0 AIR POLLUTANT EMISSIONS**
- 4.0 BEST AVAILABLE CONTROL TECHNOLOGY EVALUATION**
- 5.0 EXISTING AMBIENT AIR QUALITY**
- 6.0 AIR QUALITY IMPACT ANALYSES**
- 7.0 ADDITIONAL IMPACT ANALYSES**
- 8.0 REFERENCES**
- 9.0 ATTACHMENTS**

* A detailed Table of Contents for the Prevention of Significant Deterioration Air Permit Application is provided in Volume III.

LIST OF TABLES

Table	Page
2-1	Proposed Land Uses At The Site 2-3
2-2	Governmental Jurisdictions Within a Five-Mile Radius 2-5
2-3	Population: Lee County 1980-2000 2-13
2-4	2000 Census Estimates for Census Tracts in Study Area 2-17
2-5	Lee County Population Projections 2-18
2-6	Average Annual Labor Force 1990-2000 2-19
2-7	Major Private Sector Employers in 2000 2-19
2-8	Average Monthly Employment: Lee County 1990-2000 2-21
2-9	Monthly Employment: Lee County January-March 2001 2-24
2-10	Employment Estimates: Lee County 1998-2008 2-25
2-11	Annual Payroll by Industrial Sector: Lee County 1990-2000 2-26
2-12	Annual (Monthly) Payroll by Industrial Sector: Lee County 1990-2000 2-31
2-13	Income by Household: Lee County 2000 2-37
2-14	Housing Units: 2000 2-38
2-15	Age of Housing Stock as of 2000 2-39
2-16	Housing Values in 2000 2-39
2-17	Building Permits: Lee County 2000 2-40
2-18	Existing Roadways 2-41
2-19	Existing Traffic Volumes 2-41
2-20	Performance Standards 2-42
2-21	Influent Pretreatment Requirements for the Fort Myers Central Advanced Wastewater Treatment Plant 2-45
2-22	Summary of Soil Borings 2-52
2-23	Summary of Sieve Data for Soil Samples 2-54
2-24	On-site Groundwater Elevation Data 2-58
2-25	Summary of Groundwater Quality Data 2-61
2-26	Hydrological Data Representative of the Project Site 2-62
2-27	Wildlife Survey Results October 2001 2-69
2-28	Wildlife Observed or Expected to Occur on the Facility Site 2-71
2-29	Climatological Data - Normals, Means, and Extremes; Page Field Airport, Fort Myers 2-82
2-30	Annual Average Rural Mixing Heights and Stability 2-83
2-31	Frequency Distribution of Wind Speed and Stability 2-84
2-32	Frequency Distribution of Wind Speed and Wind Direction 2-85
2-33	Nearest Ambient Air Quality Monitoring Sites 2-87
2-34	Ambient Monitoring Data Used to Derive Background Concentrations 2-88
2-35	Proposed Background Concentrations for Criteria Pollutants 2-90
3-1	Reference Solid Waste Composition 3-8
3-2	Reference Solid Waste Ultimate Analysis 3-8

3-3	Pretreatment Requirements for the Fort Myers Central Advanced Wastewater Treatment Plant.....	3-13
5-1	Projected Solid Waste Quantities, Lee and Hendry Counties, 1995-2010.....	5-8
5-2	Comparison of Maximum Increases and Combined Facility Impacts to the NAAQS/FAAQS.....	5-11
5-3	Comparison of Maximum Increases and Combined Facility Impacts to PSD Class II Increments.....	5-12
5-4	Lee County Energy Recovery Facility; Facility Noise Levels.....	5-14
9-1	Contacts and Correspondence.....	9-1

LIST OF FIGURES

Figure		Following Page
2-1	General Location Map	2-1
2-2	Site Layout.....	2-1
2-3a	Aerial of Facility Site – February 1999	2-1
2-3b	Aerial of Facility Site – May 2002	2-1
2-4	Abutting Properties	2-2
2-5	Existing and Closed Landfills.....	2-2
2-6	Site Civil Plot Plan.....	2-2
2-7	Flood Hazard Map	2-4
2-8	Governmental Jurisdictions Within a Five-Mile Radius	2-4
2-9a	County Future Land Use Map.....	2-8
2-9b	City of Fort Myers Future Land Use Map	2-8
2-10	Existing Land Uses	2-14
2-11	Census Tract Outline Map	2-16
2-12	Water and Wastewater Treatment Plant Locations.....	2-44
2-13a	Water Table Aquifer - Wet Season	2-57
2-13b	Water Table Aquifer - Dry Season	2-57
2-14	Permitted Wells Within a Five-Mile Radius.....	2-60
2-15	Habitat Survey Results.....	2-69
2-16	Wildlife Survey Results	2-69
2-17	Page Field Airport – Fort Myers, FL NWS Station # 12835 January 1990-December 1994	2-80
2-18	Page Field Airport – Fort Myers, FL NWS Station # 12835 January 1990-1994.....	2-80
2-19	Page Field Airport – Fort Myers, FL NWS Station # 12835 February 1990-1994.....	2-80
2-20	Page Field Airport – Fort Myers, FL NWS Station # 12835 March 1990-1994.....	2-80

2-21	Page Field Airport – Fort Myers, FL NWS Station # 12835 April 1990-1994.....	2-80
2-22	Page Field Airport – Fort Myers, FL NWS Station # 12835 May 1990-1994.....	2-80
2-23	Page Field Airport – Fort Myers, FL NWS Station # 12835 June 1990-1994.....	2-80
2-24	Page Field Airport – Fort Myers, FL NWS Station # 12835 July 1990-1994.....	2-80
2-25	Page Field Airport – Fort Myers, FL NWS Station # 12835 August 1990-1994.....	2-80
2-26	Page Field Airport – Fort Myers, FL NWS Station # 12835 September 1990-1994.....	2-80
2-27	Page Field Airport – Fort Myers, FL NWS Station # 12835 October 1990-1994.....	2-80
2-28	Page Field Airport – Fort Myers, FL NWS Station # 12835 November 1990-1994.....	2-80
2-29	Page Field Airport – Fort Myers, FL NWS Station # 12835 December 1990-1994.....	2-80
3-1	Typical Stoker Mass-Burn Facility.....	3-3
3-2a	Architectural Building Elevations.....	3-5
3-2b	General Arrangement Section A-A.....	3-5
3-3	Water Balance Diagram.....	3-11
3-4	Basin and Sub-Basin Boundaries.....	3-17
4-1	Estimated Work Force Requirement During Construction.....	4-9

ACRONYMS AND ABBREVIATIONS

ADT	Average Daily Traffic
ASTM	American Society of Testing and Materials
BFD	Boiler Feedwater Demineralizer
Btu	British Thermal Unit
cfs	Cubic Feet per Second
CSM	Cubic Feet per Second per Square Mile
DSCM	Dry Standard Cubic Meter
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FGFWFC	Florida Game and Fresh Water Fish Commission
FLUCFCS	Florida Land Use and Cover Forms Classification System
FMSF	Florida Master Site File
FP&L	Florida Power and Light
gpd	Gallons per Day
HHV	Higher Heating Value
HHW	Household Hazardous Waste
HLDI	High-Level Disinfection
HSB	Highest Second-Highest
HTR	Household Trend Report
IPD	Industrial Planned Development
ISCST	Industrial Source Complex – Short Term
JMM	J. M. Montgomery & Associates
kwh	Kilowatt-Hours
lb/yd ³	Pounds per Cubic Yard
L _{eq}	Equivalent Continuous Sound Levels
LOS	Level of Service
mg/L	Milligrams per Liter
mgd	Million Gallons per Day
MPI	Malcolm Pirnie, Inc.
MSA	Metropolitan Statistical Area
MSL	Mean Sea Level
MW	Megawatt
NGVD	National Geodetic Vertical Datum
NM	Not Measured
NPDES	National Pollution Discharge Elimination System
NSPS	New Source Performance Standards
P ² /SQG	Pollution Prevention/Small Quantity Generator

ACRONYMS AND ABBREVIATIONS

PPSA	Power Plant Siting Act
PSD	Prevention of Significant Deterioration
RMPF	Recovered Materials Processing Facility
SCR	Selective Catalytic Reduction
SFWMD	South Florida Water Management District
SNCR	Selective Non-Catalytic Reduction
SPT	Standard Penetration Test
SR	State Road
STF	Summary Tape File
tpd	Tons per Day
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
USDA	U. S. Department of Agriculture
USEPA, EPA	U. S. Environmental Protection Agency
USFWS	U. S. Fish and Wildlife Service
USGS	U. S. Geological Survey
USSCS	U. S. Soil Conservation Service
VOC	Volatile Organic Compound
WWTP	Wastewater Treatment Plant
$\mu\text{g}/\text{m}^3$	Micrograms per Cubic Meter

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

1.0 INTRODUCTION

This document summarizes the key facts concerning Lee County's Supplemental Application for Power Plant Site Certification (Application), which addresses the construction and operation of Unit 3 at the County's existing Solid Waste Energy Recovery Facility (Facility). The County has prepared this Application to satisfy the requirements set forth in the Florida Electrical Power Plant Siting Act (PPSA), Sections 403.501-518, F.S., and the PPSA rules adopted by the Florida Department of Environmental Protection (FDEP) in Chapter 62-17, F.A.C.

2.0 BACKGROUND

In 1985, the Florida Legislature enacted the Lee County Solid Waste Disposal and Resource Recovery Act, which authorized Lee County to construct, operate, and maintain a solid waste disposal and resource recovery system for the benefit of the County's residents. Accordingly, in 1989, the County adopted an Integrated Solid Waste Management Master Plan (Plan), which established a comprehensive plan for the management, reuse, recycling and/or disposal of all solid waste generated in Lee County. The County's Plan was based on the development of: (a) an aggressive recycling program to reduce the quantity of materials requiring disposal; (b) a waste-to-energy facility for waste reduction and energy recovery from those materials that are not recycled; and (c) a landfill for the disposal of ash and by-pass waste (i.e., materials that are not recycled or processed in the WTE facility).

Lee County has implemented its Integrated Solid Waste Management Master Plan with innovative approaches and state of the art technology. For example, the County established a recycling and materials separation goal of 40 percent for its residents, even though the State of Florida's goal is 30 percent. The County's recycling rates have consistently exceeded the State's goal and the County continues to implement new recycling initiatives to achieve the County's goal of 40 percent. As a result of the County's comprehensive recycling activities, Lee County's recycling rate in 2000 was higher than that of any other county in Florida.

The County selected state-of-the-art technology when designing its waste-to-energy (WTE) facility, which was approved under the PPSA in 1992 and commenced commercial operations in 1994. The Facility uses filter fabric baghouses, acid gas scrubbers, selective non-catalytic reduction (SNCR) systems, and an array of continuous emission monitors to ensure that the Facility's emissions are minimized. The County's WTE facility was the first one in the United States to use an activated carbon injection (ACI) system on a continuous basis to control mercury emissions. With these advanced air pollution control systems, the Facility has operated safely and reliably for 8 years, while consistently complying with the applicable FDEP emission limits and other environmental standards.

EXECUTIVE SUMMARY

Lee County built a modern landfill, which is equipped with two synthetic liners, two leachate collection systems, and a network of groundwater monitoring wells to ensure the protection of the environment.

The County's landfill is located in Hendry County, pursuant to an interlocal agreement between Lee County and Hendry County. Under this agreement, the solid waste from both counties is taken to Lee County's Facility for processing and then the ash and by-pass waste are taken to the landfill for disposal. This cooperative, regional approach to solid waste management issues has enabled Lee County and Hendry County to provide environmentally sound, cost-effective programs for the residents of both counties.

3.0 NEED FOR UNIT 3 AT ENERGY RECOVERY FACILITY

Despite Lee County's comprehensive recycling program, the amount of solid waste delivered to the Facility has increased each year since the Facility began operation, primarily due to population growth. In 1999, the County's deliveries were equal to the Facility's guaranteed processing capacity (372, 300 tons). In 2000, the Facility processed more than 392,000 tons of solid waste, but the County still had to dispose almost 44,000 tons of processible waste in its landfill. Current population projections for Lee and Hendry counties suggest that the amount of processible solid waste will continue to increase, reaching almost 550,000 tons by 2010.

Lee County has decided that it should expand the Facility, consistent with the County's long-standing Plan, rather than discard processible waste in a landfill. The Facility currently has two municipal solid waste combustion units, but it was designed to readily accommodate the construction of a third unit. The third unit will be operating at or near its design capacity by 2010 (i.e., within five years after it commences commercial operations).

4.0 SITE AND ASSOCIATED FACILITIES

The Facility is located approximately 2.5 miles east of the intersection of Interstate-75 and State Road 82, on the north side of Buckingham Road. The site contains approximately 155 acres. The site includes the Facility, a Household Hazardous Waste (HHW) drop-off area, a waste tire storage facility, a horticultural waste processing facility, and a Recovered Materials Processing Facility (RMPF). Even after the Facility is expanded, approximately 85 percent of the site will be used solely as buffer and conservation areas.

The site and the Facility, including the third unit, are consistent and in compliance with the County's existing land use plans and zoning ordinances. The site was zoned for an Industrial Planned Development, and was designated as Public Facilities in the future land use map of the County's comprehensive land use plan, specifically to allow the Facility to be built and operated on the site.

5.0 EXISTING AND PROPOSED FACILITY

The Facility is owned by the County and operated by Covanta Lee, Inc., pursuant to a long-term contract with the County. It is anticipated that Covanta will design, construct, and operate the third combustion unit.

The Facility currently has two units that use mass-burn technology for the combustion of municipal solid waste. Each combustion unit has a nominal capacity of approximately 600 tons per day (tpd) and a continuous design-rated capacity of 660 tpd when burning a reference waste of 5,000 Btu per pound. When the Facility is expanded, the Facility will have three units and a total nominal capacity of 1,800 tpd.

The Facility was designed and built to accommodate the addition of a third combustion unit, thus making the expansion project relatively simple, without disrupting large areas of the site. The proposed expansion project will include: (a) the construction of a third combustion unit and the associated air pollution control system; (b) the expansion of the existing cooling tower and ash handling building; and (c) the addition of a new lime silo, a scale, a flue within the existing stack, and a 20 megawatt (nominal) steam turbine generator. The proposed improvements to the Facility will be enclosed, except the expansion to the cooling tower.

The new combustion unit will be equipped with the same air pollution control systems that have worked well at the existing Facility: a fabric filter (baghouse) will be used to remove particulate matter from the Facility's airborne emissions; a scrubber will control acid gases; a carbon injection system will control mercury and organics; and a selective non-catalytic reduction system (SNCR) will control nitrogen oxides (NOx).

These air pollution control systems will allow the Facility's third unit to comply with extremely stringent emission limits. At a minimum, the third unit will comply with the New Source Performance Standards (NSPS) that were established by the U.S. Environmental Protection Agency (EPA), based on the use of Maximum Achievable Control Technology (MACT). In addition to meeting the NSPS, the County has voluntarily agreed to accept emission limits that are more stringent than the NSPS, and/or more stringent than the emission limits for the two existing units, with regard to four parameters (particulate matter; sulfur dioxide; volatile organic compounds; fluorides). Further, the County has agreed to establish emissions goals that are lower than the NSPS limits for lead and cadmium.

6.0 EFFECTS OF FACILITY CONSTRUCTION AND OPERATION

The construction and operation of the Facility's third unit will have minimal impacts on the environment. Construction activities on the site will only occur in disturbed upland areas that are part of or adjacent to the Facility's existing footprint. No construction on the site will take place in a wetland, surface water, or sensitive habitat.

EXECUTIVE SUMMARY

The basic operation of the Facility will not change when the third unit is installed. Municipal solid waste will be delivered to the site in trucks, taken inside the refuse storage building, and then dumped into the refuse storage pit. Two overhead cranes will mix the waste in the refuse storage pit and then load the waste into the charging hoppers that feed the combustion units. The combustion of the municipal solid waste will generate electricity and reduce the solid waste to approximately 10 percent of its original volume. Bottom ash from the furnace and fly ash from the emission control system will be stored in the ash management building until it is taken to the County's landfill for disposal.

All of the waste handling activities will take place inside a fully enclosed building. No waste will be stored outside. Since the building will be maintained under negative air pressure, dust and odors will be contained within the refuse storage building. Only municipal solid waste and similar materials will be used as fuel at the Facility. The Facility will not accept hazardous waste, biomedical waste, or other prohibited materials.

The Facility's basic water supply and management system will remain the same after the third unit becomes operational. The Facility will not discharge any industrial or domestic wastewater to any ground water or surface water. All of the Facility's wastewater will continue to be sent via an existing pipeline to the City of Ft. Myers' wastewater treatment plant (WWTP). Treated wastewater from the City's WWTP will be used to satisfy the Facility's need for cooling water. Potable water will be provided to the Facility from the City's water supply plant. On-site wells will be available for emergency water supply purposes. Stormwater will be treated and managed in the existing system of swales and detention/retention ponds.

The operation of the third unit at the Facility will not require the construction of any new pipelines, water supply wells, stormwater management facilities, or electric transmission lines.

The County has carefully evaluated the Facility's potential impacts on air quality. The maximum impacts due to the third unit will be much less than the levels allowed under the federal and state ambient air quality standards (AAQS), Prevention of Significant Deterioration (PSD) increments, and other applicable regulations. Indeed, the maximum impacts from the Facility operating with three units will be much less than the significant impact levels (SILs) for PSD Class II areas. When all three units are operating, the Facility's impacts on ambient air quality will be immeasurably small. The Facility's maximum impacts also will be far less than FDEP's ambient reference concentrations for air toxics.

The County conducted a human health risk assessment to evaluate the potential risks associated with the operation of three units at the Facility. An ecological risk assessment was also conducted to evaluate potential effects on sensitive ecological receptors. These analyses demonstrated that the potential risks associated with the Facility's emissions will be less than the risks that generally are deemed acceptable for human and ecological receptors. These conclusions are consistent with the results of previous studies.

EXECUTIVE SUMMARY

performed for this Facility, as well as studies for other modern WTE facilities. Based on all of the analyses that have been conducted, it is anticipated that the operation of three combustion units at the Facility will not have any adverse effect on human health or the environment.

The expansion of the Facility will provide significant benefits. By reducing the volume of solid waste by approximately 90%, the Facility will greatly extend the useful life of the County's landfill and thus postpone the need to build a new landfill in Lee County or Hendry County. By producing electricity from discarded materials, the Facility will reduce the need to use fossil fuels to generate electricity at traditional power plants. For this reason, the third unit of the Facility will eliminate the need to use approximately 5.54 million barrels of oil and thus will save approximately \$150 million in oil purchases over the next 20 years. The construction and operation of the Facility also will provide significant direct and indirect economic benefits to the citizens of Lee County.



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

SECTION 1.0

NEED FOR POWER AND THE PROPOSED FACILITIES

1.0 NEED FOR POWER AND THE PROPOSED FACILITIES

Lee County received a determination of need from the Florida Public Service Commission on January 7, 1991. The County's Solid Waste Energy Recovery Facility (the "Facility") received its original Conditions of Certification in July 1992 (see Volume II, Section 7.1). The proposed 20 megawatt (MW) expansion of the Facility is exempt from the requirements in Section 403.519, Florida Statutes, for a determination of need, pursuant to Section 377.709(6), F.S., which exempts expansions of solid waste facilities of less than 50 MW. Accordingly, the Public Service Commission issued a Declaratory Statement on December 11, 2001, which confirms that the Facility is exempt from the need determination process. The Public Service Commission's Declaratory Statement, as well as additional background materials, is provided in Volume II, Appendix 6.1.



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

SECTION 3.0

THE PLANT AND

DIRECTLY ASSOCIATED FACILITIES

3.0 THE PLANT AND DIRECTLY ASSOCIATED FACILITIES

3.1 BACKGROUND

The County plans to expand the existing Facility because the County's comprehensive recycling program and the existing Facility are unable to process all of the solid waste that is being generated in Lee and Hendry Counties. A Solid Waste Master Plan Update was completed for Lee County by Malcolm Pirnie, Inc. (MPI) in April 2000. The revised plan recommended the development of a third 600 tpd (nominal) mass-burn unit at the existing Facility. On June 5, 2001, the Lee County Board of County Commissioners approved beginning the permitting and preliminary design process for adding the third unit to the Facility. The Materials Separation Plan, included in Volume II, Appendix 3.1, outlines the current systems and procedures employed in the management of the County's solid waste. This plan provides a detailed description of the County's integrated solid waste management system.

3.1.1 FACILITY SITING

The initial site selection process for the Facility began in 1989 with a detailed study prepared by the County's consulting engineers. A specific siting methodology was used to evaluate the suitability of all potential sites. The methodology eliminated areas that were either unacceptable or marginal by applying negative siting criteria, such as flood potential, well field impacts, airport proximity, urban development, and the presence of water bodies. Environmentally sensitive areas, such as cypress forests, wildlife management areas, and high water table areas, were avoided. Remaining sites were then characterized by comparing land availability and ownership, and a shortlist of six sites was developed.

A site analysis completed in February 1990 provided a more detailed comparison of these six candidate sites. This analysis compared the sites in terms of availability of water and wastewater services, proximity to electrical interconnection with FP&L or the Lee County Electric Co-op, transportation impacts and access, zoning and land use, haul cost, air quality, flood plains, wetlands, wildlife, soils and geology with respect to earthwork and foundation requirements, hydrologic conditions, and relative cost. The current Facility site was selected based on these criteria and additional information received at a public hearing before the Board of Lee County Commissioners. The original siting analyses were based on the development of a Facility with an initial capacity of 1,800 tpd and an ultimate site capacity of 2,400 tpd.. The County subsequently

decided to build the Facility with an initial capacity of 1,200 tpd (nominal). The County now wishes to increase the Facility capacity 1,800 tpd (nominal).

The 2000 Solid Waste Master Plan Update considered alternatives for meeting the County's increased need for solid waste disposal capacity. Alternatives included: expanding the existing Facility; exporting Lee and Hendry County waste to other disposal sites not in either county; and/or increasing the amount of solid waste recycled. Based on an analysis of the alternatives, the County concluded that expansion of the existing Facility was the preferred alternative, given that the County could not feasibly recycle all of the excess solid waste being generated.

3.1.2 EXISTING AND PROPOSED FACILITIES

The County has decided that its current and foreseeable solid waste needs are best served by expansion of the existing Facility with a third "identical" municipal waste combustor, which uses mass-burn technology for the combustion of solid waste. This process recovers heat energy in the form of steam, and converts that steam energy into electricity that can be sold.

Existing ancillary facilities including truck scales, a scale house for weighing refuse, an ash handling building, cooling tower, and switch yard. A RMPF, a waste tire storage facility, Household Hazardous Waste (HHW) drop-off facility, and horticultural waste facility have also been constructed at the Facility site. A description of the Facility expansion is provided below.

The Facility is owned by Lee County, and operated by a full-service vendor (Covanta Lee, Inc.) under contract to the County. It is anticipated that Covanta will provide design, construction, start-up, and acceptance testing services for the Facility expansion.

Energy Recovery Facility

The existing Facility has a nominal rated capacity of 1,200 tpd. With the expansion of the Facility, the new capacity will be a nominal 1,800 tpd. The expanded Facility will have three stoker waterwall combustion/steam generation units, each with a continuous design-rated capacity of 660 tpd at a reference waste of 5,000 Btu/lb, and a total design capacity of 1,980 (at 5,000 Btu/lb). Each boiler unit operates independently; therefore, it is possible to shut down one unit at a time for maintenance and inspection.

SECTION 3.0 THE PLANT AND DIRECTLY ASSOCIATED FACILITIES

The expansion project will include construction of the third boiler unit, expansion of the air quality control system, expansion of the cooling tower, expansion of the ash handling/storage building, addition of a lime silo, addition of a new flue within the existing stack, addition of a scale platform, and addition of a 20 megawatt (nominal) steam turbine generator. With the exception of the cooling tower, all major additions will be enclosed (e.g., the turbine-generator, APC equipment). The tipping area and refuse storage pit have already been sized to handle 1,800 tpd. The expanded Facility will generate approximately 60 megawatts at 1,800 tpd. Electrical transmission lines from the Facility's electrical switch yard connect with the FP&L Buckingham substation near the Facility. The County and its operator share electrical revenues from energy sales.

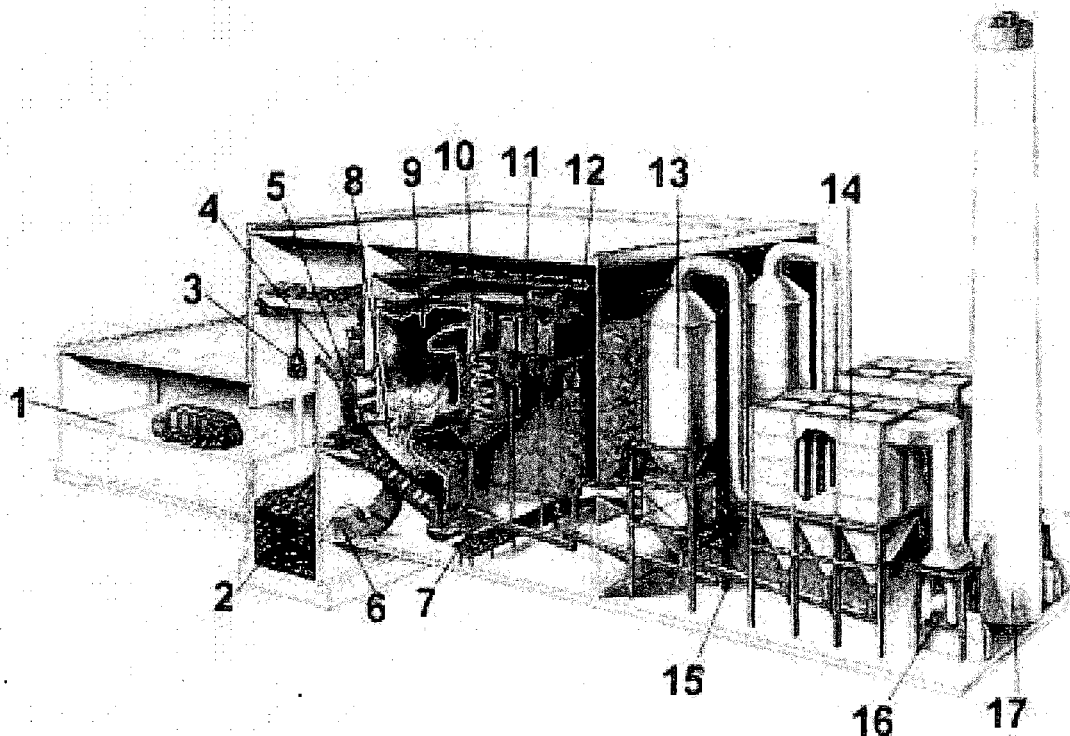
Since the Facility uses mass-burn technology, there will be no significant pre-processing of wastes at the Facility prior to combustion. Separation of recyclables will continue to occur at the RMPF. A schematic diagram of a typical stoker mass-burn facility similar to the proposed Unit No. 3 MWC is presented in Figure 3-1. Municipal solid waste will be truck-delivered to the Facility, and ash residue will be removed by the same mode of transport. The solid waste will be placed on the tipping floor and/or in the refuse bunker directly from transfer trailers and packer trucks inside the refuse storage building. All waste will be stored inside the building, and no waste will be visible from the outside. Two overhead cranes will mix the waste in the bunker and load the charging hoppers.

It is anticipated that the municipal solid waste will be reduced to 10 percent of its original volume and about 30 percent of its original weight by the combustion process. The resulting ash will be quenched to approximately 30 percent moisture. Bottom ash from the furnace and fly ash from the emission control system will be commingled and stored in the ash management building prior to removal from the Facility.

The new unit will be equipped with fabric filters (baghouses) for particulate removal. Acid gas dry scrubbers will also be used, as well as a carbon injection system and a selective non-catalytic reduction system and (SNCR).

Poor original

FIGURE 3-1 Typical Stoker Mass-Burn Facility



1 Tipping Floor

2 Refuse Pit

3 Overhead Crane

4 Feed Chute

5 MARTIN® Stoker Grate

6 Combustion Air Fan

7 MARTIN® Ash Discharge

8 Combustion Chamber

9 Furnace

10 Convection Zone

11 Superheater

12 Economizer

13 Scrubbers

14 Baghouse

15 Fly Ash Handling System

16 Induced Draft Fan

17 Stack

3.2 SITE LAYOUT

The general site development plan (Figure 2-6) shows the existing Facility layout and the proposed (future) expansion. The existing and proposed Facility structures comply with the requirements of local setback ordinances. An access road loops around the Facility. Roads and scale houses are arranged to separate most of the truck traffic from employee and visitor parking and administration areas. The Facility includes landscaping to comply with local development standards.

Roadway grades on Facility access roads do not exceed three to five percent for inbound traffic, and five percent on egress, to minimize gear shifting by trucks and the associated noise. All roads are all-weather construction for heavy traffic and comply with FDOT design standards and requirements. Traffic patterns are regulated by signs and control lights as needed to allow efficient and safe traffic flow. Parking spaces have been provided to accommodate the work force, potential visitors, and shift overlaps. Automobile parking is separated from truck circulation to minimize potential conflicts.

3.2.1 BUILDING DIMENSIONS

The Facility consists of several contiguous and separate buildings, as shown in Figure 2-6. A profile with dimensions is given in Figures 3-2a and 3-2b. The exact Facility dimensions for the expansion will be determined by Covanta and the County, but will be consistent with the existing Facility dimensions.

The existing administration building is approximately 90 feet high, 150 feet long, and 90 feet wide. It is bordered on three sides by the centrally located processing facilities, with the fourth side facing the parking area. Offices are located along the inner side of the administration building. The administration building will not require modification to accommodate the expansion.

The processing facility varies in height and area depending on the processing function housed in that portion of the building. On the tipping floor side, the building is approximately 47 feet high, and 118 feet by 290 feet in surface area, to accommodate refuse unloading activities. The maximum height of fill at the tipping floor is approximately 20 feet above existing grade. This portion of the Facility is elevated to allow waste collection trucks to drop refuse into the storage pit. The pit itself is approximately 70 feet by 235 feet in surface area, with its bottom

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approximately 13 feet below existing grade. No changes are required to the tipping building or refuse storage pit for the expansion of the Facility.

The two existing combustion/steam generation units, with appurtenances, are housed in a building that measures approximately 114 feet by 128 feet, and the new unit will increase the building surface area to approximately 176 feet by 128 feet when the Facility reaches its ultimate capacity of 1,800 tpd. Appurtenances include charging hoppers and chutes, feeders, stokers or combustors, siftings hoppers and conveyors, waterwall furnace and non-radiant superheater and convection sections, steam drums, a soot cleaning system, boiler support steel, a water quenching residue discharge/conveyor, combustion air blowers, auxiliary fuel burners, controls, and an economizer. The height of the building over the boiler units is approximately 110 feet. A new turbine building, approximately 80 feet long by 67 feet wide, will be added adjacent to the existing turbine building, towards the administration building as part of the expansion.

The existing air pollution control equipment is housed in a 97-foot by 136-foot building. With the addition of the new air pollution control equipment, the building has an approximate 176-foot by 136-foot surface area at the expanded capacity of 1,800 tpd. The existing Facility stack, located about 40 feet west of the air pollution equipment, has a height of approximately 275 feet above existing grade, or about 300 feet above mean sea level, and will house the new flue for the expanded facility.

The cooling tower and electrical switchyard are located west of the Facility proper. The ash building, to the north, is expected to expand to 75 feet wide by 100 feet long. An additional scale platform may be required near the Facility entrance.

3.2.2 VISUAL IMPACT

For the original application, a preliminary study was performed to determine the visual impact of the Facility on residences in the area. Since the emissions stack is the tallest structure of the Facility, its potential maximum height of 400 feet above MSL was chosen for study purposes. The conclusion of the study was that the stack will not cause a major impact to area aesthetics.

The existing stack is 300 feet above MSL and will not be made taller for the expanded Facility. Therefore, there will be no new or increased visual impacts due to the Facility expansion. For the expansion, the existing stack will be utilized with the addition of a third flue.

The Facility landscaping provides a natural appearance and limits the visibility of the Facility buildings. In addition to the buffer requirements of local zoning and development ordinances, the landscaping incorporates primary, secondary, and minor trees and shrubbery. Landscaping is provided along the entrance road and adjacent to the administration building and parking area. Wherever possible, native plants are used for landscaping.

3.3 FUEL

The expanded Facility, like the current one, will obtain its fuel (i.e., municipal solid waste) from Lee and Hendry Counties. Only processible solid waste will be used at the Facility. The Facility will not use hazardous or biomedical waste, or sewage sludge.

3.3.1 FUEL SUPPLY

The only fuels burned in the Facility's municipal waste combustion units are solid wastes allowed by the Conditions of Certification, and natural gas and propane as auxiliary fuels. Other wastes shall not be burned without prior approval from the FDEP. A detailed description of the authorized fuel supply is provided in Volume II, Appendix 7.1 of this Application.

The Facility's throughput exceeded Covanta's Annual Processing Guarantee (372,000 tpy) by 20,257 tons in Fiscal Year 2000. Following completion of the expansion, the Facility's processing guarantee will be a minimum of 558,450 tpy.

Most waste is delivered in standard municipal-type packer vehicles, open-bodied dump trucks, and transfer trailers. The Facility receives solid waste deliveries 6 days per week, 52 weeks per year.

All calculations, analyses, and performance data for the Facility have been based on an as-fired solid waste with a higher heat value of 5,000 Btu per pound, with a 21 percent moisture content by weight. Table 3-1 presents the composition of the reference waste and Table 3-2 lists the ultimate analysis for the reference waste.

3.3.2 FUEL STORAGE

The existing Facility is equipped with a weighing station to weigh and record the quantity of solid waste delivered. An additional scale platform may be required. The Facility also includes a totally enclosed tipping floor with 6 tipping bays of varying width, totaling approximately 234

SECTION 3 - THE PLANT AND DIRECTLY ASSOCIATED FACILITIES

feet. Wheel-stops are provided at each tipping bay to prevent vehicles from backing into the solid waste storage pit. Solid waste is stored in a completely enclosed pit with a bottom elevation below that of the tipping floor. The pit is sized for a minimum storage capacity of 5,400 tons of solid waste at a density of 550 pounds per cubic yard, which will provide at least three days storage at the Facility's ultimate capacity of 1,800 tpd. Leachate in the storage pit is normally absorbed by the solid waste and processed through the combustion units.

TABLE 3-1
REFERENCE SOLID WASTE COMPOSITION

Waste Category	Nominal Percentage By Weight
Combustibles	58.4
Moisture	20.7
Non-Combustibles	20.9
TOTAL	100.0

TABLE 3-2
REFERENCE SOLID WASTE ULTIMATE ANALYSIS

Component	Percent by Weight
Carbon	28.5
Hydrogen	3.8
Oxygen	25.1
Nitrogen	0.5
Sulfur	0.1
Chlorine	0.4
Ash and Inerts	20.9
Moisture	20.7
TOTAL	100.0

The refuse pit ensures adequate on-site storage for refuse over long weekends. The refuse pit capacity is also used to store incoming refuse when the Facility is down for scheduled or unscheduled maintenance. In this manner, the need to bypass waste directly to a landfill is

minimized. It is anticipated that in the event all three units are out of operation, the refuse pit will provide a minimum of approximately 5 days of storage capacity before waste must be directed to a Class I landfill.

3.4 AIR EMISSIONS AND CONTROLS

3.4.1 AIR EMISSION TYPES AND SOURCES

The proposed expansion of the Facility is the installation of a third 660-tpd MWC unit (Unit #3) and associated equipment, which will increase the Facility's capacity to 1,980-tpd. The expansion also will include the installation of a new boiler, air pollution control system and steam turbine generator for Unit 3.

Since the original PPSA application for the Facility anticipated the installation of a third MWC unit, the design of the Facility was planned to facilitate the addition of Unit 3. Space is available for an additional flue in the Facility's stack, and the tipping floor and refuse pit have been sized to accommodate the operation of three MWC units at 1,980-tpd.

All MSW is stored inside the fully enclosed Facility prior to combustion. Air is drawn from the tipping floor and refuse pit and then used in the combustion process. As a result, the tipping floor and refuse pit are kept under negative pressure, which helps ensure dust and odors do not escape into the atmosphere. Loading and unloading of trucks will take place inside the residue storage building and enclosed tipping floor building, respectively. Trucks entering and leaving the site will be covered and will travel on paved roads.

The existing ash handling building will be expanded to accommodate Unit 3 operations. Bottom ash from all three MWC units, and fly ash from the fabric filters are combined in an ash discharger and transported inside fully enclosed conveyors to the ash handling building, where ferrous and non-ferrous metals are removed. A fabric filter will be used to remove any potential particulate emissions released from this area.

In addition, a new lime storage silo will be installed to accommodate the increased lime usage due to the addition of Unit 3. A fabric filter will be used to remove lime particulate emissions from the loading operations. Thus, the emissions from the Unit 3 boiler stack will be the only major source of emissions from the proposed expansion. There are no PSD significant changes planned for Units 1 and 2; therefore, Units 1 and 2 are not subject to New Source Review (NSR).

A complete description of stack emissions is contained in Section 3.0 of the Prevention of Significant Deterioration (PSD) Permit Application (Volume III-Air Quality). Maximum expected emission levels for the proposed facility are contained in Table 3-1, Section 3.0, of the PSD Permit Application in Volume III. A complete Form 62-210.900⁽¹⁾ "Application for Air Permit – Title V Source", is provided in Attachment A of Volume III.

3.4.2 AIR EMISSION CONTROLS

Air pollution control technologies are available to control the different classes of pollutants, which include particulate matter (PM, including particulate matter less than 10 microns in diameter, PM₁₀), trace metals and organic compounds, sulfur dioxide (SO₂) and acid gases, nitrogen oxides (NO_x) and products of incomplete combustion such as carbon monoxide (CO) and volatile organic compounds (VOCs).

Emissions from the Unit 3 stack are controlled through a combination of good combustion practices (GCP), spray dryer absorber (SDA), fabric filter (FF) baghouse, activated carbon injection (ACI), and selective non-catalytic reduction (SNCR). These commercially available pollution control systems and their operating characteristics are fully described in the Best Available Control Technology (BACT) analysis in Section 4.0 of the Prevention of Significant Deterioration (PSD) Permit Application (Volume III-Air Quality).

3.4.3 BEST AVAILABLE CONTROL TECHNOLOGY

The proposed modification of the addition of Unit 3 is a major modification to an existing major stationary source in an attainment area and is subject to PSD review because this modification will result in an increase in pollutant emission rates in excess of the PSD significant emission rates. (Table 2-1 of Volume III.)

The BACT analysis is presented in Section 4.0 of the PSD Application (see Volume III-Air Quality). The analysis evaluates the technical feasibility, environmental, economic and energy aspects of alternative control techniques and methods. For all of the criteria pollutants, Lee County is designated as being in attainment of the National Ambient Air Quality Standards (or unclassified), and hence subject to BACT. Based on a review of various air pollutant control alternatives, a spray dryer absorber and baghouse are proposed as BACT for all pollutants (other than NO_x and Hg) subject to PSD review. The spray dryer absorber will be designed to achieve an emission limit of 29 parts per million on a dry volume basis (ppmdv) at 7% O₂ or 80%

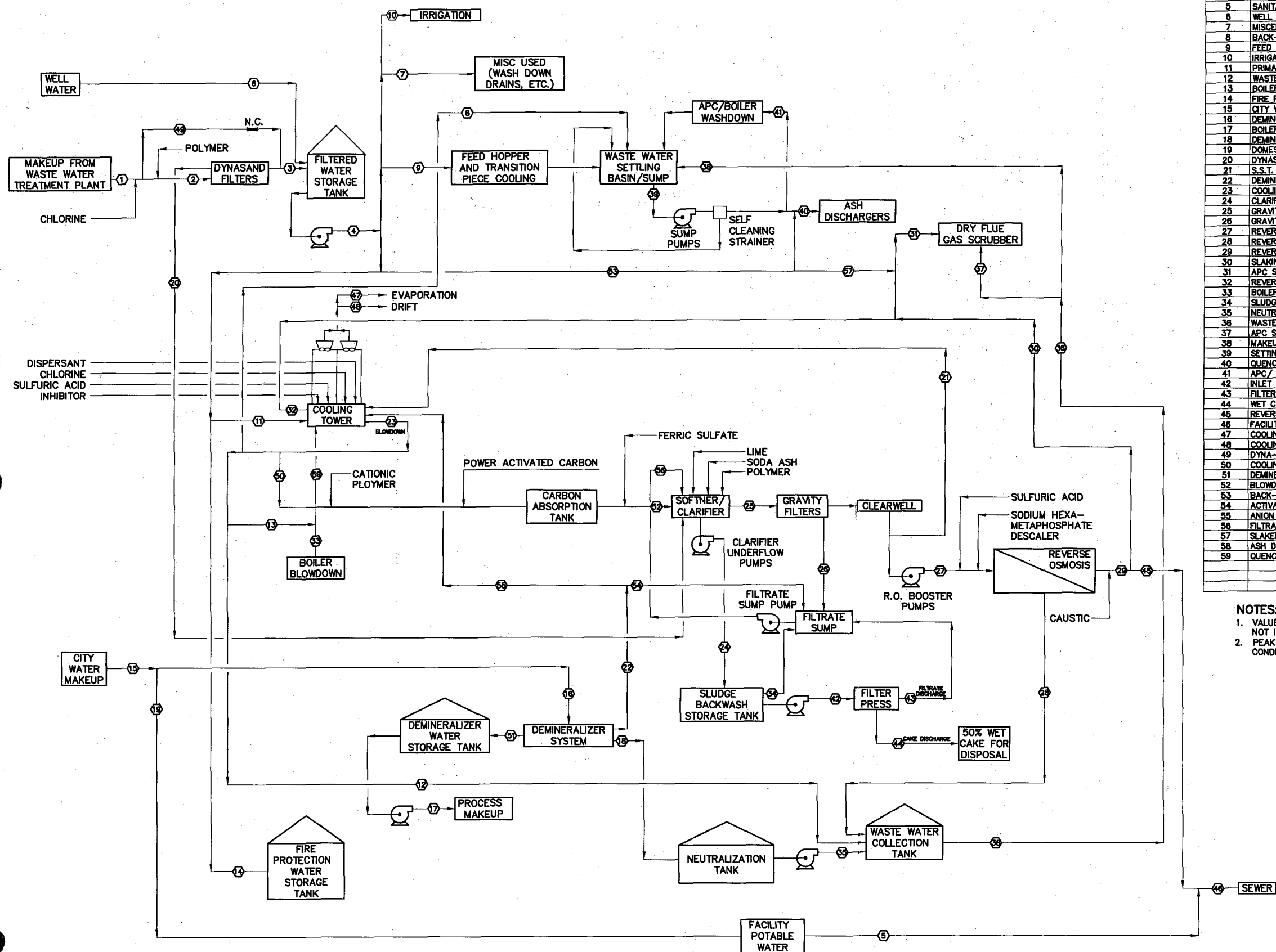
reduction for SO₂; and 25 ppmdv at 7% O₂, or 95% reduction, for HCl. The baghouse will be designed to achieve an outlet grain loading of 0.009 grains per dry standard cubic foot corrected to 7 % O₂ (gr/dscf at 7%O₂). Combustion control techniques will be employed to minimize emissions of CO (100 ppmdv at 7% O₂) and VOCs (30 ppmdv at 7% O₂). Selective non-catalytic reduction (SNCR) will be used to control NO_x emissions to 180 ppmdv at 7% O₂ for the first year of operation and 150 ppmdv at 7% O₂ thereafter. In addition, activated carbon injection will be used to control mercury emissions to 70 micrograms per dry standard cubic meter (ug/dscm) at 7% O₂ or 85% control. BACT controls for these and other pollutants are discussed in more detail in Section 4.0 of the PSD Application (Volume III-Air Quality).

3.4.4 DESIGN DATA FOR CONTROL EQUIPMENT

Design data for control equipment are not available because the furnace/boiler supplier has not been selected yet. Design parameters for the proposed expansion facilities, used in the BACT analysis, are presented in Section 4.0 of the PSD Application (Volume III-Air Quality).

3.5 PLANT WATER USE

During normal operation of the Facility, water is purchased from the City of Fort Myers' potable water system, which provides potable water used for boiler makeup and other potable purposes. Currently, the Facility uses 0.051 mgd of potable water. The Facility's use of potable water will be 0.075 mgd when the Facility processes 1,800 tpd. Treated wastewater effluent (reclaimed water) drawn from the City of Fort Myers Central Advanced Wastewater Treatment Plant (Central WWTP) is used for all process cooling water. The Central WWTP is located approximately six miles west of the site. The cooling tower blowdown water is used internally at the Facility, to the greatest practicable extent, for ash quenching, lime slaking, and any other area where usable. Process water is reused internally for ash quenching. On-site wells are available for back-up cooling water needs. However, the wells have not been regularly used as a source for back-up cooling water since the Facility was constructed. No process or sanitary wastewater is discharged to surface water or groundwater bodies. Alternative sources of water are discussed in Section 8.0. A quantitative water use diagram is provided in Figure 3-3. Volume II, Appendix 7.9 contains the Facility's Water Conservation Plan, submitted to the SFWMD August 13, 2002.



STREAM	DESCRIPTION	HISTORIC DATA (GPM)	EXPANDED PLANT TO 1800 TPD (GPM)	PEAK FLOW (GPM) ²
1	MAKEUP FROM WASTE WATER TREATMENT PLANT	415	623	1250
2	DYNA-SAND FILTER INLET	415	623	867
3	FILTERED WATER MAKEUP TO STORAGE	385	578	1250
4	FILTERED WATER TOTAL PLANT MAKEUP	410	615	1250
5	SANITARY WASTE	2	3	75
6	WELL WATER EMERGENCY MAKEUP	-	-	1000
7	MISCELLANEOUS USED (WASHDOWN, ETC.)	4	6	50
8	BACK-UP SETTLING BASIN MAKE-UP	-	0	85
9	FEED HOPPER AND TRANSITION PIECE COOLING	-	0	25
10	IRRIGATION	-	0	85
11	PRIMARY COOLING TOWER MAKEUP	395	593	825
12	WASTE WATER COLLECTION TANK MAKEUP	15	35	110
13	BOILER BLOWDOWN QUENCH WATER	.5	.1	190
14	FIRE PROTECTION MAKEUP	-	-	625
15	CITY WATER MAKEUP	36	50	224.2
16	DEMINERALIZER SYSTEM MAKEUP	23	35	172
17	BOILER PROCESS MAKEUP	20	30	57
18	DEMINERALIZER CONCENTRATED REGENERATION WASTE	3	4.5	56
19	DOMESTIC WATER	2	3	75
20	DYNASAND BACKWASH TO WASTE WATER TREATMENT	30	45	52.5
21	S.S.T. RECIRC. TO COOLING TOWER	65	96	300
22	DEMINERALIZER BACKWASH AND FINAL RINSE	3	4.5	120
23	COOLING TOWER BLOWDOWN	90	135	490
24	CLARIFIER SLUDGE BLOWDOWN	2	3	50
25	GRAVITY FILTER INLET	105	158	300
26	GRAVITY FILTER BACKWASH	4	6	1178
27	REVERSE OSMOSIS INLET	101	150	200
28	REVERSE OSMOSIS REJECT STREAM	19	28	50
29	REVERSE OSMOSIS PRODUCT STREAM	82	123	150
30	SLAKING WATER AND SECONDARY COOLING TOWER MAKEUP	82	123	150
31	APC SYSTEM SLAKING WATER	13	18	31
32	REVERSE OSMOSIS PRODUCT TO COOLING TOWER	89	105	150
33	BOILER BLOWDOWN	10	15	87.5
34	SLUDGE STORAGE TANK DECANT/ OVERFLOW	8	12	18.4
35	NEUTRALIZATION TANK DISCHARGE	13	19	140
36	WASTE WATER COLLECTION TANK DISCHARGE	47	72	110
37	APC SYSTEM DILUTION WATER	37	55	82
38	MAKEUP TO SETTLING BASIN	10	15	110
39	SETTLING BASIN DISCHARGE	16	24	85
40	QUENCH WATER TO ASH DISCHARGERS	18	24	36
41	APC/ BOILER AREA WASHDOWNS	-	-	85
42	INLET OF FILTER PRESS	9	14	100
43	FILTER PRESS FILTRATE DISCHARGE	8	12	20
44	WET CAKE DISCHARGE	.2	.3	.5
45	REVERSE OSMOSIS PRODUCT WATER TO SEWER	-	-	150
46	FACILITY DISCHARGE TO SEWER	4	6	225
47	COOLING TOWER EVAPORATION	427	641	801.9
48	COOLING TOWER DRIFT	2	3	6.5
49	DYNA-SAND FILTER BYPASS	6	9	1250
50	COOLING TOWER BLOWDOWN TO WASTE WATER TREATMENT	100	150	300
51	DEMINERALIZED WATER	21	31	52
52	BLOWDOWN TO CLARIFIER	100	150	300
53	BACK-UP WATER TO SLAKERS & ASH DISCHARGERS	-	-	67
54	ACTIVATED CARBON BED BACKWASH & RINSE	.5	1.0	120
55	ANION & CATION BACKWASH & RINSE	2.0	3.0	100
56	FILTRATE SUMP DISCHARGE	14	21	150
57	SLAKER WATER BACK-UP	-	-	31
58	ASH DISCHARGER BACK-UP WATER	-	-	36
59	QUENCHED BOILER BLOWDOWN	10.5	16	277.5

NOTES:

- VALUES SHOWN ARE FOR TYPICAL OPERATIONS ONLY AND NOT INTENDED FOR DESIGN PURPOSES.
- PEAK FLOW ARE CALCULATED BASED ON 2 LINE DUMP CONDENSER OPERATIONS.

Poor Original

WATER BALANCE DIAGRAM (PRELIMINARY)
FIGURE 3-3

MALCOLM
PIRNIE

3.5.1 HEAT DISSIPATION SYSTEM

System Design

Cooling water is used in a closed-loop system, which employs water-cooled condensers to condense the low-pressure steam discharged from the turbine. Cooling water circulates through the condensers, and waste heat is dissipated from the condenser cooling water by passage through a wet mechanical draft cooling tower.

The cooling tower system only has adequate capacity to dissipate the heat from steam generated by firing 1,200 tpd of solid waste. Therefore, the cooling tower system will have to be expanded to handle the third 600 tpd unit. If the steam turbine generator is out of service at any time when the boilers are producing high-pressure steam, a separate bypass condenser accepts the full rated design capacity of high pressure steam from the plant's boilers. Through the use of the bypass condenser system, Facility processing capacity will not be diminished during periods of full or partial turbine generator outage.

Consumptive (non-potable) water use is primarily due to losses from the cooling tower system in the form of evaporation, drift, and blow down. The average water loss due to evaporation, drift, and blowdown will be 0.80 mgd at 1,800 tpd. Other water uses (losses) include water consumed in ash quenching operations and the operation of the dry scrubber system.

All of the cooling water used by the Facility is delivered by pipeline from the Central WWTP. No wastewater is discharged from the Facility system, except for a maximum of 0.15 mgd of combined sanitary and process wastewater, which is routed to the Central WWTP for treatment and reuse. Cooling ponds are not used at the Facility.

Source of Cooling Water

All cooling tower makeup water is obtained through a direct pipeline link with the Central WWTP. It is anticipated that approximately 1.2 mgd of reclaimed water will be required for cooling tower makeup water when the Facility is operating at 1,800 tpd. The Central WWTP has a capacity of 11 MGD, which is ample to supply the reclaimed water needs of the expanded Facility, even during low wastewater flow periods. Table 3-3 lists the current pretreatment requirements for the Central WWTP. The back-up cooling water supply for the Facility is four (4) on-site wells. Additional information regarding the backup cooling water supply is provided in Section 8.2.

TABLE 3-3**PRETREATMENT REQUIREMENTS FOR THE
FORT MYERS CENTRAL ADVANCED WASTEWATER TREATMENT PLANT**

Parameter	Maximum Concentration (mg/l) (Time) Proportional Composite Sample	Maximum Instantaneous (mg/l) Concentration (Grab Sample)
Aluminum dissolved	15.00	30.00
Antimony (Sb)	0.50	1.00
Arsenic (As)	0.05	0.10
Barium (Ba)	2.50	5.00
Boron (B)	1.00	2.00
Cadmium (Cd)	0.01	0.02
Chloride (Cl)	500.00	600.00
Chromium-total (Cr)	1.50	3.00
Cobalt (Co)	5.00	10.00
Copper (Cu)	0.40	0.80
Cyanide (Cn)	0.05	0.10
Fluoride (F)	10.00	20.00
Iron (Fe)	5.00	10.00
Lead (Pb)	0.10	0.20
Manganese (Mn)	0.50	1.00
Mercury (Hg)	0.015	0.03
Nickel (Ni)	0.50	1.00
Phenols	0.40	1.00
Selenium (Se)	0.75	1.50
Silver (Ag)	0.05	0.10
Titanium dissolved (Ti)	1.00	2.00
Zinc (Zn)	2.00	4.00
Total Dissolved Solids	1875.00	3750.00
BOD	300.00*	
COD	600.00*	
TSS	300.00*	
Total Nitrogen (TKN)	30.00*	
Total Phosphorous	10.00*	
Oil and Grease	100.00	100.00
MBAS	5.00	10.00

* Concentrations above this amount are subject to a surcharge in accordance with the high strength wastewater control schedule and other rate resolutions and ordinances that are applicable.

3.5.1.3 Dilution System

Process water is treated and reused internally within the Facility to the greatest extent practical. A maximum wastewater discharge of 0.15 mgd is allowed from the Facility. This discharge includes a combination of sanitary wastewater and process water. Most of the sanitary wastewater discharged from the Facility comes from showers, offices, and personnel areas. Process water is used for ash quenching. No process water will be discharged to ground water or surface waters.

3.5.1.4 Blowdown

Flows from blowdown systems will come from the boiler, the cooling towers, and the boiler feedwater demineralizers (BFD). Blowdown flows from the BFDS and boilers will be collected in the blowdown tank and either discharged to the residue quench tank or treated and reused in the Facility. Cooling tower blowdown is recycled in the lime slaking dry scrubber system and other Facility uses to the greatest extent possible.

3.5.1.5 Injection Wells

No injection wells are used at this Facility and such use at the Facility is not contemplated for the future.

3.5.2 DOMESTIC / SANITARY WASTEWATER

The existing wastewater systems can accommodate the expansion of the Facility. Sanitary wastewater flows are generated within the Facility only in the personnel service areas (e.g., showers, break rooms and washrooms). The Facility employs approximately 40 people for normal operation, with fluctuating staff increases from time to time as contractors and other specialty staff are retained for task-specific work. Provisions exist to accommodate up to 30 visitors at the Facility at any one time.

Wastewater discharged from the Facility is limited to 0.15 mgd and consists of sanitary sewage, and small quantities of waste process water. Wastewater discharges are not currently pretreated prior to disposal in the City of Fort Myers publicly owned treatment works. If it becomes necessary, wastewater will be treated on-site, prior to discharge to comply with the City of Fort

Myers pretreatment requirements, detailed in Section 2.2.7. Wastewater will be discharged via sanitary sewer to the Central WWTP for treatment.

Potable water requirements (up to 0.075 mgd) are supplied by the City of Ft. Myers Water Treatment Plant's distribution system. The potable water transmission route is described in Section 6.2.

3.5.3 PROCESS WATER SYSTEMS

To meet its process water needs at the nominal design capacity of 1,800 tpd, the Facility will use up to 1.1 mgd of advanced treated effluent from the Central WWTP. The Facility uses this reclaimed water for cooling purposes, and will treat and reuse the process water. Any remaining liquid wastes will become part of the returned sanitary and process flows for treatment at the Central WWTP.

3.6 CHEMICAL AND BIOCIDES WASTE

Chemicals are added to several of the process streams. Corrosion inhibitors and oxygen scavengers are added to the boiler make-up water. Corrosion inhibitors, biocides, and chlorine are added to the cooling tower make-up water. The boiler make-up water (usually 1-2% of the boiler steam flow rate) replaces water that is removed from the boiler to reduce the solids content of the boiler water. The boiler blowdown water is relatively pure and is suitable for direct disposal in the sanitary sewer once cooled. There are no discharges from chemical processing, spent process water treatment, or waste piles as a result of plant operation that would enter the local environment.

The cooling tower blowdown amounts to approximately 25% of the make-up supply, depending upon the concentration levels of phosphates in the incoming water. Cooling tower blowdown is a primary source of make-up water to the ash quench system and scrubber dilution water. All but approximately 6% of blowdown water is used internally. The remaining blowdown is discharged to the sanitary sewer (approximately 7,600 gallons per day). The sanitary sewer system was designed for 150,000 gpd and is operating at 8% of that capacity. The flow diagram of the Facility wastewater system is included in Figure 3-3.

3.7 SOLID AND HAZARDOUS WASTE

Non-combustible material, ash residue, and lime grit are generated at the Facility. Appropriate disposal practices are in place to handle each of these waste streams.

3.7.1 SOLID WASTE

Municipal solid waste combustion residue consists primarily of noncombustible materials, fly ash, and bottom ash. Spent lime and carbon are a residue by-product of the air quality control system. The residue handling system removes these materials from the combustion system for disposal. The bottom ash siftings and the fly ash are quenched and commingled prior to disposal. Conveyers transport ash and spent lime from the boilers, dry scrubbers, and bag house to the residue system. The ash and lime are conveyed to the ash building where ferrous and non-ferrous materials are removed. The remaining material is loaded into dump trucks and transported to the Gulf Coast Landfill or the Lee/Hendry Landfill.

The residue contains no more than four percent noncombustible material by dry weight content after recycling.

Ash Management Plan

Ash falls from the bottom of each combustion unit directly into a water-filled quench tank. The quench tank is fully enclosed to prevent ash siftings from becoming airborne. The quenched ash is then allowed to drain free water, and is mechanically loaded into an enclosed conveyor system, which transports the ash and residue to the enclosed ash storage building. A back-up system for ash transport to the ash storage building is also in place. Mechanical transport equipment consisting of front-end loaders is available at the Facility to transport ash in the event of a breakdown of the conveyor system.

Fly ash falls from the bottom of the bag house onto conveyors. The ash removal conveyors are fully enclosed to prevent the escape of fine particulate matter. The bottom ash and fly ash are commingled in the combustion unit quench tank system and the combined ash is conveyed to the ash storage building as described above.

SECTION 3 - THE PLANT AND DIRECTLY ASSOCIATED FACILITIES

The ash building has a watertight, sealed concrete floor. Any free liquid that is generated during ash storage is collected and reused for ash quenching. The ash conveyors and storage building are covered to keep out rainwater and are enclosed to prevent wind blown emissions.

The ash is transferred from the storage area to covered leak resistant vehicles for off-site disposal at a landfill. All loading and preparation for ash transport occurs within the fully enclosed ash storage building. The ash residue is transported from the Facility to the Gulf Coast Landfill or the Lee/Hendry Landfill. Because the ash is moist, dust is not generated during transportation and conveyance. The consistency and appearance of the wetted ash material is that of wet aggregate.

As part of the ash handling system, a ferrous and nonferrous metal removal system has been installed to recover ferrous material and nonferrous material such as aluminum. In Fiscal Year 2000, over 9,200 tons of ferrous material and approximately 600 tons of non-ferrous material were recovered from the ash at the Facility. A complete description of the Lee County Materials Separation and Recycling program, as well as quantities and types of solid waste are provided in Volume II, Appendix 3.1.

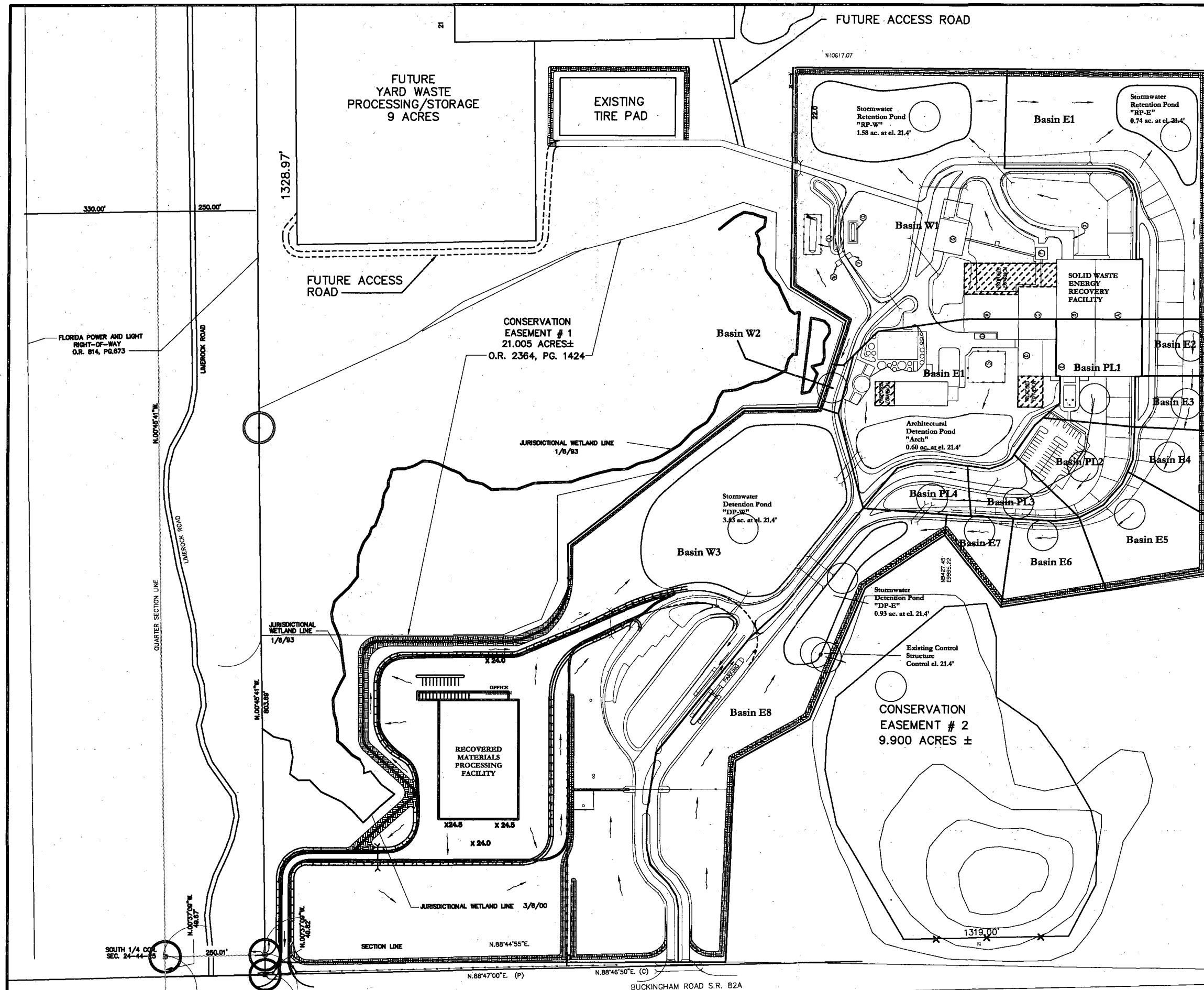
3.7.2 HAZARDOUS WASTE

No hazardous waste is generated onsite, nor accepted for processing with the solid waste; therefore, there is no hazardous waste disposal at the Facility. Section 5.4.2 describes the procedures that are to be followed if any apparent hazardous material is identified by tipping floor personnel, crane operators, or scale house personnel.

3.8 ONSITE DRAINAGE SYSTEM

The stormwater drainage system was designed for a peak discharge of 37 cubic feet per second per square mile (csm) for a 25-year, 72-hour storm event (9.78 inches of rainfall) in accordance with SFWMD criteria. The 37-csm peak discharge is based on the allowable discharge limit for the Six Mile Cypress Watershed, and equates to 3.3 cfs for the developed site (57.4 acres).

During large rain events, stormwater runoff from the drainage basins flows into the on-site retention and detention ponds (see Figure 3-4). When the wet detention ponds are filled to the design elevation, the stormwater discharges through a control structure into the wetlands area in the southeast corner of the site. The water flows south through the wetland and discharges into



LEGEND		BASIN INFORMATION	
	CONCRETE ROAD	PL1 - 1.25 AC.	
	GRAVEL ROAD	PL2 - 1.15 AC.	
	ASPHALT ROAD	PL3 - 0.66 AC.	
	REINFORCED CONCRETE PIPE	PL4 - 0.62 AC.	
	HEADWALL	E1 - 4.37 AC.	
	FENCE	E2 - 0.53 AC.	
	GUARDRAIL	E3 - 0.55 AC.	
	BERM	E4 - 0.71 AC.	
	BASIN BOUNDARY	E5 - 1.47 AC.	
		E6 - 1.00 AC.	
		E7 - 0.53 AC.	
		E8 - 5.55 AC.	
		A1 - 4.19 AC.	
		W1 - 10.78 AC.	
		W2 - 0.14 AC.	
		W3 - 24.09 AC.	

BUILDING INDEX	
(A)	TIPPING AREA
(B)	REFUSE PIT AREA
(C)	BOILER AREA
(D)	TURBINE/GENERATOR AREA
(E)	FACILITY ADMINISTRATION AREA
(F)	GRIZZLY BUILDING
(G)	RESIDUE HANDLING BUILDING
(H)	COOLING TOWER
(I)	STACK
(J)	SETTLING BASIN
(K)	APC AREA
(L)	SCALE HOUSE
(M)	FIRE WATER TANK & PUMP HOUSE
(N)	AMMONIA STORAGE
(O)	PROPANE STORAGE
(P)	SWITCHYARD
(Q)	CHLORINATION BUILDING
(R)	WATER TREATMENT BUILDING
(S)	AMMONIA UNLOADING STATION
(T)	PROPANE UNLOADING STATION
(U)	DIESEL OIL TANK & FUELING STATION

LEGEND	
T	TOWNSHIP
R	RANGE
L.B.	LICENSED BUSINESS
(C)	CALCULATED
(S)	SECTION AS SHOWN ON SURVEY
(P)	PLAT
(F)	FOUND
(C)	CORNER
S.R.	STATE ROAD
MON	MONUMENT
ELEV.	ELEVATION
M.W.	MONITORING WELL

- SURVEYOR'S NOTES**
- ELEVATIONS SHOWN (IF ANY) ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM (N.G.V.D.) US GEOLOGICAL SURVEY BENCHMARK "51 WTM 1952"
 - SURVEY BASED ON FOUND MONUMENTATION AS ESTABLISHED BY OTHERS. REFERENCE IS MADE TO A BOUNDARY SURVEY OF PART OF SECTIONS 24 AND 25, TOWNSHIP 44 SOUTH, RANGE 25 EAST, PERFORMED BY AGNOLI, BARBER & BRUNDAGE, INC., AND DATED JUNE 22, 1990.
 - BOUNDARY INFORMATION IS SHOWN FOR REFERENCE ONLY. VERIFICATION OF PREVIOUS BOUNDARY SURVEY BY AGNOLI, BARBER & BRUNDAGE, INC. NOT INCLUDED UNDER THE SCOPE OF THIS SURVEY.

Poor Original

SYMBOLS	
	DENOTES FOUND REBAR & CAP L.B. 3664
	BARBED WIRE FENCE AS SCALED FROM SURVEY
	DENOTES FOUND CONCRETE MONUMENT L.B. 3664
	DENOTES FOUND CONCRETE MONUMENT

MALCOLM PIRNIE

FIGURE 3-4

REVISIONS			
NO.	BY	DATE	REVISION

DES	CCT
DWN	CCT
CRD	RHF

LEE COUNTY ENERGY RECOVERY FACILITY
LEE COUNTY, BUCKINGHAM RD.
FT. MYERS, FLORIDA

BASIN AND SUB-BASIN BOUNDARIES

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MALCOLM PIRNIE, INC.
 DATE **FEBRUARY 18, 2002**
 SHEET **2** OF **2**
 CAD REF. NO. _____

the swale on the north side of Buckingham Road. Once in the swale, the water flows west along Buckingham Road and eventually flows under Buckingham Road (through two 10' x 2.2' box culverts) and SR 82 (through two 10' x 4' box culverts) into the Six Mile Cypress Slough.

A copy of the letter to the South Florida Water Management District notifying them of the Facility expansion and depicting the de minimis changes to the stormwater runoff volumes calculated for a 25-year and 75-year storm events are provided in Volume II, Appendix 7.6. No changes to the on-site drainage system are necessary to accommodate the flow from the expanded Facility (1,800 tpd).

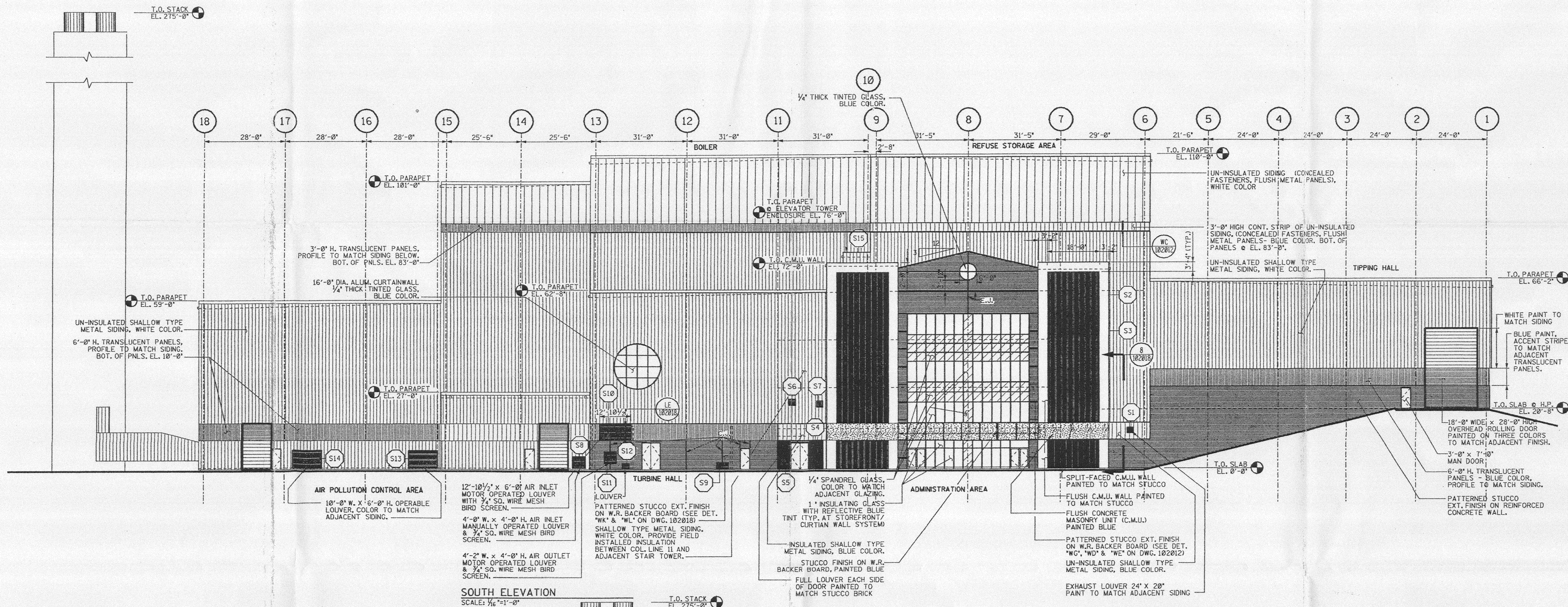
3.9 MATERIALS HANDLING

The existing Facility has two independent municipal solid waste process trains and will add a third as part of the expansion. Common elements, such as the waste feed cranes, ash conveyers, and boiler feedwater systems have redundant capabilities. The independent municipal solid waste processing trains provide flexibility during operation of the Facility, allowing solid waste processing and energy production to continue if one train breaks down or needs to be shut down for scheduled maintenance.

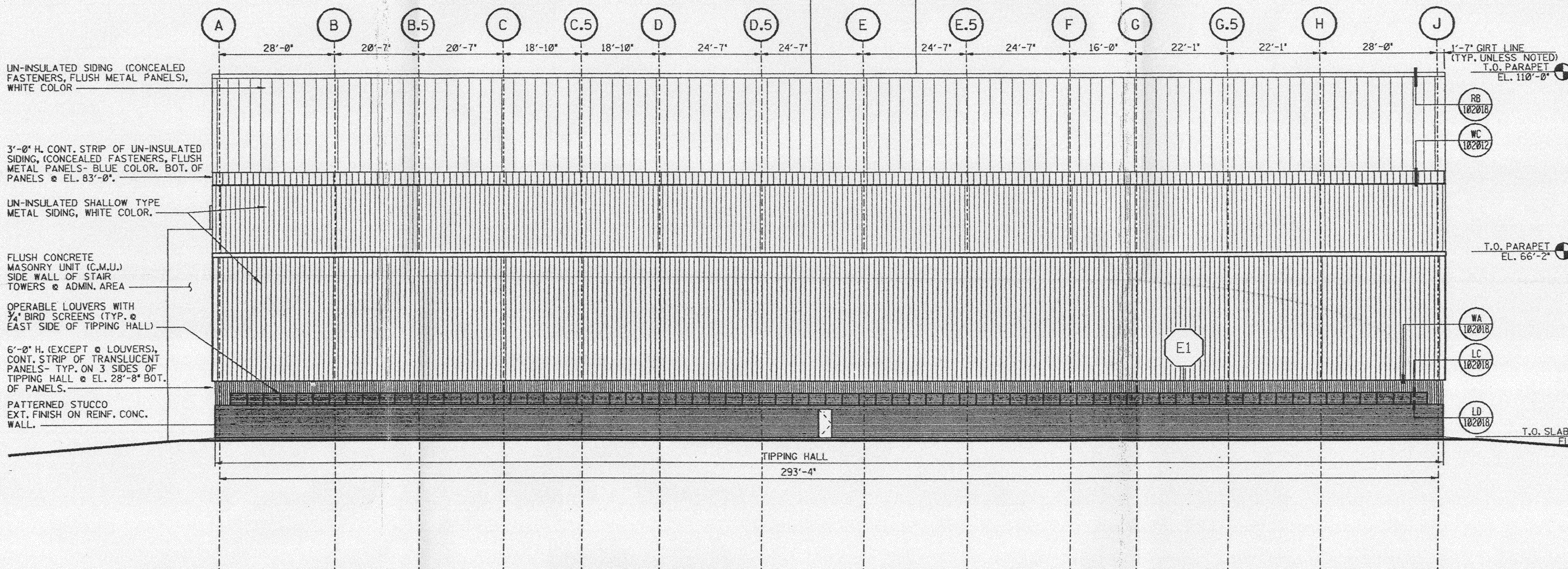
The refuse bunker and tipping floor area are under slight negative air pressure to prevent the escape of odors and dust. The underfire and overfire fans, which supply the combustion system with air, draw all the necessary air from the refuse bunker and tipping floor area. Vents installed on the walls opposite the air intakes induce cross-flow ventilation. Any dust particles and odors generated in the area are directed into the combustion zone, thereby minimizing odors outside the refuse bunker and tipping floor area. The combustion process destroys odorous compounds.

Two overhead solid waste handling cranes are installed to charge the combustion units and maintain the solid waste storage area. The cranes are the traveling bridge type, employing an orange peel-type grapple. Each crane is capable of meeting the solid waste handling requirements of the expanded Facility.

Lime for the acid gas dry scrubber is delivered two to three times a week and is pneumatically transferred to an on-site storage silo. An additional lime storage silo will be required for the third combustion unit. The lime is slaked and pumped in a slurry form to the scrubber unit, where up to 2 tons are used each day. Ash residue, which includes spent lime, is transported on a six-day per week basis to the landfill/ashfill, except for holidays.



SOUTH ELEVATION
SCALE: 1/8"=1'-0"



EAST ELEVATION
SCALE: 1/8"=1'-0"
SEE CANCO DRAWINGS FOR SIDING AND LOUVER DETAILS

LOUVER SCHEDULE

NO.	TYPE	AREA SERVED	SIZE	BOTTOM ELEV.	CFM
S1	FIXED EXHAUST	LOCKER ROOM	2'-0"x1'-8"	10'-0"	2,215
S2*	FIXED EXHAUST	MCC RM. CRANE #1	4'-0"x4'-0"	60'-6"	6,055
S3*	FIXED EXHAUST	STAIR NO. 2	2'-0"x2'-0"	48'-0"	500
S4	FIXED EXHAUST	CORRIDOR RM. #113	4'-11"x10'-0"	0'-0"	11,000
S5	FIXED EXHAUST	CORRIDOR RM. #113	4'-11"x10'-0"	0'-0"	16,200
S6	FIXED EXHAUST	BATTERY RM. #202	2'-0"x2'-0"	23'-6"	1,000
S7	FIXED EXHAUST	DC PNL'S RM. #201	2'-2"x2'-2"	22'-9"	3,200
S8	MANUAL OPERATED	CARBON STORAGE	4'-0"x4'-0"	0'-6"	6,015
S9	MOTOR OPERATED	SWITCHGEAR RM.	4'-0"x2'-0"	0'-6"	2,340
S10**	MOTOR OP. O.A.I.	STANDBY GENER.	12'-10 1/2"x6'-0"	10'-0"	15,900
S11**	MOTOR OP. EXHAUST	GENER.	4'-2"x4'-0"	1'-6"	13,000
S12**	MOTOR OP. O.A.I.	GENER.	2'-3"x1'-6"	0'-6"	955
S13*	MANUAL OP. CRANK	A.P.C. AREA	10'-0"x5'-6"	0'-6"	22,640
S14	MANUAL OP. CRANK	A.P.C. AREA	10'-0"x5'-6"	0'-6"	22,640
S15	FIXED EXHAUST	T.O. ELEV. SHAFT #1	2'-0"x2'-0"	71'-4"	500

NOTE:
PROVIDE 1/2" WIRE MESH BIRD SCREEN AT INSIDE OF ALL LOUVERS. SEE ROBERTSON DRAWINGS FOR OPENING LOCATIONS.
* LOCATED ON EAST ELEVATION OF STAIR #2
** INTERLOCK WITH STANDBY GENERATOR OPERATION, MANUAL OVERRIDE.
*** LOCATED @ NORTH SIDE OF ELEVATOR SHAFT (SEE DWG. E-102032)
O.A.I. = OUTSIDE AIR INTAKE

LOUVER SCHEDULE

NO.	TYPE	AREA SERVED	SIZE	BOTTOM ELEV.	CFM
E1	MAN. SPRING & CHAIN	TIPPING HALL	288'-0"x3'-0"	10'-0"	

NOTE:
PROVIDE 1/2" WIRE MESH BIRD SCREEN AT INSIDE OF ALL LOUVERS. SEE ROBERTSON DRAWINGS FOR OPENING LOCATIONS.

NOTE:
"PATTERNED" AND "TRADITIONAL" STUCCO WORK SHALL BE PROVIDED AND INSTALLED AS SHOWN ON THE BUILDING ELEVATION DRAWINGS. THE CONTRACTOR SHALL SUPPLY ALL MATERIALS AND LABOR INCLUDING SUPPORT SUBSTRATES FOR THE COMPLETE INSTALLATION OF ALL STUCCO WORK.
STUCCO WORK SHALL HAVE TWO DISTINCT FINISH PATTERNS. "TRADITIONAL STUCCO WORK" SHALL BE SPRAYED OR TROWELED WITH A STIPPLE OR HAND TROWEL FINISH. COLOR SHALL BE UNIFORM THROUGHOUT THESE AREAS. "PATTERNED STUCCO WORK" SHALL BE TROWELED STUCCO THAT IS SCRIBED, MOLED, SOULPTED OR MOELED AND COLORED TO AN APPEARANCE OF 8" x 8" TILES.
THE STUCCO MFR. SHALL SUBMIT ALL TECHNICAL INFORMATION, SAMPLES AND COLOR SELECTION MATERIALS FROM THE FULL RANGE OF AVAILABLE COLORS.
THE OWNER HAS THE RIGHT OF APPROVAL OF STUCCO WORK INSTALLER AND WILL REQUIRE REFERENCES AND SAMPLES OF THE INSTALLER'S PREVIOUS WORK. IF INSTALLER IS UNACCEPTABLE TO OWNER, CONTRACTOR SHALL CONTACT ADDITIONAL INSTALLERS UNTIL ONE IS ACCEPTABLE TO THE OWNER.
THE MATERIAL SHALL BE MANUFACTURED BY DRYVIT SYSTEM, INC., THOROCAT BY THORO SYSTEM PRODUCTS OR APPROVED EQUAL. SUBSTRATE SUPPORT REQUIREMENTS SHALL BE DETERMINED BY THE MATERIAL MANUFACTURER. CONTRACTOR SHALL PROVIDE ADDITIONAL STEEL STUDS, ROD INSULATION OR THE LIKE AS REQUIRED FOR SUPPORT. STUCCO WORK SHALL MEET ALL LOCAL CODES AND REGULATIONS.

LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY - SUPPLEMENTAL SITE CERTIFICATION APPLICATION
FIGURE 3-2a
ARCHITECTURAL BUILDING ELEVATIONS

United Engineers & Constructors
A Bechtel Company

ARCHITECTURAL BUILDING ELEVATIONS

LEE COUNTY SOLID WASTE RESOURCE RECOVERY FACILITY

OGDEN MARTIN SYSTEMS OF LEE, INC.

DATE	05/26/94	DESIGNED	DATE	
CHECKED	05/26/94	PROJECT NO.	C-1033	SCALE
APPROVED		DRAWING NO.	7102-E-102009	SHT. OF
				REV.

SUBCONTRACT OR PURCHASE ORDER	FOR BIDDING	FOR AWARD	FOR CONSTRUCTION
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**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

SECTION 4.0
EFFECTS OF SITE PREPARATION,
AND PLANT AND ASSOCIATED
FACILITIES CONSTRUCTION

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4.0 EFFECTS OF SITE PREPARATION, AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION

An overview of anticipated construction activities associated with the expansion of the Facility is provided as a preface to the discussion of the effects of site preparation and construction. The duration of field construction for the expansion of the Facility will be approximately 21 months. Additional personnel training, equipment testing, and calibration will be provided when construction is substantially complete. The entire design, construction, and start-up period will extend for approximately 28 months, from notice to proceed to full plant operation. The principal construction phases will include minimal site preparation (site clearing and preparation, excavation, pile construction and backfilling), expansion of the facility (foundations, building and process equipment erection, electrical and mechanical systems installation, instrumentation), and finalization (road construction and paving, final grading, painting, landscaping, and clean-up). Completion of final construction activities may extend into the start-up period.

4.1 LAND IMPACT

4.1.1 GENERAL CONSTRUCTION IMPACTS

Impact on Solid Waste Generation and Disposal

During construction associated with the expansion of the Facility, a variety of spent materials and solid waste will be generated, including vegetative matter, wood, paper products, concrete, scrap metal and lumber, and miscellaneous oils and fluids required for equipment operation. These will be disposed and/or recycled periodically using a licensed hauler to transport the materials to properly permitted disposal/recycling facilities.

Minimal site clearing activities are anticipated because the expansion is occurring within the existing Facility footprint. However, any non-marketable wood debris generated by the removal of landscape plants will go to an FDEP approved site for processing or disposal or burned on-site.

It is anticipated that small quantities of used oils and spent solvents may be generated on-site during equipment maintenance and various construction activities. Used oil will be generated at a rate of about one drum (55-gallon barrel) every two to three months. Typically, fewer spent solvents would be generated than used oils, except during certain phases of equipment installation. Drums of used oils and spent solvents will be stored on pallets within a bermed area.

4.0 EFFECTS OF SITE PREPARATION, AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION

They will be properly labeled and covered with a weatherproof canvas or plastic drop cloth. Neither used oils nor spent solvents will be stored on-site for more than 90 days. Transport and disposal will be handled by properly licensed contractors.

It is estimated that approximately 60 tons of solid waste will be generated during construction associated with the Facility's expansion. Whenever practical, recyclable materials will be recovered from this waste stream. It is anticipated that roll-off containers will be used to collect and haul materials to a FDEP approved disposal and/or recycling facility. The pattern of waste generation will correspond to the types and levels of activity occurring on the construction site. Higher generation rates will coincide with construction and installation.

Staging, Material Laydown, and Work Force Parking Areas

The staging, materials laydown, storage, and work force parking areas will be assigned to locations where construction activities are minimal and there is sufficient space away from jurisdictional wetlands. Staging will be assigned to an area adjacent to the main Facility, which will keep staged work as close to the actual construction area as possible. General work force parking and a construction office will be located near the material laydown area. These areas will be prepared to minimize dust and potential run-off (e.g., silt screens, hay bales, gravel or mulch parking etc.). Stormwater run-off will be directed to existing stormwater system.

Land Disturbance

Minimal disturbance to existing terrain is anticipated because the Facility expansion is occurring within the existing footprint of the site and adjacent to existing structures.

4.1.2 ROADS

The project site is accessed from Buckingham Road. Other than the main Facility access road and feeder roads to the RMPF and tire storage area, there are no other paved roads on-site and none will be built for this project. An existing, unimproved road is in the powerline corridor to provide access if required.

4.0 EFFECTS OF SITE PREPARATION, AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION

4.1.3 FLOOD ZONES

The Facility site is not located within the 100-year flood plain designated on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps. Consequently, this section does not apply to this project.

4.1.4 TOPOGRAPHY AND SOILS

The existing site topography will be minimally altered by the proposed Facility expansion. As construction progresses, a portion of the site area will be covered with impervious surfaces such as foundations and buildings. When expansion is complete, the site will have approximately 16.9 acres of impervious surface and the stormwater retention/detention ponds, environmental easements/wetlands and buffer areas will make up approximately 107 acres.

The creation of new impervious surfaces will not change the site drainage features and percolation rates. The hydrologic analysis is summarized in Volume II, Appendix 7.6 of this Application. Consequently, no new stormwater management facilities are needed for the expansion project.

The following measures will be suggested to the contractor to control soil erosion and air pollutants during construction:

- On-site traffic will be limited to the main access road and/or feeder roads as much as possible;
- Use of siltation barriers (i.e., haybales, sedimentation fencing earth berms) will be employed during any dewatering activities and around parking and lay-down areas; and
- Designated lay-down area and construction worker parking areas.

The existing site buffer zone will be maintained along the site border to minimize visual impacts during construction.

4.2 IMPACT ON SURFACE WATER BODIES AND USES

4.2.1 IMPACT ASSESSMENT

No impact to surface water bodies and uses is anticipated due to Facility expansion construction activities. There are no proposed intake or discharge structures for cooling water or other process waters; therefore, an NPDES discharge permit is not required related to the Facility expansion. However, possible dewatering activities during construction may trigger the requirement for a permit, depending upon the time of year that these activities will be taking place.

There are site preparation and construction activities that will have temporary impacts. For instance, if dewatering of the uppermost aquifer becomes necessary, water from the dewatering effort will be discharged to the stormwater retention and/or detention pond(s), and to a temporary retention basin created specifically for the temporary dewatering. Surface water may be discharged from the stormwater retention and/or detention pond(s), and the temporary dewatering retention pond, to on-site wetlands or drainage ditches after the suspended solids have settled from the dewatering discharge. A NPDES General Permit Coverage Notice is included in Volume II, Appendix 6.2.

4.2.2 MEASURING AND MONITORING PROGRAMS

During Facility expansion construction activities that involve dewatering, surface water may be released from the existing retention and/or detention pond(s) to on-site wetlands or existing drainage ditches. Periodic water quality sampling will be conducted at the discharge points from the retention and/or detention basins. The parameters for analysis will include field pH, field specific conductivity, metals, total dissolved solids, and suspended solids.

Stormwater runoff from the construction areas will not directly discharge to wetlands within the project site. Furthermore, since the Facility is fully enclosed and roofed, stormwater will not come into contact with solid waste and no significant impacts to the quality of surface waters in the vicinity are expected (e.g., no turbidity impact).

As described in Section 3.8, stormwater runoff from the developed site will be directed to the retention basin. In accordance with SFWMD requirements, dry pretreatment will also be provided. This allows for siltation and filtration of stormwater before it reaches the retention

4.0 EFFECTS OF SITE PREPARATION, AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION

and/or detention basin(s). The discharge structure for the retention basin includes a baffle to provide additional protection against the discharge of floatables and sediments. Since the majority of storm events in the Lee County area are less than one inch in total rainfall, appreciable discharge from the site will occur infrequently.

4.3 GROUNDWATER IMPACTS

4.3.1 IMPACT ASSESSMENT

The saturated thickness of the surficial aquifer below the site varies depending upon seasonal precipitation patterns and varying depths to the confining layer. During the wet season, the water table of the surficial aquifer is within one to five feet below ground surface. In the dry season, the water table of the surficial aquifer declines to depths of about three to seven feet below ground surface. The overall thickness of the surficial aquifer formation is about 20 feet (see Section 2.3.2).

Minimal groundwater impacts are anticipated as a result of the Facility expansion. The Facility was originally designed with construction of a third unit planned for the future. The refuse pit is already constructed. It is anticipated that minimal dewatering will be required for the expansion.

4.3.2 MEASURING AND MONITORING PROGRAMS

In the event that significant dewatering is necessary, a groundwater monitoring program will be established to monitor water elevations of the water table aquifer during dewatering if necessary. Temporary monitoring wells or piezometers will be installed before the initiation of expansion construction so that they can be used to measure the decline and subsequent recovery of water levels during and following dewatering activities.

An existing groundwater water quality-monitoring program is established for Facility operation.

4.4 ECOLOGICAL IMPACTS

4.4.1 IMPACT ASSESSMENT

Impacts to fish and wildlife populations caused by construction of the proposed Facility expansion are expected to be minimal. The Facility fenced area occupies approximately 17.3 acres of the 155-acre parcel. The Facility expansion will be located within the fenced upland area that was previously developed during the original Facility's construction. The open areas within the fence are comprised of bahia grass fields, gravel and paved lots, and stormwater retention and detention ponds. The expansion will not impact any sensitive habitats outside of the fenced area. In addition, with the exception of the American alligator, rare species do not currently inhabit the area within the fenced area of the site.

The Facility site is not an area of unique habitat. This is a previously disturbed site that has been vegetationally and hydrologically altered by logging, drainage, grazing, and construction activities over the course of 30 to 40 years. Species diversity and composition at the Facility site is not expected to undergo any major alterations as a result of the expansion construction. The present diversity of on-site habitats will not be impacted by the Facility's expansion. Impacts to existing wetlands will be avoided and no wetland impacts are anticipated.

The wildlife survey was updated by Malcolm Pirnie biologists on October 3rd, 2001. This survey encompassed the majority of the Facility property, but only the proposed impact area was searched entirely for rare species or suitable habitat. The results of the wildlife survey indicated that gopher tortoise burrows and burrowing owl burrows are not located on-site. Suitable habitats for Audubon's crested caracara, scrub jay, and red-cockaded woodpeckers were not found on-site. No suitable nesting sites for bald eagles are present, although eagles do feed southeast and southwest of the proposed site.

The Florida panther (*Felis concolor coryi*) may have used part of the area as a corridor of movement according to information supplied by the USFWS in 1990. Available habitat of pine flatwoods (map number 411) for the Florida panther is small, about 17.9 acres or 11.1 percent of the total site; these areas will not be disturbed by the expansion of the Facility. The County is not aware of any evidence indicating that the site or surrounding area has been used recently by the Florida panther.

4.0 EFFECTS OF SITE PREPARATION, AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION

Wetland bird fauna, the tricolored heron, snowy egret, and little blue heron, will not be impacted. Although the wood stork and sandhill crane use parts of the site for foraging, they are transient and will not be impacted by the expansion. No wetland habitat is expected to be disturbed during the expansion project.

Two American alligators were found on the property during the wildlife survey. The first was located in the detention pond that is 20 meters south west of the Administration building. The second was located in the undisturbed cypress dome wetland on the property owned by the County immediately north of the site. Neither is located in the proposed construction area and will not be impacted by the Facility's expansion.

The big cypress fox squirrel may also be found on the property, but no squirrel habitat exists within the proposed Facility expansion area. No negative impacts on this species are anticipated.

4.4.2 MEASURING AND MONITORING PROGRAMS

No wildlife monitoring programs are proposed because impacts will be minimal during the construction phase of this proposed project. There are no anticipated wetland impacts. The County's Exotic Species Control Plan, is provided in Volume II, Appendix 14.1.

4.5 AIR IMPACT

4.5.1 EMISSION RATES

Facility expansion construction activities may cause localized, short-term, adverse air quality impacts. Potential impacts include:

- Fugitive dust emissions from site preparation activities and temporary travel on unpaved surfaces; and
- Emissions from fuel combustion by construction equipment at the construction site.

It is anticipated that Facility construction will take a total of approximately 21 months.

Fugitive dust will be generated throughout the construction period by fill placement, excavation, grading, travel on unpaved surfaces, and wind erosion of unvegetated areas. In the event that fugitive dust becomes an issue, periodic watering will be employed to reduce the fugitive dust.

4.0 EFFECTS OF SITE PREPARATION, AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION

Good site maintenance will be practiced. The contractor will be required to employ proper dust control techniques to minimize fugitive emissions.

Internal combustion engines, primarily diesel-fuel, are associated with the dozers, backhoes, tractors, graders, trucks, concrete mixers, cranes, generators, compressors, and some smaller equipment that will be used. This equipment will emit, in decreasing order by total mass, nitrogen oxides, carbon monoxide, sulfur dioxide, hydrocarbons, and particulates. These emissions will not be great enough to cause any local exceedances of ambient air quality standards.

4.6 IMPACT ON HUMAN POPULATIONS

The expansion of the Facility may create both positive and negative impacts on the local and regional populations. Positive impacts will include the creation of construction jobs, the secondary influx of monies into the local economy from the construction work force, and revenues from the purchase of construction materials for the Facility. Negative impacts are anticipated to be minimal but could include possible short-term visual and noise impacts and traffic increases due to construction worker arrivals and deliveries of equipment and supplies.

4.6.1 SENSITIVE RECEPTORS

Sensitive receptors are individuals, institutions, or enterprises that are located in proximity to the project site that are affected by the construction. A summary of the demography and existing land use within a five-mile radius of the project site is presented in Section 2.2.3. Based on the demographic and land use section of this application, the predominant land uses on the Facility site's periphery include a FP&L power transmission line and associated easement, a county park, forested uplands, and wetlands.

Sensitive receptors in the immediate vicinity of the Facility site include the low-density residential area of Lehigh Acres located from approximately one-half to five miles east of the project site. The majority of the residentially-zoned area of Lehigh Acres within two miles of the Facility site is vacant or underdeveloped. This vacant land and the county park on the east side of the Facility site will buffer the developed residential area of Lehigh Acres from the Facility site. In addition, wetlands, forested uplands, cropland, and pastureland are located between the Facility and this primarily undeveloped area, and act as a buffer. Additional low density residential areas are located approximately one to four miles north of the Facility site. This rural

4.0 EFFECTS OF SITE PREPARATION, AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION

area is buffered from the Facility site by wetlands, forested uplands, cropland, and pastureland that surround the site.

No effects on sensitive receptors are anticipated due to Facility expansion. The distance from the Facility site to the residential areas and the presence of the buffer areas, support this determination.

4.6.2 WORK FORCE

During construction associated with the expansion of the Facility, the daily work force is expected to average between 25 to 75 people. The initial phase of construction will require a work force of approximately 50 people, while peak phases will require approximately 125 persons. The work force, from the eighth to the eighteenth month of the construction schedule, should average from 75 to 125 people. Throughout the course of the Facility construction, a total of approximately 750 people of various construction trades may be employed. Figure 4-1 illustrates the estimated work force requirements during Facility construction.

Work Shifts

The majority of activities required for the expansion of the Facility will take place on an eight- to ten hour per day shift, five-day per week schedule. Depending on construction progress and deadline constraints, alternative schedules, such as shifts of ten hours per day, four, five, or six days per week and overtime, may be implemented. However, all construction activities will be conducted during eight- to ten-hour per day shifts.

Construction Work Force Revenues

On a short-term basis, the Facility expansion construction phase will supply the region with benefits associated with a construction project in the range of \$65 to \$70 million. The construction phase will provide jobs for the construction labor and will create additional revenue for the local economy from the purchase of construction materials and services. Secondary benefits will include the secondary spending into the local economy from the construction labor force and related employment increases in these service sector jobs, and increased employment opportunities and sales revenues for businesses providing construction materials and services to the Facility project site.

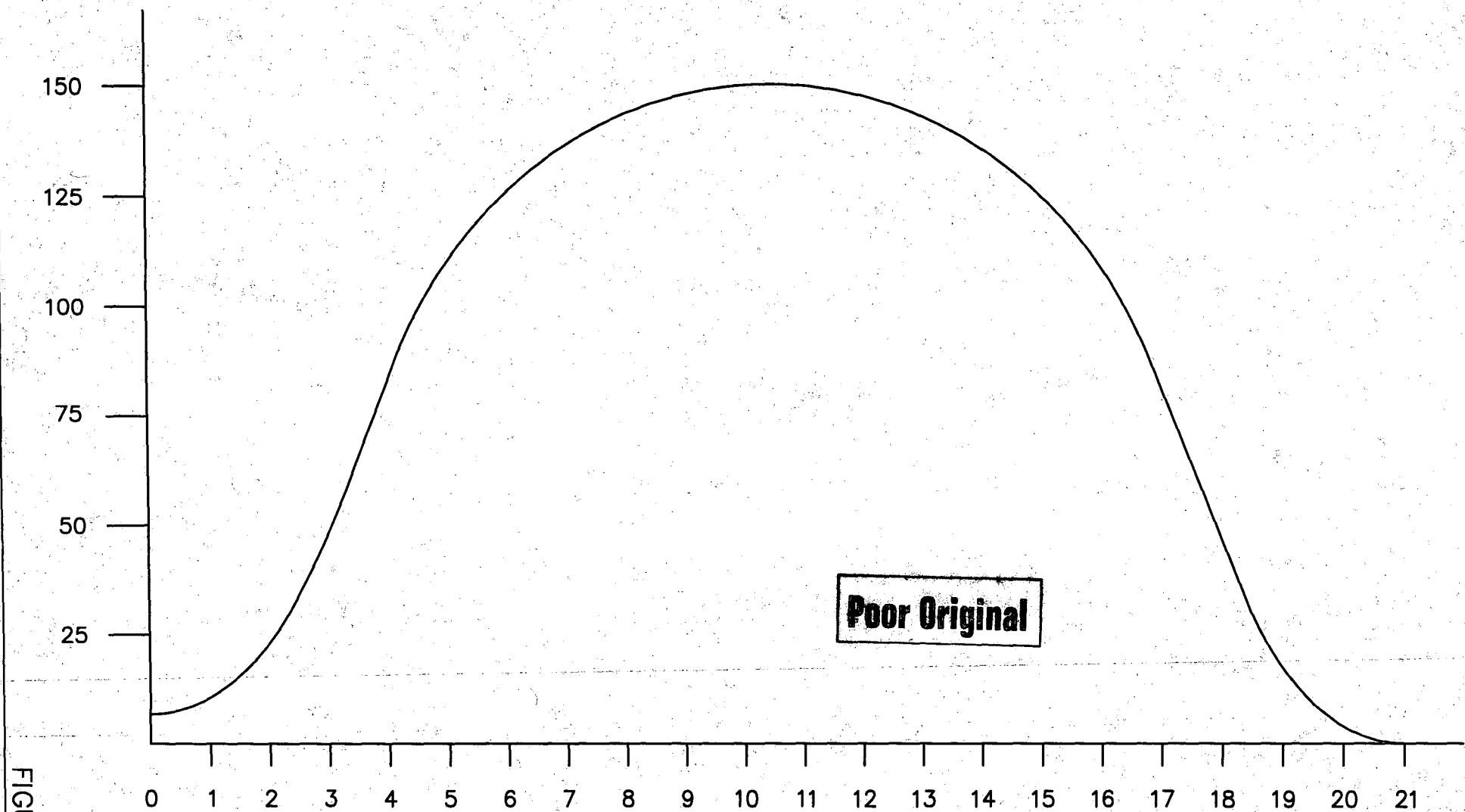


FIGURE 4-1

**MALCOLM
PIRNIE**

ESTIMATED WORK FORCE REQUIREMENT DURING CONSTRUCTION —
EXPANDED LEE COUNTY ENERGY RECOVERY FACILITY

4.0 EFFECTS OF SITE PREPARATION, AND
PLANT AND ASSOCIATED FACILITIES CONSTRUCTION

Work Force Availability

The majority of the work force for the expansion of the Facility is anticipated to be provided by the existing labor pool in Lee County and adjacent county areas. Because no major relocation and influx of construction workers and their families is expected, no increased demand and impact on the available housing stock and public facilities is anticipated.

4.6.3 TRAFFIC ASSOCIATED WITH CONSTRUCTION

The original traffic impact study, performed to assess the impacts associated with Facility construction and operation at the ultimate site capacity of 1,800 tpd, showed no impacts on the surrounding roadway network and is provided in Volume II, Appendix 11.3 of this Application.

The original traffic impact study considered trip generation, trip distribution, area of influence, existing traffic conditions, future traffic conditions, link and intersection capacity, and level of service with a 1,800 tpd Facility. For the original Facility construction, it was determined that there was a significant impact on only one of the links within the area of influence-Buckingham Road between SR 82 and the site access drive. A left-turn lane for east-bound traffic was constructed to service the vehicles accessing the site. No other roadway improvements were required to accommodate construction traffic from the Facility, although roadway improvements were also made to SR82 at the Buckingham Road intersection.

4.7 IMPACT ON LANDMARKS AND SENSITIVE AREAS

The expansion of the Facility may minimally impact Buckingham Community Park, a 135-acre park located adjacent to the eastern boundary of the project site. This park was built by the County after the Facility was constructed. Activities-based recreation, in the form of ball fields and court games, normally is not as sensitive to noise and visual impacts as a passive-based recreation area, so impacts to this park are expected to be minimal. The expansion of the Facility is not anticipated to significantly impact other parks in the area, given the distance from the Facility to the parks.

4.8 IMPACT ON ARCHAEOLOGICAL AND HISTORIC SITES

No impacts on significant archaeological or historic sites are expected as a result of construction activities associated with the expansion of the Facility because the expansion is occurring on the existing Facility site footprint. In the unlikely event that a potential archaeological site should be unearthed during expansion construction, officials of the State Division of Historical Resources will be contacted to determine its significance.

4.9 SPECIAL FEATURES

This section discusses the special features associated with site preparation, and Facility and associated facilities construction that may influence the environment and ecological systems of the site and adjacent areas as a result of the Facility's expansion.

During construction associated with the expansion of the Facility, solid and liquid wastes may be generated. This waste may consist of discarded packaging materials, refuse produced by construction workers, earth spoils, sanitary wastes, or used oils and other wastes associated with this type of construction activity. Earth spoils will be transferred to a Class III landfill or other suitable fill area. Sanitary wastes and used oils will be handled by the appropriate licensed haulers/disposers.

4.10 SUMMARY OF IMPACTS AND BENEFITS FROM CONSTRUCTION

Benefits from construction associated with the expansion of the Facility include:

- The employment of construction laborers throughout the course of construction, during which approximately 750 workers may be employed.
- Additional income to the area generated by the construction work force, including retail and service oriented businesses, which will benefit from increased sales to the construction laborers.
- The sale of goods and services relating to construction operations this should include increased employment for construction product companies providing goods and services to the construction site.

4.0 EFFECTS OF SITE PREPARATION, AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION

Impacts from construction of the expansion Facility include:

- A temporary increase in solid waste generated due to construction activities.
- The minimal disturbance of existing terrain.
- The minimal alteration of site topography.
- Minimal temporary aquifer drawdown if dewatering occurs during foundation construction.
- Localized, short-term air quality impacts from fugitive dust and fuel combustion emissions.
- Short-term visual and noise impacts (e.g., pile driving) and increased traffic during construction.

4.11 VARIANCES

No variances from any standards or guidelines are anticipated or requested.



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

SECTION 5.0

EFFECTS OF FACILITY OPERATION

5.0 EFFECTS OF FACILITY OPERATION

This section describes (1) the interaction of the Facility with the environment, and (2) Lee County's plans for monitoring the environmental impacts during operation of the Facility. In the discussion that follows, irreversible or unavoidable environmental effects are distinguished from those that are unavoidable, but temporary, or suitable for later amelioration. Mitigation actions are described, when applicable. The impacts of Facility operations are quantified whenever possible, and the source of each impact is identified. The relationship between short- and long-term effects is also discussed.

5.1 EFFECTS OF THE OPERATION OF THE HEAT DISSIPATION SYSTEM

As described in Section 3.5, cooling towers will be used on-site to dissipate heat. There will be no thermal discharges to surface water bodies; therefore, Section 316 demonstrations for thermal discharges are not applicable.

5.1.1 TEMPERATURE EFFECT ON RECEIVING WATER BODY

This section is not applicable to the Facility because there will be no direct discharge to surface waters from the Facility. All process water will be cooled in the cooling towers. Cooling water will be treated and reused as much as possible. A limited volume of spent cooling, process and sanitary wastewater (10,000 gpd normally, up to a maximum 150,000 gpd) will be discharged to the City's Central WWTP. Prior to discharge, all applicable pretreatment requirements will be met.

5.1.2 EFFECTS ON AQUATIC LIFE

This section does not apply to this Facility. There will be no discharge to surface water or groundwater, and no impacts on aquatic life in the area will occur as a result of Facility operations.

5.1.3 BIOLOGICAL EFFECTS OF MODIFIED CIRCULATION

This section is not applicable. The Facility will use reclaimed water supplied via pipeline from the Fort Myers Central WWTP. There are no surface water intake structures associated with the Facility.

5.1.4 EFFECTS OF OFFSTREAM COOLING

It is estimated that the cooling towers on the expanded Facility will use about 800,000 gallons per day (gpd) of reclaimed water from the Central WWTP to "make up" for water lost to evaporation at its ultimate capacity of 1,800 tpd. Chlorine or other equivalent compounds will be used for disinfection of the reclaimed water in conformance with Chapter 62-610, FAC. High-level disinfection (HLDI) will provide 1.0 mg/L total chlorine residual after 15 minutes of contact time at the maximum daily flow or after 30 minutes of contact time at the average daily flow, whichever provides a higher level of public health protection for the Facility in accordance with Chapter 62-610.460, FAC. The reclaimed water received from the Central WWTP will be pretreated as required to a maximum of 5.0 milligrams per liter of suspended solids prior to high-level disinfection. Filtration will be provided for control of total suspended solids (TSS). Chemical feed facilities for TSS removal will be provided as required. All process water will be treated in compliance with the City of Fort Myers Sewer Use Ordinance. The chlorination is performed at the Central WWTP, upon receipt of treated wastewater effluent provided by the County, which meets standards for public access as required for discharge from County treatment facilities.

During the cooling process, approximately 0.015 percent of the makeup water is lost as droplets in the cooling tower exhaust (cooling water "drift"). The drift will be of approximately the same quality as the reclaimed water used as makeup water. When the droplets of water composing the drift are vented from the tower, they are carried away from the Facility. The distance traveled is dependent on the size of the droplets formed.

As determined in the original application, and based on the results from operation of the existing Facility, the drift emanating from the expanded Facility will not present a health hazard to residents of nearby areas. The reclaimed water will comply with the FDEP's standards for use in unrestricted public access areas (e.g., parks, lawns, etc.). Consequently, no setbacks are required from the Facility's cooling towers. In this case, however, there will be a buffer of 800 feet between the cooling towers and the County park, the nearest place of public access. High-level disinfection of the Facility's cooling water will be implemented in accordance with Chapter 62-610.460, FAC. A monitoring program is in place at the Facility, as described in the following section.

5.1.5 MEASUREMENT PROGRAM

The existing reclaimed water supply system from the Central WWTP includes continuous on-line monitoring for turbidity prior to disinfection and total chlorine residual at the compliance monitoring point. An operating protocol, designed to ensure that the high-level disinfection criteria will be met, has been approved by the FDEP and is in compliance with Rule 62-610.463, FAC.

5.2 EFFECTS OF CHEMICAL AND BIOCIDAL DISCHARGES

5.2.1 INDUSTRIAL WASTEWATER DISCHARGES

There will be no industrial discharges to surface waters from operation of the energy recovery facility. Cooling water is treated and reused. A normal flow of 10,000 gpd, and up to a maximum of 150,000 gpd, of sanitary wastewater and spent process water is routed to the Central WWTP, following on-site pretreatment, as required, to meet Fort Myers requirements. The Facility is designed with equipment to treat the reclaimed water prior to use in the cooling tower, as needed to meet a maximum wastewater discharge limitation of 0.15 mgd. The existing Facility operates in compliance with all applicable local, State and Federal discharge regulations and water quality standards for domestic wastewater and industrial wastewater, including chemical and biocidal wastes, and oil and grease. The expanded Facility will also operate in compliance with these regulations and standards.

5.2.2 COOLING TOWER BLOWDOWN

Reclaimed water from the Central WWTP is used as cooling water for the Facility. The capacity of the Central WWTP is currently 11 mgd, which is much greater than the total water demand of the Facility (1.1 mgd). Consequently, there is ample reclaimed water available for cooling water usage at the Facility. Cooling tower blowdown is treated and reused at the Facility to the greatest extent possible. Cooling tower blowdown not reused at the Facility is blended with sanitary wastewater and discharged to the Central WWTP via sewer.

5.2.3 MEASUREMENT PROGRAMS

There is periodic monitoring of the Facility treatment operations and wastewater discharge to the sewer. The frequency of monitoring of wastewater discharge is in accordance with the City of Fort Myers Sewer Use Ordinance.

5.3 IMPACTS ON WATER SUPPLIES

5.3.1 SURFACE WATER

There are no direct impacts to surface water associated with the operation of the Facility because the Facility does not directly discharge to a surface water body.

The Facility uses reclaimed water for cooling tower makeup. Spent process water is recycled for other uses such that the minimum possible discharge occurs from the Facility. Sanitary wastewater and a small amount of spent process water is transmitted to the Central WWTP following pretreatment.

5.3.2 GROUNDWATER

Poor Original

The primary source of cooling water and potable water is provided by the City of Fort Myers. The principal source used to meet the demand for cooling water is treated reclaimed water from the Central WWTP in Fort Myers. The maximum usage allowed is 1.1 mgd. The Facility currently uses approximately 0.62 mgd, and will require approximately 0.93 mgd after expansion. The Facility administrative building and other on-site facilities requiring potable water are tied into the City's potable water distribution network. On-site wells are used as an emergency supply for back-up cooling water. The wells are not used during normal operation or normal conditions.

The current Conditions of Certification specifies the following with regard to the backup water supply wells:

1. Maximum daily withdrawal of 1.5 mgd, not to exceed a total of 10 days in any 12-month period. Withdrawals should only occur when treated effluent is not available from the City of Fort Myers.
2. Maximum annual withdrawal of 15.8 mg.

SECTION 5.0 EFFECTS OF FACILITY OPERATION

3. Authorized withdrawal facilities include six wells, eight inches in diameter and 150 feet deep, with a pumping capacity of 175 gpm per well. However, only four wells were actually installed.

For the Facility expansion, the County is requesting a change to the specification given above, to increase the number of days in any 12-month period to a maximum of 15 days. The new Site Certification Condition would read: [INSERT 1: CHANGE 10 DAYS TO 15 DAYS].

The anticipated annual withdrawal from the wells is expected to be very small because the primary source of cooling water (the Central WWTP) is rated at Class I Reliability-the highest reliability rating.

It is anticipated, based upon Facility operational history that there will not be an impact from the emergency back-up wells on other legal users, because of the infrequent use of the wells. Figure 2-14 illustrates locations of permitted withdrawals within a five-mile radius of the site. No impact on surface waters or wetlands are anticipated due to pumping from the sandstone aquifer because of the low leakage rate through the upper Hawthorn confining unit. Historical use of the wells over the past nine years of Facility operations also supports the fact that impacts will be negligible because pumping from the wells is very limited and of short duration on an emergency basis only.

Groundwater contamination from the existing and proposed Facility structures or site operations is not anticipated. All solid waste and ash are stored in enclosed buildings to prevent contact with stormwater runoff. The storage structures for the solid waste and ash are constructed of waterproof concrete to eliminate the potential for any releases to groundwater or surface waters.

The bottom of the concrete refuse storage bunker is completely sealed to prevent groundwater from seeping into the bunker. Any moisture or liquids inherent to the municipal solid waste are bound to the waste materials and incorporated into the main storage mass and combusted with the solid wastes. Typically, there is no free leachate in the refuse bunker.

There are some potential sources of off-site upgradient contamination, including a landfill located three miles south of the Facility site, and the former Buckingham Road landfill(s) located one-half mile east and southeast of the Facility site. However, there are active groundwater quality monitoring programs in place at these locations to monitor for off-site impacts.

Additionally, as described in the original certification application, the surficial groundwater system and the confining unit that underlies the site have high clay content and have a large adsorptive capacity for organic and inorganic contaminants in groundwater. Subsurface clay materials tend to bind up or adsorb a high proportion of contaminants, including metals, and thus retard potential migration.

5.3.3 DRINKING WATER

The Facility drinking water and potable water supply needs are met by distribution from the City of Ft. Myers potable water system. All municipal water supply systems in the area are 2.5 to 3 miles from the Facility. The closest supply well fields that produce more than 1 mgd are located upgradient and withdraw primarily from the sandstone aquifer. Historically, there have not been any impacts on drinking water sources and no impacts on drinking water sources are anticipated as a result of the expansion of the Facility.

5.3.4 LEACHATE AND RUNOFF

Stormwater runoff from vegetated areas, paved surfaces, and rooftops is collected in the stormwater retention/detention basins. All refuse or residue storage areas are enclosed and designed so that no runoff occurs from these surfaces. Groundwater and surface water quality is thus protected from unprocessed waste and residue. The Facility's Oil Pollution Prevention Plan is provided in Volume II, Appendix 14.2, and the Facility's Stormwater Pollution Prevention Plan is provided in Volume II, Appendix 14.3.

An off-site Class I landfill will be used to dispose of the noncombustible material from the Facility. The ashfill/landfill is in compliance with applicable FDEP regulations. Ash residue is truck transferred to the Lee-Hendry Regional Landfill in Hendry County.

5.3.5 GROUNDWATER MODELING AND MONITORING

A groundwater monitoring program exists for the Facility. Groundwater monitoring wells are installed at the Facility. There have not been any violations from existing Facility operations. The Facility Groundwater and Surface Water Monitoring Plan is provided in Volume II, Appendix 7.7.

5.4 SOLID/HAZARDOUS WASTE DISPOSAL IMPACTS

5.4.1 SOLID WASTE

This section discusses impacts not yet discussed in Section 5.2 or 5.3, which result from the processing of solid wastes on the site (solid waste is processed, but not actually disposed on the Facility site). This section also describes the benefits to be gained from the combustion of solid wastes. The existing Lee County solid waste management system is more fully described in Volume II, Appendix 3.1.

The Facility has had a net beneficial impact on solid waste disposal in Lee and Hendry Counties. The estimated processible solid waste quantities expected to be delivered annually to the energy recovery facility through the year 2010 are shown in Table 5-1. If these quantities of solid waste were to be landfilled rather than combusted, they would require about 961,400 cubic yards of landfill space (including cover) in 2005, increasing annually to about 1,093,400 cubic yards of landfill space in 2010. Instead, by achieving a 90 percent volume reduction through combustion, the ash residue to be landfilled would require only about 96,100 cubic yards of landfill space in 2005, ultimately increasing to about 109,300 cubic yards of landfill space in 2010.

Therefore, the potential savings in landfill capacity is considerable. The prolonged life of the landfill will decelerate the need for future siting of landfills in Lee and Hendry Counties (landfill volume calculations based on 1,000 lb/cy³ for municipal solid waste).

In addition to ferrous and nonferrous metal recovery at the Facility, Lee County has incorporated an aggressive materials separation and recycling program as an integral component of its total solid waste management system. This program is more fully described in the Materials Separation Plan provided in Volume II, Appendix 3.1.

TABLE 5-1
PROJECTED SOLID WASTE QUANTITIES
LEE & HENDRY COUNTIES
1995-2010

Poor Original

YEAR	LEE COUNTY	HENDRY COUNTY	TOTAL
1995	296,870	25,020	321,890
1996	301,600	26,364	327,964
1997	316,563	26,977	343,540
1998	342,233	28,120	370,353
1999	364,637	31,104	395,741
2000	380,400	31,700	412,100
2001	393,500	32,300	425,800
2002	406,600	32,900	439,500
2003	419,600	33,600	453,200
2004	432,700	34,300	467,000
2005	445,700	35,000	480,700
2006	458,200	35,700	493,900
2007	470,700	36,400	507,100
2008	483,200	37,100	520,300
2009	495,600	37,800	533,400
2010	508,100	38,600	546,700

5.4.2 HAZARDOUS WASTE

Hazardous waste is not disposed at the Facility. The Facility accepts only municipal solid waste, which includes residential, commercial, and non-hazardous industrial wastes. Public and private users of the Facility are informed of these limitations. Signs are posted at the Scale House to indicate the types of wastes that are accepted at the Facility. Routine visual inspections by personnel monitor the types of wastes received upon arrival at the Facility gates and random inspections of waste loads per 62-701, FAC are conducted. A radioactive waste detector is also installed at the scale. The crane operator is trained to visually inspect waste in the bunker. Additionally, spotters are stationed on the tipping floor to ensure that loads are inspected prior to unloading into the refuse storage bunker. Finally, contractual agreements between Lee County

and the Facility operator create shared responsibilities for the prevention of hazardous materials entering the Facility. If hazardous materials are discovered to have entered the Facility, the materials are isolated or temporarily stored. A licensed hazardous materials contractor is notified to collect and transport these materials to a proper treatment or disposal Facility. A detailed description of the programs implemented by the County for the proper management and handling of hazardous and household hazardous waste is provided in Volume II, Appendix 3.1.

A chemical and toxicity analysis of the combined ash residue (including both combustion residue and air pollution control device residues) was conducted during acceptance testing and is currently conducted quarterly. This testing is used to verify that the ash is not toxic or hazardous. Test methods used are in conformance with Rule 62-702, FAC, Solid Waste Combustor Ash Management. Based on a comparison of the test data to the USEPA and FDEP regulatory limits, the ash residue is non-hazardous. Therefore, this waste material is suitable for disposal in a Class I sanitary landfill.

5.5 SANITARY AND OTHER WASTE DISCHARGES

Solid waste generated by Facility operations (employee and visitor refuse, packing material, etc.) is collected from receptacles located throughout the Facility and deposited into the main solid waste refuse storage pit. Materials not suitable for placement into the solid waste pit are separated for off-site disposal at the Hendry County landfill/ashfill or other appropriate facility. All sanitary wastewater and spent cooling water, up to a maximum of 150,000 gpd of wastewater, is collected and discharged to the Central WWTP. Therefore, the wastes created during the operations of the Facility are handled in compliance with all applicable regulations to minimize potential impacts.

5.6 AIR QUALITY IMPACTS

5.6.1 IMPACT ASSESSMENT

The air quality modeling analysis was divided into three parts:

1. Screening Modeling Analysis - This analysis identified the operating conditions (based on waste throughput and heat content) that would have the greatest calculated air quality impact. The screening model runs were made using the Industrial Source Complex-Short Term (ISCST3) dispersion model and five years (1990 to 1994) of

SECTION 5.0 EFFECTS OF FACILITY OPERATION

hourly surface meteorological data from Page Field Airport in Fort Myers and upper air data from Tampa International Airport.

2. Refined Modeling Analysis – The refined modeling analysis was conducted using the worst-case conditions from the screening modeling analysis to identify maximum ground-level impacts for pollutants emitted from both the proposed unit and the combined facility. The refined modeling was performed using the ISCST3 model and five years (1990 to 1994) of hourly surface meteorological data from Page Field Airport in Fort Myers and upper air data from Tampa International Airport. The results of this analysis were used for a comparison of impacts from the project with applicable air quality standards and criteria. A detailed discussion of the air impacts is contained in Section 6 of the PSD Air Permit Application (Volume III - Air Quality).
3. Additional Class I Area Impact Analysis - This analysis modeled concentrations of regulated pollutants for comparison to proposed Prevention of Significant Deterioration (PSD) Class I significant impact levels, the effects of the Facility's plume on visibility, and the potential for ecological impacts due to deposition at the nearest Class I area, Everglades National Park. A detailed discussion of the air impacts is contained in Section 7 of the PSD Air Permit Application (Volume III - Air Quality).

The highest value of the second-highest concentration at each receptor for each year of meteorological data modeled (called high second high and abbreviated H2H or HSH) was selected for comparison to ambient air quality standards and PSD increments for short-term averaging times (24 hours or less). The maximum annual concentration for all receptors and years of meteorological data modeled was selected for comparison to ambient air quality standards and PSD increments for long-term averaging times (quarterly and annual periods).

Both EPA and Florida have ambient air quality standards (AAQS). Table 5-2 presents the maximum predicted impacts from the modeling analysis compared to the most restrictive ambient standard between the National AAQS and Florida AAQS. These tables appear in Section 6.10 of the PSD Air Permit Application (Volume III). Table 5-2a compares the maximum increase due to the proposed unit compared to the AAQS, while Table 5-2b compares the maximum impact for the combined facility compared to the AAQS. The predicted impacts for the proposed unit and for the combined facility are well below all AAQS.

TABLE 5-2
COMPARISON OF MAXIMUM INCREASES AND COMBINED FACILITY IMPACTS
($\mu\text{g}/\text{m}^3$) TO THE NAAQS/FAAQs

a. MAXIMUM INCREASES ($\mu\text{g}/\text{m}^3$) DUE TO PROPOSED UNIT

Pollutant	AAQS	Baseline	Max Increase for Proposed Unit	Percent of AAQS	Increase + Baseline	Percent of AAQS
CO 1-Hour	40,000	12,535	6.754	0.02%	12,542	31.35%
CO 8-Hour	10,000	6,440	2.441	0.02%	6,442	64.42%
NO _x Annual	100	19	0.216	0.22%	19.2	19.22%
SO ₂ 3-Hour	1,300	149	9.061	0.70%	158	12.16%
SO ₂ 24-Hour	260	50	2.168	0.83%	52	20.06%
SO ₂ Annual	60	8	0.200	0.33%	8.2	13.67%
PM ₁₀ 24-Hour	150	28	0.276	0.18%	28.3	18.87%
PM ₁₀ Annual	50	19	0.054	0.11%	19.1	38.20%
Pb Quarter	1.5	0.01	0.0023	0.15%	0.012	0.82%

b. MAXIMUM IMPACTS ($\mu\text{g}/\text{m}^3$) FOR COMBINED FACILITY

Pollutant	AAQS ^a	Baseline	Max Impact ^b for Facility	Percent of AAQS	Facility + Baseline	Percent of AAQS
CO 1-Hour	40,000	12,535	12.431	0.03%	12,547	31.37%
CO 8-Hour	10,000	6,440	4.234	0.04%	6,444	64.44%
NO _x Annual	100	19	0.436	0.44%	19.4	19.40%
SO ₂ 3-Hour	1,300	149	13.038	1.00%	162	12.46%
SO ₂ 24-Hour	260	50	3.112	1.20%	53	20.38%
SO ₂ Annual	60	8	0.279	0.47%	8.3	13.83%
PM ₁₀ 24-Hour	150	28	0.814	0.54%	28.8	19.20%
PM ₁₀ Annual	50	19	0.161	0.32%	19.2	38.40%
Pb Quarter ^c	1.5	0.01	0.0075	0.50%	0.018	1.20%

^a The most restrictive AAQS between the Florida AAQS (Rule 62-204.240, F.A.C.) and National AAQS (40 CFR 50) are used.

^b Based on high second-high short-term and maximum long-term impacts.

^c The maximum 24-hour modeled concentrations were used to conservatively determine compliance with quarterly value.

In Table 5-3, the maximum increases for the proposed project and the maximum combined Facility impacts are compared to the PSD Class II increments. The maximum impacts for both the proposed unit and for the combined facility are all well below their respective PSD Class II increments. This table appears in Section 6.9 of the PSD Air Permit Application (Volume III).

TABLE 5-3
COMPARISON OF MAXIMUM INCREASES AND COMBINED FACILITY
IMPACTS ($\mu\text{g}/\text{m}^3$) TO PSD CLASS II INCREMENTS

Pollutant	Class II Increment ^a	Max Increase ^b for Proposed Unit	Percent of PSD Class II Increment	Max Impact ^b for Facility	Percent of PSD Class II Increment
NO _x Annual	25	0.216	0.9%	0.436	1.7%
SO ₂ 3-hour	512	9.061	1.8%	13.038	2.5%
SO ₂ 24-hour	91	2.168	2.4%	3.112	3.4%
SO ₂ Annual	20	0.200	1.0%	0.279	1.4%
PM ₁₀ 24-hour	30	0.276	0.9%	0.814	2.7%
PM ₁₀ Annual	17	0.054	0.3%	0.161	0.9%

^a From Rule 62-204.260(2), F.A.C. (Prevention of Significant Deterioration Increments).

^b Based on high second-high short-term and maximum long-term impacts.

Additional analyses of impacts from the proposed facility were conducted for impairment to visibility, and soils and vegetation. Visibility modeling of the plume was performed for the Everglades National Park, a PSD Class I area. Using the CALPUFF Model in a screening level mode, no visibility degradation is predicted. For the soils and vegetation impact analysis, the predicted maximum annual deposition rates are well below the ecological screening thresholds, below which Facility impacts are not discernable from background levels. Additional information concerning ecological impacts is provided in Volume II, Appendix 12.1. For the PSD Class I increments, the predicted maximum concentrations are well below the proposed USEPA significant impact levels, below which Facility impacts are not discernable from background levels. Detailed Class I air quality impact analyses are presented in Section 7 of the PSD Air Permit Application (Volume III).

5.6.2 MONITORING PROGRAM

A continuous emission monitoring program will be operated for opacity, oxygen, sulfur dioxide, carbon monoxide and nitrogen oxide concentrations. The equipment will be installed, calibrated and maintained in accordance with applicable USEPA and FDEP regulations. Periodic compliance testing will also be conducted for pollutants with emission limiting standards in accordance with applicable USEPA and FDEP regulations.

5.7 NOISE

Technical noise analyses were performed prior to construction of the original Facility and again during the Acceptance Test during initial Facility operations. The noise studies are presented in Volume II, Appendix 11.1 and 11.2, respectively. The studies describe the methodologies used in estimating and determining the operational impacts of the Facility and the results of the analysis. The results from the studies indicated that Facility noise levels were acceptable and in compliance with all applicable standards.

For the original certification application, traffic noise was determined using the noise prediction model, STAMINA, 2.0 (FEWA, 1982). Traffic noise levels were compared with and without Facility traffic, and modeling predicted that Facility truck traffic would not be audible at any of the nearest residences.

Table 5-4 compares the pre-Facility and post-Facility noise levels at each monitoring station to the County standards. As depicted in Table 5-4 below, the operational noise levels of the Facility are lower than both the daytime standard and the night-time standard at all property boundary locations (See Volume II, Appendix 11.2).

All of the major equipment, with the exception of the cooling tower, to be added to the Facility will be enclosed in order to minimize potential noise emitted from the operations of the expanded Facility. A comparison of the previous studies with the assumed impacts due to the Facility expansion indicates that the expansion of the Facility will not increase the noise levels emitted from the Facility beyond allowable limits and not cause a discernable impact at any sensitive receptor.

To date there have not been any complaints regarding noise impacts from the existing Facility and it is anticipated that the operation of the expanded Facility will not cause adverse noise impacts.

SECTION 5.0 EFFECTS OF FACILITY OPERATION

TABLE 5-4
LEE COUNTY ENERGY RECOVERY FACILITY
FACILITY NOISE LEVELS

Receptor Location ⁽¹⁾	Monitoring Period	Background Noise Level 1990 ⁽²⁾	Operational Noise Level 1994 ⁽³⁾	County Standard
Boundary B1	Day	48.0	53	66
	Night	35.0	53	55
Boundary B1A ⁽⁴⁾	Day	Not Measured	48	66
	Night		48	55
Boundary B2	Day	52.0	51	66
	Night	50.0	48	55
Boundary B3	Day	48.0	49	66
	Night	42.0	49	55
Boundary B4	Day	52.0	47	66
	Night	50.0	48	55
Residence M3	Day	39.0	<42 ⁽⁵⁾	66
	Night	35.0	<42 ⁽⁵⁾	55
Residence R3	Day	55.0	<43 ⁽⁵⁾	66
	Night	42.0	<43 ⁽⁵⁾	55
⁽¹⁾ For receptor locations refer to Appendix 11.1, Figure 11-1 and Appendix 11.2, Figure 11-1. ⁽²⁾ Source Table 11-6, 1990 Noise Impact Study (See Appendix 11.1) ⁽³⁾ Source Table 4-2, 1994 Operational Noise Study Report (See Appendix 11.2) ⁽⁴⁾ This receptor is located along the new northern site boundary line and was not measured in 1990 ⁽⁵⁾ The < symbol indicates that the noise level was below the dynamic monitoring limit of the measuring instrument				

5.8 CHANGES IN NON-AQUATIC SPECIES POPULATIONS

5.8.1 IMPACT

The expansion of the Facility will occur within the existing Facility boundaries. It is anticipated that the Facility expansion will have minimal, if any, impacts on existing species populations and long-term species diversity. Given the disturbed nature of the original site, development of the Facility site, including the hydrologic enhancements, may have actually had a net positive effect with respect to species diversity, abundance, and composition on the property.

To date, there have been no adverse impacts to onsite wetlands, and no impacts are anticipated from the long-term operation of the expanded Facility. The stormwater management ponds are designed for a 25-year, 72-hour stormwater event. During design rainfall events, the stormwater pond design provides a maximum discharge of 1.7 cubic feet per second (cfs) and an average discharge of ≤ 0.5 cfs or less (see Volume II, Appendix 7.6). This discharge flows to the wetlands in the southeast quarter of the property site. This flow enhances these wetlands and does not adversely impact them. Groundwater seepage from the stormwater pond is directed toward these wetlands. Therefore, these wetlands should have enhanced hydroperiods, and thus greater wildlife utilization during operation of the Facility.

5.8.2 MONITORING

Minimal impacts on species populations are anticipated; therefore, no long-term wildlife monitoring is necessary.

5.9 OTHER FACILITY OPERATION EFFECTS

For the original application, an analysis of the traffic impacts from the originally proposed Facility was performed. The results of this study are provided in Volume II, Appendix 11.3. To facilitate access to the Facility, left and right turn lanes for traffic were constructed to service vehicles accessing the site from Buckingham Road. In addition, left and right turn lanes were constructed on SR 82 for service vehicles accessing Buckingham Road. Based on historical information obtained from the Lee County Concurrency Inventory and Projections Report (Dec 2000), the Lee County D.O.T. Traffic Section and the worst case and best-case traffic impact estimates presented in Section 2, Table 2-20, the expansion of the Facility is not anticipated to have any adverse traffic impacts.

5.10 ARCHAEOLOGICAL SITES

For the original application, an archaeological and historic survey was conducted for the Facility site (see Volume II, Appendix 10.2). Two archaeological/historic sites were found:

1. A prehistoric campsite, marked by a single chert waste flake; and
2. An early 20th century structure of board-and-batten construction, highly modified and in poor condition.

These sites were located within the study area for the archaeological/historic survey, but were not located on the Facility site. It was concluded that neither of these sites has significance for inclusion in the National Register of Historic Places. Therefore, no significant prehistoric or historic archaeological resources will be impacted by the proposed Facility expansion, since the expansion will be within the existing footprint for the Facility.

5.11 RESOURCES COMMITTED

The commitment of resources in this case is typical for major capital-intensive projects. Natural and human resources will be consumed, converted, or made unavailable for future use if the proposed Facility expansion is implemented.

The resources used in the construction of the Facility will be committed to this project. Some building materials will be irretrievably used in expansion of the Facility or irreversibly committed to the Facility. Certain lumber products and concrete structures will be committed, as well as glass, ceramics, paint, insulation, and paving materials. In addition to the materials consumed during construction, the energy and human labor expended cannot be retrieved.

Financial commitments include dedication of bond issue funds or other sources of construction funds. As with the commitment of labor and materials, the financial requirements for a major capital project are very typical.

The combustion process chemically alters many of the compounds within the waste stream. The solid waste consumed in the combustion process is permanently lost. However, this is considered a positive impact resulting in the generation of electrical energy, which otherwise would have been lost when the waste were buried in a landfill. The expanded Facility will generate over 6.67 billion net kilowatt-hours of electricity during a 20-year life. In addition to the revenue earned on the electricity sold to the power company, the energy production translates into over \$500 million¹ reduction on oil expenditures over 20 years and the reduction in consumption of nearly 19.7 million barrels of oil. The alternative processing of 1,800 tons per day of municipal solid waste by the Facility at 90% availability will conserve approximately 3.6 million tons of coal over 20 years, which would otherwise be consumed for power production. It also offers the potential for recovery of reusable materials such as ferrous and nonferrous metals.

Thus, the resources committed to this project will actually benefit the community by providing an environmentally preferred alternative to conventional landfilling, reducing the amount of solid waste to be landfilled and reducing the associated environmental risks, supplying an alternative source of energy, conserving natural resources, and stimulating the economy (by providing new jobs, which ultimately translate into the consumption of goods and services from local businesses, etc.).

5.12 VARIANCES

It is not anticipated that variances from applicable standards will be requested as part of the site certification process.

¹ Based on 2002 price of \$27/Barrel for bunker C oil.



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

SECTION 6.0
TRANSMISSION LINES
AND
OTHER LINEAR FACILITIES

6.0 TRANSMISSION LINES AND OTHER LINEAR FACILITIES

Linear facilities are those that must be routed over land, including transmission lines and pipelines. This section discusses the current routes for electrical transmission, water/wastewater, and reclaimed water for the expansion of the Facility. The expansion of the Facility will utilize existing linear facilities; no new linear facilities will be required.

6.1 TRANSMISSION LINES

The Facility site is bounded on the west by a FP&L easement, through which FP&L electrical transmission lines pass. About one-half mile north of the site (on the northern boundary of the northeast quarter of Section 24) is FP&L's Buckingham substation. Electricity generated at the Facility is routed to this substation.

The Facility's existing electrical transmission line is routed north along the eastern border of Section 24 to the FPL substation, as depicted in Figure 2-2. No new electrical lines or improvements are required for the expansion of the Facility.

Electric and Magnetic Fields

As part of the original construction of the Facility, an electrical transmission line corridor was constructed to establish the electrical interconnection between the Facility and the FP&L transmission grid. The interconnect transmission line traverses a 60-foot wide corridor for approximately 2,400 feet north and 2,600 feet west to the existing FP&L Buckingham substation. The interconnect line size has a specified capacity of 138 kV. The original design elements of the interconnect transmission line were addressed in relation to power line geometry, pole spacing, height, ground clearance, current, and voltage. These elements, combined with other design variables, were used to demonstrate compliance with Chapter 17-244, FAC, Electric and Magnetic Field (EMF), based on nominal 1,800 tpd and 60 MW.

The expansion will raise the Facility's electrical generating capacity to approximately 60 MW, which translates into a transmission line amperage of 251 A at 138 kV line voltage. The original Power Plant Siting Application contained documentation that the Electric and Magnetic Field Compliance Study was performed at a rating of 272 A at 138 kV line voltage, or about eight percent above what the capacity of the expanded Facility will be (i.e., nominal 1,800 tpd/60-65 MW). It is therefore concluded that the Electric and Magnetic Field Compliance Study performed for the original Power Plant Siting Application adequately addressed the installation

of the third combustor unit and accompanying turbine-generator. No new impacts are anticipated due to the expansion, and thus the original EMF study demonstrates that the expanded Facility will comply with the FDEP's EMF rules.

6.2 ASSOCIATED LINEAR FACILITIES

At the time of the original construction, there were no municipal potable water and wastewater utilities serving the project area. Surrounding residences use private wells and septic tanks. In order to service the Facility, three transmission pipelines were constructed and are described below.

Pipelines convey potable water and reclaimed water to the site, and wastewater from the site. The reclaimed water line was installed along SR 82, from the site westward under Interstate 75 to the intersection of Michigan Avenue, thence north and west along Michigan Avenue to the City of Ft. Myers Central Wastewater Treatment Plant. The potable water line was installed in a separate trench in accordance with guidelines for the proper separation of water and wastewater pipelines. The potable water line is routed west along SR 82 and ties into an existing distribution system near the intersection of Omni Avenue. Water is supplied by the City of Ft. Myers Water Treatment Plant. Potable water use at the project site is anticipated to increase to 75,000 gallons per day (gpd) from 51,000 gpd with the expansion.

The Facility currently generates an average of approximately 6,600 gpd of wastewater, which is treated at the Central WWTP. It is anticipated that the fully expanded facility will generate approximately 10,000 gpd of wastewater. The wastewater collection line is routed to travel along SR 82 to the intersection of Flagler Street where it ties into an existing wastewater collection system.

The existing water, reclaimed water, and wastewater transmission lines are approximately three, six, and five miles in length, respectively. These lines were all constructed in existing State and County rights-of-way. The routes avoided major intersections and congested areas to the greatest extent possible.

The Facility also uses four (4) on-site wells to provide back-up water for the cooling tower on an as-needed basis, as described in Volume I, Section 8. The Facility's Water Conservation Plan is provided in Volume II, Appendix 7.9.



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

SECTION 7.0

ECONOMIC AND SOCIAL EFFECTS

OF

PLANT CONSTRUCTION AND OPERATION

7.0 ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION AND OPERATION

Expansion and operation of the new combustion unit at the Facility will provide a number of benefits. Specifically, the Facility will:

- Meet the intent of the state Legislature [Section 377.109(1) Florida Statutes] to encourage energy conservation, to dispose of solid refuse in a proper manner, and to use resource recovery facilities as an environmentally preferred alternative to conventional solid waste disposal;
- Provide an improved process for the disposal of solid waste which remains after recycling, while minimizing ecological impacts;
- Provide a long-term economic method of solid waste disposal for those materials that remain after recycling;
- Decrease the amount of land required for sanitary landfilling purposes;
- Recover energy from the combustion of solid waste;
- Generate revenues from the sale of energy;
- Reduce the demand for auxiliary energy sources;
- Stabilize or reduce future cost increases for the disposal of the County's solid waste; and
- Become an integral component of the total solid waste management program.

Quantifying the economic and social ramifications of the expansion and operation of the Facility is a challenging task. Economic impacts are more readily identifiable, while social impacts are more difficult to calculate. The following sections discuss the socioeconomic benefits and costs related to the expansion of the Facility.

7.1 SOCIOECONOMIC BENEFITS

Land disposal of solid waste is becoming more difficult in most areas of the state. The operation of sanitary landfills has been constrained by public resistance, a decrease of available land, a decrease in suitable land away from urban sprawl, increasing environmental regulations regarding landfills and increased concerns about sanitary landfills and the protection of limited groundwater resources for increasing County and State populations. These issues suggest that the energy recovery process is the best current method of solid waste disposal for the waste that

remains after recycling. This is the approach that Lee County has chosen as its preferred method for solid waste disposal.

After expansion, the Facility will have a continuous nominal rated capacity of 1,800 tpd. Some noncombustible materials will be transported directly to the designated County landfill/ashfill. However, of the 1,800 tpd processed by the Facility, less than 10 percent by volume (containing less than 4.0 percent combustible debris) will require landfilling. This significant decrease in waste tonnage corresponds with a 90 percent reduction in waste volumes. A related 90 percent reduction in the annual space requirements for landfilling can be expected. The energy recovery process will increase the landfill/ashfill life span significantly.

The environmental benefits relating to energy recovery operations are anticipated to include improved protection of the limited, valuable, and sensitive groundwater and surface water resources in the area. The remaining ash materials processed by energy recovery operations consist of combusted matter, which is relatively inert (less than four percent combustible material).

Another benefit related to the Facility's expansion is the generation of a minimum of an additional 94.4 million kilowatt hours (kwh) of electricity per year or 1.88 billion kwh over the life of the third unit at the Facility (i.e., based on an average 160,000 tons per year over a 20-year period, and 590 kwh/ton net output). This additional production corresponds to a decrease in the use of crude oil by 278,000 barrels per year or a minimum of 5.54 million barrels over the life of the Facility. At 2001 oil prices (\$27/barrel), the decreased demand for crude oil translates into a reduction of about \$7.5 million per year in spending or \$150 million over the 20-year life of the Facility. These figures do not address expected inflation, which will increase the savings further as the price of crude oil increases.

Local economic benefits from the existing energy recovery operations include the full-time employment of approximately 40 personnel. The annual payroll for the personnel is approximately \$2.0 million, which contributes over \$40 million into the local economy over a 20-year period. Retail sales from energy recovery personnel will contribute \$0.50 million or approximately twenty-five percent of their annual income to local establishments. An estimated additional \$1.0 million in personal income will be generated by local residents. It is estimated that the expanded Facility will require an additional 9 employees for operation and maintenance of the Facility. This will increase payroll by approximately \$400,000 annually, of which 25 percent is estimated to be put back into the local retail market.

The Facility also contributes to the local economy through routine costs associated with operating and maintaining the Facility equipment. Approximately \$5.0 million per year is spent in procurement of spare parts, consumable goods, utilities, and outside service contractors in maintaining the Facility.

The expanded Facility will also add additional economic benefits to the County. As the new process line becomes operational, so in turn will the need for additional utilities, consumable products, spare parts, and personnel to maintain the expanded Facility. Initial costs will range from \$1.0 million per year, up to \$2.0 million per year after several years of operation as Facility components age and require replacement.

There are additional anticipated economic benefits related to Facility expansion. The local economy and labor market will benefit from the approximate \$70 million construction project. Increased revenues from construction-related goods and services purchases and secondary increased jobs from this spending will benefit the area. A significant amount of construction supplies, such as concrete, structural steel, glass, piping, fittings, and landscape material, are anticipated to be purchased from local businesses. There will also be indirect benefits to retail and service sector establishments supplying the work force with goods and services throughout the course of the project. It is estimated that there will be over 125 construction workers employed during the peak of construction activities, with a total of over 750 workers employed throughout the construction process.

In addition to these benefits during construction, long-term benefits associated with the expansion of the Facility include a safe method of solid waste processing and disposal, the reduction of landfilling requirements, increased protection of groundwater supplies, the generation of electric power for resale, the recovery of ferrous and non-ferrous metals, the conservation of oil and gas, and increased employment associated with a permanent work force at the Facility.

7.2 SOCIOECONOMIC COSTS

This section provides an overview of the costs related to the construction and operation of the Facility over a 20-year period.

SECTION 7.0 ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION AND OPERATION

Expansion of the Facility will be within the original proposed footprint on the 155-acre project site. The following is an approximation of costs related to the Facility expansion. The operator of the Facility receives an annual operating and maintenance fee of approximately \$9.2 million from Lee County. Operation and maintenance costs are fixed but subject to escalation indices over the life of the service agreement. It is estimated that for the new unit the operator will receive approximately \$1.5 million from Lee County for annual operations and maintenance of the new unit.

There are several land use, comprehensive plan, and zoning components that minimize the long-term land use impacts on the project site's immediate area. For example, Buckingham Park, a 135-acre parcel of land, was constructed by Lee County immediately adjacent to the project site's eastern boundary. The presence of this large park to the east, combined with the FP&L transmission corridor between the project site and any future development to the west of the Facility site, will maintain a permanent green space buffer. The wetlands and associated resource protection areas located adjacent to and north of the site buffer the site from existing and potential residential development to the north.

The Facility has become an extension of the industrial and utility uses that exist in the area, consistent with zoning and/or future land use considerations. The existing industrial use along SR 82 is a gravel pit. In addition, the majority of SR 82 frontage within two miles east of Interstate 75 is zoned for industrial, commercial, or mixed uses. The mixed use area, surrounding Six Mile Cypress Slough near SR 82, will benefit from siting commercial uses near SR 82 and residential uses away from the roadway. The existing utility uses include a landfill and a major transmission power line adjacent to the Facility site. The expansion of the Facility is compatible with these existing uses.

The majority of land surrounding the Facility site to the north of SR 82 is designated in the Lee County Existing Land Use Plan as agricultural, with minimal residential and mixed use designated.



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

SECTION 8.0

SITE AND FACILITY DESIGN ALTERNATIVES

8.0 SITE AND FACILITY DESIGN ALTERNATIVES

Many factors were evaluated during the planning of the original Lee County energy recovery project including alternative sites, solid waste management methods, ownership and financing options, and Facility size and boiler configuration. Currently, the existing Facility is a vital component of the County's integrated solid waste management system. This system also incorporates an aggressive recycling and materials recovery program that is more fully described in the County's Materials Separation Plan which is provided in Volume II, Appendix 3.1.

8.1 SITE ALTERNATIVES

In March 1990, following discussion and review at a public hearing, the Lee County Board of County Commissioners approved the current site location for the Facility. The site is located in east-central Lee County, and is relatively central to the County geographically. The site offers good access roads, a large area of land, and excellent buffer zones. The expansion of the existing Facility was anticipated in the original siting location study.

In addition, provided in Volume II, Appendix 4.1 are the Section 403.7061 requirements for new waste-to-energy facility capacity.

8.2 ALTERNATIVE WATER SOURCES

Reclaimed water from the City of Fort Myers Central WWTP is used for cooling purposes at the Facility. This primary supply was selected because of its guaranteed availability in a region where potable water supplies are extensively developed. By using reclaimed water to meet its maximum cooling water demand of 1.5 mgd, the Facility drastically reduces the burden on fresh water resources in Lee County.

Alternative sources of cooling water include City of Fort Myers and County water supplies, and a on-site wells. During the original Facility planning stages these sources were rejected as a primary cooling water supply source because of the availability of reclaimed water and the desire to preserve potable water resources in the area. However, a back-up cooling water supply was determined to be beneficial in the event that reclaimed water becomes unavailable (e.g., due to an emergency).

SECTION 8.0 SITE AND FACILITY DESIGN ALTERNATIVES

After an evaluation of potential back-up supplies, it was determined that on-site wells installed in the sandstone aquifer would best meet emergency cooling water needs. The current certification specifies the following with regard to the backup water supply wells:

- Maximum daily withdrawal of 1.5 mgd, not to exceed a total of 10 days in any 12-month period. Withdrawals should only occur when treated effluent is not available from the City of Fort Myers.
- Maximum annual withdrawal of 15.8 mg.
- Authorized withdrawal facilities include six wells, eight inches in diameter and 150 feet deep, with a pumping capacity of 175 gpm per well. However, only four wells were actually installed.

As stated in Section 5.3.2 the County is requesting a change to the Certification Condition to increase the number of days in any 12-month period to a maximum of 15 days.

Potable water for the Facility is supplied by the City. Wastewater from the Facility is pumped to the Fort Myers Central WWTP for treatment. The City utilities are considered reliable sources of potable water and wastewater treatment, such that no back-up systems are needed for these Facility services.

Volume II, Appendix 7.9 contains the County's Water Conservation Plan.



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

SECTION 9.0

COORDINATION

SECTION 9.0 COORDINATION

The permitting process for the expansion of the existing Lee County Facility has required coordination with numerous federal, state, regional, county, and local government agencies. Information was obtained through meetings, telephone calls, e-mail, websites and correspondence between the County's representatives and representatives from these agencies. Table 9-1 provides a list of government agencies and individuals who were contacted during preparation of this permit application.

Poor Original

**TABLE 9-1
CONTACTS AND CORRESPONDENCE**

Federal Agencies	Contact
U.S. Census Bureau	2000 Census Data, SF-1 and SF-2
U.S. Environmental Protection Agency	Eddie L. Wright, Environmental Justice Program
U.S. Environmental Protection Agency	Lynda C. Crum, Office of Legal Support
U.S. Environmental Protection Agency	R. Scott Davis, Air and Radiation Technology Branch
U.S. Environmental Protection Agency	James W. Little, Air, Pesticides & Toxics Management Division
U.S. Environmental Protection Agency	Gregg M. Worley, Air Pesticides & Toxics Management
U.S. Fish & Wildlife Service	Robert A. Frakes, Ph.D., Environmental Contaminants Coordinator
U.S. Fish & Wildlife Service	Jim F. Boggs, Environmental Contaminants Specialist
U.S. Fish & Wildlife Service	Jane Tutton, South Florida Ecosystem Office
Federal Websites	www.epa.gov www.census.gov
State Agencies	Contact
Florida Department of Labor and Employment Security	Bureau of Labor Market Information, ES202 Program www.labormarketinfo.com
Florida Department of Environmental Protection	Ronald D. Blackburn, District Air Program Administrator, Air Resources Management
Florida Department of Environmental Protection	Al Linero, Administrator of New Source Review, Bureau of Air Regulation
Florida Fish & Wildlife Commission	Gina Moultrie, Wildlife Surveys
State Website	www.lee-county.com
State Website	dep.state.fl.us

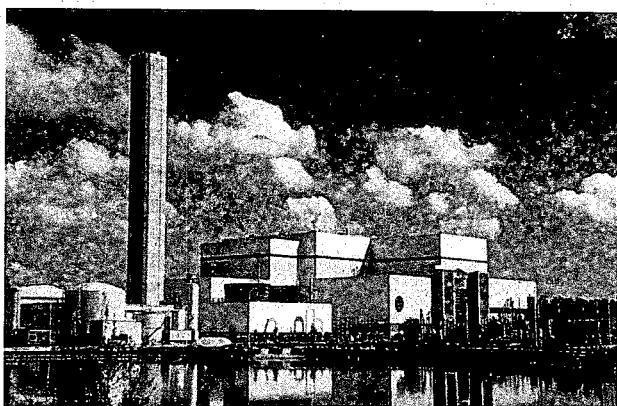
SECTION 9.0 COORDINATION

State Website	www.sfwmd.gov
State Website	www.myFlorida.com
County Agencies	Contact
Lee County Office of Economic Development	Director: Janet Watermeier and Staff
Lee County Office of Economic Development Website	http://www.leecountybusiness.com/FactsandFigures/Economic_Data/Building_Permits.htm
Lee County Planning Department	Robert J. Beluschak, Planner
Lee County Property Appraiser's Office	Helena McMullen
Lee County Community Development	Peter Blackwell
Lee County D.O.T. Traffic Section	Robert Brown, Traffic Engineering
Other Agencies	Contact
Claritas Inc.	Household Trend Report prepared for Economic Development Office of Lee County, dated 02/07/2001
Covanta Energy	Thomas C. Eriksen, General Manager, Covanta Lee, Inc.
Covanta Energy	Joseph R. Treshler, Vice President, Regional Business Management
York STB, Inc.	Alan Sakole

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LEE COUNTY, FLORIDA

SOLID WASTE ENERGY RECOVERY FACILITY



SUPPLEMENTAL APPLICATION FOR POWER PLANT SITE CERTIFICATION

VOLUME II APPENDICES

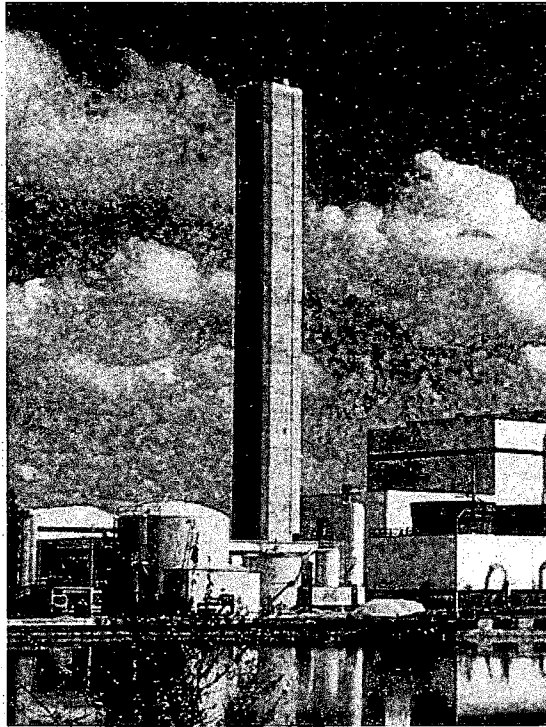


**SUBMITTED BY:
THE LEE COUNTY
BOARD OF
COUNTY
COMMISSIONERS**

NOVEMBER 7, 2002

**PREPARED BY:
MALCOLM
PIRNIE**

LEE COUNT SOLID WASTE ENERGY



SUPPLEMENTAL POWER PLANT SITE

VOLUME II -



SUBMITTED
THE LEE
BOARD OF
COUNTY

NOVEMBER

PREPARED BY

**MALCOLM
PIPER**

IMAGE QUALITY

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WERE OF POOR QUALITY.**

TABLE OF CONTENTS

VOLUME I - APPLICATION

SECTION OF PPSA APPLICATION	Page
EXECUTIVE SUMMARY	ES-1
1.0 NEED FOR POWER AND THE PROPOSED FACILITIES	1-1
2.0 SITE AND VICINITY CHARACTERIZATION	2-1
2.1 Site and Associated Facilities Delineation.....	2-1
2.1.1 Site Location	2-1
2.1.2 Existing Uses	2-2
2.1.3 Site Modification	2-2
2.1.4 100-Year Flood Zone	2-4
2.2 Socio-Political Environment	2-4
2.2.1 Governmental Jurisdictions	2-4
2.2.2 Zoning and Land Use Plans	2-6
2.2.3 Demography and Ongoing Land Use	2-12
2.2.4 Easements, Title, Agency Works	2-15
2.2.5 Regional Scenic, Cultural and Natural Landmarks	2-15
2.2.6 Archaeological and Historic Sites	2-15
2.2.7 Socioeconomics and Public Services	2-16
2.3 Biophysical Environment	2-46
2.3.1 Geology and Soils	2-46
2.3.2 Groundwater Hydrology	2-56
2.3.3 Site Water Budget and Area Uses	2-62
2.3.4 Surficial Hydrology	2-63
2.3.5 Vegetation/Land Use	2-64
2.3.6 Ecology	2-69
2.3.7 Meteorology and Ambient Air Quality	2-79
2.3.8 Noise	2-91
3.0 THE PLANT AND DIRECTLY ASSOCIATED FACILITIES	3-1
3.1 Background	3-1
3.1.1 Facility Siting	3-1
3.1.2 Existing and Proposed Facilities	3-2
3.2 Site Layout	3-5
3.2.1 Building Dimensions	3-5
3.2.2 Visual Impact	3-6
3.3 Fuel	3-7
3.3.1 Fuel Supply	3-7
3.3.2 Fuel Storage	3-7
3.4 Air Emissions and Controls	3-9

3.4.1	Air Emission Types and Sources	3-9
3.4.2	Air Emission Controls.....	3-10
3.4.3	Best Available Control Technology.....	3-10
3.4.4	Design Data for Control Equipment	3-11
3.5	Plant Water Use	3-11
3.5.1	Heat Dissipation System.....	3-12
3.5.2	Domestic/Sanitary Wastewater.....	3-14
3.5.3	Process Water Systems	3-15
3.6	Chemical and Biocide Wastes	3-15
3.7	Solid and Hazardous Waste	3-16
3.7.1	Solid Waste.....	3-16
3.7.2	Hazardous Waste	3-17
3.8	On-site Drainage System	3-17
3.9	Materials Handling.....	3-18
4.0	EFFECTS OF SITE PREPARATION, AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION.....	4-1
4.1	Land Impact	4-1
4.1.1	General Construction Impacts.....	4-1
4.1.2	Roads.....	4-2
4.1.3	Flood zones	4-3
4.1.4	Topography and Soils	4-3
4.2	Impact on Surface Water Bodies and Uses.....	4-4
4.2.1	Impact Assessment.....	4-4
4.2.2	Measuring and Monitoring Programs	4-4
4.3	Groundwater Impacts.....	4-5
4.3.1	Impact Assessment.....	4-5
4.3.2	Measuring and Monitoring Programs	4-5
4.4	Ecological Impacts.....	4-6
4.4.1	Impact Assessment.....	4-6
4.4.2	Measuring and Monitoring Programs	4-7
4.5	Air Impact	4-7
4.5.1	Emission Rates.....	4-7
4.6	Impact on Human Populations.....	4-8
4.6.1	Sensitive Receptors.....	4-8
4.6.2	Work Force	4-9
4.6.3	Traffic Associated with Construction	4-10
4.7	Impact on Landmarks and Sensitive Areas.....	4-10
4.8	Impact on Archaeological and Historic Sites.....	4-11
4.9	Special Features	4-11
4.10	Summary of Impacts and Benefits from Construction	4-11
4.11	Variances.....	4-12
5.0	EFFECTS OF FACILITY OPERATION	5-1
5.1	Effects of the Operation of the Heat Dissipation System	5-1

5.1.1	Temperature Effect on Receiving Water Body.....	5-1
5.1.2	Effects on Aquatic Life.....	5-1
5.1.3	Biological Effects of Modified Circulation	5-1
5.1.4	Effects of Offstream Cooling.....	5-2
5.1.5	Measurement Program.....	5-3
5.2	Effects of Chemical and Biocide Discharges.....	5-3
5.2.1	Industrial Wastewater Discharges.....	5-3
5.2.2	Cooling Tower Blowdown.....	5-3
5.2.3	Measurement Programs	5-4
5.3	Impacts on Water Supplies	5-4
5.3.1	Surface Water.....	5-4
5.3.2	Groundwater	5-4
5.3.3	Drinking Water	5-6
5.3.4	Leachate and Runoff.....	5-6
5.3.5	Groundwater Modeling and Monitoring.....	5-6
5.4	Solid/Hazardous Waste Disposal Impacts	5-7
5.4.1	Solid Waste	5-7
5.4.2	Hazardous Waste	5-8
5.5	Sanitary and Other Waste Discharges.....	5-9
5.6	Air Quality Impacts.....	5-9
5.6.1	Impact Assessment.....	5-9
5.6.2	Monitoring Program.....	5-12
5.7	Noise	5-13
5.8	Changes in Non-Aquatic Species Populations.....	5-15
5.8.1	Impact	5-15
5.8.2	Monitoring	5-15
5.9	Other Facility Operation Effects.....	5-15
5.10	Archaeological Sites	5-16
5.11	Resources Committed	5-16
5.12	Variances.....	5-17
6.0	TRANSMISSION LINES AND OTHER LINEAR FACILITIES.....	6-1
6.1	Transmission Lines	6-1
6.2	Associated Linear Facilities.....	6-2
7.0	ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION AND OPERATION.....	7-1
7.1	Socioeconomic Benefits.....	7-1
7.2	Socioeconomic Costs.....	7-3
8.0	SITE AND FACILITY DESIGN ALTERNATIVES	8-1
8.1	Site Alternatives.....	8-1
8.2	Alternative Water Source.....	8-1
9.0	COORDINATION	9-1

TABLE OF CONTENTS

VOLUME II - APPENDICES

- 1.0 SITE AND ABUTTING PROPERTY OWNERSHIP**
 - 1.1 Abutting Property Owners
 - 1.2 Governmental Properties
- 2.0 ZONING AND LAND USE PLANS**
 - 2.1 Proof of Zoning
 - 2.2 Lee County Ordinance 94-30
 - 2.3 Future Land Use
 - 2.4 Special Treatment Areas/Overlay Descriptions
 - 2.5 Zoning Categories
- 3.0 MATERIALS SEPARATION PLAN**
 - 3.1 Materials Separation Plan
- 4.0 REQUIREMENTS FOR NEW WASTE-TO-ENERGY FACILITY CAPACITY**
 - 4.1 Section 403.7061 Requirements for New Waste-to-Energy Facility Capacity
- 5.0 INTERLOCAL AGREEMENTS**
 - 5.1 Lee County/Hendry County Interlocal Agreement
 - 5.2 Lee County/City of Fort Myers Interlocal Wastewater Agreement
- 6.0 FEDERAL PERMIT APPLICATIONS AND APPROVALS**
 - 6.1 Florida Public Service Commission Declaratory Statement and Additional Background Information
 - 6.2 NPDES General Permit Coverage Notice
- 7.0 STATE PERMIT APPLICATIONS AND APPROVALS**
 - 7.1 Conditions of Certification as Modified
 - 7.2 Title V Air Operation Permit
 - 7.3 PSD Permit
 - 7.4 Discontinuance of Surface Water Monitoring Requirements
 - 7.5 Grant of Perpetual Conservation Easement and Agreement
 - 7.6 Revised Stormwater Calculations
 - 7.7 Ground Water and Surface Water Monitoring Plan
 - 7.8 Consumptive Use Report
 - 7.9 Water Conservation Plan

- 8.0 CORRESPONDENCE FROM FEDERAL, STATE, AND LOCAL AGENCIES**
 - 8.1 Correspondence From Federal, State, and Local Agencies
 - 8.2 Correspondence From South Florida Water Management District
- 9.0 GROUNDWATER WELL INVENTORY**
 - 9.1 Permitted Wells (>500,000 gpd)
 - 9.2 Permitted Wells (<500,000 gpd)
- 10.0 GEOTECHNICAL REPORTS AND ARCHAEOLOGICAL REPORT**
 - 10.1 Geotechnical Reports
 - 10.2 Archaeological Report
- 11.0 NOISE STUDIES AND TRAFFIC IMPACT STUDY**
 - 11.1 Noise Impact Study
 - 11.2 Operational Noise Study Report
 - 11.3 Traffic Impact Study
- 12.0 RISK ASSESSMENT**
 - 12.1 Human Health and Ecological Risk Assessment 2002
 - 12.2 Human Health and Ecological Risk Assessment 1992
- 13.0 MISCELLANEOUS REPORTS AND STUDIES**
 - 13.1 Household Trend Report
 - 13.2 Environmental Justice Overview and Audit
 - 13.3 Wetland Mitigation Monitoring Report
- 14.0 MONITORING PLANS**
 - 14.1 Exotic Species Control Plan
 - 14.2 Oil Pollution Prevention Plan
 - 14.3 Stormwater Pollution Prevention Plan
- 15.0 RESERVED**

TABLE OF CONTENTS – ABBREVIATED* VOLUME III - AIR QUALITY

INTRODUCTION

- 1.0 EXECUTIVE SUMMARY**
- 2.0 REGULATORY REVIEW**
- 3.0 AIR POLLUTANT EMISSIONS**
- 4.0 BEST AVAILABLE CONTROL TECHNOLOGY EVALUATION**
- 5.0 EXISTING AMBIENT AIR QUALITY**
- 6.0 AIR QUALITY IMPACT ANALYSES**
- 7.0 ADDITIONAL IMPACT ANALYSES**
- 8.0 REFERENCES**
- 9.0 ATTACHMENTS**

* A detailed Table of Contents for the Prevention of Significant Deterioration Air Permit Application is provided in Volume III.

LIST OF TABLES

Table	Page
2-1	Proposed Land Uses At The Site 2-3
2-2	Governmental Jurisdictions Within a Five-Mile Radius 2-5
2-3	Population: Lee County 1980-2000 2-13
2-4	2000 Census Estimates for Census Tracts in Study Area 2-17
2-5	Lee County Population Projections 2-18
2-6	Average Annual Labor Force 1990-2000 2-19
2-7	Major Private Sector Employers in 2000 2-19
2-8	Average Monthly Employment: Lee County 1990-2000 2-21
2-9	Monthly Employment: Lee County January-March 2001 2-24
2-10	Employment Estimates: Lee County 1998-2008 2-25
2-11	Annual Payroll by Industrial Sector: Lee County 1990-2000 2-26
2-12	Annual (Monthly) Payroll by Industrial Sector: Lee County 1990-2000 2-31
2-13	Income by Household: Lee County 2000 2-37
2-14	Housing Units: 2000 2-38
2-15	Age of Housing Stock as of 2000 2-39
2-16	Housing Values in 2000 2-39
2-17	Building Permits: Lee County 2000 2-40
2-18	Existing Roadways 2-41
2-19	Existing Traffic Volumes 2-41
2-20	Performance Standards 2-42
2-21	Influent Pretreatment Requirements for the Fort Myers Central Advanced Wastewater Treatment Plant 2-45
2-22	Summary of Soil Borings 2-52
2-23	Summary of Sieve Data for Soil Samples 2-54
2-24	On-site Groundwater Elevation Data 2-58
2-25	Summary of Groundwater Quality Data 2-61
2-26	Hydrological Data Representative of the Project Site 2-62
2-27	Wildlife Survey Results October 2001 2-69
2-28	Wildlife Observed or Expected to Occur on the Facility Site 2-71
2-29	Climatological Data - Normals, Means, and Extremes; Page Field Airport, Fort Myers 2-82
2-30	Annual Average Rural Mixing Heights and Stability 2-83
2-31	Frequency Distribution of Wind Speed and Stability 2-84
2-32	Frequency Distribution of Wind Speed and Wind Direction 2-85
2-33	Nearest Ambient Air Quality Monitoring Sites 2-87
2-34	Ambient Monitoring Data Used to Derive Background Concentrations 2-88
2-35	Proposed Background Concentrations for Criteria Pollutants 2-90
3-1	Reference Solid Waste Composition 3-8
3-2	Reference Solid Waste Ultimate Analysis 3-8

3-3	Pretreatment Requirements for the Fort Myers Central Advanced Wastewater Treatment Plant.....	3-13
5-1	Projected Solid Waste Quantities, Lee and Hendry Counties, 1995-2010.....	5-8
5-2	Comparison of Maximum Increases and Combined Facility Impacts to the NAAQS/FAAQS.....	5-11
5-3	Comparison of Maximum Increases and Combined Facility Impacts to PSD Class II Increments.....	5-12
5-4	Lee County Energy Recovery Facility; Facility Noise Levels.....	5-14
9-1	Contacts and Correspondence.....	9-1

LIST OF FIGURES

Figure	Following Page
2-1	General Location Map 2-1
2-2	Site Layout..... 2-1
2-3a	Aerial of Facility Site – February 1999 2-1
2-3b	Aerial of Facility Site – May 2002 2-1
2-4	Abutting Properties 2-2
2-5	Existing and Closed Landfills..... 2-2
2-6	Site Civil Plot Plan..... 2-2
2-7	Flood Hazard Map 2-4
2-8	Governmental Jurisdictions Within a Five-Mile Radius 2-4
2-9a	County Future Land Use Map..... 2-8
2-9b	City of Fort Myers Future Land Use Map 2-8
2-10	Existing Land Uses 2-14
2-11	Census Tract Outline Map 2-16
2-12	Water and Wastewater Treatment Plant Locations..... 2-44
2-13a	Water Table Aquifer - Wet Season..... 2-57
2-13b	Water Table Aquifer - Dry Season 2-57
2-14	Permitted Wells Within a Five-Mile Radius..... 2-60
2-15	Habitat Survey Results..... 2-69
2-16	Wildlife Survey Results 2-69
2-17	Page Field Airport – Fort Myers, FL NWS Station # 12835 January 1990-December 1994 2-80
2-18	Page Field Airport – Fort Myers, FL NWS Station # 12835 January 1990-1994..... 2-80
2-19	Page Field Airport – Fort Myers, FL NWS Station # 12835 February 1990-1994..... 2-80
2-20	Page Field Airport – Fort Myers, FL NWS Station # 12835 March 1990-1994..... 2-80

2-21	Page Field Airport – Fort Myers, FL NWS Station # 12835 April 1990-1994.....	2-80
2-22	Page Field Airport – Fort Myers, FL NWS Station # 12835 May 1990-1994.....	2-80
2-23	Page Field Airport – Fort Myers, FL NWS Station # 12835 June 1990-1994.....	2-80
2-24	Page Field Airport – Fort Myers, FL NWS Station # 12835 July 1990-1994.....	2-80
2-25	Page Field Airport – Fort Myers, FL NWS Station # 12835 August 1990-1994.....	2-80
2-26	Page Field Airport – Fort Myers, FL NWS Station # 12835 September 1990-1994.....	2-80
2-27	Page Field Airport – Fort Myers, FL NWS Station # 12835 October 1990-1994.....	2-80
2-28	Page Field Airport – Fort Myers, FL NWS Station # 12835 November 1990-1994.....	2-80
2-29	Page Field Airport – Fort Myers, FL NWS Station # 12835 December 1990-1994.....	2-80
3-1	Typical Stoker Mass-Burn Facility.....	3-3
3-2a	Architectural Building Elevations.....	3-5
3-2b	General Arrangement Section A-A.....	3-5
3-3	Water Balance Diagram.....	3-11
3-4	Basin and Sub-Basin Boundaries.....	3-17
4-1	Estimated Work Force Requirement During Construction.....	4-9

**MALCOLM
PIRNIE**



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

Appendix 1

APPENDIX 1.0

SITE AND ABUTTING PROPERTY OWNERSHIP

1.1 - Abutting Property Owners

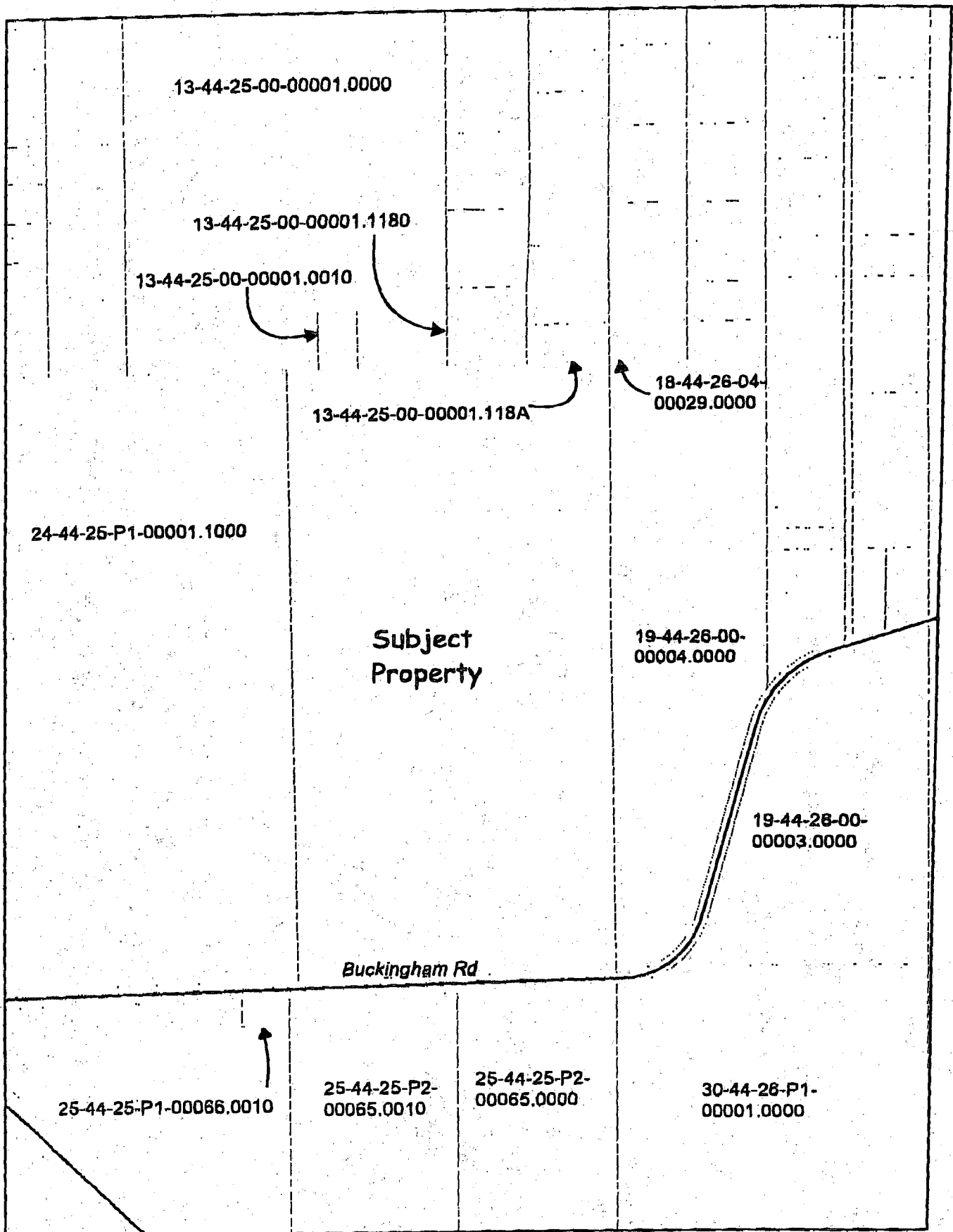
1.2 – Governmental Properties

1.1 – Abutting Property Owners

IMAGE QUALITY

**PLEASE NOTE
THE ORIGINAL DOCUMENTS
SCANNED FOR THIS RECORD
WERE OF POOR QUALITY.**

Properties Abutting The Waste To Energy Plant



LEE COUNTY PROPERTY APPRAISER

Property Data for Parcel ~~13-44-25-00-00001.0000~~[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#) | [Display Tax Bills on this Parcel](#)]

OWNERSHIP, LEGAL, SALES AND DISTRICT DATA ARE FROM THE CURRENT DATABASE. LAND, BUILDING, VALUE AND EXEMPTION DATA ARE FROM THE 2001 ROLL.

Owner of Record		Legal Description		Image of Structure	
MUNZ THOMAS C + DEAN EDWARD A TR T/C 7640 BOCILLA LN BOKEELIA FL 33922		ALL SEC 13 LESS W 1/4 + LESS PAR 1.001 LESS E 1/4		(Not Presently Available)	
Site Address		11700 LUCKETT RD EXT Fort Myers, FL 33905			
Taxing District		DOR Code			
142 - TICE FIRE		64 - GRAZING LAND CLASS V			
Property Values		Exemptions		Dimensions	
Just	1,011,060	Homestead	0	Measurement Units	AC
Assessed	20,040	Agricultural	991,020	Number of Units	319.00
Assessed SOH	20,040	Widow	0	Frontage	0
Taxable	20,040	Widower	0	Depth	0
Building	0	Disability	0	Bedrooms	
Land	20,040	Wholly	0	Bathrooms	
Building Extra Features	0	Energy	0	Total Sq. Ft.	
Land Extra Features	0	SOH Difference	0	Year Built	
Sales Transactions					
Sale Price	Date	OR Book/Page	Transaction Type	Vacant/Improved	
500,000	5/20/1999	3132/1958	01	V	
876,300	3/1/1981	1492/2235	03	V	

475,000	6/1/1974	1043/1772			
Solid Waste (Garbage) Roll Data					
Solid Waste District	Roll Type	Category	Unit/Area	Tax Amount	
003 - Service Area 3 - East Lee County Area	-		0	0.00	
Land Tracts/Land Use					
Description	Use Code	Units			
Market Value Agricultural	9910	248.70 Acres			
Market Value Agricultural	9910	70.30 Acres			
Storm Surge Category	Flood Insurance (FIRM)				
	Rate Code	Community	Panel	Version	Date
Category 4	X				

[[View 2001 TRIM Notice](#)]

[[View 2000 TRIM Notice](#)]

[[Show Building Details](#)]

[[Show Aerial View](#)]

[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#)]

[[New Query](#) | [Parcel Queries Page](#) | [Lee PA Home](#)]

LEE COUNTY PROPERTY APPRAISER

Property Data for Parcel **13-44-25-00-00001-11801**[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#) | [Display Building Permits on this Parcel](#) | [Display Tax Bills on this Parcel](#)]

OWNERSHIP, LEGAL, SALES AND DISTRICT DATA ARE FROM THE CURRENT DATABASE. LAND, BUILDING, VALUE AND EXEMPTION DATA ARE FROM THE 2001 ROLL.

Owner of Record		Legal Description		Image of Structure	
NANTZ REX A + JOANN 684 MUSCOGEE DR N FT MYERS FL 33903		PARL IN SEC 13 T 44 R 25 AS DECS IN OR 3313 PG 3473 LESS E 661.90 FT		(Not Presently Available)	
Site Address		6900 GREENBRIAR FARMS RD FT MYERS, FL			
Taxing District		DOR Code			
142 - TICE FIRE		00 - VACANT RESIDENTIAL			
Property Values		Exemptions		Dimensions	
Just	50,300	Homestead	0	Measurement Units	AC
Assessed	50,300	Agricultural	0	Number of Units	10.06
Assessed SOH	50,300	Widow	0	Frontage	0
Taxable	50,300	Widower	0	Depth	0
Building	0	Disability	0	Bedrooms	
Land	50,300	Wholly	0	Bathrooms	
Building Extra Features	0	Energy	0	Total Sq. Ft.	
Land Extra Features	0	SOH Difference	0	Year Built	
Sales Transactions					
Sale Price	Date	OR Book/Page	Transaction Type	Vacant/Improved	
60,000	2/5/2001	3365/3940	06	V	
100	2/5/2001	3365/3938	01	V	

100	10/3/2000	3313/3473	05	V
260,000	6/29/1999	3138/3293	04	V
205,500	11/1/1980	1468/261	04	V

Solid Waste (Garbage) Roll Data

Solid Waste District	Roll Type	Category	Unit/Area	Tax Amount
003 - Service Area 3 - East Lee County Area	R - Residential Category		1	191.99

Land Tracts/Land Use

Description	Use Code	Units
Vacant Residential	0	10.06 Acres

Storm Surge Category	Flood Insurance (FIRM)				
	Rate Code	Community	Panel	Version	Date
Category 4	X:FLOOD				

[[View 2001 TRIM Notice](#)][[View 2000 TRIM Notice](#)][[Show Building Details](#)][[Show Aerial View](#)][[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#)][[New Query](#) | [Parcel Queries Page](#) | [Lee PA Home](#)]

LEE COUNTY PROPERTY APPRAISER

Property Data for Parcel **13-44-25-00-00001-0010**

[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#) | [Display Building Permits on this Parcel](#) | [Display Tangible Accounts on this Parcel](#) | [Display Tax Bills on this Parcel](#)]

OWNERSHIP, LEGAL, SALES AND DISTRICT DATA ARE FROM THE CURRENT DATABASE. LAND, BUILDING, VALUE AND EXEMPTION DATA ARE FROM THE 2001 ROLL.

Owner of Record		Legal Description		Image of Structure	
FLORIDA POWER + LIGHT CO ATTN:PROPERTY TAX DEPT JLM PO BOX 14000 JUNO BEACH FL 33408		THE E 330 FT OF THE W 580 FT OF THE S 490 FT OF THE SE1/4		(Not Presently Available)	
		Site Address		6950 STALEY FARMS RD Fort Myers, FL 33905	
Taxing District		DOR Code			
142 - TICE FIRE		00 - VACANT RESIDENTIAL			
Property Values		Exemptions		Dimensions	
Just	18,550	Homestead	0	Measurement Units	AC
Assessed	18,550	Agricultural	0	Number of Units	3.71
Assessed SOH	18,550	Widow	0	Frontage	0
Taxable	18,550	Widower	0	Depth	0
Building	0	Disability	0	Bedrooms	
Land	18,550	Wholly	0	Bathrooms	
Building Extra Features	0	Energy	0	Total Sq. Ft.	
Land Extra Features	0	SOH Difference	0	Year Built	
Sales Transactions					
Sale Price	Date	OR Book/Page	Transaction Type	Vacant/Improved	
4,500	9/1/1971	753/140			

Solid Waste (Garbage) Roll Data					
Solid Waste District	Roll Type	Category	Unit/Area	Tax Amount	
003 - Service Area 3 - East Lee County Area	R - Residential Category		0	0.00	
Land Tracts/Land Use					
Description	Use Code	Units			
Vacant Residential	0	3.71 Acres			
Storm Surge Category	Flood Insurance (FIRM)				
	Rate Code	Community	Panel	Version	Date
	X				

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[[Show Aerial View](#)]

[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#)]

[[New Query](#) | [Parcel Queries Page](#) | [Lee PA Home](#)]

LEE COUNTY PROPERTY APPRAISER

Property Data for Parcel ~~13-44-25-00-00001-118A~~[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#) | [Display Tax Bills on this Parcel](#)]

OWNERSHIP, LEGAL, SALES AND DISTRICT DATA ARE FROM THE CURRENT DATABASE. LAND, BUILDING, VALUE AND EXEMPTION DATA ARE FROM THE 2001 ROLL.

Owner of Record		Legal Description		Image of Structure	
NANTZ REX A + JOANN 684 MUSCOGEE DR N FT MYERS FL 33903		FRM NW CORN OF S 1/2 OF SE 1/4 OF NE 1/4 OF SE 1/4 S 1324.11 TO POB THN E 661.66 THN S 331.08 W 661.90 N 331.03		(Not Presently Available)	
Site Address		6921 GREENBRIAR FARM RD , FL			
Taxing District		DOR Code			
142 - TICE FIRE		00 - VACANT RESIDENTIAL			
Property Values		Exemptions		Dimensions	
Just	25,100	Homestead	0	Measurement Units	AC
Assessed	25,100	Agricultural	0	Number of Units	5.02
Assessed SOH	25,100	Widow	0	Frontage	0
Taxable	25,100	Widower	0	Depth	0
Building	0	Disability	0	Bedrooms	
Land	25,100	Wholly	0	Bathrooms	
Building Extra Features	0	Energy	0	Total Sq. Ft.	
Land Extra Features	0	SOH Difference	0	Year Built	

Sales Transactions				
Sale Price	Date	OR Book/Page	Transaction Type	Vacant/Improved
30,000	2/5/2001	3365/3942	06	V
100	2/5/2001	3365/3938	04	V
100	10/3/2000	3313/3473	05	V
260,000	6/29/1999	3138/3293	04	V
205,500	11/1/1980	1468/261	04	V

Solid Waste (Garbage) Roll Data					
Solid Waste District		Roll Type	Category	Unit/Area	Tax Amount
003 - Service Area 3 - East Lee County Area		R - Residential Category			0.00

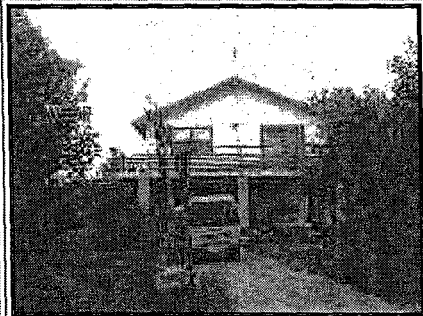
Land Tracts/Land Use		
Description	Use Code	Units
Vacant Residential	0	5.02 Acres

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[\[View 2000 TRIM Notice \]](#)
[\[Show Building Details \]](#)
[\[Show Aerial View \]](#)
[\[Next Lower Parcel Number \]](#)
[\[Next Higher Parcel Number \]](#)
[\[New Query \]](#)
[\[Parcel Queries Page \]](#)
[\[Lee PA Home \]](#)

LEE COUNTY PROPERTY APPRAISER

Property Data for Parcel ~~18-44-26-04-00029-0000~~[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#) | [Display Tax Bills on this Parcel](#)]

OWNERSHIP, LEGAL, SALES AND DISTRICT DATA ARE FROM THE CURRENT DATABASE. LAND, BUILDING, VALUE AND EXEMPTION DATA ARE FROM THE 2001 ROLL.

Owner of Record		Legal Description		Image of Structure	
GILCHER RONALD O + DIANNA G 6970 PANGOLA DR. FORT MYERS FL 33905		ORANGE RVR RANCHETTES UNR OR 760 PG 281 LOTS 29 + 30		 Photo Date: 10/16/2000	
Site Address		6970 PANGOLA RD Fort Myers, FL 33905			
Taxing District		DOR Code			
142 - TICE FIRE		01 - SINGLE FAMILY RESIDENTIAL			
Property Values		Exemptions		Dimensions	
Just	85,190	Homestead	25,000	Measurement Units	AC
Assessed	85,190	Agricultural	0	Number of Units	10.00
Assessed SOH	83,160	Widow	0	Frontage	0
Taxable	57,660	Widower	0	Depth	0
Building	25,190	Disability	500	Bedrooms	1
Land	60,000	Wholly	0	Bathrooms	2
Building Extra Features	2,070	Energy	0	Total Sq. Ft.	2,328

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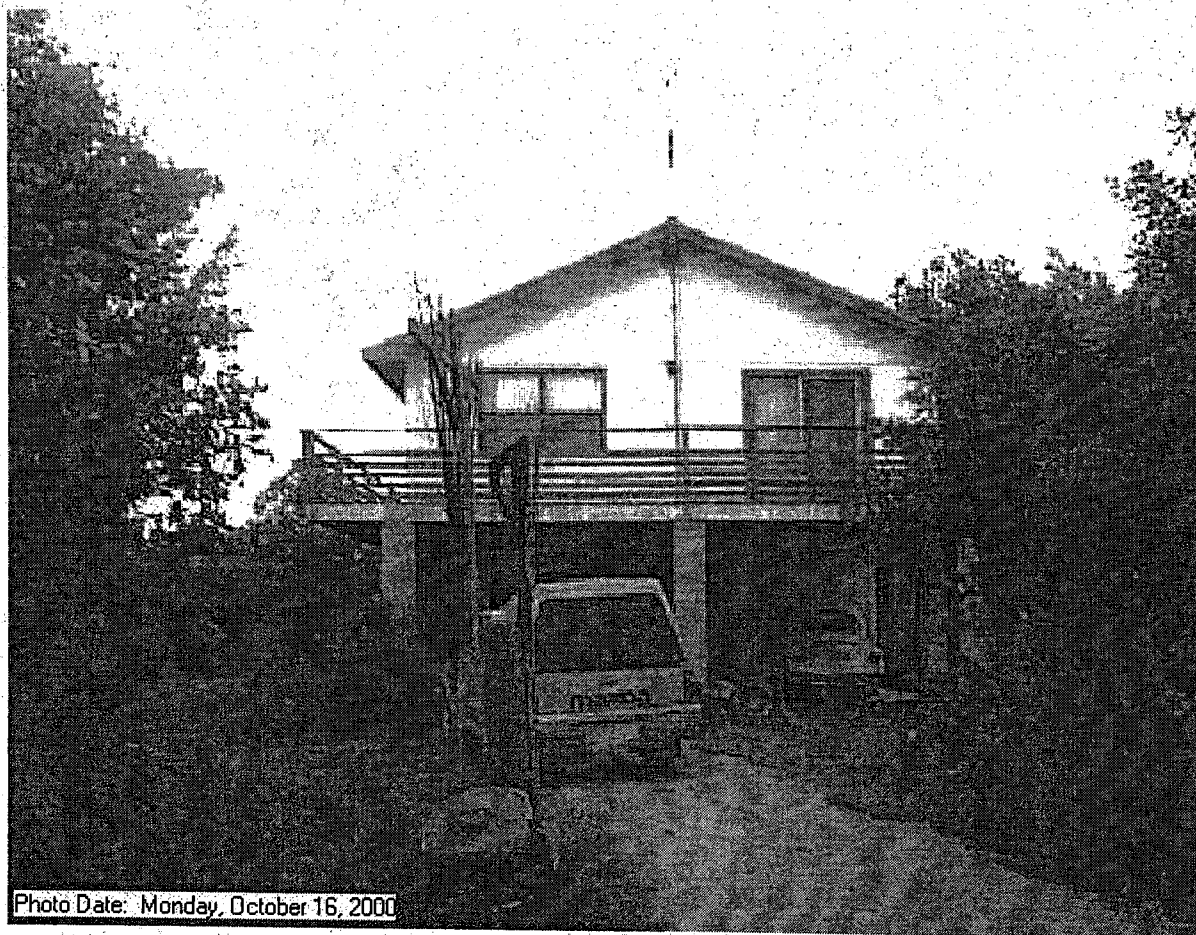
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[Next Lower Parcel Number | Next Higher Parcel Number]

[[New Query](#) | [Parcel Queries Page](#) | [Lee PA Home](#)]

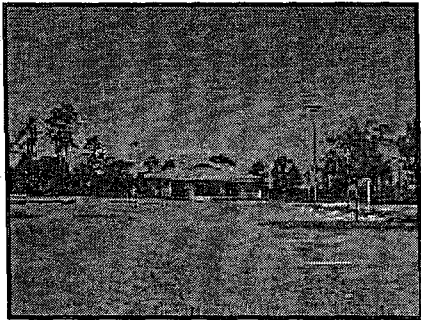


LEE COUNTY PROPERTY APPRAISER

Property Data for Parcel **19-44-26-00-00004-0000**

[Next Lower Parcel Number](#) |
 [Next Higher Parcel Number](#) |
 [Display Building Permits on this Parcel](#) |
 [Display Tangible Accounts on this Parcel](#) |
 [Display Tax Bills on this Parcel](#)

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Owner of Record		Legal Description		Image of Structure	
LEE COUNTY C/O PARKS & REC. PO BOX 398 FT MYERS FL 33902		THE W 1/2 OF W 1/2 N OF BUCKINGHAM RD.		 Photo Date: 11/10/2000	
Site Address		9800 BUCKINGHAM RD Fort Myers, FL 33905			
Taxing District		DOR Code			
142 - TICE FIRE		86 - COUNTIES-OTHER			
Property Values		Exemptions		Dimensions	
Just	845,900	Homestead	0	Measurement Units	AC
Assessed	845,900	Agricultural	0	Number of Units	135.00
Assessed SOH	845,900	Widow	0	Frontage	0
Taxable	0	Widower	0	Depth	0
Building	361,800	Disability	0	Bedrooms	0
Land	484,100	Wholly	845,900	Bathrooms	35
Building Extra Features	15,980	Energy	0	Total Sq. Ft.	9,992

Land Extra Features	214,100	SOH Difference	0	Year Built	1995
Sales Transactions					
Sale Price	Date	OR Book/Page	Transaction Type	Vacant/Improved	
0	12/1/1974	1067/176	03	V	
Solid Waste (Garbage) Roll Data					
Solid Waste District		Roll Type	Category	Unit/Area	Tax Amount
003 - Service Area 3 - East Lee County Area		C - Commercial Category	C	8,015	323.44
Land Tracts/Land Use					
Description		Use Code	Units		
Government Owned, Park		8210	135.00 Acres		
Storm Surge Category	Flood Insurance (FIRM)				
	Rate Code	Community	Panel	Version	Date
Category 4	X				

[\[View 2001 TRIM Notice \]](#)
[\[View 2000 TRIM Notice \]](#)
[\[Show Building Details \]](#)
[\[Show Aerial View \]](#)
[\[Next Lower Parcel Number \]](#)
[\[Next Higher Parcel Number \]](#)
[\[New Query \]](#)
[\[Parcel Queries Page \]](#)
[\[Lee PA Home \]](#)

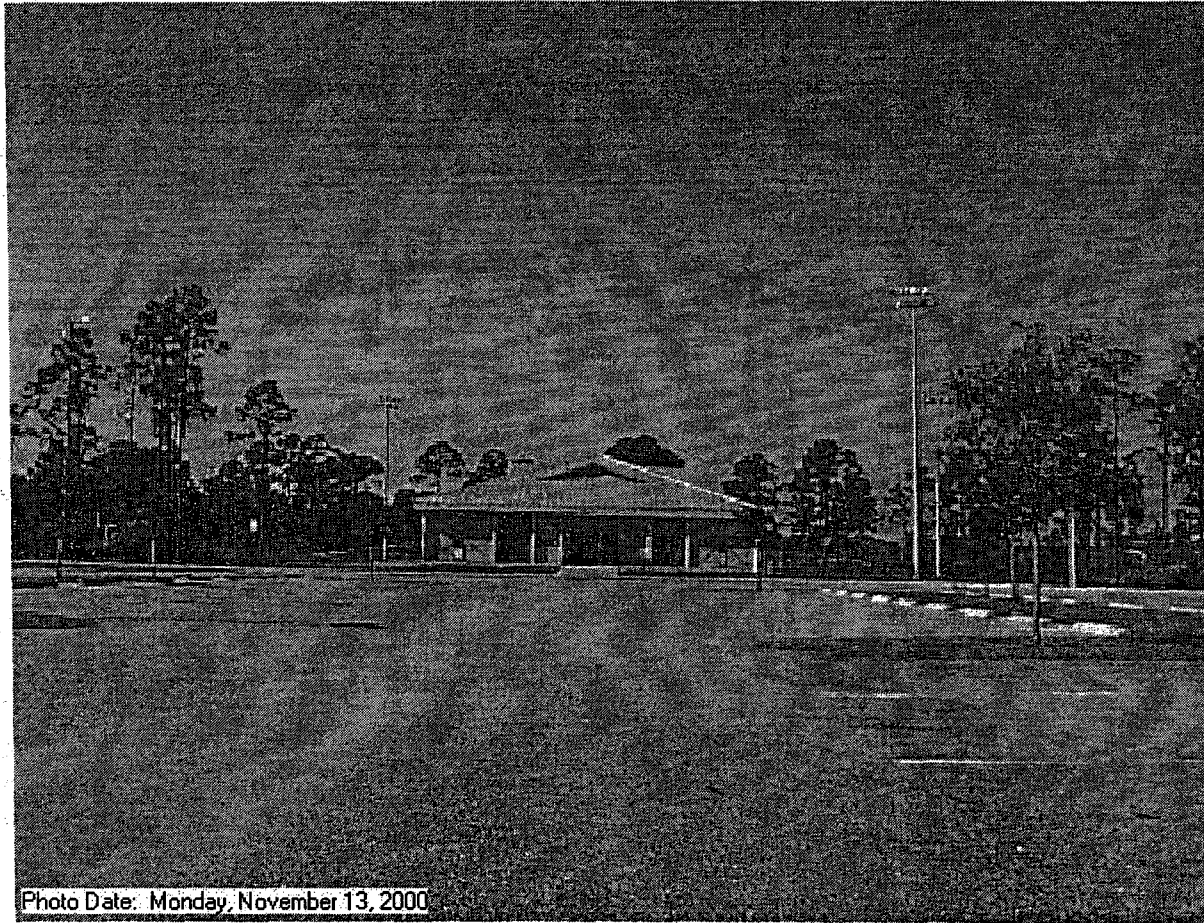


Photo Date: Monday, November 13, 2000

LEE COUNTY PROPERTY APPRAISER

Property Data for Parcel ~~19-44-26-00-00003-0000~~[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#) | [Display Tax Bills on this Parcel](#)]

OWNERSHIP, LEGAL, SALES AND DISTRICT DATA ARE FROM THE CURRENT DATABASE. LAND, BUILDING, VALUE AND EXEMPTION DATA ARE FROM THE 2001 ROLL.

Owner of Record		Legal Description		Image of Structure	
COCHRAN JIMMIE J + LOYCE F P O BOX 1701 FT MYERS FL 33902		W 1/2 LYING S + E OF SLY SI BUCKINGHAM RD.		(Not Presently Available)	
Site Address		9711 BUCKINGHAM RD Lehigh Acres, FL 33971			
Taxing District		DOR Code			
142 - TICE FIRE		61 - GRAZING LAND CLASS II			
Property Values		Exemptions		Dimensions	
Just	191,200	Homestead	0	Measurement Units	AC
Assessed	9,370	Agricultural	181,830	Number of Units	95.60
Assessed SOH	9,370	Widow	0	Frontage	0
Taxable	9,370	Widower	0	Depth	0
Building	0	Disability	0	Bedrooms	
Land	9,370	Wholly	0	Bathrooms	
Building Extra Features	0	Energy	0	Total Sq. Ft.	
Land Extra Features	0	SOH Difference	0	Year Built	
Sales Transactions					
Sale Price	Date	OR Book/Page	Transaction Type	Vacant/Improved	
100,000	1/1/1987	1890/2148	01	V	
13,300	12/1/1970	661/353	01	V	

Solid Waste (Garbage) Roll Data					
Solid Waste District	Roll Type	Category	Unit/Area	Tax Amount	
003 - Service Area 3 - East Lee County Area	-		0	0.00	
Land Tracts/Land Use					
Description	Use Code	Units			
Market Value Agricultural	9910	95.60 Acres			
Storm Surge Category	Flood Insurance (FIRM)				
	Rate Code	Community	Panel	Version	Date
Category 4	X				

[\[View 2001 TRIM Notice \]](#)
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[\[Show Building Details \]](#)
[\[Show Aerial View \]](#)
[\[Next Lower Parcel Number \]](#)
[\[Next Higher Parcel Number \]](#)
[\[New Query \]](#)
[\[Parcel Queries Page \]](#)
[\[Lee PA Home \]](#)

LEE COUNTY PROPERTY APPRAISER

Property Data for Parcel **30-44-26-P1-00001-00000**[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#) | [Display Tax Bills on this Parcel](#)]

OWNERSHIP, LEGAL, SALES AND DISTRICT DATA ARE FROM THE CURRENT DATABASE. LAND, BUILDING, VALUE AND EXEMPTION DATA ARE FROM THE 2001 ROLL.

Owner of Record		Legal Description		Image of Structure	
CITY OF FT MYERS C/O FINANCE DEPT P O BOX 2465 FT MYERS FL 33902		NW 1/4 LESS STRIP 206 FT WIDE ALG S BDRY LES R/W OR 2771/1426		(Not Presently Available)	
Site Address		5600 LEE BLVD Lehigh Acres, FL 33971			
Taxing District		DOR Code			
090 - CITY OF FORT MYERS		89 - MUNICIPAL-OTHER			
Property Values		Exemptions		Dimensions	
Just	781,000	Homestead	0	Measurement Units	AC
Assessed	781,000	Agricultural	0	Number of Units	156.20
Assessed SOH	781,000	Widow	0	Frontage	0
Taxable	0	Widower	0	Depth	0
Building	0	Disability	0	Bedrooms	
Land	781,000	Wholly	781,000	Bathrooms	
Building Extra Features	0	Energy	0	Total Sq. Ft.	
Land Extra Features	0	SOH Difference	0	Year Built	
Sales Transactions					
Sale Price	Date	OR Book/Page	Transaction Type	Vacant/Improved	
0	1/1/1900	219/67	03	V	

Solid Waste (Garbage) Roll Data					
Solid Waste District	Roll Type	Category	Unit/Area	Tax Amount	
009 - City of Fort Myers	-		0	0.00	
Land Tracts/Land Use					
Description			Use Code	Units	
Municipally Owned, Offices, Library, Government Bldg			8900	156.20 Acres	
Storm Surge Category	Flood Insurance (FIRM)				
	Rate Code	Community	Panel	Version	Date
Category 4	B	125124	0350	B	091984

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[[Show Building Details](#)]

[[Show Aerial View](#)]

[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#)]

[[New Query](#) | [Parcel Queries Page](#) | [Lee PA Home](#)]

LEE COUNTY PROPERTY APPRAISER

Property Data for Parcel **25-44-25-P2-00065.0000**[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#) | [Display Tax Bills on this Parcel](#)]

OWNERSHIP, LEGAL, SALES AND DISTRICT DATA ARE FROM THE CURRENT DATABASE. LAND, BUILDING, VALUE AND EXEMPTION DATA ARE FROM THE 2001 ROLL.

Owner of Record		Legal Description		Image of Structure	
RICHARDS R Q III TR 8191 COLLEGE PKWY STE 205 FT MYERS FL 33919		E1/2 OF NE1/4 S OF BUCKINGHAM RD + N OF LEE BLVD LES R/W OR 2771/1426		(Not Presently Available)	
Site Address		5700 LEE BLVD Lehigh Acres, FL 33971			
Taxing District		DOR Code			
137 - CITY FT MYERS/EAST CO SEWER MSTU		61 - GRAZING LAND CLASS II			
Property Values		Exemptions		Dimensions	
Just	673,200	Homestead	0	Measurement Units	AC
Assessed	5,380	Agricultural	667,820	Number of Units	67.32
Assessed SOH	5,380	Widow	0	Frontage	0
Taxable	5,380	Widower	0	Depth	0
Building	0	Disability	0	Bedrooms	
Land	5,380	Wholly	0	Bathrooms	
Building Extra Features	0	Energy	0	Total Sq. Ft.	
Land Extra Features	0	SOH Difference	0	Year Built	
Sales Transactions					
Sale Price	Date	OR Book/Page	Transaction Type	Vacant/Improved	
100	4/1/1996	2700/970	01	V	
100	9/1/1989	2102/211	01	V	

Solid Waste (Garbage) Roll Data					
Solid Waste District	Roll Type	Category	Unit/Area	Tax Amount	
009 - City of Fort Myers	-		0	0.00	
Land Tracts/Land Use					
Description		Use Code	Units		
Market Value Agricultural		9910	67.32 Acres		
Storm Surge Category	Flood Insurance (FIRM)				
	Rate Code	Community	Panel	Version	Date
	Category 4	B	125124	0350	B

[[View 2001 TRIM Notice](#)]

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[[Show Building Details](#)]

[[Show Aerial View](#)]

[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#)]

[[New Query](#) | [Parcel Queries Page](#) | [Lee PA Home](#)]

LEE COUNTY PROPERTY APPRAISER

Property Data for Parcel **25-14-25-P2-00065-0010**[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#) | [Display Tangible Accounts on this Parcel](#) | [Display Tax Bills on this Parcel](#)]

OWNERSHIP, LEGAL, SALES AND DISTRICT DATA ARE FROM THE CURRENT DATABASE. LAND, BUILDING, VALUE AND EXEMPTION DATA ARE FROM THE 2001 ROLL.

Owner of Record		Legal Description		Image of Structure	
DEWOLFE BERNARD J TR + JOHNSON ALLEN H TR + METHENY MARVIN L COTR 16050 S TAMiami TR STE 103 FT MYERS FL 33908		W1/2 OF NE1/4 + E40FT OF NW1/4 N OF LEE BLVD + S OF BUCKINGHAM RD		(Not Presently Available)	
Site Address		5750 LEE BLVD Lehigh Acres, FL 33971			
Taxing District		DOR Code			
137 - CITY FT MYERS/EAST CO SEWER MSTU		61 - GRAZING LAND CLASS II			
Property Values		Exemptions		Dimensions	
Just	577,360	Homestead	0	Measurement Units	AC
Assessed	3,740	Agricultural	573,620	Number of Units	70.00
Assessed SOH	3,740	Widow	0	Frontage	0
Taxable	3,740	Widower	0	Depth	0
Building	0	Disability	0	Bedrooms	
Land	3,740	Wholly	0	Bathrooms	
Building Extra Features	0	Energy	0	Total Sq. Ft.	
Land Extra Features	0	SOH Difference	0	Year Built	

Sales Transactions				
Sale Price	Date	OR Book/Page	Transaction Type	Vacant/Improved
100	12/17/1997	2901/927	01	V
174,000	7/1/1988	2008/4082	01	V
174,000	6/1/1988	2008/4076	01	V

Solid Waste (Garbage) Roll Data				
Solid Waste District	Roll Type	Category	Unit/Area	Tax Amount
009 - City of Fort Myers	-		0	0.00

Land Tracts/Land Use		
Description	Use Code	Units
Market Value Agricultural	9910	54.67 Acres
Market Value Agricultural	9910	15.33 Acres

Storm Surge Category	Flood Insurance (FIRM)				
	Rate Code	Community	Panel	Version	Date
Category 4	B	125124	0350	B	091984

[[View 2001 TRIM Notice](#)]

[[View 2000 TRIM Notice](#)]

[[Show Building Details](#)]

[[Show Aerial View](#)]

[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#)]

[[New Query](#) | [Parcel Queries Page](#) | [Lee PA Home](#)]

LEE COUNTY PROPERTY APPRAISER

Property Data for Parcel ~~25-44-25-P1-000660010~~
[\[Next Lower Parcel Number \]](#) | [Next Higher Parcel Number](#) | [Display Tangible Accounts on this Parcel](#) | [Display Tax Bills on this Parcel](#)]

OWNERSHIP, LEGAL, SALES AND DISTRICT DATA ARE FROM THE CURRENT DATABASE. LAND, BUILDING, VALUE AND EXEMPTION DATA ARE FROM THE 2001 ROLL.

Owner of Record		Legal Description		Image of Structure	
OPM USA INC 325 INTERSTATE BLVD SARASOTA FL 34240		PAR S OF BUCKINGHAM RD DESC OR 2840 PG 2681		(Not Presently Available)	
Site Address		10651 BUCKINGHAM RD Fort Myers, FL 33905			
Taxing District		DOR Code			
137 - CITY FT MYERS/EAST CO SEWER MSTU		10 - VACANT COMMERCIAL			
Property Values		Exemptions		Dimensions	
Just	82,410	Homestead	0	Measurement Units	MS
Assessed	82,410	Agricultural	0	Number of Units	0.00
Assessed SOH	82,410	Widow	0	Frontage	0
Taxable	82,410	Widower	0	Depth	0
Building	2,900	Disability	0	Bedrooms	
Land	79,510	Wholly	0	Bathrooms	
Building Extra Features	2,900	Energy	0	Total Sq. Ft.	
Land Extra Features	1,220	SOH Difference	0	Year Built	
Sales Transactions					
Sale Price	Date	OR Book/Page	Transaction Type	Vacant/Improved	
98,700	6/26/1997	2840/2681	06	V	
100	3/11/1997	2801/2473	01	V	
1,792,200	8/1/1988	2009/2088	01	V	

410,600	7/1/1988	2008/4032	01	V	
Land Tracts/Land Use					
Description	Use Code	Units			
Commercial, Vacant	1000	21500.00 Square Feet			
Right of Way	9400	1.52 Acres			
Storm Surge Category	Flood Insurance (FIRM)				
	Rate Code	Community	Panel	Version	Date
Category 4	X				

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[[Show Building Details](#)]

[[Show Aerial View](#)]

[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#)]

[[New Query](#) | [Parcel Queries Page](#) | [Lee PA Home](#)]

LEE COUNTY PROPERTY APPRAISER

Property Data for Parcel ~~24-14-25-P1-000015-11000~~[[Next Lower Parcel Number](#) | [Next Higher Parcel Number](#) | [Display Tax Bills on this Parcel](#)]

OWNERSHIP, LEGAL, SALES AND DISTRICT DATA ARE FROM THE CURRENT DATABASE. LAND, BUILDING, VALUE AND EXEMPTION DATA ARE FROM THE 2001 ROLL.

Owner of Record		Legal Description		Image of Structure	
WISS RONALD TR C/O WOLFF + SAMSON 5 BECKER FARM RD ROSELAND NJ 07068		W1/2 OF SEC 24 + PT SEC 25 LYING N OF BUCKINGHAM RD		(Not Presently Available)	
Site Address		0 Fort Myers, FL 33905			
Taxing District		DOR Code			
137 - CITY FT MYERS/EAST CO SEWER MSTU		64 - GRAZING LAND CLASS V			
Property Values		Exemptions		Dimensions	
Just	2,521,700	Homestead	0	Measurement Units	AC
Assessed	16,910	Agricultural	2,504,790	Number of Units	323.97
Assessed SOH	16,910	Widow	0	Frontage	0
Taxable	16,910	Widower	0	Depth	0
Building	0	Disability	0	Bedrooms	
Land	16,910	Wholly	0	Bathrooms	
Building Extra Features	0	Energy	0	Total Sq. Ft.	
Land Extra Features	0	SOH Difference	0	Year Built	
Sales Transactions					
Sale Price	Date	OR Book/Page	Transaction Type	Vacant/Improved	
1,000	1/1/1996	2676/1469	01	V	
3,197,900	9/1/1989	2099/4368	01	V	

Solid Waste (Garbage) Roll Data					
Solid Waste District	Roll Type	Category	Unit/Area	Tax Amount	
009 - City of Fort Myers	-		0	0.00	
Land Tracts/Land Use					
Description		Use Code	Units		
Market Value Agricultural		9910	288.27 Acres		
Market Value Agricultural		9910	35.70 Acres		
Storm Surge Category	Flood Insurance (FIRM)				
	Rate Code	Community	Panel	Version	Date
Category 4	X				

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[\[Hide Building Details \]](#)
[\[Show Aerial View \]](#)
[\[Next Lower Parcel Number \]](#)
[\[Next Higher Parcel Number \]](#)
[\[New Query \]](#)
[\[Parcel Queries Page \]](#)
[\[Lee PA Home \]](#)

1.2 – Governmental Properties

Strap Locations

Map Index	Strap	Owner	Street	Address	Description
1	264325-00000100000	TIITF State of Florida	0	Access Undetermined	ROW
2	264325-00000110000	TIITF State of Florida	0	Access Undetermined	ROW
3	264325-00000120000	TIITF State of Florida	0	Access Undetermined	ROW
4	274325-00000020000	TIITF State of Florida	0	Island	ROW
5	274325-00000030000	TIITF State of Florida	0	Island	ROW
6	344325-00000020000	Lee County	5240	Lake Caloosa Dr.	County Owned, Offices, Library, Government Bldg
7	344325-00000030000	Lee County	90	Schneider Dr	Mangroves
8	344325-00000080010	Lee County	5441	Palm Beach Blvd.	County Owned, Offices, Library, Government Bldg
9	344325-00000090030	TIITF State of Florida	5500	Palm Beach Blvd.	Pond
10	344325-00000130000	TIITF State of Florida	0	Access Undetermined	ROW
11	344325-01000120000	Lee County	140	Schneider Dr	Vacant Residential
12	344325-01000260000	Lee County	106	Schneider Dr	County Owned, Offices, Library, Government Bldg
13	344325-07000020010	TIITF State of Florida	0	State Land DOT	ROW
14	344325-070000A0060	TIITF State of Florida	0	State Land DOT	ROW
15	354325-00000030000	TIITF State of Florida	10941	Palm Beach Blvd.	State Owned, Offices, Library, Government Bldg
16	364325-00000270000	TIITF State of Florida	0	Palm Beach Blvd.	Government Owned, Recreational Area
17	304326-00000030030	Ft. Myers Shore Fire Pro+Rescu	12345	Palm Beach Blvd.	County Owned, Offices, Library, Government Bldg
18	304326-00000030040	Lee County	12901	Palm Beach Blvd.	County Owned, Offices, Library, Government Bldg
19	334326-00000041000	Lee County Dist School Board	3291	Buckingham Rd.	Government Owned, Public School
20	034425-00000080010	TIITF State of Florida	4051	Florida DOT Way	ROW
21	034425-00000080060	TIITF State of Florida	5251	Tice St.	State Owned, Offices, Library, Government Bldg
22	034425-00000130010	Lee County Dist School Board	4501	Underwood Dr.	School, Private
23	034425-01000460020	State of Florida	280	Procopio Ln.	ROW
24	034425-0500000B000	Lee County	120	Alameda Ave.	Commercial, Vacant
25	044425-00000170000	State of Florida	0	Kingston Dr.	Vacant Residential
26	044425-00000220000	Lee County	4834	Garcia Ave.	Vacant Residential
27	044425-00000220010	State of Florida	0	Access Undetermined	Resource Protect., Wetlands, Preserve, Cypress Head
28	044425-03000080010	Lee County	237	Lagoon Dr.	County Owned, Offices, Library, Government Bldg
29	044425-080000A0000	Lee County	300	Royal Palm Park Rd.	County Owned, Offices, Library, Government Bldg
30	044425-09000010010	Lee County	425	Royal Palm Park Rd.	Vacant Residential
31	044425-09000010020	Lee County	421	Royal Palm Park Rd.	Municipally Owned, Offices, Library, Government Bldg.
32	044425-12000000130	Lee County	419	Florence Ave	County Owned, Offices, Library, Government Bldg
33	044425-12000230000	United States Postal Service	4585	Palm Beach Blvd.	Store One (1) Floor
34	044425-12000230020	State of Florida DOT	4574	Palm Beach Blvd.	State Owned, Offices, Library, Government Bldg
35	044425-16000070060	Lee County	461	Menocal Ave.	Vacant Residential

Strap Locations

Map Index	Strap	Owner	Street	Address	Description
36	044425-170000B0090	Lee County	4679	Palm Beach Blvd.	Single Family Residential
37	084425-00000010010	City of Ft. Myers	1181	Marsh Ave.	Vacant Residential
38	084425-P20280D0140	City of Ft. Myers	4141	Woodside Ave.	Multi-Family Less than 10 units
39	084425-P2037030020	City of Ft. Myers	4238	Armeda Ave.	Government Owned, Park
40	084425-P2041000210	City of Ft. Myers	780	Adams Ave.	Vacant Residential
41	084425-P3000670020	City of Ft. Myers	851	Marsh Ave.	Vacant Residential
42	084425-P300072001A	City of Ft. Myers	0	Access Undetermined	Municipally Owned, Offices, Library, Government Bldg.
43	084425-P3048000090	Dunbar Industrial Action Dev.	4200	Arlington Ave.	Vacant Residential
44	084425-P3048000100	Dunbar Industrial Action Dev.	4210	Arlington Ave.	Vacant Residential
45	084425-P3048000110	Dunbar Industrial Action Dev.	4220	Arlington Ave.	Vacant Residential
46	084425-P3048000120	Dunbar Industrial Action Dev.	4	Roanoke Dr.	Vacant Residential
47	084425-P3048000130	Dunbar Industrial Action Dev.	6	Roanoke Dr.	Vacant Residential
48	084425-P3048000150	Dunbar Industrial Action Dev.	10	Roanoke Dr.	Vacant Residential
49	084425-P3048000160	Dunbar Industrial Action Dev.	12	Roanoke Dr.	Vacant Residential
50	084425-P3048000170	Dunbar Industrial Action Dev.	14	Roanoke Dr.	Vacant Residential
51	084425-P3048000710	Dunbar Industrial Action Dev.	1038	Windsor Dr.	Vacant Residential
52	084425-P3048003010	City of Ft. Myers	4361	Arlington Ave.	Vacant Residential
53	084425-P3048003050	City of Ft. Myers	4341	Arlington Ave.	Vacant Residential
54	084425-P3048003080	City of Ft. Myers	4321	Arlington Ave.	Vacant Residential
55	084425-P3048003100	City of Ft. Myers	4275	Arlington Ave.	Vacant Residential
56	084425-P3048003110	City of Ft. Myers	4269	Arlington Ave.	Vacant Residential
57	084425-P3048003120	City of Ft. Myers	4259	Arlington Ave.	Vacant Residential
58	084425-P3048003130	City of Ft. Myers	4251	Arlington Ave.	Vacant Residential
59	084425-P3048003140	City of Ft. Myers	4241	Arlington Ave.	Vacant Residential
60	084425-P3048003150	City of Ft. Myers	4235	Arlington Ave.	Vacant Residential
61	084425-P3048003160	City of Ft. Myers	4231	Arlington Ave.	Vacant Residential
62	084425-P3048003170	City of Ft. Myers	4221	Arlington Ave.	Vacant Residential
63	084425-P3048003180	City of Ft. Myers	4215	Arlington Ave.	Vacant Residential
64	084425-P3048003190	City of Ft. Myers	4201	Arlington Ave.	Vacant Residential
65	084425-P3049000010	City of Ft. Myers	4100	Washington Ave.	Municipally Owned, Offices, Library, Government Bldg.
66	084425-P3049000030	City of Ft. Myers	4120	Washington Ave.	Municipally Owned, Offices, Library, Government Bldg.
67	084425-P3049000040	City of Ft. Myers	4103	Madison Ave.	Municipally Owned, Offices, Library, Government Bldg.
68	084425-P4022050080	City of Ft. Myers	0	Pearl St.	Vacant Residential
69	084425-P4044000230	Dunbar Industrial Action Dev.	3843	Pearl St.	Vacant Residential
70	094425-00000060000	Lee County Dist School Board	4524	Tice St.	Government Owned, Public School

Strap Locations

Map Index	Strap	Owner	Street	Address	Description
71	094425-00000110000	Lee County	4491	Armeda Ave.	ROW
72	094425-07000010010	Lee County	4478	Glenwood Ave.	Vacant Residential
73	104425-00000020000	Lee County	5170/5180	Tice St.	County Owned, Offices, Library, Government Bldg
74	104425-03000000740	Lee County	5650/5660	Enterprise Pkwy	County Owned, Offices, Library, Government Bldg
75	104425-10000001410	Lee County	5560	Zip Dr.	Industrial, Vacant
76	154425-00000230000	Lee Co. Hyacinth Control Dist.	1277	Golden Lake Rd	Lake
77	164425-0501000A000	Lee County	8951	Laredo Ave	County Owned, Offices, Library, Government Bldg
78	164425-P1000650000	City of Ft. Myers		Access Undetermined	Acreage, Non-Agr, 20 acres or more, Lake, Conserv, Retention
79	164425-P3000670000	City of Ft. Myers	0	Ortiz Ave	Industrial, Vacant
80	164425-P4003000040	City of Ft. Myers	4650	Cummins Ct.	Industrial, Vacant
81	164425-P400300029A	City of Ft. Myers	4520	Cummins Ct.	Municipally Owned, Offices, Library, Government Bldg.
82	174425-00000160010	Lee County	3841	Ballard Rd.	County Owned, Offices, Library, Government Bldg
83	174425-00000260010	Lee County Dist School Board	1333	Marsh Ave.	Government Owned, Public School
84	174425-030000E0230	Lee County	169	Lucille Ave.	Vacant Residential
85	174425-050000G0160	Lee County	3627	Michigan Ave.	Vacant Residential
86	174425-07000010010	Lee County	4380	New York Ave.	County Owned, Offices, Library, Government Bldg
87	174425-07000040010	Lee County	194	Detroit Ave.	Vacant Residential
88	174425-P3000620000	Lee County Dist School Board	4312	Michigan Ave.	Government Owned, Public School
89	174425-P3000630000	Ft. Myers Housing Authority	4224-4258	Michigan Ave. Link	Multi-Family 10 or more units
90	174425-P4003000010	Ft. Myers Housing Authority	3920	Michigan Ave.	Municipally Owned, Offices, Library, Government Bldg.
91	174425-P4003000020	Lee County Dist School Board	3650-3850	Michigan Ave.	Government Owned, Public School
92	174425-P4003000100	Ft. Myers Housing Authority	3701	Sabal Palm Blvd.	Municipally Owned, Offices, Library, Government Bldg.
93	174425-P4003000210	Ft. Myers Housing Authority	3701	Sabal Palm Blvd.	Municipally Owned, Offices, Library, Government Bldg.
94	184425-P3035060010	City of Ft. Myers	1703	Palmetto Ave.	Municipally Owned, Offices, Library, Government Bldg.
95	184425-P3035060020	City of Ft. Myers	1709	Palmetto Ave.	Municipally Owned, Offices, Library, Government Bldg.
96	184425-P3035170010	Ft. Myers Housing Authority	3501	Dale St.	Municipally Owned, Offices, Library, Government Bldg.
97	184425-P3035180010	Ft. Myers Housing Authority	3501	Dale St.	Municipally Owned, Offices, Library, Government Bldg.
98	184425-P3035190010	Ft. Myers Housing Authority	3501	Dale St.	Municipally Owned, Offices, Library, Government Bldg.
99	194425-05000110080	USA District Director IRS	3520	Jeffcott St.	Vacant Residential
100	194425-05000160190	Lee County	3429	Canal St.	Single Family Residential
101	194425-05000280190	Lee County	3429	Willard St.	County Owned, Offices, Library, Government Bldg
102	194425-06000040090	Lee County	2399	Highland Ave.	Single Family Residential
103	194425-06000040130	Lee County	2375	Highland Ave.	Vacant Residential
104	194425-070000F0080	Dunbar Industrial Action Dev.	2335	Ben St.	Vacant Residential
105	194425-08000020110	State of Florida DOT	3540	Kaune Ave.	Vacant Residential

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Strap Locations

Map Index	Strap	Owner	Street	Address	Description
106	194425-08000020140	State of Florida DOT	0	Access Undetermined	Vacant Residential
107	194425-P3006000010	City of Ft. Myers CRA	0		Commercial, Vacant
108	204425-00000050130	City of Ft. Myers CRA	2110	Flint Dr.	Commercial, Vacant
109	204425-00000050160	State of Florida DOT	2100	Flint Dr.	Commercial, Vacant
110	204425-01000010020	Tice Fire Pro 7 Res Dist.	3701	Edison Ave	County Owned, Offices, Library, Government Bldg
111	204425-040000C0070	City of Ft. Myers CRA	2045	Barden St.	Night Club, Bar, Lounge
112	204425-040000D0390	Lee County	2370	Towles St.	Vacant Residential
113	204425-05000020270	Lee County	2199	Simon Ct.	ROW
114	204425-05000060170	Lee County	2172	Simon Ct.	Vacant Residential
115	204425-08000000080	Lee County	2029	Dupree St.	Mobile Home Subdivision
116	204425-P1003000500	State of Florida DOT	0	DR. MLK JR. Blvd.	Vacant Residential
117	204425-P100401001C	State of Florida DOT	0	DR. MLK JR. Blvd.	Municipally Owned, Offices, Library, Government Bldg.
118	204425-P2000010000	City of Ft. Myers	4301	Edison Ave	Municipally Owned, Offices, Library, Government Bldg.
119	204425-P2001010010	City of Ft. Myers	4200	DR. MLK JR. Blvd.	Municipally Owned, Offices, Library, Government Bldg.
120	204425-P2001010070	Lee County Humane Society	2008/2010	Arcadia St.	County Owned, Offices, Library, Government Bldg
121	204425-P3000020000	City of Ft. Myers	0		Municipally Owned, Offices, Library, Government Bldg.
122	204425-P4000640000	Lee County Dist School Board	3800/3713	Edison Ave/Canal St.	Government Owned, Public School
123	204425-P400600B000	City of Ft. Myers	0		County Owned, Offices, Library, Government Bldg
124	214425-P1001000160	City of Ft. Myers	2485	Ortiz Ave	Municipally Owned, Offices, Library, Government Bldg.
125	214425-P3001000900	THTF State of Florida	2625	Ortiz Ave	State Owned, Offices, Library, Government Bldg
126	234425-P1000020000	State of Florida DOT		Access Undetermined	State Owned, Offices, Library, Government Bldg
127	244425-00000010000	Lee County	10500	Buckingham Rd.	County Owned, Offices, Library, Government Bldg
128	264425-00000010010	Lee County	10011	Colonial Blvd.	County Owner, Offices, Library, Government Bldg.
129	264425-00000021000	Lee County		Access Undetermined	Acreage, Buffer - Conservation, Water Retention
130	264425-P2000670000	Lee County		SR 82/Immokalee Rd.	County Owned, Offices Library, Government Bldg.
131	274425-00000021000	Lee County	9931	Colonial Blvd.	Acreage, Buffer - Conservation, Water Retention
132	284425-P3000030000	City of Ft. Myers	3450	Ortiz Ave	Municipally Owned, Offices, Library, Government Bldg.
133	294425-P1001020040	Lee County Gov Leasing Corp	2955	Van Buren St.	County Owned, Offices, Library, Government Bldg
134	324425-P10020E0010	City of Ft. Myers	0		Municipally Owned, Offices, Library, Government Bldg.
135	324425-P10020E0060	City of Ft. Myers	0		Single Family Residential
136	324425-P10020E0070	City of Ft. Myers	0		Municipally Owned, Offices, Library, Government Bldg.
137	324425-P10020I0010	City of Ft. Myers	0		Single Family Residential
138	324425-P10020I0070	City of Ft. Myers	0		Single Family Residential
139	324425-P1002M00010	City of Ft. Myers	0		Single Family Residential

Strap Locations

Map Index	Strap	Owner	Street	Address	Description
140	324425-P1002M00050	City of Ft. Myers	0		Single Family Residential
141	324425-P1002M00090	City of Ft. Myers	0		Single Family Residential
142	324425-P1002M00110	City of Ft. Myers	0		Municipally Owned, Offices, Library, Government Bldg.
143	324425-P1002Q0001A	City of Ft. Myers	0		Municipally Owned, Offices, Library, Government Bldg.
144	324425-P1002Q00030	City of Ft. Myers	0		Single Family Residential
145	324425-P1002Q00070	City of Ft. Myers	0		Municipally Owned, Offices, Library, Government Bldg.
146	324425-P1002Q00090	City of Ft. Myers	0		Single Family Residential
147	324425-P1002Q00100	City of Ft. Myers	0		Single Family Residential
148	324425-P1002Q00110	City of Ft. Myers	0		Municipally Owned, Offices, Library, Government Bldg.
149	324425-P1002Q0011A	City of Ft. Myers	0		Municipally Owned, Offices, Library, Government Bldg.
150	324425-P20020C0030	City of Ft. Myers	0		Single Family Residential
151	324425-P20020C0050	City of Ft. Myers	0		Single Family Residential
152	324425-P20020C0070	City of Ft. Myers	0		Single Family Residential
153	324425-P20020C0110	City of Ft. Myers	0		Municipally Owned, Offices, Library, Government Bldg.
154	334425-P4000040010	School Board of Lee County	4750	Winkler Ave Ext.	Government Owned, Public School
155	354425-00000010000	Lee County	10010	Colonial Blvd.	Acreage, Buffer - Conservation, Water Retention
156	054426-00000260000	Lee County	13801	Orange River Blvd.	Vacant Residential
157	054426-00000340000	Lee County	13861	Cemetery Rd.	County Owned, Offices, Library, Government Bldg
158	054426-00000350000	Lee County	4940	Buckingham Rd.	County Owned, Offices, Library, Government Bldg
159	064426-00000110010	Lee County	12511	Orange River Blvd.	Vacant Residential
160	074426-00000050000	TIITF State of Florida	5530	Neal Rd.	Government Owned, Hospital
161	084426-00000030000	Lee County	13320	Peace Rd.	County Owned, Offices, Library, Government Bldg
162	084426-00000060010	Lee County	13800	Cemetery Rd.	County Owned, Offices, Library, Government Bldg
163	084426-00000210000	TIITF State of Florida	5820	Buckingham Rd.	Government Owned, Hospital
164	084426-00000210010	TIITF State of Florida	5850	Buckingham Rd.	County Owned, Offices, Library, Government Bldg
165	104426-00000010090	USA	0	Access Undetermined	Federally Owned, Offices, Library, Government Bldg.
166	104426-00000010110	USA	5460	Jackson Rd.	Vacant Residential
167	154426-01000040000	Lee County		Access Undetermined	County Owned, Offices, Library, Government Bldg
168	154426-01000170110	Lee Co. Mosquito Control Dist.	15191	Homestead Rd.	County Owned, Offices, Library, Government Bldg
169	164426-020000A0000	Lee County	6950	School Lane	Vacant Residential

Strap Locations

Map Index	Strap	Owner	Street	Address	Description
170	174426-00000020000	TIITF State of Florida	0		Government Owned, Hospital
171	184426-00000030000	TIITF State of Florida	0		Government Owned, Hospital
172	194426-00000040000	Lee County	9800	Buckingham Rd.	Government Owned, Park
173	214426-03000050000	Lee Co. Mosquito Control Dist.	0		Vacant Residential
174	214426-030000B0000	Lee Co. Mosquito Control Dist.	1840	Gunnery Rd. N	Vacant Residential
175	224426-01000370010	Lee Co. Mosquito Control Dist.	15200	Homestead Rd.	Vacant Residential
176	224426-01000370020	Lee Co. Mosquito Control Dist.	15170	Homestead Rd.	Vacant Residential
177	224426-0300000B000	Lee Co. Mosquito Control Dist.	0		Vacant Residential
178	224426-03000040010	Lee Co. Mosquito Control Dist.	2498	College Ave.	County Owned, Offices, Library, Government Bldg
179	224426-03000050000	Lee Co. Mosquito Control Dist.	0		Vacant Residential
180	224426-03000130020	Lee Co. Mosquito Control Dist.	2541	Park Rd	Single Family Residential
181	234426-08000200000	School Board of Lee County	15511	Homestead Rd.	Government Owned, Public School
182	264426-02000020100	Lee County Housing Dev Corp	3310	15th St. W	Vacant Residential
183	264426-05000190010	Lee County Dist School Board	601	Sara Ave N.	Government Owned, Public School
184	274426-04000420060	Lee County	4009	4th St. W	Single Family Residential
185	284426-00000020010	Lee County	891	Gunnery Rd. N	County Owned, Offices, Library, Government Bldg
186	284426-00000020020	Lee County Dist School Board	901	Gunnery Rd. N	Government Owned, Public School
187	284426-00000040000	Lee County	881	Gunnery Rd. N	County Owned, Offices, Library, Government Bldg
188	304426-05000330010	Lee County	5549	Berryman St.	Vacant Residential
189	304426-05000330160	Lee County	5548	Brookfield St.	Vacant Residential
190	304426-P1000010000	City of Ft. Myers	5600	Lee Blvd.	Municipally Owned, Offices, Library, Government Bldg.
191	334426-07000070270	Lehigh Acres Fire Control	308	Gunnery Rd. S	County Owned, Offices, Library, Government Bldg
192	334426-07000170090	Lee County	716	Gunnery Rd. S	Commercial, Vacant
193	344426-01000030020	Lee County	4121	Douglas Lane	Vacant Residential
194	034525-P2000020150	State of Florida DOT	0	Access Undetermined	ROW
195	044525-00000050010	Lee County	10951	Ben C. Pratt Six Mile Cypress	County Owned, Offices, Library, Government Bldg
196	094525-00000011000	Lee County	0	Access Undetermined	Resource Protect., Wetlands, Preserve, Cypress Head
197	104525-00000060240	Lee County	11581	Morgan Hill Rd.	County Owned, Offices, Library, Government Bldg
198	104525-00000060290	Lee County	11661	Morgan Hill Rd.	Vacant Residential
199	044526-05000230180	Lee County	2511	Gretchen Ave. S	ROW
200	084526-00000012080	Lee County Dist School Board	13280	Commerce Lakes Dr.	Government Owned, Public School
201	094526-05000230530	Lee County	2669	Gretchen Ave. S	Commercial Vacant - 64,875 Sq. Ft. ROW 1.77 Acres



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

APPENDIX 2.0

ZONING AND LAND USE PLANS

2.1 - Proof of Zoning

2.2 - Lee County Ordinance 94-30

2.3 - Future Land Use

**2.4 - Special Treatment Areas/
Overlay Descriptions**

2.5 - Zoning Categories

2.1 - Proof of Zoning

IMAGE QUALITY

**PLEASE NOTE
THE ORIGINAL DOCUMENTS
SCANNED FOR THIS RECORD
WERE OF POOR QUALITY.**

RECEIVED
ZONING

90 OCT -2 PM 2:57

RESOLUTION NUMBER 2-90-079

RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS
OF LEE COUNTY, FLORIDA

WHEREAS, the Board of County Commissioners, represented by the Department of Utilities, in reference to Lee County Resource Recovery Facility has properly filed an application for a rezoning from AS-1 to Industrial Planned Development to permit the development of an energy recovery facility with buildings not to exceed 6 stories and 240 feet in height above average grade, on 148 total acres of land.

NOTE: If approved, the Master Concept Plan will deviate from the following Lee County standard:

- (1) Requirement that the height of buildings in an Industrial Planned Development cannot exceed 2 habitable stories and 45 feet above minimum flood elevation (Section 471.8.4.), to 6 habitable stories and 380 feet above average grade; and

WHEREAS, the subject property is located at 10500 Buckingham Road, Tice, described more particularly as:

LEGAL DESCRIPTION: In Section 24, Township 44 South, Range 25 East, Lee County, Florida:

A tract or parcel of land lying in Sections 24 and 25, Township 44 South, Range 25 East, Lee County, Florida which tract or parcel is described as follows:

BEGINNING AT the East Quarter (EQ) corner of said Section 24;
THENCE run S89°41'53"E along said West line for 1,641.21 feet to the Southeast corner of said Section 24;
THENCE run S01°30'57"E along the East line of said Section 25 for 51.16 feet to an intersection with the North line of Buckingham Road (150 feet wide);
THENCE run S88°45'25"W along said North line for 2,389.3 feet;
THENCE run N86°47'48"W along a line parallel with and 356.00 feet East of the quarter section line of the East Half (EH) of said Section 24 to an intersection with the North Quarter (NQ) section line of the Southeast Quarter (SE1/4) section of said Section 24;
THENCE run East along the North Quarter (NQ) section line to the POINT OF BEGINNING.

WHEREAS, the applicant has indicated the property's current STRAP number is 26-44-25-00-00001.0000; and

WHEREAS, the Department of Utilities has the authority under Section 800.A.2 of the Lee County Zoning Ordinance to initiate this application; and

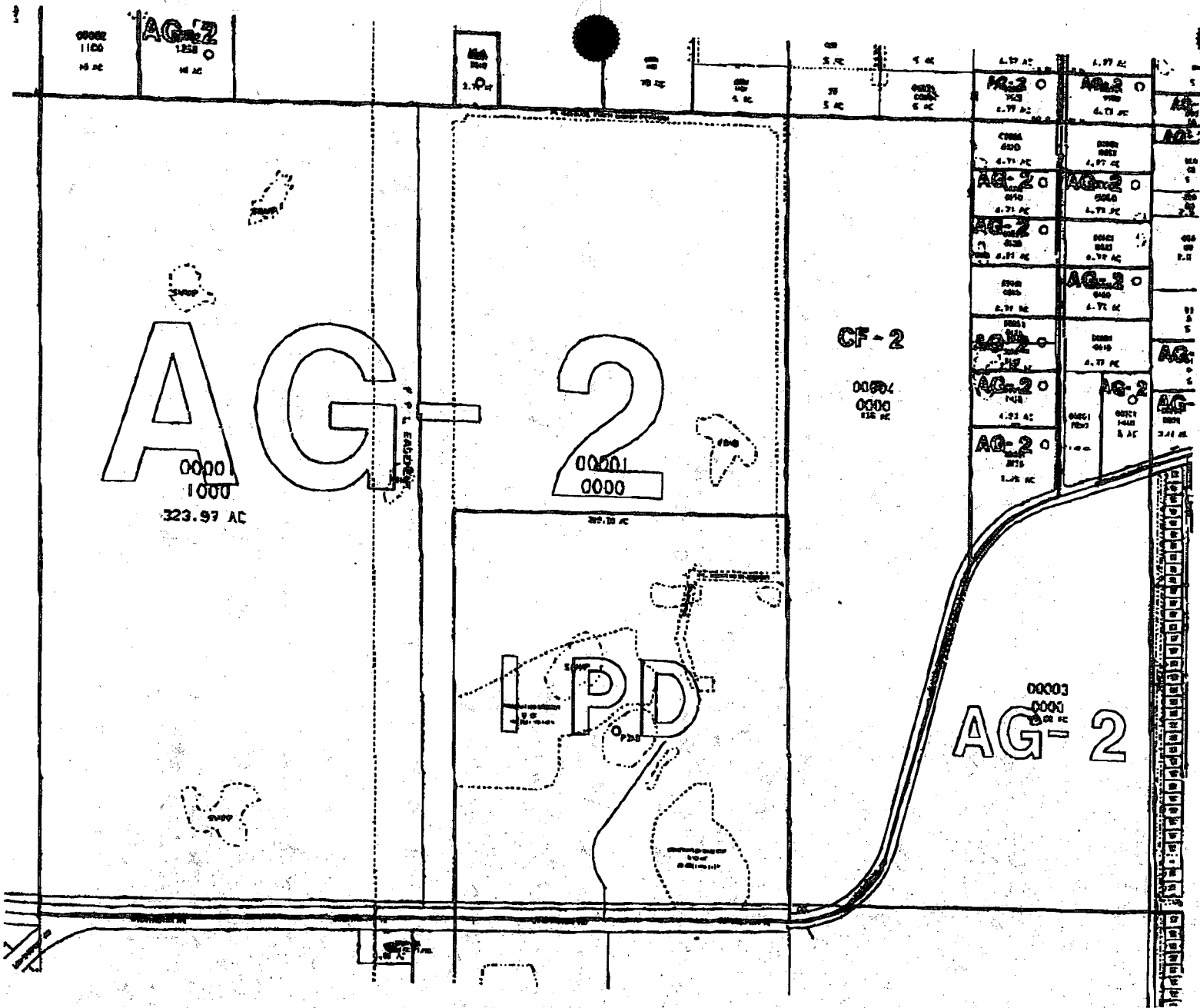
HEARING NUMBER 90-2-14-DCT-4

RESOLUTION NUMBER 2-90-079
Page 1 of 4

(93091/13)

N. Glan

S. Dym
Rosanna

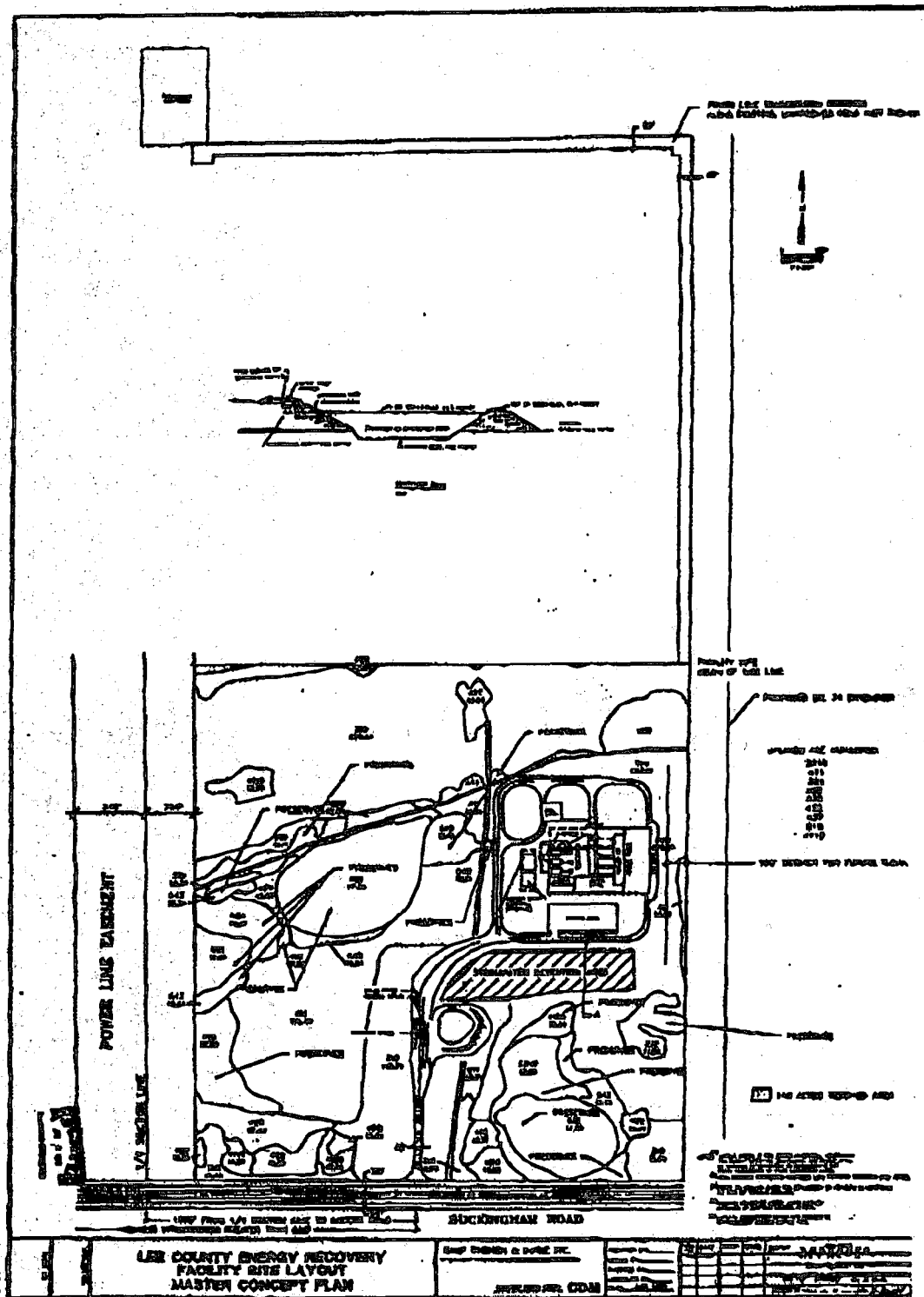


LEE COUNTY ZONING NOTES

ZONE-> IPD-001610

- 1 Z-90-079, 90-8-14-DCI-4, IPD, 9/24/90, 148 AC, LEE INCINERATOR, BCC APPV
DEC FM AG-2 TO IPD, SUBJ TO CONDS & SITE PLAN 90-079.

ZONE-> AG-2 aaaaaa CONTAINS PARCEL AP:244425:00:00001:0000 CENTER aaaaaa



WHEREAS, a public hearing was legally and properly advertised and held before the Lee County Hearing Examiner, with full consideration of all the evidence available; and

WHEREAS, the Lee County Hearing Examiner fully reviewed the matter on August 16, 1990; and

WHEREAS, a public hearing was legally and properly advertised and held before the Lee County Board of County Commissioners; and

WHEREAS, in the legislative process the Lee County Board of County Commissioners gave full and complete consideration to the recommendations of the staff, the Hearing Examiner, the documents on file with the county, and the testimony of all interested persons.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS, that the Board of County Commissioners does hereby APPROVE with conditions a Industrial Planned Development zoning.

This approval is subject to the following conditions:

1. The development of this site shall be in accordance with the one-page Master Concept plan entitled "Lee County Heavy Recovery Facility Site Layout," prepared by Camp Dresser & McKee, Inc. (dated June, 1990, stamped received July 6, 1990). Except as may be modified by the conditions herein, this approval does not relieve the development from compliance with all other applicable federal, state, or local regulations, except for those specifically approved as part of this application.

This site shall be used solely for the Lee County Heavy Recovery Facility and the auxiliary uses associated with that principal use. No other facility or use shall be permitted on this site. Any additional use or change is not inconsistent with this condition shall be considered as a substantial change requiring new public hearings.

2. The approved schedule of uses for this Industrial Planned Development is as follows:

- Salvage and disposal of materials, limited to refuse disposal and processing plant, incinerators and materials recovery and recycling facilities (Section 515)
- Administrative offices (6c)
- Amusement and recreation (Section 202.16)
- Essential Services
- Essential Service Facilities, All Groups (Section 1001.13)
- Excavation, Water Retention
- Signs, in conformance with the Lee County Sign Ordinance

3. This zoning approval does not indicate that this project's traffic impacts have been mitigated. Additional conditions may be required at the time of issuance of a local development order.

LEGISLATIVE ORDER 90-B-14-DCL-4

RESOLUTION NUMBER 2-10-97B

Page 2 of 4

(05057/16)

4. Deviation (1) is APPROVED with the condition that the Lee County Port Authority staff approve this height at this location, prior to approval of building permits on this site. This shall take the form of a letter from the Port Authority staff indicating that they have reviewed this project and have determined that it will have no adverse impacts on the air traffic in this area OR provision(s) have been made to offset any potential negative impacts.

Site Plan 90-079 is attached hereto and incorporated herein by reference, as a reduced copy of the Master Concept Plan.

The following findings of fact were made in conjunction with this approval for Industrial Planned Development zoning:

- A. That the requested rezoning is consistent with the Goals, Objectives, Policies, and intent of the Lee Plan. The Plan clearly contemplates the proposed use and allows siting in the subject area. The proposed rezoning will act to further specific Lee Plan Goals and Policies, as noted in the Staff Report.
- B. That the requested use meets or exceeds all performance and locational standards set forth for the proposed use in appropriate Lee County ordinances.
- C. That the request is consistent with the densities, intensities and general uses set forth in the Lee Plan.
- D. That the proposed use, as conditioned, will not adversely affect and will affirmatively act to protect, conserve or preserve environmentally critical areas and natural resources.
- E. That the requested use will not place an undue burden upon existing transportation or other services and facilities, and will be served by roadways with adequate capacity to carry traffic anticipated from the development.
- F. That the requested use, as conditioned, will be in compliance with all applicable general zoning provisions and supplemental regulations pertaining to the use, as set forth in the zoning ordinance.
- G. That the proposed use, as conditioned, will be compatible with existing or planned uses, and not cause damage, hazard, nuisance or other significant detriment to persons or property.

HEARING NUMBER 90-8-14-DCI-4

RESOLUTION NUMBER 2-90-079
Page 3 of 4

(9509L/15)

The foregoing Resolution was adopted by the Lee County Board of County Commissioners upon a motion by Commissioner Ray Judah, and seconded by Commissioner Bill Fussell and, upon being put to a vote, the result was as follows:

John E. Manning	<u>AYE</u>
Douglas St. Coray	<u>AYE</u>
Ray Judah	<u>AYE</u>
Bill Fussell	<u>AYE</u>
Donald D. Elischer	<u>AYE</u>

DULY PASSED AND ADOPTED this 24th day of September, A.D., 1990.

ATTEST:
CHARLIE GREEN, CLERK

By: Charlie Green
Deputy Clerk

BOARD OF COUNTY COMMISSIONERS
OF LEE COUNTY, FLORIDA

By: J. Manning
Chairman

Approved as to form by

County Attorney's Office

Poor Original

FILED
OCT 02 90
CLERK CIRCUIT COURT
BY Charlie Green D.C.

HEARING NUMBER 90-8-14-DCI-4

RESOLUTION NUMBER E-90-079
Page 4 of 4

(9509L/16)



COMMERCIAL



BUILDING PERMIT

PERMIT NUMBER: COM2001-00381

ISSUED: 06/13/01

EXPIRES: 12/13/01

Owner Name: LEE COUNTY

Contractor:
Project Name: LEE COUNTY RECOVERED

Master #:
Description: ADDITION / OFFICE BLDG 2438sf. @ LEE COUNTY RECOVERED FACILITY

Job Address: 10300 BUCKINGHAM RD

Zoning: IPD

DO NA
Coastal Req: N

of Amps: 100.00

Type of MEC
Type of PLU Plumbing

Flood Req: N

Upgrade:
Interior/Exterior:
Type of ROF Metal

FEMA Req: N

Relocate:
of Compressors:
Type of FIR Permit:
Elevation:
of Pedestals:
of Exhaust Hds:
Type of Septic: Sewer

of Meters:
New/Replace:
Threshold Building: N

Engineering:
Type of AC System: NC

INSPECTION REQUEST LINE: 479-8997
DATE
BY
DATE
BY


101 Foundation

102 Floor

103 Tie Beam

104 Columns / Piling

105 Framing

107 Insulation

201 1st R. Plumb

202 2nd R. Plumb

203 Sewer

Well

Septic

Other Inspection

301 T. Pole / 302 TUG

304 R. Electrical

401 Rough HVAC

501 Roof Dry-In

502 Roof Process

503 Roof Final

205 Gas Rough

206 Gas Final

110 Final

902 Fire

Other Inspection

Other Inspection

FEDERAL AND STATE LAWS REQUIRE THAT FOR DEMOLITION AND RENOVATIONS THE OWNER AND/OR OPERATOR TO SUBMIT A NOTICE TO THE DEPARTMENT OF ENVIRONMENTAL PROTECTION PRIOR TO THE REMOVAL OF ASBESTOS PRODUCTS AND/OR THE DEMOLITION OF A STRUCTURE. FOR MORE INFO CONTACT DEP AT 941-332-6975

WARNING TO OWNER: YOUR FAILURE TO RECORD A NOTICE OF COMMENCEMENT MAY RESULT IN YOUR PAYING TWICE FOR IMPROVEMENTS TO YOUR PROPERTY. IF YOU DO INTEND TO OBTAIN FINANCING, CONSULT WITH YOUR LENDER OR AN ATTORNEY BEFORE RECORDING YOUR NOTICE OF COMMENCEMENT. IN ADDITION TO THE REQUIREMENTS OF THIS PERMIT THERE MAY BE ADDITIONAL RESTRICTIONS APPLICABLE TO THIS PROPERTY THAT MAY BE FOUND IN THE PUBLIC RECORDS OF THIS COUNTY, THERE MAY BE ADDITIONAL PERMITS REQUIRED FROM OTHER GOVERNMENTAL ENTITIES SUCH AS WATER MANAGEMENT DISTRICTS, STATE OR FEDERAL AGENCIES. THIS PERMIT IS VOID IF THE FIRST INSPECTION IS NOT MADE WITHIN 6 MONTHS FROM THE DATE ISSUED OR IF NO INSPECTION HAS BEEN MADE FOR A PERIOD OF 6 MONTHS FROM THE MOST RECENT PASSED INSPECTION. BUILDING PLANS MUST BE ON JOBSITE AT TIME OF INSPECTION. REINSPECTION FEE IS \$25.00

THIS CARD MUST BE PLACED ON A BOARD AT EYE LEVEL SO IT CAN BE READ FROM STREET AND BE

2.2 - Lee County Ordinance 94-30

LEE COUNTY ORDINANCE NO. 94-30

AN ORDINANCE AMENDING LEE COUNTY ORDINANCE NUMBER 89-02, THE LEE COUNTY COMPREHENSIVE PLAN, COMMONLY KNOWN AS THE "LEE PLAN" SO AS TO ADOPT AMENDMENTS APPROVED IN CONJUNCTION WITH ADOPTION OF LEE COUNTY'S EVALUATION AND APPRAISAL REPORT, CONSTITUTING THE SECOND PLAN AMENDMENT CYCLE FOR 1994; PROVIDING FOR AMENDMENTS TO THE ADOPTED TEXT AND MAPS; PROVIDING FOR PURPOSE AND SHORT TITLE; PROVIDING FOR ADOPTION OF THE SPECIFIED AMENDMENTS TO THE LEE COUNTY COMPREHENSIVE PLAN; PROVIDING FOR ADOPTION OF PAM 93-05; PROVIDING FOR ADOPTION OF AMENDMENTS TO TABLE 2(A), BACKLOGGED ROADS; PROVIDING FOR THE LEGAL EFFECT OF THE "LEE PLAN"; PROVIDING FOR GEOGRAPHICAL APPLICABILITY; PROVIDING FOR SEVERABILITY, CODIFICATION, SCRIVENER'S ERRORS, AND AN EFFECTIVE DATE.

WHEREAS, the Lee County Comprehensive Plan (hereinafter referred to as the "Lee Plan"), Policy 2.4.2. and Chapter XIII, provides for adoption of Plan Amendments with such frequency as may be permitted by applicable state statutes, in accordance with such administrative procedures as the Board of County Commissioners may adopt; and,

WHEREAS, the Lee County Board of County Commissioners, in accordance with Section 163.3181, Florida Statutes, and Lee County Administrative Code AC-13-6 further provides an opportunity for individuals to participate in the plan amendment public hearing process; and,

WHEREAS, the Lee County Local Planning Agency (hereinafter referred to as the "LPA") held statutorily prescribed public hearings pursuant to Chapter 163, Part II, Florida Statutes, and

Lee County Administrative Code AC-13-6 on March 1, 1994, April 5, 1994, April 12, 1994, May 17, 1994 and May 19, 1994; and,

WHEREAS, the Board of County Commissioners, pursuant to Chapter 163, Part II, Florida Statutes, and Lee County Administrative Code AC-13-6, held a statutorily prescribed public hearing for the transmittal of the amendments being proposed on July 7, 1994, and at said hearing approved a motion to send, and did later send, the proposed amendments to the Florida Department of Community Affairs (hereinafter referred to as "DCA") for their review and comment pursuant to Chapter 163, Part II, Florida Statutes; and,

WHEREAS, at the July 7, 1994 meeting, pursuant to chapter 163, Part II, Florida Statutes, the Board of County Commissioners did announce its intention to hold a public hearing after the receipt of DCA's written comments commonly referred to as the "ORC Report." which were later received on October 5, 1994 by the Chairman of the Lee County Board of County Commissioners; and,

WHEREAS, the Board of County Commissioners during its statutorily prescribed public hearing for the plan amendment on November 1, 1994 moved to adopt said proposed amendments as more particularly set forth herein.

NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF LEE COUNTY, FLORIDA, THAT:

SECTION ONE: PURPOSE, INTENT AND SHORT TITLE

The Board of County Commissioners of Lee County, Florida, in compliance with Chapter 163, Part II, Florida Statutes, and with Lee County Administrative Code AC-13-6, has conducted a series of public hearings to review a proposed amendment to the Lee Plan. The purpose of this ordinance is to adopt that amendment to the Lee Plan discussed at said meetings and approved by an absolute majority of the Board of County Commissioners. The short title and proper reference for the Lee County Comprehensive Plan, as hereby amended, shall continue to be the "Lee Plan." This ordinance may be referred to as the "Evaluation and Appraisal Report Amendment Ordinance."

SECTION TWO: ADOPTION OF EVALUATION AND APPRAISAL REPORT AMENDMENTS TO THE LEE PLAN

The Lee County Board of County Commissioners hereby amends the existing Lee Plan, adopted by Ordinance Number 89-02, as amended, by adopting the amendments described in Exhibit A (Proposed 1994 Lee Plan Based on the Adopted Evaluation & Appraisal Report) to this ordinance which amend the text of the Lee Plan as well as the Future Land Use Map series.

SECTION THREE: ADOPTION OF AMENDMENT PAM 93-05

The Lee County Board of County Commissioners hereby amends the existing Lee Plan, adopted by Ordinance Number 89-02, as amended, by adopting the amendment described in Exhibit B (Staff Response to DCA Objections, Recommendations, and Comments for PAM 93-05) to this ordinance which amends the Future Land Use Map series, Map 1, of the Future Land Use Map.

SECTION FOUR: ADOPTION OF AMENDMENTS TO TABLE 2(a),
BACKLOGGED ROADS

The Lee County Board of County Commissioners hereby amends the existing Lee Plan, adopted by Ordinance Number 89-02, as amended, by adopting the amendments described in Exhibit C (Table 2(a), Backlogged Roads State and County Roads in Unincorporated Lee County) to this ordinance which amend the text of the Lee Plan.

SECTION FIVE: DATA AND ANALYSIS

The data and analysis required by Chapter 163, Part II, Florida Statutes for all of the amendments adopted herein is included in the following documents: The transmittal report entitled "Proposed Amendments To The Lee Plan Based On The Adopted Lee Plan Evaluation & Appraisal Report" dated July 7, 1994, with attachments; and the report entitled "Lee Plan Evaluation & Appraisal Report" Volumes 1 and 2, dated July 7, 1994, with attachments; and, the document entitled "Privately-Initiated Amendment To The Lee County Comprehensive Plan (Lee Plan) 93/94 Regular Cycle" dated July 7, 1994; and, the report entitled "Staff Response to DCA Objections, Recommendations and Comments for 1994 2nd Round Amendments" dated November 1, 1994 which includes the Motions and Findings of Fact Summary. All of the foregoing documents are hereby adopted as the data and analysis attendant to the herein adopted plan amendments. Said documents have been placed on file with

the Clerk of the Circuit Court, Minutes Department, as part of the official records of Lee County and are incorporated by reference as an integral part of this ordinance.

SECTION SIX: LEGAL EFFECT OF THE "LEE PLAN"

No public or private development shall be permitted except in conformity with the Lee Plan, and all land development regulations and land development orders shall be consistent with the Lee Plan as so amended.

SECTION SEVEN: GEOGRAPHIC APPLICABILITY

The Lee Plan shall be applicable throughout the unincorporated area of Lee County, Florida, except in such unincorporated areas as are included in any joint or interlocal agreements with other local governments that specifically provide otherwise.

This ordinance shall also be applicable to those portions of the incorporated areas of Lee County, Florida, for which the Florida Statutes have delegated regulatory jurisdiction to county governments over municipal governments.

SECTION EIGHT: SEVERABILITY

The provision of this ordinance are severable and it is the intention of the Board of County Commissioners of Lee County, Florida, to confer the whole or any part of the powers herein provided. If any of the provisions of this ordinance shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall not affect or impair any remaining

provision of this ordinance. It is hereby declared to be the legislative intent of the Board of County Commissioners that this ordinance would have been adopted had such unconstitutional provisions not been included therein.

**SECTION NINE: INCLUSION IN CODE, CODIFICATION,
SCRIVENERS' ERROR**

It is the intention of the Board of County Commissioners that the provisions of this ordinance shall become and be made a part of the Lee County Code;; and that sections of this ordinance may be numbered or relettered and the word "ordinance" may be changed to "section," "article," or such other appropriate word or phrase in order to accomplish such intention; and regardless of whether such inclusion in the code is accomplished, sections of this ordinance may be renumbered or relettered, and the correction of typographical errors which do not affect the intent, may be authorized by the County Administrator, or his or her designee, ~~without need of public hearing, by filing a corrected or~~ recodified copy of same with the Clerk of the Circuit Court.

SECTION TEN: EFFECTIVE DATE

The plan amendments adopted herein shall not be effective until all of the following occur: a final order is issued by the Florida Department of Community Affairs or Administration Commission finding the amendments in compliance with Section 163.3184, Florida Statutes; and, thereafter the Lee County Board of County Commissioners adopts a Resolution by absolute majority specifying which of the amendments that have been found in

compliance will become effective and specifying the effective date for said amendments. No development orders, development permits, or land uses dependent on an amendment may be issued or commenced before the amendment has become effective. If a final order of non-compliance is issued by the Administration Commission, any amendment found not to be in compliance may nevertheless be made effective by adoption of a Resolution by an absolute majority of the Board of County Commissioners affirming the amendments effective status. Copies of all Resolutions adopted pursuant to this section will be sent to the Florida Department of Community Affairs, Bureau of Local Planning, 2740 Centerview Drive, Tallahassee, Florida 32399-2100.

THE FOREGOING ORDINANCE was offered by Commissioner Manning who moved its adoption. The motion was seconded by Commissioner St. Cerny and, being put to a vote, the vote was as follows:

John Manning	<u>AYE</u>
Douglas St. Cerny	<u>AYE</u>
Ray Judah	<u>NAY</u>
John Albion	<u>AYE</u>
Franklin Mann	<u>ABSENT</u>

DONE AND ADOPTED this 1st day of November, 1994.

ATTEST:
CHARLIE GREEN, CLERK

By: [Signature]

County Clerk

BOARD OF COUNTY COMMISSIONERS
OF LEE COUNTY, FLORIDA

By: [Signature]

Chairman

APPROVED AS TO FORM:
LEE COUNTY ATTORNEY'S OFFICE

By: [Signature]

Assistant County Attorney

Poor Original

2.3 - Future Land Use

CHAPTER II

II. FUTURE LAND USE

GOAL 1: FUTURE LAND USE MAP. To maintain and enforce a Future Land Use Map showing the proposed distribution, location, and extent of future land uses by type, density, and intensity in order to protect natural and man-made resources, provide essential services in a cost-effective manner, and discourage urban sprawl. (Amended by Ordinance No. 94-30)

OBJECTIVE 1.1: FUTURE URBAN AREAS. Designate on the Future Land Use Map (Map 1) categories of varying intensities to provide for a full range of urban activities. These designations are based upon soil conditions, historic and developing growth patterns, and existing or future availability of public facilities and services. (The Future Land Use Map series also contains Map 2 and additional maps located in the appendix. A colored wall-size reproduction of Map 1 is also available.)

POLICY 1.1.1: The Future Land Use Map contained in this element is hereby adopted as the pattern for future development and substantial redevelopment within the unincorporated portion of Lee County. Map 16 and Table 1(b) are an integral part of the Future Land Use Map series (see Policies 1.7.6 and 2.2.2). They depict the extent of development through the year 2020. No development orders or extensions to development orders will be issued or approved by Lee County which would allow the Planning Community's acreage totals for residential, commercial or industrial uses established in Table 1(b) to be exceeded (see Policy 1.7.6). The cities of Fort Myers, Cape Coral, and Sanibel are depicted on these maps only to indicate the approximate intensities of development permitted under the comprehensive plans of those cities. Residential densities are described in the following policies and summarized in Table 1(a). (Amended by Ordinance No. 94-29, 98-09)

POLICY 1.1.2: The Intensive Development areas are located along major arterial roads in Fort Myers, North Fort Myers, and Cape Coral. By virtue of their location, the county's current development patterns, and the available and potential levels of public services, they are well suited to accommodate high densities and intensities. Planned mixed-use centers of high-density residential, commercial, limited light industrial (see Policy 7.1.6), and office uses are appropriate in these locations. As Lee County moves toward becoming a metropolitan complex of a half-million people, these centrally located urban nodes can offer a diversity of lifestyles, cosmopolitan shopping opportunities, and specialized professional services that befit such a region. The standard density range is from seven dwelling units per acre (7 du/acre) to fourteen dwelling units per acre (14 du/acre). Maximum density is twenty-two dwelling units per acre (22 du/acre). (Amended by Ordinance No. 94-30)

POLICY 1.1.3: The Central Urban areas can best be characterized as the "urban core" of the county. These consist mainly of portions of the city of Fort Myers, the southerly portion of the city of Cape Coral, and other close-in areas near these cities; and also the central portions of Bonita Springs, Iona/McGregor, Lehigh Acres, and North Fort Myers. This is the part of the county that is already most heavily settled and which has or will have the greatest range and highest levels of urban service--water, sewer, roads, schools, etc. Residential, commercial, public and quasi-public, and limited light industrial land uses (see Policy 7.1.6) will continue to predominate in the Central Urban area. This category has a standard density range from four dwelling units per acre (4 du/acre) to ten dwelling units per acre (10 du/acre) and a maximum density of fifteen dwelling units per acre (15 du/acre). (Amended by Ordinance No. 94-30)

POLICY 1.1.4: The Urban Community areas are areas outside of Fort Myers and Cape Coral that are characterized by a mixture of relatively intense commercial and residential uses. Included among them, for example, are parts of Lehigh Acres, San Carlos Park, Fort Myers Beach, South Fort Myers, Bonita Springs, Pine Island, and Gasparilla Island. Although the Urban Communities have a distinctly urban character, they should be developed at slightly lower densities. As the vacant portions of these communities are urbanized, they will need to maintain their existing bases of urban services and expand and strengthen them accordingly. As in the Central Urban area, predominant land uses in the Urban Communities will be residential, commercial, public and quasi-public, and limited light industry (see Policy 7.1.6). Standard density ranges from one dwelling unit per acre (1 du/acre) to six dwelling units per acre (6 du/acre), with a maximum of ten dwelling units per acre (10 du/acre). (Amended by Ordinance No. 94-30)

POLICY 1.1.5: The Suburban areas are or will be predominantly residential areas that are either on the fringe of the Central Urban or Urban Community areas or in areas where it is appropriate to protect existing or emerging residential neighborhoods. These areas provide housing near the more urban areas but do not provide the full mix of land uses typical of urban areas. The standard residential densities are the same as the Urban Community category. Higher densities, commercial development greater than neighborhood centers, and industrial land uses are not permitted. Bonus densities are not allowed. (Amended by Ordinance No. 94-30)

POLICY 1.1.6: The Outlying Suburban areas are characterized by their peripheral location in relation to established urban areas. In general, these areas are rural in nature or contain existing low-density development. Some, but not all, of the requisite infrastructure needed for higher density development is generally planned or in place. It is intended that these areas will develop at lower residential densities than other Future Urban Areas. As in the Suburban areas, higher densities, commercial development greater than neighborhood centers, and industrial land uses are not permitted. The standard density range is from one dwelling unit per acre (1 du/acre) to three dwelling units per acre (3 du/acre). Bonus densities are not allowed. In the Outlying Suburban area in North Fort Myers east of I-75 and in the Buckingham area (see Goal 17), the

maximum density permitted is two dwelling units per acre (2 du/acre). (Amended by Ordinance 91-19)

POLICY 1.1.7: The Industrial Development areas play an important role in strengthening the county's economic base and will become increasingly important as the county grows in size and urban complexity. To a great extent these are the areas to which Lee County must look for expanded job opportunities, investments and production opportunities, and a balanced and sufficient tax base. These areas have special locational requirements that are more stringent than those for residential areas, including transportation needs (e.g., air, rail, highway); industrial levels of water, sewer, fire protection, and other urban services; and locations that are convenient for employees to reach. Whereas the other Future Urban Areas will include a broad combination of residential, commercial, public, and limited industrial land uses, the Industrial Development area is to be reserved mainly for industrial activities per se, as well as for selective land use mixtures such as the combined uses of industrial, manufacturing, research, properly buffered recreational uses (except where precluded by airport hazard zone regulations); and office complexes (if specifically related to adjoining industrial uses) that constitute a growing part of Florida's economic development sector. New mineral extraction (mining) activities and fill dirt operations must be approved through the Industrial Planned Development rezoning process. Retail or wholesale of products manufactured or processed upon the premises may be allowed at a ratio of 1 square foot of commercial uses to 10 square feet of industrial use in association with a Planned Development. Ancillary minor retail commercial uses intended to support the surrounding industrial land uses may not exceed 30,000 square feet per development; and, at buildout, may not exceed more than ten percent (10%) of the total acreage of the lands designated as Industrial Development areas in each community outlined in Map 16. Residential uses, other than bona fide caretaker residences, are not permitted in this category except to the extent provided in Chapter XIII of the Plan. (Amended by Ordinance No. 94-30, 98-09, 99-15)

POLICY 1.1.8: The Public Facilities areas include the publicly owned lands within the county such as public schools, parks, airports, and other governmental facilities. The allowable uses within these areas are determined by the entity owning each such parcel and the local government having zoning and permitting jurisdiction.

POLICY 1.1.9: The University Community land use category provides for Florida's 10th University and for associated support development. The location and timing of development within this area must be coordinated with the development of the University and the provision of necessary infrastructure. All development within the University Community must be designed to enhance and support the University. In addition to all other applicable regulations, development within the University Community will be subject to cooperative master planning with, and approval by, the Board of Regents of the State University System.

Prior to development in the University Community land use category, there will be established a Conceptual Master Plan which includes a generalized land use plan and a

multi-objective water management plan. These plans will be developed through a cooperative effort between the property owner, Lee County, and South Florida Water Management District.

Within the University Community are two distinct sub-categories: University Campus and the University Village. The University Window overlay, although not a true sub-category, is a distinct component of the total university environment. Together these functions provide the opportunity for a diversity of viable mixed use centers. Overall average density for the University Village will not exceed 2.5 units per acre. Clustered densities within the area may reach fifteen units per acre to accommodate university housing. The overall average intensity of non-residential development within the University Village will be limited to 10,000 square feet of building area per non-residential acre allowed pursuant to Map 16 and Table 1(b). Specific policies related to the University Community are included within the Lee Plan under Goal 18. (Added by Ordinance No. 92-47) (Amended by Ordinance No. 94-30, 98-09, 00-22)

OBJECTIVE 1.2: SOUTHWEST FLORIDA INTERNATIONAL AIRPORT AREA.

Designate on the Future Land Use Map adequate land in appropriate locations to accommodate the projected growth needs of the Southwest Florida International Airport and the business and industrial areas related to it through the year 2020. These categories are also considered Future Urban Areas. (Amended by Ordinance No. 94-30)

POLICY 1.2.1: Airport lands include the Southwest Florida International Airport's existing facility and projected growth areas through the year 2020. Any airport expansion will also include extensive environmental buffer areas for the protection of groundwater resources and wildlife habitat. The physical design of the airport expansion will minimize any degradation of the recharge capability of land in the expansion area. Any airport expansion beyond the present boundaries will be subject to appropriate modifications to the DRI development order and necessary amendments to the Lee Plan. (Amended by Ordinance No. 94-30, 00-22)

POLICY 1.2.2: The Airport Commerce areas are commercial and industrial lands adjacent to the airport needed to accommodate projected growth through the year 2020. These areas will include developments consisting of light manufacturing or assembly, warehousing, and distribution facilities; offices; ground transportation and airport-related terminals or transfer facilities; and hotels/motels, meeting facilities, and other hospitality services. Because this area is located within the Six Mile Cypress Basin and is also a primary point of entry into Lee County, special environmental and design review guidelines will be applied to its development to maintain the appearance of this area as a primary point of entry into Lee County. Retail commercial uses in this category are only permitted within hotels and motels. Property in Section 1 and the east 1/2 of Section 2, Township 46 South, Range 25 East, and in Section 6, Township 46 South, Range 26 East, must be rezoned to a planned development zoning category prior to any development other than the construction of essential public services. During the rezoning process, the best environmental management practices identified on pages 43 and 44 of the July 28, 1993 Henigar & Ray study entitled, "Groundwater Resource

Protection Study" will be rebuttably presumed to be necessary to protect potential groundwater resources in the area. Residential uses are only permitted in this category to the extent described in Chapter XIII. (Amended by Ordinance No. 94-30)

POLICY 1.2.3: Airport Noise Zones are subject to varying levels of airport-related noise; see Policy 1.7.1 for details of these overlay zones.

OBJECTIVE 1.3: INTERSTATE HIGHWAY INTERCHANGE AREAS. Designate on the Future Land Use Map specialized categories for land adjacent to the interchanges of Interstate 75. It is important to make maximum beneficial use of these critical access points and at the same time avoid irreconcilable conflicts between competing demands, such as through traffic vs. local traffic, conservation vs. development, commercial development vs. industrial development, and tourist commercial facilities vs. general shopping facilities. Development in these areas must minimize adverse traffic impacts and provide appropriate buffers, visual amenities, and safety measures. Each interchange area is designated for a specific primary role: General, General Commercial, Industrial Commercial, Industrial, University Village, and Mixed Use. Residential uses are only permitted in these categories in accordance with Chapter XIII or as provided in Policy 1.3.2. These areas are also considered Future Urban Areas. (Amended by Ordinance No. 94-30, 99-18, 00-22)

POLICY 1.3.1: The Industrial Interchange areas allow combinations of light industry, research, and office uses. In addition, certain visitor-serving commercial uses such as restaurants and hotels are appropriate. (Amended by Ordinance No. 98-09)

POLICY 1.3.2: The General Interchange areas are intended primarily for land uses that serve the traveling public: service stations, hotel, motel, restaurants, and gift shops. But because of their location, market attractions, and desire for flexibility, these interchange uses permit a broad range of land uses that include tourist commercial, general commercial and light industrial/commercial. (Amended by Ordinance No. 94-30, 99-18)

POLICY 1.3.3: The General Commercial Interchange areas are intended primarily for general community commercial land uses: retail, planned commercial districts, shopping, office, financial, and business.

POLICY 1.3.4: The Industrial Commercial Interchange areas are designated to permit a mixture of light industrial and/or commercial uses. This category does not permit heavy industrial uses.

POLICY 1.3.5: The University Village Interchange land use category is designed to accommodate both interchange land uses and non-residential land uses related to the University. Development within this interchange area may or may not be related to, or justified by the land use needs of the University. Land uses allowed within this area include those allowed in the Industrial Commercial Interchange category and the associated support development allowed in the University Village. The overall average intensity of non-residential development will be limited to 10,000 square feet of

building area per non-residential acre allowed pursuant to Map 16 and Table 1(b). See the definition of Associated Support Development in the Glossary. Cooperative master planning and approval by the Board of Regents will be required prior to development within this land use category. Additionally, any development within this land use category which meets or exceeds the Development of Regional Impact thresholds, either alone or through aggregation, must conform to the requirements of Chapter 380 F.S. (Added by Ordinance No. 92-47) (Amended by Ordinance No. 94-30, 00-22)

POLICY 1.3.6: The Mixed Use Interchange District areas are intended to provide opportunities for a wide range of light industrial, office, and retail commercial uses, accompanied by a viable residential component to facilitate the internal capture of trips through on-site shopping and job creation. The residential uses in this category are to be transitional with existing and future residential uses abutting this land use district to promote compatibility with adjacent residential uses. The maximum residential density, of 5 units per acre, for this category is calculated on the upland acreage of the entire project including both residential and non-residential areas. Policy 6.1.2.2 does not apply to this interchange district.

Commercial and residential uses will meet the following criteria in this district.

1. In order to implement the standards of this district, Mixed Use Planned Development (MPD) zoning is required.
2. Residential uses in this category will serve as a transition between the intense non-residential uses within the interchange area and existing or potential residential uses on properties outside of the interchange category. To preserve the intent of the interchange designation, uses serving the traveling public are required within 330 feet of the arterial road creating the interchange.
3. To insure viable residential uses and to provide for employment and shopping opportunities for residential uses developed on site the following minimum acreage percentages are required:
 - 45 percent of the gross usable land area will be developed with residential uses, and
 - 40 percent of the gross usable land area will be developed with commercial and/or industrial uses.
4. Non-residential uses will be constructed in a fashion such that the total building area does not exceed 20% (0.2 FAR) of the total land area used for non-residential uses. Development intensities may be more or less than a floor area ratio (FAR) of 0.2 on individual parcels, as long as the project's average FAR for non-residential uses does not exceed 0.2.
5. Bicycle & Pedestrian facilities will be provided throughout the development. Connections between all uses are required to facilitate these alternative modes of

transportation. When possible, connections to developments adjacent to the MPD will be provided.

6. Vehicular connections between residential and non-residential uses will be provided to facilitate the internal capture of trips. When possible, connections to developments adjacent to the MPD will be made to provide alternative access to the non-residential components of this development other than the arterial creating the interchange with I-75.
7. Landscaping requirements will be increased in this land use category to help promote a pedestrian ambiance. The following requirements will supplement the minimum standards of the Lee County Land Development Code Section 10-416.
 - Multi-family developments will provide 1.5 trees per 3,000 S.F.
 - Non-residential uses will provide 1.5 trees per 3,500 S.F.
 - Landscaping for internal parking areas will be 15% of the total paved surface area.
 - An average fifty foot buffer strip which includes a minimum of 7 trees and 30 shrubs per 100 lineal feet and a double staggered hedge will be provided along the I-75 corridor. It is desired that existing native vegetation be retained and augmented to meet this standard.

If any facility deficiencies may result from the application of this district, commitments will be provided at the time of zoning to insure that necessary improvements will be in place to support the proposed uses.

(Added by Ordinance No. 99-18) (Amended by Ordinance No. 00-22)

POLICY 1.3.7: Lee County recognizes that development immediately adjoining the I-75 ramps could render future interchange improvements extremely costly if not prohibitive. To assist the county in evaluating the impacts of specific rezoning proposals located within 1000 feet of I-75 ramps, county staff will estimate the possible right-of-way needs for interchange improvements in that quadrant and present this information during the rezoning process. Where possible, development approvals must be phased to protect land critical for future interchange improvements. (Relocated by Ordinance No. 99-18, Amended by Ordinance No. 00-22)

POLICY 1.3.8: The following access control standards will apply to the interstate interchange areas of Lockett Road, Alico Road, Corkscrew Road, and Bonita Beach Road. Access control issues for Daniels Parkway west of I-75 are governed by the controlled access resolution adopted by the Board of County Commissioners on October 4, 1989, as may be amended from time to time. The other interchange areas are state roads where access is controlled by the Florida Department of Transportation under the provisions of Rule 14-97.003, FAC. This standard is a strict requirement during the rezoning and development order processes for cases after the effective date of this policy. (Relocated by Ordinance No. 00-22)

Access Control Standards for Lockett Road, Alico Road and Bonita Beach Road

1. The distance to the first connection will be at least 880 feet, provided such location is outside the federal limited access right-of-way line. A connection is generally defined as a driveway or roadway, limited to right-in/right-out movements, but can include a directional median opening. This distance will be measured from the end of the upstream interchange ramp or the beginning of the downstream interchange ramp, whichever is farther from the centerline of the interstate. A single connection per property not meeting this connection spacing standard may be provided, pursuant to the connection permit process, if no reasonable access to the property exists, and if permitting authority review of the connection permit application provided by the applicant determines that the connection does not create a safety, operational or weaving hazard.

2. The minimum distance to the first full movement median opening will be at least 1760 feet as measured from the end of the upstream interchange ramp or the beginning of the downstream interchange ramp, whichever is farther from the centerline of the interstate.

3. Connections and median openings consistent with the above spacing standards may still be denied in the location requested when the Lee County Traffic Engineer determines, based on the engineering and traffic information provided in the permit application, that the safety or operation of the interchange or the limited access highway would be adversely affected.

(Added by Ordinance No. 98-09, Relocated by Ordinance No. 99-18)

4. Connections and median openings existing prior to 1998 that do not meet the standards are allowed to remain (unless they need to be closed for operational safety reasons), but cannot expand movements, except in the case of County roadway extensions.

Access Control Standards for Corkscrew Road

The access on Corkscrew Road is limited to the following movements and locations, from west to east and excluding the area within the interstate limited access right-of-way:

STATION	DISTANCE ⁽¹⁾	MEDIAN OPENING?	MOVEMENT	CONNECTION
172+84	n/a	Yes	All	Three Oaks Parkway
179+44	660 ft.	Yes	EB to NB Left-in ⁽²⁾ Rt-in/Rt-out from N&S	Corkscrew Crossings (#1)
185+29	585 ft.	Yes	All	Corkscrew Crossings (#2)
187+83	254 ft.	No	Rt-in/Rt-out from N ⁽³⁾	Pic-N-Run Entrance
190+34	253 ft.	Yes	EB to NB Left-in Rt-in/Rt-out from N	Estero Int. Com. Park (#3)
194+29	395 ft.	Yes	WB to SB Left-in	Corkscrew Woodlands

221+47	n/a	Yes	NB to WB Left-out Rt-in/Rt-out from S U-turns only	None
230+14	867 ft.	Yes	EB to NB Left-in Rt-in/Rt-out from N&S ⁽⁴⁾	Miromar Outlet Mall
236+73	660 ft.	Yes	All	Ben Hill Griffin Pkwy.

⁽¹⁾Distance measured from next connection to the west.

⁽²⁾A WB to SB left-in may be allowed at this location if necessary.

⁽³⁾The previously-approved driveway for the Pic-N-Run may remain provided there is not other access; however, if Pic-N-Run establishes a connection to the frontage road system and other access locations, the driveway must be removed.

⁽⁴⁾The Right-in/Right-out from the south already exists at Station 230+65. This connection may be shifted west to any point between Stations 226+30 and 230+65 if proven not to be a traffic safety hazard.

(Relocated and Amended by Ordinance No. 00-22)

OBJECTIVE 1.4: NON-URBAN AREAS. Designate on the Future Land Use Map categories for those areas not anticipated for urban development at this time.

POLICY 1.4.1: The Rural areas are to remain predominantly rural--that is, low density residential, agricultural uses, and minimal non-residential land uses that are needed to serve the rural community. These areas are not to be programmed to receive urban-type capital improvements, and they can anticipate a continued level of public services below that of the urban areas. Maximum density in the Rural area is one dwelling unit per acre (1 du/acre). (Amended by Ordinance No. 98-09)

The property consisting of Sections 1, 2, and 3, Township 48 South, Range 26 East must be developed only in accordance with the following standards:

1. The Property may be developed only in accordance with the following conditions. Pre-development activities such as rezonings, zoning permits, certifications, special exceptions, and variances must be consistent with the following conditions, but need not implement them until application is made for a development order that would authorize physical, on-the-ground development on the Property.
 - a) The Property, or any part of it, will only be developed as a Planned Development, as defined by Chapter XIII of the Lee County Comprehensive Plan at page XII-6. Should development occur in a series of increments by different developers, each development must receive planned development approval. Residential development will be clustered in order to maximize opportunities to provide open spaces and natural areas. A maximum of five acres of the property will be reserved for commercial uses of the type which

serve neighborhood needs. Commercial development may be aggregated on any portion of the Property. Clustering will be achieved by requiring homesites to be platted or designed in contiguous groups, adjacent to open spaces. Clustering of residential development will also be achieved by limiting the areas on the Property available for residential homesites in the following fashion.

- (1) Residential development. Single and/or multiple family homesite acreage may account for no more than 45% of the gross area of the Property. Homesite acreage includes the entire site for all single family houses, multi-family dwellings, and any other residential structure, including the house or building pad, the yard, and any driveway, parking areas, landscaped areas, and the like upon the homesite.
 - (2) Open Spaces. These areas will include preserved natural areas, buffers, lakes, parks, golf courses, nature trails, retention areas, conservation areas, scenic resources, green belts, wetlands and associated areas and must account for a minimum of 40% of the Property. Golf course fairways will account for no more than fifty percent (50%) of the open space of the subject property.
 - (3) Non-residential Development. These areas will include vehicular and pedestrian ways, commercial and institutional areas, club houses and associated facilities, utility buildings, maintenance areas, tennis courts and associated non-residential uses and will be a maximum of 15% of the Property.
- b) All naturally occurring wetlands, which have not been significantly degraded, must be designated as preserve areas and be subject to a conservation easement similar to that set forth in Section 704.06, Florida Statutes. Limited uses in preserve areas such as nature trails, bike paths, cart paths, boardwalks and the like will be allowed when permitted by appropriate State and Federal agencies. The use of wetland areas for water management, to the extent allowed by law, will not be precluded. Wetland areas being used as water management areas on the Property may be relocated if (1) all approvals are obtained from appropriate State and Federal agencies and (2) where the affected wetland functions are replaced on the Property.
- c) Where feasible, open space areas will be designed so as to provide connections between wetlands, preserve areas, and buffers on the Property. The design of these open space areas will seek to provide areas which will be integrated with on-site and adjacent preserve properties so as to enhance habitat for small mammals and wading birds. Golf courses, when constructed and maintained in compliance with this paragraph will be considered to be functional open space to the extent set forth above.

d) The design of the functional open space area must incorporate the following design features:

- (1) A surface water management system that mimics the functions of the natural system, in accordance with Objective 41.2 of the Lee Plan:
- (2) For those areas that drain to the Imperial River Basin, a surface water management system that is consistent with the Kehl Canal/Imperial River basin study prepared for the SFWMD, and adopted by the BOCC pursuant to Policy 40.3.2 of the Lee Plan:
- (3) Uses including, but not limited to, picnic areas, trails, benches, boardwalks, golf courses, water management systems, biking/jogging/equestrian trails, vita courses, bird viewing blinds/tower and interpretative facilities will be permitted within functional open areas:
- (4) The open space areas must be replanted with vegetation after construction. Seventy five percent of the total number of required trees used in buffers, and landscaping must be indigenous, and fifty percent of the shrubs must be indigenous:
- (5) Plant material used for revegetation must conform to the standards for Florida Number 1, or better as given in Grades and Standards for Nursery Plants 1973, and Grades and Standards for Nursery Plants, Part II, Florida Department of Agriculture and Consumer Services Tallahassee:
- (6) Australian pine, cajeput, Brazilian pepper, downy rose myrtle, Cuban laurel, melaleuca, bishopwood, castor bean, common papaya, common snakeplant, day jessamine, hunters robe, queensland umbrella tree, trailing wedelia may not be used as part of the revegetation of the property after development. Any such plants that exist on the site at the time of the issuance of a development order must be removed; and
- (7) The vegetation that surrounds, or is within the open space areas should have the capacity to provide habitat for a diversity of wildlife.

e) Development must provide a buffer to protect adjacent natural areas from the impacts of development. The purpose of the buffer is to protect adjacent natural resources from the activities and impacts of development on the Property.

- (1) All development must incorporate buffers, as follows, in three zones:

Zone 1 will be a minimum of 100 feet wide and will extend completely along all portions of the eastern and southern boundary of the Property. These are the areas of the Property which are adjacent to the Collier

County Line. The buffer will consist of selected native upland forest plant species such as south Florida slash pine, live oak, laurel oak, and saw palmetto. Selected species will be tolerant of drought conditions, and will not require fertilizers and pesticides to promote growth and survival. Exotic plant species will be controlled by the periodic application of herbicides and mechanical removal. Wetland forest species will be used in situations where wetland functions remain on the property and where soil and moisture conditions are suitable.

Zone 1 will incorporate the existing water management reservoirs which are located along the southern boundaries of Sections 1 and 2. These reservoirs will not require additional buffering. There will be no structures erected in Zone 1, however, passive recreation such as hiking, birdwatching, and nature-study will be permitted. Construction of lakes in Zone 1 will be allowed. Existing berms and ditches will be allowed to remain in Zone 1.

Zone 2 will be adjacent to Zone 1 and will encompass an area that is at least 50 feet wide. This area will be free of lights and other structures such as fences, pools, and sheds. The permanent placement of generators, pumps, and other fixed motors will be prohibited. Homesites may extend into Zone 2, but no portion of the residence itself may extend into this zone. If residential lots are incorporated into this zone, those portions of "yard" acreage will be planted and maintained in a fashion similar to that proposed for Buffer Zone 1. Passive recreation such as hiking, jogging, biking, and walking will be allowed along designated trails and boardwalk system. Golf courses and lakes may extend into this zone, but may not incorporate lights or structures other than drainage structures and cart paths. All golf course acreage in Zone 2 will be free of lights and structures, and the use of golf carts will be permitted. If water, sewer, or electrical lines are placed in Zone 2 they must be buried.

Zone 3 will be parallel Zone 2 and will consist of residences and other infrastructure development in a 100-foot wide band. Exterior lighting in this zone may not project toward adjacent preserve land. Measures such as directional lighting, reduced-height light supports, and other light abatement technology will be used.

The buffer zones will not preclude governmental entities from constructing public roadways that are currently depicted on the Lee County 2020 Traffic Circulation Plan Map through these zones, as long as other State and Federal permits are obtained.

- f) The Property must be served with all necessary facilities and services at no expense to the County (including central water and sewer). Uniform Community Development Districts any special taxing districts may be utilized

to achieve this standard. The Property is presently within the Lee County Privately Funded Infrastructure Overlay (PFIO). This Overlay requires that all development within these areas pay for the construction and extension of public services to all properties that seek to develop to a different land use. Should at the time when the Property begins to develop, the PFIO no longer applies to this area, all development will still be required to pay for its infrastructure costs. All development must comply with the Lee County Concurrency Management Plan. The owners of the property and their successors in interest must not withdraw from or opt out of the PFIO.

- g) Development must be on central water and sewer or the extension of such and other utilities must be planned to coincide with the development of the Property. Bonita Beach Road improvements must have been extended east to the planned development, or its extension must be committed to occur in pace with the planned development.
- h) The shorelines of any stormwater management lakes must be sinuous in configuration, and must be sloped or bermed. The littoral zones around the ponds must be planted with native wetland herbaceous plants, and trees or shrubs can be included within the herbaceous plants. At least four species must be planted. The minimum required number of plants will be one plant per linear foot of lake shoreline as measured at the control elevation water level. The littoral shelf should provide a feeding area for water dependent avian species.
- i) The owners will employ management strategies in and around any golf course to address the potential for pesticide/chemical pollution of the groundwater and surface water receiving areas. The owners will comply with the goals of the Audubon Cooperative Sanctuary Program for Golf Courses. The management practices will include:
 - (1) The use of slow release fertilizers and/or carefully managed fertilizer applications which are timed to ensure maximum root uptake and minimal surface water runoff or leaching to the groundwater;
 - (2) The practice of integrated pest management when seeking to control various pests, such as weeds, insects, and nematodes. The application of pesticides will involve only the purposeful and minimal application of pesticides, aimed only at identified targeted species. The regular widespread application of broad spectrum pesticides is not acceptable. The management program will minimize, to the extent possible, the use of pesticides, and will include the use of the USDA-SCS Soil Pesticide Interaction Guide to select pesticides for uses that have a minimum potential for leaching or loss due to runoff depending of the site specific soil conditions. Application of pesticides within 25 feet of any CREW, or other adjacent public preserve lands, is prohibited.

- (3) The coordination of the application of pesticides with the irrigation practices (the timing and application rates of irrigation water) to reduce runoff and the leaching of any applied pesticides and nutrients;
 - (4) The utilization of a golf course manager who is licensed by the State to use restricted pesticides and who will perform the required management functions. The golf course manager will be responsible for ensuring that the golf course fertilizers are selected and applied to minimize fertilizer runoff into the surface water and the leaching of those same fertilizers into the groundwater; and
 - (5) The storage, mixing and loading of fertilizer and pesticides will be designed to prevent/minimize the pollution of the natural environment.
- j) In order to minimize the adverse impacts that construction may have on wildlife, natural environmental values, and water quality, the developer will institute appropriate measures such as full compaction of any fill material placed around newly installed structures.
 - k) Any future individual development on the Property will be subject to Development of Regional Impact (DRI) review once it reaches the 80% threshold, i.e., at 800 units such development will be presumed to be a DRI. If two or more individual projects will be developed on the Property, this 80% threshold will be applicable to each, and not applied in a cumulative fashion unless subject to the aggregation criteria in Rule 9J-2, Fla. Admin. Code.
- (Added by Ordinance No. 97-17, Amended by Ordinance No. 00-22)

POLICY 1.4.2: The Outer Islands are sparsely settled, have minimal existing or planned infrastructure, and are very distant from major shopping and employment centers. They are not expected to be programmed to receive urban-type capital improvements in the time frame of this plan, and as such can anticipate a continued level of public services below that of other land use categories. The continuation of the Outer Islands essentially in their present character is intended to provide for a rural character and lifestyle, and conserve open space and important natural upland resources. Maximum density is one dwelling unit per acre (1 du/acre). (Amended by Ordinance No. 98-09)

POLICY 1.4.3: The Rural Community Preserves are established following special studies of Lee County's intact rural communities. Within these areas, special design approaches are to be used to maintain the existing rural character, for example: conservation easements, flexible road design standards (including relocation of future arterials not serving the rural community), special fencing and sign standards, and retention of historic rural uses. These areas are not to be programmed to receive urban-type capital improvements. Lands within this category are not intended to be converted to any Future Urban Areas; rather, they are to remain permanently rural in

character and use. These areas are restricted to low density residential uses (with minimum lot size requirements), agricultural uses, and minimal non-residential uses that are needed to serve the rural community. Property in this category may not be rezoned to any RV district. Additional goals, objectives, policies, and standards for these areas may be included in this plan based on the special studies (see for example, Goal 17). Maximum density is one dwelling unit per acre (1 du/acre). (Amended by Ordinance 91-19) (Amended by Ordinance No. 94-30)

POLICY 1.4.4: Open Lands are upland areas that are located north of Rural and/or sparsely developed areas in Township 43 South. These areas are extremely remote from public services and are characterized by agricultural and low-density residential uses. Commercial and industrial uses are permitted in this category in accordance with the standards in the Rural category. The maximum density in this category is one dwelling unit per ten acres (1 du/10 acres); except that a maximum density of one dwelling unit per five acres (1 du/5 acres) is permitted if the planned development process is used to prevent adverse impacts on environmentally sensitive lands (as defined in Policy 77.1.1.4). (Added by Ordinance No. 94-30)

POLICY 1.4.5: The Density Reduction/Groundwater Resource (DR/GR) areas include upland areas that provide substantial recharge to aquifers most suitable for future wellfield development. These areas also are the most favorable locations for physical withdrawal of water from those aquifers. Only minimal public facilities exist or are programmed. Land uses in these areas must be compatible with maintaining surface and groundwater levels at their historic levels. Permitted land uses include agriculture, mineral or limerock extraction and related facilities, conservation uses, publicly-owned gun range facilities, private recreation facilities, and residential uses at a maximum density of one dwelling unit per ten acres (1 du/10 acres). Individual residential parcels may contain up to two acres of Wetlands without losing the right to have a dwelling unit, provided that no alterations are made to those wetland areas. (Amended by Ordinance No. 91-19, 94-30, 99-16)

Private Recreational Facilities may be permitted in accordance with the site locational requirements and design standards, as further defined in Goal 16. No Private recreational facilities may occur within the DR/GR land use category without a rezoning to an appropriate planned development zoning category, and compliance with the Private Recreation Facilities performance standards, contained in Goal 16 of the Lee Plan. (Added by Ordinance No. 99-16)

POLICY 1.4.6: The Conservation Lands include uplands and wetlands that are owned and used for long range conservation purposes. Upland and wetland conservation lands will be shown as separate categories on the FLUM. Upland conservation lands will be subject to the provisions of this policy. Wetland conservation lands will be subject to the provisions of both the Wetlands category described in Objective 1.5 and the Conservation Lands category described in this policy. The most stringent provisions of either category will apply to wetland conservation lands. Conservation lands will include all public lands required to be used for conservation purposes by some type of

legal mechanism such as statutory requirements, funding and/or grant conditions, and mitigation preserve areas required for land development approvals. Conservation Lands may include such uses as wildlife preserves; wetland and upland mitigation areas and banks; natural resource based parks; ancillary uses for environmental research and education, historic and cultural preservation, and natural resource based parks (such as signage, parking facilities, caretaker quarters, interpretive kiosks, research centers, and quarters and other associated support services); and water conservation lands such as aquifer recharge areas, flowways, flood prone areas, and well fields. (Added by Ordinance No. 98-09)

OBJECTIVE 1.5: WETLANDS. Designate on the Future Land Use Map those lands that are identified as Wetlands in accordance with F.S. 373.019(17) through the use of the unified state delineation methodology described in FAC Chapter 17-340, as ratified and amended in F.S. 373.4211. (Amended by Ordinance No. 94-30)

POLICY 1.5.1: Permitted land uses in Wetlands consist of very low density residential uses and recreational uses that will not adversely affect the ecological functions of wetlands. All development in Wetlands must be consistent with Goal 84 of this plan. The maximum density is one dwelling unit per twenty acres (1 du/20 acre) except as otherwise provided in Table 1(a) and Chapter XIII of this plan. (Amended by Ordinance No. 94-30)

POLICY 1.5.2: When the exact location of Wetlands boundaries is in question, Chapter XIII of this plan provides an administrative process, including a field check, to precisely define the boundary. (Amended by Ordinance No. 94-30)

POLICY 1.5.3: Wetlands that are conservation lands will be subject to the provisions of Policy 1.4.6 as well as the provisions of Objective 1.5. The most stringent provisions of either category will apply. Conservation wetlands will be identified on the FLUM to distinguish them from non-conservation wetlands. (Added by Ordinance No. 98-09)

OBJECTIVE 1.6: NEW COMMUNITY. Designate on the Future Land Use Map areas which are suitable for the development of large-scale multi-use communities developed pursuant to an overall master plan. This category is also considered a Future Urban Area.

POLICY 1.6.1: New Community areas are lands that are capable of being planned and developed as a cohesive unit in order to better achieve conservation of important environmental resources and to initiate areawide surface water management. New Community land must be located such that the area is capable of being developed with a balance of residential and non-residential uses and that major impacts of the development are internalized and/or alleviated by infrastructure that is existing or will be funded privately. New Community areas will be developed as freestanding economic units and will not impose negative fiscal impacts on the county (other than those associated with the delay in placing property improvements on the tax rolls).

New Communities will not exceed a residential density of six dwelling units per gross acre and must have at least the following characteristics:

1. The land will be developed under a well-conceived overall master plan;
2. The land can be served with all necessary facilities and services at no expense to the county. Uniform Community Development Districts and special taxing districts may be utilized toward achieving this objective;
3. Population, recreation, open space, educational, office, and research facilities are distributed in an orderly and attractive manner;
4. The land must be developed in such a manner as to protect environmentally sensitive areas;
5. The land must be developed as a free-standing community offering a complete range of land uses (e.g. a full mix of housing types for a range of household incomes, industrial and office employment centers, and community facilities such as fire departments, schools, law enforcement offices, public recreational areas, health care facilities, and community commercial areas);
6. Off-site impacts must be mitigated; and,
7. On-site levels of service must meet the county-wide standards contained in this plan.

(Amended by Ordinance No. 00-22)

OBJECTIVE 1.7: SPECIAL TREATMENT AREAS. Designate on the Future Land Use Map, as overlays, special treatment areas that contain special restrictions or allowances in addition to all of the requirements of their underlying categories.

POLICY 1.7.1: The Airport Noise Zones cover areas subject to varying levels of airport-related noise. By 2006 and every 5 years thereafter, the Port Authority will update the aviation forecasts and associated noise contours for the Southwest Florida International Airport and initiate an amendment to the Airport Noise Zone Overlay Map to reflect the findings of this study. Prior to the issuance of all building permits and development orders in zones 2 and 3, noise and aviation easements must be dedicated to Lee County. In addition to meeting the requirements of the underlying Future Land Use Map categories, properties within the Noise Zone Overlay must meet the following:

Airport Noise Zone 1 has no noise related restrictions.

Airport Noise Zone 2 does not permit mobile or manufactured homes. However, mobile or manufactured homes that were lawfully existing as of June 27, 2000 will be treated as legally permitted uses and may be replaced with a new mobile or manufactured home or conventional single family construction so long as such replacement would be otherwise allowed by this code.

Airport Noise Zone 3 does not permit any residential units, churches, libraries, schools, hospitals, correctional institutions, or nursing homes. However, residential units, including mobile or manufactured homes, that were lawfully existing as of June 27, 2000 will be treated as legally permitted uses and may be replaced

with a new mobile or manufactured home or conventional single family construction so long as such replacement would be otherwise allowed by this code. However, an existing conventional home may not be replaced with a new mobile or manufactured home. One conventional single family home is permitted on each lot in a plat properly recorded before June 27, 2000 if such use would have been permitted on the lot prior to June 27, 2000.

Airport Noise Zone 4 is limited to uses that are compatible with airports and air commerce, including but not limited to those necessary to provide services and convenience goods to airline passengers, those generally associated with airport operation, and related development.

(Amended by Ordinance No. 00-22)

POLICY 1.7.2: The Development of Regional Impact overlay is an informational tool showing all of the Lee County property subject to Development Orders approved pursuant to Chapter 380 of the Florida Statutes. Development in these areas is regulated by the terms of the applicable development orders. (Amended by Ordinance No. 94-30)

POLICY 1.7.3: The Urban Reserve overlay indicates areas that are suitable for annexation into the adjoining municipality. Urban Reserve areas are initially established by interlocal agreement pursuant to Section 163.3171(1), F.S.

POLICY 1.7.4: Certain lands are designated as Future Urban Areas because of special needs for the provision of Privately Funded Infrastructure. Development in these areas may occur in accordance with the provisions of Goal 3 and its subsequent objectives and policies. (Amended by Ordinance No. 93-25)

POLICY 1.7.5: The Water-Dependent overlay zone designates shoreline areas where priority will be granted to water-dependent land uses. Specific requirements are detailed for such zones on San Carlos Island under Goal 12, in the Greater Pine Island area under Goal 14, and for other areas in Lee County in the Conservation and Coastal Management Element. (Amended by Ordinance No. 94-30, 00-22)

POLICY 1.7.6: The Planning Communities Map and Acreage Allocation Table (see Map 16 and Table 1(b) and Policies 1.1.1 and 2.2.2) depicts the proposed distribution, extent, and location of generalized land uses for the year 2020. Acreage totals are provided for land in each Planning Community in unincorporated Lee County. No final development orders or extensions to final development orders will be issued or approved by Lee County which would allow the acreage totals for residential, commercial or industrial uses contained in Table 1(b) to be exceeded. This policy will be implemented as follows: (Amended by Ordinance No. 94-29, 00-22)

1. For each Planning Community the County will maintain a parcel based database of existing land use. The database will be periodically updated at least twice every year, in September and March, for each Planning Community.

2. Project reviews for development orders must include a review of the capacity, in acres, that will be consumed by buildout of the development order. No development order, or extension of a development order, will be issued or approved if the project acreage, when added to the acreage contained in the updated existing land use database, exceeds the limitation established by Table 1(b), Acreage Allocation Table regardless of other project approvals in that Planning Community.
3. No later than the regularly-scheduled date for submission of the Lee Plan Evaluation and Appraisal Report, and every five years thereafter, the County must conduct a comprehensive evaluation of Planning Community Map and the Acreage Allocation Table system, including but not limited to, the appropriateness of land use distribution, problems with administrative implementations, if any, and areas where the Planning Community Map and the Acreage Allocation Table system might be improved.

(Amended by Ordinance No. 98-09, 00-22)

POLICY 1.7.7: The Public Acquisition overlay zone designates areas that have been targeted for public acquisition by federal, state, regional, and/or local agencies. This overlay does not restrict the use of the land in and of itself. It will be utilized for informational purposes since this map will represent a composite of public acquisition activities in the county. (Amended by Ordinance No. 91-19, 00-22)

POLICY 1.7.8: The Agricultural overlay (Map 20) shows existing active and passive agricultural operations in excess of 100 acres located outside of the Future Urban Areas. Since these areas play a vital role in Lee County's economy, they should be protected from the impacts of new developments, and the county should not attempt to alter or curtail agricultural operations on them merely to satisfy the lifestyle expectations of non-urban residents. (Added by Ordinance No. 94-30)

OBJECTIVE 1.8: LEHIGH ACRES COMMERCIAL USES. Designate additional overlay zones on the Future Land Use Map to designate potential commercial land uses in Lehigh Acres. The distinction in Policy 6.1.2(7) between the two major types of commercial uses does not apply in Lehigh Acres. (Added by Ordinance No. 98-09)

POLICY 1.8.1: Commercial uses are permitted on lands in the *Lehigh Commercial* overlay once commercial zoning has been approved in accordance with this plan. Land in the *Lehigh Commercial* overlay may also be used for schools, parks, and other public facilities; churches and synagogues; and residential uses that provide housing alternatives to the typical 1/4 to 1/2 acre subdivision lots. Creation of new single-family lots smaller than one acre is not permitted due to the oversupply of standard subdivision lots. If cumulative new residential development takes place on more than 1% of this land per year, Lee County will take steps to provide additional commercial land in Lehigh Acres to offset the loss. Lee County will take steps to reduce any emerging surplus of commercial land in Lehigh Acres if cumulative new commercial

development exceeds an average floor-area ratio of 1.0 (the ratio of interior floor space to total lot area). (Amended by Ordinance No. 00-22)

The prohibition on single-family development does not apply in the following portions of the Lehigh Commercial overlay: (1) that portion of Section 6, Township 45S, Range 27E lying south of 23rd Street Southwest and its easterly extension beyond Beth Stacey Boulevard, containing about 92 acres; and (2) those portions of Section 5, Township 45S, Range 27E described as follows: (a) that part of the southwest quarter of the northeast quarter lying southwest of Homestead Road, containing 22.12 acres, and (b) the west 364 feet of the north half of the southeast quarter, containing 11.00 acres, and (c) the southwest quarter of the southeast quarter less the south 175 feet of the east 125 feet, containing 39.50 acres. (Added by Ordinance No. 98-09)

POLICY 1.8.2: Commercial uses will also be permitted on all lots in the *Reclaimed Strip* overlay facing S.R. 82 once a corridor access management plan is adopted by FDOT governing that portion of S.R. 82. This plan would provide for additional road connections between S.R. 82 and Meadow Road at about 1/8-mile spacing with full access median crossings at about 1/4-mile spacing. All lots would ultimately have access to S.R. 82 via Meadow Road, which would serve as a reverse frontage street. Commercial uses would also be permitted on all *Reclaimed Strip* lots facing Gunnery Road if Lee County adopts a similar plan, with access to all lots being provided via Gretchen Avenue which would serve as the reverse frontage street. Until such plans are in place, those lots in the *Reclaimed Strip* overlay that do not qualify for commercial development under the location standards of Policy 6.1.2 may be used only for the residential uses permitted in the C-2 zoning district. (Added by Ordinance No. 98-09)

POLICY 1.8.3: Because of the shortage of suitable undivided tracts in Lehigh Acres (whose boundaries for the purposes of this plan are shown on Map 16), commercial uses may also be appropriate on certain other lands that might otherwise be used for residential lots.

1. Many such lands are designated with the *Lot Assembly* overlay. These lands are platted for single-family lots and are under multiple ownerships. Commercial uses on individual lots or small assemblies of lots would generally be intrusive to existing or emerging neighborhoods. However, assemblies of entire blocks would provide suitable commercial parcels. Major lot assemblies could qualify for commercial zoning whether assembled by government action, private sector purchases, cooperative arrangements between individual lot-owners, or similar arrangements.
2. Other tracts or combinations of platted lots in Lehigh Acres may also be considered for commercial rezoning (even if they are outside any of the three overlays) through the normal zoning processes or by requesting a new conventional commercial zoning district that may be created to address Lehigh Acres conditions. Lands suitable for such rezoning would include:

- a. Tracts that are assembled from vacant lots at the intersection of future collector or arterial roads in sparsely developed areas where there are very limited or no suitable commercial locations in any of the commercial overlays; or
- b. Tracts that separate existing commercial and residential land uses where some commercial uses may be appropriate if they provide a substantial buffer and reasonably protect the privacy of existing dwellings. Landowners seeking commercial zoning under this subsection should expect a minimal level of commercial uses and/or to provide extra levels of buffering.

Decisions on the suitability of any proposal will be made by Lee County on a case-by-case basis in order to implement the intent of these regulations.

3. Commercially zoned land not placed within one of these overlays can be developed in accordance with previous regulations, but may be subject to county-initiated rezonings to restrict or eliminate future commercial uses there.

(Added by Ordinance No. 98-09, Amended by Ordinance No. 00-22)

GOAL 2: GROWTH MANAGEMENT. To provide for an economically feasible plan which coordinates the location and timing of new development with the provision of infrastructure by government agencies, private utilities, and other sources.

OBJECTIVE 2.1: DEVELOPMENT LOCATION. Contiguous and compact growth patterns will be promoted through the rezoning process to contain urban sprawl, minimize energy costs, conserve land, water, and natural resources, minimize the cost of services, prevent development patterns where large tracts of land are by-passed in favor of development more distant from services and existing communities. (Amended by Ordinance No. 94-30, 00-22)

POLICY 2.1.1: Most residential, commercial, industrial, and public development is expected to occur within the designated Future Urban Areas on the Future Land Use Map through the assignment of very low densities to the non-urban categories.

POLICY 2.1.2: New land uses will be permitted only if they are consistent with the Future Land Use Map and the goals, objectives, policies, and standards of this plan. (Amended by Ordinance No. 00-22)

POLICY 2.1.3: All land use categories and Planning Community Map areas permit the consideration of churches and schools (except in Wetlands and Airport Noise Zones), public uses and buildings, public utilities and resource recovery facilities, public recreational uses (including franchised quasi-commercial uses in conjunction with a public use), and sites for compatible public facilities when consistent with the goals, objectives, policies, and standards in this plan and applicable zoning and development regulations. (Amended by Ordinance No. 94-30, 98-09)

POLICY 2.1.4: Any facility licensed under Chapter 10A-5 F.A.C. (e.g. an adult congregate living facility) will be deemed a residential use and limited to locations and densities appropriate for residences. (Amended by Ordinance No. 94-30, 00-22)

OBJECTIVE 2.2: DEVELOPMENT TIMING. Direct new growth to those portions of the Future Urban Areas where adequate public facilities exist or are assured and where compact and contiguous development patterns can be created. Development orders and permits (as defined in F.S. 163.3164(7)) will be granted only when consistent with the provisions of Sections 163.3202(2)(g) and 163.3180, Florida Statutes and the county's Concurrency Management Ordinance. (Amended by Ordinance No. 94-30, 00-22)

POLICY 2.2.1: Rezoning and development-of-regional-impact proposals will be evaluated as to the availability and proximity of the road network; central sewer and water lines; community facilities and services such as schools, EMS, fire and police protection, and other public facilities; compatibility with surrounding land uses; and any other relevant facts affecting the public health, safety, and welfare. (Amended by Ordinance No. 94-30, 00-22)

POLICY 2.2.2: Map 1 of the Future Land Use Map series indicates the uses and density ranges that will ultimately be permitted on a given parcel. However, it is not a guarantee that such densities or uses are immediately appropriate, as the map provides for the county's growth over the coming 26 years. During the rezoning process the Board of County Commissioners will balance the overall standards and policies of this plan with three additional factors:

1. Whether a given proposal would further burden already overwhelmed existing and committed public facilities such that the approval should be delayed until the facilities can be constructed; and
2. Whether a given proposal is for land so far beyond existing development or adequate public facilities that approval should be delayed in an effort to encourage compact and efficient growth patterns; and
3. Whether a given proposal would result in unreasonable development expectations which may not be achievable because of acreage limitations contained in the Acreage Allocation Table (see Policy 1.7.6, Map 16 and Table 1(b)).

In all cases where rezoning is approved, such approval does not constitute a determination that the minimum acceptable levels of service (see Policy 70.1.3) will be available concurrent with the impacts of the proposed development. Such a determination must be made prior to the issuance of additional development permits, based on conditions which exist at that time, as required by Lee County's concurrency management system. (Amended by Ordinance No. 94-30, 98-09).

POLICY 2.2.3: When an area within the county is approaching the capacity of the necessary facilities as described above, requested rezonings to increase densities and

intensities may be deferred or denied to give preference to existing vacant lots and other valid development approvals, provided that a constitutionally mandated reasonable use of land would still be permitted.

OBJECTIVE 2.3: PUBLIC PROVISION OF INFRASTRUCTURE. The Capital Improvements Program will give the highest priority to the planning, programming, and construction of urban services and facilities in the existing developed areas where facilities are inadequate. Next priority will be given to service expansions in existing developed areas, followed by further expansion into other portions of the Future Urban Areas. Sufficient land will be identified and protected for utility facilities that will be necessary to support the proposed level of development. Other infrastructure planning priorities are contained in Policy 23.2.4 and Policy 70.1.1. (Amended by Ordinance No. 94-30, 00-22)

POLICY 2.3.1: Specific level-of-service standards and capital improvement priorities will be detailed in the relevant elements of this plan and carried out through a capital improvements program as described in the Capital Improvements element. (Amended by Ordinance No. 00-22)

POLICY 2.3.2: The cost for the provision and expansion of services and facilities that benefit new development will be borne primarily by those who benefit. Such funding may include (but is not limited to) impact fees, special taxing or benefit districts, community development districts, dedication of land and facilities, in-lieu-of fees, and capital construction, operation, and maintenance funds. (Amended by Ordinance No. 00-22)

POLICY 2.3.3: All facility provision from the special funding sources in Policy 2.3.2 must be consistent with this plan.

OBJECTIVE 2.4: FUTURE LAND USE MAP AMENDMENTS. Regularly examine the Future Land Use Map in light of new information and changed conditions, and make necessary modifications.

POLICY 2.4.1: The county will accept applications from private landowners or non-profit community organizations to modify the boundaries as shown on the Future Land Use Map. Procedures, fees, and timetables for this procedure will be adopted by administrative code. (Amended by Ordinance No. 94-30)

POLICY 2.4.2: All proposed changes to the Future Land Use Map in critical areas for future potable water supply (Bonita Springs as described in Policy 13.2.2; Lehigh Acres as described in Policy 34.1.9; and all land in the Density Reduction/ Groundwater Resource land use category) will be subject to a special review by the staff of Lee County. This review will analyze the proposed land uses to determine the short-term and long-term availability of irrigation and domestic water sources, and will assess whether the proposed land uses would cause any significant impact on present or future water resources. If the Board of County Commissioners wishes to approve any such changes to the Future Land Use Map, it must make a formal finding that no significant

impacts on present or future water resources will result from the change. (Amended by Ordinance No. 92-47) (Amended by Ordinance No. 94-30, 00-22)

POLICY 2.4.3: Future Land Use Map Amendments to the existing DR/GR areas south of SR 82 east of I-75, excluding areas designated by the Port Authority as needed for airport expansion, which increase the current allowable density or intensity of land use will be discouraged by the county. It is Lee County's policy not to approve further urban designations there for the same reasons that supported its 1990 decision to establish this category. In addition to satisfying the requirements in 163 Part II Florida Statutes, Rule 9J-5 of the Florida Administrative Code, the Strategic Regional Policy Plan, the State Comprehensive Plan, and all of the criteria in the Lee Plan, applicants seeking such an amendment must:

1. analyze the proposed allowable land uses to determine the availability of irrigation and domestic water sources; and,
2. identify potential irrigation and domestic water sources, consistent with the Regional Water Supply Plan. Since regional water suppliers cannot obtain permits consistent with the planning time frame of the Lee Plan, water sources do not have to be currently permitted and available, but they must be reasonably capable of being permitted; and,
3. present data and analysis that the proposed land uses will not cause any significant harm to present and future public water resources; and,
4. supply data and analysis specifically addressing the urban sprawl criteria listed in Rule 9J-5.006(5) (g), (h), (i) and (j), FAC.

During the transmittal and adoption process, the Board of County Commissioners must review the application for all these analytical requirements and make a finding that the amendment complies with all of them. (Added by Ordinance No. 97-05)

POLICY 2.4.4: Lee Plan amendment applications to expand the Lee Plan's employment centers, which include light industrial, commercial retail and office land uses, will be evaluated by the Board of County Commissioners in light of the locations and cumulative totals already designated for such uses, including the 1994 addition of 1400 acres to the Airport Commerce category just south of the Southwest Florida International Airport. (Added by Ordinance No. 97-05, Amended by Ordinance No. 00-22)

OBJECTIVE 2.5: ANNEXATION POLICY. The county will strive to negotiate interlocal agreements with the incorporated municipalities to resolve planning issues relating to areas outside the cities' limits which they would like to target for annexation. Urban Reserve boundaries adopted in such agreements will be designated on the Future Land Use Map (see Policies 1.7.3 and 109.1.4). (Amended by Ordinance No. 00-22)

OBJECTIVE 2.6: REDEVELOPMENT. Future redevelopment activities will be directed in appropriate areas, consistent with sound planning principles, the goals, objectives, and policies contained within this plan, and the desired community character. (Amended by Ordinance No. 00-22)

POLICY 2.6.1: Community redevelopment activities will be conducted by the Lee County Community Redevelopment Agency within approved redevelopment areas according to adopted redevelopment plans. (Amended by Ordinance 91-19, 00-22)

POLICY 2.6.2: Redevelopment activities will be comprehensive in approach and include the following components: (Amended by Ordinance 91-19, 00-22)

- Study of incompatible land uses;
- Correction of outdated zoning classifications;
- Elimination of substandard or unsafe buildings;
- Traffic circulation and parking;
- Economic revitalization;
- Protection of adjacent residential neighborhoods and historic and natural resources;
- Signage;
- Landscaping;
- Urban Design/Master Planning;
- Affordable Housing.

POLICY 2.6.3: Amend the county's development regulations by 1994 to provide additional flexibility for redevelopment activities within CRAs. (Added by Ordinance No. 94-30)

POLICY 2.6.4: Within the Charleston Park CRA residential, commercial and industrial uses which meet the needs of the low-income residents and which are suitable to the scale and location of the community and will be compatible with the residential character of the community and consistent with the adopted CRA plan will be permitted. (Amended by Ordinance No. 92-35) (Relocated by Ordinance No. 94-30) (Amended by Ordinance No. 00-22)

OBJECTIVE 2.7: HISTORIC RESOURCES. Historic resources will be identified and protected pursuant to the Historic Preservation element and the county's Historic Preservation Ordinance. (Amended by Ordinance No. 94-30, 00-22)

OBJECTIVE 2.8: COASTAL ISSUES. Development in coastal areas is subject to the additional requirements found in the Conservation and Coastal Management element of this plan, particularly those found under Goals 75, 79, 80, 81, 82, and 83.

OBJECTIVE 2.9: SCENIC CORRIDORS. By 1995, formally consider the establishment of specialized design standards along specified arterial and collector roads. (Amended by Ordinance No. 94-30)

POLICY 2.9.1: The county will identify key road segments which, with specialized design and landscaping standards, could become scenic landmarks. These segments may be relatively undeveloped arterial or collector roads or may be older roads along which revitalization or historic preservation efforts would be appropriate. (Amended by Ordinance No. 00-22)

POLICY 2.9.2: A study will be conducted in cooperation with interested parties to identify and evaluate alternative design themes and land use patterns. The study will recommend specific incentives, development regulations, and funding sources to implement a scenic corridor program. (Amended by Ordinance No. 00-22)

OBJECTIVE 2.10: SCHOOL LOCATION. In order to ensure that public school locations are proximate to urban residential areas and are consistent with county growth policies proposals for new schools are subject to the objectives and policies contained under Goal 46. (Added by Ordinance No. 99-15)

GOAL 3: PRIVATELY FUNDED INFRASTRUCTURE. To assist in the provision of a full range of privately funded urban infrastructure in specified Future Urban areas which have existing or projected deficits in one or more essential services. (Amended by Ordinance No. 94-30)

OBJECTIVE 3.1: FUNDING MECHANISMS. The Future Land Use Map will include overlays designating specific geographic areas which are permitted urban-level densities and intensities because most necessary infrastructure will be provided through the creation of multifunction taxing and/or benefit districts, community development districts, direct developer provision, or an effective combination of similar financing mechanisms. (Amended by Ordinance No. 00-22)

POLICY 3.1.1: The county will establish taxing/benefit districts where appropriate for the designated areas in accordance with the provisions of general law. Such a district may be limited to specific types of infrastructure upon a formal finding by the Board of County Commissioners that more appropriate mechanisms have been identified to provide the remaining facilities and services; a district may also be limited to a geographic area smaller than the overlay zone upon a formal finding by the board that this reduction will not substantially increase infrastructure costs which must be paid by general county revenues. (Amended by Ordinance No. 00-22)

POLICY 3.1.2: With initial funds from each designated area or other source, an examination will be made (under direction of the county) of the infrastructure needs for that area. A detailed plan for the provision of needed facilities will then be prepared.

POLICY 3.1.3: The infrastructure to be provided through this program in each designated area may include any or all of the following facilities and services as appropriate: collector and arterial roads, surface water management (see Policy 40.2.2), water and sewer mains and treatment, fire and EMS service, parks, etc.

POLICY 3.1.4: A committee of landowners in each designated area may be established to provide input into this process.

POLICY 3.1.5: Where proposed development projects had been approved contingent upon the private provision of infrastructure that now will be provided through a different mechanism, the developer may apply through the zoning process to have such conditions modified or deleted.

POLICY 3.1.6: Rezoning to permit increased densities that are granted after the effective date of this policy (March 1, 1989) but before the district (or equivalent funding mechanism) has been established and an infrastructure plan has been prepared will be subject to a special requirement that further development orders will be granted only upon a clear showing that the development will not cause the mandatory levels of service in Policy 70.1.3 to be exceeded. The granting of a development order will not release the property owner from any obligations under the privately funded infrastructure overlay. This requirement will not apply if it would preclude the constitutionally mandated reasonable use of a parcel of land. (Amended by Ordinance No. 93-25, 00-22)

GOAL 4: DEVELOPMENT DESIGN - GENERAL. To maintain innovative land development regulations which encourage creative site designs and mixed use developments. (Amended by Ordinance No. 94-30)

OBJECTIVE 4.1: Maintain the current planned development rezoning process which combines site planning flexibility with rigorous review. By the end of 1995, take specific steps to further promote the creation of mixed-use developments to reduce the impact on collector and arterial roads. (Amended by Ordinance 91-19) (Amended by Ordinance No. 94-30)

POLICY 4.1.1: Development designs will be evaluated to ensure that land uses and structures are well integrated, properly oriented, and functionally related to the topographic and natural features of the site, and that the placement of uses or structures within the development minimizes the expansion and construction of street and utility improvements. (Amended by Ordinance 91-19, 00-22)

POLICY 4.1.2: Development designs will be evaluated to ensure that the internal street system is designed for the efficient and safe flow of vehicles and pedestrians without having a disruptive effect on the activities and functions contained within or adjacent to the development. (Amended by Ordinance 91-19, 00-22)

GOAL 5: RESIDENTIAL LAND USES. To provide sufficient land in appropriate locations on the Future Land Use Map to accommodate the projected population of Lee County in the year 2020 in attractive and safe neighborhoods with a variety of price ranges and housing types. (Amended by Ordinance No. 94-30)

OBJECTIVE 5.1: All development approvals for residential, commercial, and industrial land uses must be consistent with the following policies, the general standards under Goal 11, and other provisions of this plan. (Amended by Ordinance No. 94-30, 00-22)

POLICY 5.1.1: Residential developments requiring rezoning and meeting Development of County Impact (DCI) thresholds must be developed as planned residential developments. (Amended by Ordinance No. 00-22)

POLICY 5.1.2: Prohibit residential development where physical constraints or hazards exist, or require the density and design to be adjusted accordingly. Such constraints or hazards include but are not limited to flood, storm, or hurricane hazards; unstable soil or geologic conditions; environmental limitations; aircraft noise; or other characteristics that may endanger the residential community.

POLICY 5.1.3: During the rezoning process, direct high-density residential developments to locations that are near employment and shopping centers; are close to parks and schools; and are accessible to mass transit and bicycle facilities. (Amended by Ordinance No. 94-30)

POLICY 5.1.4: Prohibit residential development in all Industrial Development areas and Airport Noise Zone 3 as indicated on the Future Land Use Map, except for residences in the Industrial Development area for a caretaker or security guard, and except as provided in Chapter XIII. (Amended by Ordinance No. 94-30)

POLICY 5.1.5: Protect existing and future residential areas from any encroachment of uses that are potentially destructive to the character and integrity of the residential environment. Requests for conventional rezonings will be denied in the event that the buffers provided in Chapter 10 of the Land Development Code are not adequate to address potentially incompatible uses in a satisfactory manner. If such uses are proposed in the form of a planned development or special exception and generally applicable development regulations are deemed to be inadequate, conditions will be attached to minimize or eliminate the potential impacts or, where no adequate conditions can be devised, the application will be denied altogether. The Land Development Code will continue to require appropriate buffers for new developments. (Amended by Ordinance No. 94-30, 99-15, 00-22)

POLICY 5.1.6: Maintain development regulations that require high-density, multi-family, cluster, and mixed-use developments to have open space, buffering, landscaping, and recreation areas appropriate to their density and design. (Amended by Ordinance No. 94-30)

POLICY 5.1.7: Maintain development regulations that require that community facilities (such as park, recreational, and open space areas) in residential developments are functionally related to all dwelling units and easily accessible via pedestrian and bicycle pathways. These pathways must be interconnected with adjoining developments and public pathways whenever possible. Townhouses, condominiums,

apartments, and other types of multi-family residential development must have directly accessible common open space. (Amended by Ordinance No. 94-30, 00-22)

POLICY 5.1.8: Provide for adequate locations of low- and moderate-income housing through the rezoning process, the provision of public facilities and services, and the elimination of unnecessary administrative and legal barriers.

POLICY 5.1.9: Consider by 1996 the provision of incentives and requirements for the reassembly, redesign, and replatting of vacant platted residential lots that are not suitable for timely, safe, and efficient development; and re-evaluate the effects of the single-family residence provision and the privately funded infrastructure overlay on the county's ability to provide incentives for reassembly, redesign, and replatting. (Amended by Ordinance No. 94-30)

POLICY 5.1.10: A single-family home may be constructed on a bona fide previously subdivided lot regardless of the maximum densities specified in Table 1(a) if such lot complies with the specific rules in Chapter XIII of this plan.

POLICY 5.1.11: In those instances where land under single ownership is divided into two or more land use categories by the adoption or revision of the Future Land Use Map, the allowable density under this Plan will be the sum of the allowable densities for each land use category for each portion of the land. This density can be allocated across the property provided that: (Amended by Ordinance 92-35, 00-22)

1. The Planned Development zoning is utilized; and
2. No density is allocated to lands designated as Non-Urban or Environmentally Critical that would cause the density to exceed that allowed on such areas; and
3. The land was under single ownership at the time this policy was adopted and is contiguous; in situations where land under single ownership is divided by roadways, railroads, streams (including secondary riparian systems and streams but excluding primary riparian systems and major flow ways such as the Caloosahatchee River and Six Mile Cypress Slough), or other similar barriers, the land will be deemed contiguous for purposes of this policy; and
4. The resultant Planned Development affords further protection to environmentally sensitive lands if they exist on the property.

GOAL 6: COMMERCIAL LAND USES. To permit orderly and well-planned commercial development at appropriate locations within the county. (Amended by Ordinance No. 94-30)

OBJECTIVE 6.1: All development approvals for commercial land uses must be consistent with the following policies, the general standards under Goal 11 and other provisions of this plan. (Amended by Ordinance No. 94-30)

POLICY 6.1.1: All applications for commercial development will be reviewed and evaluated as to:

- a. Traffic and access impacts (rezoning and development orders);
- b. Landscaping and detailed site planning (development orders);
- c. Screening and buffering (planned development rezoning and development orders);
- d. Availability and adequacy of services and facilities (rezoning and development orders);
- e. Impact on adjacent land uses and surrounding neighborhoods (rezoning);
- f. Proximity to other similar centers (rezoning); and
- g. Environmental considerations (rezoning and development orders).

(Amended by Ordinance No. 00-22)

POLICY 6.1.2: All commercial development must be consistent with the location criteria in this policy, except where specifically excepted by this policy or by Policy 6.1.7, or in Lehigh Acres by Policies 1.8.1 through 1.8.3.

1. Minor Commercial

a. Major function

Provides for the sale of convenience goods and services.

b. Location

The entire retail use, including buildings and outdoor sales area, must be located as follows except where this plan provides specific exceptions (e.g., Policy 6.1.7):

(1) On or near the intersection (within 330 feet of the adjoining rights-of-way of the intersection roads) of local and collector, local and arterial, or collector and collector roads. In Commercial Planned Developments where future road improvements that are included in the Capital Improvement Program will enable the property to qualify for the higher level of commercial development specified in Subsection 2 below, and which are conditioned to allow the increased commercial intensity when the roadway actually functions at the higher level of a collector road, the Minor Commercial use may extend beyond 330 feet of such intersections provided the Master Concept plan specifically indicates the phasing of the development from Minor to Neighborhood Commercial use. Proposed interconnections of future internal access roads or driveways servicing only the subject parcel with an arterial or collector will not comply with the requirements of this section;

(2) At the intersection (as defined below) of collector and arterial or arterial and arterial roads; or

(3) Within a residential planned development provided it is located and designed primarily to meet the commercial needs of the residents of the development.

- c. Site Area Two acres or less.
- d. Range of Gross Floor Area Less than 30,000 square feet.

(Amended by Ordinance No. 00-22)

2. Neighborhood Commercial

- a. Major function Provide for the sale of convenience goods and personal services such as food, drugs, sundries, and hardware items.
- b. Typical leading tenants Supermarket and drug store.
- c. Location Must be located as follows (except where this plan provides specific exceptions):

At the intersection of an arterial and a collector or two arterials so that direct access is provided to both intersecting roads. Such direct access may be provided via an internal access road to either intersecting road. On Lee County's islands where there is no intersecting network of collectors and arterials, neighborhood commercial centers may be located using the standards for minor commercial centers.

- d. Site Area 2 to 10 acres
- e. Range of Gross Floor Area 30,000 to 100,000 square feet
- f. In that portion of North Fort Myers lying between the Cape Coral city limits and the old S.A.L. railroad grade and north of the junction of the 41s, an exception to the strict adherence to the location standards in subsection (c) may

be granted upon the approval of an application for Commercial Planned Development rezoning if the Board of County Commissioners makes a formal finding that the proposed project:

- (1) is located on an existing arterial road;
- (2) is located at the intersection of that arterial with a future collector or arterial that is indicated on the Official Trafficways Map; and
- (3) will provide (or at least not interfere with) an acceptable alignment for the future roadway which is the justification for the approval, relative to both extensions from the point of intersection with the existing road.

3. Community Commercial

- | | |
|------------------------------|---|
| a. Major function | Some functions of neighborhood commercial, in addition to providing for the sale of retail goods such as clothing, variety items, appliances, and furniture. |
| b. Typical leading tenants | Supermarket, drug store, minor department store, variety store, or discount center. |
| c. Location | <p>Must be located as follows (except where this plan provides specific exceptions):</p> <p>At the intersection of two arterials so that direct access is provided to both intersecting roads. Such direct access may be provided by an internal access road to either intersecting road.</p> |
| d. Site Area | 10 to 35 acres |
| e. Range of Gross Floor Area | 100,000 to 400,000 square feet |
| f. | <p>Notwithstanding prohibitions contained elsewhere in this plan, community commercial development may be granted in a portion of the Suburban land use category in North Fort Myers lying between the Cape Coral city limits and the old S.A.L. railroad grade and north of the junction of the 41s upon the approval of an application for Commercial Planned Development rezoning if the Board of County Commissioners makes a formal finding that the proposed project:</p> |

- (1) is located on an existing arterial road;

- (2) is located at the intersection of that arterial with a future arterial road that is indicated on the Official Trafficways Map; and
- (3) will provide (or at least not interfere with) an acceptable alignment for the future roadway which is the justification for the approval, relative to both extensions of that future roadway from the point of intersection with the existing road.

4. Regional Commercial

- a. Major Function Some functions of community commercial, in addition to providing a full range and variety of shopping goods for comparative shopping (such as general merchandise, apparel, furniture, and home furnishings).
- b. Typical leading tenants One or more full-line department stores.
- c. Location Must be located in such a manner as to provide direct access to two and preferably three arterial roads. Such direct access may be via an internal access road to one or more arterials.
- d. Site Area 35 to 100 acres
- e. Range of Gross Floor Area 400,000 to 1 million square feet or more.

5. Commercial development "at the intersection" will extend no more than one-quarter mile from the centerline of the intersection and must include proper spacing of access points, with the following exception: in a commercial development approved under the planned development rezoning process, "at the intersection" may extend beyond one-quarter mile from the intersection, provided that:

- a. direct access is provided to the development within one-quarter mile of the intersection;
- b. an internal access road or frontage road provides access to the intersecting street prior to occupancy of the development; and
- c. all access points meet Land Development Code requirements for safety and spacing.

- d. the retail commercial use, including any outdoor sales, does not extend beyond one-half mile from the centerline of the intersection.

(Amended by Ordinance No. 00-22)

6. Any contiguous property under one ownership may be developed as part of the interstate interchange, except in the Mixed Use Interchange district, provided the property under contiguous ownership to be developed as part of the interstate interchange does not extend beyond three-quarters of a mile from the interchange centerpoint. This is intended to promote planned developments under unified ownership and control, and to insure proper spacing of access points. (Amended by Ordinance No. 99-18)
7. The location standards specified in Subsections 1-4 will apply to the following commercial developments: shopping centers; free-standing retail or service establishments; restaurants; convenience food stores; automobile dealerships; gas stations; car washes; and other commercial development generating large volumes of traffic. These location standards will not apply to the following: banks and savings and loan establishments without drive-in facilities; hotels or motels; marinas; general, medical, or professional offices; industrial, warehouse, or wholesale development; clubs, as defined in Chapter 34 of the Land Development Code (commercial clubs excepted); and other similar development. The distinction in this subsection between these two major types of commercial uses does not apply in Lehigh Acres, where commercial uses are permitted in accordance with Policies 1.8.1 through 1.8.3. (Amended by Ordinance No. 00-22)
8. The standards specified in Subsections 1-4 for location, floor area and site area will serve as guidelines during the rezoning process (allowing limited discretion by the Board of County Commissioners in special cases in which retail uses are the only reasonable use of the parcel in light of its size, its proximity to arterials and collectors, and the nature of the existing and projected surrounding uses, including but not limited to environmental factors) but are strict requirements during the development order process in the case of zoning that existed prior to the effective date of the Lee Plan (December 21, 1984). The other standards specified in Subsections 1-4 will serve generally to indicate the types of development which are likely to fall within each commercial category. Proposed rezonings to commercial zoning districts that include both uses that are subject to the standards in Subsections 1-4 and uses that are not (see Subsection 7) may be found consistent with the Lee Plan by the Board of County Commissioners even if the subject parcel does not comply with the applicable location standard; provided, however, that no development orders will be issued on any such parcel for any use to which the standards in Subsection 1-4 is applicable, and all such development orders must be consistent with the level of service requirements in Policy 70.1.3. (Amended by Ordinance No. 93-25, 00-22)

9. The location standards in this policy are not applicable in the Interchange land use category, or in Lehigh Acres where commercial uses are permitted in accordance with Policies 1.8.1 through 1.8.3.
10. The Board of County Commissioners may approve applications for minor commercial centers that do not comply with the location standards for such centers but which are consistent with duly adopted CRA plans.
11. Uses that must comply with Subsections 1-4 may occur at the outside of a T-intersection so long as direct access is provided from at least two points on the adjacent intersecting road, one of which must be an extension of the other intersecting road.
12. Map 19 illustrates the existing Lee County intersections that are deemed to be consistent with the standards in subsections 2 and 3. Neighborhood and community commercial centers must be located at one of the designated intersections, at another intersection utilizing the list of Functional Classification for Arterial and Collector Roads, or in accordance with one of the exceptions under Goal 6, or in Lehigh Acres in accordance with Policies 1.8.1 through 1.8.3.

The map shows some intersections with half-circles and others with full circles. Half circles indicate that only the two intersection quadrants shown on the map are deemed to be consistent with the standards. All of the quadrants of intersections designated with full circles are deemed to be consistent with the standards. Proposed neighborhood and community commercial centers that are located at the designated intersections are subject to all of the other Goals, Objectives and Policies of this Plan.

Functional classifications of new or improved streets will be established in accordance with the definitions of "arterial" and "collector" roads in Rule 9J-5.003. A list of Functional Classification for Arterial and Collector Roads, consisting of roads that meet this criteria, will be maintained by the Department of Transportation, for county maintained roads, and the Division of Development Services, for privately maintained roads. These functional classification lists will be adopted by Administrative Code. For the purpose of determining compliance with the locational standards of Policy 6.1.2, only those roads identified as Major Collector roads will be considered collector roads. Roads identified as Minor Collector or not included on the list will be considered local roads. The map will be revised annually during the county's regular plan amendment cycle.

(Amended by Ordinance No. 94-30, 98-09, 99-15, 00-22)

13. Freestanding single use commercial retail development of five (5) acres or more does not qualify as a Neighborhood Center as that term is used in the Suburban and Outlying Suburban Future Land Use Categories. (Added by Ordinance No. 00-22)
(Amended by Ordinance No. 94-30, 98-09, 99-15, 00-22)

POLICY 6.1.3: Commercial developments requiring rezoning and meeting Development of County Impact (DCI) thresholds must be developed as commercial planned developments designed to arrange uses in an integrated and cohesive unit in order to:

- provide visual harmony and screening;
- reduce dependence on the automobile;
- promote pedestrian movement within the development;
- utilize joint parking, access and loading facilities;
- avoid negative impacts on surrounding land uses and traffic circulation;
- protect natural resources; and
- provide necessary services and facilities where they are inadequate to serve the proposed use.

(Amended by Ordinance No. 94-30, 00-22)

POLICY 6.1.4: Commercial development will be approved only when compatible with adjacent existing and proposed land uses and with existing and programmed public services and facilities. (Amended by Ordinance No. 94-30, 00-22)

POLICY 6.1.5: The land development regulations will require that commercial development be designed to protect the traffic-carrying capacity of roads and streets. Methods to achieve this include, but are not limited to:

- frontage roads;
- clustering of activities;
- limiting access;
- sharing access;
- setbacks from existing rights-of-way;
- acceleration, deceleration and right-turn-only lanes; and
- signalization and intersection improvements

(Amended by Ordinance No. 94-30, 00-22)

POLICY 6.1.6: The land development regulations will require that commercial development provide adequate and appropriate landscaping, open space, and buffering. Such development is encouraged to be architecturally designed so as to enhance the appearance of structures and parking areas and blend with the character of existing or planned surrounding land uses.

POLICY 6.1.7: Prohibit commercial developments from locating in such a way as to open new areas to premature, scattered, or strip development; but permit commercial development to infill on small parcels in areas where existing commercial development would make a residential use clearly unreasonable.

POLICY 6.1.8: Commercial development may take place, when properly zoned and when meeting the standards in Policy 6.1.2, within the Future Urban Areas. Minor or rural commercial uses which serve rural residents or marine traffic, neighborhood

commercial uses which serve major non-commercial public attractions (e.g. Lee County Civic Center), limited agricultural - commercial uses which serve rural areas and agriculturally related needs, and limited commercial marinas (not including heavy marine commercial, such as extensive storage and hull, engine, and electronic repairs) may be permitted in non-urban areas. (Amended by Ordinance No. 94-30, 98-09)

POLICY 6.1.9: Prohibit commercial development from locating near existing or planned school areas in such a way as to jeopardize the safety of students. (Amended by Ordinance No. 00-22)

POLICY 6.1.10: The approval or existence of commercial development on one corner of an intersection will not dictate the development of all corners for commercial development, nor does the existence of commercial development on an arterial or collector road dictate that all frontage must be similarly used. (Amended by Ordinance No. 00-22)

POLICY 6.1.11: Provide by 1995 appropriate requirements and incentives for the conversion of strip commercial development into series of discrete, concentrated commercial areas. (Amended by Ordinance No. 94-30)

POLICY 6.1.12: Encourage the upgrading or revitalization of deteriorating commercial areas (consistent with approved CRA plans, where applicable), but prohibit the expansion or replacement of commercial uses which are inappropriately located or that have an adverse impact on surrounding residential and non-residential uses. Such revitalization includes, but is not limited to: store-front renewal, sign control, and the provision of common parking areas and consolidated access. (Amended by Ordinance No. 94-30)

GOAL 7: INDUSTRIAL LAND USES. To promote opportunities for well-planned industrial development at suitable locations within the county.

OBJECTIVE 7.1: All development approvals for industrial land uses must be consistent with the following policies, the general standards under Goal 11, and other provisions of this plan. (Amended by Ordinance No. 94-30)

POLICY 7.1.1: In addition to the standards required herein, the following factors apply to industrial rezoning and development order applications:

1. The development must comply with local, state, and federal air, water, and noise pollution standards.
2. When located next to residential areas, industry must not generate noise levels incompatible with the residential development.
3. Bulk storage or production of toxic, explosive, or hazardous materials will not be permitted near residential areas.

4. Contamination of ground or surface water will not be permitted.
5. Applications for industrial development will be reviewed and evaluated as to:
 - a. air emissions (rezoning and development orders);
 - b. impact and effect on environmental and natural resources (rezoning and development orders);
 - c. effect on neighbors and surrounding land use (rezoning);
 - d. impacts on water quality and water needs (rezoning and development orders);
 - e. drainage system (development orders);
 - f. employment characteristics (rezoning);
 - g. fire and safety (rezoning and development orders);
 - h. noise and odor (rezoning and development orders);
 - i. buffering and screening (planned development rezoning and development orders);
 - j. impacts on transportation facilities and access points (rezoning and development orders);
 - k. access to rail, major thoroughfares, air, and, if applicable, water (rezoning and development orders);
 - l. utility needs (rezoning and development orders); and
 - m. sewage collection and treatment (rezoning and development orders).

(Amended by Ordinance No. 00-22)

POLICY 7.1.2: Industrial developments requiring rezoning and meeting Development of County Impact (DCI) thresholds must be developed as Planned Developments designed to arrange uses as an integrated and cohesive unit in order to:

- promote compatibility and screening;
- reduce dependence on the automobile;
- promote pedestrian movement within the development;
- utilize joint parking, access and loading facilities;
- avoid negative impacts on surrounding land uses and traffic circulation;
- protect natural resources; and

- provide necessary facilities and services where they are inadequate to serve the proposed use.

(Amended by Ordinance No. 94-30, 98-09, 00-22)

POLICY 7.1.3: Industrial land uses must be located in areas appropriate to their special needs and constraints, including, but not limited to, considerations of: topography; choice and flexibility in site selection; access by truck, air, deep water, and rail; commuter access for home-to-work trips; utilities; greenbelt and other amenities; air and water quality considerations; proximity to supportive and related land uses; and compatibility with neighboring uses. (Amended by Ordinance No. 00-22)

POLICY 7.1.4: The Future Land Use Map must designate a sufficient quantity of land to accommodate industrial development that will employ 3% of the county's population in manufacturing activities by the year 2010. A report will be prepared by county staff every two years to monitor the county's progress towards this employment goal. (Amended by Ordinance No. 93-25) (Amended by Ordinance No. 94-30, 00-22)

POLICY 7.1.5: The timing and location of industrial development will be permitted only with the availability and adequacy of existing or planned services and facilities. (Amended by Ordinance No. 00-22)

POLICY 7.1.6: Land that is located outside of the Industrial Development, Airport Commerce, and Industrial Interchange areas but within the designated Future Urban Areas may be developed for light industrial purposes so long as adequate services and facilities are available, the use will not adversely impact surrounding land uses, and natural resources are protected, if one of the following conditions is met:

- a. The parcel is located in the Intensive Development, Central Urban, or Urban Community land use categories, was zoned IL or IG prior to the adoption of the 1984 Lee Plan, and does not exceed 50 acres in size (unless it is adjacent to other existing or designated industrial lands); or
- b. The parcel is located in the Intensive Development, Central Urban, Urban Community, General Interchange, Industrial Commercial Interchange, Mixed Use Interchange, or University Village Interchange land use categories, and is zoned as a Planned Development.

(Amended by Ordinance No. 94-30, 98-09, 99-18)

POLICY 7.1.7: Permit agriculturally-related industrial uses that directly serve the rural and agricultural community in areas indicated on the Future Land Use Map as Rural or Open Lands, provided they have adequate fire protection, transportation, and wastewater treatment and water supply, and have no adverse effect on surrounding land uses and natural resources. These determinations will be made during the rezoning process. (Amended by Ordinance No. 94-30, 00-22)

POLICY 7.1.8: Land development regulations will require that industrial uses be adequately buffered and screened from adjacent existing or proposed residential areas so as to prevent visual blight and noise pollution. (Amended by Ordinance No. 00-22)

POLICY 7.1.9: Industrial development will not be permitted if it allows industrial traffic to travel through predominantly residential areas. (Amended by Ordinance No. 00-22)

POLICY 7.1.10: All county actions relating to industrial land uses must be consistent with the goals, objectives, and policies of the Economic element of this Plan. (Added by Ordinance No. 94-30, Amended by Ordinance No. 00-22)

GOAL 8: MARINE-ORIENTED LAND USES. To designate prime locations for marine-oriented land uses and protect them from incompatible or pre-emptive land uses.

OBJECTIVE 8.1: Existing marinas, fish houses, and port facilities indicated on the Future Land Use Map as having water-dependent overlay zones will be reclassified by the county to commercial and industrial marine zoning categories to protect their rights to rebuild and expand and to prevent their conversion to non-water-dependent uses without a public hearing. (See Map 12) (Amended by Ordinance No. 94-30, 00-22)

OBJECTIVE 8.2: All development approvals for marine-oriented land uses must also comply with requirements in the Ports, Aviation and Related Facilities sub-element, Objective 98.5: Marina Siting Criteria, and Objective 98.6: Marina Design Criteria. (Amended by Ordinance No. 94-30, 00-22)

GOAL 9: AGRICULTURAL LAND USES. To protect existing and potential agricultural lands from the encroachment of incompatible land uses and to discourage the introduction or expansion of agricultural uses in the Future Urban Areas. (Amended by Ordinance No. 00-22)

OBJECTIVE 9.1: Place all existing active and passive agricultural uses on all parcels in excess of 100 acres, zoned AG, and located outside of Future Urban areas on an agricultural overlay. (Amended by Ordinance No. 94-30)

POLICY 9.1.1: In accordance with F.S. 187.201(23)(b)1, nothing in this plan will be construed to permanently prohibit the conversion of agricultural uses to other land uses. (Added by Ordinance No. 94-30, Amended by Ordinance No. 00-22)

POLICY 9.1.2: Encourage the utilization of energy and soil conservation management practices in agricultural activities.

POLICY 9.1.3: Continue to encourage agricultural operations to meet adopted water quality and surface water management standards by providing advisory water management plans through the Lee Soil and Water Conservation District. (Amended by Ordinance No. 94-30)

POLICY 9.1.4: Protect agricultural activities on lands designated as Agricultural on the agricultural overlay from the impacts of new mineral extraction operations, recreational uses, and residential developments. (Amended by Ordinance No. 94-30)

POLICY 9.1.5: Amend the Noise Ordinance by 1995 to provide exemptions for crop dusting and other essential agricultural activities. (Added by Ordinance No. 94-30)

POLICY 9.1.6: Continue to update and analyze agricultural land use data. (Added by Ordinance No. 94-30)

POLICY 9.1.7: Lee County will work with an agricultural advisory committee to establish incentives to encourage the continuation of existing agricultural operations. The county, with the assistance of the committee, will investigate the feasibility of a Purchase of Development Rights (PDR) program for agricultural property by 1995. (Added by Ordinance No. 94-30, Amended by Ordinance No. 00-22)

OBJECTIVE 9.2: To prevent the location of agricultural uses proximate to incompatible urban uses and to promote the efficient use of existing and programmed urban infrastructure, new agricultural uses should be directed away from Future Urban Areas. (Added by Ordinance No. 00-22)

POLICY 9.2.1: Rezoning of land to agricultural zoning districts is prohibited in those areas designated by the Lee Plan as Future Urban Areas, with the exception of those areas designated as Outlying Suburban. In Outlying Suburban areas, such requests will be reviewed on a case by case basis, and recommendations will be made based on current and future availability of urban infrastructure and compatibility with existing and future land uses. (Added by Ordinance No. 00-22)

POLICY 9.2.2: Planned Development rezonings within the Future Urban Areas must not establish new, or expand existing, agricultural uses. Bona fide agricultural uses that exist at the time of rezoning may be approved and the use allowed to continue until development commences. The approved existing agricultural uses must not expand beyond the boundaries that existed at the time of rezoning. Existing agricultural uses within any tract or phase must be discontinued upon local development order approval including that tract or phase. (Added by Ordinance No. 00-22)

GOAL 10: MINERAL EXTRACTION. To protect areas containing identified mineral resources from incompatible urban development, while insuring that extraction operations minimize or eliminate adverse effects on surrounding land use and natural resources.

OBJECTIVE 10.1: Designate through the rezoning process sufficient lands suitable for providing fill material and limerock to meet the county's needs and to export to other communities, while providing adequate protection for the county's natural resources. (Amended by Ordinance No. 94-30)

POLICY 10.1.1: Mineral extraction operations intending to withdraw groundwater for any purpose must provide a monitoring system to measure groundwater impacts.

POLICY 10.1.2: Applications for mineral extraction permits for new or expanding areas must include an environmental assessment. The assessment will include (but not be limited to) consideration of air emissions, impact on environmental and natural resources, effect on nearby land uses, degradation of water quality, depletion of water quantity, drainage, fire and safety, noise, odor, visual impacts, transportation including access roads, sewage disposal, and solid waste disposal. (Amended by Ordinance No. 00-22)

POLICY 10.1.3: Applications for mineral extraction permits for new or expanding sites must include a reclamation plan which provides assurance of implementation. Reclamation plans in or near important groundwater resource areas must be designed to minimize the possibility of contamination of the groundwater during mining and after completion of the reclamation. (Amended by Ordinance No. 00-22)

POLICY 10.1.4: Mineral extraction activities (and industrial uses which are ancillary to mineral extraction) may be permitted in areas indicated on the Future Land Use Map as Rural, Open Lands, and Density Reduction/Groundwater Resources, provided they have adequate fire protection, transportation facilities, wastewater treatment and water supply, and provided further that they have no significant adverse effects such as dust and noise on surrounding land uses and natural resources. In order to reduce transport costs and minimize wear on the county's roadways, the extraction and transport of fill material may also be permitted as an interim use in the Future Urban Areas provided that the above requirements are met; however, special restrictions may also be applied to protect other land uses. These determinations will be made during the rezoning process. (Amended by Ordinance No. 94-30, 00-22)

POLICY 10.1.5: Lee County will support efforts by government, community leaders, and the rock mining industry owners and businesses to seek incentives that will help to facilitate the connection of rock mining borrow lake excavations into a system of interconnected lakes and flowways that will enhance wildlife habitat values, provide for human recreation, educational and other appropriate uses, and/or strengthen community environmental benefits. (Added by Ordinance No. 99-15)

OBJECTIVE 10.2: Determine and maintain a balance between the County's petroleum resources and the health, safety and welfare of the residents of its Future Urban Areas. (Added by Ordinance No. 98-09)

POLICY 10.2.1: By 2000, the county will conduct a study to determine the appropriateness of oil exploration, drilling, or production. The study will address the issues of the compatibility of oil-related activities with the environment and urban uses. This study will include recommendations regarding the appropriateness of such activities within Lee County as well as guidelines under which such activities should be

regulated under the Lee County Land Development Code. (Added by Ordinance No. 98-09, Amended by Ordinance No. 00-22)

GOAL 11: WATER, SEWER, TRAFFIC, AND ENVIRONMENTAL REVIEW STANDARDS. To insure that appropriate water, sewer, traffic, and environmental review standards are considered in reviewing rezoning applications and are met prior to issuance of a county development order.

STANDARD 11.1: WATER

1. Any new residential development that exceeds 2.5 dwelling units per gross acre, and any new single commercial or industrial development in excess of 30,000 square feet of gross leasable (floor) area per parcel, must connect to a public water system (or a "community" water system as that is defined by Chapter 17-22, F.A.C.).
2. If the proposed development lies within the boundaries of a water utility's certificated or franchised service area, or Lee County Utilities' future potable water service area (see Map 6), then the development must be connected to that utility.
3. The developer must provide proof that the prior commitments of the water utility, plus the projected need of the developer, do not exceed the supply and facility capacity of the utility.
4. All waterline extensions to new development will be designed to provide minimum fire flows, as well as adequate domestic services as required by Chapter 10D-4, F.A.C..
5. If a new development is located in a certificated or franchised service area, or Lee County Utilities' future potable water service area (see Map 6), and the utility cannot provide the service or cannot provide the service except at a clearly unreasonable cost to the developer, the developer is encouraged to petition the appropriate regulatory agency to contract the service area so that the development may establish its own community water system or invite another adjacent utility to expand its service area in order to provide the required service.
6. If a development lies outside any service area as described above, the developer may:
 - request that the service area of an adjacent water utility be extended to incorporate the property;
 - establish a community water system for the development; or
 - develop at an intensity that does not require a community water system.(Amended by Ordinance No. 94-30, 00-22)

STANDARD 11.2: SEWER

1. Any new residential development that exceeds 2.5 dwelling units per gross acre, and any new single commercial or industrial development that generates more than 5,000 gallons of sewage per day, must connect to a sanitary sewer system.
2. If the proposed development exceeds the thresholds listed above and lies within the boundaries of a sewer utility's certificated or franchised service area, or Lee County Utilities' future sanitary sewer service area (see Map 7), and that utility has sufficient capacity to provide minimum service to the development, then the development must connect to that sewer utility if there is existing infrastructure adequate to accept the effluents of the development within 1/4 mile from any part of the development.
3. If there is not sufficient capacity nor adequate infrastructure within 1/4 mile of the development, the developer must provide proof in the form of a clearly stated rejection of service.
4. If a new development is located in a certificated or franchised service area, or Lee County Utilities' future sanitary sewer service area (see Map 7), and the utility cannot provide the service, or cannot provide the service except at a clearly unreasonable cost to the developer, the developer may establish on a temporary basis a self-provided sanitary sewer facility for the development, to be abated when the utility extends service to the site. The developer may also petition the appropriate regulatory agency to contract the service area of the utility in order that another utility may be invited to provide the service.
5. If a development lies outside any service area as described above, the developer may:
 - request that the service area of an adjacent sewer utility be expanded to incorporate the property;
 - establish a self-provided sanitary sewer system for the development;
 - develop at an intensity that does not require sanitary sewer service; or
 - if no more than 5000 gallons of effluent per day per parcel is produced, an individual sewage disposal system per Chapter 10D-6 may be utilized, contingent on approval by all relevant authorities.

(Amended by Ordinance No. 94-30, 00-22)

STANDARD 11.3: TRAFFIC.

1. A traffic impact statement must be submitted to and accepted by the county DOT for the following developments:
 - Developments of Regional Impact (D.R.I.'s);
 - Planned Developments (as specified in the Zoning Regulations); and

- developments requiring a county development order, as specified in the Land Development Code.
2. The form, content, and level of detail required in the traffic impact statement will be established by Lee County by ordinance, administrative code, or other regulations. Lee County will establish criteria or thresholds to determine the scope of the traffic impact statement required:
- if the development meets or exceeds the established thresholds, the traffic impact statement will provide a comprehensive assessment of the development's impacts on the surrounding road system.
 - if the development does not meet or exceed these thresholds, the traffic impact statement will provide information regarding traffic generation and impacts at the development's access points to the adjacent street system.
- (Amended by Ordinance No. 94-30, 00-22)

STANDARD 11.4: ENVIRONMENTAL REVIEW FACTORS. In any case where there exists or there is the probability of environmentally sensitive areas (as identified by Lee County, the Corps of Engineers, Department of Environmental Protection, South Florida Water Management District, or other applicable regulatory agency), the developer/applicant must prepare an environmental assessment that examines the existing conditions, addresses the environmental problems, and proposes means and mechanisms to protect, conserve, or preserve the environmental and natural resources. (Amended by Ordinance No. 94-30, 00-22)

GOAL 12: SAN CARLOS ISLAND. All development approvals on San Carlos Island must be consistent with following objective and policy in addition to other provisions of this plan. (Added by Ordinance No. 94-30)

OBJECTIVE 12.1: SAN CARLOS ISLAND WATER-DEPENDENT OVERLAY ZONE. To protect marine-orientated land uses on San Carlos Island from incompatible or pre-emptive land uses all development must be consistent with the following policies in addition to other provisions of this plan. (Added by Ordinance No. 99-15)

POLICY 12.1.1: New development and substantial redevelopment within the Industrial Development land use category on San Carlos Island will be permitted only in accordance with the following criteria. (See glossary for definitions and Map 2 for map boundaries.) However, in no event will Lee County permit new or expanded petroleum facilities which would serve uses other than marine-related uses. (Amended by Ordinance No. 94-30, 99-15, 00-22)

1. At the foot of the Matanzas Pass Bridge - Within the water-dependent overlay zone which is defined as land within 150 feet of the shoreline: water-dependent marine industrial uses and water-dependent functions of recreational marinas.

- Landward of the overlay zone (150-foot line): marine industrial uses, in addition to water-related accessory uses which may be permitted to occupy up to 50% of that portion of a parcel lying landward of the 150-foot line.
2. North of Main Street - Within the water-dependent overlay zone, which is defined as land within 150 feet of the shoreline: water-dependent marine industrial uses and recreational marinas.
 - Landward of the overlay zone (150-foot line): marine industrial uses, in addition to commercial or marine industrial uses which support the major industrial activities and recreational marinas.
 3. South of Main Street - Within the water-dependent overlay zone which is defined as land within 300 feet of the shoreline: water-dependent marine industrial uses only.
 - Landward of the overlay zone (300-foot line): marine industrial uses; in addition, dry-storage recreational marinas may also be permitted through the "planned development" rezoning process, provided the following is clearly demonstrated:
 - Water access can be provided with only minimal interference to the waterfront industrial uses; and
 - Adequate road access is provided for the waterfront industrial uses; and
 - Any other commercial uses (such as food service or retail space) must be clearly ancillary to the recreational marina or industrial uses and comprise no more than five percent (5%) of the site.
 4. Water-Dependent Overlay Zones in General - The water-dependent overlay zones will be included in the Lee County Zoning Regulations and may be the subject of deviation requests during the "planned development" rezoning process. This provision is particularly intended to encourage joint use of parking, access easements, and stormwater retention facilities where such joint use does not negate the essential purpose of the overlay zones. (This also applies to the water-dependent overlay zones elsewhere on San Carlos Island as described in Policy 12.1.1.) (Amended by Ordinance No. 94-30, 00-22)
 5. Ancillary Commercial Uses - Wherever water-dependent, marine industrial uses are permitted, water-related ancillary commercial uses may also be permitted, provided they are clearly subordinate to the parcel's principal use and their total development area (building, parking, required buffers, water retention, etc.) does not exceed fifteen (15) percent of the parcel's total area. However, at the foot of the Matanzas Pass Bridge, this percentage may be increased to twenty-five (25) percent so long as the resulting commercial use of land lying in the Industrial Development land use category does not

exceed fifty (50) percent of all land in that category that is under unified ownership or control as of March 1, 1988.

POLICY 12.1.2: New development and substantial redevelopment within a portion of the Urban Community land use category on San Carlos Island will be subject to the additional requirement that within a water-dependent overlay zone, wet or dry storage recreational marinas and other water-dependent uses only will be permitted. This water-dependent overlay zone affects two separate areas, both lying south of Main Street and east of San Carlos Boulevard, as depicted on Map 2 and described as follows:

- land within 150 feet of the shoreline along the inlet (between other lands designated as Industrial Development but exempting the Gulf Cove Trailer Park); and
- land within 300 feet of the shoreline and lying east of, and within 930 feet of, the main Industrial Development area.

(Relocated by Ordinance No. 99-15, Amended by Ordinance No. 00-22)

OBJECTIVE 12.2: To manage growth, development, and redevelopment on San Carlos Island. To maintain and enhance the area's quality of life and public and private infrastructure. (Added by Ordinance No. 98-09)

POLICY 12.2.1: As part of the transit design process, the county will consider ways to establish pull-overs and turn-offs for the pick-up and discharge of passengers from all trolley and mass transit vehicles and requiring that such pick-up and discharge be done only at specified transit stops. (Relocated by Ordinance No. 98-09, Amended by Ordinance No. 00-22)

POLICY 12.2.2: Prior to the expenditure of public funds for the construction of new parking facilities within San Carlos Island, an analysis of the relationship of the facility to the level-of-service on constrained and backlogged roads will be undertaken, in order to determine if the location, size and function of the facility is appropriate and consistent with the adopted CRA plan and the Transportation Element of the Lee Plan. (Relocated & Amended by Ordinance No. 98-09, Amended by Ordinance No. 00-22)

POLICY 12.2.3: Recreation areas must have a minimum of impervious surfaces. (Relocated by Ordinance No. 98-09, Amended by Ordinance No. 00-22)

POLICY 12.2.4: Sidewalks, bike paths and mass transit routes must be designed to provide convenient and safe access to all recreational facilities in the area. (Relocated by Ordinance No. 98-09, Amended by Ordinance No. 00-22)

GOAL 13: BONITA SPRINGS. To maintain and improve the existing quality of life in Bonita Springs by providing essential public facilities in cooperation with other service providers and Collier County to the extent required by present and prospective residents. (Amended by Ordinance No. 94-30)

OBJECTIVE 13.1: TRAFFIC CIRCULATION. The 2020 traffic circulation maps will contain all of the road segments that are necessary to accommodate both local traffic within the Bonita Springs area and traffic crossing the Collier County line at the minimum levels of service in this plan. (Amended by Ordinance No. 94-30, 00-22)

POLICY 13.1.1: Amendments to the Traffic Circulation Plan Map(s) will give particular attention to the CRA plan for Bonita Springs and to the road plans for Collier County. (Amended by Ordinance No. 94-30, 00-22)

POLICY 13.1.2: All future computer modeling used for transportation planning must be designed to fully recognize Bonita Springs' location at the county line. (Amended by Ordinance No. 00-22)

POLICY 13.1.3: The county will actively pursue the execution of interlocal agreements with Collier County for planning, design, and construction of roads along and crossing the county line. (Amended by Ordinance No. 00-22)

OBJECTIVE 13.2: COMMUNITY FACILITIES. Within funding constraints, the county will attempt, during 1995, to incorporate the following recommendations of the ad-hoc Bonita Study Group into the planning process for public facilities. (Amended by Ordinance No. 94-30, 00-22)

POLICY 13.2.1: POTABLE WATER. The county will grant franchise expansions to the Bonita Springs Utilities (BSU) to serve all areas designated as Future Urban Areas by the Lee Plan. In addition, the county deems it to be in the public interest to encourage:

- other private water systems in the BSU service area to be consolidated with the BSU; and
 - new development near a BSU line to hook into the system.
- (Amended by Ordinance No. 94-30, 00-22)

POLICY 13.2.2: IRRIGATION WELLS. Bonita Springs (as defined in this plan) is hereby declared a critical area for future potable water supply, based on evidence that withdrawals from the main potable aquifer, the lower Tamiami aquifer, are approaching or exceeding the maximum safe yield. In response to this designation, the county will maintain current regulations to provide that new irrigation well permits in Bonita Springs may not utilize the main potable water source. (Also see Policy 34.1.9 for new permit requirements for wells in Lehigh Acres, and Policy 2.4.2 for special requirements for amendments to the Future Land Use Map.) (Amended by Ordinance No. 94-30, 00-22)

POLICY 13.2.3: WASTEWATER. The county will continue to assist the Bonita Springs Utilities in its efforts to provide a central sewer system in the Bonita Springs area. (Amended by Ordinance No. 94-30, 00-22)

POLICY 13.2.4: SURFACE WATER MANAGEMENT. Continue to monitor water quality in the Imperial River and navigational access and tidal flushing through New Pass and Big Hickory Pass. (Amended by Ordinance No. 94-30)

OBJECTIVE 13.3: PARKS AND RECREATION. Decisions on park acquisitions and improvements will continually reflect the unique opportunities and needs of the Bonita Springs area. (Amended by Ordinance No. 00-22)

POLICY 13.3.1: The county will improve access to the Gulf beaches by providing public parking, landscaping, boardwalks, and dune walkovers. (Amended by Ordinance No. 00-22)

OBJECTIVE 13.4: HISTORIC RESOURCES. Lee County will continue to designate historic structures in Bonita Springs in accordance with the Historic Preservation Ordinance. (Amended by Ordinance No. 94-30, 00-22)

POLICY 13.4.1: In conjunction with the Bonita Springs CRA, the county will cooperate with and aid local efforts to redevelop the old downtown area (including identifying funding mechanisms) in order to build community pride, attract tourism, and improve the area's economic condition. (Amended by Ordinance No. 94-30, 00-22)

GOAL 14: GREATER PINE ISLAND. To manage future growth on and around Greater Pine Island so as to maintain the island's unique natural resources and character and to insure that island residents and visitors have a reasonable opportunity to evacuate when a hurricane strike is imminent. For the purposes of this plan, the boundaries of Greater Pine Island are indicated on the Future Land Use Map. (Amended by Ordinance No. 94-30)

OBJECTIVE 14.1: NATURAL RESOURCES. County regulations, policies, and discretionary actions affecting Greater Pine Island will permit no further degradation of estuarine and wetland resources and no unnecessary loss of native upland vegetation and wildlife habitat. (Amended by Ordinance No. 94-30, 00-22)

POLICY 14.1.1: The county will not approve or support any new canals on Greater Pine Island or any new artificial channels in natural waters within one mile of Pine Island. (Amended by Ordinance No. 94-30, 00-22)

POLICY 14.1.2: Lee County will map the seagrass beds around Greater Pine Island, and will regulate boating activities around Greater Pine Island and marina siting on Greater Pine Island in such a way as to prevent the net loss of seagrasses due to "prop dredging." (Added by Ordinance No. 94-30, Amended by Ordinance No. 00-22)

POLICY 14.1.3: Lee County will, by 1996, explore the possibility of estimating the aerial extent and maturity of mangroves in Greater Pine Island for the purpose of providing baseline data necessary to ensure that the cumulative impact of mangrove alteration does not decrease the combination of aerial extent and maturity of mangroves

relative to the baseline data. (Added by Ordinance No. 94-30, Amended by Ordinance No. 00-22)

POLICY 14.1.4: Maintenance dredging of old channels and canals may be permitted in those cases where the original channel (or canal) depth and width can be accurately determined.

POLICY 14.1.5: New "planned development" rezoning approvals and new subdivisions adjoining state-designated aquatic preserves and associated natural tributaries must provide a 50-foot-wide vegetated buffer area between the development and the waterbody. (Amended by Ordinance No. 00-22)

POLICY 14.1.6: The county will continue to purchase environmentally sensitive areas, rare and unique uplands, eagle nesting areas, and archaeological and historic sites on Greater Pine Island in accordance with the priorities set out in this plan. (Amended by Ordinance No. 94-30, 00-22)

POLICY 14.1.7: The county will continue to investigate the need for central sewer service for Bokeelia, St. James City, and Pine Island Center. This will include, for any area having a strong need for such service, an analysis of available facility sites, alternative types of service, and financial feasibility. (Amended by Ordinance No. 94-30, 00-22)

OBJECTIVE 14.2: ROAD IMPROVEMENTS. The county will continually monitor traffic levels on Pine Island Road to insure that the sum of the current population plus development on previously approved land plus new development approvals will not exceed the capacity of existing and committed roadways between Pine Island and mainland Lee County. (Amended by Ordinance No. 00-22)

POLICY 14.2.1: The minimum acceptable level-of-service standard for Pine Island Road between Burnt Store Road and Stringfellow Boulevard is hereby established as LOS "D" on an annual average peak hour basis and LOS "E" on a peak season, peak hour basis. This standard will be measured at the county's permanent count station on Little Pine Island and using the methodology described in the 1985 Highway Capacity Manual, Special Report 209. (Amended by Ordinance No. 00-22)

POLICY 14.2.2: In order to recognize and give priority to the property rights previously granted by Lee County for about 6,800 additional dwelling units, the county will consider for adoption development regulations which address growth on Pine Island and which implement measures to gradually limit future development approvals. The effect of these regulations would be to appropriately reduce certain types of approvals at established thresholds prior to the adopted level-of-service standard being reached, as follows:

- When traffic on Pine Island Road between Burnt Store Road and Stringfellow Boulevard reaches 810 peak hour, annual average two-way trips, the regulations

will provide restrictions on further rezonings which would increase traffic on Pine Island Road.

- When traffic on Pine Island Road between Burnt Store Road and Stringfellow Boulevard reaches 910 peak hour, annual average two-way trips, the regulations will provide restrictions on the further issuance of residential development orders (pursuant to the Development Standards Ordinance), or other measures to maintain the adopted level of service, until improvements can be made in accordance with this plan.

(Amended by Ordinance No. 00-22)

POLICY 14.2.3: The county will take whatever additional actions are feasible to increase the capacity of Pine Island Road. The following measure will be evaluated:

- The construction of left-turn lanes at intersections with local roads in Matlacha, or a continuous third lane.

(Amended by Ordinance No. 94-30, 00-22)

OBJECTIVE 14.3: RESIDENTIAL LAND USES. County regulations, policies, and discretionary actions will recognize certain unique characteristics of Greater Pine Island which justify different treatment of existing and future residential areas than in mainland Lee County, as described in the following policies. (Amended by Ordinance No. 94-30, 00-22)

POLICY 14.3.1: Due to the constraints on future development posed by the limited road connections to mainland Lee County, bonus densities of any kind are not permitted in Greater Pine Island. This prohibition includes housing density bonuses, off-site transfers from environmentally critical areas, and transfer from on-site wetlands at rates above the standard density rates for environmentally critical areas.

POLICY 14.3.2: When warranted by actual construction and occupancy of homes, existing substandard subdivisions may become subject to Municipal Service Taxing or Benefit Districts to provide roads, drainage, and other public facilities.

POLICY 14.3.3: The county's zoning regulations will continue to state that no building or structure on Greater Pine Island will be erected or altered so that the peak of the roof exceeds thirty-eight (38) feet above the average grade of the lot in question, or forty-five (45) feet above mean sea level, whichever is the lower. (Amended by Ordinance No. 94-30, 00-22)

POLICY 14.3.4: The county Zoning Regulations will continue to allow storage of commercial fishing equipment at a fisherman's private residence as a permitted use in residential districts on Pine Island. Reasonable restrictions not having the effect of prohibiting such storage may be developed. (Amended by Ordinance No. 94-30, 00-22)

OBJECTIVE 14.4: COMMERCIAL LAND USES. County regulations, policies, and discretionary actions will recognize certain unique characteristics of Greater Pine Island which justify different treatment of existing and future commercial areas than in mainland Lee County, as described in the following policies. (Amended by Ordinance No. 94-30, 00-22)

POLICY 14.4.1: The designated Future Urban Area at Pine Island Center is targeted for most future commercial and industrial uses, as permitted by other portions of this plan.

POLICY 14.4.2: Commercial development at other locations on Greater Pine Island should be limited to marinas, fish houses, minor commercial uses to serve local residents, and uses to serve island visitors. Such development must be sited and designed to minimize disruptive influences to the greatest degree possible. (Amended by Ordinance No. 94-30, 00-22)

OBJECTIVE 14.5: HISTORIC RESOURCES. Lee County will continue to formally designate historic resources and archaeological sites on and around Greater Pine Island. (Amended by Ordinance No. 94-30, 00-22)

POLICY 14.5.1: The county will continue to recognize Matlacha as an historic district, with an emphasis upon preserving the historic commercial fishing uses that give the community its unique character. (Amended by Ordinance No. 94-30, 00-22)

POLICY 14.5.2: Public acquisition of historic structures and archaeological sites will be considered in conjunction with other public purposes such as parks or preservation of environmentally sensitive lands. (Amended by Ordinance No. 00-22)

POLICY 14.5.3: The county will evaluate the effects of county regulations (such as zoning, road setbacks, and other development regulations) on designated historic districts and other districts of local concern, and will modify such regulations where necessary to protect both the interests of owners of historic structures and the health, safety, and welfare of the general public. (Amended by Ordinance No. 94-30, 00-22)

GOAL 15: GASPARILLA ISLAND. To provide the necessary facilities and regulations so that the remaining unbuilt portions of the island can be developed consistent with its unique character and hurricane vulnerability. For the purposes of this plan, the boundaries of Gasparilla Island are indicated on the Future Land Use Map.

OBJECTIVE 15.1: COMMUNITY FACILITIES. Lee County will continue to ensure the provision of solid waste and ambulance service to the Lee County portion of Gasparilla Island through the ongoing enforcement of interlocal agreements with Charlotte County. (Amended by Ordinance No. 94-30, 00-22)

OBJECTIVE 15.2: HISTORIC RESOURCES. Lee County will continue to recognize Boca Grande as an historic district pursuant to the Historic Preservation Ordinance. (Amended by Ordinance No. 94-30, 00-22)

OBJECTIVE 15.3: NATURAL RESOURCES. The county will protect natural and marine resources from potential oil spills at Port Boca Grande. (Amended by Ordinance No. 94-30, 00-22)

POLICY 15.3.1: The county will continue to maintain a Marine Emergency Response Team to protect natural and marine resources at Port Boca Grande and elsewhere in the county. (Amended by Ordinance No. 94-30)

OBJECTIVE 15.4: INTERGOVERNMENTAL COORDINATION. Due to the unique bi-county location of Gasparilla Island, Lee County will commit to working with Charlotte County and the Southwest Florida Regional Planning Council to propose and resolve intergovernmental concerns. (Amended by Ordinance No. 00-22)

POLICY 15.4.1: All land development on Gasparilla Island will be subject to the Special Act of the Florida Legislature known as the Gasparilla Island Conservation District Act (SA 80-473 as amended by 83-385 and 86-341). The provisions of the Act will apply in addition to those of the Lee Plan. Lee Plan policies may be more restrictive but will be consistent with the provisions of the Act. (Amended by Ordinance No. 00-22)

GOAL 16: PRIVATE RECREATIONAL FACILITIES IN THE DR/GR. To ensure that the development of Private Recreational Facilities in the DR/GR areas is compatible with the intent of this Future Land Use category, including recharge to aquifers, development of future wellfields and the reduction of density. (Added by Ordinance No. 99-16)

OBJECTIVE 16.1: To ensure that Private Recreation Facilities are located in the most appropriate areas within the DR/GR future land use category. (Added by Ordinance No. 99-16)

POLICY 16.1.1: The Private Recreation Facilities Overlay Map, Map 4, shows those locations that are appropriate for the development of Private Recreation Facilities in the DR/GR area. The areas depicted on Map 4 are consistent with the application of the following locational criteria:

1. Located outside of those areas designated for public acquisition through the Florida Conservation and Recreational Land Program (C.A.R.L.), the Corkscrew Regional Ecosystem Water Trust (C.R.E.W.), the South Florida Water Management District's Save Our Rivers Program, and the County's 2020 Conservation Program;
2. Located in areas characterized as predominantly impacted with agricultural, mining or other permitted uses;

3. Located outside of areas depicted as 100 Year Flood Plains, as illustrated on Map 9 of the Lee Plan, as amended through June of 1998;
 4. Located to minimize impact on "Hot Spots of Biological Resources and Rare Species Occurrence Records," from the Florida Game and Freshwater Fish Commission's, "Closing the Gaps in Florida Wildlife Habitat Conservation System" published in 1994;
 5. Located in areas characterized by large lot single or limited ownership patterns; and,
 6. Located in areas with direct access to existing roadways.
- (Added by Ordinance No. 99-16)

POLICY 16.1.2: Private Recreational Facilities within the DR/GR land use category will only be allowed, subject to the other requirements of this Goal, in the areas depicted on Map 4, Private Recreational Facilities Overlay Map. (Added by Ordinance No. 99-16)

OBJECTIVE 16.2 GROWTH MANAGEMENT. Development of Private Recreation Facilities in the DR/GR areas must be consistent with the growth management principles and practices as provided in the following policies. (Added by Ordinance No. 99-16)

POLICY 16.2.1: PRIVATE RECREATION FACILITY PLANNED DEVELOPMENT. By the end of December, 2000, Lee County will amend the Lee County Land Development Code (LDC) to include provisions for a new Private Recreation Facilities Planned Development zoning category. All Private Recreational Facilities proposed within the Density Reduction Groundwater Resource land use category must be reviewed as a Development of County Impact, Private Recreation Facilities Planned Development. (Added by Ordinance No. 99-16)

POLICY 16.2.2: Approved Private Recreation Facilities Planned Developments will automatically expire, reverting to the original zoning category, if a Lee County Development Order is not obtained within five (5) years of zoning approval. (Added by Ordinance No. 99-16)

POLICY 16.2.3: RESIDENTIAL USES PRECLUDED. Residential uses, other than a single bonafide caretaker's residence or a resident manager's unit, are not permitted in conjunction with a Private Recreational Facility Planned Development. Residential density associated with land zoned as Private Recreational Facility will be extinguished and cannot be transferred, clustered or otherwise assigned to any property. (Added by Ordinance No. 99-16)

POLICY 16.2.4: Further, the approval of Private Recreational Facilities on any property within the DR/GR will not be considered as justification for approving an amendment to the Future Land Use Map series which would increase residential density in the DR/GR areas. (Added by Ordinance No. 99-16)

POLICY 16.2.5: The boundaries of the Private Recreational Facility Planned Development may not be designed to allow out-parcels or enclaves of residential units to be integrated into the golf course perimeter. (Added by Ordinance No. 99-16)

POLICY 16.2.6: Private Recreational Facilities must have adequate fire protection, transportation facilities, wastewater treatment and water supply, and provided further that they have no adverse effects such as dust, noise, lighting, or odor on surrounding land uses and natural resources. (Added by Ordinance No. 99-16)

POLICY 16.2.7: Private Recreational Facilities within the DR/GR may only be located in the areas depicted on the Private Recreational Facilities Map, Map 4. (Added by Ordinance No. 99-16)

POLICY 16.2.8: Applications for Private Recreational Facility development will be reviewed and evaluated as to their impacts on, and will not negatively affect, any adjacent, existing agricultural, mining or conservation activities. (Added by Ordinance No. 99-16)

POLICY 16.2.9: Applications for Private Recreational Facility development will be reviewed and evaluated as to their impacts on, and must be compatible with any adjacent publicly owned lands. (Added by Ordinance No. 99-16)

POLICY 16.2.10: During the 2010 comprehensive plan Evaluation and Appraisal Report process the County will conduct a comprehensive evaluation of the impacts of Private Recreation Facilities on surface and groundwater quality and quantity. Recommendations from this evaluation will then be incorporated into the Lee Plan. (Added by Ordinance No. 99-16)

OBJECTIVE 16.3: GENERAL DEVELOPMENT REGULATIONS. The protection of water quality, quantity, natural resources, and compatibility will be addressed by additional development controls that regulate the permitted uses, parcel size, density, intensity and design of Private Recreational Facilities. (Added by Ordinance No. 99-16)

POLICY 16.3.1: Private Recreational Facilities will submit a Master Concept Plan at the time of Planned Development submittal that identifies the general location of proposed uses and structures, play fields and golf course routings. Minor adjustments to this Master Concept Plan may be made administratively at the discretion of the Director. (Added by Ordinance No. 99-16)

POLICY 16.3.2: Applications for Private Recreational Facilities must include an environmental assessment during the zoning approval process. The assessment must include, at a minimum, an analysis of the environment, historical and natural resources and a protected species survey as required by chapter 10 of the LDC. (Added by Ordinance No. 99-16)

POLICY 16.3.3: In addition to an environmental assessment, the applicant must demonstrate compatibility with nearby land uses (by addressing such things as noise, odor, lighting and visual impacts), and the adequate provision of drainage, fire and safety, transportation, sewage disposal and solid waste disposal. (Added by Ordinance No. 99-16)

POLICY 16.3.4: The development will incorporate an Integrated Pest Management program for any managed recreational areas. (Added by Ordinance No. 99-16)

POLICY 16.3.5: Where buildings or impervious development is located within twenty-five feet of the property boundary, a buffer 15 feet wide, with 5 trees per 100 linear feet, and a solid double row hedge must be provided, unless a more restrictive buffer is required during the Planned Development Review. (Added by Ordinance No. 99-16)

POLICY 16.3.6: No illumination may be used which creates glare on adjacent properties. All exterior lighting will be designed with downward deflectors to eliminate skyward glare. Parking areas, walkways and paths and maintenance areas may be illuminated for security purposes, provided that light poles do not exceed twelve feet in height. (Added by Ordinance No. 99-16)

POLICY 16.3.7: Native and xeriscape vegetation will be encouraged, such that:

1. 100% of all required trees and 75% of all additional trees must be native.
2. 80% of all required shrubs and 50% of all additional shrubs must be native.
3. A minimum of 70% of all trees and shrubs must be xeriscape varieties.
4. The native and xeriscape requirements do not apply to turf areas.
5. No plant species included in the *Florida Exotic Pest Plant Council, 1999 List of Florida's Most Invasive Species*, will be planted.

(Added by Ordinance No. 99-16)

POLICY 16.3.8: The following site requirements, regulating lot size, setbacks and open space must be equaled or exceeded:

1. Uses, other than golf courses, permitted under this subdivision must have a minimum lot size of ten acres.
2. **Building Setbacks.**
 - a. Fifty (50) feet from an existing right-of-way line or easment.
 - b. Seventy-five (75) feet from any private property line under separate ownership and used for residential dwellings.
 - c. Fifty (50) feet from any adjacent agricultural or mining operation.

- d. Greater setbacks may be required during the Public Hearing process to address unique site conditions.
3. **Setbacks for accessory buildings or structures.** All setbacks for accessory buildings or structures must be shown on the Master Concept Plan required as part of the Planned Development application. No maintenance area or outdoor storage area, irrigation pump or delivery area may be located less than 100 feet from any residential use. To allow flexibility, the general area of any accessory buildings, structures and maintenance areas must be shown on the site plan with the appropriate setbacks as noted in this subsection listed as criteria for the final placement of these buildings, structures or facilities.
4. **Open Space.** A minimum of 85% open space must be provided. However, natural and man-made bodies of water may contribute 100% to achieving the minimum requirements. To the extent possible, pervious paving and parking areas, and buildings elevated above ground level will exceed the 85% open space requirement.
5. **Security.** All entrances to Private Recreational Facilities must be restricted from public access during non-use hours.
(Added by Ordinance No. 99-16)

POLICY 16.3.9: Density/Intensity Limitations proposed uses are subject to the following limitations:

Clubhouse/Administrative Area:	20,000 SF/18 hole golf course.
Golf Course Restrooms:	Not to exceed two structures per 18-hole golf course, limited to 150 square feet per structure.
Maintenance Area:	25,000 SF/18 hole golf course.
Horse Stable:	40,000 SF of Stable Building/10 acres.
Camping Restrooms:	1 toilet per four (4) camp units, clustered in structures not to exceed 500 square feet per structure. 1 shower per 4 toilets.
Camping Area Office:	1,000 SF per campground.

(Added by Ordinance No. 99-16)

OBJECTIVE 16.4: Water Quality, Quantity and Surface Water Resources. Private Recreational Facilities must be located, designed and operated in such a way that they will not degrade the ambient surface or groundwater quality. These facilities must be located, designed and operated in such a way that they will not adversely impact the County's existing and future water supply. The location, design and operation of Private Recreational Facilities must maintain or improve the storage and distribution of surface water resources.
(Added by Ordinance No. 99-16)

POLICY 16.4.1: All applications and documentation for the planned development rezoning process must be submitted to the Lee County Division of Natural Resources

for their formal review and comment. The Division of Natural Resources Director must make a formal finding that the proposed uses will not have negative impacts on present and future water quality and quantity, and will review and approve modeling submitted to support the Planned Development. Applicant modeling efforts must be evaluated and approved by the Lee County Division of Natural Resources and the Lee County Water Supply Authority. Issues of well locations, easements and wastewater re-use must be evaluated and approved by the Lee County Division of Natural Resources and the Lee County Regional Water Supply Authority during the Planned Development process. Formal agreements addressing these issues will be entered into prior to the issuance of a Development Order. Co-location of recreational and public facilities is encouraged. (Added by Ordinance No. 99-16)

POLICY 16.4.2: Applications for Private Recreational Facilities in or near existing and proposed wellfields must be designed to minimize the possibility of contamination of the groundwater during construction and operation. (Added by Ordinance No. 99-16)

POLICY 16.4.3: Private Recreational Facilities must provide a monitoring program to measure impacts to surface and groundwater quality and quantity (see Objective 16.7). (Added by Ordinance No. 99-16)

POLICY 16.4.4: As part of a rezoning request for a Private Recreational Facility in the DR/GR area, a pre-development groundwater and surface water analysis must be conducted and submitted to the County. This analysis is intended to establish baseline data for groundwater and surface water monitoring for the project area. The analysis must be designed to identify those nutrients and chemicals which are anticipated to be associated with the project. Prior to the applicant commencing this baseline study, the methodology of the study must be submitted for review, comment, and approval by the County. (Added by Ordinance No. 99-16)

POLICY 16.4.5: Any "Private Recreational Facility" located in any wellfield protection zone must meet the requirements/criteria for protection zone 1, unless updated modeling is provided by the applicant and is approved by Lee County Division of Natural Resources and the Lee County Regional Water Supply Authority. (Added by Ordinance No. 99-16)

POLICY 16.4.6: The surface water management system design must incorporate natural flowway corridors, cypress heads, natural lakes, and restore impacted natural flowway corridors.

1. Stormwater run-off must be pre-treated through an acceptable recreated natural system or dry retention and water retention system, prior to discharging the run-off into existing lake or wetland (any aquatic) systems. Included within these systems must be an average 50 foot wide vegetative setback measured from the edge of managed turf to the wetland jurisdictional line or top of bank of natural water bodies.

2. The development must maintain the function and integrity of local and regional flowways. Flowways are precluded from being primary surfacewater treatment areas. Applications for Private Recreational Facilities must demonstrate adequate hydraulic capacity without increasing flood levels. Private Recreational Facilities must participate in the implementation of the Lee County Surface Water Management Plan as well as the South Florida Water Management District's South Lee County Watershed Plan.
3. The Historic Flowway Aerial Map depicts the general flowway paths that exist in the DR/GR area. The lines shown on this map are not regulatory but show the general boundaries of the main conveyances. During the rezoning process, conceptual surface water management plans must be submitted and approved. Prior to the issuance of a Development Order, proposed Private Recreation Facilities will provide detailed hydrologic and hydraulic analysis demonstrating the limits of flow for various storm events and the developed sites ability to convey these flows. Where an existing flowway is not well defined or discontinuous, flexibility will be given to allow different alignments within a site.

(Added by Ordinance No. 99-16)

POLICY 16.4.7: Any Private Recreational Facilities proposed within the DR/GR land use category must cooperate with Lee County and SFWMD in implementing an overall surface water management plan as outlined in Objective 40.2 and 87.1. Compliance with these Policies must be demonstrated during Development Order approval. (Added by Ordinance No. 99-16)

POLICY 16.4.8: If a proposed Private Recreation Facilities falls within an area identified as anticipated drawdown zone for existing or future public well development, the project must utilize an alternative water supply such as reuse or withdrawal from a different non-competing aquifer or show that adequate supply is available in excess of that being used for planned public water supply development. (Added by Ordinance No. 99-16)

OBJECTIVE 16.5: Wildlife. The location, design and operation of Private Recreational Facilities will incorporate preservation and/or management activities that restrict the unnecessary loss of wildlife habitat or impact on protected species, species of special concern, threatened or endangered species. (Added by Ordinance No. 99-16)

POLICY 16.5.1: The development will not have an adverse impact on any existing, viable on-site occupied wildlife habitat for protected species, species of special concern, threatened or endangered species. (Added by Ordinance No. 99-16)

POLICY 16.5.2: All proposed fencing must be designed to permit wide-ranging animals to traverse the site. (Added by Ordinance No. 99-16)

POLICY 16.5.3: Through the development review process, Private Recreation Facilities will be designed and operated to conserve critical habitat of protected species.

This will be accomplished through regulation, incentives and public acquisition. (Added by Ordinance No. 99-16)

OBJECTIVE 16.6: Natural Resources. Private Recreational Facilities must be located, designed and operated to minimize environmental impacts, and where appropriate, protect, enhance and manage natural resources such as flowways, waterways, wetlands, natural water bodies, and indigenous uplands. (Added by Ordinance No. 99-16)

POLICY 16.6.1: All retained onsite natural areas, must be perpetually managed by the owner(s), or their assignees, with accepted Best Management Practices. The type of management techniques will be determined by the specific plant community. A natural area land management plan must be submitted to the Lee County Division of Planning prior to the approval of a final local development order. Management techniques addressed in the plan must include, but not be limited to the following:

- Exotic pest plant control;
- Removal of any trash and debris;
- Restoration of appropriate hydrology;
- Prescribed fire;
- Native plant restoration, where appropriate;
- Discussion of flora and fauna;
- Enhancement of wildlife habitat; and,
- Retention of dead trees and snags.

(Added by Ordinance No. 99-16)

POLICY 16.6.2: The development will minimize adverse effects on wetlands and riparian areas; and will result in no net reduction in functional wetland acreage as identified by the South Florida Water Management District Wetland Rapid Assessment Procedure (WRAP). (Added by Ordinance No. 99-16)

POLICY 16.6.3: Private Recreational Facilities must be designed to preserve a minimum of 50% of on-site, indigenous native upland habitat. (Added by Ordinance No. 99-16)

POLICY 16.6.4: The development will incorporate energy and resource conservation devices, such as low flow water fixtures, and natural skylights. (Added by Ordinance No. 99-16)

OBJECTIVE 16.7: Monitoring and Enforcement. In order to ensure that Private Recreational Facilities do not degrade the ambient condition of water quality, water quantity, vegetation and wildlife, an ongoing monitoring program must be established by the developer. (Added by Ordinance No. 99-16)

POLICY 16.7.1: Annual surface water and groundwater monitoring must continue in perpetuity. The monitoring requirements will be established utilizing those nutrients and chemicals that are anticipated to be associated with the proposed project that were

identified by the pre-development groundwater and surface water analysis required by Policy 16.4.4. This surface and groundwater monitoring is to be conducted, at a minimum, on a quarterly basis by a qualified third party. This monitoring data must be submitted to the County as soon as it is available. A summary report of this monitoring effort must be provided annually to Lee County Division of Natural Resources for their review. (Added by Ordinance No. 99-16)

POLICY 16.7.2: If surface and/or groundwater monitoring shows degradation of water quality the County will notify the property owner that a plan, to correct the identified problem(s), must be submitted. The property owner must submit a plan of action within 30 days after receipt of written notice from the County. The plan must identify actions that will correct the problem(s) within the shortest possible time frame. This plan will be reviewed and must be found to be acceptable by the County. If the plan is not submitted as required, or is found to be unacceptable by the County, the County will require that all activities on the property cease until a plan is submitted and approved. The approved plan must be implemented by the property owner. If the County determines that the approved plan is not being implemented properly, the County can require that all activities on the property cease until the property owner comes back into compliance. (Added by Ordinance No. 99-16)

POLICY 16.7.3: The approved Private Recreational Facility must submit an annual monitoring report for a period of five (5) years, addressing the interaction between the use and environment. This report must provide a discussion and documentation on the following activities:

1. Construction Monitoring – the applicant will submit annual reports detailing construction activities, permitting, compliance with Audubon International Signature Standards and percent complete.
2. Land Management Activities – including those used on the golf course, as well as natural and preserve areas.
3. Wildlife Monitoring – the applicant will provide a discussion of wildlife, wildlife activity, and wildlife management activities.
4. Irrigation Monitoring – the applicant will provide a summary of the monthly irrigation withdrawal and irrigation sources.
5. Mitigation/Vegetation Monitoring – the applicant will provide status reports on the viability of any mitigation and/or landscaping conducted on site.
6. Integrated Pest Management Monitoring – the applicant will provide a discussion on the pest management techniques, and any pest problems that have occurred on the project.

Should adverse impacts in any of the above areas be identified, enforcement and mitigation will be provided through the appropriate regulatory agency and enforcement procedures. These procedures will be spelled out during the development order process. If, after five years, no significant adverse impacts are determined, the reporting on these subjects may be terminated. (Added by Ordinance No. 99-16)

OBJECTIVE 16.8: Golf Course Performance Standards. The location, design and operation of golf courses located within Private Recreational Facilities will minimize their impacts on natural resources, and incorporate Best Management Practices. A maximum of ten (10) 18-hole golf courses, for a total of 180 golf holes, will be permitted in the next 10 years. (Added by Ordinance No. 99-16)

POLICY 16.8.1: Natural waterways located on the site of a proposed golf course must be left in a natural, unaltered condition. Channelization will not be performed. (Added by Ordinance No. 99-16)

POLICY 16.8.2: An applicant must demonstrate, prior to the issuance of a local development order, that a golf course is designed to minimize adverse effects to waters and riparian areas through the use of such practices as integrated pest management, adequate stormwater management facilities, vegetated buffers, reduced fertilizer use, etc. The facility must have an adequate water quality management plan, such as a stormwater management facility constructed in uplands to ensure that the recreational facility results in no substantial adverse effect to water quality. (Added by Ordinance No. 99-16)

POLICY 16.8.3: If a waterway crossing is necessary, then it must be designed to minimize the removal of trees and other shading vegetation. Any crossings of existing natural flowways and water bodies must be bridged. Created or restored flowways and water bodies may be crossed by bridges or culverts or a combination as approved by Lee County and the South Florida Water Management District. (Added by Ordinance No. 99-16)

POLICY 16.8.4: Waterway crossings by cart paths will be constructed of permeable material, no wider than 8-feet, and placed on pilings from edge of floodplain to edge of floodplain. (Added by Ordinance No. 99-16)

POLICY 16.8.5: A new lake or pond should not be located within an existing natural waterway. Upland ponds must not expose stream channels to an increase in either the rate or duration of floodwater, unless required by the South Florida Water Management District for regional water management objectives. (Added by Ordinance No. 99-16)

POLICY 16.8.6: For golf course developments, all fairways, greens, and tees must be elevated above the 25 year flood level, and all greens must utilize underdrains. The effluent from these underdrains must be pre-treated prior to discharge into the balance of the project's water management system. (Added by Ordinance No. 99-16)

POLICY 16.8.7: Where a golf course is proposed, it must comply with the Best Management Practices for Golf Course Maintenance Departments, prepared by the Florida Department of Environmental Protection, May 1995. (Added by Ordinance No. 99-16)

POLICY 16.8.8: The owners will employ management strategies in and around any golf course to address the potential for pesticide/chemical pollution of the groundwater and surface water receiving areas. The owners will comply with the goals of the Audubon International Signature Program for Golf Courses. The management practices include:

1. The use of slow release fertilizers and/or carefully managed fertilizer applications.
2. The practice of integrated pest management when seeking to control various pests, such as weeds, insects, and nematodes. The application of pesticides will involve only the purposeful and minimal application of pesticides, aimed only at identified targeted species. The regular widespread application of broad-spectrum pesticides is not acceptable. The management program will minimize, to the extent possible, the use of pesticides, and will include the use of the USDA-SCS Soil Pesticide Interaction Guide to select pesticides for uses that have a minimum potential for leaching or loss due to runoff depending on site specific soil conditions. Application of pesticides within 100 feet of any CREW, or other adjacent public preserve lands, is prohibited.
3. The coordination of the application of pesticides with the irrigation practices (the timing and application rates of irrigation water) to reduce runoff and the leaching of any applied pesticides and nutrients.
4. The utilization of a golf course manager who is licensed by the State to use restricted pesticides and who will perform the required management functions.

(Added by Ordinance No. 99-16)

POLICY 16.8.9: Irrigation systems must utilize computerized irrigation based on weather station information, moisture sensing systems to determine existing soil moisture, evapotranspiration rates, and zone control, to ensure water conservation. For Private Recreation Facilities located outside of the depicted Wellfield Protection zones, re-use water, where available, will be utilized for irrigation. Re-use water within Wellfield Protection zones must be in compliance with the Wellfield Protection Ordinance. (Added by Ordinance No. 99-16)

POLICY 16.8.10: Golf courses must be designed, constructed, managed and certified in accordance with the Audubon International Signature Program. (Added by Ordinance No. 99-16)

POLICY 16.8.11: It is the landowner(s) responsibility to notify the county within ten (10) working days if the status of certification from Audubon changes from being in full

compliance. Failure to do so could result in penalties up to and including revocation of golf course use if it is deemed that the violation(s) are a possible threat to the environment. If the golf course loses its certification from Audubon, then the property owner must submit a plan of action acceptable to the County that will achieve recertification in the shortest possible time. The plan must be submitted within 30 days after receipt of written notice from the County. If the plan is not submitted as required, then all activity on the property must cease until a plan is submitted and approved. An approved plan must be implemented in good faith by the property owner. If the County determines that the plan is not being implemented properly, then all activity on the property must cease until the property owner comes back into full compliance. (Added by Ordinance No. 99-16)

POLICY 16.8.12: Golf Site Requirements.

1. The minimum number of golf holes is 18. The minimum size for an 18 hole golf course is 150 acres. In no instance may the golf course impacts exceed 150 acres per 18 holes. Allowable uses within the impact area are greens, tees, fairways, clubhouses, maintenance facilities, cart and pedestrian pathways, parking areas, i.e. all associated support uses.
2. Two hundred (200) acres of indigenous vegetation preserve is required for every 18 holes. The indigenous vegetation preserve requirement may be provided on-site or off-site. Indigenous vegetation preserved on site may utilize a two to one (2:1) credit. However, the indigenous vegetation preserve requirement must be met with a minimum of one hundred (100) actual indigenous acres on or off site. Indigenous vegetation preservation requirements must be met outside of the 150 acre golf course impact area.
3. All off-site indigenous vegetation preserves must be located within the DR/GR areas. Unless located within or adjacent to existing or designated public acquisition areas, the minimum parcel size is fifty (50) indigenous acres.
4. The off-site indigenous vegetation preserves must include a management plan that is approved as part of the Planned Development rezoning. This management plan must include invasive exotic vegetation removal with perpetual management. This does not preclude the transfer of the property to a public entity as long as perpetual maintenance is guaranteed.
5. Additional golf development must be in increments of 9 golf holes. For every additional 9 golf holes, the site area must be increased by 75 acres. Additional golf course impacts are limited to 75 acres per nine holes. The on-site or off-site indigenous preserve area must be increased by 100 acres for each nine holes and is subject to the restrictions above.

(Added by Ordinance No. 99-16)

GOAL 17: BUCKINGHAM. To manage the future growth in the Buckingham area; to preserve the existing agricultural land use pattern; to diversify the choice of housing for Lee County by maintaining and enhancing the historic rural character; and to protect the unique historical and environmental values of the Buckingham Community. For the purposes of this plan, the precise boundaries of Buckingham are indicated on the Future Land Use Map. (This Goal and its Objectives and Policies were Added by Ordinance 91-19) (Amended by Ordinance No. 93-25, 94-30)

OBJECTIVE 17.1: LAND USE. The primary land use designation for the Buckingham area is "Rural Community Preserve." Public Facilities have also been designated as appropriate. After the adoption of this amendment, no land in Buckingham will be changed to a land use category more intense than Rural Community Preserve (including Public Facilities) unless a finding of overriding public necessity is determined by three members of the Board of County Commissioners. (Amended by Ordinance No. 00-22)

POLICY 17.1.1: No property within Buckingham will be rezoned to RVPD. (Amended by Ordinance No. 00-22)

POLICY 17.1.2: The southeast and northeast quadrants of the intersection of Orange River Boulevard and Buckingham Road is designated as the commercial node for the Buckingham area. No new commercial activities will be located outside of this commercial node. All new commercial developments in the node are required to provide a minimum of 30% open space. This commercial node is described as those lands 300 feet eastward from the easterly right-of-way of Buckingham Road and lying between Cemetery Road and a point 300 feet north of the intersection of Buckingham Road and Orange River Boulevard. (Amended by Ordinance No. 94-30, 98-09, 00-22)

POLICY 17.1.3: Any lot created in the Rural Community Preserve land use category after the adoption of this amendment must have a minimum area of 43,560 square feet. Any residential planned development zoning granted in the Rural Community Preserve land use category will require a minimum size of one acre (43,560 square feet) for every residential lot. (Amended by Ordinance No. 00-22)

OBJECTIVE 17.2: TRANSPORTATION. To protect the rural character of the Buckingham area, the following restrictions apply: (Amended by Ordinance No. 94-30, 99-15, 00-22)

1. The existing publicly maintained Lockett Road segments currently functioning as local roads will be retained. Any proposal to change the functionality of Lockett Road, such as to provide Lehigh Acres with access to I-75 at the Lockett Road interstate interchange, will require an analysis (Alignment Study, including public input) of the impacts to the Buckingham Rural Community Preserve. This analysis will include the review of alignments including diverting the proposed collector or arterial corridor as far south as possible, starting east of Pangola, in order to skirt the Buckingham area.

2. The extension of State Route 31 south of the Orange River is prohibited;
3. The extension of Ellis Road is prohibited;
4. The extension of Staley Road to State Route 82 is prohibited;
5. No new east/west collector roadways will be planned or built within the Buckingham Rural Community Preserve;
6. All future rights-of-way in Buckingham will be no greater than 100 feet (except for Buckingham Road and Luckett Road extensions).
7. The extension and connection of Long Road to Ellis road is prohibited.

OBJECTIVE 17.3: SEWER AND WATER. In order to discourage unwanted urban development, central sewer and water lines will not be extended into the Buckingham Rural Community Preserve, except in the areas identified by Maps 6 and 7 as Future Water and Sanitary Sewer Service Areas and to the site of the proposed resource recovery facility. (Amended by Ordinance No. 00-22)

GOAL 18: UNIVERSITY COMMUNITY. In order to ensure that development within the University Community land use category protects and enhances the ability of Florida's tenth university to provide secondary education as described in the Mission Statement of that institution and to assure that land uses or development activities do not interfere with, disrupt, or impede the efficient operation of that institution the following Objectives and Policies will apply to all development within the University Community land use category. The Application (Volume 1 of 2) (1992) and the Support Document (Volume 2 of 2) (1992) to the Amendment to the Lee County Comprehensive Plan for the University Community is incorporated by reference herein as a resource and information document. (This Goal and its Objectives and Policies were Added by Ordinance No. 92-47) (Amended by Ordinance No. 94-30, 00-22)

OBJECTIVE 18.1: FUTURE LAND USE. In order to ensure that the location and timing of development within the University Community is coordinated with the development of the University and the provision of necessary infrastructure; and, that all associated support development within the University Community is designed to enhance the University; all development within the University Community will be subject to cooperative master planning which must conform to the following policies. (Amended by Ordinance No. 00-22)

POLICY 18.1.1: Lee County will, through public and private economic and business development initiatives, promote the University Community as a catalyst for economic diversification and the promotion of employment throughout Lee County and the Region. Within the University Community land use category the focus of this endeavor (the emphasis) will be on university related scientific research and high technology development activities. (Amended by Ordinance No. 00-22)

POLICY 18.1.2: The University Community will provide a mix of housing types with densities sufficient to meet the needs of and designed to accommodate the varying lifestyles of students, faculty, administration, other university personnel and employees of the associated support development. (Amended by Ordinance No. 00-22)

POLICY 18.1.3: By the end of 1995, Lee County will adopt appropriate regulations providing for university housing, including student dormitories and boarding houses. (Amended by Ordinance No. 00-22)

POLICY 18.1.4: By the end of 1995, Lee County will adopt regulations further defining how densities for individual parcels within the University Community will be determined. The regulations will address how the total number of units will be tallied to insure that the overall average density of 2.5 units an acre will be maintained. The regulations will provide a mechanism for clustering densities within the University Community. (Amended by Ordinance No. 00-22)

POLICY 18.1.5: In order to create a cohesive community, site design within the University Community must utilize alternative modes of transportation such as pedestrian networks, mass transit opportunities, sidewalks, bike paths and similar facilities. Site design must link related land uses through the use of alternative modes of transportation thus reducing automobile traffic within the University Community. The county will work cooperatively with the University on these matters as the University proceeds through the Campus Master Plan Process. (Amended by Ordinance No. 94-30, 00-22)

POLICY 18.1.6: Lee County will facilitate mass transit opportunities connecting the University Community to other parts of the county, in accordance with the goals, objectives, and policies of the Mass Transit element. (Amended by Ordinance No. 94-30, 00-22)

POLICY 18.1.7: A diverse mixture of land uses will be encouraged within the University Community. Compatibility will be addressed through project design, including adequate buffering or other performance measures, therefore allowing adjacent appropriate industrial, residential and commercial land uses where such locations represent good planning. In reviewing zoning requests within the University Community, Lee County will consider noise, odor, visual, security and traffic impacts in determining land use compatibility. Because of the required cooperative master planning with and approval by the Board of Regents, the required compatibility review and the requirement that commercial land uses within the University Village be related to the University, development within the University Community will not be subject to the site location standards set forth in Goal 6 of the Lee Plan. (Amended by Ordinance No. 94-30, 00-22)

POLICY 18.1.8: All currently permitted mining activities within the University Community area will be allowed to continue until such time as the university opens. Agricultural activity including but not limited to tree farms, nurseries, or agricultural

research facilities will be permitted within the University Community. (Amended by Ordinance No. 00-22)

POLICY 18.1.9: Prior to the commencement of development within the University Community land use category, an area-wide Conceptual Water Management Master Plan must be submitted to and approved by Lee County and South Florida Water Management District staff. This water management plan will be integrated with the Conceptual Master Plan and be prepared through a cooperative effort between the property owner, Lee County, and South Florida Water Management District. This master plan will insure that the water management design of any development within the University Community will maintain or improve the currently existing quality and quantity of groundwater recharge. This plan must be consistent with the drainage basin studies that were prepared by Johnson Engineering, and approved by the SFWMD. Lee County will amend the county land development regulations to require all new development to be consistent with the appropriate basin study. (Amended by Ordinance No. 94-30, 00-22)

POLICY 18.1.10: Development within the University Community land use category will be consistent with the Generalized Land Use Map and the eight area descriptions contained on or between pages 6 through 10 of the University Community Conceptual Master Plan, dated April 1994. (Amended by Ordinance No. 94-30)

POLICY 18.1.11: By 1996, Lee County and the Metropolitan Planning Organization will consider amending their respective transportation planning maps and policies to reflect the roadway segments identified by the Conceptual Master Plan. (Amended by Ordinance No. 94-30, 00-22)

POLICY 18.1.12: If not otherwise addressed by the Conceptual Master Plan, the landowner(s) within the University Village will coordinate infrastructure connections and interconnections, including but not limited to roadways, utilities and water management, with the University Campus through the established Board of Regents' master planning, review and approval process. (Amended by Ordinance No. 00-22)

POLICY 18.1.13: To encourage a variety of wildlife habitats and university study sites, special consideration will be given in the Conceptual Master Plan to the preservation of portions of the most pristine and diverse wildlife habitat areas (such as, pine flatwoods, palmetto prairies, and major cypress slough systems) as an incentive to reduce, on a one-for-one basis, open space requirements in other developments within the University Community. The implementation of this policy will occur at the time of zoning and development review. (Amended by Ordinance No. 94-30, 00-22)

POLICY 18.1.14: The use of septic tanks will be prohibited except for temporary septic tanks for model homes, construction trailers, and temporary sales offices. Permanent septic tanks will be limited to rest room facilities in golf courses, existing agricultural operations, or any agricultural operation of twenty five acres or more. (Amended by Ordinance No. 00-22)

POLICY 18.1.15 The cost for the provision and expansion of facilities for potable water and sanitary sewer that benefits development in the University Community will be borne by those who benefit. Such funding may include (but is not limited to) outright construction by the developer, special taxing or benefit districts, or Uniform Community Development Districts (Chapter 190, F.S.). The cost for these types of improvements will not be borne by the county. (Added by Ordinance No. 94-30, Amended by Ordinance No. 00-22)

POLICY 18.1.16 The cost for the provision and expansion of facilities necessary to comply with the recommendations of the Estero Basin that benefits development in the University Community will be borne by those who benefit. Such funding may include (but is not limited to) outright construction by the developer, special taxing or benefit districts, or Uniform Community Development Districts (Chapter 190, F.S.). The cost for these types of improvements will not be borne by the county. (Added by Ordinance No. 94-30, Amended by Ordinance No. 00-22)

OBJECTIVE 18.2: UNIVERSITY COMMUNITY SUB-CATEGORIES. The University Community meets an educational infrastructure need for the Southwest Florida five county area by providing the necessary and appropriate land uses to carry out the mission of Florida's 10th University as stated by the Board of Regents. Within the University Community land use category there are two distinct sub-categories: University Campus and the University Village. The University Window overlay is also a part of the University Community land use category. (Amended by Ordinance No. 94-30)

POLICY 18.2.1: The University Campus area provides for the land uses of the University and its related functions. Development within the University Campus will be in accordance with provisions of any development agreement(s) between the Department of Community Affairs and the Board of Regents under the provisions of Chapter 380 F.S. and any other applicable state law. (Amended by Ordinance No. 00-22)

POLICY 18.2.2: The University Village is an area which provides the associated support development and synergism to create a viable University Community. This sub-category allows a mix of land uses related to and justified by the University and its development. Predominant land uses within this area are expected to be residential, commercial, office, public and quasi-public, recreation, and research and development parks. In addition to complying with the Conceptual Master Plan required by Policy 18.1.10, all property within the University Village must undergo a Development of Regional Impact review. (Amended by Ordinance No. 00-22)

POLICY 18.2.3: The University Window Overlay includes the area within 100 feet on both sides of the right-of-way of the following roadway segments:

Treeline Avenue
Alico Road

From Alico Road to Corkscrew Road
From I-75 to Treeline Avenue

**Corkscrew Road
Koreshan Boulevard**

**From I-75 to Treeline Avenue
From I-75 to Treeline Avenue**

With input from affected property owners, by 1995, Lee County and the Board of Regents will develop mutually agreed upon standards for the University Window addressing landscaping, signage and architectural features visible from the designated roadway segments. (Amended by Ordinance No. 00-22)

GOAL 19: [RESERVED]

GOAL 20: [RESERVED]

2.4 - Special Treatment Areas/ Overlay Descriptions

New Communities will not exceed a residential density of six dwelling units per gross acre and must have at least the following characteristics:

1. The land will be developed under a well-conceived overall master plan;
2. The land can be served with all necessary facilities and services at no expense to the county. Uniform Community Development Districts and special taxing districts may be utilized toward achieving this objective;
3. Population, recreation, open space, educational, office, and research facilities are distributed in an orderly and attractive manner;
4. The land must be developed in such a manner as to protect environmentally sensitive areas;
5. The land must be developed as a free-standing community offering a complete range of land uses (e.g. a full mix of housing types for a range of household incomes, industrial and office employment centers, and community facilities such as fire departments, schools, law enforcement offices, public recreational areas, health care facilities, and community commercial areas);
6. Off-site impacts must be mitigated; and,
7. On-site levels of service must meet the county-wide standards contained in this plan.

(Amended by Ordinance No. 00-22)

Poor Original

OBJECTIVE 1.7.1: SPECIAL TREATMENT AREAS Designate on the Future Land Use Map, as overlays, special treatment areas that contain special restrictions or allowances in addition to all of the requirements of their underlying categories.

POLICY 1.7.1: The Airport Noise Zones cover areas subject to varying levels of airport-related noise. By 2006 and every 5 years thereafter, the Port Authority will update the aviation forecasts and associated noise contours for the Southwest Florida International Airport and initiate an amendment to the Airport Noise Zone Overlay Map to reflect the findings of this study. Prior to the issuance of all building permits and development orders in zones 2 and 3, noise and aviation easements must be dedicated to Lee County. In addition to meeting the requirements of the underlying Future Land Use Map categories, properties within the Noise Zone Overlay must meet the following:

Airport Noise Zone 1 has no noise related restrictions.

Airport Noise Zone 2 does not permit mobile or manufactured homes. However, mobile or manufactured homes that were lawfully existing as of June 27, 2000 will be treated as legally permitted uses and may be replaced with a new mobile or manufactured home or conventional single family construction so long as such replacement would be otherwise allowed by this code.

Airport Noise Zone 3 does not permit any residential units, churches, libraries, schools, hospitals, correctional institutions, or nursing homes. However, residential units, including mobile or manufactured homes, that were lawfully existing as of June 27, 2000 will be treated as legally permitted uses and may be replaced

with a new mobile or manufactured home or conventional single family construction so long as such replacement would be otherwise allowed by this code. However, an existing conventional home may not be replaced with a new mobile or manufactured home. One conventional single family home is permitted on each lot in a plat properly recorded before June 27, 2000 if such use would have been permitted on the lot prior to June 27, 2000.

Airport Noise Zone 4 is limited to uses that are compatible with airports and air commerce, including but not limited to those necessary to provide services and convenience goods to airline passengers, those generally associated with airport operation, and related development.

(Amended by Ordinance No. 00-22)

POLICY 1.7.2: The Development of Regional Impact overlay is an informational tool showing all of the Lee County property subject to Development Orders approved pursuant to Chapter 380 of the Florida Statutes. Development in these areas is regulated by the terms of the applicable development orders. (Amended by Ordinance No. 94-30)

POLICY 1.7.3: The Urban Reserve overlay indicates areas that are suitable for annexation into the adjoining municipality. Urban Reserve areas are initially established by interlocal agreement pursuant to Section 163.3171(1), F.S.

POLICY 1.7.4: Certain lands are designated as Future Urban Areas because of special needs for the provision of Privately Funded Infrastructure. Development in these areas may occur in accordance with the provisions of Goal 3 and its subsequent objectives and policies. (Amended by Ordinance No. 93-25)

POLICY 1.7.5: The Water-Dependent overlay zone designates shoreline areas where priority will be granted to water-dependent land uses. Specific requirements are detailed for such zones on San Carlos Island under Goal 12, in the Greater Pine Island area under Goal 14, and for other areas in Lee County in the Conservation and Coastal Management Element. (Amended by Ordinance No. 94-30, 00-22)

POLICY 1.7.6: The Planning Communities Map and Acreage Allocation Table (see Map 16 and Table 1(b) and Policies 1.1.1 and 2.2.2) depicts the proposed distribution, extent, and location of generalized land uses for the year 2020. Acreage totals are provided for land in each Planning Community in unincorporated Lee County. No final development orders or extensions to final development orders will be issued or approved by Lee County which would allow the acreage totals for residential, commercial or industrial uses contained in Table 1(b) to be exceeded. This policy will be implemented as follows: (Amended by Ordinance No. 94-29, 00-22)

1. For each Planning Community the County will maintain a parcel based database of existing land use. The database will be periodically updated at least twice every year, in September and March, for each Planning Community.

2. Project reviews for development orders must include a review of the capacity, in acres, that will be consumed by buildout of the development order. No development order, or extension of a development order, will be issued or approved if the project acreage, when added to the acreage contained in the updated existing land use database, exceeds the limitation established by Table 1(b), Acreage Allocation Table regardless of other project approvals in that Planning Community.
3. No later than the regularly-scheduled date for submission of the Lee Plan Evaluation and Appraisal Report, and every five years thereafter, the County must conduct a comprehensive evaluation of Planning Community Map and the Acreage Allocation Table system, including but not limited to, the appropriateness of land use distribution, problems with administrative implementations, if any, and areas where the Planning Community Map and the Acreage Allocation Table system might be improved.

(Amended by Ordinance No. 98-09, 00-22)

POLICY 1.7.7: The Public Acquisition overlay zone designates areas that have been targeted for public acquisition by federal, state, regional, and/or local agencies. This overlay does not restrict the use of the land in and of itself. It will be utilized for informational purposes since this map will represent a composite of public acquisition activities in the county. (Amended by Ordinance No. 91-19, 00-22)

POLICY 1.7.8: The Agricultural overlay (Map 20) shows existing active and passive agricultural operations in excess of 100 acres located outside of the Future Urban Areas. Since these areas play a vital role in Lee County's economy, they should be protected from the impacts of new developments, and the county should not attempt to alter or curtail agricultural operations on them merely to satisfy the lifestyle expectations of non-urban residents. (Added by Ordinance No. 94-30)

OBJECTIVE 1.8: LEHIGH ACRES COMMERCIAL USES. Designate additional overlay zones on the Future Land Use Map to designate potential commercial land uses in Lehigh Acres. The distinction in Policy 6.1.2(7) between the two major types of commercial uses does not apply in Lehigh Acres. (Added by Ordinance No. 98-09)

POLICY 1.8.1: Commercial uses are permitted on lands in the *Lehigh Commercial* overlay once commercial zoning has been approved in accordance with this plan. Land in the *Lehigh Commercial* overlay may also be used for schools, parks, and other public facilities; churches and synagogues; and residential uses that provide housing alternatives to the typical 1/4 to 1/2 acre subdivision lots. Creation of new single-family lots smaller than one acre is not permitted due to the oversupply of standard subdivision lots. If cumulative new residential development takes place on more than 1% of this land per year, Lee County will take steps to provide additional commercial land in Lehigh Acres to offset the loss. Lee County will take steps to reduce any emerging surplus of commercial land in Lehigh Acres if cumulative new commercial

2.5 - Zoning Categories



Poor Original

OFFICIAL ZONING ORDINANCE

ADOPTED BY THE
LEE COUNTY
BOARD OF COUNTY COMMISSIONERS
ON JUNE 25, 1986;
EFFECTIVE ON AUGUST 1, 1986.

Poor Original

410.02 AG-2 AGRICULTURAL DISTRICT

- A. Minimum Lot Area and Dimensions (Section 202.15.C.)
 - Area - 39,500 square feet - interior lot
 - 33,600 square feet - corner lot
 - Width - 100 feet
 - Depth - 130 feet
- B. Minimum Setbacks (Section 202.15.B.)
 - Street - variable according to the functional classification of street or road (Subsection 202.15.B.2.)
 - Side - 15 feet
 - Rear - 25 feet
 - Water body - 25 feet
- C. Maximum Height - 35 feet (Section 202.15.A.)
- D. Maximum Lot coverage - 25% of Total Lot Area

410.03 AG-3 AGRICULTURAL DISTRICT

- A. Minimum Lot Area and Dimensions (Section 202.15.C.)
 - Area - 20,000 square feet
 - Width - 100 feet
 - Depth - 130 feet
- B. Minimum Setbacks (Section 202.15.B.)
 - Street - variable according to the functional classification of street or road (Subsection 202.15.B.2.)
 - Side - 15 feet
 - Rear - 25 feet
 - Water body - 25 feet
- C. Maximum Height - 35 feet (Section 202.15.A.)
- D. Maximum Lot coverage - 25% of Total Lot Area

420 U.R. - URBAN RESERVE DISTRICT

A. PURPOSE AND INTENT

The purpose of the UR - Urban Reserve District is to provide a holding zone for lands designated as Urban Service Areas by the Lee Plan, and on which agricultural activities are not appropriate, but for which commitment to urban or suburban uses would be premature. It is the intent to permit, through this District, a minimum reasonable, beneficial use of land, until such time as urban growth requires conversion to more intense use through rezoning.

1231 86



470

INDUSTRIAL DISTRICTS

PURPOSE AND INTENT

The purpose and intent of the Industrial Districts is to encourage industrial growth in accordance with the goals, objectives and policies set forth in the Lee Plan and to guide most industrial growth into the Urban Service Areas where required infrastructure exists or can be feasibly extended. However, some rural-oriented industrial activities will also be permitted in the non-urban areas.

It is the intent of this Ordinance that any proposed industrial development which requires a rezoning and which meets or exceeds one or more of the following criteria, shall be rezoned only to an I.P.D. -- Industrial Planned Development.

- a. any industrial development or activity; including mining or solid mineral extraction on 5 or more acres of land; or
- b. except when approved as a minor portion of a CPD, any industrial development on land falling within a General, Industrial, or Industrial Commercial Interchange Area as specified by the Lee Plan and its attendant Land Use Plan Map; or
- c. the industrial portion of any combination of residential, commercial, community facility, or industrial land uses on 10 or more acres of land, none of the said uses, taken individually equaling or exceeding any other threshold set forth in this paragraph; or
- d. any development involving the manufacturing of the following products, regardless of the land area involved:

CHEMICALS AND ALLIED PRODUCTS - Group III (Section 1001.06)

FABRICATED METAL PRODUCTS - Group I (Section 1001.14)

LUMBER AND WOOD PRODUCTS - Group V (Section 1001.26)

NOVELTY, JEWELRY, TOYS, SIGN MANUFACTURING (Section 1001.29)

PAPER AND ALLIED PRODUCTS - Group I (Section 1001.31)

PETROLEUM MANUFACTURING (Section 1001.34)

PRIMARY METAL INDUSTRIES (Section 1001.35)

RESEARCH AND DEVELOPMENT LABORATORIES - Group III (Section 1001.41)

Poor Original

RUBBER AND PLASTICS PRODUCTS - Group I (Section 1001.43)

STONE, CLAY, GLASS AND CONCRETE PRODUCTS - Group IV
(Section 1001.48)

TEXTILE MILL PRODUCTS - Group III (Section 1001.50)

- e. Any manufacturing or industrial development involving one or more of the following activities:

BIOLOGICAL PROCESSES (other than by fermentation by common bacteria or yeast) for food or beverage processing

NUCLEAR PROCESSES

PRODUCTION OF INDUSTRIAL GAS

PRODUCTION OF EXPLOSIVES

PRODUCTION OF CORROSIVES

PRODUCTION OF TOXIC MATERIALS

- f. refuse and trash dumps
- g. landfills, sanitary
- h. salvage or junk yards
- i. auto wrecking yards
- j. resource recovery facilities to produce energy
- k. the industrial portion of any development of Regional Impact (DRI) not included above; or
- l. at the Director's discretion, any development that may
- (1) exceed 80% of the thresholds set forth above; or
 - (2) exceed 10% of the thresholds set forth in Chapters 27F-2, FAC, for DRI's, except where another specific threshold is set forth herein
- m. any industrial development proposed under New Community sections of the Land Use Element of the Lee Plan

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It is further the intent of this Ordinance to provide conventional industrial zoning districts for industrial developments already existing or which do not meet the threshold for I.P.D. zoning.

Sections 472.01 through 472.06 provide the conventional industrial districts and the use and development regulations specific to each district.

471 - IPD - INDUSTRIAL PLANNED DEVELOPMENT

PURPOSE AND INTENT

The intent of the I.P.D. district is to further the general purpose of planned developments set forth in Section 400.02.A. as it relates to industrial development.

The principal use of any Industrial Planned Development is the manufacture of goods and materials, and the storage and wholesale distribution of such goods and materials. However, for the welfare of the public and for the efficiency of the local economic structure, the IPD District permits many services and activities not allowed elsewhere and a limited number of commercial uses intended to serve principally the employees or patrons of businesses within the IPD. Permitted uses shall be subject to general and special conditions related to the uses and the unique features or location of the subject property. Standards for use and development shall be set forth in the documentation to the Master Concept Plan and, unless modified through the schedule of deviations, where applicable (see 804.02.E.), shall not be less restrictive than the minimum standards set forth either in this regulation or in other Lee County Development Regulations or Land Development Code. Areas devoted to various uses shall be designated on the Concept Plan. In all cases, an application for an Industrial Planned Development shall include a schedule detailing the uses desired, identifying said uses by citing the enumerated uses of one or more conventional zoning districts, or Use Activity Groups (Section 1001).

A. USES PERMISSIBLE IN THE IPD DISTRICT

All uses below may be permissible in an IPD - Industrial Planned Development as long as the principal use(s) are drawn from either the Light Industrial Uses or the Heavy Industrial Uses and when approved on the Master Concept Plan and the enumerated list of uses document. However, industrial and other land uses may be subject to different setbacks, performance standards and/or other restrictions.

1. COMMERCIAL USES

- a. AUTOMATIC TELLER MACHINE (ATM)
- b. BUSINESS SERVICES - all groups (Section 1001.05)
- c. CLEANING AND MAINTENANCE SERVICES (Section 1001.07)

Poor Original



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

APPENDIX 3.0

MATERIALS SEPARATION PLAN

3.1 – Materials Separation Plan

3.1 – Materials Separation Plan

**PRELIMINARY DRAFT
MATERIALS SEPARATION PLAN
FOR THE
LEE COUNTY SOLID WASTE DIVISION
1500 MONROE STREET
FORT MYERS, FLORIDA 33902**



LEE COUNTY
S O U T H W E S T F L O R I D A

September 7, 2001

PREPARED BY

**MALCOLM PIRNIE, INC.
EDISON THEATRE BUILDING
1533 HENDRY STREET, 2ND FLOOR
FORT MYERS, FLORIDA 33901**

Since the Preliminary Draft Materials Separation Plan and the Final Draft Materials Separation Plan are virtually identical documents, only the latter is provided in this Appendix 3.1 in order to minimize redundancy. The Final Draft Materials Separation Plan Appendix E contains the response to comments to the Preliminary Draft Materials Separation Plan. Volume III of this Supplemental Site Certification Application contains a copy of the notification of the public meeting for the Preliminary Draft Materials Separation Plan and the transcript of the public meeting regarding this plan (see Volume III, Section 9-Attachment B).

FINAL DRAFT
MATERIALS SEPARATION PLAN
FOR THE
LEE COUNTY SOLID WASTE DIVISION
1500 MONROE STREET
FORT MYERS, FLORIDA 33901



January 2002

PREPARED BY

MALCOLM PIRNIE, INC.
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FORT MYERS, FLORIDA 33901

FINAL DRAFT MATERIALS SEPARATION PLAN

TABLE OF CONTENTS

	Page
1.0 INTRODUCTION	1
1.1 PURPOSE	1
1.2 BACKGROUND	1
2.0 COUNTY SOLID WASTE MANAGEMENT SYSTEM SUMMARY	3
2.1 SOLID WASTE SYSTEM SERVICE AREA	3
2.2 SOLID WASTE SYSTEM AGREEMENTS	4
2.3 SOLID WASTE SYSTEM COMPONENTS	4
2.4 SOLID WASTE AND RECYCLABLE MATERIAL QUANTITIES	5
2.5 LEE COUNTY MATERIALS SEPARATION PROGRAM	5
3.0 MATERIALS SEPARATION PLAN	6
3.1 GOALS AND APPROACH	6
3.2 LEE COUNTY MATERIALS SEPARATION PROGRAM	6
• RESIDENTIAL RECYCLABLES PROGRAM	6
• COMMERCIAL RECYCLABLES PROGRAM	7
• FERROUS AND NON FERROUS RECOVERY PROGRAM	7
• HORTICULTURAL WASTE PROGRAM	8
• CONSTRUCTION AND DEMOLITION DEBRIS PROGRAM	8
• HOUSEHOLD HAZARDOUS WASTE PROGRAM	9
• POLLUTION PREVENTION/SMALL QUANTITY GENERATOR PROGRAM	9
• WHITE GOODS PROGRAM	10
• WASTE TIRE PROGRAM	10
• OTHER SPECIAL WASTE PROGRAMS	10
3.3 NEW PROGRAM INITIATIVES	11
• RECOVERED MATERIALS PROCESSING FACILITY	11
• ELECTRONIC PRODUCTS RECYCLING PROGRAM	11
3.4 ALTERNATIVE DISPOSAL METHODS CONSIDERED	12

LIST OF FIGURES

FIGURE 2-1: FACILITY SERVICE AREA & FACILITY LOCATION	3
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LIST OF APPENDICES

APPENDIX A	EXCERPTS FROM FDEP 2000 SOLID WASTE MANAGEMENT ANNUAL REPORT
APPENDIX B	LEE COUNTY SOLID WASTE MANAGEMENT SYSTEM
APPENDIX C	EXCERPTS FROM SEPTEMBER 2000 RECYCLING GRANT REPORT
APPENDIX D	EXCERPTS FROM MARCH 2000 SOLID WASTE MANAGEMENT PLAN UPDATE
APPENDIX E	RESPONSE TO COMMENTS TO THE PRELIMINARY DRAFT MATERIALS SEPARATION PLAN

1.0 INTRODUCTION

1.1 Purpose

Lee County (the "County") intends to expand its existing Solid Waste Energy Recovery Facility (the "Facility"). The County is preparing this Materials Separation Plan to satisfy the requirements set forth in 40 CFR 60.57 (b), which apply to the expansion of the Facility.

1.2 Background

In 1989, the County developed a comprehensive Integrated Solid Waste Management Master Plan that included a course of action for the County to follow in order to ensure environmentally sound methods for the management, reuse, recycling and/or disposal of all solid waste generated in Lee County. The major recommendations established in the plan included the development of: an aggressive recycling program to reduce the quantity of materials requiring disposal; a waste-to-energy facility for waste reduction and energy recovery from those materials that are not recycled; and a Class I sanitary landfill for the disposal of ash and by-pass waste. In addition, the County established a self-imposed recycling and materials separation goal of 40 percent, which exceeds the 30 percent recycling goal established by the State of Florida (the "State").

The Lee County Solid Waste Management System (the "System") implements the provisions of the Integrated Solid Waste Management Master Plan. A brief description of the County's System is provided in Section 2, which highlights the initiatives implemented by the County to address materials separation as part of the overall solid waste management program. The System has become one of the most successful solid waste management and recycling programs in the State. The County's Materials Separation Plan (the "Plan") is embodied within the System and encompasses a wide array of integrated approaches, mechanisms and components to accomplish the materials separation goals. The County's Plan is designed to provide an integrated solid waste

management and materials separation approach and has proven to be a financially and environmentally sound means of providing solid waste services to the residents and businesses in Lee County. The Plan emphasizes the conservation of resources by diverting materials from solid waste disposal facilities through recycling, reuse, and reduction. Also, in support of the Plan, the County has implemented cooperative education and grant initiatives with the Lee County School System and Keep Lee County Beautiful.

The Florida Department of Environmental Protection (FDEP) 2000 Solid Waste Management Annual Report ranks Lee County number one for recycling in the State of Florida (see Appendix A). Despite the County's comprehensive recycling program, the amount of solid waste the County delivers to the Facility has increased each year since the Facility began operation, primarily due to population growth. In 1999, this amount reached the Facility's guaranteed annual capacity of 372,300 tons. In 2000, the Facility processed over 392,000 tons of County waste, while the County landfilled nearly 44,000 additional tons of processible waste. Current population projections for Lee and Hendry Counties suggest that processible solid waste generation will continue to increase, reaching nearly 550,000 tons by 2010. Rather than landfilling processible waste, it is the County's intention to expand the Facility by adding a third 660-tpd boiler unit, (at a reference waste of 5000 Btu/lb.) which would increase the Facility's permitted capacity to 1,980-tpd.

2.0 COUNTY SOLID WASTE MANAGEMENT SYSTEM SUMMARY

2.1 Solid Waste System Service Area

The County, through its ordinances, requires all residential and commercial generators within the unincorporated areas of the County to subscribe to waste collection services. The County has established franchise districts within the unincorporated areas and grants franchise haulers exclusive rights to collect waste from their assigned district(s). Likewise, all municipalities within the County have similar mandatory solid waste collection ordinances. Hendry County requires its residents and franchise haulers to dispose of all municipal solid waste at the Lee County Disposal Facility. The size of the area served by the Facility is depicted in the shaded area of Figure 2-1.

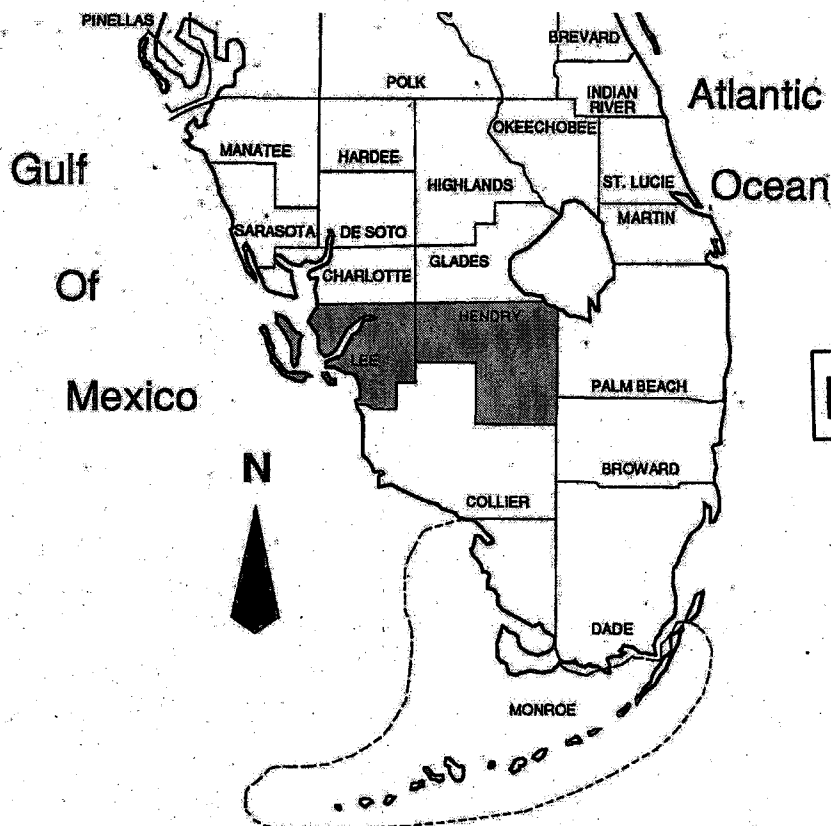


Figure 2-1

2.2 Solid Waste System Agreements

Vital elements of the County's success in effectively and efficiently managing the County's solid waste stream are its solid waste system agreements. The County has entered into a number of salient agreements that have enabled the County's System to provide for an economical, fiscally responsible and environmentally sound means of solid waste management within Lee County. These agreements include the:

- Lee / Hendry County Interlocal Agreement
- Covanta Service Agreement
- Electric Power Purchase Agreement
- Municipal Interlocal Agreements
- Franchise Agreements

2.3 Solid Waste System Components

The County's Plan encompasses a wide array of integrated mechanisms and components within the System to accomplish its materials separation goals. Briefly, the System includes the:

- Lee County Solid Waste Energy Recovery Facility
- Gulf Coast Landfill
- Lee / Hendry County Regional Landfill
- Transfer Stations
- Construction & Demolition Debris Processing and/or Disposal Facilities
- Materials Recycling Facility (MRF)
- Tire Processing Facility
- Household Hazardous Waste Collection Facilities
- Horticultural Waste Processing Facilities

For a detailed description of these facilities refer to Appendix B.

2.4 Solid Waste and Recyclable Material Quantities

The total quantity of solid waste generated in the County has increased 28 percent from 1996 to 1999. In calendar year 1999, the County generated 747,761 net tons of municipal solid waste, as reported to the FDEP, of which 271,347 tons were recycled. For a more detailed breakdown of the County's waste stream quantities and characteristics refer to Appendix C, Recycling Grant Report, Table 1: Municipal Solid Waste Collection and Recycling. Additionally, the historical quantities of solid waste specifically managed by Lee County are depicted in Table 2-3 of Appendix D. Solid waste quantities from Hendry County, which are handled by the Lee County system, are shown on Table 2-4 of Appendix D. However, recyclable materials from Hendry County do not enter into Lee County's solid waste stream, and are not included with the County's recycling totals.

2.5 Lee County Materials Separation Program

The County has implemented a comprehensive integrated materials separation system that includes the following programs:

- Construction and Demolition Debris Program
- Horticultural Waste Program
- Residential Recyclables Program
- Commercial Recyclables Program
- Ferrous and Non-Ferrous Recovery Program
- White Goods Program
- Waste Tire Program
- Household Hazardous Waste Program
- Pollution Prevention/Small Quantity Generator Program
- Other Special Waste Programs
- Electronic Products Recycling Program

3.0 MATERIALS SEPARATION PLAN

3.1 Goals and Approach

The County has a recycling goal of 40 percent, which exceeds the recycling goal established by the State. The County's Plan includes a variety of integrated mechanisms and approaches to accomplish its materials separation and recycling goals. The County has implemented a comprehensive solid waste system (the System) with proven success, as described in Appendix B. This Section summarizes the current Plan and proposed additions to the Plan that will be implemented (e.g., electronic product recycling). In addition, Appendix C (excerpts of the most recent Lee County Recycling Grant Report) provides additional information regarding the County's recycling program.

3.2 Lee County Materials Separation Program

Final disposition of solid waste generated in Lee County is dependent on the waste generator and the specific characteristics of the waste. A description of the System that the County has implemented to manage the waste stream and provide for a successful materials separation program is included in Appendix B. The County's Plan assumes that a significant portion of the waste generated by the County is recyclable. A large proportion of these recyclables are separately collected and brought to the County MRF, or to other privately operated recycling facilities within the County. The privately operated recycling facilities have a significant impact on the quantity of materials separated and recycled within the County. A list of existing recycling facilities is provided in Appendix C (Lee County Recycling Grant Report, Table 7).

Residential Recyclables Program

Lee County provides weekly curbside collection of residential recyclables within the unincorporated areas of the County through its franchise haulers. All single-family and multi-family units, including mobile home parks, apartment buildings and condominiums are included in this program. The materials collected are delivered to the County MRF

located in North Fort Myers, where the materials are sorted by type and processed prior to being marketed. Materials recycled include glass bottles, plastic containers (nos. 1 through 7), steel cans, aluminum cans and foil, corrugated cardboard, kraft paper bags, telephone books, magazines, newspapers and dry-cell batteries. The cities of Cape Coral and Fort Myers also provide weekly curbside recycling collection for residential units, and these materials are brought to the County MRF as well. The Town of Fort Myers Beach and Bonita Springs utilize County franchise haulers and have the same comprehensive recycling collection program as the County. The City of Sanibel provides for weekly curbside collection for single-family residences and also delivers the collected materials to the County MRF.

Commercial Recyclables Program

The County has a voluntary commercial recycling program, and does not mandate collection of recyclable materials from businesses and institutions. However, the County does require its franchise collection haulers to provide, at a minimum, recycling collection services for all businesses and institutions, and prohibits the imposition of any processing fees for any recyclables that are collected. This requirement applies for all materials collected by the County in its residential recycling program. Businesses and institutions contract independently for recycling services, and many commercial properties utilize the County's or cities' franchise haulers. In general, recycling within the commercial sector often depends on economic factors; recycling rates typically increase when market prices for recycled materials rise. Commercial recycling has also increased due to the "avoidance" of disposal or processing fees, despite the generally low price received for most recyclable materials. A number of privately owned and operated recycling facilities receive commercial recycled materials, in addition to the County MRF. A list of these facilities is provided in Appendix C, Table 7.

Ferrous and Non Ferrous Recovery Program

Lee County's recycling program collects steel and aluminum cans through its residential collection program. Private recycling facilities in the County have "buy-back" programs for scrap steel, copper and aluminum. In addition, the County has implemented a post-

combustion ferrous and non-ferrous metals separation and recovery program at the Facility. The system includes a vibrating conveyor, rotary drum magnet, grizzly scalper, finger screen and eddy current separator. To date, more than 43,000 tons of ferrous and more than 1,000 tons of non-ferrous metals have been separated and recycled. These materials would otherwise have been buried in the landfill. The combination of source separation/collection and post combustion separation of aluminum and steel items enables Lee County to recycle at least of 90% of these materials.

Horticultural Waste Program

Horticultural or yard waste includes vegetative materials resulting from landscaping maintenance or land clearing operations, and includes grass clippings, palm fronds, tree and shrub trimmings, trees and tree stumps. The County, through its franchise haulers, provides weekly collection of horticultural wastes from all single-family residential dwellings within the unincorporated areas of the County. This material, as well as yard waste from many commercial properties, is currently delivered to a site in Fort Myers pursuant to an interlocal agreement between the City and the County. This material is processed into mulch, which is provided free to County residents and government agencies. As part of this program, the County delivers mulch to seven (7) locations throughout Lee County where the residents can obtain this recycled horticultural material at no cost. A portion of the County's horticultural waste also is hauled by private companies and processed at several private facilities located within the County. Virtually all horticultural waste is processed and reused in the County; only small incidental amounts of this material are delivered to the County's disposal facilities.

Construction and Demolition Debris Program

Construction and demolition debris (C&D) is defined as the uncontaminated solid waste resulting from the construction, remodeling, repair and demolition of structures and roads. Much of this portion of the waste stream can be recycled if properly sorted. Materials comprising C&D include concrete, asphalt, cardboard, stone, brick, wood, metals, plasterboard and sheetrock. Due to the non-combustible nature of much of the construction and demolition debris, only small quantities are accepted at the Facility.

Within the County, C&D is landfilled at the Gulf Coast Landfill and processed at other local C&D disposal and recycling facilities. Waste Corporation of America, Inc., located in Fort Myers, is a privately owned facility that recycles some of the components comprising C&D (e.g., copper, aluminum, and concrete). Waste Corporation of America, Inc. currently receives approximately 100 to 200 tons per day of C&D materials. Some of the C&D generated in Lee County is disposed of in neighboring Charlotte and Collier Counties, where tip fees for C&D disposal are considerably lower than at Lee County's facilities. The County does not control the C&D disposal location of non-franchised haulers.

Household Hazardous Waste Program

Household hazardous wastes are those wastes consisting of discarded chemical products such as pesticides, paints, stains, solvents, drain cleaners, used motor oil, pool chemicals, antifreeze, auto batteries and household batteries. The County implemented a very successful HHW program in 1991, and recycles most of the materials brought in by the residents. The quantity of HHW collected has increased from a total of 205 tons per year in fiscal year 1996 to 233 tons per year in fiscal year 1999. The percentage of material recycled has increased from 71 percent to 81 percent. The average number of participants has increased from approximately 995 per event to 1173 per event. The recycled materials include lead acid batteries, dry cell batteries, used oil, latex paint, antifreeze and propane cylinders. Other materials that are accepted during these scheduled days include poisons and pesticides, fluorescent tubes, and corrosives. These wastes are handled by a licensed contract hauler that transports the non-recycled HHW to licensed disposal facilities outside of Lee County.

Pollution Prevention/Small Quantity Generator Program

The County has implemented the Lee County Pollution Prevention/Small Quantity Generator (P²/SQG) Program. This program monitors potential hazardous waste generators (businesses and institutions) and verifies the correct separation, handling and management of their hazardous waste materials. The program focuses on educating the public about pollution prevention and compliance issues, including recycling and

disposal options for a variety of hazardous materials. The County's P²/SQG program was the first in the State to assist a vehicle (fleet) maintenance facility to become a non-hazardous waste generating facility through proper materials separation and recycling practices. The County's program is recognized as one of the best in the State and has been used as a model for similar programs in the State and nationally.

White Goods Program

White goods are large appliances, such as stoves and refrigerators. These materials are collected separately by the franchise haulers, when requested by residential property owners, including single-family and multi-family residential units. The franchise haulers are required to deliver these recyclable materials directly to private recycling facilities. No additional fees are charged to the residential property owners for this service.

Waste Tire Program

The County maintains a waste tire storage and processing area at the Facility. The County pays a private tire processor in Bonita Springs to shred loads of tires. After the tires are shredded, the tires are returned to the Facility to be burned. By utilizing this process, the County recovers both energy and steel from the waste tires. In calendar year 2000, approximately 12,800 tons of shredded waste tires were burned at the Facility, generating approximately 17,920,000 kWh of electricity. The County also purchases tire "mulch" from the tire processing company for use at County parks and schools.

Other Special Waste Programs

The County has implemented special waste collection programs for batteries, used motor oil and certain residential biomedical waste. The County, through its residential and multi-family recycling program, collects household (dry cell) batteries. The County distributes bags and educational literature, and residents are encouraged to place spent household batteries at the curb on recycling collection day. When a "battery bag" is collected at curbside, a new empty bag is left in the customer's recycle bin. Commercial generators contract independently for proper disposal.

For used motor oil, the County has over 30 "oil-change" businesses participating in the State's used oil collection program. Additionally, the County accepts used motor oil at the scheduled HHW collection events.

With respect to residential biomedical waste, the County implemented a Used Sharps Program that provides safe and convenient disposal of used syringes from syringe-dependent residents (e.g., diabetics). Biomedical waste disposal containers (plastic red-boxes) are free at participating pharmacies. Drop-off locations for full containers are available at fire stations throughout Lee County. Disposal of this material is contracted to licensed biomedical waste haulers. Commercial generators of biomedical waste contract independently for proper collection and disposal.

Other commercially generated special waste, such as fluorescent bulbs, thermostats and thermometers, is contracted independently for proper collection and disposal by the generator. Many manufacturers, such as Honeywell, have programs for "taking-back" thermostats from equipment distributors. Information on these programs is provided to the public through the County's HHW Program and P²/SQG Program.

3.3 New Program Initiatives

Recovered Materials Processing Facility

The County is currently constructing a new Recovered Materials Processing Facility (RMPF) at the Facility site and relocating the existing MRF equipment to the new RMPF. The RMPF will be fully operational by the end of 2001, and will be capable of processing approximately 400 tpd of recovered recyclable materials. The new RMPF will enable the County to respond to changes in recovered materials composition, and add new materials to the County's recycling program in the future.

Electronic Products Recycling Program

The County was recently awarded an FDEP grant of \$50,000 to initiate an electronic products collection and recycling program. The County implemented this program on

July 24, 2001. The program will focus on monitors, televisions, computers and peripherals, and incidental amounts of other electronic products generated by households, small businesses and institutions. The County will collect these products during scheduled events at three convenient locations within Lee County. The County will also accept these products at the County's new RMPF, by appointment, on a weekly basis. As proposed in the grant application, the County expects to conduct approximately 57 collection events during the grant period and plans to continue the program after the grant period because of increased awareness and public demand for this program.

3.4 Alternative Disposal Methods Considered

As previously discussed, the County has a comprehensive and successful recycling and materials separation program. The County's program continues to grow and improve, but this program cannot handle all of the additional non-recyclable materials that are projected to be generated within the service area in the future.

The existing Facility has operated in excess of its contractual throughput capacity for the last two years. The remaining useful life of the Gulf Coast Landfill is estimated at approximately 15 months. Moreover, the County has previously agreed to limit the quantity of municipal solid waste that will be disposed at the Hendry County Regional Landfill. Consequently, there are only two practical and demonstrated options available for the future disposal of the materials that cannot be handled by the County's materials separation program: 1) expansion of the Facility, and/or 2) contracting for the transport and disposal of waste to an out-of-county landfill.

The County evaluated these options and determined that expansion of the Facility was the preferred option. Appendix D contains relevant excerpts from the March 2000 Solid Waste Management Plan Update that considered the two alternatives.

APPENDIX A

**EXCERPTS FROM FDEP 2000
SOLID WASTE MANAGEMENT ANNUAL REPORT**

Figure 12: Recycling in Florida's Counties (CY 1998)

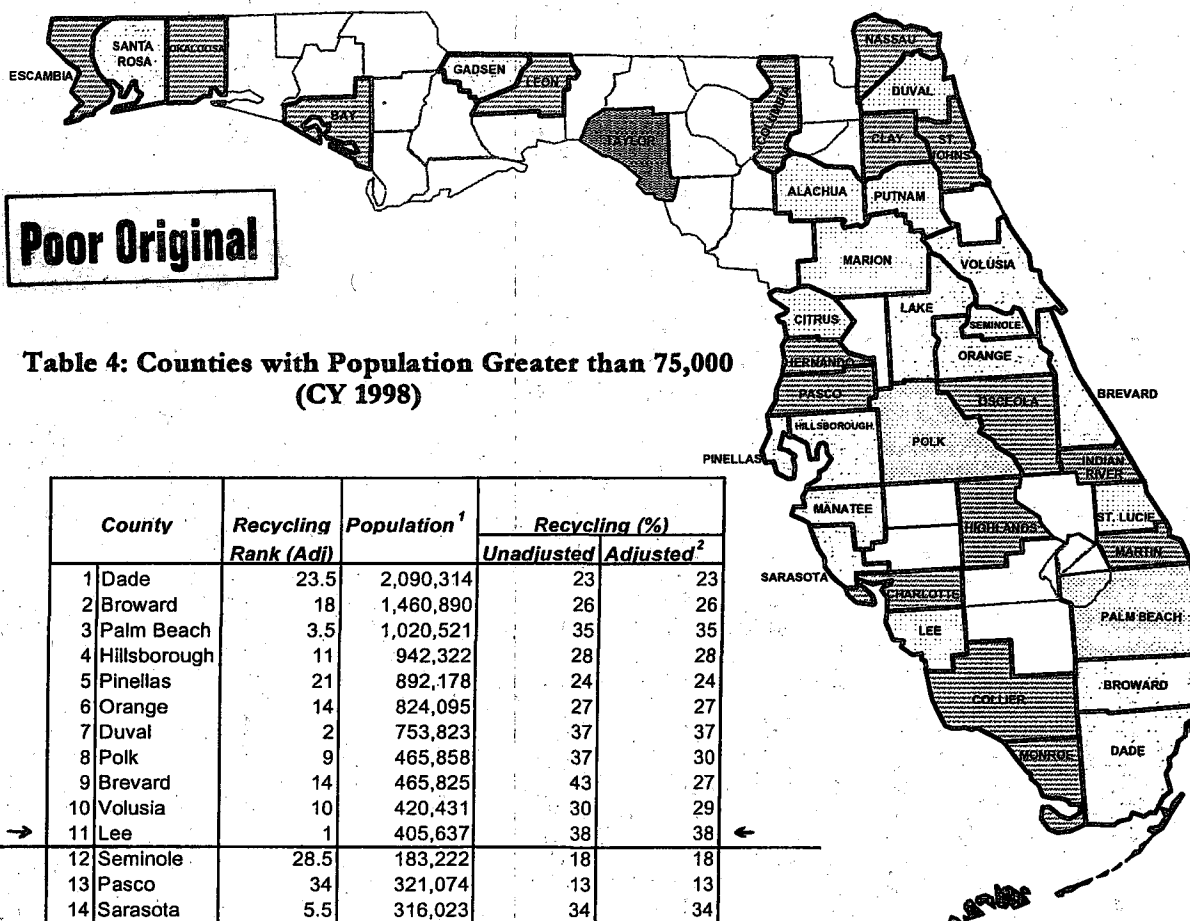


Table 4: Counties with Population Greater than 75,000 (CY 1998)

County	Recycling Rank (Adj)	Population ¹	Recycling (%)	
			Unadjusted	Adjusted ²
1 Dade	23.5	2,090,314	23	23
2 Broward	18	1,460,890	26	26
3 Palm Beach	3.5	1,020,521	35	35
4 Hillsborough	11	942,322	28	28
5 Pinellas	21	892,178	24	24
6 Orange	14	824,095	27	27
7 Duval	2	753,823	37	37
8 Polk	9	465,858	37	30
9 Brevard	14	465,825	43	27
10 Volusia	10	420,431	30	29
11 Lee	1	405,637	38	38
12 Seminole	28.5	183,222	18	18
13 Pasco	34	321,074	13	13
14 Sarasota	5.5	316,023	34	34
15 Escambia	28.5	296,164	18	18
16 Manatee	20	247,028	32	25
17 Marion	7	242,357	32	32
18 Leon	18	233,232	39	26
19 Alachua	3.5	211,403	35	35
20 Collier	26.5	210,095	22	22
21 Lake	14	196,073	27	27
22 Saint Lucie	5.5	183,222	40	34
23 Okaloosa	33	175,568	14	14
24 Osceola	30	148,712	16	16
25 Bay	35	147,496	12	12
26 Clay	31.5	134,534	15	15
27 Charlotte	18	133,655	26	26
28 Hernando	14	125,008	27	27
29 Martin	14	119,370	37	27
30 Citrus	8	112,424	31	31
31 Saint Johns	31.5	109,895	15	15
32 Santa Rosa	23.5	107,814	27	23
33 Indian River	23.5	106,690	40	23
34 Monroe	23.5	85,646	24	23
35 Highlands	26.5	80,458	22	22

- Counties with a population >75,000 which have met the 30% recycling goal.
- Counties with a population > 75,000 which have not met the 30% recycling goal.
- Counties with a population < 75,000 which have recycling rates of 30% or greater.
- Counties with a population < 75,000 which have recycling rates < 30%.

1 1998 populations used by FDEP to allocate Recycling and Education (R&E) grants for the 1999-2000 grant cycle.
2 The Legislature established a goal of 30 percent by the end of 1994 for counties with a population over 75,000.

Poor Original

Table 6B: County Recycling⁴ in Florida
By Descending Adjusted Recycling Rate
 (Jan. 1, 1998 - Dec. 31, 1998)

County	Adjusted Recycling Rank	Population Rank	Population	MSW Recycling (%)		Minimum 5 Materials Recycling (%) ³				
				Unadjusted	Adjusted ²	News-papers	Glass	Aluminum Cans	Plastic Bottles	Steel Cans
Lee	1	11	405,637	38	38	59	22	29	21	100
Duval	2	7	753,823	37	37	54	77	24	14	49
Taylor	3	53	19,527	36	36	11	0	16	11	0
Palm Beach	4.5	3	1,020,521	35	35	50	26	53	11	58
Alachua	4.5	19	211,403	35	35	56	76	17	20	15
Saint Lucie	6.5	22	183,222	40	34	41	64	57	34	19
Sarasota	6.5	14	316,023	34	34	84	94	32	21	20
Marion	8	17	242,357	32	32	22	14	28	1	1
Citrus	9.5	30	112,424	31	31	39	26	41	9	6
Putnam	9.5	36	71,454	31	31	26	0	16	14	2
Polk	11	8	465,858	37	30	28	6	21	13	2
Volusia	12	10	420,431	30	29	48	33	21	24	15
Hillsborough	13	4	942,322	28	28	61	37	38	21	78
Hernando	16	28	125,008	27	27	65	16	1	4	1
Martin	16	29	119,370	37	27	63	40	19	18	14
Lake	16	21	196,073	27	27	53	12	16	9	20
Brevard	16	9	465,825	43	27	42	27	16	22	7
Orange	16	6	824,095	27	27	36	8	42	12	13
Leon	20.5	18	233,232	39	26	44	5	21	9	8
Charlotte	20.5	26	133,655	26	26	57	63	50	29	34
Sumter	20.5	41	47,907	26	26	53	35	17	6	29
Broward	20.5	2	1,460,890	26	26	73	75	20	91	11
Manatee	24	16	247,028	32	25	17	29	24	6	17
Calhoun	24	62	13,572	25	25	0	0	3	0	3
Columbia	24	37	55,368	25	25	12	4	27	3	4
Pinellas	26	5	892,178	24	24	33	13	98	17	97
Santa Rosa	28.5	33	107,814	27	23	29	3	16	2	2
Monroe	28.5	34	85,646	24	23	42	20	20	19	35
Indian River	28.5	32	106,690	40	23	75	26	18	27	7
Dade	28.5	1	2,090,314	23	23	31	40	8	20	41
Collier	32	20	210,095	22	22	47	9	49	69	7
Highlands	32	35	80,458	22	22	35	12	9	3	3
Suwannee	32	45	33,746	22	22	7	1	31	0	17
Bradford	34	49	25,355	21	21	21	6	13	4	3
Gilchrist	35.5	63	13,140	20	20	9	11	46	6	9
Okeechobee	35.5	44	35,059	20	20	7	0	15	0	0
Madison	37	54	19,277	19	19	8	2	10	3	3
Gulf	39	57	14,260	27	18	3	7	2	0	2
Escambia	39	15	296,164	18	18	11	0	16	0	0
Seminole	39	12	345,166	18	18	93	17	10	13	9
Union	41	60	13,459	17	17	11	4	16	3	3
Holmes	43.5	56	17,949	16	16	0	0	10	0	11
Wakulla	43.5	55	19,828	16	16	100	56	18	37	16
Glades	42	65	9,875	16	16	14	0	0	1	0
Osceola	43.5	25	148,712	16	16	40	6	4	2	1
Franklin	43.5	64	10,739	15	15	21	19	7	17	87
Lafayette	47	67	6,998	15	15	37	11	0	7	100
Clay	47	27	134,534	15	15	77	8	13	18	10
Saint Johns	47	31	109,894	15	15	55	3	5	3	2
Ocala	50	23	175,568	14	14	20	15	12	1	16
Nassau	52	38	54,538	13	13	11	5	1	0	0
Dixie	52	61	13,196	13	13	0	0	35	0	0
Pasco	52	13	321,074	13	13	17	18	9	23	24
Levy	55	46	32,416	12	12	22	12	26	0	0
Bay	55	24	147,496	12	12	0	0	12	0	0
Hardee	55	50	22,801	12	12	0	7	21	0	0
Gadsden	57	39	50,820	11	11	91	14	37	11	23
Jefferson	58.5	58	14,207	10	10	20	5	0	5	0
Hamilton	58.5	59	14,120	10	10	3	0	0	0	0
Baker	61	51	21,131	9	9	15	2	10	4	3
De Soto	61	48	27,927	9	9	26	4	19	1	0
Flagler	61	42	43,441	9	9	17	0	1	0	0
Washington	63	52	21,319	8	8	5	2	15	19	16
Liberty	64	66	7,708	7	7	30	10	6	5	10
Walton	65	43	38,304	5	5	0	0	31	1	100
Jackson	66	40	49,670	4	4	2	0	0	1	6
Hendry	67	47	30,364	3	3	1	0	0	1	0
State	NA	NA	5,913,450	28	28	44	30	22	18	30

¹ Percentages are based on Waste Composition Studies as reported by each County. □

For further discussion of the data's validity, see page 6 of the Introduction.

² Official 1998 Governor's Office estimates.

³ The Legislature established a goal of 30 percent by the end of 1994 for each county with a population over 75,000.

⁴ The Legislature established a goal of 50 percent for these materials by the end of 1994 for each county.

APPENDIX B

LEE COUNTY SOLID WASTE MANAGEMENT SYSTEM

LEE COUNTY SOLID WASTE MANAGEMENT SYSTEM

The Lee County Solid Waste Management System (the "System") is the result of a comprehensive Integrated Solid Waste Management Master Plan, that has evolved into one of the most successful solid waste management and recycling programs in the State and nationally. The Florida Department Of Environmental Protection (FDEP) 2000 Solid Waste Management Annual Report ranks Lee County number one for recycling in the State of Florida (see Appendix A). The County's Materials Separation Plan (the "Plan") is embodied within the County's System.

Background

The Florida Resource Recovery and Solid Waste Management Act of 1988, Part IV, Chapter 403, Florida Statutes, was enacted in order to reduce the amount of solid waste disposed of throughout the State. This legislation enabled Florida counties to provide solid waste disposal facilities for their residents and businesses. It mandated that recycling initiatives be pursued in each county in order to meet a recycling goal of 30 percent of the waste stream by the end of 1994. It also required that construction and demolition debris be segregated from the municipal solid waste stream and disposed of separately at landfills, and that a significant portion of newspaper, aluminum cans, glass and plastic bottles also be removed for recycling rather than disposal.

The Lee County Solid Waste Disposal and Resource Recovery Act of 1985, enabled the County to enter into a contract to construct, operate, and maintain a solid waste disposal and resource recovery system for the benefit of County residents. This legislation stipulated that all entities, both public and private, within the territorial boundaries of the County utilize the solid waste facilities designated by the County. This legislation also enabled the County to impose necessary fees in order to finance the costs of the system on a self-supporting, non-profit, cost-recovery basis. The Board of County Commissioners, as the County's governing body, is responsible for setting the rates and collecting all fees necessary to operate and maintain the County's Solid Waste System

(i.e. the "System"). The County's System is designed to provide for an integrated solid waste management and materials separation approach with proven success. The program includes an aggressive recycling goal of 40 percent and emphasizes the conservation of resources by diverting materials through recycling, reuse, and reduction, from existing solid waste management facilities. The County also has programs in place which close the recycling loop, (i.e. purchase recycled products), coupled with cooperative education programs with the Lee County School Board and Keep Lee County Beautiful.

A description of the elements of the County's System emphasizes the comprehensive initiatives implemented by the County to address materials separation as it relates to the overall solid waste management program and the fulfillment of the Plan.

Solid Waste Generation and Recycling Projections

In March 2000 the County updated its 1989 Integrated Solid Waste Management Master Plan, examining the status of the County's System and the impacts of the County's growth on its future. This solid waste master plan update, like the previously developed solid waste master plan, examined the various types of solid waste generated within the County, including the quantities of wastes and recyclables generated, as well as the characteristics of each specific type of material. Historical population trends were also examined, and population projections developed for the entire Lee and Hendry counties. These population projections were utilized to estimate the quantities of materials capable of being recycled or requiring disposal capacity, for each of the next 10 years. Appendix D contains pertinent excerpts of the Lee County Solid Waste Management Plan Update.

Population

Under the terms of the Lee County/ Hendry County Interlocal Agreement, dated October 17, 1989, municipal solid waste from Hendry County is to be handled by Lee County for a 20-year period. Accordingly, population projections and waste generation rates have been developed for both Lee and Hendry Counties. Appendix D, Table 2-1 depicts the estimated population growth for Lee and Hendry counties that were used to develop the

estimates of materials capable of separation or disposal. Additionally, as reported by the U.S. Census Bureau, the population of Lee County for the year 2000 is 440,888 persons, which represents a 31.6 percent change in population from 1990. The population of Hendry County for the year 2000 is 36,210 persons, which represents a 40.5 percent change in population from 1990. For reference, the State's percent population change from 1990 to 2000 is 23.5 percent as reported by the U.S. Census Bureau.

Solid Waste and Recyclable Material Quantities

The historical quantity of solid waste generated in Lee County is shown on Table 2-3 of Appendix D. As shown, there has been an increase in the total quantity of solid waste generated of approximately 28 percent from 1996 to 1999. Solid waste quantities from Hendry County, which are handled by the Lee County system, are shown on Table 2-4 of Appendix D. Recyclable materials from Hendry County, do not enter into Lee County's solid waste stream, and are not included with the County's recyclables totals. Additional solid waste, recyclables and ash residue quantities are provided in Appendix C, Table 1 of the Recycling Grant Report.

Solid Waste System Service Area

The County, through local ordinances, has mandated that all residential and commercial entities will be subject to mandatory waste collection within the unincorporated areas of Lee County. The County established franchise districts within the unincorporated areas and granted franchise haulers exclusive rights to collect waste from their assigned district(s). The six franchise hauling areas for the unincorporated portion of the County are shown on Figure 2-1. The haulers collect both residential and commercial waste as well as residential recyclables and horticultural waste. Each hauler delivers the waste to County-designated facilities in accordance with the terms of its franchise hauler agreements. The County pays the haulers for providing residential collection service in the unincorporated areas. The County collects the disposal fee, collection fee and a surcharge from unincorporated County residents to pay for all residential solid waste and recycling services. Commercial establishments in the unincorporated areas pay for solid

waste collection and disposal services directly to their franchise hauler. The franchise haulers pay the County a tipping fee for the disposal of commercial waste and other County surcharges. In addition, all users of the County's system pay a Disposal Facility Assessment directly to the County, which is based on their average waste generation.

Each of the incorporated cities located within the County has an ordinance, which establish mandatory collection of solid waste. The City of Fort Myers provides for municipal collection of all its waste, while the Cities of Cape Coral and Sanibel utilize private haulers. The Town of Fort Myers Beach and the City of Bonita Springs utilize the franchise hauler provided by the County. Interlocal Agreements between the County and the Cities provide for solid waste disposal and recycling capacity at County facilities and Disposal Facility Assessments.

Solid Waste Flow Control

The County, recognizing the importance of waste flow control to the economics of operating an integrated solid waste system, enacted County Ordinance No. 86-14 as amended and restated by Ordinance 95-19, which states that all waste collected in the County be directed to a County-designated facility for disposal. The County, also recognizing the possibility that the constitutionality of this flow control ordinance could be challenged, has maintained County disposal fees at competitive rates as a means of retaining economic flow control, while maintaining the financial health of their solid waste program. In addition to the County's Waste Flow Control Ordinance, the County's franchise haulers are required to deliver solid waste to the Facility. The County has Interlocal Agreements with the Cities of Fort Myers, Cape Coral, Sanibel, Bonita Springs and the Town of Ft. Myers Beach, to govern the delivery of waste to the Facility.

Solid Waste System Agreements

Vital elements of the County's success in effectively and efficiently managing the County's solid waste are its solid waste system agreements. The County has entered into

a number of salient agreements that have enabled the County's System to provide for economical, fiscally responsible and environmentally sound means of solid waste management within Lee County.

Hendry/Lee County Agreement

Under the terms of the Hendry/Lee County agreement, two transfer stations were constructed in Hendry County to transport waste from Hendry County to the Facility. Hendry County also agreed to assist the County in the development of the Regional Landfill. Hendry County requires its residents and franchise haulers to dispose of all waste either at the Transfer Stations, Regional Landfill or the Facility.

Covanta Service Agreement

The Service Agreement between the County and Covanta of Lee, Inc. (formerly Ogden Martin Systems of Lee, Inc.) requires that the Facility be operated and maintained to receive and process waste, generate steam, and convert that steam to electric power for export at established guaranteed levels. Facility performance is measured on an annual basis, in comparison to the guarantees contained in the agreement.

Electric Power Purchase Agreement

In May 1999, the County entered into an Electric Power Purchase Agreement (Agreement) with Seminole Electric Cooperative, Inc. (Seminole). Under the terms of this Agreement, Seminole began purchasing the net electric power produced by the Facility on December 15, 1999. The Agreement is scheduled to expire on December 31, 2015. After an initial three-year period, either Seminole or the County may request to renegotiate the energy and/or capacity pricing. Following commencement of energy delivery to Seminole, the County's electrical revenue increased by approximately 44 percent.

Interlocal Agreements

The County has recently negotiated revised interlocal agreements with the City of Fort Myers, the City of Sanibel, the City of Cape Coral, the City of Bonita Springs, and the

Town of Fort Myers Beach to provide solid waste disposal and recycling capacity for these cities for a 10-year period.

Franchise Agreements

The unincorporated areas of the County are served by exclusive collection franchises, which cover both residential and commercial collection. In 1995 the County's franchise districts were re-drawn, dividing the unincorporated areas of the County into six hauling areas. In accordance with the terms of the Franchise Hauling Agreements, all franchised processible waste must be delivered to the Facility. The agreements were re-bid in FY 1999 with several new haulers awarded franchises beginning in October 2000.

Poor Original

Solid Waste System Components

Lee County Solid Waste Energy Recovery Facility

The Lee County Solid Waste Energy Recovery Facility (the "Facility") is a 1,200-ton per day (nominal) mass burn resource recovery facility located on a 155-acre site owned by the County on the north side of Buckingham Road in the unincorporated area of the County. The Facility has several innovative environmental aspects. Most notable are its air pollution control system, its metals recovery systems, its ecologically sound reuse of treated wastewater and its extensive wetlands protection and mitigation elements.

Briefly, the history of the Facility is as follows. In 1990, the County selected Ogden Martin Systems of Lee, Inc. (now Covanta) to design, construct, operate, and maintain the Facility, which was ultimately sized at 1,200 tons per day (tpd) with 1,800 tpd future facility capacity. The service agreement provides for the operation and maintenance of the facility for a 20-year period, beginning on December 1, 1994. "First fire" at this Facility took place on August 24, 1994. Representatives from Lee County, Covanta and the FDEP were present to participate and witness this event. Unit #1 was started up first on August 24, 1994 and Unit #2 on September 3, 1994. Acceptance testing was conducted from October 17-26, 1994 and the facility entered into commercial operation effective December 1, 1994. The Facility has operated with a combined boiler

availability of 91 percent and a Turbine Generator availability of 99.6 percent. In excess of 1.8 million tons of waste has been processed; 10,140,000 Klbs of steam produced; 1,077,000 KWh of power generated; over 1 million net KWh of power sold; 477,000 tons of ash produced; 43,000 tons of ferrous; and 1,000 tons of non-ferrous metals recovered

The Facility is equipped with two 660 tpd (at a reference waste of 5000 Btu) mass burn municipal waste combustors which utilize Martin reverse-reciprocating stoker grate and combustion control technology. Steam is generated by two 169 Klb/hr Distral water wall boilers. A Bailey Infi 90 Distributive Control System is used to regulate plant systems. The ABB pollution control equipment includes dry gas scrubbers, fabric filter baghouses and mercury and nitrogen oxide abatement systems. A Continuous Emissions Monitoring (CEM) system, built by Covanta, monitors carbon monoxide, oxygen, nitrogen oxide, opacity, sulfur dioxide, total steam production, power generation, ammonia injection rate, slaked lime usage, activated carbon usage, combustion efficiency, stack, and combustion zone temperatures. A Mitsubishi condensing steam turbine with extractions supplying auxiliary steam to air heaters, air ejectors, the deaerator and low pressure feedwater heaters drives a 39.7 MW air cooled, synchronous generator. Secondary treated wastewater is used to condense the turbine exhaust steam. This condensate is returned to the boilers. Net power produced is transformed to 138 kV and sold to Seminole Electric Company for distribution. Flyash is transported by an enclosed conveyor system to the Martin Ash Dischargers where it is combined with bottom ash from the grate. A grizzly, scalper, magnetic separator, and non-ferrous recovery system are installed to recover ferrous and non-ferrous metals from the ash.

Gulf Coast Landfill

The Gulf Coast Landfill is located on the south side of State Road 82, approximately three miles east of U.S. Interstate 75. It is owned and operated by Waste Management Inc. of Florida (WMIF) who provides disposal capacity under contract to the County. The landfill is located on approximately 320 acres, and the County sends all non-processible waste (primarily C&D) as well as bypass waste and ash residue from the Facility to this landfill. The landfill has been constructed with a single synthetic liner and

leachate collection system. In January 1998, the FDEP renewed the operating permit for the landfill for an additional five-year period, potentially extending the useful life to October 2003. It is anticipated that the landfill will reach its permitted volume by the end of 2002, and closure is expected to begin in 2002 or 2003. Under the terms of the contract between the County and WMIF, no waste from outside Lee or Hendry counties may be accepted at the landfill facility unless approved by the County, except for limited quantities of Special Wastes, which are defined as being non-hazardous, but which may require specialized handling or management.

Lee / Hendry County Regional Landfill

The Lee / Hendry County Regional Landfill (the "Regional Landfill") is located in western Hendry County on an 1800 acre site owned by Lee County, with access to the site via State Road 82 and South Church Road. The County has contracted with WMIF to operate the landfill for a 20-year period, once the Gulf Coast Landfill is no longer utilized by the County for the disposal of ash and C&D. The landfill currently consists of a 12.3 acre Class I double-lined landfill cell, which includes a leachate collection system, double-lined leachate storage pond, and other support facilities. Construction of the first cell of the landfill was completed in March 1997, and it was designed to accept ash from the County's Facility as well as by-passed waste from Lee and Hendry counties for at least a 5-year period. The landfill design meets FDEP solid waste regulations as per the Florida Administrative Code.

It is anticipated that ash, C&D, and by-pass waste will continue to be disposed of at the Gulf Coast Landfill through the third quarter of calendar year 2002, and that the Regional Landfill cell will be capable of handling ash through the year 2007, with an additional cell required to be developed prior to that time. In addition, the County has established a policy of maintaining approximately 500,000 cubic yards of landfill capacity in reserve for uncontrollable circumstances and emergencies, such as hurricanes. Based on this policy, it is estimated that construction of a second cell will be required to be completed in 2004.

Transfer Stations

The County owns and WMIF operates two transfer stations located in Hendry County; one in LaBelle and one in Clewistown, each with a design capacity of 100 tpd. These transfer stations were constructed in 1992 in accordance with the terms of the Interlocal Agreement with Hendry County. The transfer stations currently accept a total of approximately 90 tpd of Class I (household) and 5 tpd of Class III (C&D) waste from Hendry County for transfer to a Lee County-designated facility. The transfer stations in Hendry County currently accept and process a total of approximately 38,000 tons per year of waste generated within Hendry County. The capacity of these transfer stations is approximately 57,000 tons per year.

C&D Processing and/or Disposal Facilities

Construction and demolition waste from franchise haulers is primarily delivered to the Gulf Coast Landfill for disposal. In fiscal year 1999, approximately 45,700 tons of C&D were brought to that facility. A relatively small quantity of C&D, that which is processible, is burned at the Facility, amounting to about 4,900 tons in fiscal year 1999. A permit modification to the PSD permit for the facility limits the amount of non-processible C&D burned to 5 percent of the total waste delivered. Non-processible C&D includes concrete, metals, gypsum products, plaster, rock, brick and masonry, and other non-combustible materials.

In addition, C&D generated by the commercial sector, is also delivered to Forestry Resources, Inc. in Fort Myers, a privately owned facility, which recycles some of the components comprising C&D and which currently receives approximately 100 tpd of materials. Much of the C&D generated in Lee County is also disposed of in neighboring Charlotte and Collier Counties, where tip fees for C&D disposal are lower than at Lee County facilities. The County does not control the location for C&D disposal from non-franchised haulers.

Materials Recycling Facility

The County's solid waste management program emphasizes the conservation of resources by diverting materials through recycling, reuse, and reduction from existing solid waste management facilities. The State has established a statewide goal of 30 percent waste reduction, reuse and recycling. The FDEP 2000 Solid Waste Management Annual Report shows that Lee County had the highest recycling rate for any County in the State of Florida (i.e. calendar year 1998). In calendar year 1999, the County recycled 36 percent of its waste and has consistently met the State's recycling goal of 30 percent. This materials diversion rate underscores the importance the County has placed upon materials separation and recyclables recovery. The cornerstone of the County's successful recycling program is the publicly owned Materials Recycling Facility (MRF) located in North Fort Myers to handle residential recyclable materials. All single family residential units as well as multi-family dwellings in the County are provided with curbside recyclables collection, and all residential recyclable materials are delivered to the MRF. The MRF processes both mixed papers and commingled materials in its processing lines. Corrugated cardboard, phone books, magazines and newspaper are manually separated on the fiber line. Steel cans, aluminum cans, plastics (PET, HDPE and mixed) and glass (clear, brown and green) are sorted on the commingled line.

The County is in the process of constructing a new 60,000 square foot Recovered Materials Processing Facility (RMPF) at the Facility site and relocating the existing MRF equipment to the new RMPF. The RMPF will be fully operational by the end of 2001, and will be capable of handling approximately 400 tpd of recovered recyclable materials. The new RMPF will allow for changes in recovered materials composition, and the addition of new materials to the program in the future.

Tire Processing Facility

In July 1996, the County submitted an amendment to the County's application for site certification of the Facility under the Florida Electrical Power Plant Siting Act for building and operating a waste tire processing system on the site of the Facility. The County currently uses this tire processing facility for storage and pays a private tire

processor in Bonita Springs to shred loads of tires, which once shredded, are returned to the Facility to be burned. By utilizing this process the County is recovering energy and steel from the waste tire materials. In calendar year 1999, approximately 12,800 tons of shredded tires were burned at the Facility. The quantity of tires capable of being processed at the Facility is limited by the modification to the facility's PSD permit, to 5% by weight, of the facility's total fuel, with compliance determined on a calendar month basis. At the current 1200 tpd capacity of the Facility, assuming an 85 percent availability, segregated tire tonnage's would be limited to 18,615 tons per year, or approximately 1,550 tons per month.

Household Hazardous Waste Collection Facilities

The County instituted a household hazardous waste (HHW) program in 1990, consisting of a household hazardous waste transfer station combined with advertised and schedule collection events. The HHW facility is used for the collection and temporary storage of HHW which residents may bring in free of charge, at seven one-day events each year, held at Page Field in Lee County and designated locations in Cape Coral and Bonita Springs. A second transfer/storage facility was built at the Facility site in 1998. The County accommodates residents who are moving, and require access to a disposal facility at other times, by accepting these materials at the Facility by appointment. The County also accepts hazardous materials from commercial establishments by conducting four HHW collection events at Page Field each year.

Horticultural Waste Processing Facilities

The County currently has an agreement with the City of Fort Myers to deliver its horticultural waste to the Fort Myers Horticultural Trash Processing Facility. This vegetative waste mulching facility and air curtain incinerator is located in Fort Myers. Loads of horticultural waste (primarily lawn clippings and trimmings, branches, palm fronds and logs) from weekly collections of households by the franchise haulers are delivered to this site. Waste is delivered both loose and in plastic bags, then shredded. The quantity of horticultural material collected and recycled has remained fairly constant, and in fiscal year 1999, 33,660 tons of horticultural materials were delivered to this

facility by Lee County. The resultant mulch is stockpiled and screened on site for distribution to County agencies and residents. The facility has been in operation since 1993.

Additionally, the County has recently obtained a permit modification for the Facility site in order to construct a yard waste processing facility on a 13-acre parcel of land. The new facility is intended to be large enough to accommodate an entire year's volume of incoming horticultural material, or approximately 40,000 tons annually, and sufficient storage and stockpiling will be available.

Other System Components

Other System Components include the County's management programs for special wastes. These programs include collection of waste oil, curbside collection of household batteries, a used sharps depository program, and white goods collection.

APPENDIX C

**EXCERPTS FROM SEPTEMBER 2000
RECYCLING GRANT REPORT**

Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

TABLE 1
MUNICIPAL SOLID WASTE
COLLECTION AND RECYCLING
(January 1, 1999 - December 31, 1999)

Note: Refer to Grant Application Items 5(i) & 5(p)

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COUNTY: Lee		1999 POPULATION(a): 417,114					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Materials Type	Collected Tons	Percent Total Tons(b)	Pounds per Capita per Day(c)	Recycled Tons		Percent Recycled(e)	
				Public	Private	Total (d)	
1. Minimum 5 Materials(f)							
a. Newspaper	41,866	6	0.55	16,756	6,804	23,560	56
b. Glass	34,529	5	0.45	6,912	562	7,474	22
c. Aluminum cans	3,982	1	0.05	641	881	1,522	38
d. Plastic bottles	8,321	1	0.11	2,157	3	2,160	26
e. Steel cans	4,589	1	0.08	4,589	0	4,589	100
2. Special Waste Materials(g)							
a. C&D debris (l)	59,821	8	0.79	0	22,400	22,400	37
b. Yard trash	109,642	15	1.44	72,932	8,103	81,035	74
c. White goods(h)	14,955	2	0.20	10,800	1,184	11,984	80
d. Tires	5,982	1	0.08	6	0	6	0
e. Process fuel(i)	NA	NA	NA	0	0	0	0
3. Other Waste Materials							
a. Other plastics	14,955	2	0.20	0	194	194	1
b. Ferrous metals(h)	59,821	8	0.79	9,402	22,345	31,747	53
c. Non-ferrous metals	9,721	1	0.13	18	6,361	6,379	66
d. Corrugated paper	72,776	10	0.96	1,008	71,081	72,089	99
e. Office paper	4,221	1	0.06	390	927	1,317	21
f. Other paper	18,432	2	0.24	1,556	439	1,995	11
g. Food	52,343	7	0.69	482	0	482	1
h. Textiles	22,432	3	0.29	0	1,498	1,498	7
i. Miscellaneous	209,373	28	2.75	404	512	916	0
4. County Totals	747,761	100.00	8.82	128,053	143,294	271,347	36
Must Equal Figure Reported in 5.e.: 747,761		Certified Materials Total (excluding rubber)		166,508		No rates > 100%	
5. MSW Management (tons)							
a. Unadjusted Recycled (Line 4, Column 7)						271,347	
b. Landfilled (Including Landfilled Combustor Ash)						232,419	
c. Gross Combusted (WTE Input)						347,236	
i) Landfilled Combustor Ash (j)						84,576	
ii) Combustor Material Recycled (k)						8,665	
iii) Net Combusted (Output) = 5c - 5c(i) - 5c(ii)						243,995	
d. Gross MSW = 5a+5b+5c						851,002	
e. Net MSW = 5a+5b+5c(iii)						747,761	
(Must Equal Line 4, Column 2 of the Table and Line 4, Column 2 of TABLE 3.)							
6. Adjusted Recycling Rate Calculations							
a. Total tons of special wastes recycled.						115,425	
(Add lines 2a through 2e, column 7)							
b. Special waste recycling percent						15.4	
(Divide line 6a by line 4, column 2 and multiply times 100.)							
c. Line 4, column 8 minus line 6b.						20.8	
Adjusted Recycling Rate (8d or 8e the value not equal to 0)							
d. If line 6b is equal to or greater than 15%, enter here line 6c plus 15%.						36 %	
e. If line 6b is less than 15%, enter here line 4, column 8.						0 %	

	Landfilled		Combusted		Recycled (Unadj.)	
	Tons	%	Tons	%	Tons	%
Gross MSW Management	232,419	27%	347,236	41%	271,347	32 %
Net MSW Management	232,419	31%	243,995	33%	271,347	36 %

- (a) Official April 1, 1999 Governor's Office population estimates.
- (b) Percent Total Tons = column 2 (material type tons) divided by line 4, column 2 (total county tons collected) times 100.
- (c) Pounds/Capita/Day = column 2 (material type tons) times 2,000 pound/ton divided by the 1999 county population divided by 365 days.
- (d) Use Certified Recycler's numbers provided by FDEP for the appropriate material types. Column 5 (recycled-public) + column 6 (recycled-private) = column 7 (Certified Recycler's total).
- (e) Percent Recycled = column 7 (Total recycled tons) divided by column 2 (material type tons) times 100. No recycling rates can be greater than 100%.
- (f) The Legislature established a goal of 50 percent for each material by the end of 1994 for each county.
- (g) The total of all Special Waste Materials can count towards no more than one half of the 30 percent recycling goal for each county.
- (h) To establish ferrous tonnage, subtract known white goods tonnage from Certified ferrous tonnage (White Goods + Ferrous Metals = Certified Ferrous). If white goods tonnage is not known, use 16% of the Certified Ferrous tonnage for this figure.
- (i) Process fuel (yard, wood and paper waste used in process boilers) should not be included in line 4, column 2 (total county tons collected), as they are accounted for in other material categories. They should be counted in line 4, column 7 (total county tons recycled).
- (j) Tonnage of incinerator byproducts (i.e. ash and filtered material) disposed in landfill.
- (k) Tonnage of materials recovered at the incinerator that is recycled (i.e. ash and ferrous metals.) includes non-ferrous
- (l) Tonnage most likely does not include Land Clearing Debris (LCD).

TABLE 2
WASTE REDUCTION
GOALS WORKSHEET
 (January 1, 1999 - December 31, 1999)

Note: Refer to Grant Application Item 5(I)

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 any formats, do not enter information into shaded areas.

COUNTY: Lee

1. BASE YEAR #1: July 1, 1990 - June 30, 1991

a. Total MSW disposed (landfilled plus combusted)	403,200 Tons
b. Population (Official April 1, 1989 figure)	338,427 People
c. MSW/Capita: 1a/1b =	1.19 Tons/Capita

2. BASE YEAR #2: July 1, 1991 - June 30, 1992

a. Total MSW disposed (landfilled plus combusted)	351,556 Tons
b. Population (Official April 1, 1990 figure)	344,032 People
c. MSW/Capita: 2a/2b =	1.02 Tons/Capita

3. BASE YEAR #3: July 1, 1992 - June 30, 1993

a. Total MSW disposed (landfilled plus combusted)	363,228 Tons
b. Population (Official April 1, 1991 figure)	350,809 People
c. MSW/Capita: 3a/3b =	1.04 Tons/Capita

4. BASE YEAR #4: July 1, 1993 - June 30, 1994

a. Total MSW disposed (landfilled plus combusted)	378,040 Tons
b. Population (Official April 1, 1992 figure)	350,037 People
c. MSW/Capita: 4a/4b =	1.06 Tons/Capita

5. BASE YEAR #5: July 1, 1994 - June 30, 1995

a. Total MSW disposed (landfilled plus combusted)	336,724 Tons
b. Population (Official April 1, 1993 figure)	378,342 People
c. MSW/Capita: 5a/5b =	0.89 Tons/Capita

6. BASE YEAR #6: July 1, 1995 - June 30, 1996

a. Total MSW disposed (landfilled plus combusted)	430,656 Tons
b. Population (Official April 1, 1994 figure)	383,706 People
c. MSW/Capita: 6a/6b =	0.89 Tons/Capita

7. CURRENT YEAR: January 1, 1999 - December 31, 1999

a. Total MSW disposed (Table 1, line 5b plus 5c(iii))	476,414 Tons
b. Population (Official April 1, 1998 figure)	417,114 People
c. MSW/Capita: 7a/7b =	1.14 Tons/Capita

8. WASTE REDUCTION PROGRESS (a)

a. Base Year #1 to Current Year:	$[(1c - 7c) / 1c] \times 100 =$	4%
b. Base Year #2 to Current Year:	$[(2c - 7c) / 2c] \times 100 =$	-12%
c. Base Year #3 to Current Year:	$[(3c - 7c) / 3c] \times 100 =$	-10%
d. Base Year #4 to Current Year:	$[(4c - 7c) / 4c] \times 100 =$	-8%
e. Base Year #5 to Current Year:	$[(5c - 7c) / 5c] \times 100 =$	-28%
f. Base Year #6 to Current Year:	$[(6c - 7c) / 6c] \times 100 =$	-28%

(a) A negative number indicates that there has been an increase in the MSW disposal rate per capita.

TAE
**CURRENT AND FUTURE MSW
 COLLECTION AND RECYCLING BY GENERATOR TYPE**
 (Jan. 1, 1999 - Dec. 31, 1999; Jan. 1, 2000 - Dec. 31, 2000 and Jan. 1, 2019 - Dec. 31, 2019)

Note: Refer to Grant Application Items 5(b) & 5(m)

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SECTION A

		COUNTY:	Lee	1999 POPULATION(a):		417,114
(1)	(2)	(3)	(4)	(5)	(6)	
Generator Type	Collected and Recycled Jan. 1, 1999 - Dec. 31, 1999					
	Collected Tons(b)	Percent Total Tons(c)	Pounds per Capita per Day(d)	Recycled Tons	Percent Recycled(e)	
1. Residential Single Family	179,837	24	2.36	71,935	40	
2. Residential Multi-Family	96,835	13	1.27	47,458	49	
3. Commercial	471,089	63	6.19	151,954	32	
4. County Totals	747,761	100	9.82	271,347	36	
Must Equal Figure Reported in Table 1:		747,761	9.82	271,347	36	

NOTE: Line 4, Columns 2,4,5,6 (Generator Type County Totals) Must Equal TABLE 1, Line 4, Columns 2,4,7,8 (County Totals).

SECTION B

SECTION B		2000 POPULATION :		431,296		2019 POPULATION:		766,588	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
Generator Type	To Be Collected and Recycled Jan. 1, 2000 - Dec. 31, 2000					To Be Collected Jan. 1, 2019 - Dec. 31, 2019			
	Collected Tons(b)	Percent Total Tons(c)	Pounds per Capita per Day(d)	Recycled Tons	Percent Recycled(e)	Collected Tons(b)	Percent Total Tons(f)	Pounds per Capita per Day(d)	
1. Residential Single Family	165,998	24	2.11	83,141	50	322,197	24	2.30	
2. Residential Multi-Family	89,382	13	1.14	43,797	49	173,491	13	1.24	
3. Commercial	434,836	63	5.52	149,148	34	844,009	63	6.03	
4. County Totals	690,216	100	8.77	276,086	40	1,339,697	100	9.58	

(a) Official April 1, 1999 Governor's Office population estimates.

(b) Collected Tons = Tons Recycled + Tons Landfilled + Tons Combusted (Net).

(c) Percent Total Tons = column 2 (generator type tons) divided by column 2, line 4 (total county tons collected) times 100.

(d) Pounds/Capita/Day = column 2 (generator type tons) times 2,000 pound/ton divided by the appropriate county population divided by 365 days.

(e) Percent Recycled = column 5 (recycled tons) divided by column 2 (generator type tons) times 100.

(f) Percent Total Tons = column 7 (generator type tons) divided by column 7, line 4 (total county tons collected) times 100.

(g) Pounds/Capita/Day = column 7 (generator type tons) times 2,000 pound/ton divided by the 2019 county population divided by 365 days.

TABLE 4
MUNICIPAL SOLID WASTE TO BE
COLLECTED AND RECYCLED
(January 1, 2000 - December 31, 2000 and January 1, 2019 - December 31, 2019)

Note: Refer to Grant Application Items 5(b) & 5(m)

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COUNTY:	Lee		2000 POPULATION:		431,296		2019 POPULATION:		766,588	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
Materials	To Be Collected and Recycled Jan. 1, 2000 - Dec. 31, 2000					To Be Collected Jan. 1, 2019 - Dec. 31, 2019				
	Collected Tons(a)	Percent Total Tons(b)	Pounds per Capita per Day(c)	Recycled Tons (d)	Percent Recycled	Collected Tons(e)	Percent Total Tons(b)	Pounds per Capita per Day(f)		
1. Minimum 5 Materials(g)										
a. Newspaper	41,413	6	0.53	28,989	70	53,588	4	0.38		
b. Glass	34,511	5	0.44	8,628	25	53,588	4	0.38		
c. Aluminum cans	6,902	1	0.09	2,623	38	40,191	3	0.29		
d. Plastic bottles	6,902	1	0.09	1,933	28	40,191	3	0.29		
e. Steel cans	6,902	1	0.09	6,902	100	26,794	2	0.19		
2. Special Waste Materials(h)										
a. C&D debris	55,217	8	0.70	20,430	37	147,367	11	1.05		
b. Yard trash	96,630	14	1.23	71,506	74	133,970	10	0.96		
c. White goods	13,804	2	0.18	11,043	80	13,397	1	0.10		
d. Tires	6,902	1	0.09	690	10	13,397	1	0.10		
e. Process fuel(i)	NA	NA	NA		0	NA	NA	NA		
3. Other Waste Materials										
a. Other plastics	13,804	2	0.18	276	2	40,191	3	0.29		
b. Ferrous metals	55,217	8	0.70	41,413	75	107,176	8	0.77		
c. Non-ferrous metals	6,902	1	0.09	5,177	75	13,397	1	0.10		
d. Corrugated paper	69,022	10	0.88	68,331	99	13,397	1	0.10		
e. Office paper	6,902	1	0.09	2,278	33	66,985	5	0.48		
f. Other paper	13,804	2	0.18	2,071	15	13,397	1	0.10		
g. Food	48,315	7	0.61	483	1	107,176	8	0.77		
h. Textiles	20,706	3	0.26	1,449	7	80,382	6	0.57		
i. Miscellaneous	186,358	27	2.37	1,864	1	375,115	28	2.68		
4. County Totals	690,216	100.00	8.77	276,086	40	1,339,697	100.00	9.58		
Must Equal Figure Reported in Table3:	690,216	Must = 100%	8.77	276,086	40	1,339,697	Must = 100%	9.58		

- (a) Collected Tons = column 2, line 4 (total tons collected) times column 3 (percent total tons) divided by 100.
 (b) Percent Total Tons as reported in County's Waste Composition study. County Total must = 100%.
 (c) Pounds/Capita/Day = column2 (material type tons) times 2,000 pound/ton divided by the 2000 county population divided by 365 days.
 (d) Recycled Tons= column 6 (percent recycled) times column 2 (material type tons) divided by 100. No recycling rates can be greater than 100%.
 (e) Collected Tons = column 7, line 4 (total tons collected) times column 8 (percent total tons) divided by 100.
 (f) Pounds/Capita/Day = column7 (material type tons) times 2,000 pound/ton divided by the 2019 county population divided by 365 days.
 (g) The Legislature established a goal of 50 percent for each material by the end of 1994 for each county.
 (h) The total of these materials can count towards no more than one half of the 30 percent recycling goal for each county.
 (i) Process fuel (yard, wood and paper waste used in process boilers) should not be included in line 4, column 2 (total county tons collected), as the _____ accounted for in other material categories. They should be counted in line 4, column _____ (total county tons recycled.)

TAE
PARTICIPATION IN RECYCLING
(Average for the Calendar Year 1999)

Note: Refer to Grant Application Item 5(k)

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COUNTY: Lee

1999 POPULATION(b): 417,114

Generator Type	Total Units in County	Residents per Unit (c)
Residential Single Family	137,913	2.20
Residential Multi-Family	74,977	1.50
Commercial	11,000	NA

(1) Recycling Services	(2) County Units with Service Available	(3) Percent of Total Units in County with Service Available(d)	(4) County Units Participating in Available Service	(5) Percent of County Units Participating in Available Service(e)	(6) Percent of Total Units in County Participating(f)	(7) Population Participating in Available Service(g)	(8) Percent of County Population Participating in Available Service(h)
Residential Single Family							
a. Curbside collection	137,913	100	103,890	75	75	228,558	55
b. Drop off stations	137,913	100	7,000	5	5	15,400	4
c. Mobile drop off	0	0	0	0	0	0	0
d. Buy back centers	137,913	100	27,400	20	20	60,280	14
Residential Multi-Family							
a. Curbside collection	74,977	100	63,730	85	85	95,595	23
b. Drop off stations	74,977	100	3,750	5	5	5,625	1
c. Mobile drop off	0	0	0	0	0	0	0
d. Buy back centers	74,977	100	15,000	20	20	22,500	5
Commercial							
a. Scheduled collection	11,000	100	4,015	37	37	NA	NA
b. On call collection	11,000	100	700	6	6	NA	NA

(a) In the application narrative, include a summary of calculations/methodology used to determine average figures

(b) Official April 1, 1999 Governor's Office population estimate.

(c) The Residents per Unit figures for Residential Single Family and Residential Multi Family can be acquired from the county planning department as reported in the County's comprehensive plan.

(d) Percent of Total Units in County with Service Available = column 2 (County Units with Service Available) divided by Total Units in County times 100.

(e) Percent of County Units Participating in Available Service = column 4 (County Units Participating in Available Service) divided by column 2 (County Units with Available Service) times 100.

(f) Percent of Total Units in County Participating = column 4 (County Units Participating in Available Service) divided by Total Units in County times 100.

(g) Population Participating in Available Service = column 4 (County Units Participating in Available Service) times Residents per Unit.

(h) Percent of County Population Participating in Available Service = column 7 (Population Participating in Available Service) divided by the 1999 official population times 100.

TABLE 6
MUNICIPAL SOLID WASTE MANAGEMENT FACILITIES
 (As of June 2000)

Note: Refer to Grant Application Item 5(I)

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COUNTY: Lee

Facility (List Landfills by Class, then Waste-to-Energy Facilities)	Facility Type (a)	Remaining Permitted Capacity			Planned Increase			Ownership Type (Place "X" in Column)	
		Landfill (cubic yards)	Waste-to-Energy (tons per day)	Years Capacity Remaining	Landfill (cubic yards)	Waste-to-Energy (tons per day)	Year On-line	Public	Private
1. Gulf Coast Landfill	III	592,322		3					X
2. Lee/Hendry Landfill	I	13,500,000		50				X	
3. Lee/Hendry Resource Recovery	WTE		1,200	30		600	2005	X	
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									
19.									
20.									
21.									
22.									
Totals	3	14,092,322	1,200	83	0	600		2	1

SOLID WASTE DISPOSAL FEES (dollars per ton) (b)

Class I	WTE Facility	Yard Trash	White Goods	C&D	Passenger Tires	Asbestos	Out of County	Petroleum Contaminated Soils
\$35.00	\$50.00	\$12.25	\$35.00	\$35.00	\$17.50	\$35.00	\$50.00	\$50.00

(a) Designate facility as Class I, II, or III (landfill); C&D; or WTE.

(b) If any numbers are expressed in units other than dollars per ton, indicate those units beneath the number. If using a range, specify an average value.

**TABLE 7
EXISTING & PROPOSED RECYCLING FACILITIES, SERVICE CENTERS, AND OTHER RELATED SERVICE CENTERS**
(October 1, 2000-September 30, 2001)
Note: Refer to Grant Application Form 51c)

COUNTY		Lee		1999 POPULATION(a)		417,114								
Facility/Address/City/Zip (P* Indicates Proposed Facility)		Phone# (Area Code)	Type(1) (Abbreviations below)	Ownership		Capacity Tons/Day	Processed Tons/Day	Service Area(s)			Material Source(s)			Material Handled(4) (Abbreviations listed below)
				Public	Private			PO	ED	MC	R	B	C	
1. Nonhoney Recycling Center 234 East Dr., Anywhere 33033		850-935-1234	MRF	X		100	73	X					X	ON OP MP G A P S
2. LEE COUNTY RECYCLING : 7941 MERCANTILE DR., N FT MYERS 33917		(941) 731-3700	RMPF	X		300.00	130.00		X			X		ON OC M G A P O P L S O T D
3. GULF COAST HORTICULTURAL 11900 SR 82 EAST, FT MYERS 33913		(941) 332-4211	RMPF		X		170.00		X			X		Y
4. FORESTRY RESOURCES, INC 4353 MICHIGAN LINK FT MYERS 33916		(941) 334-7343	RMPF		X		100.00	X				X		Y C
5. GARDEN ST IRON & METAL 3350 METRO PARKWAY FT MYERS 33916		(941) 337-5865	BB		X		200.00			X		X		A S W SM
6. GARDEN ST PAPER PRODUCTS 2998 SOUTH ST FT MYERS 33916		(941) 332-1250	BB		X		100.00			X		X		OC OP MP
7. AMERICAN ALUMINUM RECYCLING 2203 US 41 FT MYERS 33901		(941) 332-4699	BB		X		50.00	X				X		A
8. ALLIED RECYCLING 3460 MLKING JR BLVD FT MYERS 33916		(941) 332-7766	BB		X		100.00			X		X		A S W SM
9. ALLIED RECYCLING 3770 PALMETTO AV FT MYERS 33916		(941) 332-4991	BB		X		50.00			X		X		ON OC OP MP
10. SP RECYCLING 6180 FEDERAL CT FT MYERS 33905		(941) 694-7333	BB		X		50.00			X		X		ON M MP
11. ALL SCRAP SALVAGE 2294-8 BRUNER LN FT MYERS 33912		(941) 462-5722	BB		X		10.00	X				X		W SM
12. KENETECH RESOURCE RECOVERY 2451 ARCADIA ST FT MYERS 33916		(941) 337-1973	RMPF		X		100.00		X		X			Y
13. GULF COAST GRINDING 4050 MAYFLOWER FT MYERS 33912		(941) 334-4426	RMPF		X		50.00	X				X		Y
14. BROMLEY PALLET 6115 IDLEWILD ST B17FT MYERS 33912		(941) 277-9026	O		X		10.00			X		X		O-PALLETS
15. A & D SCRAP MATERIAL, INC 3066 CRANFORD FT MYERS 33905		(941) 332-3965	BB		X		50.00			X		X		ON OC OP MP
16.														
17.														
18.														
19.														
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37.														
38.														
39.														
Totals		14	NA	13		300.00	1170.00	4	2	2	13	0	0	NA

(a) M - Monday, T - Tuesday, W - Wednesday, R - Thursday, F - Friday, S - Saturday, U - Sunday, List hours as 8-5

(b) MRF - Materials Recovery Facility (dirty MRF), RMPF - Recovered Materials Processing Facility (clean MRF), DO - Drop off center, BB - Buy back center, O - Other

(c) PC - Partial County, EC - Entire County, MC - Multiple County

(d) Majority of the materials coming from these sources: R - Residential, C - Commercial, B - Both Residential & Commercial

(e) ON-Old Newspaper, OC-Old Corrugated Containers, M-Magazines, OP-Office Paper, MP-Mixed Paper, G-Glass Bottles, A-Aluminum Cans, P-Plastic Bottles, OP-Other Plastics, S-Steel Cans, W-White Goods, SM-Scrap Metal, T-Tires, Y-Yard Trash, C-C&D, O-others.

Table 8
LOCAL GOVERNMENT PROGRAM COST SUMMARY (a)
 (October 1, 1999 - September 30, 2000)
 Note: Refer to Grant Application Item 5(e)

COUNTY:		Lee	POPULATION (b):	417,114
Cost Categories	Dollars Spent and Encumbered (c)			
	R&E Funds	Local Funds (d)	Total	
Equipment & Building(e)				
Public Sector(f)	19,776	12,400	32,176	
sub-total	19,776	12,400	32,176	
Operating Services(g)				
Public Sector(f)		362,347	362,347	
Private Sector Contracts(h)	179,519	1,675,322	1,854,841	
sub-total	179,519	2,037,669	2,217,188	
Planning/Engineering Studies(i)				
Public Sector(f)			0	
Private Sector Contracts(h)			0	
sub-total	0	0	0	
Public Education(j)				
Public Sector(f)	9,280	113,356	122,636	
Private Sector Contracts(h)	17,576	14,145	31,721	
sub-total	26,856	127,501	154,357	
Total Public Costs	29,056	488,103	517,159	
Total Private Contract Costs	197,095	1,689,467	1,886,562	
Grand Total Used	226,151	2,177,570	2,403,721	
Costs Per Capita	0.54	5.22	5.76	
Grant Award	226,151			
Remaining R&E Funds Not Used(k)	0			

(a) Information requested in this table should include cost data for both the county government and the participating municipalities found within its borders.

(b) Official April 1, 1999 Governor's Office population estimate.

(c) Include all dollars spent or committed via a purchase order by the local government on recycling programs during the county fiscal year.

(d) Any local revenues (non-R&E grants) such as tip fees, advalorem taxes, special assessments, recycling fee via waste disposal bill, material sales revenue etc., spent on the recycling program.

(e) Funds spent and encumbered for the acquisition of recycling equipment and recycling facilities.

(f) Publicly funded and operated entities such as a county or city gov't, regional planning councils, public universities, school boards, etc. May include contracts or purchase orders with public entities.

(g) Funds spent and encumbered for the acquisition of services relating to the collection, processing, marketing and sales of recycled material.

(h) Privately owned and operated entities, including non-profit organizations, contracted or retained through a purchase order to provide services or products to the local gov't for its recycling program.

(i) Funds spent and encumbered for the acquisition of planning and/or engineering products or services relating to the recycling program.

(j) Funds spent and encumbered for the acquisition of educational products or services for schools or the general public relating to the recycling program.

(k) All remaining R&E grant funds not spent or encumbered during the county fiscal year.

(l) Funds spent and encumbered for the acquisition of educational products or services for schools or the general public relating to the recycling program.

(m) All remaining R&E grant funds not spent or encumbered during the county fiscal year.

(n) Funds spent and encumbered for the acquisition of services relating to the collection, processing, marketing and sales of recycled material.

(o) Privately owned and operated entities, including non-profit organizations, contracted or retained through a purchase order to provide services or products to the local gov't for its recycling program.

(p) Funds spent and encumbered for the acquisition of planning and/or engineering products or services relating to the recycling program.

(q) Funds spent and encumbered for the acquisition of educational products or services for schools or the general public relating to the recycling program.

TAB.

**TIMETABLE FOR THE CONTINUED DEVELOPMENT & IMPLEMENTATION
OF RECYCLING/WASTE REDUCTION PROGRAMS**

(October 1, 2000 - September 30, 2002)

Note: Refer to Grant Application Item 5(j)

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COUNTY: Lee

Sector Program Elements	Events(a)																							
	FFY 00-01												FFY 01-02											
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
Single Family																								
1. Curbside Collection	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
2. MRF Relocation and Expansion	B	B	B	B	B	B	B	B	B	C	C	C	O	O	O	O	O	O	O	O	O	O	O	O
3.																								
4.																								
5.																								
6.																								
Multi-Family																								
1. Curbside Collection	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
2.																								
3.																								
4.																								
5.																								
6.																								
Commercial																								
1. Curbside Collection	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
2.																								
3.																								
4.																								
5.																								
6.																								
Institutional																								
1. Lee County School District	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
2.																								
3.																								
4.																								
5.																								
6.																								

(a) Use this list of events. Additional event may be used and should be listed below. P - Planned, R - Recurred, C - Construction, M - Maintenance

(a) Use this list of events. Additional event may be used and should be listed below. P - Planned, R - Procured, O - Operating, H - Hiring Key Staff, C - Contracting for Services, M - Executing Marketing Agreements

Additional Events:

Table 10
CURBSIDE RECYCLING PROGRAMS IN FLORIDA
(As of June 2000)

[illegible]

(a) Other materials not listed or specific notations should be footnoted below.

(b) The cost of the curbside program to each household being served. Must include offset of processing fees and revenues.

Other Materials & Notations

Table 11
CITY/INSTITUTIONAL RECYCLING PROGRAMS
(As of June 2000)

COUNTY:

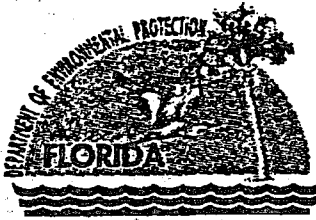
Lee

Program Name	Coordinator/Contact	Address	Zip Code	Telephone	99-00 R&E \$\$ Allocated(b)	Mandatory Recycling(c)
Cape Coral	Holly Ussery	P.O. Box 150027	33915	(941) 574-0844	\$67,255.00	
Ft. Myers	Kris Gookin	P.O. Drawer 2217	33902	(941) 332-6836	\$19,543.00	
Sanibel	Gates Castle	800 Dunlop Rd	33957	(941) 472-6397	\$2,512.00	
School District	Carolyn Morrow	3500 Central Ave	33901	(941) 337-8208	\$0.00	
Totals	4				\$89,310.00	

(a) Information listed should include significant institutional programs such as universities, public schools, hospital and prisons as well as city recycling programs. Do not list the county program.

(b) R&E Grant dollars provided by the state and passed on to each city to provide recycling services. \$0.00 indicates that no funds were provided to the city.

(c) For City programs, indicate if recycling is mandated by local ordinance or policy for the residential sector with an R, or for the commercial sector with a C (RC for both). Otherwise, LEAVE BLANK.



Jeb Bush
Governor

Department of Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

Certification Statement

I certify to the best of my knowledge that all the information LEE
County has provided in Part II of the Recycling and Education Grant Application;
including the recycling, landfill, and combustion numbers are complete and accurate.

Colleen Davis
Signature of County Recycling Coordinator

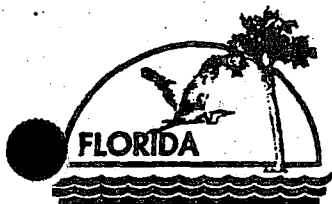
9/28/00
Date

Randy J. Simpson
Signature of County Solid Waste Director

9/28/00
Date

"Protect, Conserve and Manage Florida's Environment and Natural Resources"

Printed on recycled paper.



Jeb Bush
Governor

Department of Environmental Protection

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

DEP Form 62-716.900(1)
Form Title Solid Waste
Recycling and Education
Grant Application
Effective Date 11-16-1994

Solid Waste Recycling and Education Grant Application Part Two

1. Name of Applicant: Lee County Environmental Services
2. Contact Person (person handling program on daily basis): Rick Clontz, Recycling Coordinator
3. Address of Contact Person:
1500 Monroe Street, 3rd Floor
Ft. Myers, FL 33901
4. Telephone Number of Contact Person: (941) 479-8181

5. Required Attachments:

Are the following items attached? If not, please explain. Due October 1 of each year.

- (a) X A description of the recycling and education projects or planning studies, including any business and accounting plans. Rule 62-716.410 (1a)
- (b) X An estimate of the quantity and type of materials to be collected and recycled, including an explanation of the methods used to estimate this quantity. Rule 62-716.410(1b)
- (c) X A description of all existing or proposed recycling facilities, collection centers, or other related service centers located within the county, including ownership, capacity, type of facility, and approximate service area of such facilities. Rule 62-716.410(1c)
- (d) X A demonstration that the materials to be collected or processed, or both, are not presently being recovered to the extent necessary to meet the goal established in Section 403.706(4), F.S. and would not be so recovered, but for the proposed recycling project and a description of the method used to make this determination. This demonstration shall include an explanation of how existing private and public sector recycling programs and efforts will be incorporated into the recycling and education program. Rule 62-716.410(1d)
- (e) X A summary of all costs incurred, or to be incurred, in planning or implementing the recycling and education projects. Rule 62-716.410(1e)
- (f) X Any contracts or agreements entered into or summaries of contemplated agreements or contracts to develop and implement the recycling program. Rule 62-716.410(1g)
- (g) X The measurable objectives of the education program and an explanation of how the education program will directly promote the use of an existing or planned local recycling project. Rule 62-716.410(1h)
- (h) X A description of the methods to be used in evaluating the success of the education and recycling programs. Rule 62-716.410(1i)
- (i) X An explanation of the manner in which the recycling program will be implemented. Rule 62-716.410 (2a)
- (j) X A timetable for the continued development and implementation of the recycling program. Rule 62-716.410(2b)
- (k) X The estimated percentage of the population participating in various types of recycling activities. Rule 62-716.410(2c)
- (l) X The percent reduction each year in municipal solid waste disposed of at solid waste disposal facilities as a result of public and private recycling programs, including the success rates, perceived reasons for failure or success, and the public and private sector recycling activities which are ongoing and most successful. Rule 62-716.410(2d)
- (m) X A description of the type and the weight of solid waste generated within the applicant's service areas and the general type and the weight of solid waste that is expected to be generated within the service areas in the 20-year period following the date of the grant application. Rule 62-716.410(2e)

- (n) X An identification and description of the facilities where solid waste is being disposed of or processed, the remaining available permitted capacity of such facilities, any planned increases in the capacity of such facilities, and the anticipated effect of recycling programs on the type and size of such facilities. Rule 62-716.410(2f)
- (o) An explanation of how existing or anticipated solid waste reduction or recycling will affect the type and size of any planned or existing solid waste management facilities in the affected service areas. Rule 62-716.410(2g)
- (p) X A description and evaluation of solid waste that is being or could be recycled, including, but not limited to:
- (1) The type and weight of solid waste or materials which would otherwise become solid waste that is being or could be recycled by the public and private sector, giving consideration at a minimum to the following materials: glass, aluminum, steel and bimetallic materials, office paper, yard trash, newsprint, corrugated paper, and plastics;
 - (2) The anticipated and available markets or uses for materials collected through recycling programs; and
 - (3) The estimated costs of and revenue from operating and maintaining existing and proposed recycling programs. This does not include specific costs and revenues from privately operated recycling programs, but a summary of such costs and revenues is required if the applicant intends to provide funding for such programs. Rule 62-716.410(2h)
- (q) X A description of any recycling activities implemented or existing prior to July 1, 1989. Rule 62-716.410(2i)
- (r) X Local governments whose comprehensive plans have been submitted at the time of application shall provide an explanation of how the recycling program relates to the future land use elements, sanitary sewer, solid waste, drainage, potable water, and natural groundwater aquifer recharge elements; intergovernmental coordination elements; and capital improvements elements of the local government comprehensive plans prepared pursuant to part II of chapter 163, F.S. by the county or municipality. Rule 62-716.410(2j)
- (s) X A description of how all special wastes will be managed. Rule 62-716.410(2k)

6. Does each solid waste facility owned or operated by the county or municipality have weight scales? Rule 62-716.420(2a)
Yes ✓ No

7. Has the operator of each landfill owned or operated by this county or municipality completed an operator training course approved by the Department? Rule 62-716.420(3)
Yes ✓ No

I CERTIFY that I am familiar with the information contained in this application, and that to the best of my knowledge and belief such information is true, complete and accurate. I further certify that I possess the authority to apply for this grant on behalf of this local government.

John E. Allison
Signature of Authorized Representative

9/19/00

Date

Please return form to:
Department of Environmental Protection
Bureau of Solid and Hazardous Waste
Solid Waste Section
2600 Blair Stone Road
MS 4565
Tallahassee, Florida 32399-2400

APPROVED AS TO FORM

By

OFFICE OF COUNTY ATTORNEY

5a. A description of the recycling, waste reduction, and education projects or planning studies, including any business and accounting plans.

1. SUMMARY OF RECYCLING PROGRAM

A. Unincorporated Lee County

All single-family homes receive weekly curbside recycling service. The County provides blue 18-gallon recycling bins for commingled collection of glass bottles, #1-7 plastic containers, steel cans, aluminum cans and foil, corrugated cardboard, Kraft paper bags, telephone books, magazines, and newspapers. Franchise haulers transport the commingled materials and the fibers to the Lee County Materials Recycling Facility (MRF) for sorting and processing for market.

All multi-family units were added to the recycling program in 1995. This includes mobile home parks, apartment buildings, condominiums, and residences with more than four units. These complexes are provided with either curbside collection or central drop-offs using 96-gallon carts and in-unit bins or reusable bags. Multi-family units recycle all the same materials that the residential sector collects; these recyclables are also taken to the Lee County MRF.

The MRF is County-owned and privately operated. In 1996, recycling revenue was used to add a complete fiber sorting line to the MRF, increasing processing capacity and types of materials accepted on the curbside program.

Businesses contract independently for recycling collection. Commercial recycling increased this year in spite of low market prices for recyclables. Although businesses seem primarily interested in the cost savings provided by recycling, many employees are devoted to environmental issues and are willing to create opportunities to recycle.

The School District and all the large hospitals in Lee County have recycling programs. County government recycles office paper; aluminum, glass, and plastic at some parks; and scrap metal from sign shops and fleet shops.

In 1999, the equivalent of 1.7 full-time employees provided support to the County recycling program. The percentage of time allocated to recycling is as follows:

<u>Position</u>	<u>Time Allocated to Recycling</u>
Recycling Coordinator	90%
Public Promotions Specialist	30%
Sr. Fiscal Officer	16%
Solid Waste Director	3%
Engineer III	10%
Engineer I	10%
Right of Way Crew	8%

The job descriptions for these positions are provided in Appendix C.

B. Cape Coral

Cape Coral has weekly curbside recycling for single-family residents, and is phasing in a cart collection program for multi-family units. These materials are processed at the Lee County MRF and the city receives revenue for those tons.

C. Fort Myers

Fort Myers has weekly curbside recycling for single-family residents and many multi-family residents. These materials are processed at the Lee County MRF and the City receives revenue for those tons. The City provides cardboard and office paper recycling for businesses.

D. Sanibel

Sanibel has weekly curbside recycling for single-family residents and many multi-family residents. These materials are processed at the Lee County MRF and the City receives revenue for those tons. Sanibel has voluntary multi-family and business recycling.

E. Fort Myers Beach

The Town of Fort Myers Beach was chartered in 1996. It is still under the unincorporated Lee County franchise hauling contracts for solid waste and recycling collection.

2. BUSINESS PLAN

A. Mission Statement

To continue to develop and refine a comprehensive countywide recycling program that encourages the conservation of our natural resources. Create public awareness of the need for source reduction, reuse and recycling, and the direct benefits associated with these activities. Promote the idea that if each individual takes responsibility for doing his/her small part, then, collectively, we accomplish big goals. Promote the education of our children about solid waste issues through guided tours of our solid waste facilities, and in school curriculum of the 4 R's: Reduce, Recover, Reuse and Recycle. Promote commercial recycling by providing technical assistance in setting up recycling programs for businesses.

B. Funding and Revenues

The Lee County recycling program is funded by surcharges and recycling revenues. The following table shows that as the funding needs of the recycling program change, the tipping fee surcharge amount is proportionately changed to meet these demands:

Fiscal Year	Recycling Surcharge/ton
89/90	\$ 3.85
90/91	6.00
91/92	7.28
92/93	8.88
93/94	9.11
94/95	10.12
95/96	1.61
96/97	0.14
97/98	1.53
98/99	0.69
99/00	2.10
00/01	0.67

In the past, curbside recycling collection costs were not included in residential garbage bills, so the recycling surcharge was used to offset these costs. Recycling collection costs were included in the residential garbage bills starting in fiscal year 1995-96 when the franchise hauling contracts were competitively bid. This significantly reduced the recycling budget and the resulting surcharge.

FCR, Inc. operates the Lee County MRF and through August 1999 paid \$24.00 per ton for every ton received; after this a sliding scale was used, based on market prices. Approximately \$ 600,000 in revenue is projected for fiscal year 2000-01, and is included in the recycling budget (Table 12).

C. Plans and Projects for 2000-2001

The residential and multi-family program will focus on education, reinforcing the recycling message and reminding residents what materials are accepted. Public information efforts this year focused on reducing residue coming into the MRF and increasing participation. The business recycling program will focus on the basics of recycling. This group needs information on how recycling works and encouragement to participate. The business goal is to contact all businesses at least once with recycling information and provide interested businesses with technical information and assistance in setting up a recycling program.

Lee County will begin construction on a new MRF. This will be located on the Waste-To-Energy (WTE) property in order to share scale facilities and will be powered by the WTE plant. The facility will be 60,000 square feet with a processing capacity of 400 TPD. This will allow for greater storage space for incoming and processed materials, and provide processing efficiencies. Completion is expected in November 2001.

5b. An estimate of the quantity and type of materials to be collected and recycled or waste reduced, including an explanation of the methods used to estimate this quantity.

Current and future solid waste and recycling quantities are presented in Tables 3 and 4. These estimates are based on population and waste generation projections from Malcolm Pirnie's report Lee County Solid Waste Management Plan Update (Appendix D) which

Table 12
LEE COUNTY SOLID WASTE DIVISION
RECYCLING BUDGET 00-01

CODE DESCRIPTION	BUDGET
1210 Salaries, etc	\$169,134.00
2410 Internal /IGS Costs	\$71,744.00
3465 Software Technical suppt	\$600.00
3490 Other Contracted Services	\$1,551,613.00
4022 In State Travel	\$1,800.00
4023 Out of State Travel	\$1,800.00
4210 Postage	\$20,000.00
4510 Electric	\$12,000.00
4330 Water & Sewer	\$2,500.00
4340 Trash, Garbage	\$85,000.00
4410 Land, Bldg rental	\$20,000.00
4620 Vehicle Maint.	\$1,000.00
4690 Other Repair & Maint.	\$63,000.00
4715 County Print Shop	\$350.00
4810 Promotional advertising	\$112,700.00
4811 Promotions/brochures	\$23,525.00
4984 Rebates to Cities	\$204,000.00
5290 Other supplies	\$35,000.00
5410 Reference Materials	\$300.00
5420 Memberships	\$400.00
8210 Keep Lee Co Beautiful subsidy	\$15,000.00
<i>total</i>	<i>\$2,391,466.00</i>

Curbside Recycling	
Tons Collected 0/01 Goal	36,000
Projected Revenue	\$600,000.00

projects a 3.4% growth in solid waste each year to 2005, and 2.8% growth to 2010. A 3% growth was used for each year for 2010 through 2019. In 1999 the actual quantity of solid waste collected increased by 9% over the previous year. The quantity recycled increased 6% over the previous year.

Malcolm Pirnie projects Lee County's population to grow by 3.4% per year through 2005, and 2.8% through 2010. A 3% growth rate for years 2010 through 2019 was used for Tables 3 and 4. Actual population growth has remained between 2 and 3% for several years including 1999.

5c. A description of all existing or proposed recycling facilities, collection centers, or other related service centers located within the county, including ownership, capacity, type of facility, and approximate service area of such facilities.

Local recycling facilities, materials collected and processing capacity are listed in Table 7. Processing capacity is sufficient to meet current needs, however, more recycling collection options for businesses are needed.

5d. A demonstration that the materials to be collected or processed, or both, are not presently being recovered to the extent necessary to meet the goal established in Section 403.706(4), F.S. and would not be so recovered, but for the proposed recycling or waste reduction project and a description of the method used to make this determination. This demonstration shall include an explanation of how existing private and public sector recycling programs and efforts will be incorporated into the recycling or waste reduction education program.

Lee County believes that public/private partnerships are an integral part of the recycling program's success. The Lee County MRF is owned by the County but operated by a private firm. Curbside recycling collection for single and multi-family residents is contracted by the County to private firms, as are the yard waste recycling and office paper recycling programs.

A public MRF is used because local private recyclers only accept a few source-separated materials. With our own MRF we can accept a wider range of materials, focusing on the Minimum Five Materials, and can easily expand or change the program as needed. Commingled collection is easier for residents, reduces collection costs, and gives us control of material quality and marketability.

5e. A summary of all costs incurred, or to be incurred, in planning or implementing the recycling, waste reduction, and education projects.

Table 8 presents a summary of the recycling program costs incurred for unincorporated Lee County and the Cities in fiscal year 1999-00. Over \$2,400,000 was spent in Lee County on recycling programs. The State Recycling Grant money represents 9% of the total spent. Because these programs are mature, most of the money was spent on collection.

5f. Any contracts or agreements entered into or summaries of contemplated agreements or contracts to develop and implement the recycling or waste reduction program.

The current contracts for recycling services are presented in Appendix A. Lee County has a contract with FCR, Inc. to operate Lee County's MRF. Lee County owns the equipment; FCR accepts, processes and markets the recyclables collected on the residential and multi-family curbside programs from all of Lee County. FCR pays Lee County a per ton rate, based on an average market price.

A similar contract is in place with Better Than Wood Industries, Inc. for operation of the plastic lumber molding plant. Lee County owns the equipment; BTW purchases plastic from the Lee County curbside recycling program, produces plastic lumber products and markets them. Lee County purchases recycled plastic products at a reduced cost.

Lee County contracted with Waste Management, Inc. for the horticultural waste program in 1999. Yard waste from unincorporated Lee County residents and many commercial accounts was directed to this facility. Waste Management accepted, processed and marketed the resulting mulch and was required to provide mulch free to Lee County government and to residents.

Copies of the interlocal agreements between Lee County and the Cities of Cape Coral, Fort Myers, Sanibel and the Town of Fort Myers Beach are also presented in Appendix A. The Cities of Cape Coral, Fort Myers, and Sanibel direct their residential and multi-family recyclables to the Lee County MRF and receive the per ton rate. The Town of Fort Myers Beach is still included in the Lee County garbage and recycling franchise hauling contracts.

5g. The measurable objectives of the education program, and an explanation of how the education program will directly promote the use of an existing or planned local recycling or waste reduction project.

An integral part of the Lee County recycling plan is the public education effort using recycling, composting and source-reduction programs to foster a greater appreciation for environmental protection and natural resource conservation.

The education program goals for residential recycling are to reach all residents in unincorporated Lee County at least once with recycling information, to increase participation by 10% (from 69 to 75%), and to therefore increase materials coming in to the MRF by 10%. The goal for multi-family recycling is to provide information to at least ten percent of units and thereby decrease contamination in recycling totes and increase participation as measured by quantity of materials recycled. The business goal is to contact all businesses at least once with recycling information and provide at least 100 interested businesses with technical information and assistance in setting up a recycling program.

The School District uses the Florida Department of Education "4 R's" curriculum and provides opportunities for gaining practical experience in recycling through school-based recycling projects and tours of solid waste facilities. All fifth graders tour the MRF each year and all eighth graders tour the MRF, WTE plant and landfill. Because of School District budget cuts, this program was drastically cut in 99/00.

The primary purpose of the recycling education program is to increase participation through awareness of recycling programs and what materials are included. The recycling education program includes recycling and source reduction information through the use of the radio, TV and newspaper ads; print materials; exhibits; and group presentations. Brochures are mailed to all unincorporated residents (over 100,000 homes) at least once per year describing all solid waste management programs and recycling guidelines.

5h. A description of the methods to be used in evaluating the success of the education, recycling, and waste reduction programs.

The education program's success is measured by how many people and businesses participate in recycling. The education program increased the tonnage of residential materials going to the MRF to over 32,000 tons this fiscal year, an 8% increase over last year, and decreased the residue at the MRF. Residential participation increased from 69% last year to 75% this year. Commercial recycling participation increased from 35% to 43%.

The recycling program's success is measured by the amount of materials recycled, reduction in disposal tonnage and compliance with State and County recycling goals. The recycling program successfully met the State's 30% recycling goal and the County's 40% recycling and waste reduction goal. Total recyclables collected increased 6% over last year, from 255,229 tons to 271,247 tons for a 36% recycling rate.

5i. An explanation of the manner in which the recycling or waste reduction program will be implemented.

The residential curbside recycling plan for Lee County started in 1989 with 800 homes on a pilot program. Recyclables--clear glass, milk jugs, 2-liter pop bottles, and aluminum cans collected in blue bags and newspapers collected in paper bags--were hand-sorted by Goodwill Industries employees at the Lee County MRF. More materials and more neighborhoods were added gradually. By 1992, all single-family residents were on the program, and the County switched to blue recycling bins as the semi-automated MRF was completed. FCR, Inc. took over the MRF operating contract in 1994. In 1996, a five-sort paper line was added to the MRF and #3-7 plastics, corrugated cardboard and magazines were added to the collection program. Markets for mixed cullet have strengthened and it is no longer considered residue, but instead is shipped to a processor for a small fee.

Multi-family recycling was an additional service and charge when recycling began, yet many complexes found that it was worth the effort. Recycling collection for unincorporated multi-family units became standard service in 1995.

Commercial recycling is a voluntary program; businesses are contacted about setting up recycling programs through presentations, exhibits at business fairs and advertising in business journals. On-site assistance is also provided for businesses interested in a review of their waste management practices, setting up recycling, or improving their existing recycling system.

Currently these programs in unincorporated Lee County are provided by the equivalent of 1.7 full time employees.

5j. A timetable for the continued development and implementation of the recycling or waste reduction program.

The projected timetable for the implementation of the Lee County recycling program is shown in Table 9. The residential and multi-family programs are operating and are maintained through education and information. Commercial recycling is being taught and demonstrated to encourage new programs to come on line and to improve capture rates of established programs.

Lee County will begin construction on a new MRF. This will be located on the Waste-To-Energy (WTE) property in order to share scale facilities and will be powered by the WTE plant. The facility will be 60,000 square feet with a processing capacity of 400 TPD. This will allow for greater storage space for incoming and processed materials, and provide processing efficiencies. Completion is expected in November 2001.

5k. The estimated percentage of the population participating in various types of recycling or waste reduction activities.

Lee County has a voluntary recycling program. In 1999, average participation for single-family residents on the curbside program was 75% (Table 5). This was calculated by taking a yearly participation average by franchise area and city and calculating a weighted yearly average (based on population) for the entire county. Because Lee County has a high seasonal population the monthly average increases in the winter when most homes are occupied. Multi-family participation is measured by the number of complexes participating in the program, since a reliable estimate of residents using the central collection system is not available. Eighty-five percent of multi-family dwellings have on-site recycling programs. About 43% of businesses participate in recycling; 37% of businesses have regular or full time recycling programs and the remainder have on-call recycling, take materials to drop-off centers, or recycle on a semi-annual basis, such as when they delete records or materials.

5l. The percent reduction each year in municipal solid waste disposed of at solid waste disposal facilities as a result of public and private recycling or waste reduction programs, including the success rates, perceived reasons for failure or success, and the public and private sector recycling activities which are ongoing and most successful.

In 1999, as a result of public and private recycling programs, Lee County recycled 36% of its waste (Table 1). While total solid waste generated increased 9% over the previous year, recycling increased 6% over last year.

Since all trash goes to the WTE plant, it is assumed that 100% of steel cans are recovered. The DEP certified ferrous metals number was divided between the white goods and ferrous categories based on the recent waste composition study that showed white goods to be 1.6% of the waste stream or 11,984 tons. This was subtracted from the certified ferrous number to arrive at the 31,747 tons of ferrous metals in 3b. A non-ferrous removal-system was added to the WTE in late 1999. The quantity of combustor material recycled (Table 1, line 5cii) also includes non-ferrous material.

MSW per capita is 1.14 tons for this year (Table 2). The waste reduction progress ranges from -28% to 4% depending on the base year used.

One of the reasons for the success of the recycling program is our publicly owned MRF. We are committed to recycling only materials with long-term marketability, and to producing high quality loads. This protects us in low market times because we do not have to delete materials from the program as markets disappear, and the high quality gives us priority when demand for recyclables is low. The operating contract was let in 1994 through managed competition between the public and private sector. This provided us with good income for our material, which was used to expand the facility. Now that market prices are depressed, we are not under pressure to delete materials from the program. We may adjust the financial arrangement with the operator but the materials accepted are still under our control and we are able to maintain the program's stability and public trust.

5m. A description of the type and weight of solid waste generated within the applicant's service areas and the general type and the weight of solid waste that is expected to be generated within the service areas in the 20-year period following the date of the grant application.

Waste generation rates are displayed in Tables 3 and 4. These estimates are based on population and waste generation projections from Malcolm Pirnie's report Lee County Solid Waste Management Plan Update (Appendix D) which projects a 3.4% growth in population and solid waste each year to 2005, and 2.8% growth to 2010. A 3% growth was used for each year for 2010 through 2019.

Malcolm Pirnie completed a waste composition study in 1997 which is the basis for the distribution of recyclables in the waste stream shown in Tables 4 and 1, column 3. Distribution was adjusted to reflect actual quantities reported.

5n. An identification and description of the facilities where solid waste is being disposed of or processed, the remaining available permitted capacity of such facilities, any planned increases in the capacity of such facilities, and the anticipated effect of recycling or waste reduction programs on the type and size of such facilities.

At present, there is only one active landfill in Lee County, the Gulf Coast Landfill, owned and operated by Waste Management, Inc. (Table 6). This facility primarily accepts C&D debris and ash from the Waste-To-Energy plant and has an estimated remaining life of about three years. The Lee/Hendry County landfill, located in Hendry County, is completed but not open and does not receive waste. Lee County will apply for an operating permit before the Gulf Coast Landfill is closed and the Lee/Hendry landfill is needed for disposal capacity.

Lee County owns a 1200 TPD Resource Recovery Facility. It is a joint facility with Hendry County, and is operated by Ogden Martin Systems, Inc. Attainment of the state-mandated 30% recycling goal and the County's 40% recycling and waste reduction goal was taken into consideration in the sizing of this facility.

The tipping fees are:

	<u>98/99</u>	<u>99/00</u>	<u>00/01</u>
Disposal Surcharges:	\$52.63	\$50.00	\$50.00
Solid Waste Operations	\$ 2.86	\$ 3.42	\$ 2.37
Right-of-Way Cleanup	\$ 0.69	\$ 0.37	\$ 0.61
Recycling	\$ 1.93	\$ 2.10	\$ 0.67
Hazardous Waste	\$ 0.14	\$ 1.42	\$ 0.00
Solid Waste Management	<u>\$ 6.00</u>	<u>\$ 6.00</u>	<u>\$ 6.00</u>
	\$64.25	\$63.31	\$59.65

5o. An explanation of how existing or anticipated solid waste reduction or recycling will affect the type and size of any planned or existing solid waste management facilities in the affected service areas.

Recycling programs have been taken into consideration in planning disposal facilities. The impacts are reviewed in Malcolm Pirnie's report Lee County Solid Waste Management Plan Update (Appendix D).

During the planning for the WTE plant for Lee County, many concerns were raised about its impact on recycling. An 1800 TPD capacity facility was planned, but in the end a 1200 TPD plant was built, reducing the total cost approximately 25 million dollars and avoiding a planned increase in residential garbage bills. Recycling was in place and program expansions were planned; in fact, the County had set its own 40% recycling and waste reduction goal. A put-or-pay clause was also removed from the WTE contract when it was downsized, thus relieving pressure on waste flow to be directed to the WTE plant. The existing landfill primarily receives ash and C&D debris and is expected to last another three years, so the Lee/Hendry landfill will not be put into service as soon, all of which keep solid waste management costs down.

Most importantly, the recycling program is expanding each year. The MRF processes over 120 TPD of residential recyclables and the WTE averages 1000 TPD of waste, so if Lee County were not recycling, the WTE plant would already be at capacity and require an expansion. Because residents are so committed to recycling, a WTE expansion is not planned until 2005, again saving residents money. It was estimated that it costs \$140/ton to collect and dispose of one ton of trash. Obviously diverting recyclables is not only resourceful and environmental, but also economical. Recycling is a key piece of the integrated waste management system.

5p. A description and evaluation of solid waste that is being or could be recycled, including, but not limited to:

- (1) The type and weight of solid waste or materials which would otherwise become solid waste that is being or could be recycled by the public and private sector, giving consideration at a minimum to the following materials: glass, aluminum, steel and bimetallic materials, office paper, yard trash, newsprint, corrugated paper, and plastics;**
- (2) The anticipated and available markets or uses for materials collected through recycling programs; and,**
- (3) The estimated costs of and revenue from operating and maintaining existing and proposed recycling programs. This does not include specific costs and revenues**

from privately operated recycling programs, but a summary of such costs and revenues is required if the applicant intends to provide funding for such programs.

Quantities of materials recycled are listed in Table 1. Over 270,000 tons of recyclables were collected in Lee County in the past year.

The Lee County MRF has a long term marketing agreement with SP Recycling for newspaper processed from the curbside program. No problems with market capacity for other materials are expected. Commercial recycling has been difficult recently due to low market prices and lack of available recyclers. Currently, only one office paper recycler collects in the area, limiting options for businesses wishing to recycle.

Revenue from the Lee County MRF operation goes toward offsetting costs at the MRF. In 1999, the Solid Waste Division received revenues from a \$2.10/ton recycling surcharge for every ton disposed. Table 8 includes the local government recycling program costs. Table 12 shows the Lee County recycling budget for 2000-01 with projected revenue.

5q. A description of any recycling programs implemented or existing prior to July 1, 1989.

(DEP no longer requires this section)

5r. Local governments whose comprehensive plans have been submitted at the time of application shall provide an explanation of how the recycling program relates to the future land use elements, sanitary sewer, solid waste, drainage, potable water, and natural groundwater aquifer recharge elements; intergovernmental coordination elements; and capital improvements elements of the local government comprehensive plans prepared pursuant to Part II of Chapter 163, F.S. by the county or municipality.

The Lee Plan 1994 was adopted by the Board of County Commissioners and amended in 1996. Lee County's recycling program is integrated into the many elements of the comprehensive plan as indicated in the following:

- **FUTURE LAND USE:** The recycling program is intended to enhance future land use by diverting materials from the landfill and decreasing the reliance on this type of solid waste facility as stated in Policy 40.1.3.
- **SANITARY SEWER:** A program of co-composting sewage sludge pursuant to Policy 40.2.1, allows recycling of this material and decreased reliance on other forms of disposal
- **SOLID WASTE:** Through Policies 40.1.1 to 40.2.6 the County has created a fully integrated solid waste management system in which recycling and waste reduction is the cornerstone.
- **DRAINAGE AND POTABLE WATER:** In conjunction with Policy 41.1.2, the County reviews all developments including solid waste facilities, which can adversely affect potable waters. The current recycling facility is enclosed, providing protection of potable water supplies not always achievable by other waste management techniques.

- **NATURAL GROUND WATER AQUIFER RECHARGE:** Through Policy 41.2.1, the County has established strict guidelines regulating facility types and development in recharge areas and sensitive zones.
- **INTERGOVERNMENTAL COORDINATION:** The County provides for coordination and joint planning as indicated in Section XII of the Lee Plan. Policy 17.6 specifically established coordination for services to Gasparilla Island. Interlocal agreements with Charlotte County provide for recycling and other solid waste services.
- **CAPITAL IMPROVEMENTS:** In accordance with Policies 70.1.1 through 70.1.2, the County has established strict guidelines to assure that public facilities are adequate to service the needs of existing and future development. Policy 70.1.3 (3) specifically addresses the minimum acceptance level of service for solid waste disposal facilities.

The Comprehensive Plan's Policy 40.2.5 states: "the minimum acceptable level-of-service standard for availability of solid waste disposal facilities shall be 7 pounds per capita per day." Current and projected waste generation rates are in line with this Level of Service.

5s. A description of how all special wastes will be managed.

Special waste management programs are in place for used oil, construction and demolition debris, white goods, waste tires, biomedical wastes, and batteries.

- **USED OIL:** Used motor oil is collected at household hazardous waste collection events and daily by over 30 businesses participating in the State's used oil collection program.
- **CONSTRUCTION AND DEMOLITION DEBRIS (C&D):** Forestry Resources, Inc., processes and recycles C&D debris. Other C&D debris is presently landfilled.
- **WHITE GOODS:** White goods are collected separately by franchise garbage haulers and delivered to local recyclers. White goods collected on the County's right-of-way cleanup program are also delivered to private recyclers. Under the County's franchise garbage hauling contract, haulers are now required to collect white goods from multi-family units, which has decreased illegal dumping of white goods.
- **WASTE TIRES:** The waste tires generated in Lee County are delivered to the WTE plant. Tire mulch and other products have been purchased for several schools and parks to help develop recycled tire markets in Florida.
- **BIOMEDICAL WASTE:** Lee County's used sharps program provides safe and convenient disposal of used needles from syringe-dependent residents. Red-box disposal containers are free at participating pharmacies and convenient drop-off locations for full containers are available at fire stations throughout the County. Collection and disposal of material is contracted to licensed biomedical waste haulers. Commercial generators of biohazardous waste contract independently for proper disposal.
- **BATTERIES:** Button cell batteries are collected at several pharmacies and electronics stores for recycling. Residents place waste household (dry cell) batteries in bags and place them at the curb on their recycling day. Batteries collected are recycled or disposed of by a hazardous waste contractor. Commercial generators contract independently for proper disposal. These generators were surveyed before the WTE plant came on line; they and other mercury generators--hospitals, HVAC contractors, etc.--all had contracts for this service.

5t. A description of the progress made toward developing a composting program for organic materials such as yard waste, food waste, and paper waste that would otherwise be disposed of in a landfill.

All residential yard waste is currently collected separated from garbage and is processed into mulch or compost. Commercial land clearing debris is also ground into mulch. The resulting product is distributed to five sites throughout the County for residents' use. The County Parks Department also uses this mulch for their landscaping projects. Over 81,000 tons of horticultural material were recycled this year.

Lee County schools are conducting a pilot composting program. Broken pallets are made into composting bins by the vo-tech classes, then cafeteria food waste and paper hand-towel waste is composted. No numbers are available, but so far the program is successfully reducing waste and producing compost.

5u. A description of the procurement policies and activities by county and city governments who will be utilizing the Recycling and Education grant monies.

The Lee County Administrative Code for recycled content procurement was adopted in 1991 and amended in 1997 (Appendix B). The policy states that 75% of paper products purchased by County offices must contain recycled content, and that janitorial paper products must have at least 50% recycled content. All printed materials are to indicate that they are printed on recycled paper. The policy requires purchase of recycled content when available and that bid specifications request recycled content. It also limits the purchase of non-recyclable paper products. The policy created a recycled-content paper product pool within the County for smaller Departments and Divisions to purchase from.

A list of vendors and the recycled content products they provide is circulated yearly to County departments. Recycled plastic park benches, picnic tables, car stops and lumber products are to be purchased instead of pressure-treated wood or other materials when the life cycle cost is equal, with a minimum of 50%. In 1999, Lee County government purchased over 20 tons of recycled plastic products, such as picnic tables and lumber made from the plastics collected by Lee County's residential curbside programs. In 1999 Lee County government purchased \$178,000 worth of recycled content products. What percent of all products purchased by Lee County this figure represents was not available.

APPENDIX D

**EXCERPTS FROM MARCH 2000
SOLID WASTE MANAGEMENT PLAN UPDATE**



**EXCERPTS FROM SECTION 2:
SOLID WASTE QUANTITIES AND CHARACTERISTICS**

Poor Original

**TABLE 2-1
PROJECTED POPULATIONS**

CALENDAR YEAR	LEE COUNTY			HENDRY COUNTY			TOTAL POPULATION OF STUDY AREA
	PERMANENT POPULATION (1)	SEASONAL POPULATION (1,2)	TOTAL POPULATION	PERMANENT POPULATION (3)	SEASONAL POPULATION (3)	TOTAL POPULATION	
1995	414,574	24,874	439,448	-	-	-	-
1996	430,257	25,815	456,072	-	-	-	-
1997	446,530	26,792	473,322	-	-	-	-
1998	463,417	27,805	491,222	-	-	-	-
1999	480,948	28,857	509,805	33,350	1,300	34,650	544,455
2000	499,150	29,949	529,099	33,842	1,241	35,083	564,182
2001	516,281	30,977	547,258	34,857	1,278	36,135	583,393
2002	533,412	32,005	565,417	35,872	1,315	37,187	602,604
2003	550,544	33,033	583,577	36,886	1,352	38,238	621,815
2004	567,675	34,061	601,736	37,901	1,389	39,290	641,026
2005	584,806	35,088	619,894	38,916	1,427	40,343	660,237
2006	601,169	36,070	637,239	39,270	1,440	40,710	677,949
2007	617,533	37,052	654,585	39,624	1,453	41,077	695,662
2008	633,896	38,034	671,930	39,978	1,466	41,444	713,373
2009	650,260	39,016	689,276	40,332	1,479	41,811	731,086
2010	666,623	39,997	706,620	40,686	1,492	42,178	748,798

Notes:

(1) Based on BEBR population projection information received from the Lee County Division of Planning. Linear progression estimated between years 2000, 2005 and 2010.

(2) Based on calculated seasonal population of 18% of permanent population, provided by Lee County Division of Planning. Seasonal population assumes an average stay of four months.

(3) Based on information received from the Hendry County Planning Consultant, LaRue Planning & Management Services, Inc. 1998 data unavailable. Linear progression estimated between the years 2000, 2005 and 2010.

TABLE 2-2
POPULATION PROJECTIONS BY AREA
(including estimated seasonal population)

COMMUNITY	ESTIMATED PERCENTAGE OF 1999 POPULATION	ESTIMATED PERCENTAGE OF 2000 POPULATION	RESULTING ESTIMATED 2000 POPULATION	ESTIMATED PERCENTAGE OF 2010 POPULATION	RESULTING ESTIMATED 2100 POPULATION
City of Fort Myers	11.3%	14.5%	76,600	14.6%	103,000
City of Cape Coral	23.2%	22.8%	120,800	26.4%	186,500
Sanibel	1.4%	2.5%	13,400	2.3%	16,300
Fort Myers Beach	1.5%	1.6%	8,300	1.3%	9,300
Bonita Springs	5.3%	5.2%	27,500	6.2%	43,800
Rest of Lee County	57.3%	53.4%	282,500	49.2%	347,800
TOTAL		100.0%	529,100	100%	706,700

TABLE 2-3
HISTORICAL LEE COUNTY SOLID WASTE STREAM
(in tons)
(Excludes Hendry County Tonnage)

FISCAL YEAR	WASTE TO ENERGY (1)	MSW LANDFILLED (2,3)	CHARLOTTE COUNTY LANDFILL	WHITE GOODS	TOTAL TIRES	RECYCLED & HORTICULTURE (5)	CONSTRUCTION & DEMOLITION (6)	MRF (7)	PRIVATE RECYCLING (8,9)	HOUSEHOLD HAZARDOUS WASTE	TOTAL WASTE GENERATED
1995	296,870	-	-	(4)	-	-	55,000	-	-	-	351,870
1996	300,695	2,131	1,846	(4)	905	31,311	34,507	23,680	126,429	204	521,708
1997	315,619	3,063	1,804	387	944	31,008	41,074	26,015	129,049	215	549,178
1998	340,706	2,142	1,824	6,542	1,527	30,822	42,124	26,502	176,335	156	628,680
1999	347,036	19,533	1,859	6,673	2,601	33,660	45,678	28,358	179,874	233	665,505

(1) Composed of mostly MSW plus small amounts of C&D, horticulture, and shredded tires.

(2) Excludes ash from the Waste-to-Energy Facility, Includes processible waste diverted from the WTE Facility.

(3) Due to an outage in FY1999, an estimated 15,000 tons of processible waste normally received at the WTE Facility was diverted to the landfill.

(4) Data for this category not available, not reported separately at that time.

(5) Only horticultural waste mulched at the landfill. Does not include Cape Coral and City of Fort Myers.

(6) C&D landfilled. Does not include C&D exported from the County.

(7) Residue from MRF included under WTE column.

(8) Private recycling, as reported in the Joint Application for Recycling & Education Grant less ferrous recovered (included in WTE).

(9) 1999 estimated, based on a 2% increase over the previous year.

TABLE 2-4
HISTORICAL HENDRY COUNTY SOLID WASTE STREAM
(in tons, excluding recyclables)

FISCAL YEAR	WASTE TO ENERGY (1)	MSW LANDFILLED (2)	TOTAL TIRES (3)	HORTICULTURE	CONSTRUCTION & DEMOLITION	TOTAL WASTE GENERATED
1995	25,020	-	-	-	3,080	28,100
1996	26,364	163	521	1,105	7,677	35,830
1997	26,977	-	496	1,518	7,280	36,271
1998	28,120	14	491	1,665	6,343	36,633
1999	26,104	5,223	330	1,533	5,572	38,762

Notes:

(1) Includes small amounts of C&D and horticultural waste. Some tires are processed at the WTE Facility, however, quantities included under Total Tires.

(2) Due to an outage in FY1999, an estimated 5,000 tons of processible waste, normally processed by the WTE Facility was diverted to the landfill.

(3) Only includes waste from Hendry County that enters the Lee County system. Does not include recyclable materials.

TABLE 2-5
PROCESSIBLE SOLID WASTE PROJECTIONS
(in tons)

YEAR	LEE COUNTY	HENDRY COUNTY	TOTAL
1995	296,870	25,020	321,890
1996	301,600	26,364	327,964
1997	316,563	26,977	343,540
1998	342,233	28,120	370,353
1999	364,637	31,104	395,741
2000	380,400	31,700	412,100
2001	393,500	32,300	425,800
2002	406,600	32,900	439,500
2003	419,600	33,600	453,200
2004	432,700	34,300	467,000
2005	445,700	35,000	480,700
2006	458,200	35,700	493,900
2007	470,700	36,400	507,100
2008	483,200	37,100	520,300
2009	495,600	37,800	533,400
2010	508,100	38,600	546,700

TABLE 2-6
C&D WASTE PROJECTIONS
(in tons)

YEAR	LEE COUNTY	HENDRY COUNTY	TOTAL
1995	55,000	3,080	58,080
1996	34,507	7,677	42,184
1997	41,074	7,280	48,354
1998	42,124	6,343	48,467
1999	45,678	5,572	51,250
2000	49,246	5,683	54,929
2001	50,936	5,797	56,733
2002	52,626	5,913	58,539
2003	54,316	6,031	60,348
2004	56,007	6,152	62,158
2005	57,697	6,275	63,972
2006	59,311	6,400	65,712
2007	60,925	6,528	67,454
2008	62,540	6,659	69,199
2009	64,154	6,792	70,947
2010	65,769	6,928	72,697

TABLE 2-7
HORTICULTURAL WASTE PROJECTIONS
(in tons)

YEAR	LEE COUNTY	HENDRY COUNTY	TOTAL
1997	31,008	-	31,008
1998	30,822	-	30,822
1999	33,660	1,533	35,193
2000	33,997	1,564	35,560
2001	34,337	1,595	35,931
2002	34,680	1,627	36,307
2003	35,027	1,659	36,686
2004	35,377	1,693	37,070
2005	35,731	1,726	37,457
2006	36,088	1,761	37,849
2007	36,449	1,796	38,245
2008	36,813	1,832	38,646
2009	37,182	1,869	39,050
2010	37,553	1,906	39,459

TABLE 2-8
RESIDENTIAL MRF RECYCLABLES
PROJECTIONS
(tons)

YEAR	QUANTITY
1995	-
1996	23,680
1997	26,015
1998	26,502
1999	28,358
2000	30,899
2001	31,960
2002	33,020
2003	34,081
2004	35,141
2005	36,202
2006	37,215
2007	38,228
2008	39,241
2009	40,254
2010	41,267

TABLE 2-9
COMMERCIAL RECYCLABLES
PROJECTIONS
(tons)

YEAR	QUANTITY*
1995	-
1996	126,429
1997	129,049
1998	176,335
1999	179,874
2000	188,868
2001	198,311
2002	208,227
2003	218,638
2004	229,570
2005	241,048
2006	253,101
2007	265,756
2008	279,044
2009	292,996
2010	307,646

** Increased 5% per year after 1999.*

TABLE 2-10
WHITE GOODS PROJECTIONS
(tons)

YEAR	QUANTITY*
1995	(4)
1996	-
1997	387
1998	6,542
1999	6,673
2000	6,806
2001	6,943
2002	7,081
2003	7,223
2004	7,368
2005	7,515
2006	7,665
2007	7,818
2008	7,975
2009	8,134
2010	8,297

**Increased 2% per year after 1999.*

TABLE 2-11
HOUSEHOLD HAZARDOUS WASTE
PROJECTIONS
(in tons)

YEAR	QUANTITY*
1995	-
1996	204
1997	215
1998	156
1999	233
2000	242
2001	252
2002	262
2003	273
2004	283
2005	295
2006	307
2007	319
2008	332
2009	345
2010	359

** Increases at 4% per year after 1999.*

**EXCERPTS FROM SECTION 4:
ALTERNATIVES REVIEW AND ECONOMIC ANALYSIS**

4.1 EXPANSION OF PROCESSIBLE WASTE DISPOSAL CAPACITY

In accordance with the processible waste projections, as shown on Table 2-5, the County's existing waste-to-energy facility will reach its designed capacity during the year 2000. The difference between the available capacity and the estimated required capacity is the shortfall in capacity which the County must address since the facility will continue to process waste up to its available capacity through the planning period. As illustrated by Table 3-1 the shortfall is projected to increase from approximately 27,900 tpy in the year 2000 to 172,200 tpy by the year 2010. This translates to a shortfall ranging from 76 tpd to about 472 tpd. Several alternatives have been developed to address this shortfall in processible waste capacity.

4.1.1 Expansion of the Existing Waste to Energy Facility

The existing waste-to-energy facility was designed to be capable of processing a total of 1,200 tpd of waste, but prior to pursuing an aggressive recycling program, the County had intended for the facility to have a capacity of 1,800 tpd. As previously stated, there will be an anticipated shortfall in required processing capacity beginning in the year 2000, as shown on Table 3-1 in Section 3.3, which will need to be met. Malcolm Pirnie investigated the expansion of the waste-to-energy facility by installing an additional 600 tpd unit along with its associated equipment, increasing the total facility capacity to 1,800 tpd in accordance with the original development plan for the facility. In addition, a second option of increasing the Facility's capacity to 1,950 tpd by installing an additional 750 tpd unit was also examined. Malcolm Pirnie believes that sufficient space is available to accommodate either unit size.

4.1.1.1 Economic Analysis

Malcolm Pirnie performed a review of the existing equipment design and condition to determine the various portions of the existing equipment which would require expansion, refurbishment or a new installation under each scenario. Equipment vendors were contacted to determine current pricing for various components of the

expanded facility and pricing of other components was determined by using the drawdown schedule and the original Facility Price (\$126,933,174; November 1992 dollars) from the Construction Agreement between Lee County and OMSL.

The following assumptions have been utilized in this analysis:

- Construction costs are based upon a qualified vendor completing the expansion.
- The estimated construction costs, excluding bonding, insurance or financing are:

600 tpd expansion	\$65,000,000
750 tpd expansion	\$78,000,000
- Energy revenues from the sale of electricity to the County at \$0.026 per kwh in the year 2000.
- Revenues from ferrous and non-ferrous materials similar to current per ton revenues.
- Incremental O&M costs for additional capacity assumed to be \$20.07. (Current O&M is approximately \$23.40/ton.)
- Incremental pass-through and ash hauling costs would be similar to costs currently encumbered.
- Levelized annual debt service costs over a 20-year bond period, and 6 percent interest rate for a 600 tpd unit.

Based upon these assumptions, and keeping in mind that per ton annual debt service costs would be dependent upon the capacity utilization of the third unit, with lower per ton costs anticipated as the unit is more utilized, costs would range from about \$74 per ton in 2004 to about \$41 per ton in 2010, all in FY 2000 dollars, as shown in the base case projections in Appendix B. These costs could be reduced if the entire construction cost need not be financed, or if the revenues brought to the County through its new power purchase agreement with Seminole Electric Cooperative, Inc. are considerably higher than what was assumed in this analysis.

4.1.1.2 Schedule

Malcolm Pirnie performed a preliminary analysis of the work effort associated with the expansion of the Lee County waste-to-energy facility from the existing 1,200 tpd to 1,800 tpd or 1,950 tpd. Based upon previous experience with procurement projects, the permitting process is usually the limiting timing factor prior to actual construction.

According to the Florida Department of Environmental Protection, the two permits which would require the longest lead of time for preparation and approval would be the Air Permit (including the PSD permit) and the Power Plant Siting Certification Modification (PPSC). These permits may be worked on in parallel however, and since this modification would involve the expansion of an existing facility, a full siting process would not be required. It is estimated that a total of 16.5 months would be required for permit preparation to approval. During this time frame, procurement documents would be prepared, vendors would prepare their proposals, and vendor selection and negotiations would be completed. Financing of the facility could also occur in conjunction with the permitting process. An additional 3 months may be required for a 1,950 tpd facility, since the original permitting effort was undertaken when the facility was sized at 1,800 tpd prior to its downsizing to 1,200 tpd.

Once a contract is awarded, it would take approximately 24 months to complete construction and pass acceptance testing. Therefore, the entire process could be expected to take 3.5 to 4 years, including contingencies.

Malcolm Pirnie also analyzed the available waste processing capacity and the required waste processing capacity to determine the point at which a new unit should ideally be in service. Malcolm Pirnie understands that the facility can be operated at a 70 percent capacity, but based on technical experience, it is believed that the facility should ideally be operated at a minimum of 80 to 85 percent capacity in order to maintain steady state conditions and prevent unbalanced or excessive wear and maintenance between the units. Historical facility operating time was examined for the existing 1,200 tpd facility, and facility operating time has averaged 92.57 percent. However, the timing for the installation of a third unit should also be dependent on how quickly the ideal capacity of

the unit is achieved, since it would not be practical to install a unit which would exceed its ideal capacity within a few years. Based upon the estimated time frame required for facility expansion, the earliest time when a new unit could be operational would be the year 2004. At that time, the facility would be utilized at about 75 percent of the operating capacity for all three units. In the year 2006, the facility would be operating at almost 80 percent of its guaranteed capacity which would be a more preferable utilization. If waste is generated at a rate higher than shown by the projections, however, the third unit would need to be on-line at an earlier date. Should the County decide to expand the facility, Malcolm Pirnie analyzed the time required for the entire Facility to be off-line to complete various construction work related to expansion, for such things as piping and electrical tie-ins. At this time, Malcolm Pirnie believes that one full facility outage, with a maximum duration of two weeks, would be required for various system interconnections related to Facility expansion. In addition, a need for an additional shorter outage would probably be required for testing and other miscellaneous reasons.

4.1.2 Export of Processible Waste

As an alternative to expansion of the Facility, the County could enter into an agreement for the export of its excess processible waste. This agreement could be competitively procured as a contract with a disposal facility operator. In surveying disposal facilities in neighboring communities, it appears that most other County or municipally-owned sites have a policy against accepting out-of-county waste, therefore this alternative focuses on the export of excess processible waste to a privately-operated disposal facility. The Okeechobee Landfill has been identified as the most likely potential competing disposal facility due to its relative proximity to the County, and its relatively low tips fees.

As mentioned in the previous section, the shortfall in processible waste disposal capacity which would need to be met by this alternative ranges from about 28,000 tpy in 2000 to 172,200 by the year 2010. The current spot market disposal fee at the Okeechobee Landfill is reported to be \$32.80 per ton. If the County enters into a disposal contract with the operator of the landfill, however, this disposal fee can be significantly

reduced. For the purposes of this analysis, a negotiated disposal fee of \$25 per ton has been assumed.

The exportation of waste from Lee and/or Hendry County would require processible waste to be long-hauled to a designated disposal facility. Depending on the distance of the designated disposal facility, it may be more economical for the waste to be transported in transfer trailers as opposed to packer trucks. An analysis of transfer trailer haul costs versus packer haul costs indicates that transfer trailer operations would be more economical for hauling distances in excess of about 30 round-trip miles (15 miles one-way). This analysis assumes an estimated transfer station cost of \$8 per ton, transfer trailer haul cost of \$0.11 per round-trip ton-mile, and a packer truck hauling cost of \$.40 per round-trip ton-mile.

The Okeechobee Landfill is located northeast of Lee County, approximately 95 miles from the waste-to-energy facility. It is also located approximately 73 miles from the two transfer stations located in Hendry County, and 113 miles from the privately-owned transfer station on Pine Island Road. As such, under an export scenario, the long-haul of waste in transfer trailers would be preferred from an economic standpoint. The combined capacity of the existing transfer stations is approximately 250 tpd, and this level of capacity would service the County's export capacity needs through the year 2004. However, it would not be practical to deliver waste from the County to the transfer stations in Hendry. Therefore, additional transfer station capacity would need to be developed to service the projected excess capacity needs of the County through the entire planning period.

4.1.2.1 Economic Analysis

An economic assessment of costs associated with the export of waste was undertaken for comparative purposes, and taking into account the availability of existing County-owned and private facilities, new facility requirements and current operation and disposal agreements. The following assumptions have been utilized in this analysis:

- Of the current annual costs to the County for the development and operation of the two existing transfer stations in Hendry County, approximately \$13 per ton of capacity are fixed costs associated with the development and administration of the facilities, and about \$3.20 per ton of waste processed are variable costs related to the operation and maintenance of the facilities.
- Due to the closer proximity of Hendry County to the Okeechobee Landfill, it is assumed that the export of waste generated in Hendry County would take priority over the export of waste generated in Lee County.
- Since the fixed costs associated with the development of the two transfer stations in Hendry County as well as the incremental operating costs associated with the transfer of Hendry County would remain part of the County's budget regardless of the alternative selected, these costs are excluded from this analysis.
- The costs for transfer station capacity in excess of the 200 tpd available from two County owned transfer stations is estimated to be \$8 per ton. This unit cost is based on the assumption that this capacity will be secured via use of the existing private transfer station owned by Waste Management and/or development of a new transfer station to be constructed at the waste-to-energy facility site. Use of the Facility should serve to reduce development costs associated with property acquisition, permitting, truck scale operations, etc. In addition, transfer station operations at the Facility could also provide emergency back-up for the Facility.
- Hauling costs are based on a unit transfer trailer haul cost of \$0.11 per roundtrip ton-mile. Mileage is based on a distance of an average of approximately 73 miles for waste transferred from the two transfer stations in Hendry County and approximately 100 miles for waste transferred from a privately owned transfer station or new transfer station to be constructed at the Facility site.
- Disposal costs are based on the disposal of processible waste at the Okeechobee Landfill at an estimated disposal fee to the County of \$25 per ton.

Based upon these assumptions, the County's cost to export Hendry County's processible waste would be approximately \$41 per ton. The cost to export waste in excess of what Hendry County generates would be approximately \$55/ton, all in year 2000 dollars.

4.1.2.2 Schedule

Hendry County's waste should be the first to be exported since it would be most economical to do so, and the existing transfer stations are capable of handling Hendry County's waste through the planning period. Transfer station capacity for Lee County's waste, however, would be required. It is estimated that the County could develop procurement documents to provide for the exportation of waste to Okeechobee or to another landfill, within a 3 to 4 month time period for Hendry County waste.

Procurement documents could specifically request costs utilizing the existing transfer stations as well as costs for the private hauler to utilize their own transfer station. Should the County determine that it might wish to construct its own transfer station, most likely at the site of the waste-to-energy facility, it is estimated that approximately 6 to 9 months would be required for permitting and construction of such a facility.

4.1.3 Landfilling of Processible Waste at the Regional Landfill

The Regional Landfill located in neighboring Hendry County was developed for the disposal of ash, C&D, and by-passed waste from the waste-to-energy facility. Although the first cell of the landfill has been developed for ash disposal, to date it has not been utilized. On June 23, 1993, prior to development of the first cell, the County entered into an agreement with A. Duda & Sons, Inc., Cooperative Producers, Inc., and Turner Foods Corporation, whose properties lie adjacent to the landfill site. This agreement presents limited options for the future use of this landfill. In almost all situations under this agreement, Lee County must gain approvals of each of the parties to the agreement prior to changing the agreed upon alternative uses of the Regional Landfill.

The Duda Agreement specifically prohibits the use of the Regional Landfill as a long-term disposal option. Section E of the Agreement requires the County to look everywhere but the Regional Landfill for its solid waste management needs over time. However, the landfill may be used as an interim measure during the construction of waste management facilities elsewhere. Permissible uses of the Regional Landfill for solid waste disposal for a limited period of time during maintenance activities of the waste-to-energy facility or at other facilities used by Lee County are described within the Agreement. Solid waste disposal is also acceptable during certain narrowly defined "emergency" situations. In addition, Lee County may use the Regional Landfill for solid waste disposal when "...the volume of such waste exceed the capacity of Lee County resource recovery facility and all other available solid waste management facilities then in use by the Board."

In summary, it would seem that the County must make a good faith effort to identify alternative available solid waste management capacity, and utilize these available alternatives, prior to being able to utilize the Regional Landfill for the long-term disposal of processible solid waste. Therefore, this alternate is not considered to be a viable long-term option for the County. The Regional Landfill may be utilized as a short-term interim disposal facility once the Gulf Coast Landfill reaches its permitted capacity, however, and until such time that the long-term plan is implemented.

4.1.4 Additional Recycling Initiatives

As stated in earlier sections of this report, the County recycles approximately 37 percent of the materials generated by County residences and commercial establishments. In 1998, the County was ranked the third highest recycling county in the State of Florida. The County estimates that about 69 percent of the permanent single-family residents regularly recycle, and within the commercial sector, about 35 percent of businesses recycle some portion of their waste stream. Both residential and commercial recycling programs are voluntary in nature, and it is the County's desire to maintain these programs on a voluntary basis.

Given the high percentage participation in the County's programs, at this time it would appear to be unrealistic to count on meeting the County's shortfall in processing capability through additional recycling initiatives. Those materials which are highly recyclable, such as steel cans, ferrous and non-ferrous metals are currently recycled at rates exceeding 80 percent. The County implemented a non-ferrous recovery system at the waste-to-energy facility which is anticipated to boost recovery of this material, but even if all non-ferrous materials were recovered, this would amount to only about 1,500 additional tons of material recovered on an annual basis. Given that recycling rates, particularly in the commercial sector are tied to market conditions, and rates for recyclable materials can vary from year to year, it is unlikely to realistically be able to depend on increased recycling to meet the needs of the processible waste shortfall.

Nevertheless, based upon an analysis of recyclable materials in the waste stream undertaken in 1997, considerable quantities of certain recyclable materials remain in the waste stream, particularly from commercial establishments.

While the County estimates that approximately 94 percent of corrugated cardboard generated in the County is currently recycled, only 29 percent of office paper, and approximately 15 percent of other paper is currently recycled. By boosting these levels to 50% of office paper, and 30% of other paper recycled, and additional 5,900 tons of material would be diverted from the waste-to-energy facility in the year 2000 and an estimated 8,800 tons in the year 2010. These reductions in processible waste would not be sufficient to meet the County's needs in the future. However, such recycling programs should be implemented to reduce the amount of waste disposed, and to delay the need for additional disposal capacity. Therefore this alternative is not considered further, in terms of meeting the County's needs for processible waste disposal capacity.

4.1.5 Conclusions

In summary, the County has two viable options for handling its processible waste quantities over the long-term, if the Cities continue to participate in the regional system developed by the County. Expansion of the existing waste-to-energy facility would have the advantage of the County being able to process its own waste in an environmentally

sound manner. The County, however would need to obtain long-term (10-year), firm commitments from the Cities, so that the proper timing and sizing of the facility would be taken into account.

Long-term exportation of waste, on the other hand, would be less dependent on timing or waste flow issues, but the County would be subject to outside factors such as unanticipated landfill closures, increased tipping fees, increased hauling costs, or other influences which are beyond the County's control. Long-term exportation of waste would also require the construction of a transfer station, at the waste-to-energy facility site. It is estimated that construction of a transfer facility would have a capital cost amortized over a 20-year period of approximately \$3 to \$5/ton. Operation and maintenance costs would add about \$2 to \$5/ton.

APPENDIX E

RESPONSE TO COMMENTS TO THE PRELIMINARY DRAFT MATERIALS SEPARATION PLAN

The following is in response to the October 26, 2001 letter provided as Attachment 1 to Appendix E, regarding comments to the Preliminary Draft Materials Separation Plan:

- The comments regarding preventative maintenance and protective coatings for shingled roofs are noted. The County supports the concept of sustainable growth practices to extend roof life and reduce waste. However, shingled roof waste material is considered a construction and demolition debris type of waste material and would ultimately be handled as described in the Plan, and as such would not impact the Facility.
- The comments regarding carpet waste material recovery and re-use are noted. Components of carpet waste material (e.g., carpet padding) have not been recycled with much success. Carpet waste material recovery and re-use operations and other types of commercial recycling operations are considered to be private enterprise commercial recycling operations within the County's System as described in the Plan.

APPENDIX E
ATTACHMENT 1

DATE;OCTOBER 26,2001

PROPOSAL TO LEE COUNTY COMMISSIONERS AND SOLID WASTE DIVISION
RE:FIBERGALSS SHINGLE WASTE AND USED CARPET WASTE,IN CONJUNCTION WITH
P.R.A.I.R.

I have lived in Lee county for 10 years.I pressure clean roofs and homes for a living.Fibergalss shingle roofs get dirty and moldy like most things,and most people replace a dirty roof at a great expense,Far before the warranty has accrues,creating needles waste for the county.My experience has shown me an opportunity for a tremendously profitable business,with an ancillary benefit to the county.

1.Bleach and pressure clean the roof.

2.Spray/Seal the roof which will protect it for 5 years.At that point do it again.The cost for this is 15-20% of the cost of a new roof.

3.The 80-85% saved put into a savings account accrues interest in the 5 years in the bank,and offsets and pays for the cleaning and sealing,thereby costing nothing for the consumer,and creating no waste for the county.

I have done this and know that I am right.A large building owner like Benson's who owns large apartment/condo buildings,could save a fortune with this program,and could be approached with this opportunity.

Regarding used carpet,it typically is hauled away from the backs of carpet stores,with them paying for its removal.Why cant Lee co.get the money to remove it,or adopt an ordinance to have carpet installers take it to the waste facility at the end of a work day.There it can be bleached and pressure cleaned,vacuumed with an industrial vacuum and be ready for fabrication.The carpet then can be cut,stenciled and used as decorated doormats,and sold at a profit.

If interested in more details please contact:

PATRICK FARRELL
15821 COUNTRY CT.
FT.MYERS,FL.33912
437-6564



CC:JOHN ALBION,RAY JUDAH,DOUGLAS ST.CERNY,BOB JANES,ANDY COY,
LEE CO.SOLID WASTE DIVISION

**MALCOLM
PIRNIE**



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

	Appendix 4
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APPENDIX 4.0

REQUIREMENTS FOR NEW WASTE-TO-ENERGY FACILITY CAPACITY

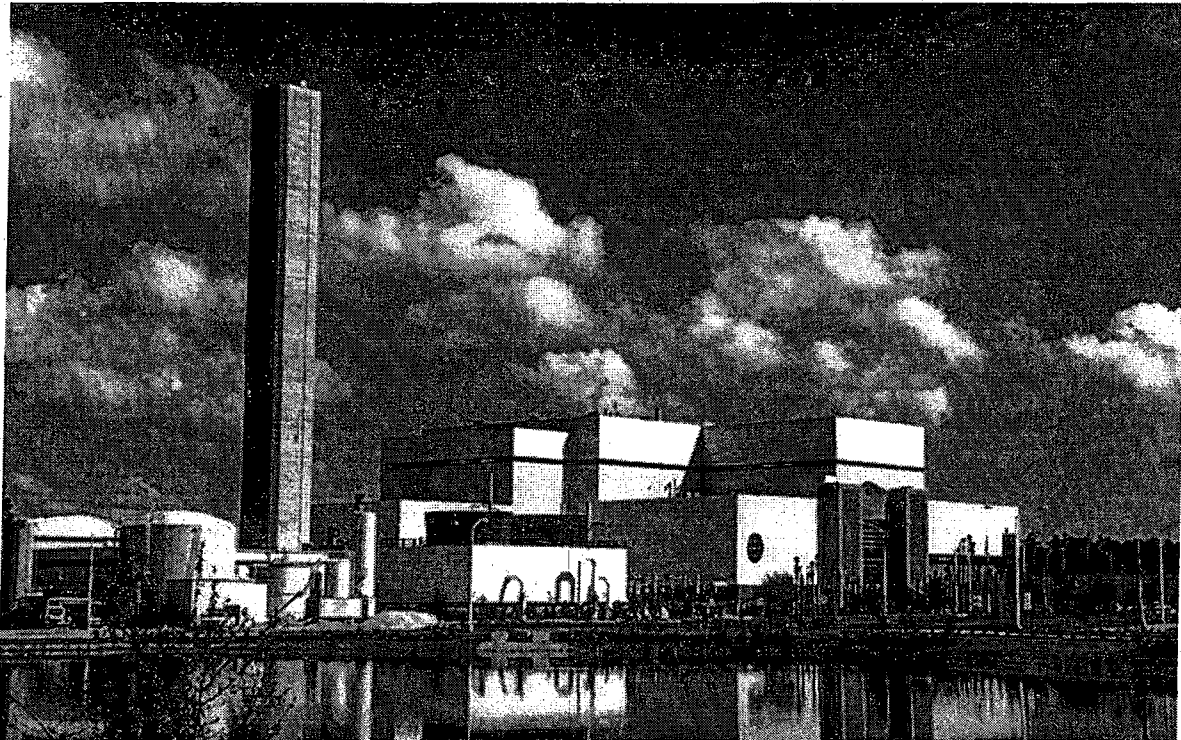
4.1 - Section 403.7061 Requirements for New Waste-to-Energy Facility Capacity

4.1 - Section 403.7061
**Requirements for New Waste-to-
Energy Facility Capacity**

APPENDIX 4.1

TO SITE CERTIFICATION APPLICATION
FOR THE
LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY

403.7061 REQUIREMENTS FOR NEW
WASTE-TO-ENERGY FACILITY CAPACITY



PREPARED FOR:

LEE COUNTY SOLID WASTE DIVISION
10500 BUCKINGHAM ROAD, SUITE 200
FT. MYERS, FL. 33905

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PREPARED BY:
MALCOLM PIRNIE, INC.

EDISON BUILDING
1533 HENDRY STREET, 2ND FLOOR
FT. MYERS, FL 33901

JULY, 2002

1.0 Purpose

Lee County (the "County") intends to expand its existing Solid Waste Energy Recovery Facility ("Facility" or "SWERF"). The County has prepared this document to satisfy the requirements set forth in Section 403.7061(3), Florida Statutes, which apply to the expansion of the Facility.

2.0 Background

Prior to 1989, the County primarily landfilled its solid waste. In 1989, the County began implementing a comprehensive Integrated Solid Waste Management Master Plan, which described the course of action the County would follow to ensure that environmentally sound methods are used for the management, reuse, reduction, recycling and/or disposal of the solid waste generated in Lee County. The Integrated Solid Waste Master Plan recommended the development of: an aggressive recycling program to reduce the quantity of materials requiring disposal; a waste-to-energy facility for waste reduction and energy recovery from those materials that are not recycled; and a "Class I" landfill for the disposal of ash and "by-pass waste" (i.e., solid waste that could not be processed at the waste-to-energy facility). In addition, the County established a self-imposed recycling and materials separation goal of 40 percent, which exceeds the 30 percent recycling goal established by the State of Florida.

Lee County's solid waste management system (the "System") implements the provisions of the County's Integrated Solid Waste Management Master Plan. A description of the County's System is provided in Attachment A.

The County's System has become one of the most successful solid waste management and recycling programs in the State of Florida. The County's System implements the County's Materials Separation Plan (the "Plan"), which is designed to provide integrated solid waste management and materials separation programs as part of a financially and environmentally sound means of delivering solid waste services to the residents and businesses in Lee County. The Materials Separation Plan emphasizes the conservation of resources through recycling, reuse, and reduction of solid waste. The County also has

implemented cooperative education and grant initiatives with the Lee County School System and Keep Lee County Beautiful. In addition, the Facility operator received an "Environmental Citizen Award" from the Florida Department of Environmental Protection ("DEP"). See Attachment B. In light of the County's efforts, it is not surprising that DEP's 2000 "Solid Waste Management Annual Report" shows that Lee County had the highest recycling rate of any county in the State of Florida. See Attachment A.

Despite the County's comprehensive recycling program, the amount of solid waste delivered to the Facility has increased each year since the Facility began operation, primarily due to population growth. In 1999, this amount reached the Facility's guaranteed annual capacity of 372,300 tons. In 2000, the Facility processed over 392,000 tons of County waste, but the waste stream had grown so large that the County had to landfill nearly 44,000 additional tons of processible waste. Current population projections for Lee and Hendry Counties suggest that processible solid waste generation will continue to increase, reaching nearly 550,000 tons by 2010. Rather than landfilling processible waste, it is the County's intention to expand the Facility by adding a third 660-tpd boiler unit, which would increase the Facility's permitted capacity to 1,980-tpd (assuming a reference waste with a higher heating value of 5000 Btu/lb).

3.0 Requirements in Section 403.7061(3), Florida Statutes

The following sections of this report discuss the requirements in Section 403.7061(3), Florida Statutes, that apply to the expansion of waste-to-energy facilities. Each requirement in Section 403.7061(3) is quoted below (in italics) and is followed by an explanation of how the County complies with Section 403.7061.

403.7061(3)(a) *The facility is a necessary part of the local government's integrated solid waste management program in the jurisdiction where the facility is located and cannot be avoided through feasible and practical efforts to use recycling or waste reduction.*

Since 1989, the County has developed and implemented an Integrated Solid Waste Management Master Plan to ensure that environmentally sound methods are used for the management, reuse, recycling and/or disposal of the County's solid waste. The County's Solid Waste Energy Recovery Facility is one of the essential components of the County's integrated solid waste management system.

The County's comprehensive system includes the following programs:

- Residential Recyclables Program
- Commercial Recyclables Program
- Construction and Demolition Debris Program
- Horticultural Waste Program
- Ferrous and Non-Ferrous Recovery Program
- White Goods Program
- Waste Tire Program
- Household Hazardous Waste Program
- Pollution Prevention/Small Quantity Generator Program
- Other Special Waste Programs
- Electronic Products Recycling Program

The County administers one of the most successful recycling programs in the State, and the County's recycling and materials separation programs continue to grow and improve, but these programs cannot handle all of the non-recyclable materials that are projected to be generated within the County in the future. As shown in Table 1, below, the amount of processible solid waste generated in Lee and Hendry counties is expected to increase by more than 30 % by 2010.

Poor Original**TABLE 1****PROCESSIBLE SOLID WASTE PROJECTIONS**

YEAR	LEE COUNTY	HENDRY COUNTY	TOTAL
1995	296,870	25,020	321,890
1996	301,600	26,364	327,964
1997	316,563	26,977	343,540
1998	342,233	28,120	370,353
1999	364,637	31,104	395,741
2000	380,400	31,700	412,100
2001	393,500	32,300	425,800
2002	406,600	32,900	439,500
2003	419,600	33,600	453,200
2004	432,700	34,300	467,000
2005	445,700	35,000	480,700
2006	458,200	35,700	493,900
2007	470,700	36,400	507,100
2008	483,200	37,100	520,300
2009	495,600	37,800	533,400
2010	508,100	38,600	546,700

At this time, the County believes it is unrealistic to plan to meet the County's shortfall in processing and disposal capacity only through additional recycling initiatives. A large percentage of the County's population already participates in the County's recycling programs. For instance, the County has a residential recycling weekly set-out rate of 55 percent. Additionally, the County estimates that 75 percent of all single family and 85 percent of all multi-family households participate in the recycling program. Materials that are highly recyclable, such as steel cans and ferrous metals, already are recycled at rates exceeding 80 percent. The County implemented a non-ferrous recovery system at the Facility, which has increased the recovery of this material, but even if all of the County's non-ferrous materials were recovered, only about 1,500 additional tons of material would be recovered on an annual basis. The County continually looks for new opportunities to enhance its recycling programs, but the County has not identified feasible, cost-effective, and practical recycling or waste reduction methods that can be used to eliminate the County's need to expand the Facility.

The Facility has operated well and has processed more than its guaranteed throughput (372,300 tpy) during each of the last three years. However, as shown in Table 2, below, the size of the waste stream will exceed the Facility's processing capacity by more than

170,000 tpy in the year 2010. The proposed expansion of the Facility is needed to help the County overcome this shortfall in the County's solid waste processing capacity.

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TABLE 2

LEE COUNTY SWERF-AVAILABLE PROCESSING CAPACITY

Fiscal Year	Expected Available Waste Processing Capacity Note (1)	Required Waste Processing Capacity Note (2)	Waste Processing Capacity Shortfall
1995	385,184	321,890	0
1996	385,184	327,964	0
1997	385,184	343,540	0
1998	385,184	370,353	0
1999	385,180	395,741	-10,561
2000	384,210	412,100	-27,890
2001	383,240	425,800	-42,560
2002	382,270	439,500	-57,230
2003	381,300	453,200	-71,900
2004	380,320	467,000	-86,680
2005	379,350	480,700	-101,350
2006	378,380	493,900	-115,520
2007	377,410	507,100	-129,690
2008	376,430	520,300	-143,870
2009	375,460	533,400	-157,940
2010	374,490	546,700	-172,210

(1) Assumes facility operating time decreases to 90 percent in 2010 from 92.57 percent, decreasing the available waste processing capacity from 385,184 tpy to 374,490 tpy in 2010. The decrease in facility availability is due to the age of units one and two and anticipated outages for maintenance of these units.

(2) Based on BEBR high population projections and an estimated per capita generation rate of 3.94 ppd. The high BEBR population projections were used in order to provide for a conservative estimate of future available processing capacity.

Given that recycling rates are tied to market conditions, especially in the commercial sector, and recycling rates for recyclable materials can vary from year to year, it is highly unlikely that increased recycling and waste reduction practices will meet the County's needs for processing an additional 172,000 tons by 2010. Thus, the expansion of the Facility is a necessary part of the County's solid waste management program, and expansion of the Facility cannot be avoided through feasible and practical efforts to use recycling or waste reduction.

403.7061(3)(b)

The use of capacity at existing waste-to-energy facilities within reasonable transportation distance of the proposed facility must have been evaluated and found not to be economically feasible when compared to the use of the proposed facility for the expected life of the proposed facility.

The use of capacity at existing waste-to-energy ("WTE") facilities within reasonable transportation distance of the County and the Facility was evaluated and found not to be economically feasible when compared to the proposed expansion of the Facility for the expected life of the Facility.

When considering the economic feasibility of hauling waste out of the County to another WTE facility, it is important to note that there are no existing WTE facilities within 50 miles of the County's Facility. Thus, it is not economical to use "packer trucks" to transport the County's solid waste to an existing WTE facility. Instead, the County would need to build and operate a new transfer station, and use tractor trailers to ship the waste to the existing out-of-county WTE facility. Hence, the cost of using an out-of-county WTE facility must include waste transfer and disposal costs. Further, it should be remembered that the cost of using a distant WTE facility will escalate if the cost of diesel fuel increases above current low levels.

The costs for transfer and disposal at other WTE facilities are depicted in Table 3, below. Comparing these costs to the County's solid waste disposal fee of \$47 per ton clearly indicates that the transfer and disposal of the County's waste at other WTE facilities is not prudent or economically feasible. The County's disposal fee is significantly less than the projected transfer and disposal fee for the use of those facilities that would potentially accept the County's solid waste. Moreover, the County has no guarantee that the rates shown in Table 3 will not escalate in the future. Indeed, the County has no guarantee that these out-of-county WTE facilities will even accept Lee County's waste, at any price, for the next 20 to 30 years.

TABLE 3

**LEE COUNTY WASTE-TO-ENERGY FACILITY
FEASIBILITY SURVEY DATA SUMMARY**

Survey Question	N. Broward 1*	S. Broward 2*	Dade	Hills. SW 3*	TPA 4*	Lake	W. Palm Bch	Pasco	Pinellas
1. Does your facility accept out-of county municipal solid waste?	Yes	Yes	No	No	No	County-No; Covanta-Yes	Yes	No	No
2. If yes, would you enter into a 20-year disposal agreement?	Yes	Yes	-	-	-	Covanta-Yes	Depends on BOCC	-	-
3. If yes, what is the disposal fee per ton?	56.45	56.98	-	-	-	~55.00	69.00	-	-
4. Distance from Lee County WTE facility to the Selected Out-of-County WTE facility?	143.7 miles	132.8 miles	-	-	-	182.09 miles	128 miles	-	-
5. Transfer cost and haul cost per ton.*	\$25.87	\$23.90	-	-	-	\$32.78	\$23.04	-	-
6. Total disposal cost and transfer cost per ton. **	\$82.31	\$80.88	N/A	N/A	N/A	\$87.78	\$92.04	N/A	N/A

County Name of Waste-to-Energy Facility
 Broward 1*North Broward County Resource Recovery Facility; 2* South Broward County Resource Recovery Facility
 Dade Dade County Resource Recovery Facility
 Hillsborough 3* Hillsborough County SW Energy Recovery Facility; 4* McKay Bay Refuse to Energy Facility
 Lake Lake County Resource Recovery Facility
 Palm Beach North County Regional Resource Recovery Facility
 Pasco Pasco County Solid Waste Resource Recovery Facility
 Pinellas Pinellas County Resource Recovery Facility

*Transfer cost and haul cost per ton: based on \$0.18 per ton/ mile and travel distance to the facility.

**Total disposal adjusted cost per ton: mileage from the Facility to respective facility (0.18) + disposal fee per ton in Line 3.

403.7061(3)(c) *The County in which the facility is located will achieve the 30-percent waste reduction goal set forth in s. 403.706(4) by the time the facility begins operation.*

Lee County has already achieved and will continue to achieve the 30% waste reduction goal in s.403.706(4) by the time the proposed Municipal Waste Combustion (MWC) unit at the Facility begins operation.

As stated earlier, the Florida Department of Environmental Protection's 2000 Solid Waste Management Annual Report shows that Lee County had the highest recycling rate of any county in the State of Florida.

Table 4 below lists the FDEP's recycling rates for Lee County from 1996 through 2000. Lee County has consistently met the State's 30% waste reduction goal and the County expects to continue meeting the 30% recycling goal.

TABLE 4
LEE COUNTY RECYCLING RATES
FROM 1996 THROUGH 2000

Year	1996	1997	1998	1999	2000
Recycling Rate ⁽¹⁾	40%	37%	37%	33%	31% ⁽²⁾

⁽¹⁾ As calculated using CS/HB 851, First Engrossed, posted 3/26/2002

⁽²⁾ unconfirmed by the FDEP

Recent recycling initiatives implemented by the County are aimed at increasing the County's recycling rate. For example, the County has implemented a new program for providing recycling bins to new homes when it receives the certificate of occupancy, as opposed to relying upon the homeowner to request a bin from the franchise hauler. In addition, in the Fall 2001, the County completed the construction of a new 400 ton per day ("tpd") Recovered Materials Processing Facility ("RMPF") that provides the County with an additional 200 tpd of recovered materials processing capacity. The RMPF allows the County to accept different and new types of materials as markets arise. In 2002, the County added three new materials to its recycling program: junk mail, office paper and pizza boxes. The RMPF also allows the County to expand its commercial and industrial waste reduction and recycling programs in the future. To this end, the County recently initiated a new Commercial Recycling Program. For this program the County has planned for the deployment of 22 covered roll-off containers at strategic locations throughout Lee County for the collection of office paper, old corrugated cardboard, magazines etc. To date the County has deployed 12 containers, and has 10 more containers planned for deployment in 2003. In July 2002, the County will begin collecting and recycling all paper products from the three major medical facilities in the County. In September 2002, at the County's request, the School Administration will launch a new recycling program for all schools in the County.

In addition, the County recognizes that C&D debris is a large component of the waste stream that continues to increase each year because of the County's high growth rate. To achieve the County's 40% waste reduction goal, the County is investigating various methods of increasing its recycling and waste reduction programs for C&D. The new C&D programs, combined with the new RMPF, will help ensure that Lee County will maintain compliance with the state's 30% waste reduction goal.

403.7061(3)(d) *The local government in which the facility is located has implemented a mulching, composting or other waste reduction program for yard waste.*

The County has implemented a waste reduction program for yard waste. The County, through its franchise haulers, provides weekly collection of horticultural wastes (yard waste) for all single-family residential dwellings within the unincorporated areas of the County. This material, as well as yard waste from many commercial properties (e.g. condominiums), is currently delivered to a site in Fort Myers for processing into mulch pursuant to an interlocal agreement between the City of Ft. Myers and the County. A portion of the County's horticultural waste is also hauled by private companies and processed at several private facilities located within the County. Additionally, the County delivers mulch to seven locations throughout the County where the residents can obtain this recycled horticultural material at no additional cost to the resident. With these programs in place, virtually all horticultural waste is processed and reused.

403.7061(3)(e) *The local governments served by the facility will have implemented or participated in a separation program designed to remove small-quantity generator and household hazardous waste, mercury containing devices, and mercuric-oxide batteries from the waste stream prior to incineration, by the time the facility begins operation.*

The local governments served by the Facility have implemented a program designed to remove small-quantity generator and household hazardous waste, mercury containing devices, and mercuric-oxide batteries from the waste stream prior to incineration.

The County instituted a household hazardous waste ("HHW") program in 1990, which includes a HHW transfer station and advertised, scheduled collection events to remove small quantity generator and HHW waste, mercury containing devices and mercuric oxide batteries. The HHW facility is used for the collection and temporary storage of HHW. Residents may dispose of their HHW, free of charge, during seven one-day events ("amnesty days") each year, held at Page Field in Lee County and designated locations in Cape Coral and Bonita Springs.

A second HHW transfer/storage facility was built at the Facility in 1998. The County accommodates residents who are moving, and require access to a HHW disposal facility at times other than the scheduled events, by accepting these materials at the Facility by appointment. The County also accepts hazardous materials from commercial establishments (SQG & CESQG) by conducting four collection events for businesses at its central transfer/storage facility (i.e. Page Field) each year.

The County has a very successful HHW program and recycles most of the HHW materials brought in by the residents. The quantity of HHW collected has increased from a total of 205 tons per year in fiscal year 1996 to 233 tons per year in fiscal year 1999. The percentage of HHW material recycled has increased from 71 percent to 81 percent.

The average number of participants has increased from approximately 995 per event to 1173 per event. The recycled materials include lead acid batteries, dry cell batteries, mercury containing devices, used oil, latex paint, antifreeze and propane cylinders. Other materials that are accepted during these scheduled days include poisons and pesticides, fluorescent tubes, and corrosives. These wastes are handled by a licensed contract hauler that transports the non-recycled HHW to licensed disposal and recycling facilities outside of the County.

In addition, the County has implemented a Pollution Prevention/Small Quantity Generator (P²/SQG) Program. This program monitors potential hazardous waste generators (businesses and institutions) and verifies the correct separation, handling and management of hazardous waste materials. The program focuses on educating the public about pollution prevention and compliance issues, including recycling and disposal options for a variety of hazardous materials.

The County's P²/SQG program was the first in the State to assist a vehicle (fleet) maintenance facility become a non-hazardous waste generating facility through proper materials separation and recycling practices. The County's P²/SQG program is recognized as one of the best in the State and has been used as a model for similar programs nationally.

Other commercially generated special wastes, such as fluorescent bulbs, thermostats and thermometers, are managed independently by the generator. Many manufacturers, such as Honeywell, have programs for "taking-back" thermostats from equipment distributors. Information on these programs is provided to the public through the County's HHW Program and P²/SQG Program.

The County was awarded a DEP grant of \$50,000 to initiate an electronic products collection and recycling program. The County implemented this program on July 24, 2001. As of July 31, 2002, the County has had 3,929 participants, collected 4,135 units for a total of 98,099 pounds. The program focuses on televisions, computers, monitors,

peripherals, and incidental amounts of other electronic products generated by households, small businesses and institutions. The County collects these products during scheduled events at three convenient locations within the County. The County also accepts these products at the County's new RMPF, by appointment, on a weekly basis. As proposed in the grant application, the County expects to conduct approximately 57 collection events during the grant period and plans to continue the program after the grant period because of increased awareness and public demand for this program.

Finally, a battery waste report was prepared by the National Electrical Manufacturers Association (NEMA) in the Fall of 2000, which included survey data from Lee County's battery recycling program. The purpose of this report was to determine the age, type and mercury level of the batteries currently collected in the U.S. The report concluded that mercury levels from batteries declined significantly from the first to the latest battery sort and the number of mercury free batteries increased in the latest sort. These results show that there has been a greater than 90% reduction in mercury levels from the mid-1980s. Based on these results, NEMA projects that the average mercury level in waste batteries will decline exponentially, decreasing by approximately 50% every 2 years. Mercury levels from batteries in the waste stream are expected to fall to the same mercury levels (less than 5 ppm) as the overall waste stream by the year 2008. A copy of the NEMA report is provided in Attachment C.

403.7061(3)(f) *The local government in which the facility is located has implemented a program to procure products or materials with recycled content, pursuant to s. 403.7065.*

Lee County has implemented a program to procure products and materials with recycled content, pursuant to s. 403.7065, F.S. Lee County's requirements for the procurement of materials with recycled content was adopted in 1991 and amended in 1997. The County's policy states that 75% of the paper products purchased by the County's offices must contain recycled content, and janitorial paper products must have at least 50% recycled

content. All printed materials are to indicate that they are printed on recycled paper. The County's policy requires the purchase of recycled content materials when available and requires that the County's bid specifications request recycled content materials. The County's policy also limits the purchase of non-recyclable paper products. The policy created a recycled-content paper product pool within the County to address the purchasing needs of the smaller Departments and Divisions within the County.

A list of vendors and the recycled content products they provide is circulated yearly to County departments. Recycled plastic park benches, picnic tables, car stops and lumber products are to be purchased instead of pressure-treated wood or other materials when the life cycle cost is equal. In 2000, the County government purchased \$119,453 worth of recycled content products. A description of the County's Government Office Recycling Program is provided in Attachment D.

403.7061(3)(g) *A program will exist in the local government in which the facility is located for collecting and recycling recovered materials from the institutional, commercial, and industrial sectors by the time the facility begins operation.*

Lee County has a program for collecting and recycling recovered materials from the institutional, commercial and industrial sectors of the County. As stated earlier, the County has a recycling goal of 40 percent. The County's Plan assumes that a significant portion of the waste generated by the County is recyclable. A large portion of these materials are separately collected and brought to the County RMPF or to other privately operated recycling facilities within the County. The privately operated recycling facilities have a significant impact on the quantity of materials separated and recycled within the County.

The County has a voluntary commercial recycling program and does not mandate collection of recyclable materials from businesses and institutions. However, the County

requires its franchise collection haulers to provide, at a minimum, recycling collection services for all businesses and institutions, and prohibits the imposition of any processing fees for any recyclables that are collected. Additionally, the County franchise haulers are prohibited from charging commercial customers higher collection fees for recyclables than are charged for collecting garbage. This commercial recycling program requirement applies for all materials collected by the County in its residential recycling program. Businesses and institutions contract independently for recycling services and many commercial properties utilize the County's or cities' franchise haulers.

Recycling within the commercial sector often reflects economic factors. For this reason, recycling rates increase when market prices for recycled materials rise and when disposal or processing fees can be avoided. A number of privately owned and operated recycling facilities receive commercial recycled materials, in addition to the County RMPF. A list of these facilities is provided in Attachment A.

In addition, as stated earlier, the County, through its HHW Program and P²/SQG Program provides additional opportunities to separate and recover materials from the institutional, industrial, and commercial sectors.

403.7061(3)(h) *The facility will be in compliance with applicable local ordinances and with the approved state and local comprehensive plans required by Chapter 163.*

The Lee County Facility is, and the expansion of the Facility will be, in compliance with the applicable local ordinances and with the approved state and local comprehensive plans. Indeed, before the Facility was built, the Facility was found to be in compliance with the applicable land use plans and zoning ordinances, consistent with the requirements and procedures in the Florida Electrical Power Plant Siting Act.

The Board of County Commissioners adopted its comprehensive land use plan (the Lee Plan) in 1994 and amended it in 1996. The County's Facility, the materials separation program, and the recycling program are integrated into many elements of the comprehensive plan. For example, the Facility is intended to divert materials from the landfill and decrease the County's reliance on landfills, consistent with Policy 40.13 in the Future Land Use Element of the Lee Plan. Similarly, in Policies 40.1.1 to 40.2.6 of the Solid Waste Element, the County supports the use of a fully integrated solid waste management system in which recycling and waste reduction are integral parts of the County's System. The use of the Facility is consistent with these and other policies in the Lee Plan.

403.7061(3)(i) *The facility is in substantial compliance with its permit, conditions of certification, and any agreements or orders resulting from environmental enforcement actions by state agencies.*

Lee County's Facility is in compliance with its permit conditions and conditions of certification. The Facility has not had any environmental enforcement actions by federal, state or local agencies.

The County's Facility is equipped with extensive, state-of-the-art air-pollution control equipment systems. It is the first operational waste-to-energy facility in the United States to be built with a permanent activated carbon injection system for controlling mercury emissions. The Facility has received numerous awards for operating in an environmentally sensitive and conscientious manner, such as the "Environmental Citizen" Award received from the DEP's South District office in 1994. The Facility received the "1999 Gold Excellence Award" for outstanding solid waste and waste-to-energy operations from the Solid Waste Association of North America. In August 2001 the Facility received an award from the American Society of Mechanical Engineers for outstanding waste-to-energy facility operation and maintenance. In Fiscal Year 2000/2001 the Facility had zero unexcused emissions for the fifth straight year.

ATTACHMENT A

MATERIALS SEPARATION PLAN – APPENDIX B

LEE COUNTY SOLID WASTE MANAGEMENT SYSTEM

The Lee County Solid Waste Management System (the "System") is the result of a comprehensive Integrated Solid Waste Management Master Plan, that has evolved into one of the most successful solid waste management and recycling programs in the State and nationally. The Florida Department Of Environmental Protection (FDEP) 2000 Solid Waste Management Annual Report ranks Lee County number one for recycling in the State of Florida (see Appendix A). The County's Materials Separation Plan (the "Plan") is embodied within the County's System.

Background

The Florida Resource Recovery and Solid Waste Management Act of 1988, Part IV, Chapter 403, Florida Statutes, was enacted in order to reduce the amount of solid waste disposed of throughout the State. This legislation enabled Florida counties to provide solid waste disposal facilities for their residents and businesses. It mandated that recycling initiatives be pursued in each county in order to meet a recycling goal of 30 percent of the waste stream by the end of 1994. It also required that construction and demolition debris be segregated from the municipal solid waste stream and disposed of separately at landfills, and that a significant portion of newspaper, aluminum cans, glass and plastic bottles also be removed for recycling rather than disposal.

The Lee County Solid Waste Disposal and Resource Recovery Act of 1985, enabled the County to enter into a contract to construct, operate, and maintain a solid waste disposal and resource recovery system for the benefit of County residents. This legislation stipulated that all entities, both public and private, within the territorial boundaries of the County utilize the solid waste facilities designated by the County. This legislation also enabled the County to impose necessary fees in order to finance the costs of the system on a self-supporting, non-profit, cost-recovery basis. The Board of County Commissioners, as the County's governing body, is responsible for setting the rates and collecting all fees necessary to operate and maintain the County's Solid Waste System

(i.e. the "System"). The County's System is designed to provide for an integrated solid waste management and materials separation approach with proven success. The program includes an aggressive recycling goal of 40 percent and emphasizes the conservation of resources by diverting materials through recycling, reuse, and reduction, from existing solid waste management facilities. The County also has programs in place which close the recycling loop, (i.e. purchase recycled products), coupled with cooperative education programs with the Lee County School Board and Keep Lee County Beautiful.

A description of the elements of the County's System emphasizes the comprehensive initiatives implemented by the County to address materials separation as it relates to the overall solid waste management program and the fulfillment of the Plan.

Solid Waste Generation and Recycling Projections

In March 2000 the County updated its 1989 Integrated Solid Waste Management Master Plan, examining the status of the County's System and the impacts of the County's growth on its future. This solid waste master plan update, like the previously developed solid waste master plan, examined the various types of solid waste generated within the County, including the quantities of wastes and recyclables generated, as well as the characteristics of each specific type of material. Historical population trends were also examined, and population projections developed for the entire Lee and Hendry counties. These population projections were utilized to estimate the quantities of materials capable of being recycled or requiring disposal capacity, for each of the next 10 years. Appendix D contains pertinent excerpts of the Lee County Solid Waste Management Plan Update.

Population

Under the terms of the Lee County/ Hendry County Interlocal Agreement, dated October 17, 1989, municipal solid waste from Hendry County is to be handled by Lee County for a 20-year period. Accordingly, population projections and waste generation rates have been developed for both Lee and Hendry Counties. Appendix D, Table 2-1 depicts the estimated population growth for Lee and Hendry counties that were used to develop the

estimates of materials capable of separation or disposal. Additionally, as reported by the U.S. Census Bureau, the population of Lee County for the year 2000 is 440,888 persons, which represents a 31.6 percent change in population from 1990. The population of Hendry County for the year 2000 is 36,210 persons, which represents a 40.5 percent change in population from 1990. For reference, the State's percent population change from 1990 to 2000 is 23.5 percent as reported by the U.S. Census Bureau.

Solid Waste and Recyclable Material Quantities

The historical quantity of solid waste generated in Lee County is shown on Table 2-3 of Appendix D. As shown, there has been an increase in the total quantity of solid waste generated of approximately 28 percent from 1996 to 1999. Solid waste quantities from Hendry County, which are handled by the Lee County system, are shown on Table 2-4 of Appendix D. Recyclable materials from Hendry County, do not enter into Lee County's solid waste stream, and are not included with the County's recyclables totals. Additional solid waste, recyclables and ash residue quantities are provided in Appendix C, Table 1 of the Recycling Grant Report.

Solid Waste System Service Area

The County, through local ordinances, has mandated that all residential and commercial entities will be subject to mandatory waste collection within the unincorporated areas of Lee County. The County established franchise districts within the unincorporated areas and granted franchise haulers exclusive rights to collect waste from their assigned district(s). The six franchise hauling areas for the unincorporated portion of the County are shown on Figure 2-1. The haulers collect both residential and commercial waste as well as residential recyclables and horticultural waste. Each hauler delivers the waste to County-designated facilities in accordance with the terms of its franchise hauler agreements. The County pays the haulers for providing residential collection service in the unincorporated areas. The County collects the disposal fee, collection fee and a surcharge from unincorporated County residents to pay for all residential solid waste and recycling services. Commercial establishments in the unincorporated areas pay for solid

waste collection and disposal services directly to their franchise hauler. The franchise haulers pay the County a tipping fee for the disposal of commercial waste and other County surcharges. In addition, all users of the County's system pay a Disposal Facility Assessment directly to the County, which is based on their average waste generation.

Each of the incorporated cities located within the County has an ordinance, which establish mandatory collection of solid waste. The City of Fort Myers provides for municipal collection of all its waste, while the Cities of Cape Coral and Sanibel utilize private haulers. The Town of Fort Myers Beach and the City of Bonita Springs utilize the franchise hauler provided by the County. Interlocal Agreements between the County and the Cities provide for solid waste disposal and recycling capacity at County facilities and Disposal Facility Assessments.

Solid Waste Flow Control

The County, recognizing the importance of waste flow control to the economics of operating an integrated solid waste system, enacted County Ordinance No. 86-14 as amended and restated by Ordinance 95-19, which states that all waste collected in the County be directed to a County-designated facility for disposal. The County, also recognizing the possibility that the constitutionality of this flow control ordinance could be challenged, has maintained County disposal fees at competitive rates as a means of retaining economic flow control, while maintaining the financial health of their solid waste program. In addition to the County's Waste Flow Control Ordinance, the County's franchise haulers are required to deliver solid waste to the Facility. The County has Interlocal Agreements with the Cities of Fort Myers, Cape Coral, Sanibel, Bonita Springs and the Town of Ft. Myers Beach, to govern the delivery of waste to the Facility.

Solid Waste System Agreements

Vital elements of the County's success in effectively and efficiently managing the County's solid waste are its solid waste system agreements. The County has entered into

a number of salient agreements that have enabled the County's System to provide for economical, fiscally responsible and environmentally sound means of solid waste management within Lee County.

Hendry/Lee County Agreement

Under the terms of the Hendry/Lee County agreement, two transfer stations were constructed in Hendry County to transport waste from Hendry County to the Facility. Hendry County also agreed to assist the County in the development of the Regional Landfill. Hendry County requires its residents and franchise haulers to dispose of all waste either at the Transfer Stations, Regional Landfill or the Facility.

Covanta Service Agreement

The Service Agreement between the County and Covanta of Lee, Inc. (formerly Ogden Martin Systems of Lee, Inc.) requires that the Facility be operated and maintained to receive and process waste, generate steam, and convert that steam to electric power for export at established guaranteed levels. Facility performance is measured on an annual basis, in comparison to the guarantees contained in the agreement.

Electric Power Purchase Agreement

In May 1999, the County entered into an Electric Power Purchase Agreement (Agreement) with Seminole Electric Cooperative, Inc. (Seminole). Under the terms of this Agreement, Seminole began purchasing the net electric power produced by the Facility on December 15, 1999. The Agreement is scheduled to expire on December 31, 2015. After an initial three-year period, either Seminole or the County may request to renegotiate the energy and/or capacity pricing. Following commencement of energy delivery to Seminole, the County's electrical revenue increased by approximately 44 percent.

Interlocal Agreements

The County has recently negotiated revised interlocal agreements with the City of Fort Myers, the City of Sanibel, the City of Cape Coral, the City of Bonita Springs, and the

Town of Fort Myers Beach to provide solid waste disposal and recycling capacity for these cities for a 10-year period.

Franchise Agreements

The unincorporated areas of the County are served by exclusive collection franchises, which cover both residential and commercial collection. In 1995 the County's franchise districts were re-drawn, dividing the unincorporated areas of the County into six hauling areas. In accordance with the terms of the Franchise Hauling Agreements, all franchised processible waste must be delivered to the Facility. The agreements were re-bid in FY 1999 with several new haulers awarded franchises beginning in October 2000.

Solid Waste System Components

Lee County Solid Waste Energy Recovery Facility

The Lee County Solid Waste Energy Recovery Facility (the "Facility") is a 1,200-ton per day (nominal) mass burn resource recovery facility located on a 155-acre site owned by the County on the north side of Buckingham Road in the unincorporated area of the County. The Facility has several innovative environmental aspects. Most notable are its air pollution control system, its metals recovery systems, its ecologically sound reuse of treated wastewater and its extensive wetlands protection and mitigation elements.

Briefly, the history of the Facility is as follows. In 1990, the County selected Ogden Martin Systems of Lee, Inc. (now Covanta) to design, construct, operate, and maintain the Facility, which was ultimately sized at 1,200 tons per day (tpd) with 1,800 tpd future facility capacity. The service agreement provides for the operation and maintenance of the facility for a 20-year period, beginning on December 1, 1994. "First fire" at this Facility took place on August 24, 1994. Representatives from Lee County, Covanta and the FDEP were present to participate and witness this event. Unit #1 was started up first on August 24, 1994 and Unit #2 on September 3, 1994. Acceptance testing was conducted from October 17-26, 1994 and the facility entered into commercial operation effective December 1, 1994. The Facility has operated with a combined boiler

availability of 91 percent and a Turbine Generator availability of 99.6 percent. In excess of 1.8 million tons of waste has been processed; 10,140,000 Klbs of steam produced; 1,077,000 KWh of power generated; over 1 million net KWh of power sold; 477,000 tons of ash produced; 43,000 tons of ferrous; and 1,000 tons of non-ferrous metals recovered

The Facility is equipped with two 660 tpd (at a reference waste of 5000 Btu) mass burn municipal waste combustors which utilize Martin reverse-reciprocating stoker grate and combustion control technology. Steam is generated by two 169 Klb/hr Distral water wall boilers. A Bailey Infi 90 Distributive Control System is used to regulate plant systems. The ABB pollution control equipment includes dry gas scrubbers, fabric filter baghouses and mercury and nitrogen oxide abatement systems. A Continuous Emissions Monitoring (CEM) system, built by Covanta, monitors carbon monoxide, oxygen, nitrogen oxide, opacity, sulfur dioxide, total steam production, power generation, ammonia injection rate, slaked lime usage, activated carbon usage, combustion efficiency, stack, and combustion zone temperatures. A Mitsubishi condensing steam turbine with extractions supplying auxiliary steam to air heaters, air ejectors, the deaerator and low pressure feedwater heaters drives a 39.7 MW air cooled, synchronous generator. Secondary treated wastewater is used to condense the turbine exhaust steam. This condensate is returned to the boilers. Net power produced is transformed to 138 kV and sold to Seminole Electric Company for distribution. Flyash is transported by an enclosed conveyor system to the Martin Ash Dischargers where it is combined with bottom ash from the grate. A grizzly scalper, magnetic separator, and non-ferrous recovery system are installed to recover ferrous and non-ferrous metals from the ash.

Gulf Coast Landfill

The Gulf Coast Landfill is located on the south side of State Road 82, approximately three miles east of U.S. Interstate 75. It is owned and operated by Waste Management Inc. of Florida (WMIF) who provides disposal capacity under contract to the County. The landfill is located on approximately 320 acres, and the County sends all non-processible waste (primarily C&D) as well as bypass waste and ash residue from the Facility to this landfill. The landfill has been constructed with a single synthetic liner and

leachate collection system. In January 1998, the FDEP renewed the operating permit for the landfill for an additional five-year period, potentially extending the useful life to October 2003. It is anticipated that the landfill will reach its permitted volume by the end of 2002, and closure is expected to begin in 2002 or 2003. Under the terms of the contract between the County and WMIF, no waste from outside Lee or Hendry counties may be accepted at the landfill facility unless approved by the County, except for limited quantities of Special Wastes, which are defined as being non-hazardous, but which may require specialized handling or management.

Lee / Hendry County Regional Landfill

The Lee / Hendry County Regional Landfill (the "Regional Landfill") is located in western Hendry County on an 1800 acre site owned by Lee County, with access to the site via State Road 82 and South Church Road. The County has contracted with WMIF to operate the landfill for a 20-year period, once the Gulf Coast Landfill is no longer utilized by the County for the disposal of ash and C&D. The landfill currently consists of a 12.3 acre Class I double-lined landfill cell, which includes a leachate collection system, double-lined leachate storage pond, and other support facilities. Construction of the first cell of the landfill was completed in March 1997, and it was designed to accept ash from the County's Facility as well as by-passed waste from Lee and Hendry counties for at least a 5-year period. The landfill design meets FDEP solid waste regulations as per the Florida Administrative Code.

It is anticipated that ash, C&D, and by-pass waste will continue to be disposed of at the Gulf Coast Landfill through the third quarter of calendar year 2002, and that the Regional Landfill cell will be capable of handling ash through the year 2007, with an additional cell required to be developed prior to that time. In addition, the County has established a policy of maintaining approximately 500,000 cubic yards of landfill capacity in reserve for uncontrollable circumstances and emergencies, such as hurricanes. Based on this policy, it is estimated that construction of a second cell will be required to be completed in 2004.

Transfer Stations

The County owns and WMIF operates two transfer stations located in Hendry County; one in LaBelle and one in Clewistown, each with a design capacity of 100 tpd. These transfer stations were constructed in 1992 in accordance with the terms of the Interlocal Agreement with Hendry County. The transfer stations currently accept a total of approximately 90 tpd of Class I (household) and 5 tpd of Class III (C&D) waste from Hendry County for transfer to a Lee County-designated facility. The transfer stations in Hendry County currently accept and process a total of approximately 38,000 tons per year of waste generated within Hendry County. The capacity of these transfer stations is approximately 57,000 tons per year.

C&D Processing and/or Disposal Facilities

Construction and demolition waste from franchise haulers is primarily delivered to the Gulf Coast Landfill for disposal. In fiscal year 1999, approximately 45,700 tons of C&D were brought to that facility. A relatively small quantity of C&D, that which is processible, is burned at the Facility, amounting to about 4,900 tons in fiscal year 1999. A permit modification to the PSD permit for the facility limits the amount of non-processible C&D burned to 5 percent of the total waste delivered. Non-processible C&D includes concrete, metals, gypsum products, plaster, rock, brick and masonry, and other non-combustible materials.

In addition, C&D generated by the commercial sector, is also delivered to Forestry Resources, Inc. in Fort Myers, a privately owned facility, which recycles some of the components comprising C&D and which currently receives approximately 100 tpd of materials. Much of the C&D generated in Lee County is also disposed of in neighboring Charlotte and Collier Counties, where tip fees for C&D disposal are lower than at Lee County facilities. The County does not control the location for C&D disposal from non-franchised haulers.

Materials Recycling Facility

The County's solid waste management program emphasizes the conservation of resources by diverting materials through recycling, reuse, and reduction from existing solid waste management facilities. The State has established a statewide goal of 30 percent waste reduction, reuse and recycling. The FDEP 2000 Solid Waste Management Annual Report shows that Lee County had the highest recycling rate for any County in the State of Florida (i.e. calendar year 1998). In calendar year 1999, the County recycled 36 percent of its waste and has consistently met the State's recycling goal of 30 percent. This materials diversion rate underscores the importance the County has placed upon materials separation and recyclables recovery. The cornerstone of the County's successful recycling program is the publicly owned Materials Recycling Facility (MRF) located in North Fort Myers to handle residential recyclable materials. All single family residential units as well as multi-family dwellings in the County are provided with curbside recyclables collection, and all residential recyclable materials are delivered to the MRF. The MRF processes both mixed papers and commingled materials in its processing lines. Corrugated cardboard, phone books, magazines and newspaper are manually separated on the fiber line. Steel cans, aluminum cans, plastics (PET, HDPE and mixed) and glass (clear, brown and green) are sorted on the commingled line.

The County is in the process of constructing a new 60,000 square foot Recovered Materials Processing Facility (RMPF) at the Facility site and relocating the existing MRF equipment to the new RMPF. The RMPF will be fully operational by the end of 2001, and will be capable of handling approximately 400 tpd of recovered recyclable materials. The new RMPF will allow for changes in recovered materials composition, and the addition of new materials to the program in the future.

Tire Processing Facility

In July 1996, the County submitted an amendment to the County's application for site certification of the Facility under the Florida Electrical Power Plant Siting Act for building and operating a waste tire processing system on the site of the Facility. The County currently uses this tire processing facility for storage and pays a private tire

processor in Bonita Springs to shred loads of tires, which once shredded, are returned to the Facility to be burned. By utilizing this process the County is recovering energy and steel from the waste tire materials. In calendar year 1999, approximately 12,800 tons of shredded tires were burned at the Facility. The quantity of tires capable of being processed at the Facility is limited by the modification to the facility's PSD permit, to 5% by weight, of the facility's total fuel, with compliance determined on a calendar month basis. At the current 1200 tpd capacity of the Facility, assuming an 85 percent availability, segregated tire tonnage's would be limited to 18,615 tons per year, or approximately 1,550 tons per month.

Household Hazardous Waste Collection Facilities

The County instituted a household hazardous waste (HHW) program in 1990, consisting of a household hazardous waste transfer station combined with advertised and schedule collection events. The HHW facility is used for the collection and temporary storage of HHW which residents may bring in free of charge, at seven one-day events each year, held at Page Field in Lee County and designated locations in Cape Coral and Bonita Springs. A second transfer/storage facility was built at the Facility site in 1998. The County accommodates residents who are moving, and require access to a disposal facility at other times, by accepting these materials at the Facility by appointment. The County also accepts hazardous materials from commercial establishments by conducting four HHW collection events at Page Field each year.

Horticultural Waste Processing Facilities

The County currently has an agreement with the City of Fort Myers to deliver its horticultural waste to the Fort Myers Horticultural Trash Processing Facility. This vegetative waste mulching facility and air curtain incinerator is located in Fort Myers. Loads of horticultural waste (primarily lawn clippings and trimmings, branches, palm fronds and logs) from weekly collections of households by the franchise haulers are delivered to this site. Waste is delivered both loose and in plastic bags, then shredded. The quantity of horticultural material collected and recycled has remained fairly constant, and in fiscal year 1999, 33,660 tons of horticultural materials were delivered to this

facility by Lee County. The resultant mulch is stockpiled and screened on site for distribution to County agencies and residents. The facility has been in operation since 1993.

Additionally, the County has recently obtained a permit modification for the Facility site in order to construct a yard waste processing facility on a 13-acre parcel of land. The new facility is intended to be large enough to accommodate an entire year's volume of incoming horticultural material, or approximately 40,000 tons annually, and sufficient storage and stockpiling will be available.

Other System Components

Other System Components include the County's management programs for special wastes. These programs include collection of waste oil, curbside collection of household batteries, a used sharps depository program, and white goods collection.

ATTACHMENT B

ENVIRONMENTAL CITIZEN AWARD

Environmental Citizen Award

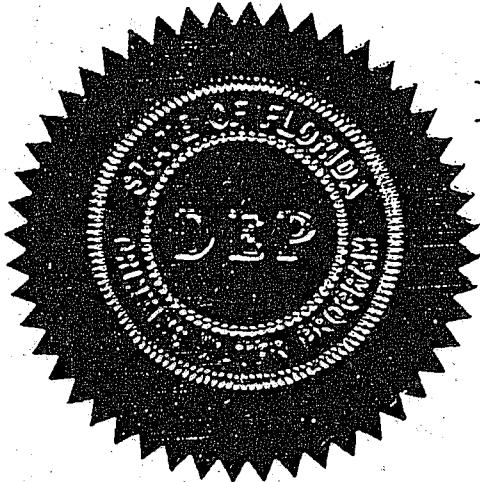
awarded to

**Ogden Martin Systems of Lee, Inc. Lee County
Solid Waste Resource Recovery Facility**

Awarded for continuing dedication to improving air quality while reducing our municipal solid waste and our dependence on fossil fuels for the production of electricity.

presented by

**Department of Environmental Protection,
South District
September 12, 1996**



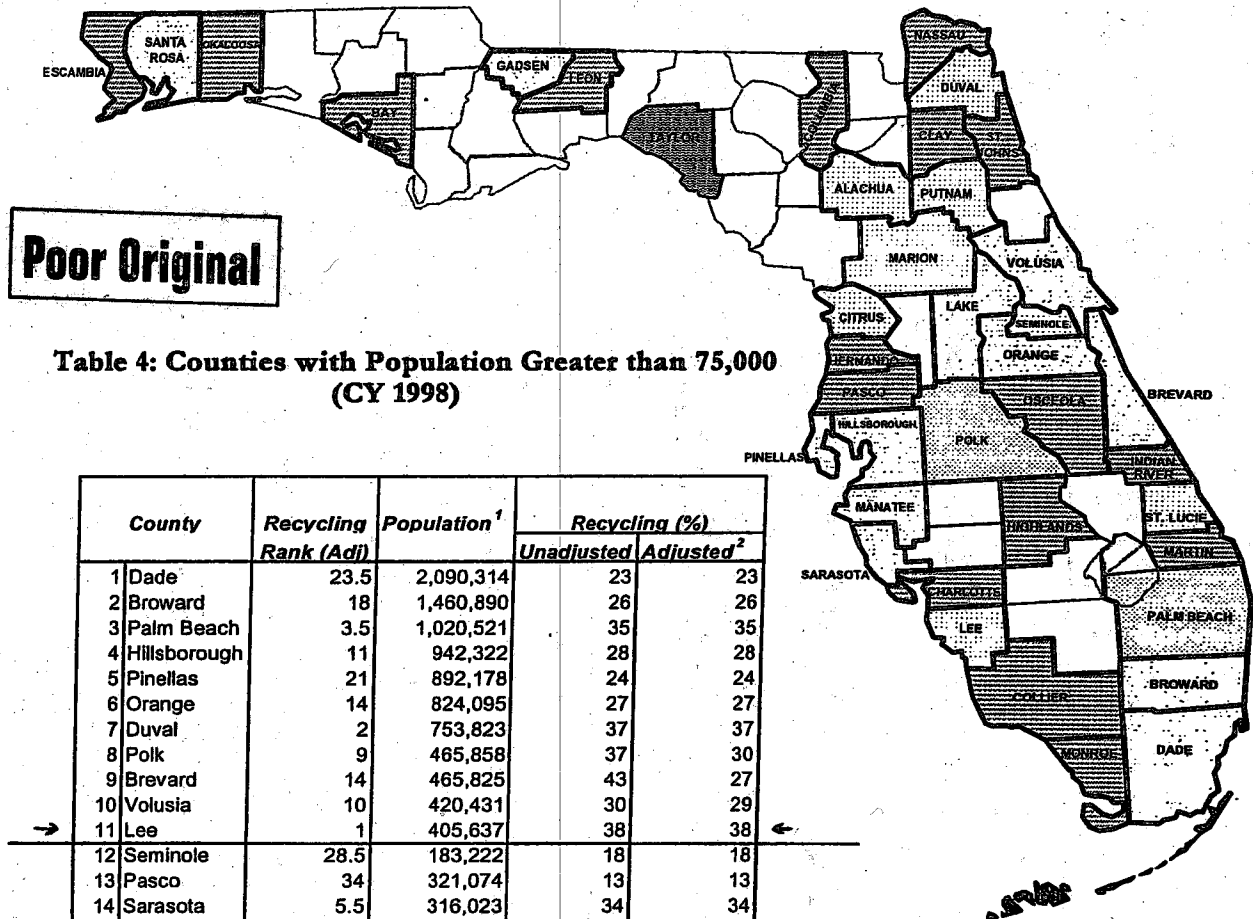
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Peter Ware, District Director

ATTACHMENT C

EXCERPTS FROM DEP'S 2000 SOLID WASTE ANNUAL REPORT

Figure 12: Recycling in Florida's Counties (CY 1998)



-  Counties with a population >75,000 which have met the 30% recycling goal.
-  Counties with a population > 75,000 which have not met the 30% recycling goal.
-  Counties with a population < 75,000 which have recycling rates of 30% or greater.
-  Counties with a population < 75,000 which have recycling rates < 30%.

¹ 1998 populations used by FDEP to allocate Recycling and Education (R&E) grants for the 1999-2000 grant cycle.

² The Legislature established a goal of 30 percent by the end of 1994 for counties with a population over 75,000.

Table 6B: County Recycling⁴ in Florida
By Descending Adjusted Recycling Rate
 (Jan. 1, 1998 - Dec. 31, 1998)

County	Adjusted Recycling Rank	Population Rank	Population ⁴	MSW Recycling (%)		Minimum 5 Materials Recycling (%) ³				
				Unadjusted	Adjusted ³	News-papers	Glass	Aluminum Cans	Plastic Bottles	Steel Cans
Lee	1	11	405,637	38	38	59	22	29	21	100
Duval	2	7	753,823	37	37	54	77	24	14	49
Taylor	3	53	19,527	36	36	11	0	16	11	0
Palm Beach	4.5	3	1,020,521	35	35	50	26	53	11	58
Alachua	4.5	19	211,403	35	35	56	76	17	20	15
Saint Lucie	6.5	22	183,222	40	34	41	64	57	34	19
Sarasota	6.5	14	316,023	34	34	84	94	32	21	20
Marion	8	17	242,357	32	32	22	14	28	1	1
Citrus	9.5	30	112,424	31	31	39	26	41	9	6
Putnam	9.5	36	71,454	31	31	26	0	16	14	2
Polk	11	8	465,858	37	30	28	6	21	13	2
Volusia	12	10	420,431	30	29	48	33	21	24	15
Hillsborough	13	4	942,322	28	28	61	37	38	21	78
Hernando	16	28	125,008	27	27	65	16	1	4	1
Martin	16	29	119,370	37	27	63	40	19	18	14
Lake	16	21	196,073	27	27	53	12	16	9	20
Brevard	16	9	465,825	43	27	42	27	16	22	7
Orange	16	6	824,095	27	27	36	8	42	12	13
Leon	20.5	18	233,232	39	26	44	5	21	9	8
Charlotte	20.5	26	133,655	26	26	57	63	50	29	34
Sumter	20.5	41	47,907	26	26	53	35	17	6	29
Broward	20.5	2	1,460,890	26	26	73	75	20	91	11
Manatee	24	16	247,028	32	25	17	29	24	6	17
Calhoun	24	62	13,572	25	25	0	0	3	0	3
Columbia	24	37	55,368	25	25	12	4	27	3	4
Pinellas	26	5	892,178	24	24	33	13	98	17	97
Santa Rosa	28.5	33	107,814	27	23	29	3	16	2	2
Monroe	28.5	34	85,646	24	23	42	20	20	19	35
Indian River	28.5	32	106,690	40	23	75	26	18	27	7
Dade	28.5	1	2,090,314	23	23	31	40	8	20	41
Collier	32	20	210,095	22	22	47	9	49	69	7
Highlands	32	35	80,458	22	22	35	12	9	3	3
Suwannee	32	45	33,746	22	22	7	1	31	0	17
Bradford	34	49	25,355	21	21	21	6	13	4	3
Gilchrist	35.5	63	13,140	20	20	9	11	46	6	9
Okeechobee	35.5	44	35,059	20	20	7	0	15	0	0
Madison	37	54	19,277	19	19	8	2	10	3	3
Gulf	39	57	14,260	27	18	3	7	2	0	2
Escambia	39	15	296,184	18	18	11	0	16	0	0
Seminole	39	12	345,166	18	18	93	17	10	13	9
Union	41	60	13,459	17	17	11	4	16	3	3
Holmes	43.5	56	17,949	16	16	0	0	10	0	11
Wakulla	43.5	55	19,828	16	16	100	56	18	37	16
Glades	42	65	9,875	16	16	14	0	0	1	0
Osceola	43.5	25	148,712	16	16	40	6	4	2	1
Franklin	43.5	64	10,739	15	15	21	19	7	17	87
Lafayette	47	67	6,998	15	15	37	11	0	7	100
Clay	47	27	134,534	15	15	77	8	13	18	10
Saint Johns	47	31	109,894	15	15	55	3	5	3	2
Okaloosa	50	23	175,568	14	14	20	15	12	1	16
Nassau	52	38	54,538	13	13	11	5	1	0	0
Dixie	52	61	13,196	13	13	0	0	35	0	0
Pasco	52	13	321,074	13	13	17	18	9	23	24
Levy	55	46	32,416	12	12	22	12	26	0	0
Bay	55	24	147,496	12	12	0	0	12	0	0
Hardee	55	50	22,801	12	12	0	7	21	0	0
Gadsden	57	39	50,820	11	11	91	14	37	11	23
Jefferson	58.5	58	14,207	10	10	20	5	0	5	0
Hamilton	58.5	59	14,120	10	10	3	0	0	0	0
Baker	61	51	21,131	9	9	15	2	10	4	3
De Soto	61	48	27,927	9	9	26	4	19	1	0
Flagler	61	42	43,441	9	9	17	0	1	0	0
Washington	63	52	21,319	8	8	5	2	15	19	16
Liberty	64	66	7,708	7	7	30	10	6	5	10
Walton	65	43	38,304	5	5	0	0	31	1	100
Jackson	66	40	49,670	4	4	2	0	0	1	6
Hendry	67	47	30,364	3	3	1	0	0	1	0
State	NA	NA	5,913,450	28	28	44	30	22	18	30

¹ Percentages are based on Waste Composition Studies as reported by each County. □

For further discussion of the data's validity, see page 6 of the Introduction.

² Official 1998 Governor's Office estimates.

³ The Legislature established a goal of 30 percent by the end of 1994 for each county with a population over 75,000.

⁴ The Legislature established a goal of 50 percent for these materials by the end of 1994 for each county.

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ATTACHMENT D

**THE NATIONAL ELECTRICAL MANUFACTURERS
ASSOCIATION'S SUMMARY REPORT OF ANALYSES OF
MERCURY FROM CONSUMER BATTERIES IN THE WASTE
STREAM - FALL 2000**



Setting Standards for Excellence
1926 - 2001

SUMMARY REPORT OF ANALYSES OF MERCURY FROM CONSUMER BATTERIES IN THE WASTE STREAM

Fall 2000

Poor Original

April 2001

National Electrical
Manufacturers Association
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Image Quality

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Please note that the original documents
were of poor quality.**

SUMMARY

During September 2000, the National Electrical Manufacturers Association (NEMA) Battery Section conducted the fifth round of analyses of samples of post consumer round cell, alkaline manganese and zinc carbon batteries in the municipal waste stream. These were from the Camden County New Jersey battery drop off collection program, the Lee County Florida battery curbside collection program, and the Hennepin County Minnesota drop off and curbside collection programs. The purpose of these analyses is to determine the age, type, and mercury level of the batteries currently collected in the US.

Prior to the elimination of the use of mercury in these batteries, average mercury levels for alkaline batteries were 8,000-12,000 PPM and for zinc carbon batteries were 100 PPM. Between 1989 and 1991, the industry shifted to producing very low (< 250 PPM) mercury alkaline batteries. In 1992-1993, the industry stopped adding mercury to both alkaline and zinc carbon batteries. The results of the analyses, which show a significant reduction of the average level of mercury in the waste stream from batteries, are as follows:

Mercury Level in Parts Per Million

<u>County</u>	<u>Alkaline Manganese</u>	<u>Mercury % No Added</u>
Camden (2000)	365	88
Lee (2000)	259	88
Hennepin (2000)	388	87

In calculating the mercury content, NEMA made certain assumptions documented in this report. The analysis used gives a "worst case" mercury concentration. The battery industry developed the method of analysis employed in this study over a five-year period during stockpile analyses in Germany, Sweden, Belgium and the Netherlands. The industry employed it over the past four years to predict the decline of residual mercury in the collected batteries within The Netherlands. Independent chemical analyses conducted during mercury removal trials on typical mixes of batteries, which found similar levels of residual mercury, have validated the accuracy of this method.

The concentration of mercury and age distribution trends found in alkaline manganese and zinc carbon batteries continue to mirror those found during stockpile analyses carried out annually in Europe by the battery industry since 1992.

In each case, mercury levels from batteries declined significantly from the first to the latest battery sort and the number of mercury free batteries increased from the first to the latest sort. These results now represent a greater than 90% reduction in mercury levels from the mid 1980s.

In each county, larger C and D alkaline manganese batteries had higher levels of mercury than AA batteries. The most frequent (median) ages of alkaline batteries found in the stockpiles were 2-3 years old.

Considering these results, NEMA projects that the average mercury level will decline exponentially, decreasing by approximately 50% every 2 years. This would result in mercury levels from batteries in the waste stream falling to background mercury levels (less than 5 PPM) by the year 2008.

Readers should interpret these results with caution. NEMA has now undertaken fourteen studies and the analyses of mercury levels are in broad agreement despite some regional differences. A limited number of data points, however, form the basis for the projection of future mercury levels. NEMA intends to conduct annual analyses to document the continued decline in mercury levels.

1. Determination of the Mercury Content of Round Alkaline Manganese and Zinc Carbon Batteries

1.1 Introduction

During September 2000, NEMA conducted the latest analyses of post consumer round alkaline manganese and zinc carbon batteries collected in Camden, Lee and Hennepin Counties. The objective of the analyses was to determine the age and types of batteries present in the waste stream and to determine the extent by which the mercury content has decreased since the first set of analyses conducted in 1996 and 1997. The age and battery type information, together with compositional information supplied by battery manufacturers, was used to calculate the amount of mercury still present in these batteries. Additionally, the information gathered has been used to project the decline in mercury levels in these batteries in future years.

The Camden County analysis was based on a 1,002-kilogram sample collected from the Camden County, New Jersey battery "drop off" collection program. This program consists of 40 to 100 battery "drop off" locations, such as schools, fire stations, court houses, tax assessor offices, etc. Many of these locations are open throughout the week. Although the program has been established primarily for the collection of consumer batteries, businesses (such as hospitals) are encouraged to utilize the program for non-consumer batteries. Batteries are picked up weekly by the Pollution Control Financing Authority (PCFA) and are delivered to Wade Salvage approximately every two weeks. Wade Salvage then separates out the various batteries for appropriate waste management.

The Lee County analysis was based on a 922-kilogram sample collected from the Lee County Florida battery collection program. This is a "curb side" collection program. In this program, single-family households are supplied with unique sealable plastic bags for disposal of used batteries as part of a household battery disposal system. Curbside collection vehicles operated under contract for the Lee County Department of Solid Waste Management regularly collect these bags.

The Hennepin County analysis was based on a 356-kilogram sample collected from the Hennepin County Minnesota battery collection program. In this program, both "curb-side" and "drop-off" collection are utilized. The sample analyzed contained batteries from both collection schemes.

1.2 Method

The battery industry has developed the method of analysis employed in this study over a five-year period during stockpile analyses in Germany, Sweden, Belgium and The Netherlands. The industry has employed it for the past eight years to predict the decline of residual mercury in the collected batteries within The Netherlands. Independent chemical analyses conducted during mercury removal trials on typical mixes of batteries which found similar levels of residual mercury has validated the accuracy of this method.

1.2.1 Aging of the Sample

For alkaline batteries in Camden and Lee Counties, only those produced by Duracell, Panasonic and Kodak were used in the analysis to determine battery age. The analysis does not include other batteries for the following reasons: 1) no information on date coding was available; 2) the codes were illegible; or 3) time constraints prevented the use of the coded data. This was particularly problematical for zinc carbon batteries. Although the analysis excludes other battery manufacturers, they are assumed to follow the same trends as the three manufacturers analyzed. Alkaline batteries produced by Energizer were used in the analysis for Hennepin County batteries.

Additionally, the analysis excludes AAA size batteries, as the date code is very small and difficult to read. As these constitute only a small percentage by weight of the alkaline batteries, their exclusion is not considered significant.

For the mercury analysis of zinc carbon batteries, only those manufactured by Panasonic and Kodak could be used. Consequently, the analysis uses only a very small sample for these calculations. This results in a much lower confidence in the zinc carbon data compared to the alkaline data and indeed the statistical significance of the zinc carbon data is questionable. In addition, zinc carbon batteries had much lower mercury levels, approximately 100 PPM, than alkaline batteries. As a consequence, this report projects and discusses only the decline of residual mercury in the alkaline batteries.

Manufacturers generally either stamp date codes on the base or side of the battery. The analysis determined age of each battery and hence the mercury content by recording the manufacturers date code and converting this back to the year of manufacture. In the case of the Duracell batteries, the analysis uses freshness code printed on the label to determine the year of manufacture. This is not ideal, but Duracell manufacturing codes are either printed invisibly, or beneath the label and this prevented their use in this study. The analysis assigns some batteries to manufacturing dates one year earlier than their actual year of manufacture as a result of using freshness codes.

1.2.2 Calculation of Mercury Content

The mercury content of the batteries for each year of manufacture was calculated from manufacturing information supplied by Duracell, Panasonic and Kodak and from direct analysis. An adjustment based on market share was also made¹.

¹ Duracell and Energizer are the largest manufacturers and combined have a majority share of the market. Energizer's date codes however were unable to be easily read and therefore were not used in the aging calculation for Camden and Lee Counties. But a mean average of Duracell and Energizer mercury contents, based on market share, was used in the calculation of residual mercury in the samples.

The study uses the mercury content of each battery type, for each year of manufacture, to calculate an average (mean) mercury content for that battery type. These were then used to determine the mercury contents of the alkaline and zinc carbon streams within the samples.

Some assumptions, however, were made:

1. When a manufacturer changed the mercury content of a battery, all batteries manufactured in that year were taken as having the higher mercury content.
2. Batteries manufactured before mercury concentration data was available were taken as having the same concentration as the year in which the first data became available.

Assumption one is likely to bias the mercury content higher than the actual level. Assumption two is unlikely to cause major changes to the overall mercury content since battery companies manufactured these batteries before they introduced the mercury reduction programs. In general, this method of analysis will give a "worst case" mercury concentration.

Table 1 shows the calculated mercury content breakdown for alkaline and zinc batteries respectively

Battery Type	Mean Percentage (w/w)		
	Hennepin	Lee	Camden
AAA	0.0265	0.0160	0.0218
C	0.0469	0.0451	0.0502
D	0.0464	0.0250	0.0467
Average	0.0388	0.0259	0.0365

Table 1 Mercury Content by Battery Size - Alkaline Batteries

The percentage of mercury free alkaline manganese batteries by number ranged from 87 to 88.

1.3 Discussion

That the percentage of mercury free alkaline manganese batteries was within one percent difference across each collection scheme shows that the penetration rate for the new, mercury free alkaline manganese batteries is consistent across the states. The factor that determines the overall mercury content is therefore the disposal regime within the different regions. Each of the counties shows a decreasing trend in mercury content within the stockpiles. Camden county showed an exceptionally low result in 1999, (which could be due to sampling error), resulting in the 2000 data point being higher than the previous year. But despite this the overall trend remains the same. The fall in mercury content is not as marked as previous years, but this is to be expected as we anticipate the mercury reduction rate to be exponential.

0.025
Lowest
1999
NFC

Over the past two years, very few zinc carbon batteries were found and many of these were corroded to a point where the date codes could not be read and therefore were assumed to be mercury containing. As a result, the data from zinc carbons was not adequate to be able to make a statistically relevant evaluation. As a consequence, they were excluded from the 2000 study. Typically zinc carbon cells and batteries have been found to contain less than 10 ppm of mercury. This is consistent with studies carried out in Europe

1.4 Age Distribution and Projection of Mercury Decline in Alkaline Batteries

The following histogram shows the age distribution of alkaline batteries within each county sample.

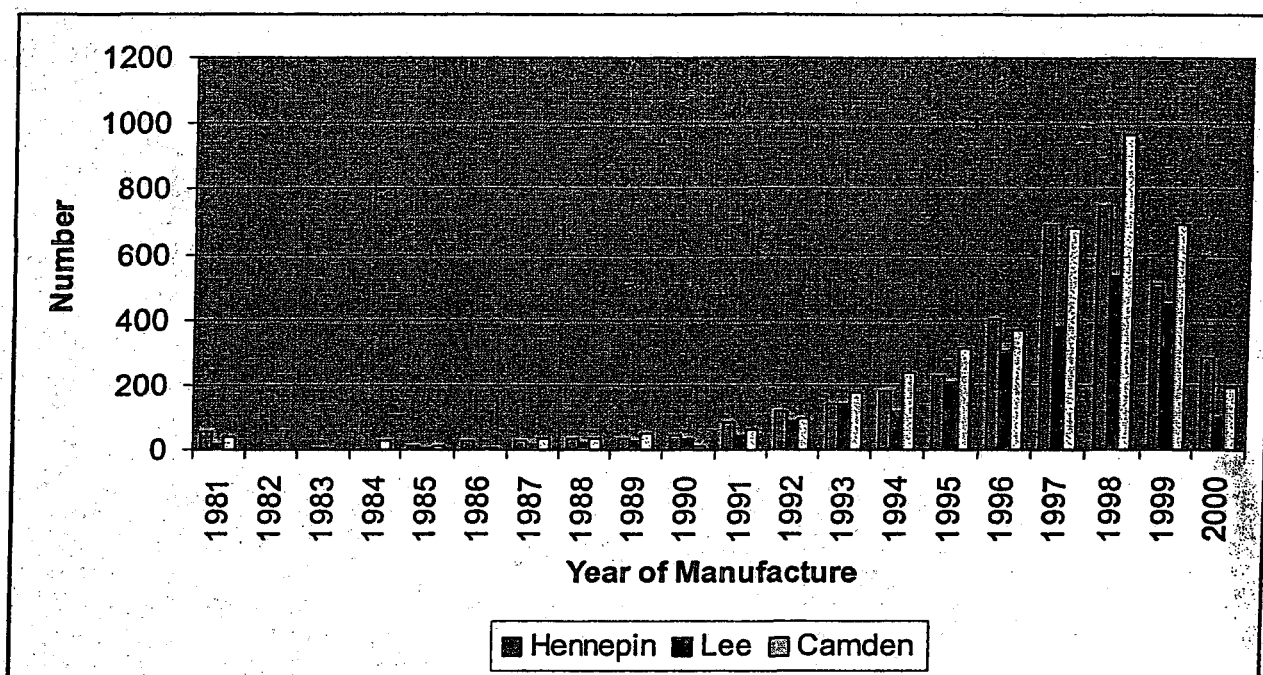


Figure 1 Age Distribution of Alkaline Batteries in the Sample

The plot shows that the most frequent (median) age of alkaline batteries found in the stockpile is 1 to 3 years old. This is comparable with previous stockpile data. Typically, the medium age of batteries during the European and US battery analyses have been either one or two years old. The plot shows a small peak in 1981. This is because NEMA is unable to identify the exact age of some Duracell batteries, but battery companies are known to have manufactured them in 1981 or before. As the mercury content remains constant for these cells, for the purpose of this study they are all included in the 1981 total².

² This will not affect the mercury content calculation, but may increase the projected date when the stockpile will be mercury free.

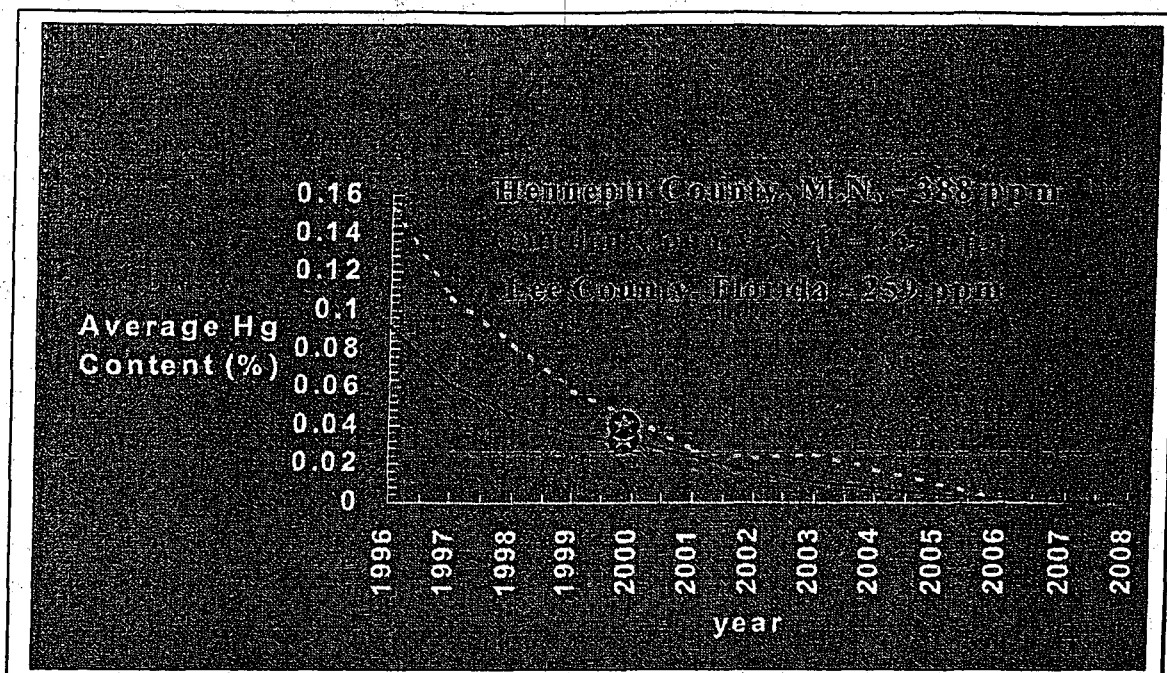


Figure 2. Prediction of the decline of mercury in the Alkaline Batteries

NEMA used the previous distributions in the histograms to project the decline of mercury in the waste stream in the future. NEMA made the projection by first calculating an average mercury content for each year of manufacture and then by shifting the distribution forward by one year³ and re-calculating the overall mercury concentration. This analysis repeats this process until the oldest cells found are manufactured in mercury free years. Figure 2 shows this prediction graph with the 2000 data points superimposed on the curve. This shows that the each county sample this year was found to be in line with expectations based on this model.

The upper and lower limit curves have been generated by assuming that highest mercury or the lowest mercury containing batteries for each particular year is found. Consequently we would expect the mercury concentration for alkaline batteries to fall between these two limits. Sampling to date is consistent with the projection that the alkaline batteries found in each county's sample will theoretically be mercury free by year 2008⁴.

1.5 Mercury Sources in the Waste Stream

As with previous studies, a number of button cells were identified within each collection scheme that would contribute to the overall mercury level within the sample. These button cells and hence their mercury contribution, have not been quantified. One mercuric oxide, special purpose cell was found during the Hennepin study. This weighed 136.8g and would contribute approximately 41g of mercury to the waste stream.

2. Stockpile Analysis by Battery Size and Type.

³ For example, by shifting the distribution forward by one year, 9 year old cells would be manufactured in 1992, not 1991.

⁴ The first report prepared in 1996 gave the expected year at which the waste stream will be Hg free as being 2005. However since this report was published, Duracell concluded that its metal-jacketed cells were at least 15 years old, not 12 years old as given in the report. Consequently, based on the revised 1996 data, the waste stream will not be Hg free until 2008.

System	Size	Camden		Lee		Hennepin	
		Number	Weight	Number	Weight	Number	Weight
Alkaline	D	1183	147.86	1603	200.40	1254	156.74
Alkaline	C	1562	105.29	1004	67.70	872	58.75
Alkaline	AA	5968	137.27	3983	91.60	7648	175.90
Alkaline	AAA	1985	25.81	846	11.00	1923	25.00
Alkaline	9v	1100	49.50	344	15.50	843	37.95
Alkaline	TOTAL	11799	465.73	7781	386.20	12540	454.34
Zinc Carbon	D	325	32.27	564	56.00	188	18.64
Zinc Carbon	C		no data	239	11.50	127	6.14
Zinc Carbon	AA	1332	23.18	948	16.50	561	9.77
Zinc Carbon	AAA	424	3.60	294	2.50	134	1.14
Zinc Carbon	9v	247	9.09	122	4.50	130	4.77
Zinc Carbon	TOTAL	2328	68.14	2167	91.00	1140	40.46
NiCd/NiMH	OEM		20.45		4.50	155	15.84
NiCd/NiMH	Consumer		4.54		3.00		
NiCd/NiMH	TOTAL		24.99		7.50	155	15.84
Lithium	TOTAL		4.09		2.00		0.71
Grand Totals		14126	562.95	9948	486.70	13835	511.35
Pb Acid	Packs		56.36		105.00	22	8.64
Lantern Batteries		90		398	247.00	62	
Button Cells			0.91				
Specials							
Hg						1	0.14

Table 2 Breakdown of Cylindrical Batteries by Weight in Kg and by number⁵

⁵The number of alkaline and zinc carbon batteries in some cases has been calculated from the actual weights for each battery stream and the typical average battery weight. Where no values are shown in the number column, the cells were not of one size only and therefore their numbers could not be calculated.

2.1 Non-battery waste

Non-battery waste was not analyzed during these studies.

3. Summary of Waste Sorts 1996-2000

Mercury Level in Parts Per Million

<u>County</u>	<u>All Round Cells</u>	<u>Alkaline Manganese</u>	<u>Zinc Carbon</u>	<u>% No Added Mercury</u>
Camden I (1996)	728	920	11	67
Camden II (1997)	138	348	5	84
Camden III (1998)	--	389	8*	85
Camden IV (1999)	--	284	8*	88
Camden V (2000)	--	365		88
Lee I (1996)	622	806	4	62
Lee II (1997)	354	559	7	79
Lee III (1998)	--	451	5*	80
Lee IV (1999)	--	289	7*	86
Lee V (2000)	--	259		88
Hennepin I (1997)	741	915	11	66
Hennepin II (1998)	569	701	6	72
Hennepin III (1999)	--	677	12*	80
Hennepin IV (2000)	--	388		87

* Not Statistically Significant

4. Discussion of Results

These analyses indicate that low levels of mercury are still present in post consumer batteries, and these levels are declining rapidly with time, about 50% every two years.

4.1 Limitations and future work

The results of this study should be interpreted with caution. The analysis is based on a small number of producers but the results are assumed to be valid for all manufacturers.

NEMA is planning to continue this program of battery waste stream analysis in future years. For additional information, contact NEMA at 703-841-3200 or www.nema.org.

ATTACHMENT E

**LEE COUNTY GOVERNMENT
OFFICE RECYCLING POLICY**

ADMINISTRATIVE CODE
BOARD OF COUNTY COMMISSIONERS

CATEGORY:

Utilities/Refuse

CODE NUMBER:

AC-10-4

TITLE:

LEE COUNTY GOVERNMENT OFFICE
RECYCLING PROGRAM

ADOPTED:

3/27/91

AMENDED:

11/9/94 1/15/97

ORIGINATING DEPARTMENT:

SOLID WASTE

PURPOSE/SCOPE:

To provide County Recycling Policy for purchase of products made from recycled materials, provide minimum requirements for a County Government Office Recycling Program and Source Reduction Program.

POLICY/PROCEDURE

Lee County, by and through its Board of County commissioners, hereby adopts these administrative procedures for expanding the County's ongoing Paper Recycling Program to include providing a County Recycling Policy for the purchase of products made from recycled materials and provide minimum requirements for a County Government Office **Recycling Program** and Source Reduction Program.

POLICY OBJECTIVES

1. Ensure all departments are aware of availability of recycled products for purchase.
2. Provide convenient recycling at employee work stations for paper recycling and aluminum recycling containers at break rooms and vending machines.
3. Develop recycling education curriculum for new and existing employees.
4. Reduce waste disposed of 10% through source reduction and reuse.

The above specific policy objectives will be achieved as follows:

POLICY FOR PURCHASE OF PRODUCTS MADE FROM RECYCLED MATERIALS

1. Utilize the State's purchase list of products with recycled content. Expand this list when and where possible; Purchase recycle-d content when available. Request recycled content in bid specs and quotes.
2. Create a recycled paper product pool in Print Services from which smaller departments and divisions can purchase recycled products. This pool will allow smaller division/departments to use recycled products without buying large amounts of the vendor's products.

POLICY FOR PURCHASE OF PRODUCTS MADE FROM RECYCLED MATERIALS (CONT'D)

3. 75% of all paper products will be from recycled stock: for example business cards, paper stock, copy paper, letterhead, preprinted forms, legal pads, file folders and envelopes.,
4. Convert print plates, where applicable and as needed, to indicate that the paper is a recycled product.
5. Purchase recycled plastic products such as park benches, car stops, picnic tables, traffic control structures and lumber using County discount prices from the Lee County Intrusion Molding Plant/Better than Wood (C#940715) instead of pressure treated wood or other materials when the application is practical and the life cycle cost is equivalent: Calculate life cycle costs using 15 year average life for recycled plastic lumber products and five year average life for pressure treated wood. At a Minimum, 50% of these should be recycled plastic products.

POLICY FOR COUNTY GOVERNMENT OFFICE RECYCLING PROGRAM

1. Require all departments to recycle office paper, and limit the purchase of paper that cannot be recycled.
2. Require all departments or buildings to recycle aluminum and cardboard.
3. At expiration of existing janitorial contracts, or if possible, negotiate a no cost amendment to the existing contracts to enable the recycling of other materials such as glass, tin, plastics and cardboard. Also, on a replacement basis, require janitorial products such as toilet paper and hand towels to be of at least 50% recycled content and unbleached. In addition, future bid requirements for janitorial services should discourage the use of aerosol dispensers, to be replaced by pump spray applicator.
4. Recycle toner cartridges and ribbons where feasible.

POLICY/OR SOURCE REDUCTION PROGRAM

1. Copy on both sides of a page where feasible. When replacing copiers require models that automatically copy double sided and with a power saver feature.
2. When replacing or purchasing fax machines, include the additional cost of copier paper in the total cost for thermal fax machines to compare life cycle costs of thermal and plain paper faxes. Purchase plain paper faxes when the life cycle costs are equivalent. Use smaller cover sheets cover sheets - 1/2 page or fax transmission stickers.
3. Discourage the use of Styrofoam cups and plates. Encourage employees to use their own cups and utensils.- Exempt the food- service establishments in the Courthouse and Justice Center. As part of this program, create a series of posters educating employees on this recommendation.

**MALCOLM
PIRNIE**



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

	Appendix 5
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APPENDIX 5.0

INTERLOCAL AGREEMENTS

**5.1 – Lee County/Hendry County
Interlocal Agreement**

**5.2 – Lee County/City of Fort
Myers Interlocal Wastewater
Agreement**

5.1 – Lee County/Hendry County Interlocal Agreement

IMAGE QUALITY

**PLEASE NOTE
THE ORIGINAL DOCUMENTS
SCANNED FOR THIS RECORD
WERE OF POOR QUALITY.**

NOV 10 1989

INTERLOCAL AGREEMENT
FOR SOLID WASTE DISPOSAL

This Interlocal Agreement is made and entered into this 17th day of OCTOBER, 1989, by and between Lee County, a political subdivision of the State of Florida, and Hendry County, a political subdivision of the State of Florida.

WITNESSETH

WHEREAS, County governments under Chapter 125, Part I, Chapter 403, Part IV, and Chapter 163, Florida Statutes, and Chapter 85-447, Laws of Florida, Special Acts of 1985, collectively "The Act", are vested with the authority, and charged with the obligation to provide necessary public services to insure the public health, welfare and safety within their boundaries; and,

WHEREAS, the parties to this Agreement are non-charter counties and political subdivisions of the State of Florida; and,

WHEREAS, disposal of solid waste is one of the County's obligations to provide for the public health and welfare; and,

WHEREAS, both Lee and Hendry Counties are experiencing finite limitations with their respective sanitary landfills; and,

WHEREAS, The Act empowers and encourages County governments to develop, implement and utilize efficient and environmentally acceptable solid waste management programs, to include regional-type disposal systems by interlocal or intergovernmental agreements; and,

WHEREAS, Florida Statutes also empowers and encourages County governments to develop, implement and utilize efficient and environmentally acceptable resource recovery systems for the responsible management of air, water and land resources; and,

WHEREAS, both the Lee County and the Hendry County Comprehensive Plans encourage more efficient, effective and environmentally acceptable methods for the disposal of solid waste; and,

WHEREAS, both Lee County and Hendry County desire to enter into an Interlocal Agreement and cooperate in the development, implementation and operation of a solid waste disposal program, to include the use of a resource recovery system; and,

WHEREAS, both Lee County and Hendry County find that it is in the best public interest and to the public benefit that Lee and Hendry Counties enter into this Interlocal Agreement for the development, implementation and operation of such a combined solid waste disposal program;

NOW, THEREFORE, IN CONSIDERATION OF THE FOREGOING, AND THE MUTUAL COVENANTS AND PROMISES CONTAINED HEREIN, LEE COUNTY AND HENDRY COUNTY HEREBY AGREE AS FOLLOWS:

DEFINITIONS

0.1 As used in this Agreement, unless the context clearly indicates otherwise, all terms herein that are defined in Section 403.703, Florida Statutes, shall be given the meaning as defined therein.

0.2 As used in this Agreement, unless the context clearly indicates otherwise, the term:

"Ash" means the material including, but not limited to, fly ash, bottom ash and siftings, that remain after solid waste has been processed at a resource recovery facility and any recovered materials have been removed.

"Tipping Fee" means the charge for disposing of solid waste at a solid waste disposal facility under this Agreement. For waste generated in Hendry County, the tipping fee shall include the cost of transferring the solid waste from a transfer station to that facility.

LEE COUNTY OBLIGATIONS

Disposal Site

1.1 Lee County, or its agents or designees, shall acquire, own, permit, develop, operate and maintain land within Hendry County, consisting of 1734± acres, lying in Sections 4, 9 and a portion of 16, Township 45S, Range 28E, Hendry County, Florida, (hereinafter: "Disposal Site") as the combined Solid Waste Disposal Site for both Lee and Hendry Counties.

Facilities Covered by Agreement

1.2(a) Lee County shall obtain all necessary permits for, construct and operate the following solid waste facilities:

1. A Class I solid waste disposal facility for waste generated in both counties;
 2. An ash landfill for bottom-ash, fly-ash and siftings from the resource recovery facility for solid waste generated in both counties;
 3. A Class III solid waste disposal facility for waste generated in both counties;
 4. A resource recovery facility for waste generated in both counties;
 5. A materials recycling facility or facilities for solid waste generated in both counties;
 6. A sludge disposal and composting facility or facilities for waste generated in both counties;
 7. A used tire and white goods disposal facility or facilities;
 8. Not more than two transfer stations within Hendry County for the transfer of waste generated in Hendry County; and
 9. Such ancillary property and facilities as are necessary for the efficient and proper operation of a complete solid waste disposal system for both counties.
- (b) The ash landfill, Class I and Class III solid waste disposal facilities referred to in subsection (a)

shall be located at the Disposal Site. The resource recovery facility shall be located at the Disposal Site or at a site located in Lee County. The transfer stations referred to in subsection (a) 8. shall be located at sites designated by Hendry County. The other facilities referred to in subsection (a) may be located at the Disposal Site or at a site or sites designated by Agreement of both counties. Hendry County shall not unreasonably withhold Agreement for sites selected in Lee County.

Responsibilities for Construction, Operation, and Closure

- 1.3(a) Lee County, or its agents or designees, shall be the owner of the Disposal Site and of the facilities established under this Agreement.
- (b) Lee County shall pay all costs and expenses for the purchase, permitting, construction, operation and closure of the land, equipment and facilities established under this Agreement, except such costs and expenses that are specifically required for Hendry County by this Agreement.
- (c) Lee County shall be solely responsible for the design, construction and operation of the facilities established under this agreement and the solid waste management program for both counties, subject to the terms and exceptions of this Agreement.
- (d) Lee County shall construct, operate, and cause the closure of the facilities set forth in paragraph

1.2(a) above in a manner which, in conjunction with the existing facilities in both counties, will allow Lee County and Hendry County to comply with the requirements of Chapter 403, Florida Statutes, pertaining to recycling and solid waste management, and with the requirements of all applicable local, state and federal statutes, rules, procedures and permits pertaining to the construction, operation and closure of solid waste disposal facilities and solid waste management programs.

- (e) Upon specific requests by Lee County, Hendry County shall use its power of eminent domain to obtain real property in Hendry County for the Disposal Site, facilities, and roadways necessary to construct and operate the facilities established under this Agreement. Lee County shall pay all costs and judgments of such condemnation proceedings and shall reimburse Hendry County for reasonable attorney fees and costs which are incurred by Hendry County as the result of a request under this subsection. Upon receipt of payment for all such costs, Hendry County shall convey all of its title in property, other than roadways, obtained under this paragraph to Lee County.

Class I and Ash Landfills

- 1.4 The Class I solid waste disposal facility and the ash landfill established at the Disposal Site shall each be

constructed with a minimum of two (2) impervious bottom liners with a minimum of 60 millimeter thickness per liner, and each shall have a leachate collection and treatment system. A methane gas recovery system may be included upon further Agreement of the parties.

Transfer Stations

1.5 Each transfer station established under this Agreement shall have separate receptacles for Class I and Class III solid wastes and shall include a truck scale. The transfer stations shall be completed and operational upon the opening of the Class I and Class III solid waste disposal facilities at the Disposal Site or upon the closure of the Hendry County Pioneer Plantation Solid Waste Disposal Facility, whichever first occurs.

Resource Recovery Facility

1.6 Lee County shall use its resources and best effort to complete construction and begin operation of the resource recovery facility within 60 months from the opening date of the Class I solid waste disposal facility at the Disposal Site. In the absence of any culpable action or inaction by Lee County or its agents or designees which would contribute to any delay, failure to commence operation of the resource recovery facility within the 60 months shall not be considered a breach of this Agreement.

Additional Lands

1.7 Lee County shall pay all costs and expenses for the

acquisition of any additional lands adjacent or proximate to the disposal site which may be required for the efficient and environmentally responsible operation of the disposal site.

Disposal Site Access Roads

1.8 (a) Lee County shall acquire, design, construct, and maintain a paved Disposal Site access route within Hendry County for the transportation of solid waste and/or resource recovery by-products to the Disposal Site. Such route shall consist of approximately nine (9) miles of Church Road from State Road 82 to the Disposal Site, and thence east to State Road 29. If approved by Hendry County, Lee County shall have the right to determine, select and develop an alternate alignment of such Disposal Site access route.

(b) Subsequent maintenance costs for the above Disposal Site access route shall be funded by Lee County for the first ten (10) years of operation of the Disposal Site. Beginning with the eleventh (11th) year of operation of the Disposal Site, maintenance costs for the Disposal Site access route shall be included as a cost of the operation of the Disposal Site until closure of the Disposal Site.

Changes in Technology

1.9 Lee County shall assume all responsibility and liability for any changes in the operation of the Disposal Site and the facilities thereon as the result of any changes in

technology, which by permit, law, statute or rule of any federal, state or local government or their agencies, mandates that such changes be implemented at any of the facilities at the Disposal Site.

OBLIGATIONS OF HENDRY COUNTY

- 1.10 In conjunction with the development of the Disposal Site by Lee County, Hendry County shall use all of its lawfully available governmental condemnation powers for purposes of obtaining any necessary property for the location of the Disposal Site, transfer stations, roadways or other facilities requiring real property necessary for the safe, efficient and environmentally responsible placement and operation of the Solid Waste Disposal System within Hendry County.
- 1.11 Similarly, Hendry County shall cooperate with Lee County and use its best and most expeditious efforts to assist Lee County, its agents or designees, with the development of the Disposal Site, to include assistance with the obtaining of all necessary permits, approvals or re-zonings of any property within Hendry County for the placement, construction and operation of the Disposal Site, transfer stations or any of the associated Solid Waste Disposal Facilities.
- 1.12 Hendry County shall honor and accommodate Lee County's reasonable requests through its agents or designees with respect to the placement of any or all of the

Disposal Site facilities as outlined in paragraph 1.2, above.

1.13 Hendry County shall honor and accommodate Lee County's reasonable requests through its agents or designees with respect to the obtaining of any property, permits, approvals, or zonings necessary for the placement, construction and operation of the Disposal Site and any of the associated Solid Waste Disposal Facilities.

1.14 Hendry County shall grant to Lee County, its agents or designees, the right to free and unimpeded access and travel with their vehicles, over and across Hendry County roads, as designated by Hendry County, to and from the transfer station(s) and the Disposal Site, subject only to any state or federal regulations governing such transportation of Class I and Class III solid waste. As consideration for this privilege, Lee County shall hold Hendry County harmless, release and indemnify Hendry County for any and all losses or damage by reason of the acts of Lee County, its employees, agents or designees, while operating within Hendry County.

1.15 Upon the completion of the respective facilities hereunder, each county shall allow all solid waste generated in Lee and Hendry counties to be disposed of and/or processed at each such facility, subject to the terms of this Agreement, the conditions and limits of

applicable permits, and the requirements of local, state and federal law.

1.16 Hendry County shall require of its citizens and franchise haulers by appropriate legislation or contract, that all persons utilizing the disposal facilities as contemplated under this Agreement shall abide by all rules and regulations relating to the disposal of solid waste at the solid waste disposal facilities.

1.17 Nothing in this Agreement shall be construed as requiring either party to take any action contrary to its own ordinances, policies or procedures, nor to violate any state or federal law, rule, permit or procedure with respect to any activity or obligation set forth herein.

Interim Solid Waste Disposal

2.1 Lee County shall continue to dispose of its solid waste at its currently permitted Disposal Site until the later occurrence of:

- i) attainment of the permitted design height, or
- ii) the opening of the Disposal Site in Hendry County, at which time Lee County reserves the right to determine the site or sites for the placement of its solid waste.

2.2 Hendry County shall continue to dispose of its solid waste at its currently permitted disposal site until the occurrence of:

- i) an order from the Department prohibiting the disposal of solid waste at said landfill, or
- ii) the opening of the Disposal Site in Hendry County.

2.3(a) Lee County shall accept Hendry County solid waste at its currently permitted disposal site if the Florida Department of Environmental Regulation or other similar State of Florida regulatory agency prohibits the placement of solid waste into the existing Hendry County Landfill (Pioneer Plantation Site) prior to the opening of the Class I and Class III facilities at the new Disposal Site.

(b) Hendry County shall pay the then existing tipping fee at the Lee County (Gulf Coast) Landfill, less Lee County surcharges, if Hendry County disposes its solid waste at that facility.

2.4 Upon the opening of the Class I and Class III facilities at the Disposal Site, Hendry County shall not construct or operate another sanitary landfill or resource recovery facility, and shall require of its citizens, by means of appropriate legislation, that all Hendry County solid waste shall be disposed of at the Disposal Site and/or resource recovery facility.

2.5 Hendry County shall authorize Lee County's continuous operation of the Disposal Site for the duration of this Agreement, provided that said Disposal Site is operated in accordance with all applicable local, state and federal permits, laws, rules and regulations pertaining to such a

Disposal Site and its associated solid waste disposal facilities.

Intergovernmental Loan

2.6 To assist with the closure of its existing landfill (Pioneer Plantation Site), Hendry County may request and Lee County shall grant an intergovernmental loan in an amount sufficient to pay for the closure of the landfill. This loan shall be for a term of up to fifteen (15) years, at no interest, shall meet all requirements as contained in §403.7125 (3)(b), relating to the escrow of closure funds, and shall be subject to such additional reasonable terms and conditions to be negotiated and developed in a separate loan agreement between the parties.

GENERAL CONDITIONS OF THE AGREEMENT

Exclusivity

- 3.1 a) This Agreement is exclusive as between the parties named above, and as such, no other county, municipality or any other governmental agency shall be a party to, or a part of this Agreement without the express approval of the original parties, and in the manner and form as an amendment to this Agreement, to be executed with all of the same formalities as this original Agreement.
- b) Only persons, units of government, and other entities authorized by this Agreement or by further Agreement of the parties shall be permitted, either directly or indirectly to dispose of any solid waste at the Disposal Site.

Third Party Contractors

3.2 a) It is understood and agreed to by the parties, that Lee County and Hendry County may utilize at their discretion, agents, designees, contractors or other entities in order to fulfill the terms of this Agreement to include those duties as outlined in §1.3, herein. Such agents, designees, contractors or other entities shall be duly authorized to act on behalf of the respective parties by means of an official contract with the respective County. However, no such agency or contract with third party contractors shall diminish or relieve either party to this Agreement from its respective duties, responsibilities or obligations under this Agreement.

b) Any such third party contractor retained by either Hendry County or Lee County shall be contractually bound to perform all services in such a manner so as to meet or exceed all local, state and federal regulations, laws, rules and permits relating to all facilities at the Disposal Site and the requirements of this Agreement.

c) Hendry County has been made aware of, and has reviewed the existing contracts between Lee County and Waste Management, Inc. of Florida, dated June 20, 1984, as amended, and January 11, 1989, respectively, relating to the disposal of Lee County's solid waste. Nothing in this Agreement or any subsequent Agreements between

the parties hereto shall impair, conflict with or diminish the rights, duties and obligations as between the parties to those contracts (Lee County and Waste Management, Inc. of Florida) as stated above, and this Agreement shall be so construed.

- d) Hendry County shall be subrogated to the rights and interests of Lee County under Section 7.1, 7.2, 7.3, and 7.4 of its current Solid Waste Disposal Extension Agreement with Waste Management, Inc. of Florida dated January 11, 1989 and any similar rights and interests in rights of indemnification, policies of insurance, bonds, letters of credit, and other instruments to the extent that such subrogation is necessary for Hendry County to fully enforce its rights and benefits under this Agreement.

Third Party Use of Resource Recovery Facility

3.3 Lee County, with the concurrence of Hendry County, may contract with other adjoining counties for the disposal of additional solid waste at the resource recovery facility. Any such contracts, however, shall expressly provide that the pro rata amount of fly ash and bottom ash for that county's solid waste shall be disposed of by such county using the resource recovery facility, at a licensed disposal facility other than the ash landfill at the Disposal Site.

Hendry County Fees

3.4 (a) Hendry County shall pay tipping fees to Lee County for

the use of the Class I and Class III waste disposal and resource recovery facilities at the Disposal Site for solid wastes generated in Hendry County as follows:

1) Ten dollars (\$10.00) per ton for the first year of operation of the Class I waste disposal facility and Ten dollars (\$10.00) per ton for the second through tenth years of said operation, plus or minus an amount each year to adjust for inflation or deflation as shown by the Consumer Price Index, Southeast Region. The inflation or deflation adjustment shall be made on the anniversary date of the opening of the Class I waste disposal facility at the Disposal Site.

2) Commencing on the eleventh anniversary of the opening of the Class I waste disposal facility at the Disposal Site, an amount determined by adding to the previous year's tipping fee 10% of the difference between the Hendry County tipping fee for the tenth year and the tipping fee then charged for waste generated in Lee County. Commencing on the twenty-first anniversary of the opening of the Class I and Class III waste disposal facilities, an amount equal to the lesser of (1) the tipping fee less Lee County surcharges charged for waste generated in Lee County, or (2) a proration of the actual net costs for operating the solid waste management system under this Agreement. The actual net costs for operating the solid waste management system shall consist of the

operating costs for that year, an amount that recognizes the capital costs attributable to that year, plus an amount reserved for closure and related costs attributable to that year, and less any derived revenues for that year. For those facilities operated by a contractor under Section 3.2, the costs shall be based on the payments made under the contract with the contractor. Actual net costs shall not include any amount reflecting the costs of Disposal Site or adjacent land purchases.

(b) Hendry County shall not be required to pay any fees or costs for the use of the Class I and Class III waste disposal and resource recovery facilities covered by this Agreement for waste generated in Hendry County except as specifically set forth in this Agreement.

Derived Revenues

3.5 It is understood and agreed to by the parties, that any derived revenues from the operation of the ancillary solid waste disposal facilities, to include recycling, methane gas recovery, generation of electricity, or composting, shall be shared and expended by the parties solely for the purpose of meeting capital, operational and maintenance costs for the disposal of the parties' solid waste, and bond obligations as may be incurred by Lee County for the design and construction of the Disposal Site, the resource recovery facility, and other related facilities.

Term of the Agreement

3.6 Except as required under paragraph 3.13 herein, and as otherwise required by permit or law, the term of this Agreement shall extend uninterrupted from the date as first indicated above, for a period through and until the expiration of twenty (20) years following final closure of the Disposal Site.

Books and Records

3.7 It is understood and agreed to by the parties, that either party shall have reasonable access to the books, records and accounts of the agents, designees or contractors duly contracting with either party for the purpose of fulfilling any of their obligations under this Agreement.

Amendments to the Agreement

3.8 This Agreement may be amended by the mutual acceptance of the amendments made in writing and signed to by both Hendry County and Lee County. Such amendments shall be incorporated into the body of this original Agreement. All provisions of the original Agreement shall remain in full force and effect with the exception of the amending language, which shall control.

Applicable Law

3.9 a) This Agreement shall be controlled and interpreted according to the laws, rules and regulations of the State of Florida, and the United States Government, when applicable.

- b) None of the terms, conditions or provisions herein shall be construed or interpreted to relieve either party from any local, state and federal laws, rules or requirements as applicable to such party, or that one party has assumed any such obligations for or on behalf of the other, except as specifically provided herein.
- c) In addition to all other remedies in law and equity, this Agreement shall be enforceable by specific performance and by injunction. No waiver by either party or any breach of a provision herein shall be considered to be a waiver of any succeeding breach of such provision or a waiver of any other provision.

Scope of Agreement

3.10 (a) This Agreement, including any incorporated exhibits and amendments, constitutes the entire Agreement between the parties and shall supersede and replace any and all prior agreements or understandings, either written or oral, relating to the matters herein.

(b) The headings used herein are for convenience only and are not to be construed as part of this Agreement.

Severability

3.11 A determination that a provision of this Agreement is illegal, void, or unenforceable shall not cause the entire Agreement to be void unless the provision determined to be illegal, void, or unenforceable is a

provision relating to a significant item of consideration for the benefit of either party.

Indemnification

3.12 Lee County shall hold Hendry County harmless and shall release and indemnify Hendry County for all claims, actions, judgments, losses, damages, and expenses by reason of the construction, operation, or closure of any facility referenced in paragraph 1.2 above, or by reason of the acts or omissions of Lee County, its employees, agents or designees in connection with this Agreement. This paragraph does not preclude the recognition of reasonable liability insurance premiums and/or other costs of risk assumption as operational costs for the facilities operated under this Agreement.

Termination of the Agreement

3.13 (a) Except as set forth in paragraph (b) and (c) below, this Agreement shall terminate when any of the Class I, Class III, or ash landfills at the Disposal Site reach capacity and cannot be permitted for the disposal of additional solid waste.

(b) Notwithstanding any other provision of this Agreement, the responsibility of Lee County under this Agreement, or under any local, state or federal permit, law or regulation, for the closure of facilities at the Disposal Site and follow-up monitoring of same shall not terminate until full compliance with all such requirements has been completed.

(c) If this Agreement should terminate under paragraph (a) above before Lee County ceases the operation of the resource recovery facility constructed hereunder, Hendry County shall have the option to have solid waste that is generated in Hendry County processed at the resource recovery facility as follows:

(1) if the resource recovery facility is located at the Disposal Site or at another site in Hendry County, for so long as the resource recovery facility is operated.

(2) if the resource recovery facility is located in Lee County, for so long as the resource recovery facility is operated, but not longer than forty (40) years from the time such facility commences operation.

(d) The tipping fee for the use of the resource recovery facility after the Agreement has been otherwise terminated under paragraph (a) above shall be at the rate set forth in Section 3.4.

(e) Lee County shall annually submit to Hendry County an engineering projection of the remaining life expectancy for each facility under this Agreement and shall give 24 month notice, if possible, to Hendry County prior to the closure of any facility constructed and operated under this Agreement.

Notices

3.14 All Notices or other communications to be given hereunder shall be in writing and shall be deemed given when mailed by Registered or Certified United States mail:

To Lee County: Director
 Division of Solid Waste Management
 Lee County Board of County
 Commissioners
 2013 Altamont Avenue
 Fort Myers, Florida 33902-0398

With a Copy to: Office of the Lee County Attorney
 P.O. Box 398
 2115 Second Street
 Fort Myers, Florida 33902

To Hendry County: Director,
 Division of Solid Waste Management
 Hendry County Board of County
 Commissioners
 P.O. Box 1760
 LaBelle, Florida 33935

With a Copy to:

Office of the Hendry County

Attorney

P.O. Box 1760

LaBelle, Florida 33935

Any change of address by either party shall be by notice given to the other in the same manner as specified above.

Entire Agreement

3.15 This Agreement constitutes the entire Agreement and understanding between the parties hereto, and it will not be considered modified, altered, changed, or amended in any respect unless in writing and signed by the parties hereto.

Acceptance

3.16 This Agreement shall become effective upon the signing of the Agreement by the official representative of both Hendry County and Lee County, and with the appropriate filing with the Clerks of the Circuit Court of the respective counties.

ATTEST:
CHRISTINE PRATT,
CLERK OF THE CIRCUIT COURT

By: Christine Pratt

~~Deputy~~ Clerk

BOARD OF COUNTY COMMISSIONERS
OF HENDRY COUNTY, FLORIDA

By: Paul D. Rabin

Chairman

Approved As To Form:

E. D. Rabin
County Attorney
for Hendry County

ATTEST:
CHARLIE GREEN,
CLERK OF THE CIRCUIT COURT

By: Mary Ammentrost

Deputy Clerk

BOARD OF COUNTY COMMISSIONERS
OF LEE COUNTY, FLORIDA

By: Jim Baker

Chairman

Approved As To Form:

James H. Greer
County Attorney for Lee County

(30081)

5.2 – Lee County/City of Fort Myers Interlocal Wastewater Agreement

THIRD AMENDMENT TO THE
INTERLOCAL WASTEWATER AGREEMENT
BETWEEN
THE CITY OF FORT MYERS
AND
LEE COUNTY, FLORIDA

COMES NOW the parties to that certain Interlocal Agreement of November 16, 1983 (Lee County Contract No. C-840106), as amended, and make this Third Amendment on this 3rd day of March, 1993, by stating as follows:

WITNESSETH:

WHEREAS, Lee County ("COUNTY") desires Reclaimed Water Service to be provided to its Resource Recovery Facility located in Lee County and as further described in Exhibit "A" to this Amendment; and,

WHEREAS, the City of Fort Myers ("CITY") and COUNTY recognize and acknowledge that developing a Reclaimed Water Production, Transmission and Distribution system is an important element of long-range, area-wide water resource management; and,

WHEREAS, the CITY and COUNTY are desirous of entering into an Amendment to their existing Interlocal Agreement defining the responsibility of each party as it relates to the production, transmission, distribution and ultimate use of reclaimed water by the CITY and COUNTY; and,

WHEREAS, the parties recognize that time is of the essence of this matter, and that CITY and COUNTY agree to use their best efforts and due diligence to complete the proposed Reclaimed Wastewater System within thirteen (13) months after entering into this Third Amendment; and,

WHEREAS, both the CITY and COUNTY find that it is in the public interest and to the benefit of the citizens of each respective government, that the CITY and COUNTY enter into this Amendment.

NOW THEREFORE, in consideration of the foregoing and the mutual covenants as contained herein, the CITY and COUNTY do hereby agree as follows:

1. Definitions for purposes of this Amendment:

- a) Reclaimed Wastewater Treatment Facilities ("Treatment Facilities") shall mean: the capital improvements for advanced secondary wastewater treatment, to be added to the CITY'S Central Wastewater Treatment Plant, to include all necessary piping, electrical systems, storage tanks, effluent filters, high service pumps for effluent processing and distribution, and any and all other appurtenances necessary for complete treatment, and to meet all current requirements established by applicable state and federal regulatory agencies.

b) Reclaimed Wastewater Transmission Facilities

("Transmission Facilities") shall mean: the capital improvements consisting of the effluent transmission main which shall extend from the CITY'S Central Wastewater Treatment Plant to the COUNTY'S Resource Recovery Facility, of such size and location so as to serve the COUNTY'S Resource Recovery Facility and future, potential CITY and COUNTY Reclaimed Water customers.

These facilities do not include other mains or lines that the CITY may construct and connect to the reclaimed wastewater transmission facilities for the purpose of serving additional CITY customers.

c) Reclaimed Wastewater System ("System") shall mean: the combined capital improvements consisting of the "Treatment Facilities" and the "Transmission Facilities".

2. The CITY and COUNTY will proportionately share the capital costs as further outlined herein and pursuant to Exhibit "B", for the design, permitting, and construction of the "System".

Each year during development of the "System", an allocation of capital costs will be established by the parties, if applicable.

In the event that CITY or COUNTY adds additional reclaimed wastewater customers resulting in additional use above the long term estimates as outlined in Exhibit "B", the COUNTY or the CITY, as appropriate, will be entitled to credits or rebates for costs associated with the development of the transmission facilities; as may be further developed by the parties upon such occurrence.

3. a) 1. The CITY shall be responsible for the complete design and permitting of the "Treatment Facilities" at the CITY'S Central Wastewater Treatment Plant for the initial capacity as outlined in Exhibit "B". The COUNTY shall have the right to review and make recommendations to the CITY with respect to the design of the "Treatment Facilities"; however, the CITY reserves the right to make all final decisions concerning the design and permitting of the "Treatment Facilities".
2. In consideration of the above, the CITY, insofar as it may lawfully do so, and without waiving its rights to sovereign immunity per the limitations as set out in §768.28, F.S., shall indemnify and hold the COUNTY harmless

from any and all actions, suits at law or any other proceedings brought by third parties as the result of claims made for injuries to persons or property as the result of the negligent acts or omissions of the CITY or its employees, agents, or designees with respect to the design and/or permitting of the "Treatment Facilities".

- b) 1. The COUNTY shall be responsible for the complete construction of the "Treatment Facilities" at the CITY'S Central Wastewater Treatment Plant, utilizing the CITY'S design and permit conditions, with proposed costs to be shared by the CITY and the COUNTY as further described in Exhibit "B".

The CITY shall have the right to review and make recommendations to the COUNTY with respect to the construction of the "Treatment Facilities"; however, the COUNTY reserves the right to make all final decisions concerning the construction of the "Treatment Facilities".

2. In consideration of the above, the COUNTY, insofar as it may lawfully do so, and without waiving its rights to sovereign immunity per

the limitations as set out in §768.28, F.S. shall indemnify and hold the CITY harmless from any and all actions, suits at law or any other proceedings brought by third parties as the result of claims made for injuries to persons or property as the result of the negligent acts or omissions of the COUNTY or its employees, agents, or designees with respect to the construction of the "Treatment Facilities".

- c) In order to expedite both the design and construction of the "Treatment Facilities," and for the benefit of the COUNTY, the COUNTY will advance the funds for the CITY'S share of the development of the "Treatment Facilities." The CITY'S pro rata share shall be subsequently paid in full to the COUNTY pursuant to: 1) the same repayment term, rates and schedule as set out in the Series 1991A and B Solid Waste Revenue Bonds, issued by Lee County on June 27, 1991, the closing memorandum of which is incorporated herein by reference in its entirety, or, 2) the CITY may elect, at its option, to pay its pro rata share pursuant its own financing, and according to the drawdown schedule for construction of the "Treatment Facilities."

If payments by the CITY to the COUNTY for its proportionate share of the costs for the "Treatment Facilities" under any financing and repayment schedule developed pursuant to the terms herein, are more than thirty (30) days late from the designated payment date, the COUNTY shall be entitled to recover penalty interest from the CITY on any outstanding sums in an amount of up to 1% per month.

4. The COUNTY shall be responsible for the design and construction of the "Transmission Facilities" to convey treated effluent from the "Treatment Facilities" to the COUNTY'S Resource Recovery Facility Site and adjacent COUNTY park. The transmission lines shall be sized so as to accommodate the CITY'S reasonable requests for their ultimate sale to future CITY customers of reclaimed water, with the proposed costs shared by CITY and COUNTY as further described in Exhibit "B", and per the CITY'S current Water Re-Use Master Plan.
5. The COUNTY desires, and the CITY shall provide, reclaimed water service to the Resource Recovery Facility to meet the following estimated service demands as outlined in Exhibit "B".

The estimated demands are not to require the County to accept these quantities of reclaimed water, but are stated to establish the estimated maximum demand the CITY may receive from the COUNTY'S Resource Recovery Facility.

6. a) COUNTY shall purchase from the CITY, the reclaimed water service as outlined in Section 5. above, at CITY'S actual operating and maintenance cost to produce such reclaimed water, and as actually purchased by the COUNTY on a per 1000 gallon cost basis. Actual operating and maintenance cost to produce reclaimed water shall not include the cost for providing existing secondary treatment service, but will include those costs for the additional processes required for the production and distribution of reclaimed water (i.e., filtration, high level disinfection and distribution pumping).
- b) CITY shall provide the reclaimed water service to the COUNTY at a point of delivery (p.o.d.) located upon the COUNTY'S Resource Recovery Facility site. At the p.o.d., there shall be located a master meter to be owned, installed, maintained and read by the CITY. Annual testing and calibration of the meter will be the CITY'S responsibility and shall be reported to the COUNTY.

- c) COUNTY shall make monthly payments to the CITY for its actual gallonage purchase of the reclaimed water service from the CITY as substantiated by meter readings by the CITY.
- d) Such payments for Reclaimed Water Service shall be made by the COUNTY to the CITY within thirty (30) days after the submittal by the CITY to the COUNTY of an invoice reflecting the previous month's actual reclaimed water service provided by the CITY.

If payments are made by the COUNTY to the CITY after the thirty-day (30-day) period as indicated above, the CITY shall be entitled to recover penalty interest on any outstanding sums in an amount of up to 1% per month.

- e) The audit provisions of the existing Interlocal Agreement shall be amended to incorporate the rates for the reclaimed water to be purchased by the COUNTY as contemplated herein.

7. CITY and COUNTY recognize that time is of the essence in this matter, and agree to use all lawfully available efforts and due diligence to have the herein contemplated capital improvements available for the COUNTY'S use within thirteen (13) months following the execution of this Third Amendment by the parties.

8. The provisions of this Amendment constitute the entire understanding and agreement between the parties; no modification or changes may be made without the consent of both parties as reduced to writing and acknowledged with the same formality as this Amendment.

9. This Third Amendment to the Interlocal Wastewater Agreement may be executed in counterparts, with each document constituting a fully executed Amendment upon adoption by the respective parties.

IN WITNESS TO THIS AMENDMENT, the undersigned parties hereby affix their signatures.

ATTEST: CHARLIE GREEN
CLERK OF THE COURT

By: Risa L. Pierce
Deputy Clerk

ATTEST: MARIE ADAMS
CITY CLERK

Marie Adams

APPROVED AS TO FORM:

[Signature]
Office of County Attorney

Date

BOARD OF COUNTY COMMISSIONERS
OF LEE COUNTY, FLORIDA

By: Ray Judah
Ray Judah Vice- Chairman

CITY OF FORT MYERS

By: [Signature]
Wilbur C. Smith, III, Mayor

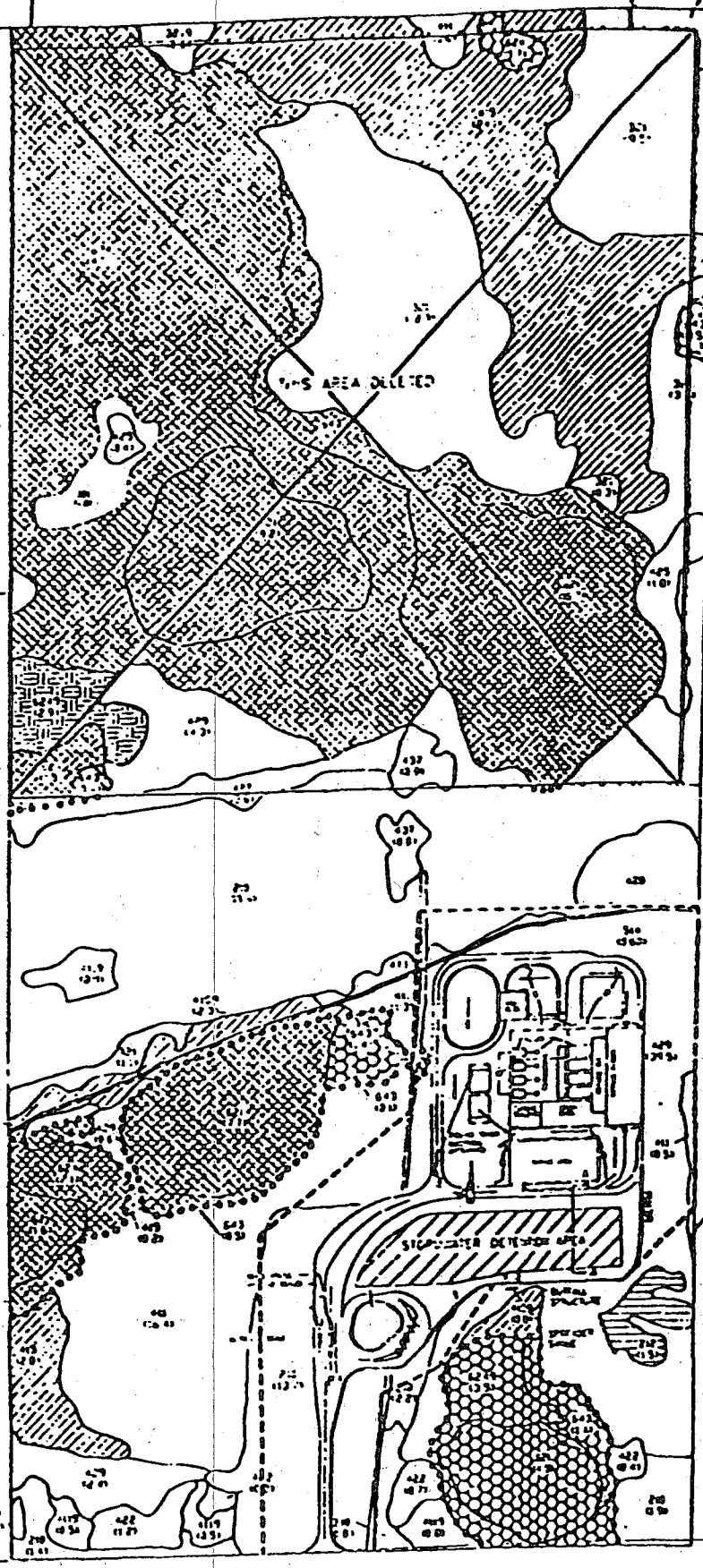
Jacqueline W. Hubbard
City Attorney

April 15, 1993
Date

POWER LINE EASEMENT (20' WIDE) (SEE SHEET 1)



POWER LINE EASEMENT



FACILITY SITE
SOUTH OF THIS LINE

LEGEND

- SET AREA AT CDM (15 ACRES) (SEE SHEET 1)
- POWER LINE
- ROAD
- SET AREA AT CDM (15 ACRES) (SEE SHEET 1)
- 100' BUFFER (SEE SHEET 1)

NOTES
 1. All areas shown on this map are for informational purposes only. The actual location of the power line easement and the facility site shall be determined by the Lee County Energy Recovery Plant. The Lee County Energy Recovery Plant is located at the intersection of Buckingham Road and County Road 900. The Lee County Energy Recovery Plant is a 15-acre facility. The Lee County Energy Recovery Plant is a 15-acre facility. The Lee County Energy Recovery Plant is a 15-acre facility.

BUCKINGHAM ROAD

LEE COUNTY ENERGY RECOVERY
DRAINAGE PLAN DETAILS

CAMP DRESSER & SUTHERS INC

CDM

DATE	BY	REVISION
10/1/88	CDM	1
10/1/88	CDM	2
10/1/88	CDM	3
10/1/88	CDM	4
10/1/88	CDM	5
10/1/88	CDM	6
10/1/88	CDM	7
10/1/88	CDM	8
10/1/88	CDM	9
10/1/88	CDM	10

The East one-half of Section 24, Township 44 South, Range 25 East, Lee County, Florida, except the westerly 250 feet for a Florida Power and Light right-of-way;

AND

All that part of the East one-half of Section 25, Township 44 South, Range 25 East, Lee County, Florida, lying northerly of the northerly right-of-way line of Buckingham Road (SR 82A) except the westerly 250 feet for a Florida Power and Light right-of-way.

EXHIBIT B

Shared Costs and Uses for
City of Fort Myers, Lee County
Reclaimed Wastewater System

I. Reclaimed Wastewater Treatment Facilities
(City of Fort Myers Central Wastewater Treatment
Plant Modifications)

Facility Size:	1,750,000 gpd (initial)
City Cost Share:	25%
County Cost Share:	75%

II. Transmission Facilities

Facility Size:	3,468,500 gpd
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Uses:

County

Short Term	1,300,000 gpd
Long Term (add'l)	400,000 gpd
Total	1,700,000 gpd

City

Short Term	430,000 gpd
Long Term (add'l)	1,338,500 gpd
Total	1,768,500 gpd

City Cost Share:	51%
County Cost Share:	49%

III. Pressure Requirement

45 pounds per square inch (psi), minimum at the Resource
Recovery Facility Point Of Delivery (p.o.d.)

**MALCOLM
PIRNIE**



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

	Appendix 6
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APPENDIX 6.0

FEDERAL PERMIT APPLICATIONS AND APPROVALS

**6.1 – Florida Public Service
Commission Declaratory
Statement and Additional
Background Information**

**6.2 - NPDES General Permit
Coverage Notice**

**6.1 – Florida Public Service
Commission Declaratory Statement
and Additional Background
Information**

Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Petition of Lee County,
Florida, for declaratory
statement of exemption, pursuant
to Section 377.709(6), F.S.,
from determination of need
requirement of Section 403.519,
F.S.

DOCKET NO. 011356-EQ
ORDER NO. PSC-01-2390-DS-EQ
ISSUED: December 11, 2001

The following Commissioners participated in the disposition of
this matter:

E. LEON JACOBS, JR., Chairman
J. TERRY DEASON
LILA A. JABER
BRAULIO L. BAEZ
MICHAEL A. PALECKI

ORDER GRANTING PETITION OF LEE COUNTY, FLORIDA
FOR DECLARATORY STATEMENT

By the Commission:

BACKGROUND

On October 11, 2001, Lee County, Florida filed its petition requesting a declaration that Lee County is exempt from having to obtain a determination of need for a contemplated expansion to Lee County's Resource Recovery Facility (Facility). Lee County owns the Facility, which is located in unincorporated Lee County, Florida.

Under the Florida Electrical Power Plant Siting Act (Chapter 403, Florida Statutes), we are empowered to make a determination of need for any electrical power plant for which an applicant seeks certification under the act. As set forth in Sections 403.508(3) and 403.503(12), Florida Statutes, the Siting Act requires a need determination prior to certification of any generating facility greater than 75 MW, but provides that a need determination may be obtained for a smaller facility. Lee County filed its petition for determination of need for the Facility on May 10, 1990 in Docket No. 900454-EQ. On January 7, 1991, we issued Order No. 23963 granting Lee County's need determination petition.

According to Lee County's Petition, the Facility has a nominal electric generating capacity of approximately 40 MW. The Facility initially achieved commercial in-service status in December, 1994. The Facility is operated by Covanta Energy of Lee, Inc., formerly Ogden Martin Systems of Lee, Inc., on behalf of the County pursuant to a twenty-year operations contract which expires in December 2014.

As described in the Petition, p. 5-6, the Facility receives and disposes of solid waste by burning the waste in the Facility's furnaces. This combustion process then produces steam from boilers, which is then directed through the Facility's steam turbine generator to produce electricity. Approximately 5 to 10 MW of the Facility's output is used to operate the Facility, and the remaining 30 to 35 MW of the Facility's output is sold to Seminole Electric Cooperative, Inc. (Seminole). Accordingly, the Facility is a "solid waste facility" within the meaning of Section 377.709(2)(f), Florida Statutes.¹ Seminole purchases the Facility's output on a firm capacity and energy basis, pursuant to a negotiated power purchase agreement. Seminole in turn uses the power purchased from Lee County to meet the needs of its ten member electric distribution cooperatives.

Lee County believes that the need for this declaratory statement arises from statements made in certain opinions of the Florida Supreme Court which indicate that need determinations are only available for power plants being built by retail-serving utilities to meet the needs of their retail customers or by entities having contracts with such retail-serving utilities.

Lee County is therefore uncertain whether the Florida Supreme Court's statements in the Nassau cases² and in Tampa Electric v.

¹ Section 377.709(2)(f) defines solid waste facility as "...a facility owned or operated by, or on behalf of, a local government for the purpose of disposing of solid waste, as that term is defined in s. 403.703(13), by any process that produces heat and incorporates, as a part of the facility, the means of converting heat to electrical energy in amounts greater than actually required for the operation of the facility."

² Nassau Power Corp. v. Beard, 602 So. 2d 1175 (Fla. 1992); Nassau Power Corp. v. Deason, 642 So. 2d 396 (Fla. 1994).

Garcia³ may be construed to override or negate the clearly articulated exemption enacted by the Legislature in Section 377.709(6), Florida Statutes, so as to require that Lee County must obtain a need determination based on a demonstration that the output of the proposed Facility expansion is fully committed to meeting the specific needs of Florida retail-serving electric utilities and those utilities' customers. According to Section 377.709(6), Florida Statutes, both new solid waste facilities having capacity less than 75 MW and expansions of solid waste facilities of less than 50 MW are exempt from the need determination process. Lee County is now preparing to file with the Florida Department of Environmental Protection its application for the certification of a planned expansion to the Facility by approximately 20 to 25 MW, which will bring the total electric generating capacity of the Facility to approximately 60 to 65 MW.

DISCUSSION

We grant Lee County's Petition for Declaratory Statement that its expansion is exempt from the need determination process pursuant to Section 377.709(6), Florida Statutes. Since Lee County's Resource Recovery Facility is a "solid waste facility" within the meaning of Section 377.709(2)(f), Florida Statutes, its expansion by 20-25 MW is exempt from the need determination requirement pursuant to Section 377.709(6), Florida Statutes.

We believe that any uncertainty on Lee County's part is resolved in this instance because the contemplated facility expansion of 20-25 MW is within the limits provided by the exemption from the need determination process provided in Section 377.709(6), Florida Statutes. As to statements in the Nassau and Tampa Electric v. Garcia cases, those statements appear to have been directed toward implementation of the need determination process as to entities subject to that process, rather than entities exempt from it. Moreover, the exemption is effective because the enactment of Section 377.709(6), Florida Statutes, in 1994 was subsequent to the revision of the conflict of laws provision of the Siting Act, Section 403.510, Florida Statutes, in 1990. Therefore, the Legislature should be assumed to have enacted Section 377.709(6), Florida Statutes, with knowledge of Section 403.510, Florida Statutes, and with the intent that the exemption provision be effective, rather than nullified by the earlier enacted provision. State v. Zimmerman, 370 So. 2d 1179,

³ Tampa Electric v. Garcia, 767 So. 2d 428 (Fla. 2000).

ORDER NO. PSC-01-2390-DS-EQ
DOCKET NO. 011356-EQ
PAGE 4

1180 (Fla. 4th DCA 1979); State v. Parsons, 569 So. 2d 437, 438 (Fla. 1990).

In view of the above, it is

ORDERED by the Florida Public Service Commission that the Petition for Declaratory Statement of Lee county, Florida is granted. It is further

ORDERED that this docket shall be closed.

By ORDER of the Florida Public Service Commission this 11th day of December, 2001.

/s/ Blanca S. Bayó

BLANCA S. BAYÓ, Director
Division of the Commission Clerk
and Administrative Services

This is a facsimile copy. Go to the Commission's Web site, <http://www.floridapsc.com> or fax a request to 1-850-413-7118, for a copy of the order with signature.

(S E A L)

RCB

ORDER NO. PSC-01-2390-DS-EQ
DOCKET NO. 011356-EQ
PAGE 5

NOTICE OF FURTHER PROCEEDINGS OR JUDICIAL REVIEW

The Florida Public Service Commission is required by Section 120.569(1), Florida Statutes, to notify parties of any administrative hearing or judicial review of Commission orders that is available under Sections 120.57 or 120.68, Florida Statutes, as well as the procedures and time limits that apply. This notice should not be construed to mean all requests for an administrative hearing or judicial review will be granted or result in the relief sought.

Any party adversely affected by the Commission's final action in this matter may request: 1) reconsideration of the decision by filing a motion for reconsideration with the Director, Division of the Commission Clerk and Administrative Services, 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399-0850, within fifteen (15) days of the issuance of this order in the form prescribed by Rule 25-22.060, Florida Administrative Code; or 2) judicial review by the Florida Supreme Court in the case of an electric, gas or telephone utility or the First District Court of Appeal in the case of a water and/or wastewater utility by filing a notice of appeal with the Director, Division of the Commission Clerk and Administrative Services and filing a copy of the notice of appeal and the filing fee with the appropriate court. This filing must be completed within thirty (30) days after the issuance of this order, pursuant to Rule 9.110, Florida Rules of Appellate Procedure. The notice of appeal must be in the form specified in Rule 9.900(a), Florida Rules of Appellate Procedure.

LANDERS & PARSONS, P.A.

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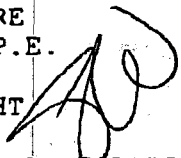
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MEMORANDUM

TO: DAVID M. OWEN, ESQUIRE
LINDSEY J. SAMPSON, P.E.

FROM: ROBERT SCHEFFEL WRIGHT 

SUBJECT: LEE COUNTY PETITION FOR DECLARATORY STATEMENT REGARDING
EXEMPTION FROM NEED DETERMINATION FOR RRF EXPANSION

DATE: NOVEMBER 20, 2001.

Attached please find the Public Service Commission Staff's recommendation to grant Lee County's petition for declaratory statement confirming that the planned expansion of the Lee County Resource Recovery Facility is exempt from the need determination process pursuant to Section 403.519, Florida Statutes. You will note that the Staff's recommendation accepts our analysis in reaching their conclusion that the petition should be granted. The full Commission is scheduled to vote on our petition at its regular agenda conference on December 4, 2001. I will plan to attend the conference so as to be available to answer any questions that the Commissioners may have, and I will report to you immediately thereafter. Frankly, I believe that this matter is so straightforward that the Commission will simply vote to approve it without discussion.

Thanks again for the opportunity to be of service. If you have any questions, please give me a call. I look forward to talking with you soon.

COPY: David S. Dee, Esquire

State of Florida



Public Service Commission

CAPITAL CIRCLE OFFICE CENTER • 2540 SHUMARD OAK BOULEVARD
TALLAHASSEE, FLORIDA 32399-0850**-M-E-M-O-R-A-N-D-U-M-**

DATE: NOVEMBER 19, 2001

TO: DIRECTOR, DIVISION OF THE COMMISSION CLERK &
ADMINISTRATIVE SERVICES (BAYO)

FROM: DIVISION OF APPEALS (BELLAK)
DIVISION OF SAFETY & ELECTRIC RELIABILITY (COLSON)

RE: DOCKET NO. 011356-EQ - PETITION OF LEE COUNTY, FLORIDA FOR
DECLARATORY STATEMENT OF EXEMPTION, PURSUANT TO SECTION
377.709(6), F.S., FROM DETERMINATION OF NEED REQUIREMENT
OF SECTION 403.519, F.S.

AGENDA: 12/04/01 - REGULAR AGENDA - DECLARATORY STATEMENT
INTERESTED PERSONS MAY PARTICIPATE AT THE COMMISSION'S
DISCRETION

CRITICAL DATES: NONE

SPECIAL INSTRUCTIONS: NONE

FILE NAME AND LOCATION: S:\PSC\APP\WP\011356.RCM

CASE BACKGROUND

On October 11, 2001, Lee County, Florida filed its petition requesting a declaration that Lee County is exempt from having to obtain a determination of need for a contemplated expansion to Lee County's Resource Recovery Facility (Facility). Lee County owns the Facility, which is located in unincorporated Lee County, Florida.

Under the Florida Electrical Power Plant Siting Act (Chapter 403, Florida Statutes), the Commission is empowered to make a determination of need for any electrical power plant for which an applicant seeks certification under the act. As set forth in Sections 403.508(3) and 403.503(12), Florida Statutes, the Siting Act requires a need determination prior to certification of any generating facility greater than 75 MW, but provides that a need

DOCKET NO. Q11356-EQ

DATE: NOVEMBER 19, 2001

determination may be obtained for a smaller facility. Lee County filed its petition for determination of need for the Facility on May 10, 1990 in Docket No. 900454-EQ. On January 7, 1991, the Commission issued Order No. 23963 granting Lee County's need determination petition.

According to Lee County's Petition, the Facility has a nominal electric generating capacity of approximately 40 MW. The Facility initially achieved commercial in-service status in December, 1994. The Facility is operated by Covanta Energy of Lee, Inc., formerly Ogden Martin Systems of Lee, Inc., on behalf of the County pursuant to a twenty-year operations contract which expires in December 2014.

As described in the Petition, p. 5-6, the Facility receives and disposes of solid waste by burning the waste in the Facility's furnaces. This combustion process then produces steam from boilers, which is then directed through the Facility's steam turbine generator to produce electricity. Approximately 5 to 10 MW of the Facility's output is used to operate the Facility, and the remaining 30 to 35 MW of the Facility's output is sold to Seminole Electric Cooperative, Inc. (Seminole). Accordingly, the Facility is a "solid waste facility" within the meaning of Section 377.709(2)(f), Florida Statutes.¹ Seminole purchases the Facility's output on a firm capacity and energy basis, pursuant to a negotiated power purchase agreement. Seminole in turn uses the power purchased from Lee County to meet the needs of its ten member electric distribution cooperatives.

Lee County believes that the need for this declaratory statement arises from statements made in certain opinions of the Florida Supreme Court which indicate that need determinations are only available for power plants being built by retail-serving utilities to meet the needs of their retail customers or by entities having contracts with such retail-serving utilities.

¹ Section 377.709(2)(f) defines solid waste facility as "...a facility owned or operated by, or on behalf of, a local government for the purpose of disposing of solid waste, as that term is defined in s. 403.703(13), by any process that produces heat and incorporates, as a part of the facility, the means of converting heat to electrical energy in amounts greater than actually required for the operation of the facility."

DOCKET NO. 011356-EQ

DATE: NOVEMBER 19, 2001

Lee County is therefore uncertain whether the Florida Supreme Court's statements in the Nassau cases² and in Tampa Electric v. Garcia³ may be construed to override or negate the clearly articulated exemption enacted by the Legislature in Section 377.709(6), Florida Statutes, so as to require that Lee County must obtain a need determination based on a demonstration that the output of the proposed Facility expansion is fully committed to meeting the specific needs of Florida retail-serving electric utilities and those utilities' customers. According to Section 377.709(6), Florida Statutes, both new solid waste facilities having capacity less than 75 MW and expansions of solid waste facilities of less than 50 MW are exempt from the need determination process. Lee County is now preparing to file with the Florida Department of Environmental Protection its application for the certification of a planned expansion to the Facility by approximately 20 to 25 MW, which will bring the total electric generating capacity of the Facility to approximately 60 to 65 MW.

DISCUSSION OF ISSUES

ISSUE 1: Should the Commission grant Lee County's Petition for Declaratory Statement that its expansion is exempt from the need determination process pursuant to Section 377.709(6), Florida Statutes?

RECOMMENDATION: Yes. Since Lee County's Resource Recovery Facility is a "solid waste facility" within the meaning of Section 377.709(2)(f), Florida Statutes, its expansion by 20-25 MW is exempt from the need determination requirement pursuant to Section 377.709(6), Florida Statutes.

STAFF ANALYSIS: Staff believes that any uncertainty on Lee County's part is resolved in this instance because the contemplated facility expansion of 20-25 MW is within the limits provided by the exemption from the need determination process provided in Section 377.709(6), Florida Statutes. As to statements in the Nassau and Tampa Electric v. Garcia cases, those statements appear to have been directed toward implementation of the need determination

² Nassau Power Corp. v. Beard, 602 So. 2d 1175 (Fla. 1992); Nassau Power Corp. v. Deason, 642 So. 2d 396 (Fla. 1994).

³ Tampa Electric v. Garcia, 767 So. 2d 428 (Fla. 2000).

DOCKET NO. 011356-EQ

DATE: NOVEMBER 19, 2001

process as to entities subject to that process, rather than entities exempt from it. Moreover, the exemption is effective because the enactment of Section 377.709(6), Florida Statutes, in 1994 was subsequent to the revision of the conflict of laws provision of the Siting Act, Section 403.510, Florida Statutes, in 1990. Therefore, the Legislature should be assumed to have enacted Section 377.709(6), Florida Statutes, with knowledge of Section 403.510, Florida Statutes, and with the intent that the exemption provision be effective, rather than nullified by the earlier enacted provision. State v. Zimmerman, 370 So. 2d 1179, 1180 (Fla. 4th DCA 1979); State v. Parsons, 569 So. 2d 437, 438 (Fla. 1990).

DOCKET NO. Q11356-EQ

DATE: NOVEMBER 19, 2001

ISSUE 2: Should this docket be closed?

RECOMMENDATION: Yes, if the Commission votes to dispose of the petition for declaratory statement, the docket should be closed.

STAFF ANALYSIS: A declaratory statement is issued as a final order and the docket may be closed.

RCB

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION || PM 4:16

In Re: Petition of Lee County,)
Florida for Declaratory Statement) DOCKET NO. _____-EQ
Of Exemption, Pursuant to Section)
377.709(6), Florida Statutes, From) FILED: October 11, 2001
Determination of Need Requirement)
of Section 403.519, Florida Statutes)

COMMISSION
CLERK

PETITION FOR DECLARATORY STATEMENT BEFORE
THE FLORIDA PUBLIC SERVICE COMMISSION

Lee County, Florida ("Lee County"), pursuant to Section 120.565, Florida Statutes,¹ and Rule 28-105.002, Florida Administrative Code ("F.A.C."), hereby respectfully requests the Florida Public Service Commission's ("Commission" or "PSC") declaration that, on the facts and law as set forth below, Lee County is exempt from having to obtain a determination of need for the contemplated expansion to the Lee County Resource Recovery Facility (the "Facility"). Lee County has a real and immediate need for the Commission's declaration because the Commission decision will determine how Lee County proceeds with the certification process for its planned expansion to the Facility. In support of its petition, Lee County states as follows.

In summary, Lee County owns and operates the Facility, a "solid waste facility" within the meaning of Section

¹ All references herein to Florida Statutes are to the 2001 edition thereof.

RECEIVED & FILED

377.709(2)(f), Florida Statutes, having a nominal electric generating capacity of approximately 40 megawatts ("MW"). Lee County is preparing to file with the Florida Department of Environmental Protection its application for the certification of its planned expansion to the Facility by approximately 20 to 25 MW, which will bring the total electric generating capacity of the Facility to approximately 60 to 65 MW. Pursuant to the plain and unambiguous language of Section 377.709(6), Florida Statutes, Lee County's planned expansion of the Facility is exempt from the Commission's need determination process articulated in Section 403.519, Florida Statutes. The Commission has the statutory responsibility and jurisdiction to administer both Sections 377.709 and 403.519, Florida Statutes, and accordingly, Lee County is entitled to the requested declaratory statement from the Commission.

PROCEDURAL BACKGROUND

1. The name and address of the Petitioner is:

Lee County, Florida
Division of Solid Waste Management
1500 Monroe Street (ZIP 33901)
Post Office Box 398
Fort Myers, Florida 33902-0398.
Telephone (941) 479-8181
Telecopier (941) 479-8119.

2. All pleadings, motions, orders, and other documents directed to the Petitioner are to be served on the following:

Robert Scheffel Wright, Esq.
Landers & Parsons, P.A.
310 West College Avenue (ZIP 32301)
Post Office Box 271
Tallahassee, Florida 32302

and

David M. Owen, Esq.
Lee County Attorney's Office
2115 Second Street, 6th Floor (ZIP 33901)
Post Office Box 398
Fort Myers, Florida 33902-0398,

with a courtesy copy to:

Lindsey J. Sampson, P.E., Director
Lee County Division of Solid Waste Management
1500 Monroe Street (ZIP 33901)
Post Office Box 398
Fort Myers, Florida 33902-0398.

DECLARATORY STATEMENT SOUGHT

3. Based upon the facts and law as set forth below, Lee County respectfully requests the Commission's declaration that:

Pursuant to Section 377.709(6), Florida Statutes, Lee County is exempt from having to obtain a determination of need from the Commission as articulated in Section 403.519, Florida Statutes, for the planned expansion of the Lee County Resource Recovery Facility from the Facility's current capacity of approximately 40 MW to its projected capacity of approximately 60 to 65 MW.

STATUTES AND ORDERS INVOLVED

4. Lee County seeks the Commission's declaratory statement granting Lee County's exemption from the Commission's need determination process. The requested declaratory statement involves the following statutes, rules, and cases.

- a. Section 403.519, Florida Statutes, which establishes the determination of need process that the Commission administers with respect to the siting of electrical power plants under the Florida Electrical Power Plant Siting Act, Sections 403.501-.518, Florida Statutes (the "Siting Act").
- b. Section 377.709(2)(f), Florida Statutes, which provides as follows:
 - (f) "Solid waste facility" means a facility owned or operated by, or on behalf of, a local government for the purpose of disposing of solid waste, as that term is defined in s. 403.703(13), by any process that produces heat and incorporates, as a part of the facility, the means of converting heat to electrical energy in amounts greater than actually required for the operation of the facility.
- c. Section 377.709(6), Florida Statutes, which provides as follows:
 - (6) EXEMPTIONS.-- A new solid waste facility, as defined in this section, not greater than 75MW, or a solid waste facility expansion of not greater than 50MW, shall be exempt from the need determination process outlined in s. 403.519.
- d. Commission Rules 25-22.080-.081, F.A.C., which implement Section 403.519 and govern the Commission's need determination processes.
- e. Tampa Electric Co. v. Garcia, 767 So. 2d 428 (Fla. 2000).

- f. Nassau Power Corp. v. Deason, 641 So. 2d 396 (Fla. 1994).
- g. Nassau Power Corp. v. Beard, 601 So. 2d 1175 (Fla. 1992).

FACTS

5. Lee County owns the Lee County Resource Recovery Facility, which is located in unincorporated Lee County, Florida. The Facility initially achieved commercial in-service status in December, 1994. The Facility is operated by Covanta Energy of Lee, Inc., formerly Ogden Martin Systems of Lee, Inc., on behalf of the County pursuant to a twenty-year operations contract which expires in December 2014. The Facility receives and disposes of solid waste by burning the waste in the Facility's furnaces. This combustion process then produces steam from boilers, which is then directed through the Facility's steam turbine generator to produce electricity. Approximately 5 to 10 MW of the Facility's output is used to operate the Facility, and the remaining 30 to 35 MW of the Facility's output is sold to Seminole Electric Cooperative, Inc. ("Seminole"). Accordingly, the Facility is a "solid waste facility" within the meaning of Section 377.709(2)(f), Florida Statutes. Seminole purchases the Facility's output on a firm capacity and energy basis, pursuant to a negotiated power purchase agreement. Seminole in turn uses the power purchased from Lee County to meet the needs of its ten member electric distribution cooperatives.

6. Lee County is preparing to file its application for a modification to the Site Certification for the Facility. Through this application, Lee County is seeking the Siting Board's authorization to increase the Facility to its planned capacity of 1,800 tons per day ("TPD") of solid waste throughput by adding the final boiler and one additional steam turbine generator to the existing physical plant of the Facility. The expansion of the Facility will comprise approximately 20 to 25 MW of additional capacity, and the Facility's total capacity, once the expansion is complete, will be approximately 60 to 65 MW.

DISCUSSION AND ANALYSIS OF APPLICABLE LAW

7. The permitting of certain power plants in Florida is subject to the processes established in the Siting Act and in Section 403.519, Florida Statutes,² which governs the "determination of need" for such power plants. In summary, power plants, including expansions thereof, that have a steam or solar energy cycle of 75 megawatts ("MW") or more must follow the permitting procedures pursuant to the Siting Act, while those using other technologies and those with steam or solar energy cycles less than 75 MW may, but are not required to, pursue permitting under the Siting Act. Fla. Stat. § 403.503(12). The Commission has exclusive jurisdiction over the determination of

² Section 403.519 is part of the Florida Energy Efficiency and Conservation Act, commonly referred to as "FEECA."

need issue in connection with site certification applications. Fla. Stat. § 403.519; Florida Chapter of the Sierra Club v. Orlando Utilities Commission, 436 So. 2d 383, 387 (Fla. 5th DCA 1983) (District Court of Appeals affirmed Siting Board's final certification order, holding, inter alia, that "the language [in Section 403.519], as well as the language from section 403.508(3), compels the finding that the PSC is the sole judge as to the need for the power plant, with the hearing officer and, indeed, the Siting Board, bound by that determination.") The rules by which the Commission fulfills its responsibilities under Section 403.519 are codified at Rules 25-22.080-.081, F.A.C.

8. Because Lee County is a charter county organized under the Florida Constitution and general law, Lee County is a proper applicant for both Site Certification by the Siting Board pursuant to the Siting Act and, where applicable, for the Commission's need determination pursuant to Section 403.519, Florida Statutes. See Fla. Stat. §§ 403.503(4)&(13).

9. The Commission is also the agency responsible for administering Section 377.709, Florida Statutes. Section 377.709 relates primarily to the funding of local government solid waste facilities that generate electricity. Among other things, Section 377.709 authorizes the Commission to establish an advance funding program for solid waste facilities and requires the Commission to establish rules relating to the purchase by electric utilities of electric capacity and energy produced by

local government solid waste facilities. In addition, Section 377.709(6) exempts from the Commission's need determination process under Section 403.519, Florida Statutes, both new solid waste facilities having capacity less than 75 MW and expansions of solid waste facilities of less than 50 MW. This exemption was enacted by the Florida Legislature in 1994 (Chapter 94-321, Laws of Fla.).

10. Lee County's need for this declaratory statement arises from statements made in certain opinions of the Florida Supreme Court which indicate that need determinations are only available for power plants being built by retail-serving utilities to meet the needs of their retail customers or by entities having contracts with such retail-serving utilities. In the earliest of this line of cases, the Florida Supreme Court stated in a footnote that the need criteria in Section 403.519, Florida Statutes, are utility-specific and unit-specific, thereby rejecting a cogenerator's claim that need for its project, which was to provide power to a retail-serving utility pursuant to a "standard offer contract" with pricing based on the costs of a "statewide avoided unit," had already been determined by the Commission in its approval of the "standard offer contract." Nassau Power Corp. v. Beard, 601 So. 2d 1175 at 1178 n.9 (Fla. 1992).³ In a subsequent case, the court affirmed the

³ The actual holding of Nassau Power v. Beard was that the cogenerator had appealed the wrong order in having failed to

Commission's order that held that an independent cogeneration power producer was not a valid applicant for a determination of need unless it had a contract with a retail-serving utility to provide power to meet such utility's needs for power for its retail customers. Nassau Power Corp. v. Deason, 641 So. 2d 396, 398 (Fla. 1994). In that opinion, the court stated that, under the Commission's interpretation, which the court affirmed:

[A] non-utility generator will be able to obtain a need determination for a proposed project only after a power sales agreement has been entered into with a utility. The non-utility generator will be considered a joint applicant with the utility with which it has contracted.

Id. at 398.

11. In the last case of this line, the Commission held that the contract requirement of Nassau Power v. Deason did not extend to cases wherein the applicant proposed to build and operate a wholesale power plant, where the applicant had no power to force any retail-serving utility to purchase its output, and where the proposed plant would not be in any retail-serving utility's rate base. In Re: Joint Petition for Determination of Need for an Electrical Power Plant in Volusia County by the Utilities Commission, City of New Smyrna Beach, Florida and Duke Energy New Smyrna Beach Power Company Ltd., L.L.P., 99 FPSC 3:401

appeal an earlier Commission order enunciating the Commission's policy of determining need on a utility-specific basis. Id. at 1178-79.

(hereinafter "Duke/New Smyrna Beach"), reversed sub nom. Tampa Electric Co. v. Garcia, 767 So. 2d 428 (Fla. 2000). Although the Commission distinguished the facts in Duke/New Smyrna Beach from those in Nassau Power v. Deason, notably the facts that the applicant in Duke/New Smyrna Beach had no power to force any Florida utility to purchase its power and that the costs of the proposed plant could not be imposed on any retail-serving utility's captive customers, 99 FPSC 3:434-35. On appeal, however, the Florida Supreme Court reversed, holding, inter alia, that

A determination of need is presently available only to an applicant that has demonstrated that a utility or utilities serving retail customers has specific committed need for all of the electrical power to be generated at a proposed plant.

Tampa Electric v. Garcia, 767 So. 2d at 434.

The court also stated that

the statutory scheme embodied in the Siting Act and FEECA was not intended to authorize the determination of need for a proposed power plant output that is not fully committed to use by Florida customers who purchase electrical power at retail rates.

Id. at 435.

12. It is worth noting that the Siting Board and the Commission have granted numerous site certifications and need determinations for waste-to-energy facilities where the applicant was a single entity, usually a county, that neither had responsibility for serving retail electric customers nor had a

power sales contract with a retail-serving utility at the time of the site certification proceedings. See, e.g., In Re: North Broward County Resource Recovery Project Power Plant Siting Certification Application P.A. 86-22, DOAH Case No. 86-0674 (Fla. Power Plant Siting Bd., March 9, 1987) and In Re: Petition by Broward County for a Determination of Need for a Solid Waste-Fired Electrical Power Plant, Docket No. 850915-EU, Order No. 15723 (Fla. Pub. Serv. Comm'n, February 21, 1986); In Re: Hillsborough County Resource Recovery Project Power Plant Siting Certification Application PA 83-19, DOAH Case No. 84-2789 (Fla. Power Plant Siting Bd., December 20, 1984) and In Re: Petition by Hillsborough County for Determination of Need for a Solid Waste-Fired Cogeneration Power Plant, Docket No. 830419-EU, Order No. 12610 (Fla. Pub. Serv. Comm'n, October 14, 1983); In Re: Pinellas County Power Plant Certification Application PA 83-18, DOAH Case No. 83-2355 (Fla. Power Plant Siting Bd., March 20, 1984) and In Re: Petition by Pinellas County for Determination of Need for a Solid Waste-Fired Cogeneration Power Plant, Docket No. 830417-EU, Order No. 12611 (Fla. Pub. Serv. Comm'n, October 14, 1983); In Re: Application for Power Plant Site Certification of Lee County Solid Waste Resource Recovery Facility, DOAH Case No. 90-3942EPP (Fla. Power Plant Siting Bd., June 17, 1992) and In Re: Petition for Determination of Need for a Solid Waste-Fired Cogeneration Power Plant by Lee County, Docket No. 900454-EQ, Order No. 23963 (Fla. Pub. Serv. Comm'n, January 7, 1991). In 1993, after the

court's decision in Nassau Power v. Beard but before the enactment of Section 377.709(6), the Commission also granted a determination of need for an expansion of the Dade County Resources Recovery Facility, even though there was no contract in place for the additional output to be produced by the expansion. In Re: Petition to Determine Need for Proposed Capital Expansion Project of the Dade County Resources Recovery Facility, an Existing Solid Waste Facility, by Metropolitan Dade County, FPSC Docket No. 930196-EQ, Order No. PSC-93-1715-FOF-EQ at 3, 6 (Fla. Pub. Serv. Comm'n, November 30, 1993).

13. The question posed by this petition thus becomes: whether the Florida Supreme Court's statements in the earlier Nassau cases and in Tampa Electric v. Garcia may somehow be construed to override or negate the clearly articulated exemption enacted by the Legislature in Section 377.709(6), Florida Statutes, so as to require that Lee County must obtain a need determination based on a demonstration that the output of the proposed Facility expansion is fully committed to meeting the specific needs of Florida retail-serving electric utilities and those utilities' customers.⁴

⁴ In point of fact, Lee County's existing power purchase agreement with Seminole Electric Cooperative obligates Seminole to purchase the additional capacity and energy to be produced by the expanded Facility. Lee County seeks the Commission's declaratory statement in order to avoid wasting both the Commission's and Lee County's time and resources on an unnecessary -- both as a matter of law and as a matter of policy -- need determination proceeding.

14. Lee County is entitled to the requested declaratory statement by the plain and unambiguous language of Section 377.709(6), Florida Statutes. The cardinal rule to be followed in applying statutes is that legislative intent, as reflected in the plain language of the statute, controls. "Where the language of a statute is plain and unambiguous and conveys a clear and definite meaning, there is no occasion for resort to the rules of statutory interpretation. The plain and obvious provisions must control." 49 Fla. Jur. 2d Statutes § 111 (1984 & Supp. 1994). "Where legislative intent as evidenced by statute is plain and unambiguous, there is no necessity for any construction or interpretation of the statute, and courts need only give effect to the plain meaning of its terms." State v. Egan, 287 So. 2d 1 (Fla. 1973).

15. Here, the language of Section 377.709(6), Florida Statutes, is clear and unambiguous: new solid waste facilities with capacity less than 75 MW and solid waste facility capacity expansions less than 50 MW are exempt from the need determination process outlined in Section 403.519, Florida Statutes. Neither Nassau Power v. Beard, nor Nassau Power v. Deason, nor Tampa Electric v. Garcia addressed the case of a need determination for a solid waste facility. Even considering that solid waste facilities are, typically, qualifying facilities under both federal law and the Commission's rules, the Commission should note that it granted the need determination for the Dade County

Facility expansion after the court's opinion in Nassau Power v. Beard was rendered. This at least strongly implies that the Commission has recognized that the Legislature's declared policy favoring solid waste facilities supersedes the utility-specific need requirements articulated by the Commission in its orders and affirmed by the Florida Supreme Court in Nassau Power v. Beard. There is no indication whatsoever in either Nassau Power Corp. v. Deason or in Tampa Electric v. Garcia that the Supreme Court meant to apply those cases to override the provisions of Section 377.709(6) so clearly articulated by the Florida Legislature.

16. It could be suggested that certain provisions of the Siting Act also require a need determination for the expansion. Section 403.508(3), Florida Statutes, provides that an affirmative determination of need is a condition precedent to holding a site certification hearing, and Section 403.510, Florida Statutes, provides that in the event of conflict between any provision of the Siting Act and any other statute, the Siting Act controls. Thus it might be suggested that, by operation of the "supremacy" provision of Section 403.510, the "need determination as condition precedent" requirement of Section 403.508(3) supersedes the limited exemption from the need determination process afforded by Section 377.709(6).

17. However, such a suggestion fails by the application of several standard rules of statutory construction. First, in interpreting a statute, the courts must presume that the

Legislature intended every part of a statute to have a purpose.

49 Fla. Jur. 2d Statutes § 179 (1984 & Supp. 1994). As the Florida Fourth District Court of Appeals stated in State v. Zimmerman, 370 So. 2d 1179, 1180 (Fla. 4th DCA 1979),

It is an axiom of statutory construction that the legislature would not enact a purposeless and therefore useless piece of legislation. Sharer v. Hotel Corporation of America, 144 So. 2d 813 (Fla. 1962). It is the judiciary's duty to uphold and give effect to all provisions of a legislative enactment, and to adopt any reasonable view that will do so. Tyson v. Lanier, 156 So. 2d 833 (Fla. 1963).

(Citations in original.) Here, the hypothetical suggestion given would directly and inescapably imply that the Legislature enacted Section 377.709(6) as a "purposeless and therefore useless piece of legislation." Florida law does not allow such a result. Moreover, in the absence of a showing to the contrary, all laws are presumed to be consistent with each other, and where possible, it is the duty of the courts to adopt a construction of a statutory provision that harmonizes and reconciles it with other statutory provisions. 49 Fla. Jur. 2d Statutes § 180 (1984 & Supp. 1994); Woodgate Development Corp. v. Hamilton Invest. Trust, 351 So. 2d 14, 16 (Fla. 1977); State v. Putnam County Development Authority, 249 So. 2d 6, 10 (Fla. 1971). The provisions of Sections 377.709(6) and 403.508(3) are readily harmonized by recognizing that Section 377.709(6) is a legislatively created exemption to the general need determination requirement, and that this exemption was adopted by the

Legislature in furtherance of its clearly articulated policy favoring solid waste facilities. See Fla. Stat. § 377.709(1).

18. Second, this hypothetical suggestion would conflict with the principle of statutory construction that a more specific statute governs a more general statute. 49 Fla. Jur. 2d Statutes § 182 (1984 & Supp. 1994). As the Florida Supreme Court stated the principle,

A specific statute always prevails over a general statute to the extent of any irreparable inconsistency. Adams v. Culver, 111 So. 2d 665 (Fla. 1959). In effect, the former is construed as an exception to the latter.

People Against Tax Revenue Mismanagement, Inc. v. County of Leon, 583 So. 2d 1373, 1377 n.5 (Fla. 1991) (citation in original). In this instance, Section 377.709(6) is a specific statute that expressly exempts certain solid waste facility expansions from the need determination process, whereas Section 403.508(3) is a general requirement for need determinations within the site certification process. Accordingly, the specific statutory provision, that is, the exemption provision of Section 377.709(6), takes precedence over the general requirement of Section 403.508(3).

19. Next, the hypothetical suggestion would conflict with the basic principle that a more recently enacted statute controls or overrides an older statute. 49 Fla. Jur. 2d Statutes § 181 (1984 & Supp. 1994); State v. Parsons, 569 So. 2d 437, 438 (Fla.

1990); Askew v. Schuster, 331 So. 2d 297, 300 (Fla. 1976). This principle, however, only applies where the provisions in question are hopelessly inconsistent. In this case, as articulated above, the provisions of Sections 377.709(6) and 403.508(3) are readily harmonized.

20. Finally, requiring a need determination for the specified classes of solid waste facilities and expansions would not only render useless the express provisions of Section 377.709(6), it would also frustrate the express policy purposes articulated by the Legislature in enacting Section 377.709, namely to promote and encourage the "combustion of refuse by solid waste facilities to supplement the electricity supply," which "not only represents an effective conservation effort but also represents an environmentally preferred alternative to conventional solid waste disposal in this state." Fla. Stat. § 377.709(1).

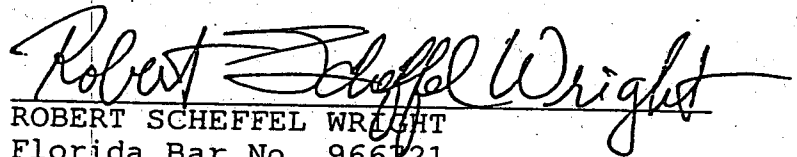
CONCLUSION

As presented in the foregoing analysis, the plain and unambiguous language of Section 377.709(6), Florida Statutes, exempts Lee County's proposed 20 to 25 MW expansion of the Lee County Resource Recovery Facility from the need determination process outlined in Section 403.519, Florida Statutes. There is no authority to indicate that the Florida Supreme Court's holdings in Nassau Power v. Deason or Tampa Electric v. Garcia in

any way impair this legislatively created exemption. Requiring a need determination for the proposed expansion would render Section 377.709(6) a nullity, would needlessly waste the Commission's and Lee County's time and resources, and is plainly contrary to the Legislature's articulated policy favoring solid waste facilities both as an energy conservation measure and as an environmentally preferred means of solid waste disposal. Lee County has a real and immediate need for the requested declaration, and accordingly, the Commission should grant Lee County's petition.

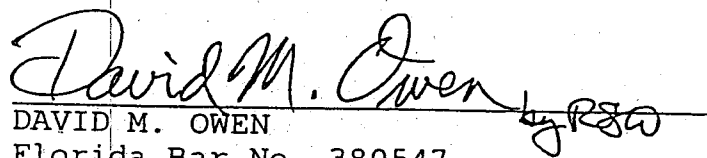
WHEREFORE, Lee County, Florida, respectfully requests the Commission to enter its order declaring that, on the facts and law as presented herein, and in particular pursuant to Section 377.709(6), Florida Statutes, Lee County is exempt from having to obtain a determination of need for the planned expansion to the Lee County Resource Recovery Facility pursuant to Section 403.519, Florida Statutes.

Respectfully submitted this 11th day of October, 2001.



ROBERT SCHEFFEL WRIGHT
Florida Bar No. 966721
LANDERS & PARSONS, P.A.
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Tallahassee, Florida 32302
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and



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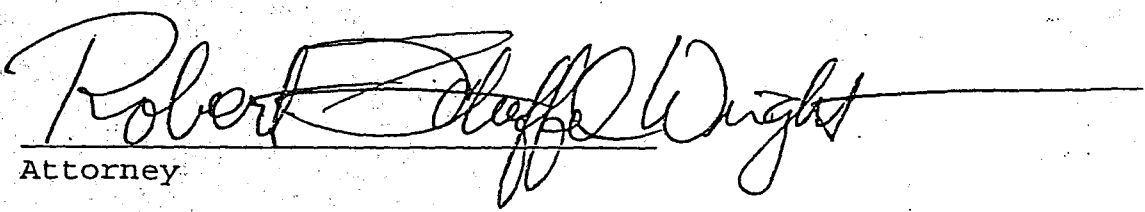
Attorneys for Lee County, Florida

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished by hand delivery (*), or U.S. Mail, on this 11th day of October, 2001, to the following:

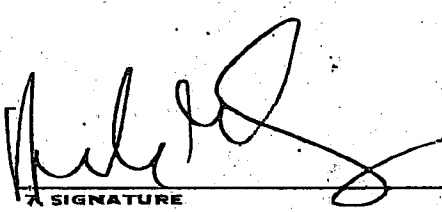
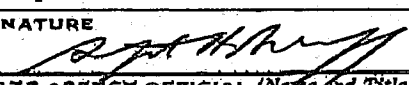
David E. Smith, Esq.*
Division of Appeals
Florida Public Service Comm.
2540 Shumard Oak Boulevard
Gunter Building, Room 301H
Tallahassee, FL 32399-0850

Robert V. Elias, Esq.*
Division of Legal Services
Florida Public Service Comm.
2540 Shumard Oak Boulevard
Gunter Building, Room 301H
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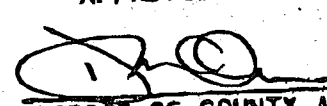

Attorney

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
PLANT PROTECTION AND QUARANTINE PROGRAMS

COMPLIANCE AGREEMENT

1. NAME AND MAILING ADDRESS OF PERSON OR FIRM Lee County Solid Waste Division, Waste to Energy Facility 10500 Buckingham Road, Suite 200 Ft. Myers, Florida 33905		2. LOCATION Same as number one.	
3. REGULATED ARTICLE(S) Foreign Plant and Animal Products, including Meat, Animal-Byproducts, Fruits, Vegetables, Plant Products, and International Regulated Garbage.			
4. APPLICABLE FEDERAL QUARANTINE(S) OR REGULATIONS 9 CFR 94.5 and 7 CFR 330.400			
5. I/We agree to the following: See attached Compliance Agreement provisions.			
7. SIGNATURE 		8. TITLE Vice-Chairman	
		9. DATE SIGNED 2/20/01	
The affixing of the signatures below will validate this agreement which shall remain in effect until cancelled, but may be revised as necessary or revoked for noncompliance.		10. AGREEMENT NO. RSW-CA8	
		11. DATE OF AGREEMENT January 25, 2001	
12. PPQ OFFICIAL (Name and Title) Stephen H. Polydoroff, PPQ Officer		13. ADDRESS USDA APHIS PPQ 16000 CHAMBERLIN PKWY STE 8634 FT. MYERS, FL 33913-8831	
14. SIGNATURE 		15. ADDRESS	
15. STATE AGENCY OFFICIAL (Name and Title)			
17. SIGNATURE			

APPROVED AS TO FORM


OFFICE OF COUNTY ATTORNEY

C8a
2-20-01

I. DEFINITIONS:

- A. Garbage.** All waste derived in whole or in part from fruits, vegetables, meats, or other plant or animal (including poultry) products, and other refuse of any kind that has been associated with any such material on board any means of conveyance; and includes food scraps, table refuse, galley refuse, food wrappers and packaging materials, and other waste material from food preparation areas, passenger or crew areas, or other areas on the means of conveyance. For the purposes of this part, garbage also means any meals or foods that were available for consumption by passengers or crew, but were not consumed.
- B. USDA Regulated Garbage.** Any garbage on, or removed from, a means of conveyance that has arrived from any port outside the United States and Canada; or a United States territory, possession, or the State of Hawaii, unless specifically excepted by USDA, APHIS, PPQ.
- C. USDA, APHIS, PPQ.** United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine. Local contact (941)768-4758.
- D. PPQ Officer.** A properly identified employee of the USDA, APHIS, PPQ, or other person authorized by USDA, APHIS, PPQ to enforce the Federal Plant Pest Act, Plant Quarantine Act, any pertinent parts of Title 7 or Title 9 of the Code of Federal Regulations, and/or the provisions of this agreement.
- E. Ogden.** Ogden Martin Systems of Lee, Inc. At 10500 Buckingham Road, Ft. Myers, FL 33905 and its employees. Ogden is the contract operator of the Lee County Waste to Energy Facility.
- F. Facility.** The Lee County Waste to Energy Facility, located at 10500 Buckingham Road, Ft. Myers, FL 33905 designed, permitted, and operated to combust municipal solid waste and generate electricity. The Facility is owned by Lee County, a political subdivision of the State of Florida.

II. Regulated Garbage Handling and Transfer to Approved Waste Disposal Site.

A. Transfer Requirements.

All USDA regulated garbage approved for transfer to, and incineration at the Lee County Waste to Energy Facility, 10500 Buckingham Road, Ft. Myers, Florida 33905, will be placed in small individual, leak proof, and secure containers. Double bagging, with use of heavy duty, red plastic bags (at least 4 mil thickness without biohazard imprint) as an outside layer is recommended. These bags if punctured or leaking, should be made leak proof before proceeding to the next step. The resultant leak proof bagged garbage will then be placed in a leak proof shipping or handling container. This container must be conspicuously labeled to readily identify it as containing "USDA Regulated Garbage", with letters 2 to 4 inches in height, or tagged with a label at least 3 by 5 inches in size, with minimum lettering of 1 inch height. Ideally this shipping or second container should be incinerated with the contained garbage. If this is not the case, the shipping and handling container **MUST** be thoroughly cleaned and disinfected (See Appendix 1.) After each use, and prior to exiting the facility/ tipping floor area. The leak proof container(s) must be placed in a tightly covered, rigid, leak proof carrier, bin, or dumpster. This transit container must be bird and rodent proof. Canvas or tarp type covers are not acceptable. This container must be secured by lock, seal, or similar device prior to transport to the Facility. If this transit container is the secondary container, and will not be incinerated, it must be clearly marked as "USDA Regulated Garbage" with letters at least 4 inches high. The load must be weighed, recorded, and certified by Ogden entry gate personnel to be leak proof and sealed prior to acceptance into the Lee County incineration facility. Any spillage or leaks must be contained, cleaned, and disinfected before transfer of regulated garbage container. The shipper will be held responsible for the cost and cleanup of any leaks, spills, and/or associated environmental damage while in a transit status. USDA, APHIS, PPQ office, Ft. Myers, FL will be contacted immediately in case of spill, leakage, or accident. Routing of the transporting vehicle should be direct to the nearest USDA approved incinerator or cooker available. After offloading regulated garbage, Ogden personnel will ensure the transfer container is cleaned and disinfected as required under Appendix I, prior to departure from the Facility tipping floor.

B. Regulated Garbage Processing Facility Requirements.

Upon arrival at the Facility, the load will be weighed, recorded as to origin, and confirmed by Ogden personnel as being free of leaks and under seal or lock, before allowed onto premises for incineration. Records/logs of regulated garbage accepted for processing will be maintained by Ogden, and presented to USDA quarterly or upon request. Regulated garbage loads will receive priority status, and must be dumped directly into the "pit" and the entire contents immediately incinerated. No diversion or dumping on the tipping floor is allowed. After dumping, the transfer container must be cleaned and disinfected immediately, as outlined in Appendix I, prior to departure from the Facility. Any resultant liquid wastes in the containment pit originating from the processing of regulated garbage, or the cleaning and disinfection process will be considered as non-regulated after a 24 hour period has elapsed. All solid waste residues from regulated loads must be incinerated. Ogden must make a reasonable effort to exclude birds and rodents from the

II. Regulated Garbage Handling and Transfer to Approved Waste Disposal Site.

loading floor and pit areas to prevent the introduction and spread of injurious organisms. Any breakdown, shut down, or maintenance required of the facility that affects the processing procedures outlined above should be immediately reported to USDA, PPQ Ft. Myers, FL. As two incinerators are currently online and operational, the back up incinerator requirement will be considered met.

III. TRAINING.

- A. The establishment shall present a training program to employees before they are permitted to handle or supervise the handling of USDA regulated garbage. This training program s should be at least 1 hour in length. Previously trained employees shall be provided review training annually.**
- B. The training package must be approved by the local USDA, APHIS, PPQ Officer in Charge, and may include both classroom and on-the-job training. It must:**
 - 1. Define regulated garbage.**
 - 2. Explain the regulations and the purpose of the regulations.**
 - 3. Include film, slides, or other training aids on foreign animal and plant diseases and pests.**
 - 4. Demonstrate proper regulated garbage handling procedures for the facility, step by step, from collection to the disposal of regulated garbage.**
 - 5. Be presented in English and other appropriate languages.**
- C. Proof of training administered to employees is required and shall be made available to PPQ personnel upon request. Only those employees with current documented training will be allowed to handle regulated garbage.**

IV. Monitoring for Compliance. USDA, APHIS, PPQ will routinely monitor the operations, procedures, personnel, and regulated material covered under this agreement. PPQ Officers shall be allowed unrestricted access, to any part of a facility, or means of conveyance, engaged in the handling of USDA regulated garbage, to inspect and monitor for compliance of any applicable Federal laws, regulations, or stipulations of this agreement.

V. Violations and Penalties. Notice: This compliance agreement may be immediately canceled or revoked for noncompliance. Violations of applicable Federal regulations of this agreement may result in a criminal penalty of up to a \$5,000 fine, a year in jail, or both; or a civil penalty and fine of up to \$1,000 per violation. Unauthorized removal, diversion, misappropriation, or use of USDA regulated garbage by any individual is punishable by a \$100 civil penalty for the first violation.

VI. Environmental Protection. By signing this agreement, the signer certifies that the establishment named in the agreement has met, or will meet, all requirements of applicable EPA, State, and Local environmental authorities prior to handling USDA regulated garbage.

APPENDIX I

Cleaning and Disinfection Procedures

Articles Requiring Cleaning and Disinfection: Any article, surface, or means of conveyance contaminated with animal materials and/or spillage from USDA regulated garbage; and any associated containers, pallets, machinery, work areas, or equipment **MUST** be cleaned and disinfected as outlined below.

Directions for Cleaning and Disinfection:

1. Immediately notify USDA, APHIS, PPQ of any spill or leakage at (941)768-4758 .
2. The area first needs to be prepared by removing as much gross contaminant as possible by sweeping, wiping, scrapping, or using an absorbent material; and placing the resultant residue into a leakproof container for incineration.
3. The area then needs to be cleaned and scrubbed with an effective detergent solution, and flushed with clean water. This allows maximum efficiency of the disinfectant treatment.
4. Next, an approved disinfectant is applied to the area, to the point of runoff. The only disinfectants approved for use on articles where the source of contamination is USDA regulated garbage are "1 Stroke Environ" and Sodium Hypochlorite (bleach) solution. If using a premixed solution, agitate thoroughly before application.
 - (a) 1 Stroke Environ- Manufactured by Calgon-Vestal Laboratories, St. Louis, MO 63110. Use at a rate of ½ ounce of 1-Stroke Environ per gallon of water. Mix as needed, and hold no more than six months in a mixed form. A supply of pre-mixed disinfectant should be kept on hand for immediate clean ups. If needed, 1-Stroke Environ can be obtained from LCPA Facilities Department.
 - (b) Sodium Hypochlorite (Bleach)-For small amounts of solution, add 5 tablespoons household bleach [5.25%] per gallon of water and mix thoroughly. When large amounts are needed, add 1 gallon of household bleach to 50 gallons of water and mix thoroughly. Mix only as needed, and hold no longer than 24 hours.

WARNING: Do **NOT** use these disinfectants around food, or in areas where food is handled, prepared, transported, or used; such as catering kitchens, aircraft galley areas, or catering carts and trucks. When disinfecting areas such as these, use a sanitizer approved by the FDA and/or EPA for use around food products. Also, Do **NOT** use the above disinfectants inside the aircraft, as it could corrode sensitive aircraft or electronic parts. If a spill occurs inside an aircraft, outside the galley area, contact local USDA, APHIS, PPQ for the appropriate disinfectant to use.

5. Handle all refuse that was swept or scrapped up, and all absorbent materials used in the process as regulated garbage, and incinerate. Clean and disinfect all other tools and materials contaminated during the cleanup.

6.2 - NPDES General Permit Coverage Notice



**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
STORM WATER MULTI-SECTOR GENERAL PERMIT COVERAGE NOTICE**

March 2, 1998

Dear Operator:

Your Notice of Intent (NOI) for the facility noted below has been processed by the U.S. Environmental Protection Agency. This facility is authorized to discharge storm water associated with industrial activity under the terms and conditions imposed by EPA's NPDES storm water multi-sector general permit issued for use in the state of Florida. **Your facility's NPDES multi-sector storm water general permit number is FLR05B588.**

EPA's storm water multi-sector general permit requires certain storm water pollution prevention and control measures, possible monitoring and reporting, and annual inspections. Among the conditions and requirements of this permit, you must prepare and implement a pollution prevention plan (PPP) that is tailored to your industrial site. Enclosed is a summary guidance document designed to assist you in the development and implementation of your PPP. The summary is organized according to the phases of the pollution prevention planning process. As a facility authorized to discharge under this storm water multi-sector general permit, all terms and conditions must be complied with to maintain coverage and avoid possible penalties.

The information included on your NOI indicated that you are required to submit monitoring data for your facility's storm water discharges. Enclosed is a copy of the Discharge Monitoring Report. If you have questions regarding the specific monitoring requirements that apply to your facility, please contact the EPA Regional office with permitting authority for your State.

FACILITY:

Lee County Resource Recovery
10500 Buckingham Rd
Fort Myers, FL 33905-
263754, 0814541
24, 044S 025E

OPERATOR:

Lee County Solid Waste Dept.
10500 Buckingham Rd Ste 400
Ft Myers
FL 33905

To obtain a copy of the multi-sector general permit terms and conditions to which you are now held accountable, please call the EPA Office of Water Resource Center at (202)260-7786. If you have general questions concerning the storm water program, please call the EPA Region 04 contact: Floyd Wellborn, (404) 562-9296.



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

APPENDIX 7.0

STATE PERMIT APPLICATIONS AND APPROVALS

- 7.1 – Conditions of Certification as Modified**
- 7.2 - Title V Air Operation Permit**
- 7.3 - PSD Permit**
- 7.4 – Discontinuance of Surface Water Monitoring Requirements**
- 7.5 - Grant of Perpetual Conservation Easement and Agreement**
- 7.6 – Revised Stormwater Calculations**
- 7.7 – Groundwater and Surface Water Monitoring Plan**
- 7.8 – Consumptive Use Report**
- 7.9 – Water Conservation Plan**

7.1 – Conditions of Certification as Modified

**BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

In Re: LEE COUNTY RESOURCE RECOVERY)
 FACILITY, MODIFICATION OF CONDITIONS)
 OF CERTIFICATION)
 LEE COUNTY, FLORIDA)

DEP Case No. PA90-30D
OGC Case No. 00-2426

**FINAL ORDER MODIFYING
CONDITIONS OF CERTIFICATION**

On June 19, 1992, the Governor and Cabinet, sitting as the Siting Board, issued a final order approving certification for the Lee County Resource Recovery Facility (Facility). The certification order approved the construction and operation of a nominal 1,200 tons per day municipal waste fired power plant and associated facilities located in Lee County, Florida. The certification was modified on April 3, 1995, on August 22, 1996, and again on August 21, 2000.

On August 10, 1999, Lee County (County) filed a request to modify the Conditions of Certification to clarify testing and other requirements concerning the airborne emissions for the Facility; to clarify the description of fuels that may be used at the Facility; to authorize the construction and operation of a yard waste processing facility on the certified site; to authorize the construction and operation of a materials recovery facility on the certified site; to update references to the applicant's current name, current agency names, and current rule citations; and to conform the conditions to amended permits issued under federally delegated or approved permit programs.

On June 30, 2000, a Notice of Intent to Issue Proposed Modification of Power Plant Certification for the above described modifications was published in the Florida Administrative Weekly. That notice specified that any person who was not already party to the certification proceeding and whose substantial interest is affected by the requested modification had 30 days from the date of publication of the public notice to object in writing. On July 21, 2000, the Department received a written objection to the portion of the

modification describing the types of solid waste that may be used as fuel at the facility. The Department received no timely objections to the remaining portions of the modification. Pursuant to Section 62-17.211(1)(b)5., F.S., a Final Order was issued on August 21, 2000, approving that portion of the modification to which no objections were filed. On November 5, 2000, the July 21, 2000, letter of objection was withdrawn in writing. No other objection has been received. Therefore:

IT IS ORDERED:

The proposed changes to the certification order for the Lee County Resource Recovery Facility to clarify the types of solid waste that may be used as fuel at the facility are APPROVED. Pursuant to Section 403.516(1)(b), F.S., the conditions of certification for the Lee County Resource Recovery Facility are MODIFIED as follows:

I. through XIII. No change.

XIV. OPERATION

A. Air

The operation of the Solid Waste Energy Recovery Facility shall be in accordance with all applicable provisions of Chapter 62-204, 62-210, 62-212, 62-213, 62-256, 62-296, 62-297 and 62-702, Florida Administrative Code.

The construction of the Lee County Solid Waste Energy Recovery Facility in Fort Myers, Florida, shall consist of three mass-burn Municipal Waste Combustors (MWC), with two units to be constructed initially and the third unit to be installed in the future. These mass-burn units shall be of Stoker Waterwall Combustor design (or equivalent) with a maximum heat input of 275 MMBtu per hour per unit or a total heat input for the facility of 825 MMBtu per hour based on a municipal solid waste average heating value of 5000 Btu per pound.

Each combustor unit is designed to produce a maximum of 152,000 pounds of steam per hour at 865 psig and 830° F. Each combustor shall be equipped with auxiliary burners to be fired by propane gas only. Emissions from each combustor shall be controlled by a slaked lime scrubber followed by a baghouse. NO_x emissions shall be controlled by a Selective Non-Catalytic Reduction (SNCR) system. Mercury emissions shall be controlled by injecting activated carbon. This facility shall be allowed to operate continuously (8,760 hrs/yr).

The permittee shall submit at least four copies of complete information as to the make and model numbers of Municipal Waste Combustors, all pollution control and continuous emissions monitoring devices, and related equipment to the Bureau of Air Regulation prior to purchase and installation. The permittee shall also submit detailed stack drawings showing sampling locations, operation and maintenance manuals, and calibration procedures at least 90 days prior to commencing operations to the Bureau of Air Regulation.

In addition to the foregoing, the Permittee shall comply with the following specific Conditions of Certification:

1. through 2. No Change

3. Miscellaneous Requirements

a. - e. No change.

f. Restriction for Type of Wastes Combusted

(1) - (7) No change.

(8) Subject to the conditions and limitations contained in these conditions, the following other solid waste may be used as fuel at the facility:

(a) Confidential, proprietary or special documents (including but not limited to business records, lottery tickets, event tickets, coupons and microfilm);

(b) Contraband which is being destroyed at the request of appropriately authorized local, state or federal governmental agencies, provided that such material is not an explosive, a propellant, a hazardous waste, or otherwise prohibited at the facility. For the purposes of this section, contraband includes but is not limited to drugs, narcotics, fruits, vegetables, plants, counterfeit money, and counterfeit consumer goods;

(c) Wood pallets, clean wood, and land clearing debris;

(d) Packaging materials and containers;

(e) Clothing, natural and synthetic fibers, fabric remnants, and similar debris, including but not limited to aprons and gloves; or

(f) Rugs, carpets, and floor coverings, but not asbestos-containing materials or polyethylene or polyurethane vinyl floor coverings.

(g) The predominantly combustible fraction of sorted construction and demolition debris. Sorting of mixed construction and demolition debris at the facility shall occur on the tipping floor or at another location approved by the Department.

(9) (8) No change to text.

(10) (9) No change to text.

(11) (40) No change to text.

g. - k. No change.

4. - 5. No change.

B. through I. No Change

XV. through XXII. No change.

Any party to this Final Order has the right to seek judicial review of the Final Order Pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department of Environmental Protection, Office of General Counsel, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000, and by filing a copy of the Notice of Appeal, accompanied by the applicable filing fee, with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date that this Final Order is filed with the Department of Environmental Protection.

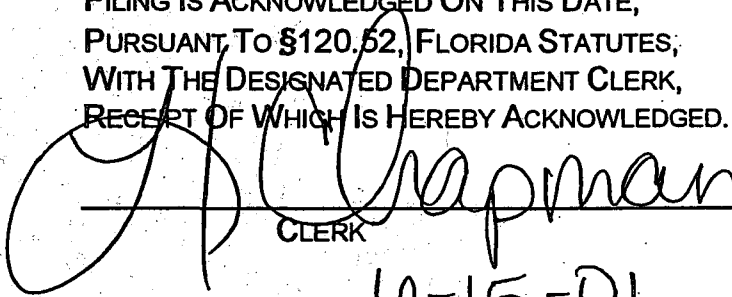
DONE AND ENTERED this 15 day of June, 2001, in
Tallahassee, Florida.

STATE OF FLORIDA, DEPARTMENT
OF ENVIRONMENTAL PROTECTION



DAVID B. STRUHS, SECRETARY
3900 Commonwealth Boulevard
Tallahassee, FL 32399-3000
Telephone: (850) 488-1554

FILING IS ACKNOWLEDGED ON THIS DATE,
PURSUANT TO §120.52, FLORIDA STATUTES;
WITH THE DESIGNATED DEPARTMENT CLERK,
RECEIPT OF WHICH IS HEREBY ACKNOWLEDGED.



CLERK

DATE

6-15-01

Certificate of Service

I hereby certify that a copy of the Final Order Modifying Conditions of Certification for the Lee County Resource Recovery Facility was sent to the following parties by United States Mail on this 18th day of June, 2001.

Jim Yaeger
Office of the County Attorney
P.O. Box 398
Fort Myers, FL 32902

Lindsey Sampson
Lee Co. Dept. of Solid Waste
Management
P.O. Box 398
Fort Myers FL 33902

Paul Darst
Dan Stengle
Dept. of Community Affairs
2740 Centerview Drive
Tallahassee FL 32399-2100

Wayne Daltry
SWFRPC
4980 Bayline Drive, 4th Floor
P.O. Box 3455
North Fort Myers FL 33918

James Golden
John Fumero
SFWMD
P.O. Box 24680
West Palm Beach FL 33416-4680

Cathey Bedell, General Counsel
Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee FL 32399-0450

David Dee
Landers & Parsons
P.O. Box 271
Tallahassee, FL 32302

Joe Treshler
Tom Erickson
Ogden Projects, Inc.
350 N. Falkenburg Road
Tampa FL 33619

Sheauching Yu
Dept. of Transportation
605 Suwannee St.
Tallahassee FL 32399-0450

Jim Antista
Doug Bailey
Fish & Wildlife Conservation Commission
620 South Meridian
Tallahassee FL 32399-1600

Aliki Moncrief
Legal Environmental Assistance
Foundation
1114 Thomasville Road
Tallahassee, FL 32303-6290

The following persons on the Department's "Interested Persons" mailing list for this case were sent a copy:

W. Dexter Bellamy
5548 Hamlet Lane
Fort Myers, FL 33919-2713

**STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION**


SCOTT A. GOORLAND
Senior Assistant General Counsel
Florida Bar No. 0066834
Douglas Building, MS 35
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000
Telephone: (850) 488-9314

IMAGE QUALITY

**PLEASE NOTE
THE ORIGINAL DOCUMENTS
SCANNED FOR THIS RECORD
WERE OF POOR QUALITY.**

**BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

In Re: Lee County Resource)
Recovery Facility)
Modification of Conditions)
of Certification)
PA 90-30C)
Lee County, Florida)

OGC Case No. 99-1343

RECEIVED

AUG 26 2000

OGDEN MARTIN SYSTEMS
OF HILLSBOROUGH, INC.

**FINAL ORDER MODIFYING
CONDITIONS OF CERTIFICATION**

On June 19, 1992, the Governor and Cabinet, sitting as the Siting Board, issued a final order approving certification for the Lee County Resource Recovery Facility (Facility). The certification order approved the construction and operation of a nominal 1,200 tons per day municipal waste fired power plant and associated facilities located in Lee County, Florida. The certification was modified on April 3, 1995, and again on August 22, 1996.

On August 10, 1999, Lee County (County) filed a request to modify the certification order to clarify the testing and other requirements concerning the airborne emissions for the Facility, clarify the description of fuels that may be used at the Facility, authorize the construction and operation of a yard waste processing facility on the certified site, authorize the construction and operation of a materials recovery facility on the certified site, and revise the conditions to conform with amended permits issued under federally delegated or approved permit programs. Furthermore, on March 21, 2000 the Department issued an amendment to permit PSD-FL-151 and PSD-FL-151(A) for the County as PSD-FL-151(B). This action requires the Department to make certain modifications to conform the Conditions of Certification for the above referenced facility to the revised PSD permit. Additionally, the Department propose and the petitioner concurred that the conditions should be updated to reflect the applicant's current name, the Department's current name, and current rule citations.

On June 23, 1999, the South Florida Water Management District approved the discontinuance of a surface water monitoring program subject to Condition XV.C.3.c.(4). The District's action is included in this modification. The District has also requested revisions to the water use conditions, specifically those pertaining to impacts on legal uses, impacts on existing off-site land uses, impacts to natural resources, modification of authorized withdrawals, and a water conservation plan.

Copies of the proposed modifications were made available for public review on June 21, 2000. On June 30, 2000, Notice of Intent to Issue Proposed Modification of Power Plant Certification was published in the Florida Administrative Weekly. On June 21, 2000, all parties to the original proceeding were furnished with Notice of Intent to Issue Proposed Modification of Power Plant Certification. The notices specified that all parties to the original certification proceeding have 45 days from the issuance of the notice by mail to such party's last address of record in which to object to the requested modification. Failure of any of the parties to file a response constitutes a waiver of objection to the requested modification. The notices further specified that any person who is not already a party to the certification proceeding and whose substantial interest is affected by the requested modification has 30 days from the date of publication of the public notice to object in writing. If no objections are received, then a Final Order approving the modification shall be issued by the Department.

One written letter of objection was received by the Department. On July 21, 2000, a letter of objection was received from Dr. W. Dexter Bellamy, of Fort Myers, Florida. Dr. Bellamy objected to the inclusion of paragraphs XIV.A.3.f.(8)(a) – (g) of the Proposed Final Order Modifying Conditions of Certification issued June 21, 2000. Those proposed paragraphs would allow Lee County to use certain products and materials as fuel for the Resource Recovery Facility. Dr. Bellamy had no objection to any other portion of the proposed modifications. No other written objection to the proposed modifications has been received by the Department.

Section 62-17.211(1)(b)5., F.A.C., states, "If written objections are filed which address only a portion of the modification, then the department shall issue a Final Order approving the portion of the modification to which no objections were filed,

unless that portion of the requested modification is substantially related to or necessary to implement the portion to which written objections are filed." Those portions to which Dr. Bellamy objects have been removed from this Final Order, and the portions to which no objection has been made are not substantially related to or necessary to implement the objected to portion. In the future if an agreement cannot be reached, then pursuant to §403.516(1)(c), F.S., the applicant or the Department may file a petition for modification seeking approval for those portions of the request for modification to which written objections were timely filed.

Accordingly, in the absence of any other timely objection,

IT IS ORDERED:

The proposed changes to the certification order for the Lee County Resource Recovery Facility, excluding those to which Dr. W. Dexter Bellamy objects, are **APPROVED**. Pursuant to Section 403.516(1)(b), F.S., the conditions of certification for the Lee County Resource Recovery Facility are **MODIFIED** as follows:

I. No Change.

II. NON-COMPLIANCE NOTIFICATION

If, for any reason, the Permittee (defined as the Applicant or its successors and or assigns) does not comply with or will be unable to comply with any limitation specified in this certification, the Permittee shall notify the South District Office of the Department of Environmental Protection Regulation by telephone within a working day that said noncompliance occurs and shall confirm this in writing within seventy-two (72) hours of becoming aware of such conditions, and shall supply the following information:

A. – B. No change

III. - IV.

No change.

V. RIGHT OF ENTRY

The Permittee shall allow during operational hours the Secretary of the Florida Department of Environmental Protection Regulation and/or authorized representatives, upon the presentation of credentials: —

A. – D. No change

VI. – XII.

No change.

XIII. CONSTRUCTION

The facility shall be constructed pursuant to the design standards presented in the application and the standards or plans and drawings submitted and signed by an engineer registered in the state of Florida. The Applicant shall present specific facility plans, as developed, for review by the South District Office at least 90 days prior to construction of those portions of the facility for which the plans are then being submitted. Specific South District Office acceptance of plans will be required based upon a determination of consistency with approved design concepts, regulations and these Conditions prior to initiating construction of the off-site water and wastewater pipelines; transmission line; stormwater run-off system; and hazardous, toxic or pathological handling facilities or areas. Review and action by the South District Office on said plans shall be accomplished in a timely fashion in accordance with Chapter 120, F.S., from the date of a complete submittal of such plans and any action may be subject to review pursuant to Chapter 120, Florida Statutes.

A. Control Measures

1. Stormwater Run-off

To control run-off during construction which may reach and thereby pollute Waters of the State, necessary measures shall be utilized to settle, filter, treat or absorb silt-containing or pollutant-laden storm water to ensure against spillage or discharge of excavated material that may cause turbidity in excess of 29 Nephelometric Turbidity Units above background in Waters of the State. Control measures may consist of sediment traps, barriers, berms, and vegetation plantings. Exposed or disturbed soil shall be protected and stabilized as soon as possible to minimize silt and sediment laden run-off. The pH of the run-off shall be kept within the range of 6.0 to 8.5. The Permittee shall comply with Florida Administrative Code Chapters 17-25, 40E-2, and 40E-4. The Permittee shall complete the forms required by 17-25.09(1) and 40E-4 and submit those forms and the required information to the SFWMD for any modifications that might occur.

2. Open Burning

Open burning in connection with initial land clearing shall be in accordance with Chapter 62-256 17-256, F.A.C., Chapter 51-2, F.A.C., Uniform Fire Code Section 33.101 Addendum, and any other applicable County regulation.

Any burning of construction generated material, after initial land clearing, that is allowed to be burned in accordance with Chapter 62-256 17-256, F.A.C., shall be approved by the South District Office in conjunction with the Division of Forestry and any other County regulations that may apply. Burning shall not occur unless approved by the appropriate agency or if the Department or the Division of Forestry has issued a ban on burning due to fire safety conditions or due to air pollution conditions.

3. No change

4. Solid Wastes

with a maximum heat input of 275 MMBtu per hour per unit or a total heat input for the facility of 825 MMBtu per hour based on a municipal solid waste average heating value of 5000 Btu per pound.

Each combustor unit is designed to produce a maximum of 152,000 pounds of steam per hour at 865 psig and 830°F. Each combustor shall be equipped with auxiliary burners to be fired by propane gas only. Emissions from each combustor shall be controlled by a slaked lime scrubber followed by a baghouse. NO_x emissions shall be controlled by a Selective Non-Catalytic Reduction (SNCR) system. Mercury emissions shall be controlled by injecting activated carbon. This facility shall be allowed to operate continuously (8,760 hrs/yr).

The Permittee shall submit at least four copies of complete information as to the make and model numbers of Municipal Waste combustors, all pollution control and continuous emissions monitoring devices, and related equipment to the Bureau of Air Regulation prior to purchase and installation. The Permittee shall also submit detailed stack drawings showing sampling locations, operation and maintenance manuals and calibration procedures at least 90 days prior to commencing operations to the Bureau of Air Regulation.

In addition to the foregoing the Permittee shall comply with the following specific Conditions of Certification:

1. Emission Standards

a. Based on a permitted capacity of 275 MMBtu/hr. and a Btu content of 5000 Btu/lb of MSW, per unit, the stack emissions from each unit shall not exceed any of the following limitations:

(1) – (12) No Change

Solid wastes resulting from construction shall be disposed of in accordance with the applicable regulations of Chapter 62-701 ~~17-701~~, F.A.C.

5. – 6. No change

7. Transmission Lines

The directly associated transmission lines from the SWERF electric generators to the existing Florida Power & Light substation shall be cleared, maintained, and prepared without the use of herbicides. Wetland mitigation shall be accomplished in accordance with Chapter 62-312 ~~17-312~~, F.A.C. Wetland mitigation proposals shall be submitted to the Department at least 90 days prior to start of construction.

8. – 9. No change

B. – C. No change

XIV. OPERATION

A. Air

The operation of the Solid Waste Energy Recovery Facility shall be in accordance with all applicable provisions of Chapter 62-204, 62-210, 62-212, 62-213, 62-256, 62-296, 62-297 and 62-702 ~~17-2, 17-256, and 17-702~~, Florida Administrative Code.

The construction of the Lee County Solid Waste Energy Recovery Facility in Fort Myers, Florida shall consist of three mass-burn Municipal Waste Combustors (MWC) with two units to be constructed initially and the third unit to be installed in the future. These mass-burn units shall be of Stoker Waterwall Combustor design (or equivalent)

(13) Hg (Mercury): In no case shall mercury emissions exceed 70 ug/dscm @ 7% O₂ or 85% reduction by weight, whichever is less stringent. Emissions of mercury shall also not exceed 1.38×10^{-4} lb/mmBtu, 0.0379 lb/hr per unit, and 0.166 tons/year per unit.

[Rules 62-296.416(3)(a)1 and 62-204.800(8)(b)3.d, F.A.C., 40 CFR 60.33b(a)(3) and PSD-FL-151]

~~*Hg: Mercury emissions shall not exceed 0.00038 lbs/MMBtu, 0.0379 lbs/hr/unit, and 0.166 tons/yr/unit at 140 ug/dscm at 7% O₂ or at least 70% removal efficiency by weight, whichever is less stringent.~~

(14) No Change

(15) *Dioxins/Furans: Emissions of total (tetra thru octa-chlorinated dibenzo-p dioxins and dibenzofurans) shall not exceed 30.0 ng/dscm @ 7% O₂, 2.54×10^{-8} lbs/MMBtu, 7.0×10^{-6} lbs/hr/unit, and 2.8×10^{-5} tons/yr per unit.

(16) - (18)

* Pursuant to Rule ~~62-4.080~~ 17-4.080 F.A.C., for good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions for the pollutants CO, VOC, F, Pb, Be, Hg, dioxins and visible emissions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time.

2. Stack Testing/Continuous Emissions Monitoring/Record Keeping Requirements

a. Test Methods

Compliance with emission limitation standards mentioned in Specific Condition No. 1 shall be demonstrated using EPA Methods, as contained in 40 CFR Part 60 (Standards of Performance for New Stationary Sources), or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants), or any other method as approved by the Department, in accordance with F.A.C. Rule 62-297.620 47-2.700. A test protocol shall be submitted for approval to the Bureau of Air Regulation at least 90 days prior to testing.

<u>EPA Method</u>	<u>For Determination of</u>
1	Selection of sample site and velocity traverses.
2	Stack gas flow rate when converting concentrations to or from mass emission limits.
3	Gas analysis when needed for calculation of molecular weight or percent O ₂ .
4	Moisture content when converting stack velocity to dry volumetric flow rate for use in converting concentrations in dry gases to or from mass emission limits.
5	Particulate matter concentration and mass emissions.
<u>5</u> , 201 or 201A	PM ₁₀ emissions.
6, 6C, or 19	Sulfur dioxide emissions from stationary sources.
7, 7C, <u>7E</u> or 19	Nitrogen oxide emissions from stationary sources.
9	Visible emission determination of opacity. - At least <u>one</u> three one-hour <u>run</u> runs to be conducted simultaneously with particulate testing for the emissions from the dry scrubber/baghouse, and ash handling building baghouse. - <u>At least one 30-minute run to be conducted for the ash</u>

	<u>handling building baghouse.</u> <u>- At least one 30-minute run to be conducted for the lime silo baghouse while a truck is unloading lime into the lime silo. If the unloading is completed before 30 minutes duration, the duration of the unloading shall be sufficient to meet this requirement, provided it exceeds 12 minutes.</u> -At least one lime truck unloading into the lime silo (from start to finish).
10	Carbon monoxide emissions from stationary sources.
<u>29 12 or 101A</u>	Lead concentration from stationary sources.
13A or 13B	Fluoride emissions from stationary sources.
23	Dioxin/furan concentration.
18 or 25A	Volatile organic compounds concentration.
26	HCl emissions or other methods approved by EPA or <u>DEP DER.</u>
<u>29 101A or 108</u>	Mercury, Antimony, Arsenic, and Cadmium emissions based on an average of three runs.
<u>29 104</u>	Beryllium emission rate and associated moisture content.

Note: The weight of MSW being fed to each combustor during the stack test shall be continuously monitored and recorded by a weighing device which is properly calibrated. Stack test shall be conducted upstream and downstream of the applicable control device for the following pollutants, SO₂, Hg and HCl. Soot blowers shall be operated in a mode consistent with normal cleaning requirements of the system during the compliance testing.

[Rules 62-4.070(3) and 62-296.416(3)(d)1, and 62-297.310(4)(a)2., F.A.C., 40 CFR 60.38b and 40 CFR 60.58b, and applicant request]

b. Continuous Emissions Monitoring

Continuous emission monitors with recorders shall be installed, calibrated, maintained and operated subject to approval by the Department for the following:

Carbon Monoxide, Oxygen, Nitrogen Oxide, Opacity, and Sulfur Dioxide (for SO₂ one monitor shall be located upstream of the scrubber and one shall be located downstream of the baghouse), as specified in 40 CFR 60, Appendix B; total steam production (lbs/hr, pressure, and temperature) and power generation (MW) for each unit; ammonia injection rate; slaked lime; activated carbon and/or sodium sulfide injection or usage rates; and thermocouple to measure roof temperature of combustion zone (to be specified by the vendor and one second residence time). The monitoring devices shall meet the applicable requirements of Chapter Rule 62-297.520 17-2, Section 17-2.710, F.A.C. and 40 CFR 60.45, and 40 CFR 60.13, including certification of each device in accordance with 40 CFR 60, Appendix B, Performance Specifications and 40 CFR 60.7 (a)(5). Data on monitoring equipment specifications, manufacturer, type, calibration and maintenance needs, and its proposed location after the economizer or in the air pollution control equipment outlet duct shall be provided to the South District Office for review prior to installation together with and subject to the same provisions as submittal of air pollution control equipment pursuant to paragraph XIII hereof.

c. Testing Frequency

Compliance with the emission limitations of condition of certification XIV.A.1. shall be determined by annual emission testing, except that testing for arsenic, beryllium, fluoride, sulfuric acid mist, ammonia and VOC shall be performed prior to renewal of each operation permit. Testing of the MWC units for particulate matter shall be performed using three one-hour test runs so that two one-

hour runs are conducted during normal operation and one one-hour run is conducted during soot blowing conditions. Compliance for visible emissions shall be determined in accordance with Rule 62-297.310(4)(a), F.A.C. [Rules 62-4.070(3), 62-297.310(4)(a), and 62-297.310(7)(a)3, F.A.C., and request of the applicant]

~~Compliance with emission standards contained in Condition No. XIV.A.1.a. shall be determined by conducting stack tests within 120 days of completion of construction and initial operation and annually thereafter. These tests may be staggered throughout the year with the approval of the Bureau of Air Regulation. Pursuant to Rule 62-297.310(7)(b), F.A.C. 17-2-700(2)(b), when the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in these conditions of certification this permit is being violated, it may require the owner or operator of the source to conduct compliance tests which identify the nature and quantity of pollutant emissions from the source and to provide a report on the results of said tests to the Department. Compliance testing for particulate matter emissions from the ash handling building baghouse is waived, and an alternative standard of 5% opacity is imposed, pursuant to rule 62-297.620(4), F.A.C. If the Department has reason to believe that the particulate weight emission standard is not being met, it shall require that compliance be demonstrated using EPA Method 5. Compliance testing for visible emissions from the ash handling building baghouse and lime silo baghouse shall be conducted annually. Compliance testing for the flyash handling building (baghouse) and the lime silo loading operation (V.E. test) shall be conducted within 90 days of completion of construction and initial operation and annually thereafter. All notification requirements of 40 CFR parts 60 and 61 shall be complied with by the owner/operator of the SWERF. [Rules 62-4.070(3) and 62-297.620(4), F.A.C., and request of the applicant]~~

d. Sampling Ports

The Permittee shall provide sampling ports in the air pollution control equipment outlet duct or stack and shall provide access to the sampling ports in accordance with Section 62-297.310(6) 47-2.700, F.A.C. Drawings of testing facilities including sampling port locations as required by Section 62-297.310(6) 47-2.700 F.A.C. shall be submitted to the South District Office for approval at least 60 days prior to construction of the sampling ports and stack.

e. No Change

3. Miscellaneous Requirements

a. Start-up and Shut-down Procedures

During start-up and shut-down, the auxiliary burners shall be fired as needed to ensure proper combustion of wastes consistent with good operating practices as specified in 40 CFR 60.53b. ~~propane gas shall be used to preheat the combustion zone to achieve a minimum furnace roof temperature and a minimum temperature of 1800°F above the grate (at a height to be specified by the vendor) prior to the ignition of MSW. The appropriate minimum furnace roof temperature shall be established by the Department, based on the test data collected during the facility's initial start-up operations, and shall be correlated to the minimum temperature of 1800 degrees F above the grate.~~

~~During all shut-down procedures, propane gas shall be used to ensure that the temperature above the grate, as specified above, does not drop below 1800°F and the furnace roof temperature is maintained above the correlated minimum furnace roof temperature while any MSW is still burning.~~

b. Operating Procedures

Operating procedures shall include good combustion practices and proper training and certification of all operators. The good combustion practices shall meet the guidelines established in 40 CFR 60, Subpart Ea and procedures as established by the equipment manufacturers. All operators (including supervisors) of air pollution control devices shall be properly trained and certified in accordance with the manufacturers guidelines. A list of all such certified personnel shall be submitted to the South District Office. Department staff may attend any training sessions related to operation and maintenance of air pollution control devices.

The emission limitations for this facility shall apply at all times, except during periods of startup, shut down, or malfunctions, provided that the duration of startup, shut down and malfunction periods shall not exceed three hours per occurrence. The startup period commences when the affected facility begins the continuous burning of municipal solid waste and does not include any warm-up period when the affected facility is combusting natural gas or propane, and no municipal solid waste is being fed to the combustor. Continuous burning is the continuous, semi-continuous, or batch feeding of municipal solid waste for purposes of waste disposal, energy production, or providing heat to the combustion system in preparation for waste disposal or energy production. The use of municipal solid waste solely to provide thermal protection of the grate or hearth during the startup period when municipal solid waste is not being fed to the grate is not considered to be continuous burning. During all periods of startup, shut down and malfunction, the owner or operator shall use best operational practices to minimize air pollutant emissions. The owner or operator shall maintain a manual that identifies and describes best operational practices that will be used during periods of startup, shut down and malfunction at this facility.

[Rules 62-4.070(3), and 62-210.700(1) and (5), F.A. C., 40 CFR 60.38b and 40 CFR 60.58b(a), and request of the applicant]

The emission standards for this facility shall apply at all times, except during periods of start-up, shut-down, or malfunctions, provided that the

~~duration of start-up, shut-down, or malfunction shall not exceed 3 hours per occurrence. The start-up period commences when the affected facility begins the continuous burning of MSW and does not include any warm-up period when the affected facility is combusting only propane gas and no MSW is being combusted. During all startups, shutdowns and malfunctions the owner/operator shall use best operational practices to minimize air pollutant emissions. Within 90 days prior to commencing commercial operations of this facility, the permittee shall submit to the South District Office an operational procedures manual that identifies and describes best operational practices that will be used during startup, shutdown, and malfunctions of this facility.~~

c. Odor Control

No objectionable odors are allowed from this facility pursuant to F.A.C. Rule 62-296.320(2), F.A.C. 17-2-620. The truck access doors to the facility shall remain closed except during normal working shifts when MSW is being received near the storage pit area to allow vehicle passage. To minimize odors at the facility, a negative pressure shall be maintained on the tipping floor and air from within the building will be used as combustion air.

d. Auxiliary Burners

These devices shall be used at startup during the introduction of MSW fuel until design furnace gas temperature is achieved. They shall be fueled only with natural gas or propane. If the annual capacity factor for natural gas is greater than 10%, as determined by 40 CFR 60.41b, the facility shall be subject to 40 CFR 60.44b(d), Standards for Nitrogen Oxides.
[Rules 62-4.070(3), 62-4.160(2) and 62-210.200, F.A.C., and 40 CFR 60.40b(d)]

Auxiliary burners for each unit shall be fired only by propane gas and shall not exceed the 10% capacity factor as determined by 40 CFR 60.44b(d).

e. No Change

f. Restriction for Type of Wastes Combusted

(1) Allowable Fuels. The only fuels allowed to be burned in the MWC units are solid wastes allowed by this condition and natural gas and propane as auxiliary fuels. Other wastes shall not be burned without written prior approval from the Department. Lee County shall minimize emissions of mercury through a battery collection program. Chromium compounds shall not be used as an additive in the cooling tower water.

(2) The primary fuel for the facility is municipal solid waste (MSW), including the items and materials that fit within the definition of MSW contained in either 40 CFR 60.51b or Section 403.706(5), Florida Statutes (1999).

(3) Subject to the limitations contained in these conditions, the authorized fuels for the facility also include the other solid wastes that are not MSW which are described below. However, the facility shall not burn:

(a) those materials that are prohibited by state or federal law;

(b) those materials that are prohibited by these conditions;

(c) lead acid batteries;

(d) hazardous waste;

(e) nuclear waste;

(f) radioactive waste;

(g) sewage sludge;

(h) explosives.

Further, the facility shall not knowingly burn:

(i) nickel-cadmium batteries pursuant to Section 403.7192(3), F.S.

(j) mercury containing devices and lamps pursuant to Sections 403.7186(2) and (3), F.S.

(4) The fuel may be received either as a mixture or as a single-item stream (segregated load) of discarded materials. If the facility intends to use an authorized fuel that is segregated non-MSW material, the fuel shall be either:

(a) well mixed with MSW in the refuse pit; or

(b) alternately charged with MSW in the hopper.

(5) The facility operator shall prepare and maintain records concerning the description and quantities of all segregated loads of non-MSW material which are received and used as fuel at the facility, and subject to percentage weight limitations, below. For the purposes of these conditions, a segregated load is defined to mean a container or truck that is almost completely or exclusively filled with a single item or homogeneous composition of waste material, as determined by visual observation.

(6) To ensure that the facility's fuel does not adversely affect the facility's combustion process or emissions, the facility operator shall:

(a) comply with good combustion operating practices in accordance with 40 CFR 60.34b;

(b) install, operate and maintain continuous emissions monitors (CEMS) for oxygen, carbon monoxide, sulfur dioxide, oxides of nitrogen and temperature in accordance with 40 CFR 60.58b;
and

(c) record and maintain the CEMS data in accordance with 40 CFR 60.59b.

These steps shall be used to ensure and verify continuous compliance with the emissions limitations in these conditions.

(7) Natural gas or propane may be used as fuel during warm-up, startup, shutdown, and malfunction periods, and at other times when necessary and consistent with good combustion practices.

(8) Subject to the conditions and limitations contained in these conditions, waste tires may be used as fuel at the facility. The total quantity of waste tires received as segregated loads and burned at the facility shall not exceed 3%, by weight, of the facility's total fuel, except as provided in the following sentence. Subsequent to an initial test burn scheduled to allow Department representatives to observe, while firing 5% (by weight) tires at each of the combustion units while operating each unit at capacity that demonstrates via the CEMS that each unit can comply with the emission limits for pollutants monitored by the CEMS while firing 5% (by weight) tires, this quantity limitation shall rise from 3% to 5%. Compliance with this limitation shall be determined on a calendar monthly basis.

(9) Subject to the conditions and limitations contained in these conditions, the following other solid waste materials may be used as fuel at the facility (i.e. the following are authorized fuels that are non-MSW material). The total quantity of the following non-MSW material received as segregated loads and burned at the facility shall not exceed 5%, by weight, of the facility's total fuel. Compliance with this limitation shall be determined on a calendar monthly basis.

(a) Unsorted mixtures of construction and demolition debris, or that fraction of sorted construction and demolition debris that is predominantly non-combustible. Non-combustible construction and demolition debris shall include concrete, metals, gypsum products, plaster, rock, brick, and masonry.

(b) Oil spill debris from aquatic, coastal, estuarine or river environments. Such items or materials include but are not limited to rags, wipes, and absorbents.

(c) Items suitable for human, plant or domesticated animal use, consumption or application where the item's shelf-life has expired or the

generator wishes to remove the items from the market. Such items or materials include but are not limited to off-specification or expired consumer products, pharmaceuticals, medications, health and personal care products, cosmetics, foodstuffs, nutritional supplements, returned goods, and controlled substances.

(d) Consumer-packaged products intended for human or domesticated animal use or application but not consumption. Such items or materials include but are not limited to carpet cleaners, household or bathroom cleaners, polishes, waxes and detergents.

(e) Waste materials that:

(i) are generated in the manufacture of items in categories (c) or (d), above and are functionally or commercially useless (expired, rejected or spent); or

(ii) are not yet formed or packaged for commercial distribution. Such items or materials must be substantially similar to other items or materials routinely found in MSW.

(f) Waste materials that contain oil from:

(i) the routine cleanup of industrial or commercial establishments and machinery; or

(ii) spills of virgin or used petroleum products. Such items or materials include but are not limited to rags, wipes, and absorbents.

(g) Used oil and used oil filters. Used oil containing a PCB concentration equal or greater than 50 ppm shall not be burned, pursuant to the limitations of 40 CFR 761.20(e).

(h) Waste materials generated by manufacturing, industrial or agricultural activities, provided that these items or materials are substantially similar to items or materials that are found routinely in MSW, subject to prior approval of the Department.

(10) The following records shall be made and kept to demonstrate compliance with the segregated non-MSW percentage limitations of these conditions:

(a) Each segregated load of non-MSW materials, that is subject to the percentage weight limitations of these conditions, which is received for processing shall be documented as to waste description and weight. The weight of all waste materials received for processing shall be measured using the facility truck scale and recorded.

(b) Each day the total weight of segregated tires received shall be computed, and the daily total shall be added to the sum of the daily totals from the previous days in the current calendar month. At the end of each calendar month, the resultant monthly total weight of tires shall be divided by the total weight of all waste materials received in the same calendar month, and the resultant number shall be multiplied by 100 to express the ratio in percentage terms. The percentage computed shall be compared to the 3% or 5% limitation, whichever is applicable.

(c) Each day the total weight of segregated non-MSW materials received that are subject to the 5% restriction shall be computed, and the daily total shall be added to the sum of the daily totals from the previous days in the current calendar month. At the end of each calendar month, the resultant monthly total weight of segregated non-MSW materials shall be divided by the total weight of all waste materials received in the same calendar month, and the resultant number shall be multiplied by 100 to express the ratio in percentage terms. The percentage computed shall be compared to the 5% limitation.

[Rule 62-4.070(3), F.A.C., PSD-FL-151, request of the applicant].

~~No biological waste, medical waste, bio-hazardous waste, sewage sludge or hazardous wastes shall be received or combusted at this facility without obtaining proper modification to the power plant site certification conditions from the Department. The County shall establish a household battery collection program to be specified by the~~

~~applicant prior to start of construction, to further minimize mercury emissions.~~

~~Chromium compounds shall not be used as an additive in the cooling tower water.~~

g. – k. No Change

4. No Change

5. Reporting

a. No Change

b. Emissions monitoring shall be reported to the South District Office on a quarterly basis in accordance with Section 62-4.070(3) ~~17-2.710~~, F.A.C., 40 CFR, part 60, Subsection 60.7 or 40 CFR part 61 as appropriate.

c. Notice of anticipated and actual start-up dates of each waste combustor boiler shall be submitted to the DEP ~~DER~~ South District Office.

B. Reserved Fuel

~~The SWERF shall utilize refuse such as garbage and trash (as defined in Chapter 17-7, F.A.C.) as its fuel. Use of alternate fuels except for distillate fuel oil or natural gas in start-up burners would necessitate modification of these Conditions of Certification. Refuse as fuel shall not include "hazardous waste" as defined in Chapter 17-30, F.A.C. The alternate fuel, which may be used distillate oil, shall not contain more than 0.3% sulfur by weight and shall not be used more than required during boiler startup or shutdown.~~

C. Wastewater Disposal

A complete submittal of plans, drawings and specifications for leachate collection systems, pumps, lift stations, sewage collection systems, and wastewater collection systems in accordance with appropriate DEP ~~DER~~ rules shall be furnished to the South District Office for approval at least 90 days prior to start of construction for the particular of such component. In order to obtain approval, the receiving sewage treatment plant shall indicate its ability and willingness to accept the wastewater. Also, plans and specifications for connections to off-site sewage and wastewater transmission systems shall be furnished to the South District Office for approval 90 days prior to start of construction. Review shall be accomplished in accordance with Condition XIII.

D. Water Discharges

1. Surface Water

Any discharges from the site stormwater system via the emergency overflow structure which results from an event LESS than a ten-year, 24-hour storm (as defined by the U.S. Weather Bureau Technical Paper No. 40, or the DOT drainage manual, or similar documents) shall meet applicable State Water Quality Standards, Chapter 62-302 ~~17-302~~, F.A.C., ~~the Standards of Chapter 17-25, F.A.C.,~~ and Chapter 40-E, F.A.C.

2. Groundwaters

All discharges to groundwaters shall be collected and treated as necessary, or otherwise be of high enough quality, to be able to meet the applicable Water Quality Standards of Sections 62-520.400 ~~17-301.402~~ and 62-520.420 ~~17-301.404~~, F.A.C., at the boundary of a zone of discharge approved for each potential pollution source. If monitoring should indicate a violation of the standards, the Permittee shall immediately notify the South District office and SFWMD and institute remedial action.

3. Groundwater Monitoring Program

a. – c. No change

d. Upon completion of construction of the groundwater monitoring system, but no less than 12 months before the commencement of operation the Permittee shall sample all ground water monitoring wells for the Primary and Secondary Drinking Water parameters included in Chapter 62-550 17-22, F.A.C., ~~Public Drinking Water Systems~~. The specific parameters to be sampled are listed in ~~Part II, Quality Standards, Analytical Methods, Sampling, Sections 62-550.310, 62-550.320 and 62-550, Part V 17-550.310 and 17-550.320~~, F.A.C.

e. The field testing, sample collection and preservation and laboratory testing, including quality control procedures, shall be in accordance with Chapter 62-550, Part V 17-4.246 and 17-301.401, F.A.C. Approved methods as published by the Department or as published in Standard Methods, A.S.T.M. or EPA methods shall be used. Approved methods for chemical analyses are summarized in the Federal Register, December 1, 1976 (41FR52780) except that turbidity shall be measured by the Nephelometric Method.

E. Solid/Hazardous Waste

1. Incinerator ash, fly ash, spent acid control medias and other forms of solid waste shall be disposed of in a licensed off-site landfill in accordance with all applicable portions of Chapters 62-701 17-701 and 62-702 17-702, F.A.C., including prohibitions, procedures for closing of the landfill, and final cover requirements, or, as provided in this condition (XIV.E.) in its entirety. The plans of the final landfill design shall be provided to the South District Office and the Division of Waste Management for review and approval at least 90 days prior to start of operation of the SWERF Unit.

Review shall be performed in accordance with Condition XIII. The final plans for this SWERF shall include provisions for the isolated temporary handling of suspected hazardous, toxic or infectious wastes. The SWERF shall not be operated until a landfill capable of disposing of plant wastes is licensed to operate.

2 – 8. No change

9. The design, operation, and monitoring of disposal or control of any "special wastes" shall be in accordance with F.A.C. Section Rule 62-701.520 ~~17-702.060~~, and any other applicable department rules, to protect the public safety, health and welfare. "Special wastes" means those wastes that require extraordinary management. They include but are not limited to abandoned automobiles, white goods, used tires, waste oil, sludges, dead animals, agricultural and industrial wastes, septic tank pumpings, and infections and hazardous wastes. Sludges which may be hazardous due to their chemical composition shall be disposed of in accordance with F.A.C. Chapter 62-730 Section 17-7.040(4). Disposal of Grade III Domestic Wastewater Treatment Sludge, disposal of domestic septage, and disposal of food service sludge, shall be in accordance with F.A.C. Chapter 62-701 Section 17-7.540(6).

F. No change

G. Transmission Lines and Pipe Lines

The Licensee shall demonstrate compliance with Chapter 62-814 ~~17-274~~, F.A.C., at least 90 days prior to start of construction for the directly associated transmission lines from the SWERF electric generators to the Florida Power and Light Company Substation. Transmission and pipeline routes shall be kept cleared without the use of herbicides. Prior to clearing activities within any of the right-of-way associated with the various linear facilities, a survey shall be conducted to identify the presence of any listed wildlife species likely to occur within the right-of-way based on

range and habitat. Results of this survey shall be submitted to the Florida Game and Fresh Water Fish and Wildlife Conservation Commission (FFWCC) (~~FGFWFC~~) and the United States Fish and Wildlife Service (USFWS). If it is determined that any of these species will be affected by the construction of any of these linear facilities the Permittee shall consult with the FFWCC (~~FGFWFC~~) and the USFWS to determine the appropriate steps to be taken to avoid, minimize, mitigate, or otherwise appropriately deal with any adverse impacts within each agency's respective jurisdiction.

Prior to any clearing on the project site, the permittee shall arrange a site visit by personnel from the South District Office to verify the wetland jurisdictional areas on the project site and to inspect the proposed fill areas. If additional areas are determined to be within the Department's Wetland Resource jurisdiction or if the site plan is modified to impact additional wetlands, the Permittee shall submit a revised Joint Application for Works in Waters of the State and revised permit drawing package reflecting the changes. The permittee shall provide mitigation for any habitat loss or degradation resulting from the construction of the project. The mitigation shall meet all the requirements of Rule 62-312.300 ~~17-312.300~~, Florida Administrative Code.

H. – I. No change

XV. SOUTH FLORIDA WATER MANAGEMENT DISTRICT

A. Legal/Administrative Conditions

1. General

a. Responsible Entity

The Permittee, defined as Lee County or any full-service vendor/contractor under contract to the County, shall be responsible for the

implementation of the Certification Conditions. If contractual rights, duties, or obligations are transferred under this Certification, notice of such transfer or assignment shall immediately be submitted to the Florida Department of Environmental Protection Regulation and the SFWMD by the previous certification holder (Permittee) and the Assignee. Included in the notice shall be the identification of the entity responsible for compliance with the Certification. Any assignment or transfer shall carry with it the full responsibility for the limitations and conditions of this Certification. Reference: Sections 373.223 and 373.413, F.S.; Rules 40E-2.091(1)(a), 40E-2.301, 40E-2.381(1), 40E-4.091(1)(a), and 40E-4.301, F.A.C.

b. – g. No change

h. Post Certification Information Submittals

Information submitted to the SFWMD subsequent to Certification, in compliance with the conditions of this Certification, shall be for the purpose of the SFWMD determining the Permittee's compliance with the Certification conditions and the non-procedural criteria contained in Chapters 40E-2, 40E-3, and 40E-4, F.A.C., as applicable, prior to the commencement of the subject construction, operation and/or maintenance activity covered thereunder. Reference: Rule 62-17.191 ~~17-17.191~~, F.A.C.

i. – j. No Change

k. Operation Authorization

Authorization for the proposed energy recovery facility to begin operating shall not be granted by the Florida Department of Environmental Protection Regulation until it has received and approved an executed contract between Lee County and an entity capable of receiving and disposing of the ash residue and other

waste products to be generated by the proposed facility. Reference: Sections 373.043 and 403.504, F.S.

I. Enforcement

The SFWMD may take any and all lawful actions to enforce any condition of this Certification that is based on the rules of the agency. Prior to initiating such actions, the SFWMD shall notify the Secretary of DEP ~~DER~~ of the proposed actions. The SFWMD may seek modification of this Certification for any change in any activity resulting from the SFWMD's enforcement of this Certification which change will have a duration longer than 60 days. Reference: Sections 373.2223, 373.319, 373.423, and 373.603, F.S.; Rules 40E-2.091(1)(a), 40E-2.301, 40E-2.381(2)(f), 40E-3.461, 40E-4.091(1)(a), and 40E-4.301, F.A.C.

A.2.a – d. No Change

e. Subsequent modifications to the drawings and supporting calculations submitted to the SFWMD which may alter the quantity and/or quality of waters discharged off-site shall be made pursuant to Section 403.516, F.S., and Rule 62-17.211 ~~17-17.211~~, F.A.C. They shall also be submitted to the SFWMD for a determination that the modifications are in compliance with Chapters 40E-2, 40E-3, and 40E-4, F.A.C., prior to the commencement of construction. Reference: Section 403.516, F.S.

f. No change

B. Water Use Conditions

1. General

a. No Change

b. Impacts on Existing Legal Uses

The Permittee shall mitigate any adverse impact on existing legal uses caused by the ground water withdrawals authorized by this Certification. When adverse impacts occur or are imminent, the SFWMD reserves the right to curtail future withdrawal rates pursuant to the enforcement provisions of Condition A.1.I. of these conditions. The adverse impacts can include:

(1) A reduction in well water levels that impairs the ability of an adjacent well, including a domestic well, lawn irrigation well, or public water supply well, to produce by 10% or greater;

(2) A significant reduction in water levels in an adjacent water body such as a lake, pond, wetland, or canal system that impairs the ability to produce water by 10% or greater;

(3) Saline water intrusion or induced movement of pollutants into the water supply of an adjacent water user, resulting in a significant reduction in water quality; and/or

(4) A change in water quality caused by the Permittee that results in significant impairment or loss of use of a well or water body.

Reference: Section 373.223, F.S.; Rules 40E-2.091(1), 40E-2.301, and 40E-2.381, F.A.C.

~~The Permittee shall be responsible for mitigating to the satisfaction of the SFWMD any adverse impacts on existing legal uses caused by the groundwater withdrawals~~

~~authorized by this Certification. If adverse impacts occur, or are imminent, SFWMD reserves the right to curtail withdrawal rates pursuant to the enforcement provisions of Condition XV.A.1.1 of these conditions. The adverse impacts can include:~~

~~(1) A reduction in well water levels that impairs the ability of an adjacent well to produce water (an adjacent well may be a domestic well, lawn irrigation well, public water supply well, etc.);~~

~~(2) A significant reduction in water levels in an adjacent water body such as a lake, pond, wetland, or canal system;~~

~~(3) Saline water intrusion or induction of pollutants into the water supply of an adjacent water user, resulting in a significant reduction in water quality; and/or~~

~~(4) A change in water quality that causes impairment or loss of use of well or water body.~~

~~Reference: Section 373.223, F.S.; Rules 40E-2.091(1)(a), 40E-2.301(1), and 40E-2.381(2)(d), F.A.C.~~

c. Impacts on Existing Off-Site Land Uses

The Permittee shall mitigate any adverse impacts on existing off-site land uses that are a consequence of the groundwater withdrawals authorized by this Certification. If increased withdrawals cause an adverse impact on existing land uses, the SFWMD reserves the right to curtail future withdrawal rates pursuant to the enforcement provisions of Condition A.1.1 of these conditions. Adverse impacts can include:

(1) A significant reduction in water levels in an adjacent water body, including impoundments, to the extent that the designed function of the water body is impaired;

(2) Land collapse or subsidence caused by a reduction in water levels; and/or

(3) Damage to crops and other types of vegetation.

Reference: Sections 373.223, F.S.; Rules 40E-2.091(1), 40E-2.301, and 40E-2.381, F.A.C.

~~The Permittee shall be responsible for mitigating to the satisfaction of the SFWMD any adverse impacts on existing off-site land uses as a consequence of the groundwater water withdrawals authorized by this Certification. If the withdrawals cause an adverse impact on existing land uses, the SFWMD reserves the right to curtail future withdrawal rates pursuant to the enforcement provisions of condition IV.a.1.1 of these conditions. Adverse impacts can include:~~

~~(1) A significant reduction in water levels in an adjacent water body such as a lake, pond, wetland, or canal system;~~

~~(2) Land collapse or subsidence caused by a reduction in water levels;~~

~~(3) Damage to crops and other vegetation, causing financial harm to the landowner; and/or~~

~~(4) Damage to the habitat of rare, endangered or threatened species.~~

Reference: Section 373.223, F.S.; Rules 40E-2.091(1)(a), 40E-2.301(1), and 40E-2.381(2)(e), F.A.C.

d. Impacts to Natural Resources

The Permittee shall mitigate any adverse impacts to natural resources as a consequence of the groundwater withdrawals authorized by this Certification. When adverse impacts occur, or are imminent, the SFWMD reserves the right to curtail future withdrawal rates pursuant to the enforcement provisions of Condition A.1.1 of these conditions. Adverse impacts can include:

(1) A reduction in ground water levels that results in significant lateral movement of the fresh water/salt water interface;

(2) A reduction in water levels that adversely impacts the hydroperiod of protected wetland environments;

(3) A significant reduction in water levels or hydroperiod in a naturally occurring water body such as a lake or pond;

(4) Induced movement or induction of pollutants into the water supply resulting in a significant reduction in water quality; and/or

(5) Harm to the natural system including damage to habitat for rare or endangered species.

Reference: Sections 373.223, F.S.; Rules 40E-2.091(1), 40E-2.301, and 40E-2.381, F.A.C.

e. d. Well System Operation

No Change to text.

2. Site Specific Standards Design Requirements

a. – c. No Change

d. ~~Duration of Authorization~~

~~This Certification authorizes the withdrawals specified in Conditions B.2.a, B.2.b, and B.2.c above for five (5) years from the date of Certification. The Permittee must request an extension of this authorization prior to the expiration of the five (5) year period.~~

~~Reference: Sections 373.223 and 373.236, F.S.; Rules 40E-2.091(1)(a), 40E-2.301, 40E-2.321(1)(e), and 40E-2.381, F.A.C.~~

d. Modification of Authorized Withdrawals

Within ten years of Certification and every ten years thereafter, unless extended by mutual agreement between the Permittee and the SFWMD, the Permittee shall submit to the SFWMD a report on the project's consumptive water use which contains the information required by Chapter 40E-2, F.A.C. in effect at that time. Within 90 days after receipt of the completed report, the SFWMD shall evaluate the information contained therein and issue a written notification to the Department and the Permittee as to whether the groundwater withdrawals for consumptive use authorized by this Certification remain in compliance with the provisions of Chapter 373, F.S., and Chapter 40-2, F.A.C., in effect at that time. If the notification indicates that the withdrawals are not in compliance with these provisions, it shall recommend possible alternatives for bringing the withdrawals into

compliance or otherwise meeting the minimum consumptive water use needs of the Certified project. If mutual agreement cannot be reached within 90 days after issuance of the written notification on whether the withdrawals of groundwater for consumptive use remain in compliance, then the written notification shall be immediately referred to the Division of Administrative Hearings (DOAH) for resolution in accordance with the procedural provisions of Sections 403.516(1)(c) and 120.569, F.S. (1999).

e. Right to Petition for Modification of Withdrawals

The SFWMD retains the right to request that the Department petition for a modification of the groundwater withdrawals for consumptive use authorized by this Certification, in accordance with the provisions of Section 403.516, F.S. (1999). Any request for an increase in water withdrawals shall be made pursuant to the provisions of Section 403.516, F.S.

3. Additional Information Requirements

a. – d. No Change

e. Water Conservation Plan

Within two (2) years of issuance of the modified Certification Order, the Permittee shall submit a Water Conservation Plan required by Chapter 40E-2, F.A.C., in effect at that time, for review and approval by SFWMD staff. The plan shall, at a minimum, incorporate the following components:

(1) An audit of the amount of water needed in the Permittee's operational processes. The following measures shall be implemented within one year of audit completion if found to be cost effective in the audit:

(a) Implementation of a leak detection and repair program;

(b) Implementation of a recovery/recycling or other program providing for technological, procedural or programmatic improvements to the Permittee's facilities; and

(c) Use of processes to decrease water consumption.

(2) Development and implementation of an employee awareness program concerning water conservation.

Reference: Sections 373.223, F.S.; Rules 40E-2.091(1), 40E-2.301, and 40E-2.381, F.A.C.

C. Surface Water Management Conditions

1. – 2. No Change

3. Additional Information Requirements

a. – b. No change.

c. Surface Water Quality Monitoring Program

~~Within three months of issuance of this Certification, the Permittee shall submit for review by the SFWMD a surface water quality monitoring program which monitors all discharges from the surface water management system into the Buckingham Road drainage system.~~

~~(1) While the program may incorporate additional monitoring requirements and parameters as required by other agencies, it shall include the following parameters and time frames at a minimum:~~

** MONITOR TYPE AND SCHEDULE	PARAMETERS
A. GENERAL (EVERY OTHER MONTH)	TOTAL ORGANIC CARBON, DISSOLVED OXYGEN, pH, TURBIDITY, SPECIFIC CONDUCTANCE, CHEMICAL OXYGEN DEMAND, TOTAL SUSPENDED SOLIDS, AND ALKALINITY.
B. ORGANICS (SEMI-ANNUAL)	OIL AND GREASE, DETERGENTS, EPA METHODS 601 AND 602
C. METALS (SEMI-ANNUAL)	ALUMINUM, ANTIMONY, BERYLLIUM, CADMIUM, COPPER, CYANIDE, IRON, LEAD, MERCURY, NICKEL, SELENIUM, SILVER, AND ZINC.

~~(2) Water quality samples shall be taken at the above noted locations in accordance with the above schedule during periods of discharge. The Permittee shall provide such data to the SFWMD as volumes of water discharged, including total volume discharged during the days of sampling, and total discharges from the property or into surface waters of the state. A laboratory certified by the State of Florida shall be responsible for all water quality analyses under (1)B and (1)C. above. Reports shall be submitted to the SFWMD on a semi-annual basis. Initial sampling results shall be reported to the SFWMD no later than six months following the issuance of this Certification.~~

~~(1) (3) The SFWMD will evaluate monitoring requirements to determine whether the discharge degrades receiving waters and conforms to State water quality standards as defined in Chapter 62-302 17-3, F.A.C. If water quality problems develop, the SFWMD reserves the right to require more frequent sampling~~

and more thorough analyses in order to provide assurances that the discharges will not cause additional off-site water quality impacts.

(2) (4) After a minimum of two years of sampling, the applicant may request a reduction in monitoring frequencies and parameters. If the documentation provided in support of the request does not provide sufficient reasonable assurances to support a reduction, the SFWMD reserves the right to require that the original water quality monitoring program be continued.

Reference: Section 373.413(1), 373.413(2), and 373.416(1), F.S.; Rules 40E-4.091(1)(a), 40E-4.301, and 40E-4.381, F.A.C.

d. No change

D. No change.

XVI. - XIX. No Change.

XX. DEPARTMENT OF COMMUNITY AFFAIRS

A. - C. No change

D. Air Pollution Control

1. - 2. No change

3. The Permittee shall undertake and implement any additional processes and procedures to control emissions of regulated pollutants which are determined necessary by the Department of Environmental Protection Regulation or the U.S. Environmental Protection Agency (EPA). This shall specifically include the

new EPA emission limitations to be promulgated later this year, as required under the Clean Air Act Amendments of 1990.

4. No change

5. The Permittee shall monitor mercury emissions from the energy recovery facility to ascertain the efficiency of its mercury-control equipment. The results shall be reported to the DEP DER.

E. Ash Marketing

The Permittee shall endeavor to market the energy recovery facility's ash residue. The Permittee shall file an annual report with the Department of Environmental Protection Regulation detailing its progress in marketing the ash.

F. Microbiological Testing

The Permittee shall carry out biweekly tests of facility cooling water for bacteria and viruses during the first 3 months of facility operation. The results shall be sent to the Florida Department of Environmental Protection Regulation (DEP DER). If the DEP DER determines that the concentrations of bacteria or viruses in the cooling water pose a threat to public health the Permittee shall take all necessary measures to eliminate the threat.

G. – H. No change

I. Traffic Minimization

1. After the site for the associated landfill/ ashfill site is selected, the Permittee shall carry out a traffic analysis of project traffic to and from the landfill/ashfill

to assure that any significant traffic impacts are mitigated. The analysis shall be submitted to the Department of Environmental Protection Regulation and the Department of Community Affairs for review and approval, which shall include a determination of any mitigation that may be needed. The Department of Environmental Protection Regulation may modify the certification as necessary to incorporate any conditions needed for the mitigation of traffic impacts.

2. No change

J. No change

XXI. SOUTHWEST FLORIDA REGIONAL PLANNING COUNCIL

A. No change

B. Water Resources

1 – 7. No change

8. As the applicant has stated that the project may use reclaimed wastewater for irrigation, the applicant will ensure that the onsite ponds, drainageways and wetlands are adequately buffered from possible effluent contamination, in accordance with FDEP FDER criteria.

9. No change.

C. – F. No change.

XXII. FEDERAL ANNUAL OPERATING PERMITS AND FEES

A. DEP DER Responsibilities

The Department of Environmental Protection Regulation shall implement the provisions of Title V of the 1990 Clean Air Act for the Lee County Solid Waste to Energy Resource Recovery Facility by developing Conditions of Certification requiring submission of annual operating permit information and annual pollutant emission fees in accordance with Federal Law and Federal Regulations.

B. – C. No change

History

Final Order of Certification 06/19/92; signed by Governor Chiles

Modification 04/03/95; signed by Secretary Wetherell

Modification 08/22/96; signed by Secretary Wetherell

Modification 0X/XX/00; signed by Deputy Secretary Green

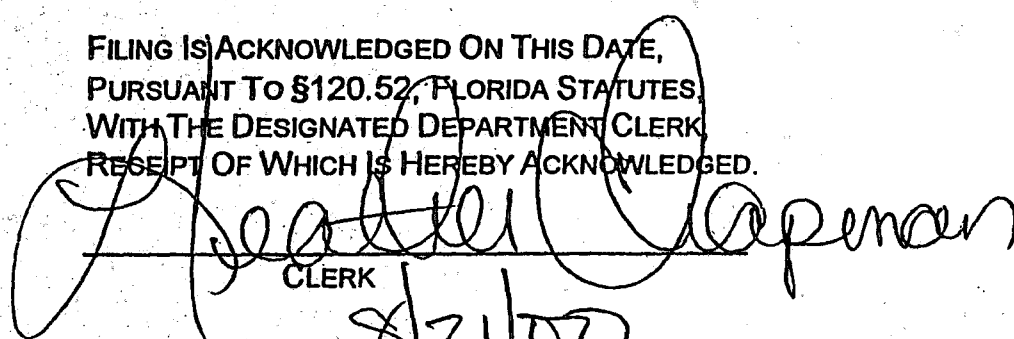
Any party to this Notice has the right to seek judicial review of the Order Pursuant to Section 120.68, Florida Statutes, by the filing of Notice Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department of Environmental Protection, Office of General Counsel, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000 and by filing a copy of the Notice of Appeal accompanied by the applicable filing fee with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date that this Final Order is filed with the Department of Environmental Protection.

DONE AND ENTERED this 21st day of August, 2000, in Tallahassee, Florida.

STATE OF FLORIDA, DEPARTMENT
OF ENVIRONMENTAL PROTECTION


KIRBY B. GREEN, III
DEPUTY SECRETARY
3900 Commonwealth Boulevard
Tallahassee, FL 32399-3000
Telephone: (850) 488-7131

FILING IS ACKNOWLEDGED ON THIS DATE,
PURSUANT TO §120.52, FLORIDA STATUTES,
WITH THE DESIGNATED DEPARTMENT CLERK
RECEIPT OF WHICH IS HEREBY ACKNOWLEDGED.


CLERK

8/21/00
DATE

Certificate of Service

I hereby certify that a copy of the Final Order Modifying Conditions of Certification for the Lee County Resource Recovery Facility was sent to the following parties by United States Mail on this 21st day of Aug., 2000.

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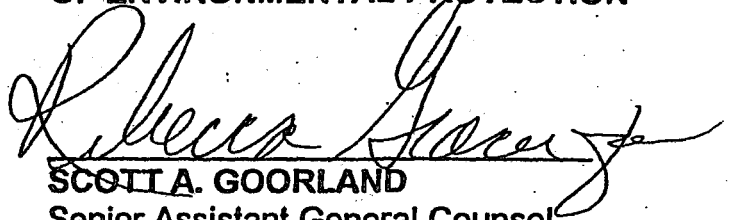
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The following persons on the Department's "Interested Persons" mailing list for this case were sent a copy:

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Fort Myers, FL 33919-2713

**STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION**

A handwritten signature in cursive script, appearing to read "Scott A. Goorland", is written over a horizontal line.

SCOTT A. GOORLAND
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STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY
CASE NO. PA 90-30

CONDITIONS OF CERTIFICATION

Table of Contents

I.	CHANGE IN DISCHARGE	1
II.	NONCOMPLIANCE NOTIFICATION	1
III.	FACILITIES OPERATION	1
IV.	ADVERSE IMPACT	2
V.	RIGHT OF ENTRY	2
VI.	REVOCATION OR SUSPENSION	3
VII.	CIVIL AND CRIMINAL LIABILITY	3
VIII.	PROPERTY RIGHTS	3
IX.	SEVERABILITY	3
X.	DEFINITIONS	4
XI.	REVIEW OF SITE CERTIFICATION	4
XII.	MODIFICATION OF CONDITIONS	4
XIII.	CONSTRUCTION	4
	A. Control Measure	5
	1. Stormwater Run-off	5
	2. Open Burning	5
	3. Sanitary Wastes	6
	4. Solid Wastes	6
	5. Noise	6
	6. Dust and Odors	6
	7. Transmission Lines	6
	8. Protection of Vegetation	6
	9. Dewatering Operations	6
	B. Environmental Control Program	7
	C. Reporting	7
XIV.	OPERATION	7
	A. Air	7
	1. Emission Standards	8
	2. Stack Testing	10
	3. Miscellaneous Requirements	13
	4. Emission Control Equipment	15
	5. Reporting	16
	B. Fuel	16

C. Wastewater Disposal	16
D. Water Discharges	16
1. Surface Water	16
2. Groundwaters	17
3. Groundwater Monitoring Program	17
E. Solid/Hazardous Waste	18
F. Operational Safeguards	19
G. Transmission Lines	20
H. Noise	20
 XV. SOUTH FLORIDA WATER MANAGEMENT DISTRICT	20
A. Legal/Administrative Conditions	20
1. General	21
2. Processing of Information Request	23
B. Water Use Conditions	24
1. General	24
2. Site Specific Standard Design Requirements	26
3. Additional Information Requirements	27
C. Surface Water Management Conditions	27
1. General	28
2. Site Specific Specific Design Requirements	30
3. Additional Information Requirements	31
D. Environmental Conditions	35
1. General	35
2. Additional Information Requirements	36
 XVI. OPERATIONAL CONTINGENCY PLANS	39
A. Operating Procedures	39
B. Contingency Plans	39
C. Current Engineering Plans	39
D. Application Modifications	39
 XVII. TRANSFER AND/OR ASSIGNMENT	39
 XVIII. PROPRIETARY DOCUMENTS OR INFORMATION CONFIDENTIALITY	40
 XIX. COOLING TOWER	40
 XX. DEPARTMENT OF COMMUNITY AFFAIRS	40
A. Transmission Line	40
B. Wildlife Survey	40
C. Exotic Plant Removal	41

D.	Air Pollution Control	41
E.	Ash Marketing	41
F.	Microbiological Testing	42
G.	Offsite Landfill Approval	42
H.	Archaeological Finds	42
I.	Traffic Minimization	42
J.	Employment	42
XXI.	SOUTHWEST FLORIDA REGIONAL PLANNING COUNCIL	43
A.	Waste Management	43
B.	Water Resources	43
C.	Natural Systems and Recreational Lands	44
D.	Air Quality	44
E.	Hazardous and Nonhazardous Materials and Waste	45
F.	Transportation	45
XXII.	FEDERAL ANNUAL OPERATING PERMITS AND FEES	46
A.	DER	46
B.	Lee County Responsibilities	46
C.	Annual Operation Permit and Fee	46

CONDITIONS OF CERTIFICATION

I. CHANGE IN DISCHARGE

All discharges or emissions authorized herein shall be consistent with the terms and conditions of this certification. The discharge of any regulated pollutant not identified in the application, or more frequent than, or at a level in excess of that authorized herein, shall constitute a violation of the certification. Any anticipated facility expansions beyond the certified initial nameplate capacity of 1,200 TPD, production increases, or process modifications which may result in new, different, or increased discharges of pollutants, change in type of fuel as described in XIV.8., or expansion in steam generation capacity shall be reported by submission of a supplemental application pursuant to Chapter 403, Florida Statutes.

II. NON-COMPLIANCE NOTIFICATION

If, for any reason, the Permittee (defined as the Applicant or its successors and or assigns) does not comply with or will be unable to comply with any limitation specified in this certification, the Permittee shall notify the South District Office of the Department of Environmental Regulation by telephone within a working day that said noncompliance occurs and shall confirm this in writing within seventy-two (72) hours of becoming aware of such conditions, and shall supply the following information:

A. A description of the discharge and cause of noncompliance; and

B. The period of noncompliance, including exact dates and times; or if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying event.

III. FACILITIES OPERATION

The Permittee shall at all times maintain in good working

order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the Permittee to achieve compliance with the terms and conditions of this certification. In the event of a malfunction of a solid waste energy recovery facility's boiler's pollution control system, that unit's furnace emissions shall be shifted to one or both of the remaining units having a properly functioning pollution control system, or the unit shall be promptly shut down.

In the event of a prolonged (thirty (30) days or more) equipment malfunction or shutdown of air pollution control equipment, operation may be allowed to resume and continue to take place under an appropriate Department order, provided that the Permittee demonstrates that such operation will be in compliance with all applicable ambient air quality standards and PSD increments, solid waste rules, domestic waste rules and industrial waste rules. During such malfunction or shutdown, the operation of the SWERF shall comply with all other requirements of this certification and all applicable state and federal emission standards not affected by the malfunction or shutdown which is the subject of the Department's order. Operational stoppages exceeding two hours for air pollution control systems or four hours for other systems or operational malfunctions as defined in the operational contingency plans as specified in Condition XVI are to be reported as specified in Condition II. Identified operational malfunctions which do not stop operation but do compromise the integrity of the operation shall be reported to the South District Office as specified in Condition II.

IV. ADVERSE IMPACT

The Permittee shall take all reasonable steps to minimize any adverse impact resulting from noncompliance with any limitation specified in this certification, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

V. RIGHT OF ENTRY

The Permittee shall allow during operational or business hours the Secretary of the Florida Department of Environmental Regulation and/or authorized representatives, upon the presentation of credentials:

A. To enter upon the Permittee's premises where an effluent source is located or in which records are required to be kept under the terms and conditions of this certification, and:

B. To have access during normal business hours (Mon.-Fri., 9:00 a.m. to 5:00 p.m.) to any records required to be kept under the conditions of this certification for examination and copying, and:

C. To inspect and test any monitoring equipment or monitoring method required in this certification and to sample any discharge or pollutants, and:

D. To assess any damage to the environment or violation of ambient standards.

VI. REVOCATION OR SUSPENSION

This certification may be suspended or revoked for violations of any of its conditions pursuant to Section 403.512, Florida Statutes.

VII. CIVIL AND CRIMINAL LIABILITY

This certification does not relieve the Permittee from civil or criminal penalties for noncompliance with any conditions of this certification, applicable rules or regulations of the Department or Chapter 403, Florida Statutes, or regulations thereunder.

Subject to Section 403.511, Florida Statutes, this certification shall not preclude the institution of any legal action or relieve the Permittee from any responsibilities or penalties established pursuant to any other applicable State Statutes, or regulations.

VIII. PROPERTY RIGHTS

The issuance of this certification does not convey any property rights in either real or personal property, nor any exclusive privileges, nor does it authorize any injury to public or private property or any invasion of personal rights nor any infringement of Federal, State or local laws or regulations.

IX. SEVERABILITY

The provisions of this certification are severable, and if any provision of this certification or the application of any provision of this certification to any circumstances, is held invalid, the application of such provisions to other

circumstances and the remainder of the certification shall not be affected thereby.

X. DEFINITIONS

The meaning of terms used herein shall be governed by the definitions contained in Chapter 403, Florida Statutes and any regulations adopted pursuant thereto. In the event of any dispute over the meaning of a term in these conditions which is not defined in such statutes or regulations, such dispute shall be resolved by reference to the most relevant definitions contained in any other state or federal statute or regulation. Words or phrases used herein dealing with conditions of the South Florida Water Management District (SFWMD) shall be defined by reference to Chapter 373, Florida Statutes, or applicable rules of the SFWMD. The Lee County Solid Waste Energy Recovery Facility (SWERF) may be referred to herein as the SWERF or as the Energy Recovery Facility.

XI. REVIEW OF SITE CERTIFICATION

The certification shall be final unless revised, revoked, or suspended pursuant to law. At least every five years from the date of issuance of certification the Department shall review these conditions of certification and propose any needed changes.

XII. MODIFICATION OF CONDITIONS

Pursuant to Subsection 403.516(1), F.S., the Board hereby delegates the authority to the Secretary to modify any condition of this certification dealing with sampling, monitoring, reporting, specification of control equipment, related time schedules, emission limitations, conservation easements, transfer or assignment of the Certification or related federally delegated permits, or any special studies conducted, as necessary to attain the objectives of Chapter 403, Florida Statutes.

All other modifications to these conditions shall be made in accordance with Section 403.516, Florida Statutes.

XIII. CONSTRUCTION

The facility shall be constructed pursuant to the design standards presented in the application and the standards or plans and drawings submitted and signed by an engineer registered in the state of Florida. The Applicant shall present specific facility plans, as developed, for review by

the South District Office at least 90 days prior to construction of those portions of the facility for which the plans are then being submitted. Specific South District Office acceptance of plans will be required based upon a determination of consistency with approved design concepts, regulations and these Conditions prior to initiating construction of the: off-site water and wastewater pipelines; transmission line; stormwater run-off system; and hazardous, toxic or pathological handling facilities or areas. Review and action by the South District Office on said plans shall be accomplished in a timely fashion in accordance with Chapter 120, F.S. from the date of a complete submittal of such plans and any action may be subject to review pursuant to Chapter 120, Florida Statutes.

A. Control Measures

1. Stormwater Run-off

To control run-off during construction which may reach and thereby pollute Waters of the State, necessary measures shall be utilized to settle, filter, treat or absorb silt-containing or pollutant-laden storm water to ensure against spillage or discharge of excavated material that may cause turbidity in excess of 29 Nephelometric Turbidity Units above background in Waters of the State. Control measures may consist of sediment traps, barriers, berms, and vegetation plantings. Exposed or disturbed soil shall be protected and stabilized as soon as possible to minimize silt and sediment laden run-off. The pH of the run-off shall be kept within the range of 6.0 to 8.5. The Permittee shall comply with Florida Administrative Code Chapters 17-25, 40E-2, and 40E-4. The Permittee shall complete the forms required by 17-25.09(1) and 40E-4 and submit those forms and the required information to the SFWMD for any modifications that might occur.

2. Open Burning

Open burning in connection with initial land clearing shall be in accordance with Chapter 17-256, F.A.C., Chapter 5I-2, F.A.C., Uniform Fire Code Section 33.101 Addendum, and any other applicable County regulation.

Any burning of construction generated material, after initial land clearing that is allowed to be burned in accordance with Chapter 17-256, F.A.C., shall be approved by the South District Office in conjunction with the Division of Forestry and any other County regulations that may apply. Burning shall not occur unless approved by the appropriate agency or if the Department or the Division of Forestry has issued a ban on burning due to fire safety conditions or due to air pollution conditions.

3. Sanitary Wastes

Disposal of sanitary wastes from construction toilet facilities shall be in accordance with applicable regulations of the appropriate local health agency.

4. Solid Wastes

Solid wastes resulting from construction shall be disposed of in accordance with the applicable regulations of Chapter 17-701, F.A.C.

5. Noise

Construction noise shall not exceed either local noise ordinance specifications, or those noise standards imposed by zoning.

6. Dust and Odors

The Permittee shall employ proper odor and dust-control techniques to minimize odor and fugitive dust emissions. The applicant shall employ control techniques sufficient to prevent nuisance conditions on adjoining property.

7. Transmission Lines

The directly associated transmission lines from the SWERF electric generators to the existing Florida Power & Light substation shall be cleared, maintained, and prepared without the use of herbicides. Wetland mitigation shall be accomplished in accordance with Chapter 17-312, F.A.C. Wetland mitigation proposals shall be submitted to the Department at least 90 days prior to start of construction.

8. Protection of Vegetation

The Permittee shall develop the site so as to retain a buffer of trees or shall plant a buffer of trees sufficient to minimize the aesthetic and noise impacts of the facility. The buffer, as far as practicable, shall be of sufficient height and width suitable for the purpose of mitigating both construction and operational impacts of the facility.

9. Dewatering Operations

The dewatering operations during construction shall be carried out in such a manner that all water withdrawn will be retained on site. There shall be no discharge of water off site due to dewatering operations unless approved by the

Department and SFWMD.

B. Environmental Control Program

An environmental control program shall be established under the supervision of a Florida registered professional engineer to assure that all construction activities conform to applicable environmental regulations and the applicable Conditions of Certification. If a violation of standards, harmful effects or irreversible environmental damage not anticipated by the application or the evidence presented at the certification hearing are detected during construction, the Permittee shall notify the South District Office as required by Condition II.

C. Reporting

1. Notice of commencement of construction shall be submitted to the South District Office within 15 days of initiation. Starting three (3) months after construction commences, a quarterly construction status report shall be submitted to the South District Office. The report shall be a short narrative describing the progress of construction. ✓

2. Upon or immediately prior to completion of construction of the Energy Recovery Facility or a phase thereof and upon or immediately prior to completion of all necessary preparation for the operation of the off-site landfill, the South District Office will be notified of a date on which a site or facility inspection can be performed in accordance with Condition V.

XIV. OPERATION

A. Air

The operation of the Solid Waste Energy Recovery Facility shall be in accordance with all applicable provisions of Chapter 17-2, 17-256, and 17-702, Florida Administrative Code.

The construction of the Lee County Solid Waste Energy Recovery Facility in Fort Myers, Florida shall consist of three mass-burn Municipal Waste Combustors (MWC) with two units to be constructed initially and the third unit to be installed in the future. These mass-burn units shall be of Stoker Waterwall Combustor design (or equivalent) with a maximum heat input of 275 MMBtu per hour per unit or a total heat input for the facility of 825 MMBtu per hour based on a municipal solid waste average heating value of 5000 Btu per pound.

Each combustor unit is designed to produce a maximum of

152,000 pounds of steam per hour at 865 psig and 830°F. Each combustor shall be equipped with auxiliary burners to be fired by propane gas only. Emissions from each combustor shall be controlled by a slaked lime scrubber followed by a baghouse. NO_x emissions shall be controlled by a Selective Non-Catalytic Reduction (SNCR) system. Mercury emissions shall be controlled by injecting activated carbon and/or sodium sulfide or other appropriate reagent. This facility shall be allowed to operate continuously (8,760 hrs/yr).

The permittee shall submit at least four copies of complete information as to the make and model numbers of Municipal Waste Combustors, all pollution control and continuous emissions monitoring devices and related equipment, to the Bureau of Air Regulation prior to purchase and installation. The permittee shall also submit detailed stack drawings showing sampling locations, operation and maintenance manuals and calibration procedures at least 90 days prior to commencing operations to the Bureau of Air Regulation.

In addition to the foregoing the Permittee shall comply with the following specific Conditions of Certification:

1. Emission Standards

a. Based on a permitted capacity of 275 MMBtu/hr. and a Btu content of 5000 Btu/lb of MSW, per unit, the stack emissions from each unit shall not exceed any of the following limitations:

- (1) Particulate matter: Particulate emissions from the baghouse shall not exceed 0.010 grains/dry standard ft³, corrected to 7% O₂; 5.34 lbs/hr per unit, and 21.3 tons/year per unit.
- (2) PM₁₀: 0.010 gr/dscf, corrected to 7% O₂ for the fraction of particles less than 10 microns in diameter; 5.34 lbs/hr per unit, and 21.3 tons/year per unit.
- (3) * Opacity: Visible emission from each baghouse exhaust shall not exceed 10% opacity. (Six minute average)
- (4) SO₂: 30 ppm_{dv} corrected to 7% O₂, 24 hour daily geometric average or at least 80% removal efficiency, whichever is least restrictive (not to exceed 0.150 lbs/MMBtu per unit), or 41 lbs/hr/unit, and 163.3 tons/year per unit.
- (5) NO_x: 180 ppm_{dv} corrected to 7% O₂, 24 hour daily

block average (midnight to midnight), 0.29 lb/MMBtu, 80 lbs/hr per unit, and 320 tons/yr per unit.

- (6) *Carbon Monoxide: 100 ppm_{dv} at 7% O₂, 4-hour block average beginning at midnight, 0.099 lb/MMBtu, 27.23 lbs/hr/unit, and 108 tons/year per unit.
- (7) *VOC (Hydrocarbons): 37 ppm_{dv} at 7% O₂, 0.0211 lb/MMBtu, 5.80 lbs/hr/unit and 23 tons/yr. per unit.
- (8) HCl: 25 ppm_{dv} at 7% O₂, or at least 95% removal, which ever is least restrictive (not to exceed 0.0644 lb/MMBtu or 17.7 lbs/hr/unit), and 70.7 tons/yr per unit.
- (9) H₂SO₄ (sulfuric acid mist): 0.0358 lb/MMBtu, or 9.85 lbs/hr/unit and 39.3 tons/year per unit.
- (10) *F (fluoride): 5.0 ppm_{dv} at 7% O₂, 0.0035 lb/MMBtu, or 0.96 lbs/hr/unit, and 3.8 tons/year per unit.
- (11) *Pb (lead): Lead emission shall not exceed 0.0006 lbs/MMBtu, .165 lbs/hr/unit and .66 tons/yr per unit.
- (12) *Be: Beryllium emissions shall not exceed 1.35×10^{-7} lbs/MMBtu, 3.7×10^{-5} lbs/hr/unit, and 1.47 $\times 10^{-4}$ tons/yr per unit.
- (13) *Hg: Mercury emissions shall not exceed .0006 lbs/MMBtu, 0.165 lbs/hr/unit, and .66 tons/yr per unit.
- (14) As: Arsenic emissions shall not exceed 9.1×10^{-6} lbs/MMBtu, 2.5×10^{-3} lbs/hr/unit, and 0.01 tons/yr per unit.
- (15) *Dioxins/Furans: Emissions of total (tetra thru octa-chlorinated dibenzo-p dioxins and dibenzofurans) shall not exceed 30.0 ng/dscm @ 7% O₂, 2.54×10^{-8} lbs/MMBtu, 7.0×10^{-6} lbs/hr/unit, and 2.8×10^{-5} tons/yr per unit.
- (16) NH₃: Ammonia slip from exhaust gases shall not exceed 50 ppm_v.
- (17) There shall be no visible emissions during the lime silo loading operations (i.e., less than 5% opacity).

- (18) Visible emissions from the ash handling building baghouse shall not exceed a particulate limit of 0.010 grains/dscf nor visible emissions of 5% opacity.

* Pursuant to Rule 17-4.080 F.A.C., for good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions for the pollutants CO, VOC, E, Pb, Be, Hg, dioxins and visible emissions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time.

2. Stack Testing/Continuous Emissions
Monitoring/Record Keeping Requirements

a. Test Methods

Compliance with emission limitation standards mentioned in Specific Condition No. 1 shall be demonstrated using EPA Methods, as contained in 40 CFR Part 60 (Standards of Performance for New Stationary Sources), or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants), or any other method as approved by the Department, in accordance with F.A.C. Rule 17-2.700. A test protocol shall be submitted for approval to the Bureau of Air Regulation at least 90 days prior to testing.

EPA Method

For Determination of

- | | |
|--------------|--|
| 1 | Selection of sample site and velocity traverses. |
| 2 | Stack gas flow rate when converting concentrations to or from mass emission limits. |
| 3 | Gas analysis when needed for calculation of molecular weight or percent O ₂ . |
| 4 | Moisture content when converting stack velocity to dry volumetric flow rate for use in converting concentrations in dry gases to or from mass emission limits. |
| 5 | Particulate matter concentration and mass emissions. |
| 201 or 201A | PM ₁₀ emissions. |
| 6, 6C, or 19 | Sulfur dioxide emissions from stationary |

sources.

- 7, 7C, or 19 Nitrogen oxide emissions from stationary sources.
- 9 Visible emission determination of opacity.
- At least three one hour runs to be conducted simultaneously with particulate testing for the emissions from dry scrubber/baghouse, and ash handling building baghouse.
 - At least one lime truck unloading into the lime silo (from start to finish).
- 10 Carbon monoxide emissions from stationary sources.
- 12 or 101A Lead concentration from stationary sources.
- 13A or 13B Fluoride emissions from stationary sources.
- 23 Dioxin/furan concentration.
- 18, or 25, Volatile organic compounds concentration.
- 26 HCl emissions or other methods approved by EPA or DER.
- 101A or 108 Mercury, Antimony, Arsenic, and Cadmium emissions.
- 104 Beryllium emission rate and associated moisture content.

Note: The weight of MSW being fed to each combustor during the stack test shall be continuously monitored and recorded by a weighing device which is properly calibrated. Stack test shall be conducted upstream and downstream of the applicable control device for the following pollutants, SO₂, Hg and HCl. Soot blowers shall be operated in a mode consistent with normal cleaning requirements of the system during the compliance testing.

b. Continuous Emissions Monitoring

Continuous emission monitors with recorders shall be installed, calibrated, maintained and operated subject to approval by the Department for the following:

Carbon Monoxide, Oxygen, Nitrogen Oxide,

Opacity, and Sulfur Dioxide (for SO₂ one monitor shall be located upstream of the scrubber and one shall be located downstream of the baghouse), as specified in 40 CFR 60, Appendix B; total steam production (lbs/hr, pressure, and temperature) and power generation (MW) for each unit; ammonia injection rate; slaked lime; activated carbon and/or sodium sulfide injection or usage rates; and thermocouple to measure temperature of combustion zone (to be specified by the vendor and one second residence time). The monitoring devices shall meet the applicable requirements of Chapter 17-2, Section 17-2.710, F.A.C. and 40 CFR 60.45, and 40 CFR 60.13, including certification of each device in accordance with 40 CFR 60, Appendix B, Performance Specifications and 40 CFR 60.7 (a)(5). Data on monitoring equipment specifications, manufacturer, type, calibration and maintenance needs, and its proposed location after the economizer or in the air pollution control equipment outlet duct shall be provided to the South District Office for review prior to installation together with and subject to the same provisions as submittal of air pollution control equipment pursuant to paragraph XIII hereof.

c. Testing Frequency

Compliance with emission standards contained in Condition No. XIV.A.1.a. shall be determined by conducting stack tests within 120 days of completion of construction and initial operation and annually thereafter. These tests may be staggered throughout the year with the approval of the Bureau of Air Regulation. Pursuant to Rule 17-2.700(2)(b), when the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in this permit is being violated, it may require the owner or operator of the source to conduct compliance tests which identify the nature and quantity of pollutant emissions from the source and to provide a report on the results of said tests to the Department. Compliance testing for the flyash handling building (baghouse) and the lime silo loading operation (V.E. test) shall be conducted within 90 days of completion of construction and initial operation and annually thereafter. All notification requirements of 40 CFR parts 60 and 61 shall be complied with by the owner/operator of the SWERF.

d. Sampling Ports

The Permittee shall provide sampling ports in the air pollution control equipment outlet duct or stack and shall provide access to the sampling ports in accordance with Section 17-2.700, F.A.C. Drawings of testing facilities including sampling port locations as required by Section 17-2.700 shall be submitted to the South District Office for

approval at least 60 days prior to construction of the sampling ports and stack.

e. Record Keeping

Lee County Solid Waste Energy Recovery Facility shall maintain a central file containing all measurements, records, and other data that are required to be collected pursuant to the various specific conditions of this permit. This file shall include but not be limited to: i) the data collected from in-stack monitoring instruments, ii) the records on MSW input rate, iii) the amount of propane gas burned per unit, iv) the results of all source tests or performance tests, v) the amount of ammonia, activated carbon, sodium sulfide or other chemicals used for NOx and mercury control, vi) calibration logs for all instruments, vii) maintenance/ repair logs for any work performed which is subject to this permit. All measurements, records, and other data required to be maintained by SWERF shall be retained for at least two years following the date on which such measurements, records, or data are recorded and made available to the Department upon request. The South District office of the Department shall be notified in writing at least 15 days prior to any testing of any instrument to allow witnessing.

3. Miscellaneous Requirements

a. Start-up and Shut-down Procedures

During start-up procedures, propane gas shall be used to preheat the combustion zone to achieve a furnace roof temperature of 1270°F and a minimum temperature of 1800°F above the grate (at a height to be specified by the vendor) prior to the ignition of MSW.

During all shut-down procedures, propane gas shall be used to ensure that the temperature above the grate, as specified above, does not drop below 1800°F and the furnace roof temperature is maintained above 1270° while any MSW is still burning.

b. Operating Procedures

Operating procedures shall include good combustion practices and proper training and certification of all operators. The good combustion practices shall meet the guidelines established in 40 CFR 60, Subpart Ea and procedures as established by the equipment manufacturers. All operators (including supervisors) of air pollution control devices shall be properly trained and certified in accordance with the manufacturers guidelines. A list of all such certified personnel shall be submitted to the South District Office.

Department staff may attend any training sessions related to operation and maintenance of air pollution control devices.

The emission standards for this facility shall apply at all times, except during periods of start-up, shut-down, or malfunctions, provided that the duration of start-up, shut-down, or malfunction shall not exceed 3 hours per occurrence. The start-up period commences when the affected facility begins the continuous burning of MSW and does not include any warm-up period when the affected facility is combusting only propane gas and no MSW is being combusted. During all startups, shutdowns and malfunctions the owner/operator shall use best operational practices to minimize air pollutant emissions. Within 90 days prior to commencing commercial operations of this facility, the permittee shall submit to the South District Office a operational procedures manual that identifies and describes best operational practices that will be used during startup, shutdown, and malfunctions of this facility.

c. Odor Control

No objectionable odors are allowed from this facility pursuant to F.A.C. Rule 17-2.620. The truck access doors to the facility shall remain closed except during normal working shifts when MSW is being received near the storage pit area to allow vehicle passage. To minimize odors at the facility, a negative pressure shall be maintained on the tipping floor and air from within the building will be used as combustion air.

d. Auxiliary Burners

Auxiliary burners for each unit shall be fired only by propane gas and shall not exceed the 10% capacity factor as determined by 40 CFR 60.44b(d).

e. Baghouse Operations

All baghouses (except for lime silo dust collector) shall be equipped with pressure drop monitoring equipment. Baghouses shall have a maximum air to cloth ratio of 4:1.

f. Restriction for Type of Wastes Combusted

No biological waste, medical waste, bio-hazardous waste, sewage sludge or hazardous wastes shall be received or combusted at this facility without obtaining proper modification to the power plant site certification conditions from the Department. The County shall establish a household battery collection program to be specified by the applicant.

prior to start of construction, to further minimize mercury emissions. Chromium compounds shall not be used as an additive in the cooling tower water.

g. Fugitive (Unconfined) Emissions

Fugitive emissions at this facility shall be adequately controlled at all times. All roads shall be adequately paved and vacuum swept if appropriate, to keep free of visible dust. Speed limit signs shall be posted. Residue from the grates, grate siftings, and ash from the combustor/boiler and fabric filter hoppers during normal operations shall be discharged into the ash quenching system so as to minimize visible dust. The ash/residue in the ash handling building shall remain sufficiently moist to prevent dust during storage and handling operations.

h. The height of the boiler exhaust stack shall not be less than 275 feet above grade or the height determined to be Good Engineering Practice.

i. The SWERF's boilers shall not be loaded in excess of their permitted capacity of or 275×10^6 Btu per hour, each unit, based on heating value of 5000 Btu/lb of MSW.

j. The combustor boilers shall have a metal name plate affixed in a conspicuous place on the shell showing manufacturer, model number, type waste, and rated capacity.

k. Combustion efficiency shall be calculated by: $\%CE = (1 / (1 + (CO/CO_2))) \times 100$, and shall be at least 99.5% for an 8 hour average.

4. Emission Control Equipment

a. The combustor's particulate control baghouse shall be designed, constructed and operated to achieve a maximum emission rate of 0.010 grains per dscf corrected to 7% O_2 .

b. The facility shall be equipped with dry scrubbers which are designed, constructed and operated to remove SO_2 at an efficiency of 80% by weight or to achieve an emission rate of 30 ppmdv at 7% O_2 which ever is less stringent and to cool the flue gases to an average temperature not to exceed 300°F (3-hour rolling average).

c. The Permittee shall submit to the Bureau of Air Regulation within thirty (30) days after it becomes available, copies of technical data pertaining to the selected emissions control systems. These data should include, but not be limited to, guaranteed efficiency and emission rates, and major design parameters.

5. Reporting

a. Two copies of the results of the emissions tests for the pollutants listed in XIV.A.1.a. shall be submitted within forty-five days of the last sampling run to the South District Office.

b. Emissions monitoring shall be reported to the South District Office on a quarterly basis in accordance with Section 17-2.710, F.A.C., 40 CFR, part 60, Subsection 60.7 or 40 CFR part 61 as appropriate.

c. Notice of anticipated and actual start-up dates of each waste combustor boiler shall be submitted to the DER South District Office.

B. Fuel

The SWERF shall utilize refuse such as garbage and trash (as defined in Chapter 17-7, F.A.C.) as its fuel. Use of alternate fuels except for distillate fuel oil or natural gas in start-up burners would necessitate modification of these Conditions of Certification. Refuse as fuel shall not include "hazardous waste" as defined in Chapter 17-30, F.A.C. The alternate fuel, which may be used distillate oil, shall not contain more than 0.3% sulfur by weight and shall not be used more than required during boiler startup or shutdown. 60-701.200 602-730, F.A.C.

C. Wastewater Disposal

A complete submittal of plans, drawings and specifications for leachate collection systems, pumps, lift stations, sewage collection systems, and wastewater collection systems in accordance with appropriate DER rules shall be furnished to the South District Office for approval at least 90 days prior to start of construction for the particular of such component. In order to obtain approval, the receiving sewage treatment plant shall indicate its ability and willingness to accept the wastewater. Also plans and specifications for connections to off-site sewage and wastewater transmission systems shall be furnished to the South District Office for approval 90 days prior to start of construction. Review shall be accomplished in accordance with Condition XIII.

D. Water Discharges

1. Surface Water

Any discharges from the site stormwater system via the emergency overflow structure which results from an event LESS than a ten-year, 24-hour storm (as defined by the U.S.

Weather Bureau Technical Paper No. 40, or the DOT drainage manual, or similar documents) shall meet applicable State Water Quality Standards, Chapter 17-302, F.A.C., the Standards of Chapter 17-25, F.A.C., and Chapter 40-E, F.A.C.

2. Groundwaters

All discharges to groundwaters shall be collected and treated as necessary, or otherwise be of high enough quality, to be able to meet the applicable Water Quality Standards of Sections 17-301.402 and 17-301.404, F.A.C., at the boundary of a zone of discharge approved for each potential pollution source. If monitoring should indicate a violation of the standards, the Permittee shall immediately notify the South District office and SFWMD and institute remedial action.

3. Groundwater Monitoring Program

a. Sampling of the shallow aquifer groundwater quality shall be conducted in at least six well clusters in the site vicinity. At least one of these wells shall be up the hydrologic slope from the landfill area to provide current background data. Other wells shall be located down the hydrologic slope from the ground water discharge areas. Specific location of any new wells or modifications to the monitoring program may be proposed by the applicant, but shall be approved by the South District Office prior to the construction of the new monitoring wells.

b. A ground water monitoring plan shall be submitted within 120 days of certification in accordance with Rule 17-28.700 F.A.C., for approval by the South District Office.

c. Upon completion of construction of the groundwater monitoring system, the following information shall be submitted to the South District Office for all ground water monitoring wells and any new well(s) constructed:

Well identification	Drillers log
Latitude/Longitude	Total depth of well
Aquifer monitored	Casing diameter
Screen type & slot size	Casing type and length
Screen length	SFWMD well construction
Elevation at top of pipe	permit numbers
Elevation at land surface	

c. Upon completion of construction of the groundwater monitoring system, but no less than 12 months before the commencement of operation the Permittee shall sample all ground water monitoring wells for the Primary and Secondary

Drinking Water parameters included in Chapter 17-22, F.A.C., Public Drinking Water Systems. The specific parameters to be sampled are listed in Part II, Quality Standards, Analytical Methods, Sampling, Sections 17-550.310 and 17-550.320, F.A.C.

d. The field testing, sample collection and preservation and laboratory testing, including quality control procedures, shall be in accordance with Chapter 17-4.246 and 17-301.401, F.A.C. Approved methods as published by the Department or as published in Standard Methods, A.S.T.M. or EPA methods shall be used. Approved methods for chemical analyses are summarized in the Federal Register, December 1, 1976 (41FR52780) except that turbidity shall be measured by the Nephelometric Method.

e. All required submittals shall be sent to the South District Office within 60 days of installation of the ground water monitoring system. Upon receipt and review of the required data, quarterly sampling reports shall be submitted to the South District Office commencing 12 months prior to the operation of the SWERF. Any required modifications of the groundwater monitoring system or program shall be modified in accordance with the provisions of Condition XII. The groundwater monitoring program may be reviewed annually.

E. Solid/Hazardous Waste

1. Incinerator ash, fly ash, spent acid control medias and other forms of solid waste shall be disposed of in a licensed off-site landfill in accordance with all applicable portions of Chapters 17-701 and 17-702, F.A.C., including prohibitions, procedures for closing of the landfill, and final cover requirements, or, as provided in this condition (XIV.E.) in its entirety. The plans of the final landfill design shall be provided to the South District Office and the Division of Waste Management for review and approval at least 90 days prior to start of operation of the SWERF Unit. Review shall be performed in accordance with Condition XIII. The final plans for this SWERF shall include provisions for the isolated temporary handling of suspected hazardous, toxic or infectious wastes. The SWERF shall not be operated until a landfill capable of disposing of plant wastes is licensed to operate.

2. No suspected or known hazardous, toxic, or infectious wastes as defined by Federal, State or local statutes, rules, regulations or ordinances shall be burned or landfilled at the site.

3. Rodent and insect control shall be provided as necessary to protect the health and safety of site employees and the public. Pesticides used to control rodents, flies, and other vectors shall be as specified by the Florida Department

of Agriculture and Consumer Services.

4. Storage of putrescible waste for processing shall not exceed storage capacity of the refuse bunker or tipping floor as designed on the approved plan.

5. Ash prior to transport to the landfill shall be stored in an enclosed building on an impervious surface. Final disposal of the ash shall be into the lined landfill or other method approved by the South District Office. Any leachate generated within the building shall be collected and disposed of by a method approved by the South District Office. The South District Office shall notify the SFWMD of the plans and specifications regarding the above referenced method.

* 6. A monthly report shall be prepared detailing the amount and type (putrescible, special wastes, boiler residue, etc.) of materials processed at the site. (see condition XIV.E.2. above). These reports shall be furnished to the South District Office quarterly, commencing 120 days after the SWERF becomes operational and is producing residues.

7. Unless approved by the Department with subsequent modification of conditions, this facility shall not accept materials defined by applicable Federal, State or local statutes, rules, regulations or ordinances as "Hazardous Wastes".

8. There shall be no discharge to waters of the State of polychlorinated biphenyl compounds.

9. The design, operation, and monitoring of disposal or control of any "special wastes" shall be in accordance with F.A.C. Section 17-702.060, and any other applicable department rules, to protect the public safety, health and welfare. "Special wastes" means those wastes that require extraordinary management. They include but are not limited to abandoned automobiles, white goods, used tires, waste oil, sludges, dead animals, agricultural and industrial wastes, septic tank pumpings, and infections and hazardous wastes. Sludges which may be hazardous due to their chemical composition shall be disposed of in accordance with F.A.C. Section 17-7.040(4). Disposal of Grade III Domestic Wastewater Treatment Sludge, disposal of domestic septage, and disposal of food service sludge, shall be in accordance with F.A.C. Section 17-7.540(6).

F. Operational Safeguards

The overall design and layout of the facilities shall be such as to mitigate potential adverse effects to humans and the environment. Security control measures shall be utilized to prevent exposure of the public to hazardous conditions. The

Federal Occupational Safety and Health Standards will be complied with during construction and operation. The safety standards specified under Section 440.56, Florida Statutes, by the Industrial Safety Section of the Florida Department of Commerce will be complied with during operation.

G. Transmission Lines and Pipe Lines

The Licensee shall demonstrate compliance with Chapter 17-274, F.A.C., at least 90 days prior to start of construction for the directly associated transmission lines from the SWERF electric generators to the Florida Power and Light Company Substation. Transmission and pipeline routes shall be kept cleared without the use of herbicides. Prior to clearing activities within any of the right-of-way associated with the various linear facilities, a survey shall be conducted to identify the presence of any listed wildlife species likely to occur within the right-of-way based on range and habitat. Results of this survey shall be submitted to the Florida Game and Fresh Water Fish Commission (FGFWFC) and the United States Fish and Wildlife Service (USFWS). If it is determined that any of these species will be affected by the construction of any of these linear facilities the Permittee shall consult with the FGFWFC and the USFWS to determine the appropriate steps to be taken to avoid, minimize, mitigate, or otherwise appropriately deal with any adverse impacts within each agency's respective jurisdiction.

Prior to any clearing on the project site, the permittee shall arrange a site visit by personnel from the South District Office to verify the wetland jurisdictional areas on the project site and to inspect the proposed fill areas. If additional areas are determined to be within the Department's Wetland Resource jurisdiction or if the site plan is modified to impact additional wetlands, the Permittee shall submit a revised Joint Application for Works in Waters of the State and revised permit drawing package reflecting the changes. The permittee shall provide mitigation for any habitat loss or degradation resulting from the construction of the project. The mitigation shall meet all the requirements of Rule 17-312.300, Florida Administrative Code.

H. Noise

Operational noises shall not exceed local noise ordinance limitations nor those noise standards imposed by zoning.

XV. SOUTH FLORIDA WATER MANAGEMENT DISTRICT

A. Legal/Administrative Conditions

1. General

a. Responsible Entity

The Permittee, defined as Lee County or any full-service vendor/contractor under contract to the County, shall be responsible for the implementation of the Certification Conditions. If contractual rights, duties, or obligations are transferred under this Certification, notice of such transfer or assignment shall immediately be submitted to the Florida Department of Environmental Regulation and the SFWMD by the previous certification holder (Permittee) and the Assignee. Included in the notice shall be the identification of the entity responsible for compliance with the Certification. Any assignment or transfer shall carry with it the full responsibility for the limitations and conditions of this Certification. Reference: Sections 373.223 and 373.413, F.S.; Rules 40E-2.091(1)(a), 40E-2.301, 40E-2.381(1), 40E-4.091(1)(a), and 40E-4.301, F.A.C.

b. Minimum Standards

This Certification is based on the Permittee's submitted information to the SFWMD which reasonably demonstrates that adverse off-site water resource related impacts will not be caused by the authorized activities. The plans, drawings and design specifications submitted by the Permittee shall be considered the minimum standards for compliance. Reference: Sections 373.219, 373.223, 373.229, 373.308, 373.316, 373.413(1) and 373.416(1), F.S.; Rules 40E-2.091(1)(a), 40E-2.301(1), 40E-2.381, 40E-3.500-531, 40E-4.091(1)(a), 40E-4.301(1), and 40E-4.381, F.A.C.

c. Compliance Requirements

This project must be constructed, operated and maintained in compliance with and meet all non-procedural requirements set forth in Chapter 373, F.S., and Chapters 40E-2 (Consumptive Use), 40E-3 (Water Wells), and 40E-4 (Surface Water Management), F.A.C.

d. Off-site Impacts

It is the responsibility of the Permittee to ensure that adverse off-site water resource related impacts do not occur during the construction, operation, and maintenance of the project. Reference: Sections 373.223 and 373.413(1); Rules 40E-2.091(1)(a), 40E-2.381(d), 40E-2.381(e), 40E-4.091(1)(a), 40E-4.301, and 40E-4.381(2)(k), F.A.C.

e. Liability

The Permittee shall hold and save the SFWMD harmless from any and all damages, claims, or liabilities which may arise by reason of the construction, operation, maintenance and/or use of any facility authorized by this Certification, to the extent allowed under Florida law. Reference: Sections 373.223, 373.443, F.S.; Rules 40E-2.091(1)(a), 40E-2.381(2)(i), 40E-4.091(1)(a), and 40E-4.381(2)(j), F.A.C.

f. Construction, Operation and Maintenance Responsibilities

The Permittee shall be responsible for the construction, operation, and maintenance of all facilities installed for the proposed project. Reference: Sections 373.309, 373.413(1) and 373.416(1), F.S., Rules 40E-3.301, 40E-4.091(1)(a), 40E-4.301, and 40E-4.381(2)(h), F.A.C.

g. Access

SFWMD representatives shall be allowed reasonable escorted access to the power plant site and any associated linear facilities to inspect and observe any activities associated with the construction of the proposed project and/or the operation and/or maintenance of the on-site wells and/or surface water management system in order to determine compliance with the conditions of this Certification. The Permittee shall not refuse immediate entry or access upon reasonable notice to any SFWMD representative who requests entry for the purpose of the above noted inspections and presents appropriate credentials. Reference: Sections 373.223, 373.319, and 373.423, F.S.; Rules 40E-2.091(1)(a), 40E-2.301, 40E-2.381(2)(f), 40E-3.461, 40E-4.091(1)(a), and 40E-4.301, F.A.C.

h. Post Certification Information Submittals

Information submitted to the SFWMD subsequent to Certification, in compliance with the conditions of this Certification, shall be for the purpose of the SFWMD determining the Permittee's compliance with the Certification conditions and the non-procedural criteria contained in Chapters 40E-2, 40E-3, and 40E-4, F.A.C., as applicable, prior to the commencement of the subject construction, operation and/or maintenance activity covered thereunder. Reference: Rule 17-17.191, F.A.C.

i. Post Certification Permit Modifications

Once the final certification for a phase of the project, including the transmission line, has been issued, the SFWMD will require modification of the appropriate permits issued by SFWMD for any affected entities to reflect the

activities authorized by the Certification Order. Reference: Sections 373.239 and 373.429, F.S.; Rules 40E-2.331 and 40E-4.331, F.A.C.

j. Post Certification Construction Notifications

At least 30 days prior to the commencement of construction, the Permittee or Project Engineer shall notify the SFWMD Field Engineering Division of the construction start date. Annual construction status reports shall be submitted by the Permittee to the SFWMD Engineering Division beginning with the initial construction start date. Reference: Sections 373.413(1) and 373.416(1), F.S.; Rules 40E-4.091(1)(a), 40E-4.301, and 40E-4.381(2)(h), F.A.C.

k. Operation Authorization

Authorization for the proposed energy recovery facility to begin operating shall not be granted by the Florida Department of Environmental Regulation until it has received and approved an executed contract between Lee County and an entity capable of receiving and disposing of the ash residue and other waste products to be generated by the proposed facility. Reference: Sections 373.043 and 403.504, F.S.

1. Enforcement

The SFWMD may take any and all lawful actions to enforce any condition of this Certification that is based on the rules of the agency. Prior to initiating such actions, the SFWMD shall notify the Secretary of DER of the proposed actions. The SFWMD may seek modification of this Certification for any change in any activity resulting from the SFWMD's enforcement of this Certification which change will have a duration longer than 60 days. Reference: Sections 373.2223, 373.319, 373.423, and 373.603, F.S.; Rules 40E-2.091(1)(a), 40E-2.301, 40E-2.381(2)(f), 40E-3.461, 40E-4.091(1)(a), and 40E-4.301, F.A.C.

2. Processing of Informational Requests

a. At least ninety (90) days prior to the commencement of construction of any portion of the proposed project, the Permittee shall submit to SFWMD staff, for a completeness and sufficiency review, any pertinent additional information required under the SFWMD's site specific standards and the Conditions of Certification for that portion proposed for construction. If SFWMD staff does not issue a written request for additional information within thirty (30) days, the information will be presumed to be complete and sufficient. Reference: Section 373.413(2), F.S.

The Permittee shall be responsible for mitigating to the satisfaction of the SFWMD any adverse impacts on existing legal uses caused by the groundwater withdrawals authorized by this Certification. If adverse impacts occur, or are imminent, SFWMD reserves the right to curtail withdrawal rates pursuant to the enforcement provisions of Condition XV.A.1.1 of these conditions. The adverse impacts can include:

(1) A reduction in well water levels that impairs the ability of an adjacent well to produce water (an adjacent well may be a domestic well, lawn irrigation well, public water supply well, etc.);

(2) A significant reduction in water levels in an adjacent water body such as a lake, pond, wetland, or canal system;

(3) Saline water intrusion or induction of pollutants into the water supply of an adjacent water user, resulting in a significant reduction in water quality; and/or

(4) A change in water quality that causes impairment or loss of use of well or water body.

Reference: Section 373.223, F.S.; Rules 40E-2.091(1)(a), 40E-2.301(1), and 40E-2.381(2)(d), F.A.C.

c. Impacts on Existing Off-Site Land Uses

The Permittee shall be responsible for mitigating to the satisfaction of the SFWMD any adverse impacts on existing off-site land uses as a consequence of the groundwater water withdrawals authorized by this Certification. If the withdrawals cause an adverse impact on existing land uses, the SFWMD reserves the right to curtail future withdrawal rates pursuant to the enforcement provisions of condition IV.a.1.1 of these conditions. Adverse impacts can include:

(1) A significant reduction in water levels in an adjacent water body such as a lake, pond, wetland, or canal system;

(2) Land collapse or subsidence caused by a reduction in water levels;

(3) Damage to crops and other vegetation, causing financial harm to the landowner; and/or

(4) Damage to the habitat of rare, endangered or threatened species.

Reference: Section 373.223, F.S.; Rules 40E-2.091(1)(a), 40E-2.301(1), and 40E-2.381(2)(e), F.A.C.

d. Well System Operation

At any time, if there is an indication that the well casing, valves, or controls associated with the on-site backup well system leak or have become inoperative, the Permittee shall be responsible for making the necessary repairs or replacement to restore the well system to an operating condition acceptable to the SFWMD. Failure to make such repairs shall be cause for requiring that the well(s) be filled and abandoned in accordance with the procedures outlined in Chapter 40E-3 (Water Wells), F.A.C. Reference: Sections 373.308 and 373.316, F.S.; Rules 40E-3.041, 40E-3.101, 40E-3.411, and 40E-3.500-531, F.A.C.

2. Site Specific Standards Design Requirements

a. Authorized Daily Withdrawals

This Certification authorizes a maximum daily withdrawal of 1.5 MGD from the Sandstone aquifer for process cooling, ash quenching, and landscape irrigation purposes for a period not to exceed a total of ten days within any twelve month period. Withdrawals in excess of ten days shall require prior SFWMD approval. These withdrawals shall only occur during those times when treated effluent is not available from the City of Fort Myers.

b. Authorized Annual Withdrawals

This Certification authorizes a maximum annual withdrawal of 15.8 MG from the Sandstone aquifer for process cooling, ash quenching, landscape irrigation, and maintenance exercising of the on-site wells. Withdrawals in excess of this amount shall require prior SFWMD approval. These withdrawals shall only occur during those times when treated effluent is not available from the City of Fort Myers or the wells are being exercised for maintenance purposes.

c. Authorized Withdrawal Facilities

6 - 8" x 150' well cased to 80' withdrawing from the Sandstone aquifer with a pumping capacity of 175 gpm per well.

d. Duration of Authorization

This Certification authorizes the withdrawals specified in Conditions B.2.a, B.2.b, and B.2.c above for five (5) years from the date of Certification. The Permittee must

request an extension of this authorization prior to the expiration of the five (5) year period.

Reference: Sections 373.223 and 373.236, F.S.; Rules 40E-2.091(1)(a), 40E-2.301, 40E-2.321(1)(e), and 40E-2.381, F.A.C.

3. Additional Information Requirements

a. Dewatering Operations

Prior to the commencement of construction of those portions of the project which involve dewatering activities, a detailed plan for the proposed dewatering activities must be reviewed by the SFWMD for a determination of compliance with the non-procedural provisions of Chapter 40E-2, 40E-3, and 40E-4, F.A.C. The following information must be submitted:

- (1) A detailed site plan which shows the location(s) for the proposed dewatering area(s);
- (2) The method(s) of dewatering operations;
- (3) The maximum depth for each dewatering operation;
- (4) The location and specifications for all proposed wells and/or pumps associated with each dewatering operation;
- (5) The discharge method, route, and location of receiving waters generated by each dewatering operation, including the measures (Best Management Practices) to be taken to prevent water quality problems in the receiving waters;
- (6) The duration of each dewatering operation;
- (7) An analysis of the impacts of the proposed dewatering operations which indicates that no significant impacts will occur to any existing on-site and/or off-site legal users, wetlands, or any existing plume of groundwater contamination;
- (8) The location of any infiltration trench(es); and
- (9) All plans must be signed and sealed by a State of Florida registered Professional Engineer and a State of Florida registered Professional Geologist.

Reference: Sections 373.229, 373.308, and 373.413, F.S., Rules 40E-2.091(1), 40E-2.301, 40E-3.500-531, and 40E-4.381(2)(1), F.A.C.

b. Monthly Reporting Requirements

Groundwater withdrawal quantities shall be submitted to the SFWMD on a monthly basis beginning with the month following construction and operation of the proposed wells. Reference: Section 373.223, F.S.; Rules 40E-2.091(1), 40E-2.301, and 40E-2.381, F.A.C.

c. Groundwater Monitoring Program

Within six months of issuance of this Certification, the Permittee shall develop and implement a groundwater monitoring program. Within three months of issuance of this Certification, a preliminary proposal shall be submitted to the SFWMD for review for compliance with the non-procedural requirements specified in Chapter 40E-2, F.A.C. In developing the groundwater monitoring program, the Permittee shall consider well locations, depth and method of well construction, types of well screens, and frequency of data collection. Reference: Section 373.223, F.S.; Rules 40E-2.091(1), 40E-2.301, and 40E-2.381, F.A.C.

d. New Well Construction

Prior to the construction of the proposed on-site wells, the Permittee shall submit the drilling plans and other pertinent information required by Rule 40E-3, F.A.C. to the SFWMD for review and approval. If the final well locations are different from those originally proposed in the certification application, the Permittee shall also submit to the SFWMD for review and approval an evaluation of the impacts of the proposed pumpage from the proposed well location(s) on adjacent existing legal users, pollution sources, environmental features, the saline water interface, and water bodies. Reference: Section 373.223, F.S.; Rules 40E-2.091(1)(a), 40E-2.301, and 40E-2.381, F.A.C.

C. Surface Water Management Conditions

1. General

a. Professional Engineer Certificate

The operation of the surface water management system authorized under this Certification shall not become effective until a Florida Registered Professional Engineer certifies, upon completion of each phase, that these facilities have been constructed in accordance with the design approved by the SFWMD. Within 30 days after completion of construction of the surface water management system, the Permittee shall submit the engineer's certification and notify the SFWMD Field Engineering Division that the facilities are ready for

inspection and approval. Such notification shall include as-built drawings of the site which shall include elevations, locations, and dimensions of components of the surface water management system. Reference: Sections 373.117 and 373.419, F.S.; Rules 40E-4.091(1)(a), 40E-4.301(2), and 40E-4.381(2)(d), F.A.C.

b. Impacts on Fish, Wildlife, Natural Environment Values and Water Quality

The Permittee shall prosecute the work authorized under this Certification in a manner so as to minimize any adverse impacts of the authorized works on fish, wildlife, natural environment values, and water quality. The Permittee shall institute necessary measures during the construction period, including necessary compaction of any fill materials placed around newly installed structures and/or the use of silt screens, hay bales, seeding and mulching, and/or other similar techniques, to reduce erosion, turbidity, nutrient loading and sedimentation in the receiving waters. Reference: Sections 373.413(1) and 373.416(1) F.S.; Rules 40E-4.091(1)(a), 40E-4.301, and 40E-4.381(2)(a), F.A.C.

c. Access Roads

The Permittee shall, whenever available, utilize adjacent existing roads for access to the transmission line and potable water, reclaimed water and wastewater transmission line rights-of-way for construction, operation and/or maintenance purposes. Finger roads connecting the existing roads to the structure pads and access roads which must be constructed in areas where an existing road is not available shall be constructed in a manner which does not impede natural drainage flows and minimizes impacts to on-site and adjacent wetlands. Reference: Sections 373.413(1), 373.414, 373.416(1); Rules 40E-4.301, and 40E-4.381, F.A.C.

d. Off-site Discharges

Off-site discharges during construction and development shall be made only through the discharge facilities authorized by this Certification. No roadway or building construction shall commence on-site until completion of the permitted discharge structure and detention areas. Water discharged from the project shall be through structures having a mechanism suitable for regulating upstream water stages. Stages may be subject to operating schedules satisfactory to the SFWMD. Reference: Sections 373.413(1) and 373.416(1), F.S.; Rules 40E-091(1)(a), 40E-4.301, and 40E-4.381(2)(g), F.A.C.

e. Discharge Structures

Discharge structures, where appropriate, shall include a baffle, skimmer, or other mechanism suitable for preventing oil, grease, or other floatable materials from discharging to and/or from retention/detention areas.

Reference: sections 373.413(a), and 373.416(a), F.S.; Rules 40E-4.091(1)(a), 40E-4.301, and 40E-4.381, F.A.C.

f. Correction of Water Quality Problems

The Permittee shall be responsible for the correction of any sedimentation, turbidity, erosion, shoaling and/or other water quality problems that result from the construction, operation, and/or maintenance of the works authorized under this Certification. Reference: Sections 373.413(1) and 373.416(1); Rules 40E-4.091(1)(a), 40E-4.301, and 40E-4.381, F.A.C.

g. Additional Water Quality Requirements

The Permittee may be required to incorporate additional water quality treatment methods into the surface water management system if such measures are shown to be necessary. Reference: Section 373.413(1), and 373.416(1); Rules 40E-4.091(1)(a), 40E-4.301, and 40E-4.381, F.A.C.

2. Site Specific Design Requirements

a. Allowable Discharge

The surface water management system for the proposed project facilities will be designed such that peak post-development discharges from the project site do not exceed 37 csm for the 25 year/3 day design storm.

b. Authorized Discharge Facilities

1-3.0 ft. wide Weir with a crest at elevation 23.5' NGVD,

1-3.0" diameter Bleeder Orifice with an invert elevation at 20.5' NGVD,

1 Screw Gate incorporated into the the structure

for potential restriction of discharge when closed.

Discharge from the system will be through 70 linear feet of 24" diameter RCP Culvert.

c. Authorized Receiving Water

Six Mile Cypress Slough

d. Authorized Control Elevation

20.5 Feet NGVD.

e. Should Lee County determine that this project should discharge to the Orange River, it may be necessary to revise these facilities in order to bring them into compliance with the appropriate drainage criteria. Reference: Section 373.413 and 373.414, F.S.; Rules 40E-4.091, 40E-301, and 40E-4.381, F.A.C.

3. Additional Information Requirements

a. Surface Water Management System Construction Plans

Prior to the commencement of construction of any portion of the project which affects the movement of waters, all construction activities for that portion of the proposed project which may obstruct, divert, control, impound or cross waters of the state must be reviewed by the SFWMD for a determination of compliance with the non-procedural requirements of Chapters 40E-2 and 40E-4, F.A.C. All plans, detail sheets and calculations shall be signed and sealed by a Florida Registered professional Engineer. For all construction activities, the following information shall be submitted:

- (1) Detailed paving, grading and drainage plans, including on-site water management areas and on-site and perimeter site grades, which clearly indicate how run-off will be routed within and discharged from the site, demonstrate that the design storm will be held on-site, and verify the stage/storage assumptions;**
- (2) If control elevations are revised for any portion of the proposed surface water management system, revised calculations which demonstrate compliance with the SFWMD's retention/detention criteria for both quantity and quality purposes;**
- (3) If control elevations are revised for any portion of the proposed surface water management system, revise soil storage calculations;**
- (4) Detailed plans of all proposed roads, parking lots and building pads which demonstrate compliance with Lee County and SFWMD flood protection criteria;**
- (5) Cross-section of all proposed control structures which demonstrate compliance with SFWMD water quality and quantity criteria;**

- (6) Calculations and any other pertinent documentation which demonstrate that no net encroachment into the flood plain, between the average wet season water table and that encompassed by the 100-year event, which will adversely affect the existing rights of others, will occur. Calculations should follow the Design Example for Flood Plain Storage Compensation found on page D-F-1 of South Florida Water Management District, Permit Information Manual, Volume IV.

Reference: Sections 373.413(1), 373.413(2), and 373.416(1), F.S.; Rules 40E-4.091(1)(a), 40E-4.301, and 40E-4.381, F.A.C.

b. Transmission Line and Potable Water,
Reclaimed Water, and Wastewater -
Transmission Lines Construction Plans

Prior to the commencement of construction of any portion of the proposed transmission line or potable water, reclaimed water, and/or wastewater transmission lines, all construction activities for that portion of the transmission line or potable water, reclaimed water, and/or wastewater transmission lines which may obstruct, divert, control, impound or cross waters of the state, either temporarily or permanently, must be reviewed by the SFWMD for a determination of compliance with the non-procedural requirements of Chapters 40E-2 and 40E-4, F.A.C. "Construction activities" in this situation shall include the placement of structure pads, access/maintenance roads, culverts, and/or fill materials, excavation activities, and related activities. All plans, detail sheets and calculations shall be signed and sealed by a Florida Registered Professional Engineer. For all construction activities, the following information shall be submitted:

- (1) A centerline profile of existing topographic features along the proposed access/maintenance road(s);
- (2) A preliminary design of the proposed access/maintenance and finger road(s) with elevations marked;
- (3) A typical cross-section of the proposed access/maintenance and finger roads;
- (4) Specifications showing the location of each transmission tower, finger and access/maintenance road, culvert, and/or other related structure or facility to be constructed, including all areas to be filled or excavated;
- (5) Specifications, including supporting assumptions and

calculations, showing the type and size of water control structures (pipe, culvert, equalizer, etc.) to be used, with proposed flowline elevations marked, drainage areas identified and design capacity verified;

- (6) A cross-section of all proposed excavation areas showing the proposed depth of excavation;
- (7) Calculations and the supporting documentation which demonstrate compliance with all applicable criteria, particularly as they relate to allowable discharge;
- (8) Identification of wet season water table elevations for each basin in which facilities will be located;
- (9) Calculations and supporting documentation which demonstrate that the proposed construction activities associated with the transmission line or potable water, reclaimed water, and/or wastewater transmission line will not have an adverse water quantity and/or water quality impact on existing and/or permitted surface water management systems; and
- (10) If construction of the proposed transmission line or potable water, reclaimed water, and/or wastewater transmission lines contributes to the necessity for future modifications to adjacent/existing roads, water quality treatment of the requested modifications must be addressed in the surface water management system design for the transmission line or potable water, reclaimed water, and/or wastewater transmission lines.

Reference: Sections 373.413(1), 373.413(2), and 373.41691), F.S.; Rules 40E-4.091(1)(a), 40E-4.301, and 40E-4.381, F.A.C.

c. Surface Water Quality Monitoring Program

* Within three months of issuance of this Certification, the Permittee shall submit for review by the SFWMD a surface water quality monitoring program which monitors all discharges from the surface water management system into the Buckingham Road drainage system. *

- (1) While the program may incorporate additional monitoring requirements and parameters as required by other agencies, it shall include the following parameters and time frames at a minimum:

**** MONITOR TYPE AND SCHEDULE**

PARAMETERS

A. GENERAL (EVERY OTHER MONTH)

TOTAL ORGANIC CARBON, DISSOLVED OXYGEN, pH, TURBIDITY, SPECIFIC CONDUCTANCE, CHEMICAL OXYGEN DEMAND, TOTAL SUSPENDED SOLIDS, AND ALKALINITY.

B. ORGANICS (SEMI-ANNUAL)

OIL AND GREASE, DETERGENTS, EPA METHODS 601 AND 602

C. METALS (SEMI-ANNUAL)

ALUMINUM, ANTIMONY, BERYLLIUM, CADMIUM, COPPER, CYANIDE, IRON, LEAD, MERCURY, NICKEL, SELENIUM, SILVER, AND ZINC.

- (2) Water quality samples shall be taken at the above noted locations in accordance with the above schedule during periods of discharge. The Permittee shall provide such data to the SFWMD as volumes of water discharged, including total volume discharged during the days of sampling, and total discharges from the property or into surface waters of the state. A laboratory certified by the State of Florida shall be responsible for all water quality analyses under (1)B and (1)C. above. Reports shall be submitted to the SFWMD on a semi-annual basis. Initial sampling results shall be reported to the SFWMD no later than six months following the issuance of this Certification.
- (3) The SFWMD will evaluate monitoring requirements to determine whether the discharge degrades receiving waters and conforms to State water quality standards as defined in Chapter 17-3, F.A.C. If water quality problems develop, the SFWMD reserves the right to require more frequent sampling and more thorough analyses in order to provide assurances that the discharges will not cause additional off-site water quality impacts.
- (4) After a minimum of two years of sampling, the applicant may request a reduction in monitoring frequencies and parameters. If the documentation provided in support of the request does not provide

sufficient reasonable assurances support a reduction, the SFWMD reserves the right to require that the original water quality monitoring program be continued.

Reference: Section 373.413(1), 373.413(2), and 373.416(1), F.S.; Rules 40E-4.091(1)(a), 40E-4.301, and 40E-4.381, F.A.C.

d. Hazardous Materials Management

Prior to the commencement of construction of this project, the Permittee shall submit a copy of the Comprehensive Oil, Hazardous Materials, and Waste Management Plan for the Lee County Energy Recovery Facility to the SFWMD for a determination of compliance with the requirements of Chapter 40E-4, F.A.C. The plan shall provide an adequate level of detail for early warning and detection of hazardous materials within the shallow groundwater. At a minimum, the plan shall include a groundwater monitoring network, including proposed up-gradient and down-gradient locations of monitoring wells, prepared by a hydrogeology consultant. Reference: Section 373.413(1), 373.413(2), and 373.416(1), F.S.; Rules 40E-4.091(1)(a), 40E-4.301, and 40E-4.381, F.A.C.

D. Environmental Conditions

1. General

a. Wetland Avoidance

The Permittee shall avoid impacting wetlands within the plant site and transmission line and potable water, reclaimed water and wastewater transmission line corridors wherever practicable. Where necessary and feasible the location and span between power poles and the location of the potable water, reclaimed water and wastewater transmission lines within the right-of-way shall be varied to eliminate or reduce wetland impacts. Reference: Sections 373.413(1), 373.414, and 373.416(1) F.S.; Rules 40E-4.091(1)(a), 40E-4.301, and 40E-4.381, F.A.C.

b. Fill Materials

No fill materials shall be obtained from excavated wetlands within the project site, unless in accordance with a mitigation plan submitted in compliance with the conditions of this Certification. Reference: Sections 373.413(1), 373.414, and 373.416(1) F.S.; Rules 40E-4.091(1)(a), 40E-4.301, and 40E-4.381, F.A.C.

c. Additional Wetlands Mitigation

* The Permittee may be required to provide additional mitigation and/or other measures if wetland monitoring and/or other information demonstrates that adverse impacts to protected, restored and/or mitigated wetlands have occurred as a result of project-related activities. Reference: Sections 373.413, 373.414, and 373.416, F.S.; and Rules 40E-4.091, 40E-4.301, and 40E-4.381, F.A.C.

* 2. Additional Information Requirements

a. Wetland Protection

Prior to the commencement of construction of any facilities located adjacent to the wetlands identified for preservation, the Permittee shall stake and rope off the protected wetlands and buffer zones to prevent encroachment during construction. Staking shall remain in place until all adjacent construction activities have been completed. Verification of staked areas of SFWMD staff shall be required prior to commencement and upon completion of any construction activities. Reference: Sections 373.413, 373.414, and 373.416 F.S.; Rules 40E-4.091, 40E-4.301, and 40E-4.381, F.A.C.

b. Enhancement/Mitigation Area Plan

* Prior to the commencement of construction of any portion of the enhancement/mitigation areas, final details of the proposed enhancement/mitigation plan shall be submitted to the SFWMD for a determination of compliance with Chapter 40E-2 and 40E-4, F.A.C., including Appendix 7 (Isolated Wetlands Rule) of the Basis of Review for Surface Water Management Permit applications within the SFWMD. The plan shall include the following:

- (1) ✓ Specific acreage figures and locations of all wetlands to be preserved, created and restored/enhanced;
- (2) Identification of all proposed areas of inundation;
- (3) Identification of proposed control elevation(s), including documentation which demonstrates that the proposed control elevation(s) are sufficient to hydrologically maintain all the wetlands proposed to be preserved, created, and/or restored/enhanced;
- (4) Documentation that the proposed enhancement/mitigation activities will not adversely impact adjacent land owners;
- (5) A discussion of any additional mitigation activities

to be undertaken, including the location of all mitigation areas and a description of the manner in which these areas will be created, restored or enhanced;

- (6) A timetable for accomplishing the proposed mitigation activities prior to, or concurrent with, the construction of the proposed power plant facilities and any associated wetland impacts, unless documentation for doing otherwise is submitted and approved in writing prior to the commencement of construction;
- (7) Documentation that the mitigation areas and preserved wetlands, with buffer zones, have been legally reserved such that they will be managed in a manner consistent with their proposed use as conservation areas;
- (8) A detailed monitoring and maintenance program designed to ensure the survival and success of any created, restored, or enhanced wetlands, which is predicated on a guaranteed survival or coverage of 80% of the appropriate vegetation. At a minimum, the monitoring program shall be conducted for a period of five years, with reports submitted to SFWMD staff annually, and all monitoring stations identified on a plan view.

Reference: Sections 373.413(1), 373.413(2), 373.414, 373.416(1), and 373.59, F.S.; Rules 40E-4.091(1)(a), 40E-4.301, and 40E-4.381, F.A.C.

c. Transmission Line and Potable Water,
Reclaimed Water, and Wastewater
Transmission Lines Mitigation Plans

Prior to the commencement of construction of any portion of the proposed transmission line or potable water, reclaimed water and/or wastewater transmission lines, a mitigation plan to offset any wetland impacts associated with that portion of the transmission line or potable water, reclaimed water and/or wastewater transmission lines must be submitted to the SFWMD for a determination of compliance with Chapters 40E-2 and 40E-4, F.A.C., including Appendix 7 (Isolated Wetlands Rule) of the Basis of Review for Surface Water Management Permit application within the SFWMD. The plan shall include the following:

- (1) Specific acreage figures and locations of all wetlands, both within the transmission line and potable water, reclaimed water and wastewater

* transmission line rights-of-way and adjacent to it, which would be impacted by the construction activities, including an explanation of why no feasible alternative exists;

- (2) Identification of any proposed areas of inundation within the transmission line or potable water, reclaimed water and/or wastewater transmission lines rights-of-way;
- (3) Identification of proposed control elevations for any drainage facilities to be located within the transmission line or potable water, reclaimed water and/or wastewater transmission line rights-of-way, including documentation which demonstrates that the proposed control elevations are sufficient to hydrologically maintain all wetlands to be preserved, created and/or restored/enhanced within any of the rights-of-way;
- (4) Documentation that none of the proposed construction and/or excavation activities will adversely impact off-site wetlands;
- (5) A discussion of the proposed mitigation activities to be undertaken, including the location of all mitigation areas and a description of the manner in which these areas will be created, restored or enhanced;
- (6) If such mitigation shall occur within the mitigation enhancement area designated within the energy recovery plant site, documentation that sufficient wetland mitigation areas within the mitigation/enhancement area have been legally reserved to compensate for the proposed wetland impacts;
- (7) A timetable for accomplishing the proposed mitigation activities concurrently with the construction of the transmission line or potable water, reclaimed water and/or wastewater transmission lines and any associated wetland impacts, unless documentation for doing otherwise is submitted and approved in writing prior to the commencement of construction;
- (8) A monitoring and maintenance program to ensure the survival and success of any created, restored, or enhanced wetlands, which is predicated on a guaranteed survival or coverage of 80% of the appropriate wetland vegetation. At a minimum, the monitoring program shall be conducted for a period of five years, with reports submitted to SFWMD staff

annually, and all monitoring stations identified on a plan view.

Reference: Sections 373.413(1), 373.413(2), 373.414, and 373.416(1), F.S.; Rules 40E-4.091(1)(a), 40E-4.301, and 40E-4.381, F.A.C.

XVI. OPERATIONAL CONTINGENCY PLANS

A. Operating Procedures

The permittee shall develop and furnish the South District Office a copy of written operating instructions for all aspects of the operations which are critical to keeping the facility working properly. The instructions shall also include procedures for the handling of suspected hazardous, toxic and infectious wastes.

B. Contingency Plans

The Permittee shall develop and furnish the South District Office written contingency plans for the continued operation of the system in event of breakdown. Stoppages which compromise the integrity of the operations must have appropriate contingency plans. Such contingency plans shall identify critical spare parts to be readily available.

C. Current Engineering Plans

The Permittee shall maintain a complete current set of modified engineering plans, equipment data books, catalogs and documents in order to facilitate the smooth acquisition or fabrication of spare parts or mechanical modifications.

D. Application Modifications

The Permittee shall furnish appropriate modifications to drawings and plot plans submitted as part of the application, including operational procedures for isolation and containment of hazardous wastes.

XVII. TRANSFER AND OR ASSIGNMENT

If contractual rights, duties or obligations are proposed under this certification, notice of such transfer or assignment shall immediately be submitted to the Department and SFWMD by the certification holder (Permittee) and the Assignee. Included within the notice shall be the identification of the entity responsible for compliance with the certification. The Department may approve such transfer or assignment by

modification of the certification and by transfer of any federally delegated permits. Any assignment or transfer shall carry with it full responsibility for the limitations and conditions of this certification.

XVIII. PROPRIETARY DOCUMENTS OR INFORMATION - CONFIDENTIALITY

Proprietary or confidential data, documents or information submitted or disclosed to any agency shall be identified as such by the Permittee and shall be maintained as such pursuant to applicable Florida law.

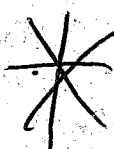
XIX. COOLING TOWER

A. The Lee County Solid Waste Energy Recovery Facility may utilize reclaimed water from a domestic wastewater treatment plant or stormwater run-off as a source of cooling water. If the Permittee is forced to use groundwater for cooling due to non-availability of reclaimed water, such use shall be in accordance with Condition XV.

B. Prior to use in the cooling tower, reclaimed water shall be treated to reduce turbidity to 5 NTU or less and disinfected by use of chlorine or other suitable biocide to achieve a 1.0 mg/l concentration of total chlorine residual after a 15 minute contact time.

XX. DEPARTMENT OF COMMUNITY AFFAIRS

A. Transmission Line



The Permittee shall make all feasible efforts to avoid impacting wetlands on the site and within the certified corridor. The permittee reports that it has attempted, unsuccessfully, to enter into an agreement with the Florida Power and Light Company (FPL) to allow the placement of its proposed 138-kilovolt transmission line within FPL's existing transmission line easement, which runs along the west boundary of the energy recovery facility site. The facility's transmission line right-of-way would then run generally west from the facility site to the existing easement and then north within the easement to the Buckingham substation and would not impact any wetlands. The Department considers this to be the preferred alignment for the transmission line and recommends that it be certified if an agreement can be reached with FPL.

B. Wildlife Survey

The Permittee shall perform a survey of the project site for endangered and threatened plants and animals according to Florida Game and Fresh Water Fish Commission specifications prior to initiation of construction. If it is determined that any of these species will be adversely affected by the construction, the Permittee shall consult with the Commission to determine the appropriate steps to be taken to minimize or mitigate any adverse impacts.

C. Exotic Plant Removal



All Brazilian pepper, Australian pine, and melaleuca shall be removed from the site during construction or the trees shall be cut and the stumps treated with an approved herbicide. Removal shall be in a manner that minimizes seed dispersal. Removal of these species shall be a part of the regular maintenance of these areas.

D. Air Pollution Control

1. The County shall add a mercury control device to the project that is guaranteed by its manufacturer to remove 70 percent of the mercury in the exhaust gases..

2. The County shall operate a household battery collection program to remove batteries from the waste stream.

3. The Permittee shall undertake and implement any additional processes and procedures to control emissions of regulated pollutants which are determined necessary by the Department of Environmental Regulation or the U.S. Environmental Protection Agency (EPA). This shall specifically include the new EPA emission limitations to be promulgated later this year, as required under the Clean Air Act Amendments of 1990.

4. The Permittee shall increase the planting of trees on county properties and encourage the planting of trees throughout the county. The objective is to offset the energy recovery facility's release of carbon dioxide from the combustion of fossil-fuel-derived materials.

5. The Permittee shall monitor mercury emissions from the energy recovery facility to ascertain the efficiency of its mercury-control equipment. The results shall be reported to the DER.

E. Ash Marketing

The Permittee shall endeavor to market the energy recovery facility's ash residue. The Permittee shall file an annual report with the Department of Environmental Regulation

detailing its progress in marketing the ash.

F. Microbiological Testing

The Permittee shall carry out biweekly tests of facility cooling water for bacteria and viruses during the first 3 months of facility operation. The results shall be sent to the Florida Department of Environmental Regulation (DER). If the DER determines that the concentrations of bacteria or viruses in the cooling water pose a treat to public health the Permittee shall take all necessary measures to eliminate the threat.

G. Offsite Landfill Approval

The energy recovery facility shall not be approved to begin operation until the designated disposal area receives all necessary permits for its operation.

H. Archaeological Finds

In the event of discovery of any archaeological artifacts during construction of the Lee energy recovery facility, the Permittee shall stop construction in that area and immediately notify the Division of Historic Resources (DHR) in the Florida Department of State. The Permittee shall consult with the DHR to determine appropriate action. If avoidance is not possible, the impact will be mitigated through archaeological salvage excavation operation or by other methods acceptable to the DHR.

I. Traffic Minimization

* 1. After the site for the associated landfill/ashfill site is selected, the Permittee shall carry out a traffic analysis of project traffic to and from the landfill/ashfill to assure that any significant traffic impacts are mitigated. The analysis shall be submitted to the Department of Environmental Regulation and the Department of Community Affairs for review and approval, which shall include a determination of any mitigation that may be needed. The Department of Environmental Regulation may modify the certification as necessary to incorporate any conditions needed for the mitigation of traffic impacts.

2. The Permittee shall promote ride sharing by members of the construction and operation work forces.

J. Employment

1. The Permittee shall assist unemployed and economically disadvantaged persons in finding employment during

construction and operation of the facility.

2. The Permittee shall provide innovative arrangements such as flexible hours of employment, as appropriate, to increase the access of working parents to employment at the facility.

XXI. SOUTHWEST FLORIDA REGIONAL PLANNING COUNCIL

A. Waste Management

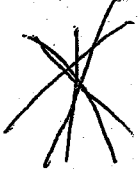
1. Lee County shall amend the application to include the additional control device for mercury removal (as described in the March 8, 1991 letter to FDER) or comply with any future requirement for mercury emission controls of the United States Environmental Protection Agency, whichever is more restrictive.

2. Lee County shall implement a battery recycling program.

3. Lee County shall implement a commercial recycling program. The aim of the program should be to separate recyclable materials from the commercial waste stream.

4. The project will be required to ensure that no objectionable smell will be produced in areas downwind of the facility, or in the adjacent park site.

B. Water Resources



1. All impacted wetlands, whether on-site or off-site, shall be buffered from impacts of construction or operation of the proposed facility. Such buffers may be natural or structural, but should extend between 15 feet and 25 feet from the edge of each impacted wetland to comply with the requirements of the SFWMD and Lee County.

2. The applicant will be required to ensure that the recycled wastewater and circulation systems do not impact surface or groundwater quality, and that the water from the cooling tower blowdown (via the dry scrubber and residue quench tanks), does not discharge to surface or ground waters. The applicant shall provide safeguards to prevent any leakage from these systems from impacting surface water or groundwater.

3. The applicant shall ensure that the moist residue from the residue quench system does not contaminate surface water or groundwater.

4. The construction, operation and maintenance of

the Lee County Resource Recovery Facility Surface Water Management System will be the responsibility of Lee County.

5. Retention pond slopes will be constructed according to criteria of the South Florida Water Management District and Lee County. Pond slopes should be planted with appropriate native vegetation, according to District and Lee County criteria.

6. If development of the project contributes to the necessity for future improvements to adjacent existing roadways (SR 82 and Buckingham Road), the water quality treatment for these roadway improvements will be provided by Lee County.

7. If the Surface Water Management System as proposed does not adequately return the water level of onsite wetlands to the proposed control elevations, appropriate modifications to the system shall be required.

8. As the applicant has stated that the project may use reclaimed wastewater for irrigation, the applicant will ensure that the onsite ponds, drainageways and wetlands are adequately buffered from possible effluent contamination, in accordance with FDER criteria.

9. The project's drainage system will be constructed and operated in such a manner as to be consistent with the County-wide Surface Water Management Master Plan and the Basin Plan for the Six Mile Cypress Watershed, or the Orange River Water Management Plan, whichever is applicable.

C. Natural Systems and Recreational Lands

1. Lee County shall institute a nuisance species control plan for the entire facility site (150 acres approx.). Such a plan should include control and monitoring procedures for the removal of exotic vegetation, replacement of exotic vegetation with appropriate native vegetation, and all steps necessary to ensure survival of native vegetation.

2. Onsite landscaping will utilize native vegetation and xeriscape principles to the extent practicable.

3. The proposed powerline road will be unpaved. Stabilization activities will be limited to the minimum amount necessary to ensure road use.

D. Air Quality

Lee County shall monitor the emission of mercury on a monthly basis (or other appropriate basis in which to

accurately measure) and ensure that the removal levels are being attained.

E. Hazardous and Nonhazardous Materials and Waste

1. The hazardous waste and recycling programs identified by Lee County within the letter to the SWFRPC, dated Nov. 5, 1990, and the mercury control strategy identified in the March 8, 1991, letter to FDER shall be implemented.

2. The applicant will take steps and precautions to ensure that commercial and industrial wastes accepted at the facility as a fuel source do not contain hazardous materials or wastes, and that such materials and wastes do not enter the processing stream.

F. Transportation

1. The construction phases for the facility have the potential to produce more traffic than the facility when operational. Prior to approval of building permits, an analysis of the traffic produced during construction should be performed.

2. A reanalysis of the traffic impacts of the facility should be performed prior to approval of building permits. The analysis should address the following:

a. Turn lane improvements to accommodate the trucks accessing the facility both on site and at the intersection of Buckingham Road with State Road 82/Immokalee Road and other impacted intersections.

b. Access to the proposed joint Hendry/Lee County landfill in Hendry County.

c. Potential widening of Buckingham Road and State Road 82/Immokalee Road and other impacted roadways to accommodate truck traffic.

d. The trucks accessing the site will be heavily loaded; projections are between 30 and 35 tons apiece. The additional roadway and bridge maintenance or reconstruction costs associated with the weights of the trucks should be reviewed.

3. The traffic analysis assumes that the ash residue will be taken by truck from the resource recovery facility to a disposal site in Hendry County via SR 82. If the route to the disposal site changes in the future, Lee County shall be required to submit a revised analysis of traffic impacts and

shall make such traffic safety improvements as are necessary to accommodate the increased truck traffic using the new route.

XXII. Federal Annual Operating Permits and Fees

A. DER Responsibilities

The Department of Environmental Regulation shall implement the provisions of Title V of the 1990 Clean Air Act for the Lee County Solid Waste to Energy Resource Recovery Facility by developing Conditions of Certification requiring submission of annual operating permit information and annual pollutant emission fees in accordance with Federal Law and Federal Regulations.

B. Lee County Responsibilities

Lee County shall submit the appropriate annual operating permit application information as well as the appropriate annual pollutant emission fees as required by Federal Law to the Department as specified in Condition C. below.

**C. Annual Operating Permit Application and Fee
(Reserved)**

STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

In Re:

APPLICATION FOR POWER PLANT
SITE CERTIFICATION OF LEE
COUNTY SOLID WASTE RESOURCE
RECOVERY FACILITY

CASE NO. 90-3942EPP

APPENDIX B

APPENDIX TO RECOMMENDED ORDER
IN CASE NO. 90-3942EPP

The following constitutes my specific rulings pursuant to Section 120.59(2), Florida Statutes, on the proposed findings of fact submitted by the parties in this case.

Specific Rulings on Proposed Findings of Fact
Submitted by Lee County

1. Each of the following proposed findings of fact is adopted in substance as modified in the Recommended Order. The number in parentheses is the Finding of Fact which so adopts the proposed finding of fact: 1-10(1-10) and 11-98(22-109).

Specific Rulings on Proposed Findings of Fact
Submitted by the Department of Environmental Regulation

1. Each of the following proposed findings of fact is adopted in substance as modified in the Recommended Order. The number in parentheses is the Finding of Fact which so adopts the proposed finding of fact: 2-6(11-15); 7(3); 8(4); 10-15(16-21); 16(25); 17(26&27); and 18-20(28).
2. Proposed findings of fact 1, 2, 9, and 21-26 are subordinate to the facts actually found in this Recommended Order.

Specific Rulings on Proposed Findings of Fact
Submitted by SFCARE, Inc.

1. Each of the following proposed findings of fact is adopted in substance as modified in the Recommended Order. The number in parentheses is the Finding of Fact which so adopts the proposed finding of fact: 7(16-18).
2. Proposed findings of fact 1-6, 8, 10, 11, and 15 are subordinate to the facts actually found in this Recommended Order.
3. Proposed findings of fact 9, 12, 13, 14, and 16, in whole or in part, are unsupported by the credible, competent, and substantial evidence.

STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

In re:

APPLICATION FOR POWER PLANT
SITE CERTIFICATION OF LEE
COUNTY SOLID WASTE RESOURCE
RECOVERY FACILITY

DOAH CASE NO. 90-3942EPP

RECOMMENDED ORDER ON REMAND

Pursuant to notice, a formal hearing was held in this case on April 13, 1992, in Fort Myers, Florida, before the Division of Administrative Hearings, by its designated Hearing Officer, Diane K. Kiesling.

APPEARANCES

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(the County):

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Inc. (SFCARE):

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PRELIMINARY STATEMENT

On June 28, 1990, Lee County filed an application with the Florida Department of Environmental Regulation for site certification of a proposed resource recovery facility (the Facility) under the Florida Electrical Power Plant Siting Act, Chapter 403, Part II, Florida Statutes. On December 9, 1991, the undersigned Hearing Officer issued a Recommended Order, which recommended approval of the Facility. On February 1, 1992, the Governor and Cabinet, sitting as the Siting Board issued an Order of Remand, which stated that the Siting Board wanted additional evidence concerning "the actual amount of mercury which is likely to be emitted from the Facility if certified."

The Siting Board's Order of Remand indicates that the evidence should include:

(a) "a detailed exposition of the mercury control technology which the County proposes to install, including the selected reagent medium;"

(b) "the results of U.S. Environmental Protection Agency testing at the Stanislaus, California resource recovery facility and expert evaluation thereof;" and

(c) "evidence concerning any proposed U.S. Environmental Protection Agency standards for the limitation of mercury emissions from MSW [municipal solid waste] incinerators."

According to the Order of Remand, these are the issues to be determined in this remand proceeding.

During a prehearing conference on February 24, 1992, the attorney for Intervenor, SFCARE, withdrew and was replaced by new counsel. SFCARE subsequently announced its desire to present evidence at the remand hearing concerning issues other than those identified in the Order of Remand. Lee County then filed a Motion in Limine, which was granted. On March 26, 1992, SFCARE served a Motion for Clarification which requested the Siting Board to expand the list of issues in the Order of Remand. The Siting Board did not rule on SFCARE's Motion for Clarification before the remand hearing and it has not yet ruled.

At the remand hearing on April 13, 1992, Lee County presented the testimony of Jeffrey L. Hahn, Donald F. Elias, and Paul C. Chrostowski. Lee County's exhibits 66-97 were admitted into evidence. DER presented the testimony of Clair Fancy and Hamilton S. Oven, Jr. SFCARE presented the testimony of Henry Cole. SFCARE's exhibits 2-6 and 11-13 were admitted into evidence. The Department of Natural Resources was represented by counsel, but did not present any testimony or introduce any exhibits. The Department of Community Affairs, the Florida Game and Fresh Water Fish Commission, and the South Florida Water Management District signed the prehearing stipulation, but they did not participate at the remand hearing.

At the remand hearing, SFCARE stated that it wanted to proffer the testimony of Henry Cole concerning the potential environmental impacts associated with the emissions from Lee County's proposed Facility. Although Cole's testimony would

address issues that were outside the scope of the Siting Board's Order of Remand, Lee County stated that it would not oppose SFCARE's request because Lee County wanted to ensure that the record in this case would be complete for the Governor and Cabinet. Accordingly, Cole was allowed to testify in the nature of a proffer about those subjects in which he had the requisite level of expertise. This proffered testimony and other evidence concerning the Facility's environmental impacts are addressed in the supplemental findings of fact on proffer that are set forth below.

The transcript of the remand hearing was filed on May 1, 1992. Lee County, DER, DNR, and SFCARE filed timely proposed recommended orders. All of their proposed findings of fact and conclusions of law have been considered. Specific rulings on each finding of fact are contained in Appendix A, which is attached hereto. Appendix B contains additional conditions of certification for the Facility.

This Recommended Order On Remand supplements and should be read in conjunction with the Recommended Order that was entered in this case on December 9, 1991.

FINDINGS OF FACT CONCERNING THE ISSUES ON REMAND

Lee County's Proposed Mercury Control System

1. Lee County intends to build a resource recovery (waste-to-energy) facility with two combustion units capable of handling 1200 tons per day (tpd) of municipal solid waste (MSW). Lee County will minimize the Facility's airborne emissions by using front-end source separation and recycling programs, plus

post-combustion air pollution control systems. The Facility's air pollution control systems will include a spray dryer scrubber, a fabric filter (baghouse), and a selective non-catalytic reduction (SNCR) system.

2. Lee County's Facility also will use a reagent injection system to control mercury emissions. The reagent injection system will inject activated carbon into the flue gas at a location between the furnace and the fabric filter. Mercury in the flue gas will adsorb to the carbon particles, which resemble a fine black powder. The activated carbon will be captured in the baghouse and disposed of with the Facility's combined ash.

3. The activated carbon can be injected into the flue gas upstream of the dry scrubber or in the dry scrubber itself. The location of the carbon injection system will not affect the system's mercury removal efficiency if the carbon feed rate is maintained at an appropriate level.

4. The reagent injection system is relatively simple and reliable. Carbon will be stored on-site and then fed into the flue gas with a metering system. The carbon feed rate will be set at an optimal level and monitored. The monitor will be connected to an alarm which will alert the facility operator if there are any problems with the carbon injection system.

Test Data For Reagent Injection Systems Used Outside The U.S.A.

5. Reagent injection systems have been used successfully for mercury control in at least 11 resource recovery facilities in Europe and Canada. Reagent injection

systems have never been used on a continuous basis at any resource recovery facility in the United States.

6. Sodium sulfide has been used as a reagent in at least six resource recovery facilities in Europe. It also has been used at the resource recovery facility in Burnaby, British Columbia, Canada. A comprehensive testing program at Burnaby indicated that the mercury removal efficiency of the sodium sulfide injection system ranged from 73 to 87%. European tests with sodium sulfide produced similar results.

7. Activated carbon has been used as a reagent in at least five resource recovery facilities located outside of the United States. Test data from Europe and Burnaby indicate that activated carbon injection systems can achieve mercury removal rates between 50 and 97%.

EPA's Tests In Stanislaus County, California

8. In July and August, 1991, the United States Environmental Protection Agency (EPA) conducted an extensive testing program with an activated carbon injection system at a resource recovery facility in Stanislaus County, California. The tests were conducted at a resource recovery facility that was built and operated by Ogden Martin, the same company that will build and operate Lee County's Facility. Lee County's Facility will be virtually identical to the Stanislaus facility.

9. EPA's tests were designed to evaluate the effectiveness of the mercury removal system under different conditions. Among other things, EPA studied the effect of changes in the carbon injection location, carbon feed rate, type

of carbon utilized, flue gas temperature, SNCR system for NOx control, and the SO₂ control system.

10. The EPA tests reveal that the mercury control efficiency of the carbon injection system is primarily affected by the carbon feed rate. The system's mercury removal rate increased as the carbon feed rate increased, up to a feed rate of approximately 12 pounds per hour (lbs/hr). Increasing the carbon feed rate above 12 lbs/hr did not significantly improve the system's performance.

11. The system's mercury control efficiency was not materially affected by other factors so long as the carbon feed rate was maintained at or above 12 lbs/hr. Changes in the injection location, in temperature, and in other test parameters did not have any significant effects on the system's mercury control efficiency when the system used an appropriate carbon injection rate.

12. The mercury concentrations in the flue gas entering the pollution control system at Stanislaus ranged from 303 to 1276 micrograms per dry standard cubic meter (ug/dscm), corrected to 7% oxygen, as measured with EPA Method 101A. When the carbon feed rate was equal to or greater than 12 lbs/hr, the average mercury concentrations in the flue gases were reduced to levels between 31 and 60 ug/dscm, and the reagent injection system attained average mercury removal rates between 88 and 94%.

Mercury Revolatilization

13. In the testing program at Stanislaus, EPA wanted to determine whether mercury would revolatilize and thus be released from the carbon after the mercury and carbon were placed in an ashfill for disposal. EPA's test data confirmed that mercury "did not revolatilize from the combined ash [i.e., mixed bottom and fly ash] once captured." EPA's findings on this subject are consistent with data collected in Japan and Sweden. Mercury becomes extremely stable when it adsorbs onto carbon. Since mercury remains adsorbed onto carbon particles at temperatures of 300 degrees Fahrenheit in the baghouse, where the particles are held for up to one hour, the mercury in the combined ash will not be released at ambient temperatures.

Sodium Sulfide vs. Activated Carbon

14. Tests also have been conducted at Stanislaus with a sodium sulfide injection system. The tests demonstrated that sodium sulfide is effective at removing mercury, but it is not as effective as activated carbon.

15. Operational experience at resource recovery facilities has shown that activated carbon is better than sodium sulfide. Activated carbon is easier to use and less likely to pose operational problems. A sodium sulfide injection system at Burnaby was replaced with an activated carbon system because the activated carbon was more effective and easier to use.

16. Given the test data and operational histories from Stanislaus, Burnaby and elsewhere, Lee County has concluded that activated carbon should be used at its Facility. Activated

carbon is the most effective reagent available at this time for the control of mercury emissions from resource recovery facilities.

EPA and DER Mercury Emission Limits

17. EPA released the results of its Stanislaus tests during a public meeting on November 22, 1991. EPA subsequently placed the Stanislaus test results in the official docket for EPA's rulemaking activities under the Clean Air Act for a mercury emission standard. A draft report concerning the Stanislaus tests was prepared in November 1991 and it is anticipated that the final report will be published in June 1992. EPA has not yet officially published its report and data, but the basic test results from Stanislaus have been finalized and are not expected to change in the future.

18. Under Section 129 of the Clean Air Act Amendments of 1990, EPA was obligated to promulgate a mercury emission standard for resource recovery facilities by November 15, 1991. Although EPA has not yet adopted its mercury emission standard, EPA believes a standard will be proposed in August 1992 and will be promulgated in its final form within 12 months thereafter.

19. DER's Division of Air Resources has requested and received authorization to adopt rules establishing mercury emission limits for resource recovery facilities, electrical power plants, and other facilities that are sources of mercury. DER will conduct its first workshop in April 1992. DER's proposed rule is scheduled for adoption in 1993.

20. EPA and DER have not yet formally proposed any specific emission limits for mercury. EPA staff members have discussed emission limits ranging from 130 to 200 ug/dscm and removal efficiencies of 60 to 90%. At this time, however, it is impossible to accurately predict when the EPA or DER emission limits will be adopted or what the emission limits will be.

21. EPA and DER are well-aware of Lee County's activated carbon injection system. The mercury emission limits being considered by EPA and DER are based on the use of the add-on control technology that is proposed for Lee County's Facility. EPA has recommended approval of the Lee County Facility and concluded that the conditions of certification for the Facility are acceptable.

22. The Lee County Facility will be able to comply with the expected EPA and DER regulations. Lee County would not be required to comply with EPA's new source performance standards for new facilities, but Lee County has stipulated that it will comply with the new EPA mercury emission limit, whenever it is adopted, whatever it is. Further, the conditions of certification for the proposed Lee County Facility will be modified automatically pursuant to Section 403.511(5)(a), Florida Statutes, to incorporate any new DER emission limitation for electrical power plants (i.e., resource recovery facilities) that is more stringent than the conditions of certification adopted by the Siting Board.

New Conditions of Certification for Mercury

23. The new test data have been independently evaluated by Lee County and DER. DER and Lee County agree that

Ogden's contractual guarantee establishes appropriate mercury emission limits for the conditions of certification for the Lee County Facility. DER, Lee County and Ogden have correctly concluded that these limits establish reasonable upper bounds for the Facility's emissions. The conditions of certification, especially Condition XIV.A.(1).a.13, should be amended to reflect maximum emission limits of 70% removal or 140 ug/dscm at 7% O₂.

24. Lee County has proposed other permit conditions to ensure that the County will reduce the Facility's mercury emissions to the lowest levels possible. First, the County proposed that optimization tests be conducted during the initial start-up operations at the Facility. Since the carbon feed rate is the key factor affecting the system's operation, the optimization tests will be conducted to help identify the carbon feed rate which will be most effective. After the appropriate carbon feed rate is established, Lee County cannot change the feed rate unless it obtains DER's prior written approval. The carbon feed rate will be monitored, it will be recorded for County and DER review, and the monitor will be connected to an alarm in the Facility's main control room. The County's optimization tests and operational safeguards will ensure that the Facility's carbon injection system will be operated at its optimal level when the Facility commences commercial operations and at all times thereafter.

25. Lee County also has proposed a new condition of certification that would allow DER to reduce the Facility's

mercury emission limit by an additional 50%. Under this proposed "ratchet" condition, Lee County will measure the Facility's mercury emissions during annual tests conducted over a period of four years. These tests will evaluate the Facility's actual emissions during different seasons and different years. Lee County has stipulated that DER can use the test data to reduce the Facility's mercury emission limit by an additional 50%, down to a level of 70 ug/dscm, so long as the data confirm that the new emission limit is achievable.

26. Lee County has proposed these new permit conditions and agreed to further reductions in the permit limits for mercury because Lee County, Ogden, and DER are confident that the Facility's actual emissions will be less than 70 ug/dscm on an annual basis. The test data from Stanislaus show that the average mercury emissions at that facility ranged between 31 and 60 ug/dscm when the carbon feed rate was set at or above 12 lbs/hr. The Stanislaus test data confirm that mercury emissions below 70 ug/dscm can be attained on a long-term basis.

Other Factors Affecting Mercury Emissions

27. Lee County will reduce the Facility's mercury emissions by utilizing a carbon injection system, but other factors will help the County reduce the Facility's mercury emissions even further. Most significantly, the mercury content of municipal solid waste is rapidly declining. Reductions in the amount of mercury in the waste stream will help reduce the Facility's mercury emissions.

28. The amount of mercury used in batteries in the United States has gone down about 90% since 1985 and it is expected to drop even further in the near future. All of the major manufacturers of dry cell batteries will be producing mercury-free batteries by the end of 1993. It will take about two years for older batteries to be removed from the waste stream, but after 1995 consumers will not be disposing of batteries containing mercury. This is extremely important because batteries contain up to 88% of the mercury found in municipal solid waste.

Lee County's Mercury Collection Programs

29. Lee County has undertaken a comprehensive program to reduce the mercury content of its solid waste. The County has a household hazardous waste collection facility where homeowners can deposit mercury-rich materials (e.g., paint, barometers). The County has 46 battery drop-off stations in retail stores. In May 1992 the County will start a residential curbside battery collection program serving 70,000 homes. To promote these programs, the County has undertaken a public education program and distributed educational materials. The County has been working with various hospitals to remove mercury-laden batteries from the hospitals' solid waste. The County also has been working with commercial heating, ventilation, and air conditioning companies to recycle thermostats and other mercury-containing commercial wastes.

Lee County's Mass Balance Analysis

30. Lee County performed a mass balance analysis to evaluate how the reduction in the mercury content of batteries would affect the mercury emissions from the Facility. The mass balance analysis shows that the Facility's mercury emissions would be at a level of approximately 126 ug/dscm if the mercury content of batteries remained the same as it was in 1990 and the carbon injection system removed only 70% of the mercury in the flue gas. If the carbon injection system removes mercury at an average rate of 80%, as suggested by EPA's Stanislaus data, the Facility's mercury emissions would be reduced to 84 ug/dscm, even if the mercury content of batteries remains at 1990 levels. However, when the future reductions in the mercury content of batteries are considered, the mass balance predicts mercury emissions of 30 ug/dscm in 1995 and 7.5 ug/dscm in the year 2000.

31. The County's mass balance analysis only reflects the reduction of mercury emissions that will occur as battery manufacturers reduce the mercury content of batteries. The mercury emissions would be reduced further if: (a) the carbon injection system achieves more than 70% mercury removal; (b) the mercury content of other materials in the municipal solid waste were reduced; or (c) the County's recycling and source separation programs removed mercury-containing materials from the waste stream before they enter the Facility. It is expected that all of these things will occur, even though the County did not take credit for these factors in the mass balance. The

County's mass balance is conservative, but it reasonably predicts the Facility's actual emissions in the future.

The Facility's Annual Mercury Emissions

32. The new proposed permit limit of 140 ug/dscm for the County's 1200 tpd Facility will restrict the Facility's maximum annual mercury emissions to approximately 664 pounds. However, the Stanislaus data show that the Facility's average mercury emissions will be less than 70 ug/dscm, which would result in annual emissions of less than 332 pounds. Indeed, the most realistic prediction comes from Lee County's mass balance, which demonstrates that the Facility's actual mercury emissions will be less than 100 pounds per year.

Summary on Mercury Issues

33. The Lee County Facility will "use the most effective method of mercury control that is available in the world today." It will be the first resource recovery facility in the United States to utilize an activated carbon injection system. The County has implemented comprehensive source separation and recycling programs to enhance the performance of the carbon injection system. This system, together with the Facility's other pollution control equipment, will reduce the Facility's mercury emissions to levels that will meet the expected DER and EPA emission standards. These emissions will be so small as to have virtually no adverse environmental or health impacts. The proposed conditions of certification will ensure that the Facility consistently provides the maximum reduction in mercury emissions that is technologically feasible.

SUPPLEMENTAL FINDINGS OF FACT ON PROFFERED TESTIMONY

34. In its case-in-chief, SFCARE presented the testimony of Henry Cole, who advocates a complete moratorium on all new resource recovery facilities and coal-fired power plants because they are potential sources of mercury emissions. Although Cole objects to any new resource recovery facility, Cole admits that existing resource recovery facilities should be allowed to continue operating, albeit subject to strict limitations. Cole also acknowledges that landfills release mercury emissions to the environment.

35. In this case, Cole expressed his concern that some of the mercury emissions from the proposed Lee County Facility might be deposited in the area near the Facility because rainstorms may wash some fraction of the mercury out of the atmosphere. Cole also is concerned that sea breezes and thunderstorms may carry some portion of the Facility's emissions into the Everglades where they may be deposited in the wetlands.

36. Cole's concerns were not quantifiable or site-specific. Cole could not quantify (or even roughly estimate) the amount of mercury that might be deposited near the Facility or in the Everglades. Cole had not conducted any site specific analyses. Cole had not performed any computer modelling, laboratory testing or field work to evaluate the manner in which the emissions from the Lee County Facility would be dispersed or deposited in the environment. For these reasons, Cole's testimony is entitled to be given very little weight and is not persuasive.

37. The credible, competent and substantial evidence again confirms that Lee County has utilized all reasonable and available methods to ensure that the construction and operation of its proposed Facility will produce minimal impacts on human health, the environment, the ecology of the land and its wildlife, and the ecology of state waters and their aquatic life. The operational safeguards and conditions of certification for the Facility are more than sufficient to protect Florida's citizens and its environment. The evidence demonstrates that the Facility's construction and operation will not have any significant impacts on Florida's air, water, soil, or wildlife. Additionally, Lee County has designed and proposed an excellent biomonitoring program to further protect against any negative environmental impacts from the Facility. The biomonitoring program should be incorporated into the conditions of certification.

CONCLUSIONS OF LAW

The Division of Administrative Hearings has jurisdiction over the parties to and subject matter of this proceeding. 408.508(3), Florida Statutes.

In this remand proceeding, Lee County demonstrated that its proposed resource recovery facility will provide the maximum reduction in mercury emissions that is technologically achievable at this time. The County's Facility will have the best pollution control system that is available in the world today.

SFCARE presented little or no evidence concerning the specific issues raised in the Siting Board's Order of Remand.

SFCARE did raise concerns about the Facility's environmental impacts, but in every instance Lee County provided credible and credited evidence to prove that SFCARE's concerns are not well-founded. SFCARE's evidence on the disputed issues was not persuasive.

SFCARE contends that the remand hearing was conducted prematurely because EPA has not yet adopted its mercury emission standard. As a practical matter, it would be unfair to delay the resolution of this case until some unknown and indeterminate time in the future when EPA's standards become effective. It also would be unlawful to do so. In Florida Power Corporation v. State of Florida Siting Board, 513 So. 2d 1341 (Fla. 1st DCA 1987), the court ruled that the Siting Board could not lawfully deny certification until another agency (DER) adopted standards. The court's ruling suggests that it also would be unlawful to delay certification until another agency (EPA) took action, especially since the Siting Board has a statutory obligation to take timely action on the County's application. 403.509(1), Florida Statutes.

In the instant case, it is unnecessary to await EPA's standard because it will not affect the Facility's design, operation, or environmental impacts. The proposed conditions of certification will ensure that the Facility will be built and operated in the manner which will produce the lowest possible mercury emissions.

SFCARE claims that ash is a hazardous waste, but SFCARE's argument is based on a misreading of recent case law.

The United States Court of Appeals for the Second Circuit has ruled that ash created by the incineration of municipal solid waste is exempt from federal hazardous waste regulations, pursuant to Section 3001(i) of the Resource Conservation and Recovery Act (RCRA). Environmental Defense Fund, Inc. v. Wheelabrator Technologies, Inc., 931 F.2d 211, 213 (2d Cir. 1991). The Second Circuit affirmed the trial judge's "well reasoned opinion," which explained that:

The legislative history makes clear that at the time of its passage, Congress intended Section 3001(i) to exempt ash from regulation under [the hazardous waste requirements in] Subtitle C in order to pave the way for increased use of the resource recovery process.

Environmental Defense Fund, Inc. v. Wheelabrator Technologies, Inc., 725 F. Supp. 758, 770 (S.D.N.Y. 1989).

In a related case, the federal district court for the Northern District of Illinois held that:

ash remaining after the incineration of household waste and non-hazardous commercial waste is exempt from regulation [under RCRA Subtitle C] if the resource recovery facility satisfies the criteria of 3001(i).

Environmental Defense Fund, Inc. v. City of Chicago, 727 F. Supp. 419, 424 (N.D. Ill. 1989). The U.S. Court of Appeals for the Seventh Circuit reviewed this decision and reached a different conclusion. In a split decision, the court ruled that ash is subject to regulation under RCRA. Environmental Defense Fund v. City of Chicago, 948 F.2d 343 (7th Cir. 1991), petition for cert. filed February 18, 1992, 60 U.S.L.W. 3600. The Seventh Circuit would require ash to be tested under RCRA. If

the ash were shown to have hazardous characteristics, then it would be handled as a hazardous waste. Id. at 349.

The decisions of the Second and Seventh Circuits are in direct conflict, and the conflict now is awaiting resolution by the United States Supreme Court. The outcome of that case is immaterial, however, because the evidence in this case demonstrates that the combined ash from Lee County's Facility will not have the characteristics of a hazardous waste.

The record in this proceeding overwhelmingly supports the County's application for certification. In accordance with the Siting Board's decision in AES Cedar Bay, Inc. v. Department of Environmental Regulation, DOAH Case No. 88-5740 (Final Order February 18, 1991), the County has demonstrated that the project as a whole will have "minimal adverse effects" compared to the need for the electric generating capacity at issue.

When the Siting Board balances "the broad interests of the public" in this case, it should remember that the Facility will have a variety of beneficial and regional impacts. As noted in the Recommended Order dated December 9, 1991, the Facility will provide an environmentally sound method of solid waste disposal for two counties. The Facility will compliment the County's recycling and source separation programs because it will only process that material which is left over after recycling is completed. The Facility will eliminate a large discharge of domestic wastewater into the Caloosahatchee River. It will provide jobs and significant economic benefits for the region. It will use discarded materials to generate electricity,

thus reducing the state's reliance on fossil fuels, while maximizing the use of valuable landfill capacity.

RECOMMENDATION

Based on the entire record in this proceeding and on the Findings of Fact and Conclusions of Law contained in the initial Recommended Order and this Recommended Order on Remand, it is RECOMMENDED that the Siting Board enter a Final Order and therein:

(1) Grant site certification for the Lee County solid waste resource recovery facility, subject to the conditions of certification, as supplemented by Appendix B and these Findings of Fact; and

(2) Order the Department of Environmental Regulation to issue a PSD permit authorizing the construction of the Lee County solid waste resource recovery facility in accordance with the DER BACT determination, subject to the conditions of certification, as supplemented by Appendix B and these Findings of Fact.

DONE AND ENTERED this 21st day of May, 1992, in Tallahassee, Florida.


DIANE K. KIESLING
Hearing Officer
Division of Administrative Hearings
The DeSoto Building
1230 Apalachee Parkway
Tallahassee, Florida 32399-1550
904/488-9675

Filed with the Clerk of the
Division of Administrative Hearings
this 21st day of May, 1992.

NOTICE OF RIGHT TO SUBMIT EXCEPTIONS: All parties have the right to submit written exceptions to this Recommended Order. All agencies allow each party at least 10 days in which to submit written exceptions. Some agencies allow a larger period within which to submit written exceptions. You should contact the agency that will issue the final order in this case concerning agency rules on the deadline for filing exceptions to this Recommended Order. Any exceptions to this Recommended Order should be filed with the agency that will issue the final order in this case.

Copies furnished to:

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APPENDIX A TO THE RECOMMENDED ORDER ON REMAND
IN CASE NO. 90-3942EPP

The following constitutes my specific rulings pursuant to Section 120.59(2), Florida Statutes, on the proposed findings of fact on remand submitted by the parties in this case.

Specific Rulings on Proposed Findings of Fact
Submitted by the Applicant

1. Each of the following proposed findings of fact is adopted in substance as modified in the Recommended Order on Remand. The number in parentheses is the Finding of Fact which so adopts the proposed finding of fact: 1-22(1-22); 26-34(23-31); 36(32); 43(33); 44-46(34-36); and 73(37).
2. Proposed findings of fact 23-25, 35, 37-42, and 47-72 are unnecessary.

Specific Rulings on Proposed Findings of Fact
Submitted by SFCARE, Inc.

1. Proposed findings of fact 1-5, 11-13, 21, 26, 28, 31-35, 45, 46, and 48-60 are irrelevant.
2. Proposed findings of fact 6-10, 14-20, 23-25, 27, 29, 30, 44, 47, and 61 are subordinate to the facts actually found in this Recommended Order on Remand.
3. Proposed findings of fact 22, and 36-43 are unsupported by the credible, competent and substantial evidence.

**Appendix B
to Recommended Order on Remand**

**(DOAH Case No.
90-3942EPP)**

EXHIBIT

LEE COUNTY

96

D R A F T

EVALUATION TEST METHODOLOGY
FOR THE
MERCURY CONTROL PROCESS
AT THE
LEE COUNTY RESOURCE RECOVERY FACILITY

OVERVIEW

The mercury content in municipal solid waste (MSW) is variable and represents changes in industrial, commercial and residential practices as well as the effectiveness of any regulatory mechanisms including recycling programs. While recognizing that the most effective control of mercury emissions begins in waste stream management, a special mercury air pollution control process has been selected for use at the Lee County Resource Recovery Facility (Facility).

Testing by the USEPA and industry at the Stanislaus Resource Recovery Facility evaluated two different processes: sodium sulfide injection and activated carbon. The activated carbon process is presently the preferred process because it yielded better results when considering removal efficiency; therefore, it will be used at the Facility.

PROCESS OBJECTIVES

The first objective of the mercury test program is organized to demonstrate that the total Facility air pollution control (APC) system (spray dryer, fabric filter and activated carbon equipment) can control mercury emissions to within the permit condition of 70% removal or 140 ug/dscm at 7% O₂. After demonstrating that this condition can be met within a range of relevant operating conditions, the second objective is to establish the capability of the APC system in reducing Hg emissions to a value of 70 ug/dscm at 7% O₂ or its equivalent.

Operating APC conditions from the Stanislaus program will be used to establish a baseline level for attaining the first objective. A preselected continuous activated carbon injection rate will be used with the fabric filter operating initially at 285°F and subsequently at 325°F. The actual rate will be based upon performance data from the Stanislaus program and others which occur up to the scheduled test date. The stated temperature range is greater than that evaluated at Stanislaus, however, it represents the required operating range for the Floridian climate (i.e., high humidity). After the first objective has been met, the activated carbon injection rate will be modified for a greater performance level.

PROGRAM SCHEDULE

A four-year observation program will be used to determine how uncontrolled mercury emissions vary due to natural variations (e.g., seasonal, yearly) in MSW and the influence of the household hazardous waste and battery recycling program. The first and second objective will be initially demonstrated during the initial environmental compliance test program. The annual retests that are required by permit will be used to demonstrate the variability of uncontrolled Hg emissions and whether there is any variability in APC performance.

The matrix presented below summarizes the scope of testing over the four-year period:

LEE COUNTY FACILITY TEST SCHEDULE

Flue Gas Temp. (°F)	<u>Unit #1</u>		<u>Unit #2</u>	
	285	325	285	325
Year #1	3	3	3	3
#2	3	3	3	3
#3	3	3	3	3
#4	3	3	3	3
Total	<u>12</u>	<u>12</u>	<u>12</u>	<u>12</u>

four
The total over four years are ~~three~~ test events with each test event consisting of three test runs for both inlet and outlet emission values for a total of 96 test runs.

DRAFT

MERCURY CONTROL

- A. The permittee must operate the pollution control equipment at the facility under procedures designed to minimize emissions of mercury and maximize the removal of mercury from the flue gas of the facility. An activated carbon injection system for mercury control approved by the Department in accordance with Condition XIV.A. shall be operated continuously whenever MSW is burned at the facility. The emissions of mercury from the facility shall not exceed the standard established in Condition XIV.A.(1).a.13.
- B. The permittee shall determine through Department-approved operational testing the feed rate for activated carbon injection which provides the most effective mercury removal over the normal operating regime for the facility while achieving the levels stated hereafter. Following determination of this feed rate, the permittee shall not reduce it without specific written permission from the Department.
- C. The permittee acknowledges and agrees that the 140 ug mercury emission standard established by Condition XIV.A.1.(a)13 may be reduced to a level no lower than 70 ug/dscm at 7% O₂ or its equivalent upon written notice to the permittee that Departmental review of at least four operational test results (specified according to protocol) from the facility shows that a reduction of the 140 ug/dscm standard is statistically achievable as determined by the student T-test at the 99 percent confidence limit and is in the public interest. If the Department elects to proceed under this provision, the procedures of Section 403.516(1), Florida Statutes, shall not apply unless the permittee disputes the factual basis for the Department's determination.
- D. If the Department proposes to reduce the 140 ug mercury emission standard for the facility to a level below 70 ug/dscm at 7% O₂ or its equivalent, it shall proceed in accordance with the provisions of Section 403.516(1), Florida Statutes.

NOTE: Paragraph C, above, has been revised in accordance with the testimony presented at the remand hearing.
Revised April 29, 1992.

RESOURCE RECOVERY SITE BIOMONITORING PROTOCOL

Lee County has proposed to construct a 1,200 ton-per-day waste-to-energy (WTE) facility on a site located approximately one mile east of Fort Myers, Florida. The site is near the headwaters of Six Mile Cypress Slough. The air emissions from the facility are expected to be far below any level that might result in adverse impacts on human health or the environment.

Clement International Corporation (CIC) determined that there would be no adverse ecological impacts from emissions from the facility (CIC 1991). However, during a recent meeting on December 18, 1991, in Vero Beach with the U.S. Fish and Wildlife Services (USFWS) and the permit applicant, concerns were voiced by the USFWS for certain listed wildlife species. The species of concern discussed at the meeting were the Florida panther (*Felis concolor coryi*), wood stork (*Mycteria americana*), and bald eagle (*Haliaeetus leucocephalus leucocephalus*). The USFWS stated that these species may be affected by potential mercury emissions from the facility. The basis for this statement by the USFWS is that elevated mercury concentrations have been reported in environmental media throughout Florida and mercury baseline data are lacking in the Fort Myers area.

The USFWS stated that the applicant should provide biomonitoring for mercury for both pre-and post-construction periods for indicator wildlife species. During the December 18, 1991 meeting between the USFWS, the applicant, and the applicant's consultants, it was agreed that the biomonitoring would be conducted at Six Mile Cypress Slough and Tarpon Bay at Sanibel Island. It was discussed and agreed upon at the meeting that the biomonitoring program would provide background and trend data, but would not necessarily provide "cause-effect" relationships. The proposed biomonitoring program is described below.

METHODS

Biomonitoring will be conducted by the use of indicator species such as shellfish and fin-fish. Indicator species were selected to provide baseline and trend data for mercury in the local environment. Indicator species selected are the coon oyster (*Crassostrea virginica*)¹, the largemouth bass (*Micropterus salmoides*), and the mosquitofish (*Gambusia affinis*). The coon oyster would be collected for analysis at three sampling stations at Tarpon Bay on Sanibel Island and the fin-fish would be collected at Six Mile Cypress Slough. Shellfish, such as the coon oyster, are long-lived, bottom-dwelling filter-feeders that can accumulate toxic metals, pesticides and other hazardous substances from the sediment and surrounding water even when these pollutants are present at concentrations below the levels detectable by chemical analysis of grab water samples.

¹ A positive identification of the oyster to be used for mercury tissue analysis at Sanibel Island was not made at the time of writing of this protocol. The scientific name of the oyster currently being monitored for toxic analysis by the USFWS at Sanibel Island will be confirmed prior to sample collection to maintain continuity of the USFWS biomonitoring program.

Sanibel Island (Tarpon Bay) oyster samples will be collected by wildlife refuge personnel. Oyster samples will be manually collected at low tide and placed in a labeled ziplock bag and placed on ice in the field. These collected samples will be immediately taken to the laboratory, shucked, and frozen. After shucking the oyster, samples should be placed in ziplock bags or glass jars and double labeled. A label should be placed on the outside and inside of the bags or jars. Six Mile Cypress Slough fin-fish will be collected by Lee County personnel. Fin-fish samples will be collected by electrofishing or some other suitable collecting method for largemouth bass and by dip netting for mosquitofish. Fin-fish samples will be placed on ice following collection. These collected samples will be immediately returned to the laboratory and either placed in 1-gallon ziplock bags or double wrapped in aluminum foil with the shiny side of the foil facing outward. The samples will be double labeled. One label will be placed inside of the plastic bag or aluminum foil wrapping and one label will be placed on the outside of the plastic bag or aluminum foil.

The samples will be immediately frozen and shipped in an ice chest with dry ice to the USFWS office in Vero Beach, Florida. The samples will be sent with a chain of custody form. The USFWS will ship the samples from Vero Beach to the Patuxant Analytical Control Facility for total mercury laboratory analysis. Total mercury will be measured at a detection limit of 0.05 ppm or less using a method which requires digestion either by microwave in a sealed container, or by reflux using water condensers. After digestion by one of these methods, analysis will be performed by cold vapor atomic absorption.

Pre-construction sampling will be initiated within 6 months after the County commences construction of the facility and will be conducted each September and March until the facility starts operation. Post-construction monitoring and analysis will be conducted twice each year (September and March) for up to five years. Thereafter, the County and USFWS will evaluate the data and determine whether the biomonitoring should be reduced or eliminated.

DATA ANALYSIS AND REPORTING

The USFWS will conduct the laboratory analysis for total mercury at approximately fifty dollars (\$50.00) per sample. Lee County will pay for all shipping costs associated with sample collection and analysis. The Lee County Solid Waste Division will promptly reimburse the USFWS for the cost of the laboratory analysis upon receipt of an appropriate billing statement from the USFWS. The USFWS will prepare any appropriate data summary or analysis and will provide such data each year to Lee County Solid Waste Division. Data will be placed in the STORET data base for public access. Data will be transformed ($\log_{10}$ transformation) prior to analysis (Facemire 1991).

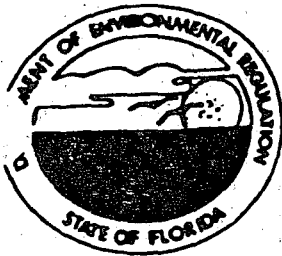
REFERENCES

Clement International Corporation (CIC). 1991. Lee County Board of County Commissioners, Ecological Assessment For The Proposed Lee County Waste-To-Energy Facility. December, 1991.

Facemire, C.F. 1991. Toxicologist, Environmental Contaminants Division, U.S. Fish and Wildlife Service, Arlington, Virginia. Telephone Communication. December 23, 1991.

FINAL DETERMINATION

The power plant site certification of Lee County Solid Waste resource recovery facility was approved by the Governor and the Cabinet sitting as the Siting Board on June 16, 1992. The Department is issuing a PSD air permit for this facility which is substantially identical to the terms of the Conditions of Certification contained in the power plant site certification. There are no changes in the process input or steam production rates. Revised mercury emission standards are contained in the PSD permit as were prescribed in the final power plant site certification approved by the Siting Board.



Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399

Lawton Chiles, Governor

Carol M. Browner, S

PERMITTEE:
Lee County Utilities
2178 McGregor Blvd.
Ft. Myers, FL 33902

Permit Number: PSD-FL-151

County: Lee
Latitude/Longitude: 26°37'54"N
81°45'41"W

Project: Lee County Waste to Energy
Recovery Facility Units
1 and 2

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the construction of the Lee County Solid Waste Energy Recovery Facility located at Buckingham Road and State Road 82, in Fort Myers, Florida consisting of two mass-burn Municipal Waste Combustors (MWC) with two units to be constructed initially and the third unit to be installed in the future. These mass-burn units shall have a maximum permitted capacity of 660 tons/day, each unit, for a total capacity for both units not to exceed 1320 tons/day; and a maximum heat input of 275 MMBtu/hr, per unit, for a total heat input for both units not to exceed 550 MMBtu/hr, based on a municipal solid waste average heating value of 5000 Btu/lb.

Each combustor unit shall be of Stoker Waterwall design (or equivalent) capable of generating 20 MW for a total of 40 MW from both units. Each unit shall be allowed to produce a maximum of 186,200 lbs of steam per hour at 865 psig and 830°F. Each combustor unit shall be equipped with auxiliary burners to be fired by only propane gas. Emissions from each combustor shall be controlled by a slaked lime scrubber followed by a baghouse. NO_x emissions shall be controlled by a SNCR System. Mercury emissions shall be controlled by injecting activated carbon.

The permittee must submit four copies of complete information prior to purchase and installation of any combustor and related equipment. Such information shall include the following: make and model numbers of each MWC and all pollution control and continuous emissions monitoring devices and related equipment.

PERMITTEE: Lee County

Permit Number: PSD-FL-151

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 3.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.120 and 17-30.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit or a copy thereof shall be kept at the work site of the permitted activity.

13. This permit also constitutes:

- (x) Determination of Best Available Control Technology (BACT)
- (x) Determination of Prevention of Significant Deterioration (PSD)
- (x) Compliance with New Source Performance Standards (NSPS)

14. The permittee shall comply with the following:

- a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

PERMITTEE: Lee County

Permit Number: PSD-FL-151

GENERAL CONDITIONS:

- b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report or application unless otherwise specified by Department rule.
- c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the dates analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.

15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

SPECIFIC CONDITIONS:

1. This facility shall be allowed to operate continuously (i.e. 8760 hours/year).

2. Emission Standards

Based on the permitted capacities mentioned in the project description the stack emissions from each unit shall not exceed any of the following limitations:

- a. Particulate matter: Particulate emissions from the baghouse shall not exceed 0.010 grains/dry standard cubic

SPECIFIC CONDITIONS:

- foot, corrected to 7% O₂; 5.34 lbs/hr per unit; and 21.3 tons/year per unit.
- b. PM₁₀: In no case shall PM₁₀ emissions exceed 0.010 gr/dry cubic standard foot, corrected to 7% O₂ for the fraction of particles less than 10 microns in diameter; 5.34 lbs/hr per unit; and 21.3 tons/year per unit.
 - c. *Opacity: In no case shall visible emissions from each baghouse exhaust exceed 10% opacity (six minute average).
 - d. *SO₂: 30 ppm_{dv} corrected to 7% O₂, 24 hour daily geometric average or at least 80% removal efficiency, whichever is least restrictive. In no case shall SO₂ emissions exceed 0.150 lbs/MMBtu per unit, 41 lbs/hr/unit, and 163.3 tons/year, per unit.
 - e. *NO_x: 180 ppm_{dv} corrected to 7% O₂, 24 hour daily block average (midnight to midnight). In no case shall NO_x emissions exceed 0.290 lb/MMBtu, 80 lbs/hr per unit, and 320 tons/year, per unit.
 - f. *Carbon Monoxide: 100 ppm_{dv} at 7% O₂, 4-hour block average beginning at midnight. In no case shall CO emissions exceed .10 lb/MMBtu, 27.2 lbs/hr/unit, and 108 tons/year, per unit.
 - g. *VOC (Hydrocarbons): 37 ppm_{dv} at 7% O₂. In no case shall VOC emissions exceed 0.021 lb/MMBtu, 5.80 lbs/hr/unit and 23 tons/year, per unit.
 - h. HCl: 25 ppm_{dv} at 7% O₂, or at least 95% removal efficiency, which ever is least restrictive. In no case shall HCl emissions exceed 0.064 lb/MMBtu, 17.70 lbs/hr/unit, and 70.70 tons/year, per unit.
 - i. H₂SO₄ (sulfuric acid mist): In no case shall H₂SO₄ emissions exceed 0.036 lb/MMBtu, 9.85 lbs/hr/unit and 39.3 tons/year per unit.
 - j. *F (fluoride): 5.0 ppm_{dv} at 7% O₂. In no case shall F emissions exceed 0.0035 lb/MMBtu, 0.96 lbs/hr/unit, and 3.8 tons/year, per unit.

PERMITTEE: Lee County

Permit Number: PSD-FL-151

SPECIFIC CONDITIONS:

- k. *Pb (lead): In no case shall lead emissions exceed 0.00060 lbs/MMBtu, 0.165 lbs/hr/unit and 0.66 tons/yr., per unit.
- l. *Be (Beryllium): In no case shall Be emissions exceed 1.35×10^{-7} lbs/MMBtu, 3.70×10^{-5} lbs/hr/unit, and 1.47×10^{-4} tons/year, per unit.
- m. *Hg (Mercury): In no case shall mercury emissions exceed 0.000138 lbs/MMBtu, 0.0379 lbs/hr/unit, and 0.166 tons/yr per unit at 140 ug/dscm at 7% O₂ or at least 70 percent removal efficiency by weight.
- n. As (Arsenic): In no case shall arsenic emissions exceed 9.10×10^{-6} lbs/MMBtu, 2.50×10^{-3} lbs/hr/unit, and 0.01 tons/year, per unit.
- o. *Dioxins/Furans: In no case shall emissions of total (tetra thru octa-chlorinated dibenzo-p dioxins and dibenzofurans) exceed 30 ng/dscm @ 7% O₂, 2.54×10^{-8} lbs/MMBtu, 7.0×10^{-6} lbs/hr/unit, and 2.80×10^{-5} tons/year, per unit.
- p. *NH₃: In no case shall ammonia slip from exhaust gases exceed 50 ppmv.
- q. There shall be no visible emissions (less than 5% opacity) during the operations of the lime silo.
- r. In no case shall emissions from the ash handling building baghouse exceed a particulate limit of 0.010 grains/dscf and visible emissions of 5% opacity.
- * Pursuant to Rule 17-4.080 F.A.C., for good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions for the pollutants CO, VOC, F, NH₃, SO₂, NO_x, Pb, Be, Hg, dioxins and furans, and visible emissions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time.

SPECIFIC CONDITIONS:

3. Test Methods/Continuous Emissions Monitoring System (CEMS)/Testing Frequency/Sampling Ports/Record Keeping/Reporting of Excess Emissions and Malfunctions.

a. Test Methods

Compliance with emission limiting standards mentioned in Specific Condition No. 2 shall be demonstrated using EPA Methods, as contained in 40 CFR Part 60 (Standards of Performance for New Stationary Sources), or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants), or any other method as approved by the Department, in accordance with F.A.C. Rule 17-2.700(3). A test protocol shall be submitted for approval to the South Florida District and to the Bureau of Air Regulation at least 90 days prior to testing. This protocol shall include details on how the weight percentage of used tires in the MSW stream will be accounted for during the compliance testing.

EPA Method

For Determination of

- | | |
|--------------|--|
| 1 | Selection of sample site and velocity traverses |
| 2 | Stack gas flow rate when converting concentrations to or from mass emission limits. |
| 3 or 3A | Gas analysis when needed for calculation of molecular weight or percent O ₂ . |
| 4 | Moisture content when converting stack velocity to dry volumetric flow rate for use in converting concentrations in dry gases to or from mass emission limits. |
| 5 | Particulate matter concentration and mass emissions. |
| 201 or 201A | PM ₁₀ emissions. |
| 6, 6C, or 19 | Sulfur dioxide emissions from stationary sources. |
| 7, 7C, or 19 | Nitrogen oxide emissions from stationary sources. |

PERMITTEE: Lee County

Permit Number: PSD-FL-151

SPECIFIC CONDITIONS:

- 9 Visible emission determination of opacity.
 - At least three one hour runs to be conducted simultaneously with particulate testing for the emissions from dry scrubber/baghouse, and ash handling building baghouse.
 - At least one lime truck unloading into the lime silo (start to finish).
- 10 Carbon monoxide emissions from stationary sources.
- 12 Lead concentration from stationary sources.
- 13A or 13B Fluoride emissions from stationary sources.
- 23 Dioxin/furan concentration.
- 18 or 25 Volatile organic compounds concentration.
- 26, 26a HCl emissions or other methods approved by DER.
- 101A Mercury emissions based on an average of three runs.
- 29 Antimony, Cadmium
- 104 Beryllium emission rate and associated moisture content.
- 108 Arsenic

Note: The weight of MSW being fed to each combustor during the stack test shall be continuously monitored and recorded by a weighing device which is properly calibrated. Stack tests shall be conducted upstream and downstream of the applicable control device for SO₂, Hg and HCl. Soot blowers shall be operated in a mode consistent with the normal cleaning requirements of the system during the compliance testing.

b. Continuous Emissions Monitoring System (CEMS)

Continuous emission monitors with recorders shall be installed, calibrated, maintained and operated subject to approval by the Department for the following:

SPECIFIC CONDITIONS:

Carbon Monoxide, Oxygen, Nitrogen Oxide, Opacity, and Sulfur Dioxide (for SO₂ one monitor shall be located upstream of the scrubber and one shall be located downstream of the baghouse), as specified in 40 CFR 60, Appendix B; total steam production (lbs/hr, pressure, and temperature) and power generation (MW) for each unit; ammonia injection rate; slaked lime; activated carbon injection or usage rates; and thermocouple to measure temperature of combustion zone (to be specified by the vendor). The monitoring devices shall meet the applicable requirements of Chapter 17-2, Section 17-2.710, F.A.C. and 40 CFR 60.45, and 40 CFR 60.13, including certification of each device in accordance with 40 CFR 60, Appendix B, Performance Specifications and 40 CFR 60.7 (a)(5). Data on monitoring equipment specifications, manufacturer, type, calibration and maintenance needs, and its proposed location after the economizer or in the air pollution control equipment outlet duct shall be provided to the South District Office for review prior to installation together with and subject to the same provisions as submittal of air pollution control equipment as mentioned earlier.

c. Testing Frequency

Compliance with emission standards contained in Specific Condition 2 shall be determined by conducting stack tests within 120 days of completion of construction and initial operation and annually thereafter. In addition to the three test runs conducted under normal operation, three compliance test runs shall be conducted annually under soot blowing conditions for particulate and VE. Each soot blowing test run shall be a representative of normal soot blowing operation. The compliance tests may be staggered throughout the year with the approval of the Bureau of Air Regulation. Pursuant to Rule 17-2.700(2)(b), when the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in this permit is being violated, it may require the owner or operator of the source to conduct compliance tests which identify the nature and quantity of pollutant emissions from the source and to provide a report on the results of said tests to the Department. Compliance testing for the flyash handling building (baghouse) and the lime silo loading operation (V.E. test) shall be conducted within 120 days of completion of

PERMITTEE: Lee County

Permit Number: PSD-FL-151

SPECIFIC CONDITIONS:

construction and initial operation and annually thereafter. All notification requirements of 40 CFR parts 60 and 61 shall be complied with by the owner/operator of the SWERF.

d. Sampling Ports

The Permittee shall provide sampling ports in the air pollution control equipment outlet duct or stack and shall provide access to the sampling ports in accordance with Section 17-2.700, F.A.C. Drawings of testing facilities including sampling port locations as required by Section 17-2.700 shall be submitted to the South District Office for approval at least 60 days prior to construction of the sampling ports and stack.

e. Record Keeping

Lee County Solid Waste Energy Recovery Facility shall maintain a central file containing all measurements, records, and other data that are required to be collected pursuant to the various specific conditions of this permit. This file shall include but not be limited to:

- (i) the data collected from in-stack monitoring instruments,
- (ii) the records on MSW input rate,
- (iii) the amount of propane gas burned per unit,
- (iv) the results of all source tests or performance tests,
- (v) the amount of ammonia, activated carbon, or other chemicals used for NOx and mercury control,
- (vi) calibration logs for all instruments,
- (vii) maintenance/repair logs for any work performed which is subject to this permit.

All measurements, records, and other data required to be maintained by SWERF shall be retained for at least two years following the date on which such measurements, records, or data are recorded and made available to the Department upon request. The permittee shall keep accurate records of MSW being fired to each combustor along with the weight percent of used tires in the waste stream being combusted on an estimated weekly basis

PERMITTEE: Lee County

Permit Number: PSD-FL-151

SPECIFIC CONDITIONS:

for the entire life of this facility. The South District office of the Department and the Bureau of Air Regulation shall be notified in writing at least 30 days prior to any compliance testing.

f. Reporting of Excess Emissions and Malfunctions

(i) A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation, any other preventable upset condition, or preventable equipment breakdown shall not be considered malfunctions.

(ii) Excess emissions resulting from startup, shutdown or malfunction of any source shall be permitted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized but in no case exceed two hours in 24 hour period unless specifically authorized by the Department for longer duration (Rule 17-2.250(1), F.A.C.).

(iii) Excess emissions which are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure which may reasonable be prevented during startup, shutdown, or malfunction shall be prohibited (Rule 17-2.250(4), F.A.C.).

(iv) In case of excess emissions resulting from malfunctions, each source shall notify the Department or the appropriate Local Program in accordance with Section 17-4.130, Florida Administrative Code. A full written report on the malfunctions shall be submitted in a quarterly report (Rule 17-2.250(6), F.A.C.).

(v) The owner or operator shall submit excess emission reports for any calendar quarter during which there are excess emissions from the facility. If there are no excess emissions during the calendar quarter, the owner or operator shall submit a report quarterly stating that no excess emissions occurred during the quarterly reporting period. The report shall include the following:

(A) The magnitude of excess emissions computed in accordance with 40 CFR 60.13(h), any conversion factors used, and the

SPECIFIC CONDITIONS:

- date and time of commencement and completion of each period of excess emissions [40 CFR60.7(c)(1)].
- (B) Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the furnace boiler system. The nature and cause of any malfunction (if known) and the corrective action taken or preventive measures adopted [40CFR60.7(c)(2)].
- (C) The date and time identifying each period during which the continuous monitoring system was inoperative except for zero and span checks, and the nature of the system repairs or adjustments [40CFR60.7(c)(3)].
- (D) When no excess emissions have occurred or the continuous monitoring system has not been inoperative, repaired, or adjusted, such information shall be stated in the report [40CFR60.7(c)(4)].
- (E) The owner or operator shall maintain a file of all measurements, including continuous monitoring systems performance evaluations; monitoring systems or monitoring device calibration; checks; adjustments and maintenance performed on these systems or devices; and all other information required by this permit recorded in a permanent form suitable for inspection [40CFR60.7(d)].

4. Miscellaneous Requirements

a. Start-up and Shut-down Procedures

During start-up procedures, propane gas shall be used to preheat the combustion zone to achieve a furnace roof temperature of 1270°F and a minimum temperature of 1800°F above the grate (at a height to be specified by the vendor) prior to the ignition of MSW.

During all shut-down procedures, propane gas shall be used to ensure that the temperature above the grate, as specified above, does not drop below 1800°F and the furnace roof temperature is maintained above 1270° while any MSW is still burning.

SPECIFIC CONDITIONS:

b. Operating Procedures

Operating procedures shall include good combustion practices and proper training and certification of all operators. The good combustion practices shall meet the guidelines established in 40 CFR 60, Subpart Ea and procedures as established by the equipment manufacturers. All operators (including supervisors) of air pollution control devices shall be properly trained and certified in accordance with the manufacturers guidelines. A list of all such certified personnel shall be submitted to the South District Office. The Permittee/Operator shall inform the District office of any planned training sessions so that Department staff may attend any such training sessions related to operation and maintenance of air pollution control devices.

The emission standards for this facility shall apply at all times, except during periods of start-up, shut-down, or malfunctions, provided that the duration of start-up, shut-down, or malfunction shall not exceed 2 hours within 24 hour period. The start-up period commences when the affected facility begins the continuous burning of MSW and does not include any warm-up period when the affected facility is combusting only propane gas and no MSW is being combusted. During all startups, shutdowns and malfunctions the owner/operator shall use best operational practices to minimize air pollutant emissions. Within 90 days prior to commencing commercial operations of this facility, the permittee shall submit to the South District Office for approval a operational procedures manual that identifies and describes best operational practices that will be used during startup, shutdown, and malfunctions of this facility.

c. Odor Control

No objectionable odors are allowed from this facility pursuant to F.A.C. Rule 17-2.620. The truck access doors to the facility shall remain closed except during normal working shifts when MSW is being received near the storage pit area to allow vehicle passage. To minimize odors at the facility, a negative pressure shall be maintained on the tipping floor and air from within the building will be used as combustion air.

PERMITTEE: Lee County

Permit Number: PSD-FL-151

SPECIFIC CONDITIONS:

d. Auxiliary Burners

Auxiliary burners for each unit shall be fired only by propane gas and shall not exceed the 10% capacity factor as determined by 40 CFR 60.44b(d).

e. Baghouse Operations

All baghouses (except for lime silo dust collector) shall be equipped with pressure drop monitoring equipment. Baghouses shall have a maximum air to cloth ratio of 4:1. Extra bags shall be maintained at the site for emergency purposes.

f. Restriction for Type of Wastes Combusted

No biological waste, medical waste, bio-hazardous waste, sewage sludge or hazardous or unauthorized wastes shall be received or combusted at this facility without obtaining proper modification to the power plant site certification and this permit. The Permittee may combust up to 3% (by weight) of used tires along with the MSW. If the applicant wishes to combust used tires in excess of 3% (by weight) modification to the construction permit will be required prior to increasing the feed rate of the tires. The County shall establish a household battery collection program to be specified by the applicant prior to start of construction, to further minimize mercury emissions. Chromium compounds shall not be used as an additive in the cooling tower water.

g. Fugitive (Unconfined) Emissions

Fugitive emissions at this facility shall be adequately controlled at all times. All roads shall be adequately paved and vacuum swept if appropriate, to keep free of visible dust. Speed limit signs shall be posted. Residue from the grates, grate siftings, and ash from the combustor/boiler and fabric filter hoppers during normal operations shall be discharged into the ash quenching system so as to minimize visible dust. The ash/residue in the ash handling building shall remain sufficiently moist to prevent dust during storage and handling operations.

SPECIFIC CONDITIONS:

- h. The height of the boiler exhaust stack shall not be less than 275 feet above grade or the height determined to be Good Engineering Practice.
- i. The SWERF's boilers shall not be loaded in excess of their permitted capacity of 55,000 lb/hr. of MSW per unit, and 275×10^6 Btu per hour, each unit, and 186,200 lb/hour of steam, based on heating value of 5000 Btu/lb of MSW.
- j. The combustor boilers shall have a metal name plate affixed in a conspicuous place on the shell showing manufacturer, model number, type waste, and rated capacity.
- k. Combustion efficiency shall be calculated by: $\%CE = (1/(1+(CO/CO_2))) \times 100$, and shall be at least 99.5% for an 8 hour average.

5. Emission Control Equipment

- a. The combustor's particulate control baghouse shall be designed, constructed and operated to achieve a maximum emission rate of 0.010 grains per dscf corrected to 7% O₂.
- b. The facility shall be equipped with dry scrubbers which are designed, constructed and operated to remove SO₂ at an efficiency of 80% by weight or to achieve an emission rate of 30 ppmdv at 7% O₂, 24 hour daily geometric average, which ever is less stringent and to cool the flue gases to an average temperature not to exceed 300°F (3-hour rolling average).
- c. The Permittee shall submit to the South Florida District and to the Bureau of Air Regulation within thirty (30) days after it becomes available, copies of technical data pertaining to the selected emissions control systems. These data should include, but not be limited to, guaranteed efficiency and emission rates, and major design parameters.

6. Stack Test Reports

- a. Two copies of the results of the emissions tests for the pollutants listed in Specific Condition No. 2 shall be submitted within forty-five days of the last sampling run

PERMITTEE: Lee County

Permit Number: PSD-FL-151

SPECIFIC CONDITIONS:

to the South District Office, and one copy of the test results shall be submitted to the Bureau of Air Regulation in Tallahassee.

- b. Emissions monitoring shall be reported to the South District Office on a quarterly basis in accordance with Section 17-2.710, F.A.C., 40 CFR, part 60, Subsection 60.7 or 40 CFR part 61 as appropriate.
 - c. Notice of anticipated and actual start-up dates of each waste combustor boiler shall be submitted to the DER South District Office and the Bureau of Air Regulation.
7. Pursuant to Recommended Order on Remand (DOAH Case No. 90-3942 EPP), Appendix B, Exhibit 96, dated May 21, 1992, evaluation test methodology for the mercury control process at this facility shall be subject to the following:
- A. The permittee must operate the pollution control equipment at the facility under procedures designed to minimize emissions of mercury and maximize the removal of mercury from the flue gas of the facility. An activated carbon injection system for mercury control approved by the Department in accordance with Specific Condition No. 2 shall be operated continuously whenever MSW is burned at the facility. The emissions of mercury from the facility shall not exceed the standard established in Specific Condition No. 2(m).
 - B. The permittee shall determine through Department-approved operational testing the feed rate for activated carbon injection which provides the most effective mercury removal over the normal operating regime for the facility while achieving the levels stated hereafter. Following determination of this feed rate, the permittee shall not reduce it without specific written permission from the Department.
 - C. The permittee acknowledges and agrees that the 140 ug/dscm mercury emission standard established by Specific Condition No. 2(m) may be reduced to a level no lower than 70 ug/dscm at 7% O₂ or its equivalent upon written notice to the permittee that Departmental review of at least four operational test results (specified according to protocol) from the facility shows that a reduction of the 140 ug/dscm

PERMITTEE: Lee County

Permit Number: PSD-FL-151

SPECIFIC CONDITIONS:

standard is statistically achievable as determined by the student T-test at the 99 percent confidence limit and is in the public interest. If the Department elects to proceed under this provision, the procedures of Section 403.516(1), Florida Statutes, shall not apply unless the permittee disputes the factual basis for the Department's determination.

- D. If the Department proposes to reduce the 140 ug/dscm mercury emission standard for the facility to a level below 70 ug/dscm at 7% O₂ or its equivalent, it shall proceed in accordance with the provisions of Section 403.516(1), Florida Statutes.

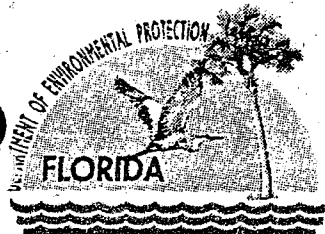
Issued this 20th day
of July, 1992

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION



Carol M. Browner, Secretary

7.2 - Title V Air Operation Permit



Jeb Bush
Governor

Department of Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

NOTICE OF FINAL PERMIT

In the Matter of an
Application for Permit by:

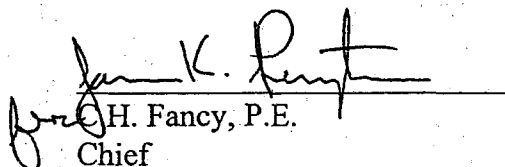
Mr. Lindsey Sampson, P.E.
Deputy Director
Lee County Solid Waste Division
1500 Monroe Street
Fort Myers, Florida 33901

FINAL Permit No.: 0710119-001-AV
Lee County Resource Recovery Facility

Enclosed is FINAL Permit Number 0710119-001-AV for the operation of the Lee County Resource Recovery Facility located at 10500 Buckingham Road, Fort Myers, Lee County, issued pursuant to Chapter 403, Florida Statutes (F.S.).

Any party to this order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, F.S., by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Legal Office; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 (thirty) days from the date this Notice is filed with the Clerk of the permitting authority.

Executed in Tallahassee, Florida.


James K. Fancy, P.E.
Chief
Bureau of Air Regulation

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF FINAL PERMIT (including the FINAL permit) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 11/01/00 to the person(s) listed or as otherwise noted:

Lindsey Sampson, P.E., Lee County Department of Solid Waste Management *

Tamara Stankunas, P.G., Malcolm Pirnie, Inc.

Ron Blackburn, FDEP South District

USEPA, Region 4 (INTERNET E-mail Memorandum)

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to Section 120.52(7), Florida Statutes, with the designated agency Clerk, receipt of which is hereby acknowledged.

Bulawa J. Friday 11/01/00
(Clerk) (Date)

FINAL PERMIT DETERMINATION

FINAL Permit No.: 0710119-001-AV

Page 1 of 1

I. Correction.

In order for the FINAL permit to be consistent with changes made in response to previous EPA objections or other permits for resource recovery facilities, the following correction has been made:

- (1) The language for the Federal test procedures of Specific Condition(s) A.67., is changed as follows:

From: A.67. Compliance with standards in 40 CFR 60, other than opacity standards, shall be determined only by performance tests established by 40 CFR 60.8, unless otherwise specified in the applicable standard.
[40 CFR 60.11(a)]

To: A.67. Compliance with standards in 40 CFR 60, other than opacity standards, shall be determined by performance tests established by 40 CFR 60.8, unless otherwise specified in the applicable standard.
[40 CFR 60.11(a)]

III. Conclusion.

The permitting authority hereby issues the FINAL Title V permit, with the change noted above.

STATEMENT OF BASIS

Lee County
Lee County Resource Recovery Facility
Facility ID No.: 0710119
Lee County

Initial Title V Air Operation Permit
FINAL Permit No.: 0710119-001-AV

This Title V air operation permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Chapters 62-4, 62-210, and 62-213. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents, attached hereto or on file with the permitting authority, in accordance with the terms and conditions of this permit.

This facility is subject to the requirements of 40 CFR 60, Subpart Cb and has obtained permits [PSD-FL-151A & PSD-FL-151B] which will bring the facility into compliance with the subpart. The existing facility consists of two municipal waste combustors. Each of the combustors has a maximum charging rate of 660 tons per day based on solid waste fuel with a nominal HHV of 5,000 Btu/lb. Dry flue gas scrubbers, baghouse, SNCR, and carbon injection are used to control emissions from the combustors. The facility also contains a lime silo and an ash handling system. The lime silo stores pebble lime which is used to make lime slurry. Particulate matter emissions occur when lime is loaded from trucks to the silo. Emissions from the lime silo are controlled by a filter baghouse. The ash handling system at the facility consists of conveyors, scalpers, and a ferrous and non-ferrous removal system. Ventilation of the ash handling building is controlled by a baghouse. The facility is currently operating. The combustors each have a capacity of 660 tons/day for a total of 1,320 tons/day of MSW. This is equal to a maximum heat input of 275 MMBtu/hr per unit. The facility produces up to 40 MW of electricity daily. The facility is self-sufficient and uses a small amount of this energy. The rest of the energy is sold to an electric utility market.

Emissions units 1 and 2 are regulated under NSPS - 40 CFR 60, Subpart E, Standards of Performance for Incinerators, adopted and incorporated by reference in Rule 62-204.800(7), F.A.C.; Rule 62-212.400(5), F.A.C., Prevention of Significant Deterioration (PSD); Rule 62-212.400(6), F.A.C., Best Available Control Technology (BACT); Rule 62-296.401(2), F.A.C., Incinerators; Rule 62-296.416, F.A.C., Waste-to-Energy Facilities. These emissions units will be subject to the requirements of NSPS - 40 CFR 60, Subpart Cb, Emissions Guidelines and Compliance Times for Large Municipal Waste Combustors That Are Constructed on or Before September 20, 1994, adopted and incorporated by reference, subject to provisions, in Rule 62-204.800(8)(b), F.A.C., no later than December 10, 2000, applicable to Units 1 and 2.

The ash handling system is completely enclosed to decrease the potential for fugitive emissions. The ash is quenched and wetted before being temporarily stored in the ash handling facility and loaded onto a truck. Two baghouses are located on the ash handling building as an added precaution for fugitive emissions. The baghouses keeps the building under negative pressure.

Also included in this permit are miscellaneous unregulated/insignificant emissions units and/or activities.

Based on the initial Title V permit application received June 11, 1996, this facility is a major source of hazardous air pollutants (HAPs).

Lee County Department of Solid Waste
Lee County Resource Recovery Facility

Facility ID No.: 0710119

Lee County

Title V Air Operation Permit

FINAL Permit No.: 0710119-001-AV

Project Description:

Initial Title V Permit

Permitting Authority

State of Florida

Department of Environmental Protection

Division of Air Resources Management

Bureau of Air Regulation

Title V Section

Mail Station #5505

2600 Blair Stone Road

Tallahassee, Florida 32399-2400

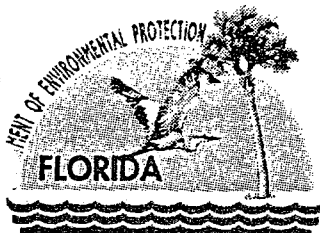
Telephone: 850/488-0114

Fax: 850/922-6979

Title V Air Operation Permit

Table of Contents

<u>Section</u>	<u>Page Number</u>
Title V Air Operation Permit Placard Page.	1
I. Facility Information.	2
II. Facility-wide Conditions.	3
III. Emissions Units and Conditions.	
A. Municipal Waste Combustion Units.	6
B. Lime Silo.	43
C. Ash Handling System.	48
Appendix U-1, List of Unregulated Emissions Units and/or Activities.	53
Appendix I-1, List of Insignificant Emissions Units and/or Activities.	54
Appendix H-1, Permit History/ID Number Changes.	55
Referenced Attachments.	56
Appendix A-1, Abbreviations, Definitions, Citations, and Identification Numbers.	
Appendix BW, Biomedical Waste Definitions	
Appendix SS-1, Stack Sampling Facilities (version dated 3/25/96).	
Appendix TV-3, Title V Conditions (version dated 4/30/99).	
Figure 1: Summary Report Gaseous and Opacity Excess Emission and Monitoring System Performance (40 CFR 60, July, 1996).	
Table 297.310-1, Calibration Schedule (version dates 10/07/96).	
Table 1-1, Summary of Air Pollutant Standards and Terms.	
Table 2-1, Summary of Compliance Requirements.	



Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

Permittee:
Lee County Department of Solid Waste
1500 Monroe Street
Fort Myers, Florida 33901

FINAL Permit No.: 0710119-001-AV
Facility ID No.: 0710119
Project: Initial Title V Permit

This permit is for the operation of the Lee County Resource Recovery Facility. This facility is located at 10500 Buckingham Road, Ft. Myers, Lee County; UTM Coordinates: Zone 17, 424.21 km East and 2945.70 km North; Latitude: 26° 37' 54" North and Longitude: 81° 45' 41" West.

STATEMENT OF BASIS: This Title V air operation permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Chapters 62-4, 62-210, and 62-213. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents, attached hereto or on file with the permitting authority, in accordance with the terms and conditions of this permit.

Referenced attachments made a part of this permit:

Appendix I-1, List of Insignificant Emissions Units and/or Activities
Appendix U-1, List of Unregulated Emissions Units and/or Activities
Appendix SS-1, Stack Sampling Facilities (version dated 10/7/96)
Appendix TV-3, Title V Conditions (version dated 4/30/97)
Table 297.310-1, Calibration Schedule (version dated 10/07/96)
*Figure 1: Summary Report-Gaseous and Opacity Excess Emission and Monitoring
System Performance (40 CFR 60, July, 1996)*

Effective Date: November 1, 2000
Renewal Application Due Date: April 31, 2005
Expiration Date: October 31, 2005

Howard L. Rhodes, Director
Division of Air Resources
Management

HLR/ss/h

Section I. Facility Information.

Subsection A. Facility Description.

The Lee County Resource Recovery Facility began operation in August 1994. The facility has a capacity of 660 tons/day per unit for a total of 1,320 tons per day of solid waste fuel with a nominal HHV of 5,000 Btu/lb. This is equal to a maximum heat input of 275 MM/Btu/hour per unit, for a total heat input not to exceed 550 MMBtu/hr. The facility converts solid waste into saleable energy. It produces up to 40 MW of electricity daily. The facility is self-sufficient and operates on a small portion of the power it generates. The remaining electricity is sold to an electric utility market. The facility is owned by Lee County, and was designed and built, and is currently operated by Ogden-Martin Systems of Lee, Inc. (OMSL).

The facility's mass burn combustion system incorporates the technology of German-based Martin GmbH. Waste is combusted at furnace temperatures exceeding 1,800 degrees Fahrenheit, and reduced to an inert ash residue. The air pollution control equipment at the facility consists of dry flue gas scrubbers, fabric filter baghouses and mercury and nitrogen abatement systems.

Based on the initial Title V permit application received June 17, 1996, this facility is a major source of hazardous air pollutants (HAPs).

Subsection B. Summary of Emissions Unit ID Nos. and Brief Descriptions.

E.U. ID No.	Brief Description
-001	Municipal Waste Combustion Unit No. 1
-002	Municipal Waste Combustion Unit No. 2
-003	Lime Silo
-004	Ash Handling System

The facility also includes several insignificant emissions units. Appendix I-1, List of Insignificant Emissions Units and/or Activities is attached.

Please reference the Permit No., Facility ID No., and appropriate Emissions Unit(s) ID No(s). on all correspondence, test report submittals, applications, etc.

Subsection C. Relevant Documents.

The documents listed below are not a part of this permit; however, they are specifically related to this permitting action.

These documents are provided to the permittee for information purposes only:

Table 1-1, Summary of Air Pollutant Standards and Terms

Table 2-1, Summary of Compliance Requirements

Appendix A-1, Abbreviations, Acronyms, Citations, and Identification Numbers

Appendix BW, Biomedical Waste Definitions

Appendix H-1, Permit History/ID Number Changes

These documents are on file with permitting authority:

Initial Title V Permit Application received June 17, 1996

Documents on file with USEPA:

Risk Management Plan submitted to RMP reporting center on 06/20/1999

Section II. Facility-wide Conditions.

The following Conditions apply facility-wide:

1. APPENDIX TV-3, TITLE V CONDITIONS, is a part of this permit.
{Permitting note: APPENDIX TV-3, TITLE V CONDITIONS, is distributed to the permittee only. Other persons requesting copies of these conditions shall be provided a copy when requested or otherwise appropriate.}
2. General Pollutant Emission Limiting Standards. Objectionable Odor Prohibited. No person shall cause, suffer, allow, or permit the discharge of air pollutants which cause or contribute to an objectionable odor. The truck access doors to the facility shall remain closed except during normal working shifts when MSW is being received near the storage pit area to allow vehicle passage. To minimize odors at the facility, a negative pressure shall be maintained on the tipping floor and air from within the building will be used as combustion air.
[Rule 62-296.320(2), F.A.C., PSD-FL-151]
3. General Particulate Emission Limiting Standards. General Visible Emissions Standard. Except for emissions units that are subject to a particulate matter or opacity limit set forth or established by rule and reflected by conditions in this permit, no person shall cause, let, permit, suffer or allow to be discharged into the atmosphere the emissions of air pollutants from any activity, the density of which is equal to or greater than that designated as Number 1 on the Ringelmann Chart (20 percent opacity). EPA Method 9 is the method of compliance pursuant to Chapter 62-297, F.A.C.
[Rules 62-296.320(4)(b)1. & 4., F.A.C.]
4. Prevention of Accidental Releases (Section 112(r) of CAA).
 - a. As required by Section 112(r)(7)(B)(iii) of the CAA and 40 CFR 68, the owner or operator shall submit an updated Risk Management Plan (RMP) to the Chemical Emergency Preparedness and Prevention Office (CEPPO) RMP Reporting Center.
 - b. As required under Section 252.941(1)(c), F.S., the owner or operator shall report to the appropriate representative of the Department of Community Affairs (DCA), as established by department rule, within one working day of discovery of an accidental release of a regulated substance from the stationary source, if the owner or operator is required to report the release to the United States Environmental Protection Agency under Section 112(r)(6) of the CAA.
 - c. The owner or operator shall submit the required annual registration fee to the DCA on or before April 1, in accordance with Part IV, Chapter 252, F.S. and Rule 9G-21, F.A.C.

Any required written reports, notifications, certifications, and data required to be sent to the DCA, should be sent to:

Department of Community Affairs
Division of Emergency Management
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
Telephone: 850/413-9921, Fax: 850/488-1739

Any Risk Management Plans, original submittals, revisions or updates to submittals, should be sent to:

RMP Reporting Center
Post Office Box 3346
Merrifield, VA 22116-3346
Telephone: 703/816-4434

Any required reports to be sent to the National Response Center, should be sent to:

National Response Center
EPA Office of Solid Waste and Emergency Response
USEPA (5305 W)
401 M Street, SW
Washington, D.C. 20460
Telephone: 1/800/424-8802

Send the required annual registration fee using approved forms made payable to:

Cashier
Department of Community Affairs
State Emergency Response Commission
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2149

[Part IV, Chapter 252, F.S. and Rule 9G-21, F.A.C.]

5. Unregulated Emissions Units and/or Activities. Appendix U-1, List of Unregulated Emissions Units and/or Activities, is a part of this permit.
[Rule 62-213.440(1), F.A.C.]

6. Insignificant Units and/or Activities. Appendix I-1, List of Insignificant Emissions Units and/or Activities, is a part of this permit.
[Rules 62-213.440(1), 62-213.430(6) and 62-4.040(1)(b), F.A.C.]

7. General Pollutant Emission Limiting Standards. Volatile Organic Compounds Emissions or Organic Solvents Emissions. The permittee shall allow no person to store, pump, handle, process, load, unload or use in any process or installation, volatile organic compounds or organic solvents without applying known and existing vapor emission control devices or systems deemed necessary and ordered by the Department.

{Permitting Note: The Department has not ordered any control devices or systems under the referenced rule}.
[Rule 62-296.320(1)(a), F.A.C.]

8. Fugitive (Unconfined Emissions). Fugitive emissions at this facility shall be adequately controlled at all times. All roads shall be adequately paved and vacuum swept if appropriate, to keep free from visible dust. Speed limit signs shall be posted. Residue from the grates, grate siftings, and ash from the combustor/boiler and fabric filter hoppers during normal operations shall be discharged into the ash quenching system as to minimize visible dust. The ash/residue in the ash handling building shall remain sufficiently moist to prevent dust during storage and handling operations.
[Rule 62-296.320(4)(c)2., PSD-FL-151]

9. When appropriate, any recording, monitoring, or reporting requirements that are time-specific shall be in accordance with the effective date of the permit, which defines day one.
[Rule 62-213.440, F.A.C.]

10. The permittee shall submit all compliance related notifications and reports required of this permit to the Department's South District office:

Department of Environmental Protection
South District
2295 Victoria Avenue, Suite 364
Fort Myers, Florida 33901-3381
Telephone: 941/332-6975
Fax: 941/332-6969

11. Any reports, data, notifications, certifications, and requests required to be sent to the United States Environmental Protection Agency, Region 4, should be sent to:

United States Environmental Protection Agency
Region 4
Air, Pesticides & Toxics Management Division
Air & EPCRA Enforcement Branch, Air Enforcement Section
61 Forsyth Street
Atlanta, Georgia 30303
Telephone: 404/562-9155
Fax: 404/562-9163 or 404/562-9164

Section III. Emissions Unit(s) and Conditions.

Subsection A. This section addresses the following emissions units.

E.U. ID No.	Brief Description
-001	Municipal Waste Combustion Unit No. 1
-002	Municipal Waste Combustion Unit No. 2

The two Municipal Waste Combustor (MWC) emissions units are identical in configuration, and each has a nameplate rating of 275 MMBtu/hr. Distal Termica manufactured both units. The serial numbers are A2900 and A2901. Emissions are controlled by a dry scrubber, fabric filter baghouse, and mercury and nitrogen (SNCR) abatement systems. Using lime slurry, the scrubber neutralizes any acid-forming gases, such as sulfur oxides and hydrogen chloride. The baghouse captures the particulate matter. Captured dry ash particles fall into hoppers and are transported by an enclosed conveyor system to the bottom ash discharger where they are wetted to prevent dust, and mixed with the bottom ash. Activated carbon is injected into the flue gases prior to the baghouse to control mercury emissions. Stack height is 275 feet. The emissions units' initial startup date was in August of 1994.

{Permitting note(s): These emissions units are regulated under NSPS - 40 CFR 60, Subpart Cb, Emission Guidelines and Compliance Times for Large Municipal Waste Combustors That Are Constructed on or Before September 20, 1994, adopted and incorporated by reference in Rule 62-204.800(7), F.A.C.; Rule 212.400(5), F.A.C., Prevention of Significant Deterioration (PSD)(Permit No. PSD-FL-151); Rule 62-212.400(6), F.A.C., Best Available Control Technology (BACT) Determination. Also please note that conditions in 40 CFR 60, Subpart Cb, are contained in 40 CFR 60, Subpart Eb.}

Status of Compliance with Increments of Progress for Title V Permit.

The following provides a status of Lee County's progress toward compliance with 40 CFR 60, Subpart Cb, emission requirements for its MWCs.

The Lee County Resource Recovery Facility underwent annual stack testing October 23, 1995 to October 30, 1995. The facility's air emissions were tested for particulate matter, PM₁₀, opacity, arsenic, beryllium, lead, mercury, sulfuric acid mist, fluorides, nitrogen oxides, hydrogen chloride, dioxin/furans, carbon monoxide, total hydrocarbons, and sulfur dioxide. These tests have since been conducted on an annual basis. The results have demonstrated that the facility was in compliance with the emissions limits established in Permit No. PSD-FL-151.

The facility also owns and operates continuous emissions monitors (CEMS) for the following pollutants: carbon monoxide, oxygen, oxides of nitrogen, opacity, and sulfur dioxide. Any exceedances are reported on a quarterly basis to FDEP.

The following conditions apply to the emissions unit(s) listed above:

General

A.1. Definitions. For the purposes of Rule 62-204.800(7), F.A.C., the definitions contained in the various provisions of 40 CFR 60, shall apply except that the term "Administrator" when used in 40 CFR 60, shall mean the Secretary or the Secretary's designee.

[40 CFR 60.2; Rule 62-204.800(7)(a), F.A.C.]

A.2. Circumvention. No owner or operator subject to the provisions of 40 CFR 60 shall build, erect, install, or use any article, machine, equipment or process, the use of which conceals an emission which would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous diluents to achieve compliance with an opacity standard or with a standard which is based on the concentration of a pollutant in the gases discharged to the atmosphere.

[40 CFR 60.12]

A.3. The combustor boilers shall have a metal nameplate affixed in a conspicuous place on the shell showing the manufacturer, model number, type of waste, and rated capacity.

[PSD-FI-151]

A.4. Combustion efficiency shall be calculated by: $\%CE = (1/(1+(CO/CO_2))) \times 100$, and shall be at least 99.5% for an 8 hour average.

[PSD-FL-151]

A.5. A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation, any other preventable upset condition, or preventable equipment breakdown shall not be considered malfunctions.

[PSD-FL-151]

Essential Potential to Emit (PTE) Parameters

A.6. Capacity.

(a) Each of the MWCs have a design rated capacity of 660 tons of municipal solid waste (MSW) per day, and 275 MMBtu heat input per hour, and 186,200 lbs/hour of steam based on a heating value of 5,000 Btu/lb of MSW.

(b) The procedures specified in paragraph (1), below, shall be used for calculating municipal waste combustor unit capacity as defined under 40 CFR 60.51b.

(1) For municipal waste combustor units capable of combusting municipal solid waste continuously for a 24-hour period, municipal waste combustor unit capacity shall be calculated based on 24 hours of operation at the maximum charging rate. The maximum charging rate shall be determined as specified in paragraphs (i) and (ii) as applicable.

(i) For combustors that are designed based on heat capacity, the maximum charging rate shall be calculated based on the maximum design heat input capacity of the unit and a heating value of 12,800 kilojoules per kilogram for combustors firing refuse-derived fuel and a heating value of 10,500 kilojoules per kilogram for combustors firing municipal solid waste that is not refuse-derived fuel.

(ii) For combustors that are not designed based on heat capacity, the maximum charging rate shall be the maximum design charging rate.

[40 CFR 60.31b and 40 CFR 60.58b(j); Rules 62-4.160(2) and 62-210.200(PTE), F.A.C.; and PSD-FL-151]

A.7. Emissions Unit Operating Rate Limitation After Testing. See Specific Condition A.62.

[Rule 62-297.310(2), F.A.C.]

A.8. Maximum Demonstrated Municipal Waste Combustor Unit Load. Maximum demonstrated municipal waste combustor unit load (as determined in Specific Condition A.6.) means the highest 4-hour arithmetic average municipal waste combustor unit load achieved during four consecutive hours during

the most recent dioxin/furan performance test demonstrating compliance with the applicable limit for municipal waste combustor organics specified in Specific Condition A.32.
[40 CFR 60.34b(b) and 40 CFR 60.51b]

A.9. Maximum Demonstrated Particulate Matter Control Device Temperature. Maximum demonstrated particulate matter control device temperature means the highest 4-hour arithmetic average flue gas temperature measured at the particulate matter control device inlet during four consecutive hours during the most recent dioxin/furan performance test demonstrating compliance with the applicable limit for municipal waste combustor organics specified in Specific Condition A.32.
[40 CFR 60.34b(b) and 40 CFR 60.51b]

A.10. Methods of Operation.

A.10.1. Allowable Fuels. The only fuels allowed to be burned in the MWC units are solid wastes allowed by this permit, and natural gas and propane as auxiliary fuels. Other wastes shall not be burned without written prior approval from the Department. Lee County shall minimize emissions of mercury through a battery collection program. Chromium compounds shall not be used as an additive in the cooling tower water.

The primary fuel for the facility is municipal solid waste (MSW), including the items and materials that fit within the definition of MSW contained in either 40 CFR 60.51b or Section 403.706(5), Florida Statutes (1995).

Subject to the limitations contained in this permit, the authorized fuels for the facility also include the other solid wastes that are not MSW which are described below. However, the facility shall not burn:

- (a) those materials that are prohibited by state or federal law;
- (b) those materials that are prohibited by this permit;
- (c) lead acid batteries;
- (d) hazardous waste;
- (e) nuclear waste;
- (f) radioactive waste;
- (g) sewage sludge;
- (h) explosives.
- (i) beryllium-containing waste, as defined in 40 CFR 61, Subpart C.

Further, the facility shall not knowingly burn:

- (j) nickel-cadmium batteries pursuant to Section 403.7192(3);
- (k) mercury containing devices and lamps pursuant to Sections 403.7186(2) & (3);
- (l) untreated biomedical waste from biomedical waste generators regulated pursuant to Chapter 64E-16, F.A.C., and from other similar generators (or sources);
- (m) segregated loads of biological waste.

{Permitting Note: See the attached Appendix BW, Biomedical Waste Definitions, for definitions of what constitutes biomedical waste.}

The fuel may be received either as a mixture or as a single-item stream (segregated load) of discarded materials. If the facility intends to use an authorized fuel that is segregated non-MSW material, the fuel shall be either:

- (a) well mixed with MSW in the refuse pit; or
- (b) alternately charged with MSW in the hopper.

The facility operator shall prepare and maintain records concerning the description and quantities of all segregated loads of non-MSW material which are received and used as fuel at the facility, and subject to percentage weight limitations, below. For the purposes of this permit, a segregated load is defined to mean a container or truck that is almost completely or exclusively filled with a single item or homogeneous composition of waste material, as determined by visual observation.

To ensure that the facility's fuel does not adversely affect the facility's combustion process or emissions, the facility operator shall:

- (a) comply with good combustion operating practices in accordance with 40 CFR 60.53b;
- (b) install, operate and maintain continuous emissions monitors (CEMS) for oxygen, carbon monoxide, sulfur dioxide, oxides of nitrogen and temperature in accordance with 40 CFR 60.58b; and
- (c) record and maintain the CEMS data in accordance with 40 CFR 60.59b.

These steps shall be used to ensure and verify continuous compliance with the emissions limitations in this permit.

Natural gas or propane may be used as fuel during warm-up, startup, shutdown, and malfunction periods, and at other times when necessary and consistent with good combustion practices.

Subject to the conditions and limitations contained in this permit, the following other solid waste may be used as fuel at the facility:

- (a) Confidential, proprietary or special documents (including but not limited to business records, lottery tickets, event tickets, coupons and microfilm);
- (b) Contraband which is being destroyed at the request of appropriately authorized local, state or federal governmental agencies, provided that such material is not an explosive, a propellant, a hazardous waste, or otherwise prohibited at the facility. For the purposes of this section, contraband includes but is not limited to drugs, narcotics, fruits, vegetables, plants, counterfeit money, and counterfeit consumer goods;
- (c) Wood pallets, clean wood, and land clearing debris;
- (d) Packaging materials and containers;
- (e) Clothing, natural and synthetic fibers, fabric remnants, and similar debris, including but not limited to aprons and gloves; or
- (f) Rugs, carpets, and floor coverings, but not asbestos-containing materials or polyethylene or polyurethane vinyl floor coverings.
- (g) The predominantly combustible fraction of sorted construction and demolition debris. Sorting of mixed construction and demolition debris at the facility shall occur on the tipping floor or at another location approved by the Department.

Subject to the conditions and limitations contained in this permit, waste tires may be used as fuel at the facility. The total quantity of waste tires received as segregated loads and burned at the facility shall not exceed 3%, by weight, of the facility's total fuel, except as provided in the following sentence. Subsequent to an initial test burn scheduled to allow Department representatives to observe, while firing 5% (by weight) tires at each of the combustion units while operating each unit at capacity that demonstrates via the CEMS that each unit can comply with the emission limits for pollutants monitored by the CEMS while firing 5% (by weight) tires, this quantity limitation shall rise from 3% to 5%. Compliance with this limitation shall be determined on a calendar monthly basis.

Subject to the conditions and limitations contained in this permit, the following other solid waste materials may be used as fuel at the facility (i.e. the following are authorized fuels that are non-MSW material). The total quantity of the following non-MSW material received as segregated

loads and burned at the facility shall not exceed 5%, by weight, of the facility's total fuel. Compliance with this limitation shall be determined on a calendar monthly basis.

- (a) Unsorted mixtures of construction and demolition debris, or that fraction of sorted construction and demolition debris that is predominantly non-combustible. Non-combustible construction and demolition debris shall include concrete, metals, gypsum products, plaster, rock, brick, and masonry.
- (b) Oil spill debris from aquatic, coastal, estuarine or river environments. Such items or materials include but are not limited to rags, wipes, and absorbents.
- (c) Items suitable for human, plant or domesticated animal use, consumption or application where the item's shelf-life has expired or the generator wishes to remove the items from the market. Such items or materials include but are not limited to off-specification or expired consumer products, pharmaceuticals, medications, health and personal care products, cosmetics, foodstuffs, nutritional supplements, returned goods, and controlled substances.
- (d) Consumer-packaged products intended for human or domesticated animal use or application but not consumption. Such items or materials include but are not limited to carpet cleaners, household or bathroom cleaners, polishes, waxes and detergents.
- (e) Waste materials that:
 - (i) are generated in the manufacture of items in categories (c) or (d), above and are functionally or commercially useless (expired, rejected or spent); or
 - (ii) are not yet formed or packaged for commercial distribution. Such items or materials must be substantially similar to other items or materials routinely found in MSW.
- (f) Waste materials that contain oil from:
 - (i) the routine cleanup of industrial or commercial establishments and machinery; or
 - (ii) spills of virgin or used petroleum products. Such items or materials include but are not limited to rags, wipes, and absorbents.
- (g) Used oil and used oil filters. Used oil containing a PCB concentration equal or greater than 50 ppm shall not be burned, pursuant to the limitations of 40 CFR 761.20(e).

{Permitting Note: Waste materials specifically authorized in paragraphs (a) – (g), above, do not require Department approval.}

- (h) Waste materials generated by manufacturing, industrial or agricultural activities, provided that these items or materials are substantially similar to items or materials that are found routinely in MSW, subject to prior approval of the Department.

The following records shall be made and kept to demonstrate compliance with the segregated non-MSW percentage limitations of this condition:

Each segregated load of non-MSW materials, that is subject to the percentage weight limitations of this condition, which is received for processing shall be documented as to waste description and weight. The weight of all waste materials received for processing shall be measured using the facility truck scale and recorded.

Each day the total weight of segregated tires received shall be computed, and the daily total shall be added to the sum of the daily totals from the previous days in the current calendar month. At the end of each calendar month, the resultant monthly total weight of tires shall be divided by the total weight of all waste materials received in the same calendar month, and the resultant number shall be multiplied by 100 to express the ratio in percentage terms. The percentage computed shall be compared to the 3% or 5% limitation, whichever is applicable.

Each day the total weight of segregated non-MSW materials received that are subject to the 5% restriction shall be computed, and the daily total shall be added to the sum of the daily totals from the previous days in the current calendar month. At the end of each calendar month, the resultant monthly total weight of segregated non-MSW materials shall be divided by the total weight of all waste materials received in the same calendar month, and the resultant number shall be multiplied by 100 to express the ratio in percentage terms. The percentage computed shall be compared to the 5% limitation.

[Rules 62-4.070(3), 62-213.410 & 62-213.440, F.A.C.; PSD-FL-151; and, request of the applicant]

A.10.2. Auxiliary Fuel Burners. These devices shall be used at startup during the introduction of MSW fuel until design furnace gas temperature is achieved. They shall be fueled only with natural gas or propane. If the annual capacity value for natural gas is greater than 10%, as determined by 40 CFR 60.43b(d), the facility shall be subject to 40 CFR 60.44b, Standards for Nitrogen Oxides.

[Rules 62-4.070(3), 62-4.160(2), and 62-210.200, F.A.C.; 40 CFR 60.40b(d), PSD-FL-151]

A.10.3. Start-up and Shutdown Procedures. During start-up and shut-down, the auxiliary burners shall be fired as needed to ensure proper combustion of wastes consistent with good operating practices as specified in 40 CFR 60.53b.

[PSD-FL-151A]

A.11. Hours of Operation. These emissions units are allowed to operate continuously, i.e., 8,760 hours/year.

[Rule 62-210.200(PTE), F.A.C.; PSD-FL-151]

Operating Practices and Requirements

A.12. No owner or operator of an affected facility shall cause such facility to operate at a load level greater than 110 percent of the maximum demonstrated municipal waste combustor unit load as defined in Specific Condition A.6., except as specified below. The averaging time is specified in Specific Condition A.14.

(1) During the annual dioxin/furan performance test and the two weeks preceding the annual dioxin/furan performance test, no municipal waste combustor unit load limit is applicable.

(2) The municipal waste combustor unit load limit may be waived in accordance with permission granted by the Administrator or delegated State regulatory authority for the purpose of evaluating system performance, testing new technology or control technologies, diagnostic testing, or related activities for the purpose of improving facility performance or advancing the state-of-the-art for controlling facility emissions.

[40 CFR 60.34b(b) and 40 CFR 60.53b(b)]

A.13. No owner or operator of an affected facility shall cause such facility to operate at a temperature, measured at the particulate matter control device inlet, exceeding 17°C above the maximum demonstrated particulate matter control device temperature as defined in Specific Condition A.9., except as specified below. The averaging time is specified in Specific Condition A.14. These requirements apply to each particulate matter control device utilized at the affected facility.

(1) During the annual dioxin/furan performance test and the two weeks preceding the annual dioxin/furan performance test, no particulate matter control device temperature limitations are applicable.

(2) The particulate matter control device temperature limits may be waived in accordance with permission granted by the Administrator or delegated State regulatory authority for the purpose of evaluating system performance, testing new technology or control technologies, diagnostic testing, or related activities for the purpose of improving facility performance or advancing the state-of-the-art for controlling facility emissions.

[40 CFR 60.34b(b) and 40 CFR 60.53b(c)]

A.14. Operating Requirements. The procedures specified in paragraphs (1) through (12) shall be used for determining compliance with the operating requirements under 40 CFR 60.53b.

- (1) Compliance with the carbon monoxide emission limits in 40 CFR 60.53b(a) shall be determined using a 4-hour block arithmetic average for all types of affected facilities except mass burn rotary waterwall municipal waste combustors and refuse-derived fuel stokers.
- (2) For affected mass burn rotary waterwall municipal waste combustors and refuse-derived fuel stokers, compliance with the carbon monoxide emission limits in 40 CFR 60.53b(a) shall be determined using a 24-hour daily arithmetic average.
- (3) The owner or operator of an affected facility shall install, calibrate, maintain, and operate a continuous emission monitoring system for measuring carbon monoxide at the combustor outlet and record the output of the system and shall follow the procedures and methods specified in paragraphs(i) through(iii).
 - (i) The continuous emission monitoring system shall be operated according to Performance Specification 4A in appendix B of 40 CFR 60.
 - (ii) During each relative accuracy test run of the continuous emission monitoring system required by Performance Specification 4A in appendix B of 40 CFR 60, carbon monoxide and oxygen (or carbon dioxide) data shall be collected concurrently (or within a 30- to 60-minute period) by both the continuous emission monitors and the test methods specified in paragraphs (A) and(B).
 - (A) For carbon monoxide, EPA Reference Method 10, 10A, or 10B shall be used.
 - (B) For oxygen (or carbon dioxide), EPA Reference Method 3, 3A, or 3B, as applicable shall be used.
 - (iii) The span value of the continuous emission monitoring system shall be 125 percent of the maximum estimated hourly potential carbon monoxide emissions of the municipal waste combustor unit.
- (4) The 4-hour block and 24-hour daily arithmetic averages specified in paragraphs (1) and (2) shall be calculated from 1-hour arithmetic averages expressed in parts per million by volume corrected to 7 percent oxygen (dry basis). The 1-hour arithmetic averages shall be calculated using the data points generated by the continuous emission monitoring system. At least two data points shall be used to calculate each 1-hour arithmetic average.
- (5) The owner or operator of an affected facility may request that compliance with the carbon monoxide emission limit be determined using carbon dioxide measurements corrected to an equivalent of 7 percent oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established as specified in 40 CFR 60.58b(b)(6).
- (6) The procedures specified in paragraphs (i) through (v) shall be used to determine compliance with load level requirements under 40 CFR 60.53b(b).
 - (i) The owner or operator of an affected facility with steam generation capability shall install, calibrate, maintain, and operate a steam flow meter or a feedwater flow meter; measure steam (or feedwater) flow in kilograms per hour (or pounds per hour) on a continuous basis; and record the output of the monitor. Steam (or feedwater) flow shall be calculated in 4-hour block arithmetic averages.
 - (ii) The method included in the "American Society of Mechanical Engineers Power Test Codes: Test Code for Steam Generating Units, Power Test Code 4.1-1964 (R1991)" section 4 (incorporated by reference, see 40 CFR 60.17) shall be used for calculating the steam (or feedwater) flow required under paragraph (6)(i). The recommendations in "American Society of Mechanical Engineers Interim Supplement 19.5 on Instruments and Apparatus: Application, Part II of Fluid Meters, 6th edition (1971)," chapter 4 (incorporated by reference-see 40 CFR 60.17) shall be followed for design, construction, installation, calibration, and use of nozzles and orifices except as specified in (iii).
 - (iii) Measurement devices such as flow nozzles and orifices are not required to be recalibrated after they are installed.

- (iv) All signal conversion elements associated with steam (or feedwater flow) measurements must be calibrated according to the manufacturer's instructions before each dioxin/furan performance test, and at least once per year.
- (7) To determine compliance with the maximum particulate matter control device temperature requirements under 40 CFR 60.53b(c), the owner or operator of an affected facility shall install, calibrate, maintain, and operate a device for measuring on a continuous basis the temperature of the flue gas stream at the inlet to each particulate matter control device utilized by the affected facility. Temperature shall be calculated in 4-hour block arithmetic averages.
- (8) The maximum demonstrated municipal waste combustor unit load shall be determined during the initial performance test for dioxins/furans and each subsequent performance test during which compliance with the dioxin/furan emission limit specified in 40 CFR 60.52b(c) is achieved. The maximum demonstrated municipal waste combustor unit load shall be the highest 4-hour arithmetic average load achieved during four consecutive hours during the most recent test during which compliance with the dioxin/furan emission limit was achieved.
- (9) For each particulate matter control device employed at the affected facility, the maximum demonstrated particulate matter control device temperature shall be determined during the initial performance test for dioxins/furans and each subsequent performance test during which compliance with the dioxin/furan emission limit specified in 40 CFR 60.52b(c) is achieved. The maximum demonstrated particulate matter control device temperature shall be the highest 4-hour arithmetic average temperature achieved at the particulate matter control device inlet during four consecutive hours during the most recent test during which compliance with the dioxin/furan limit was achieved.
- (10) At a minimum, valid continuous emission monitoring system hourly averages shall be obtained as specified in paragraphs(i) and(ii) for 75 percent of the operating hours per day for 90 percent of the operating days per calendar quarter that the affected facility is combusting municipal solid waste.
- (i) At least two data points per hour shall be used to calculate each 1-hour arithmetic average.
- (ii) At a minimum, each carbon monoxide 1-hour arithmetic average shall be corrected to 7 percent oxygen on an hourly basis using the 1-hour arithmetic average of the oxygen (or carbon dioxide) continuous emission monitoring system data.
- (11) All valid continuous emission monitoring system data must be used in calculating the parameters specified under 40 CFR 60.58b(i) even if the minimum data requirements of paragraph (10) are not met. When carbon monoxide continuous emission data are not obtained because of continuous emission monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments, emissions data shall be obtained using other monitoring systems as approved by the Administrator or EPA Reference Method 10 to provide, as necessary, the minimum valid emission data.
- (12) Quarterly accuracy determinations and daily calibration drift tests for the carbon monoxide continuous emission monitoring system shall be performed in accordance with procedure 1 in appendix F of 40 CFR 60.
- [40 CFR 60.38b and 40 CFR 60.58b(i)]

A.15. Operating procedures. The emission limitations for this facility shall apply at all times, except during periods of startup, shut down, or malfunctions, provided that the duration of startup, shut down and malfunction periods shall not exceed three hours per occurrence. The startup period commences when the affected facility begins the continuous burning of municipal solid waste and does not include any warm-up period when the affected facility is combusting natural gas or propane, and no municipal solid waste is being fed to the combustor. Continuous burning is the continuous, semi-continuous, or batch feeding of municipal solid waste for purposes of waste disposal, energy production, or providing heat to the combustion system in preparation for waste disposal or energy production. The use of municipal solid waste solely to provide thermal protection of the grate or hearth during the startup period when municipal solid waste is not being fed to the grate is not considered to be continuous burning. During all periods of startup, shut down and malfunction, the owner or operator shall use best operational

practices to minimize air pollutant emissions. The owner or operator shall maintain a manual that identifies and describes best operational practices that will be used during periods of startup, shut down and malfunction at this facility.

[Rules 62-4.070(3), and 62-210.700(1) and (5), F.A.C.; 40 CFR 60.38b and 40 CFR 60.58b(a); PSD-FL-151B; and, request of the applicant]

Operator Training and Certification

A.16. Standards for municipal waste combustor operator training and certification.

- (a) No later than the date 6 months after the date of startup of an affected facility or 12 months after State plan approval [40 CFR 60.39b(c)(4)(ii)], whichever is later, each chief facility operator and shift supervisor shall obtain and maintain a current provisional operator certification from either the American Society of Mechanical Engineers [QRO-1-1994 (incorporated by reference - see 40 CFR 60.17 of Subpart A)], or a State certification program.
- (b) No later than the date 6 months after the date of startup of an affected facility or 12 months after State plan approval [40 CFR 60.39b(c)(4)(ii)], whichever is later, each chief facility operator and shift supervisor shall have completed full certification or shall have scheduled a full certification exam with either the American Society of Mechanical Engineers [QRO-1-1994 (incorporated by reference - see 40 CFR 60.17 of Subpart A)] or a State certification program.
- (c) No owner or operator of an affected facility shall allow the facility to be operated at any time unless one of the following persons is on duty and at the affected facility: A fully certified chief facility operator, a provisionally certified chief facility operator who is scheduled to take the full certification exam according to the schedule specified in paragraph (b), a fully certified shift supervisor, a provisionally certified shift supervisor who is scheduled to take the full certification exam according to the schedule specified in paragraph (b).
 - (1) The requirement specified in paragraph (c) shall take effect 6 months after the date of startup of the affected facility or 12 months after State plan approval [40 CFR 60.39b(c)(4)(ii)], whichever is later.
 - (2) If one of the persons listed in paragraph (c) must leave the affected facility during their operating shift, a provisionally certified control room operator who is onsite at the affected facility may fulfill the requirement in paragraph (c).
- (d) All chief facility operators, shift supervisors, and control room operators at affected facilities must complete the EPA or State municipal waste combustor operator training course no later than the date 6 months after the date of startup of the affected facility, or by 12 months after State plan approval [40 CFR 60.39b(c)(4)(iii)], whichever is later.
- (e) The owner or operator of an affected facility shall develop and update on a yearly basis a site-specific operating manual that shall, at a minimum, address the elements of municipal waste combustor unit operation specified in paragraph (e)(1) through (e)(11).
 - (1) A summary of the applicable standards;
 - (2) A description of basic combustion theory applicable to a municipal waste combustor unit;
 - (3) Procedures for receiving, handling, and feeding municipal solid waste;
 - (4) Municipal waste combustor unit startup, shutdown, and malfunction procedures;
 - (5) Procedures for maintaining proper combustion air supply levels;
 - (6) Procedures for operating the municipal waste combustor unit within the standards established;
 - (7) Procedures for responding to periodic upset or off-specification conditions;
 - (8) Procedures for minimizing particulate matter carryover;
 - (9) Procedures for handling ash;
 - (10) Procedures for monitoring municipal waste combustor unit emissions; and
 - (11) Reporting and recordkeeping procedures.
- (f) The owner or operator of an affected facility shall establish a training program to review the operating manual according to the schedule specified in paragraphs (f)(1) and (f)(2) with each person who has

responsibilities affecting the operation of an affected facility including, but not limited to, chief facility operators, shift supervisors, control room operators, ash handlers, maintenance personnel, and crane/load handlers.

- (1) Each person specified in paragraph (f) shall undergo initial training no later than the date specified in paragraph (f)(1)(i), (f)(1)(ii), or (f)(1)(iii), whichever is later.
 - (i) The date 6 months after the date of startup of the affected facility;
 - (ii) The date prior to the day the person assumes responsibilities affecting municipal waste combustor unit operation; or
 - (iii) 12 months after State plan approval [40 CFR 60.39b(c)(4)(iii)].
 - (2) Annually, following the initial review required by paragraph (f)(1).
 - (g) The operating manual required by paragraph (e) shall be kept in a readily accessible location for all persons required to undergo training under paragraph (f). The operating manual and records of training shall be available for inspection by the EPA or its delegated enforcement agency upon request.
 - (3) A list of all certified personnel shall be submitted to the South District Office. The Permittee/Operator shall inform the District office of any planned training sessions so that Department staff may attend any such training sessions related to operation and maintenance of air pollution control devices.
- [40 CFR 60.35b, 40 CFR 60.39b(c)(4)(ii) & (iii), and 40 CFR 60.54b, PSD-FL-151]

A.17. The requirement specified in 40 CFR 60.54b(d) does not apply to chief operators, shift supervisors, and control room operators who have obtained full certification from the American Society of Mechanical Engineers on or before the date of State plan approval.
[40 CFR 60.39b(c)(4)(iii)(A)]

A.18. The owner or operator of a designated facility may request that the EPA Administrator waive the requirement specified in 40 CFR 60.54b(d) for chief operators, shift supervisors, and control room operators who have obtained provisional certification from the American Society of Mechanical Engineers on or before the date of State plan approval.
[40 CFR 60.39b(c)(4)(iii)(B)]

A.19. The initial training requirements specified in 40 CFR 60.54b(f)(1) shall be completed no later than the date specified in (1), (2), or (3), whichever is later.

- (1) The date six (6) months after the date of startup of the affected facility;
- (2) Twelve (12) months after State plan approval; or
- (3) The date prior to the day when the person assumes responsibilities affecting municipal waste combustor unit operation.

[40 CFR 60.39b(c)(4)(iii)(C)]

Emission Limitations and Standards

{Permitting note: Table 1-1, Summary of Air Pollutant Standards and Terms, summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.}

A.20. For good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions for the pollutants CO, VOC, F, NH₃, SO₂, NO_x, Pb, Be, Hg, dioxins and furans, and visible emissions. The Department shall allow the permittee reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time.
[PSD-FL-151]

Particulate Matter

A.21. The emission limit for PM/PM₁₀ contained in the gases discharged to the atmosphere is 0.010 grains/dry standard cubic foot; 5.34 lbs/hr per unit; and 21.3 tons/year per unit, corrected to 7 percent oxygen.

[PSD-FL-151]

Visible Emissions

A.22. The emission limit for opacity exhibited by the gases discharged to the atmosphere is 10 percent (6-minute average).

[40 CFR 60.33b(a)(1)(iii)]

Cadmium

A.23. The emission limit for cadmium contained in the gases discharged to the atmosphere is 0.040 milligrams per dry standard cubic meter, corrected to 7 percent oxygen.

[40 CFR 60.33b(a)(2)(i)]

Mercury

A.24. The emission limit for mercury contained in the gases discharged to the atmosphere is 0.070 milligrams per dry standard cubic meter or 15 percent of the potential mercury emission concentration (85-percent reduction by weight), corrected to 7 percent oxygen, whichever is less stringent.

[40 CFR 60.33b(a)(3) and Rule 62-296.416(3)(a)1., F.A.C.]

A.25. Flue gas emissions from each unit shall not exceed 0.000138 lb/MMBtu, 0.0379 lbs/hour per unit and 0.166 tons/year per unit.

[PSD-FL-151]

Lead

A.26. In no case shall lead emissions exceed 0.00060 lbs/MMBtu, 0.165 lbs/hour per unit and 0.66 tons/year per unit.

[PSD-FL-151]

Fluoride

A.27. Flue gas emissions from each unit shall not exceed 5.0 parts per million, by volume, corrected to 7 percent oxygen. In no case shall emissions exceed 0.0035 lb/MMBtu, 0.96 lbs/hour per unit, and 3.8 tons/year per unit.

[PSD-FL-151]

Beryllium

A.28. Flue gas emissions from each unit shall not exceed 1.35×10^{-7} lb/MMBtu heat input, 3.70×10^{-5} lbs/hour per unit and 1.47×10^{-4} tons/year per unit.

[PSD-FL-151]

Volatile Organic Compounds

A.29. Flue gas emissions from each unit shall not exceed 37 parts per million, by volume, corrected to 7 percent oxygen. In no case shall emissions exceed 0.021lb/MMBtu, 5.80 lbs/hour per unit, and 23 tons/year per unit.
[PSD-FL-151]

Sulfur Dioxide

A.30. The emission limit for sulfur dioxide contained in the gases discharged to the atmosphere is 29 parts per million, by volume, or 20 percent of the potential sulfur dioxide emission concentration (80-percent reduction by weight or volume), corrected to 7 percent oxygen (dry basis), whichever is less stringent. Compliance with this emission limit is based on a 24-hour daily geometric mean.
[40 CFR 60.33b(b)(3)(i), PSD-FL-151]

Hydrogen Chloride

A.31. The emission limit for hydrogen chloride contained in the gases discharged to the atmosphere is 25 parts per million, by volume, or 5 percent of the potential hydrogen chloride emission concentration (95-percent reduction by weight or volume), corrected to 7 percent oxygen (dry basis), whichever is less stringent.
[40 CFR 60.33b(b)(3)(ii), PSD-FL-151]

Dioxins/Furans

A.32. The emission limit for dioxins/furans contained in the gases discharged to the atmosphere that do not employ an electrostatic precipitator-based emission control system is 30 nanograms per dry standard cubic meter (total mass), corrected to 7 percent oxygen. In no case shall emissions exceed 2.54×10^{-8} lbs/MMBtu heat input, 7.0×10^{-6} lbs/hour per unit, and 2.80×10^{-5} tons/year per unit.
[40 CFR 60.33b(c)(1)(ii), PSD-FL-151]

Nitrogen Oxides

A.33. The emission limit for nitrogen oxides contained in the gases discharged to the atmosphere is 180 parts per million, by volume, corrected to 7 percent oxygen, dry basis. Compliance with this emission limit is based on a 24 hour daily block average (midnight to midnight). In no case shall NO_x emissions exceed 0.290 lb/MMBtu, 80 lbs/hour per unit and 320 tons/year per unit.
[40 CFR 60.33b(d), PSD-FL-151]

Carbon Monoxide

A.34. The emission limit for carbon monoxide contained in the gases discharged to the atmosphere is 100 parts per million, by volume, measured at the combustor outlet in conjunction with a measurement of oxygen concentration, corrected to 7 percent oxygen, dry basis. Calculated as an arithmetic average. Averaging time is a 4-hour block average, beginning at midnight. In No case shall CO emissions exceed 0.10 lb/MMBtu, 27.2 lbs/hour per unit, and 108 tons/year per unit.
[40 CFR 60.34b(a), PSD-FL-151]

Sulfuric Acid Mist

A.35. In no case shall H_2SO_4 emissions exceed 0.036 lbs/MMBtu, 9.85 lbs/hour per unit, and 39.3 tons/year per unit.
[PSD-FL-151]

Arsenic

A.36. In no case shall arsenic emissions exceed 9.10×10^{-6} lbs/MMBtu, 2.50×10^{-3} lbs/hour per unit, and 0.01 tons/year per unit
[PSD-FL-151]

Ammonia

A.37. In no case shall ammonia slip from exhaust gases exceed 50 parts per million, by volume.
[PSD-FL-151]

Fugitive Ash Visible Emissions

A.38. Fugitive Ash Visible Emissions.

(a) On and after the date on which the initial performance test is completed or is required to be completed under 40 CFR 60.8 of Subpart A, no owner or operator of an affected facility shall cause to be discharged to the atmosphere visible emissions of combustion ash from an ash conveying system (including conveyor transfer points) in excess of 5 percent of the observation period (i.e., 9 minutes per 3-hour period), as determined by EPA Reference Method 22 observations as specified in 40 CFR 60.58b(k), except as provided in paragraphs (b) and (c). See Specific Condition A.60.

(b) The emission limit specified in paragraph (a) does not cover visible emissions discharged inside buildings or enclosures of ash conveying systems; however, the emission limit specified in paragraph (a) does cover visible emissions discharged to the atmosphere from buildings or enclosures of ash conveying systems.

(c) The provisions of paragraph (a) do not apply during maintenance and repair of ash conveying systems.

[40 CFR 60.36b and 40 CFR 60.55b]

Excess Emissions

{Permitting Note: The Excess Emissions Rule at Rule 62-210.700, F.A.C., cannot vary any requirement of an NSPS, NESHAP, or Acid Rain program provision.}

A.39. The opacity standards set forth in 40 CFR 60 shall apply at all times except during periods of startup, shutdown, malfunction, and as otherwise provided in the applicable standard.
[40 CFR 60.11(c)]

A.40. At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source.

[40 CFR 60.11(d)]

A.41. Startup, Shutdown and Malfunction. The provisions for startup, shutdown, and malfunction are provided in paragraph (1).

(1) The standards under 40 CFR 60, Subpart Cb, as incorporated in Rule 62-204.800(8)(b), F.A.C., apply at all times except during periods of startup, shutdown, or malfunction. Duration of startup or shutdown periods is limited to 3 hours per occurrence.

(i) The startup period commences when the affected facility begins the continuous burning of municipal solid waste and does not include any warm-up period when the affected facility is combusting fossil fuel or other nonmunicipal solid waste fuel, and no municipal solid waste is being fed to the combustor.

(ii) Continuous burning is the continuous, semicontinuous, or batch feeding of municipal solid waste for purposes of waste disposal, energy production, or providing heat to the combustion system in preparation for waste disposal or energy production. The use of municipal solid waste solely to provide thermal protection of the grate or hearth during the startup period when municipal solid waste is not being fed to the grate is not considered to be continuous burning.

[40 CFR 60.38b and 40 CFR 60.58b(a)]

A.42. [Reserved]

A.43. Excess emissions which are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure which may reasonably be prevented during startup, shutdown or malfunction shall be prohibited.

[Rule 62-210.700(4), F.A.C., PSD-FL-151]

Test Methods and Procedures

{Permitting note: Table 2-1, Summary of Compliance Requirements, summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.}

A.44. Performance tests shall be conducted under such conditions as the Administrator shall specify to the plant operator based on representative performance of the affected facility. The owner or operator shall make available to the Administrator such records as may be necessary to determine the conditions of the performance tests. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a performance test nor shall emissions in excess of the level of the applicable emission limit during periods of startup, shutdown, and malfunction be considered a violation of the applicable emission limit unless otherwise specified in the applicable standard. A test protocol shall be submitted for approval to the Department's South Florida District Office and to the Bureau of Air regulation at least 90 days prior to testing. This protocol shall include details on how the weight percentage of used tires in the MSW stream will be accounted for during the compliance testing.

[40 CFR 60.8(c), PSD-FL-151]

A.45. The weight of MSW being fed to each combustor during the stack test shall be continuously monitored and recorded by a weighing device which is properly calibrated. Stack tests shall be conducted upstream and downstream of the applicable control device for SO₂, Hg and HCl. Soot blowers shall be operated in a mode consistent with the normal cleaning requirements of the system during the compliance testing.

[PSD-FL-151]

Particulate Matter and Opacity

A.46. The procedures and test methods specified in paragraphs (1) through (11) shall be used to determine compliance with the emission limits for particulate matter and opacity.

- (1) The EPA Reference Method 1 shall be used to select sampling site and number of traverse points.
- (2) The EPA Reference Method 3, 3A, or 3B, as applicable shall be used for gas analysis.
- (3) The EPA Reference Method 5 shall be used for determining compliance with the particulate matter emission limit. The minimum sample volume shall be 1.7 cubic meters. The probe and filter holder heating systems in the sample train shall be set to provide a gas temperature no greater than 160 ± 14 °C. An oxygen or carbon dioxide measurement shall be obtained simultaneously with each Method 5 run.
- (4) The owner or operator of an affected facility may request that compliance with the particulate matter emission limit be determined using carbon dioxide measurements corrected to an equivalent of 7 percent oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established as specified in paragraph (6).
- (5) As specified under 40 CFR 60.8, all performance tests shall consist of three test runs. The average of the particulate matter emission concentrations from the three test runs is used to determine compliance.
- (6) In accordance with paragraphs (7) and (11), EPA Reference Method 9 shall be used for determining compliance with the opacity limit except as provided under 40 CFR 60.11(e). At least one one-hour run to be conducted simultaneously with particulate testing for the emissions from the dry scrubber/baghouse.
- (7) The owner or operator of an affected facility shall conduct an initial performance test for particulate matter emissions and opacity as required under 40 CFR 60.8.
- (8) The owner or operator of an affected facility shall install, calibrate, maintain, and operate a continuous opacity monitoring system for measuring opacity and shall follow the methods and procedures specified in paragraphs (8)(i) through (8)(iv).
 - (i) The output of the continuous opacity monitoring system shall be recorded on a 6-minute average basis.
 - (ii) The continuous opacity monitoring system shall be installed, evaluated, and operated in accordance with 40 CFR 60.13.
 - (iii) The continuous opacity monitoring system shall conform to Performance Specification 1 in appendix B of 40 CFR 60.
 - (iv) The initial performance evaluation shall be completed no later than 180 days after the date of the initial startup of the municipal waste combustor unit, as specified under 40 CFR 60.8.
- (9) Following the date that the initial performance test for particulate matter is completed or is required to be completed under 40 CFR 60.8 for an affected facility, the owner or operator shall conduct a performance test for particulate matter on an annual basis (no more than 12 calendar months following the previous performance test).
- (10) [reserved]
- (11) Following the date that the initial performance test for opacity is completed or is required to be completed under 40 CFR 60.8 for an affected, the owner or operator shall conduct a performance test for opacity on an annual basis (no more than 12 calendar months following the previous performance test) using the test method specified in paragraph (6).
- (12) The EPA Reference Method 201 or 201A shall be used and supplemented with Method 5 to demonstrate compliance with PM_{10} emissions.
[40 CFR 60.38b and 40 CFR 60.58b(c); PSD-FL-151]

Cadmium, Lead and Mercury

A.47. The procedures and test methods specified in paragraphs (1) and (2) shall be used to determine compliance with the emission limits for cadmium, lead, and mercury.

- (1) The procedures and test methods specified in paragraphs (1)(i) through (1)(ix) shall be used to determine compliance with the emission limits for cadmium and lead.

- (i) The EPA Reference Method 1 shall be used for determining the location and number of sampling points.
 - (ii) The EPA Reference Method 3, 3A, or 3B, as applicable, shall be used for flue gas analysis.
 - (iii) The EPA Reference Method 29 shall be used for determining compliance with the cadmium and lead emission limits.
 - (iv) An oxygen or carbon dioxide measurement shall be obtained simultaneously with each Method 29 test run for cadmium and lead required under paragraph (1)(iii).
 - (v) The owner or operator of an affected facility may request that compliance with the cadmium or lead emission limit be determined using carbon dioxide measurements corrected to an equivalent of 7 percent oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established as specified in paragraph 40 CFR 60.58b(b)(6).
 - (vi) All performance tests shall consist of a minimum of three test runs conducted under representative full load operating conditions. The average of the cadmium or lead emission concentrations from three test runs or more shall be used to determine compliance.
 - (vii) Following the date of the initial performance test or the date on which the initial performance test is required to be completed under 40 CFR 60.8, the owner or operator of an affected facility shall conduct a performance test for compliance with the emission limits for cadmium and lead on an annual basis (no more than 12 calendar months following the previous performance test).
 - (viii) [reserved]
 - (ix) [reserved]
- (2) The procedures and test methods specified in paragraphs (2)(i) through (2)(xi) shall be used to determine compliance with the mercury emission limit.
- (i) The EPA Reference Method 1 shall be used for determining the location and number of sampling points.
 - (ii) The EPA Reference Method 3, 3A, or 3B, as applicable, shall be used for flue gas analysis.
 - (iii) The EPA Reference Methods 29 shall be used to determine the mercury emission concentration. The minimum sample volume when using Method 29 for mercury shall be 1.7 cubic meters.
 - (iv) An oxygen (or carbon dioxide) measurement shall be obtained simultaneously with each Method 29 test run for mercury required under paragraph (2)(iii).
 - (v) The percent reduction in the potential mercury emissions (%P_{Hg}) is computed using equation 1:

$$[\%P_{HG}] = \left[\frac{E_i - E_o}{E_i} \right] \times 100 \quad (\text{equation 1})$$

where:

%P_{Hg} = percent reduction of the potential mercury emissions achieved.

E_i = potential mercury emission concentration measured at the control device inlet, corrected to 7 percent oxygen (dry basis).

E_o = controlled mercury emission concentration measured at the mercury control device outlet, corrected to 7 percent oxygen (dry basis).

- (vi) All performance tests shall consist of a minimum of three test runs conducted under representative full load operating conditions. The average of the mercury emission concentrations or percent reductions from three test runs or more is used to determine compliance.
- (vii) The owner or operator of an affected facility may request that compliance with the mercury emission limit be determined using carbon dioxide measurements corrected to an equivalent of 7

percent oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established as specified in paragraph 40 CFR 60.58b(b)(6).

(viii) The owner or operator of an affected facility shall conduct an initial performance test for mercury emissions as required under 40 CFR 60.8.

(ix) Following the date that the initial performance test for mercury is completed or is required to be completed under 40 CFR 60.8, the owner or operator of an affected facility shall conduct a performance test for mercury emissions on an annual basis (no more than 12 calendar months from the previous performance test).

(x) [reserved]

(xi) The owner or operator of an affected facility where activated carbon injection is used to comply with the mercury emission limit shall follow the procedures specified in 40 CFR 60.58b(m) for measuring and calculating carbon usage. See Specific Condition A.103.

[40 CFR 60.38b and 40 CFR 60.58b(d), PSD-FL-151 & 151B]

A.48. Mercury Emissions Test Method and Procedures. All mercury emissions tests performed pursuant to the requirements of this rule shall comply with the following provisions.

1. The test method for mercury shall be EPA Method 29 adopted in Rule 62-297, F.A.C. EPA

2. Test procedures shall meet all applicable requirements of Chapter 62-297, F.A.C.

(4) Flue Gas Temperature Standard. Waste-to-energy facilities choosing to control mercury emissions through the use of post-combustion control equipment designed to remove mercury from flue gases shall comply with the flue gas temperature standard of Rule 62-296.416(4)(a), F.A.C.

(a) Temperature Standard. The flue gas temperature standard set forth in 40 CFR 60.53b(c), incorporated by reference in Rule 62-2-4.800, F.A.C., shall apply.

(b) Temperature Monitoring. The temperature monitoring requirements set forth in 40 CFR 60.58b(i), incorporated by reference in Rule 62-204.800, F.A.C., shall apply.

(5) Carbon Usage Rate. The carbon injection rate operating standard and monitoring requirements set forth in 40 CFR 60.58b(m), incorporated by reference in Rule 62-204.800, F.A.C.; shall apply.

See Specific Condition A.103.

[Rule 62-296.416(3)(d), F.A.C.]

Sulfur Dioxide

A.49. The procedures and test methods specified in paragraphs (1) through (14) shall be used for determining compliance with the sulfur dioxide emission.

(1) The EPA Reference Method 19, section 4.3, shall be used to calculate the daily geometric average sulfur dioxide emission concentration.

(2) The EPA Reference Method 19, section 5.4, shall be used to determine the daily geometric average percent reduction in the potential sulfur dioxide emission concentration.

(3) The owner or operator of an affected facility may request that compliance with the sulfur dioxide emission limit be determined using carbon dioxide measurements corrected to an equivalent of 7 percent oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established as specified in 40 CFR 60.58b(b)(6).

(4) The owner or operator of an affected facility shall conduct an initial performance test for sulfur dioxide emissions as required under 40 CFR 60.8. Compliance with the sulfur dioxide emission limit (concentration or percent reduction) shall be determined by using the continuous emission monitoring system specified in paragraph (5) to measure sulfur dioxide and calculating a 24-hour daily geometric average emission concentration or a 24-hour daily geometric average percent reduction using EPA Reference Method 19, sections 4.3 and 5.4, as applicable.

(5) The owner or operator of an affected facility shall install, calibrate, maintain, and operate a continuous emission monitoring system for measuring sulfur dioxide emissions discharged to the atmosphere and record the output of the system.

- (6) Following the date that the initial performance test for sulfur dioxide is completed or is required to be completed under 40 CFR 60.8, compliance with the sulfur dioxide emission limit shall be determined based on the 24-hour daily geometric average of the hourly arithmetic average emission concentrations using continuous emission monitoring system outlet data if compliance is based on an emission concentration, or continuous emission monitoring system inlet and outlet data if compliance is based on a percent reduction.
- (7) At a minimum, valid continuous monitoring system hourly averages shall be obtained as specified in paragraphs (7)(i) and (7)(ii) for 75 percent of the operating hours per day for 90 percent of the operating days per calendar quarter that the affected facility is combusting municipal solid waste.
- (i) At least two data points per hour shall be used to calculate each 1-hour arithmetic average.
 - (ii) Each sulfur dioxide 1-hour arithmetic average shall be corrected to 7 percent oxygen on an hourly basis using the 1-hour arithmetic average of the oxygen (or carbon dioxide) continuous emission monitoring system data.
- (8) The 1-hour arithmetic averages required under paragraph (6) shall be expressed in parts per million corrected to 7 percent oxygen (dry basis) and used to calculate the 24-hour daily geometric average emission concentrations and daily geometric average emission percent reductions. The 1-hour arithmetic averages shall be calculated using the data points required under 40 CFR 60.13(e)(2).
- (9) All valid continuous emission monitoring system data shall be used in calculating average emission concentrations and percent reductions even if the minimum continuous emission monitoring system data requirements of paragraph (7) are not met.
- (10) The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of the continuous emission monitoring system.
- (11) The initial performance evaluation shall be completed no later than 180 days after the date of initial startup of the municipal waste combustor as specified under 40 CFR 60.8.
- (12) The continuous emission monitoring system shall be operated according to Performance Specification 2 in 40 CFR 60 appendix B.
- (i) During each relative accuracy test run of the continuous emission monitoring system required by Performance Specification 2 in 40 CFR 60 appendix B, sulfur dioxide and oxygen (or carbon dioxide) data shall be collected concurrently (or within a 30- to 60-minute period) by both the continuous emission monitors and the test methods specified in paragraphs (A) and (B).
 - (A) For sulfur dioxide, EPA Reference Method 6, 6A, or 6C shall be used.
 - (B) For oxygen (or carbon dioxide), EPA Reference Method 3, 3A, or 3B, as applicable shall be used.
 - (ii) The span value of the continuous emissions monitoring system at the inlet to the sulfur dioxide control device shall be 125 percent of the maximum estimated hourly potential sulfur dioxide emissions of the municipal waste combustor unit. The span value of the continuous emission monitoring system at the outlet of the sulfur dioxide control device shall be 50 percent of the maximum estimated hourly potential sulfur dioxide emissions of the municipal waste combustor unit.
- (13) Quarterly accuracy determinations and daily calibration drift tests shall be performed in accordance with procedure 1 in appendix F of 40 CFR 60.
- (14) When sulfur dioxide emissions data are not obtained because of continuous emission monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments, emissions data shall be obtained by using other monitoring systems as approved by the Administrator or EPA Reference Method 19 to provide, as necessary, valid emissions data for a minimum of 75 percent of the hours per day that the affected facility is operated and combusting municipal solid waste for 90 percent of the days per calendar quarter that the affected facility is operated and combusting municipal solid waste.
- [40 CFR 60.38b and 40 CFR 60.58b(e)]

Hydrogen Chloride

A.50. The procedures and test methods specified in paragraphs (1) through (8) shall be used for determining compliance with the hydrogen chloride emission limit.

- (1) The EPA Reference Method 26 or 26A, as applicable, shall be used to determine the hydrogen chloride emission concentration. The minimum sampling time for Method 26 shall be 1 hour.
- (2) An oxygen (or carbon dioxide) measurement shall be obtained simultaneously with each Method 26 test run for hydrogen chloride required by paragraph (1).
- (3) The percent reduction in potential hydrogen chloride emissions (% P_{HCl}) is computed using equation 2:

$$[\%P_{HCl}] = \left[\frac{E_i - E_o}{E_i} \right] \times 100 \quad (\text{equation 2})$$

where:

% P_{HCl} = percent reduction of the potential hydrogen chloride emissions achieved.

E_i = potential hydrogen chloride emission concentration measured at the control device inlet, corrected to 7 percent oxygen (dry basis).

E_o = controlled hydrogen chloride emission concentration measured at the control device outlet, corrected to 7 percent oxygen (dry basis).

(4) The owner or operator of an affected facility may request that compliance with the hydrogen chloride emission limit be determined using carbon dioxide measurements corrected to an equivalent of 7 percent oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established as specified in 40 CFR 60.58b(b)(6).

(5) As specified under 40 CFR 60.8, all performance tests shall consist of three test runs. The average of the hydrogen chloride emission concentrations or percent reductions from the three test runs is used to determine compliance.

(6) The owner or operator of an affected facility shall conduct an initial performance test for hydrogen chloride as required under 40 CFR 60.8.

(7) Following the date that the initial performance test for hydrogen chloride is completed or is required to be completed under 40 CFR 60.8, the owner or operator of an affected facility shall conduct a performance test for hydrogen chloride emissions on an annual basis (no more than 12 calendar months following the previous performance test).

(8) [reserved]

[40 CFR 60.38b and 40 CFR 60.58b(f)]

Dioxin/Furan

A.51. The procedures and test methods specified in paragraphs (1) through (9) shall be used to determine compliance with the limits for dioxin/furan emissions.

(1) The EPA Reference Method 1 shall be used for determining the location and number of sampling points.

(2) The EPA Reference Method 3, 3A, or 3B, as applicable, shall be used for flue gas analysis.

(3) The EPA Reference Method 23 shall be used for determining the dioxin/furan emission concentration.

(i) The minimum sample time shall be 4 hours per test run.

- (ii) An oxygen (or carbon dioxide) measurement shall be obtained simultaneously with each Method 23 test run for dioxins/furans.
- (4) The owner or operator of an affected facility shall conduct an initial performance test for dioxin/furan emissions in accordance with paragraph (3), as required under 40 CFR 60.8.
- (5) Following the date that the initial performance test for dioxins/furans is completed or is required to be completed under 40 CFR 60.8, the owner or operator of an affected facility shall conduct performance tests for dioxin/furan emissions in accordance with paragraph (3), according to one of the schedules specified in paragraphs (i) through (iii).
 - (i) For affected facilities, performance tests shall be conducted on an annual basis (no more than 12 calendar months following the previous performance test.)
 - (ii) [reserved]
 - (iii) Where all performance tests over a 2-year period indicate that dioxin/furan emissions are less than or equal to 15 nanograms per dry standard cubic meter (total mass) for all affected facilities located within a municipal waste combustor plant, the owner or operator of the municipal waste combustor plant may elect to conduct annual performance tests for one affected facility (i.e., unit) per year at the municipal waste combustor plant. At a minimum, a performance test for dioxin/furan emissions shall be conducted annually (no more than 12 months following the previous performance test) for one affected facility at the municipal waste combustor plant. Each year a different affected facility at the municipal waste combustor plant shall be tested, and the affected facilities at the plant shall be tested in sequence (e.g., unit 1, unit 2, unit 3, as applicable). If each annual performance test continues to indicate a dioxin/furan emission level less than or equal to 15 nanograms per dry standard cubic meter (total mass), the owner or operator may continue conducting a performance test on only one affected facility per year. If any annual performance test indicates a dioxin/furan emission level greater than 15 nanograms per dry standard cubic meter (total mass), performance tests thereafter shall be conducted annually on all affected facilities at the plant until and unless all annual performance tests for all affected facilities at the plant over a 2-year period indicate a dioxin/furan emission level less than or equal to 15 nanograms per dry standard cubic meter (total mass).
- (6) The owner or operator of an affected facility that selects to follow the performance testing schedule specified in paragraph (5)(iii) shall follow the procedures specified in 40 CFR 60.59b(g)(4) for reporting the selection of this schedule.
- (7) The owner or operator of an affected facility where activated carbon is used to comply with the dioxin/furan emission limits specified in 40 CFR 60.52b(c) or the dioxin/furan emission level specified in paragraph (5)(iii) shall follow the procedures specified in 40 CFR 60.58b(m) for measuring and calculating the carbon usage rate.
- (8) The owner or operator of an affected facility may request that compliance with the dioxin/furan emission limit be determined using carbon dioxide measurements corrected to an equivalent of 7 percent oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established as specified in 40 CFR 60.58b(b)(6).
- (9) As specified under 40 CFR 60.8, all performance tests shall consist of three test runs. The average of the dioxin/furan emission concentrations from the three test runs is used to determine compliance. [40 CFR 60.38b and 40 CFR 60.58b(g)]

Nitrogen Oxides

A.52. The procedures and test methods specified in paragraphs (1) through (12) shall be used to determine compliance with the nitrogen oxides emission limit for affected facilities under Sec. 60.52b(d).

- (1) The EPA Reference Method 19, section 4.1, shall be used for determining the daily arithmetic average nitrogen oxides emission concentration.
- (2) The owner or operator of an affected facility may request that compliance with the nitrogen oxides emission limit be determined using carbon dioxide measurements corrected to an equivalent of 7 percent

oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established as specified in 40 CFR 60.58b(b)(6).

(3) The owner or operator of an affected facility subject to the nitrogen oxides limit shall conduct an initial performance test for nitrogen oxides as required under 40 CFR 60.8. Compliance with the nitrogen oxides emission limit shall be determined by using the continuous emission monitoring system specified in paragraph (4) for measuring nitrogen oxides and calculating a 24-hour daily arithmetic average emission concentration using EPA Reference Method 19, section 4.1.

(4) The owner or operator of an affected facility subject to the nitrogen oxides emission shall install, calibrate, maintain, and operate a continuous emission monitoring system for measuring nitrogen oxides discharged to the atmosphere, and record the output of the system.

(5) Following the date that the initial performance test for nitrogen oxides is completed or is required to be completed under 40 CFR 60.8, compliance with the emission limit for nitrogen oxides shall be determined based on the 24-hour daily arithmetic average of the hourly emission concentrations using continuous emission monitoring system outlet data.

(6) At a minimum, valid continuous emission monitoring system hourly averages shall be obtained as specified in paragraphs (i) and (ii) for 75 percent of the operating hours per day for 90 percent of the operating days per calendar quarter that the affected facility is combusting municipal solid waste.

(i) At least 2 data points per hour shall be used to calculate each 1-hour arithmetic average.

(ii) Each nitrogen oxides 1-hour arithmetic average shall be corrected to 7 percent oxygen on an hourly basis using the 1-hour arithmetic average of the oxygen (or carbon dioxide) continuous emission monitoring system data.

(7) The 1-hour arithmetic averages required by paragraph (5) shall be expressed in parts per million by volume (dry basis) and used to calculate the 24-hour daily arithmetic average concentrations. The 1-hour arithmetic averages shall be calculated using the data points required under 40 CFR 60.13(e)(2).

(8) All valid continuous emission monitoring system data must be used in calculating emission averages even if the minimum continuous emission monitoring system data requirements of paragraph (6) are not met.

(9) The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of the continuous emission monitoring system. The initial performance evaluation shall be completed no later than 180 days after the date of initial startup of the municipal waste combustor unit, as specified under 40 CFR 60.8.

(10) The owner or operator of an affected facility shall operate the continuous emission monitoring system according to Performance Specification 2 in appendix B of 40 CFR 60 and shall follow the procedures and methods specified in paragraphs(i) and (ii).

(i) During each relative accuracy test run of the continuous emission monitoring system required by Performance Specification 2 of appendix B of 40 CFR 60, nitrogen oxides and oxygen (or carbon dioxide) data shall be collected concurrently (or within a 30- to 60-minute period) by both the continuous emission monitors and the test methods specified in paragraphs(A) and (B).

(A) For nitrogen oxides, EPA Reference Method 7, 7A, 7C, 7D, or 7E shall be used.

(B) For oxygen (or carbon dioxide), EPA Reference Method 3, 3A, or 3B, as applicable shall be used.

(ii) The span value of the continuous emission monitoring system shall be 125 percent of the maximum estimated hourly potential nitrogen oxide emissions of the municipal waste combustor unit.

(11) Quarterly accuracy determinations and daily calibration drift tests shall be performed in accordance with procedure 1 in appendix F of 40 CFR 60.

(12) When nitrogen oxides continuous emissions data are not obtained because of continuous emission monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments, emissions data shall be obtained using other monitoring systems as approved by the Administrator or EPA Reference Method 19 to provide, as necessary, valid emissions data for a minimum of 75 percent of the

hours per day for 90 percent of the days per calendar quarter the unit is operated and combusting municipal solid waste.
[40 CFR 60.38b and 40 CFR 60.58b(h)]

Fluoride

A.53. EPA Method 13A or 13B shall be used to ensure compliance.
[PSD-FL-151]

Beryllium

A.54. EPA Method 29 shall be used to ensure compliance.
[PSD-FL-151B]

Volatile Organic Compounds

A.55. EPA Method 18 or 25A shall be used to ensure compliance.
[PSD-FL-151]

Carbon Monoxide

A.56. EPA Method 10 shall be used to ensure compliance.
[PSD-FL-151]

Sulfuric Acid Mist

A.57. EPA Method 8 shall be used to ensure compliance.
[Rule 62-213.440, F.A.C.]

Arsenic

A.58. EPA Method 29 shall be used to ensure compliance.
[PSD-FL-151B.]

Ammonia

A.59. EPA Method CTM-027 (Conditional Test Method) shall be used to ensure compliance.
[Rule 62-213.440, F.A.C.]

Fugitive Ash

A.60. The procedures specified in paragraphs (1) through (4) shall be used for determining compliance with the fugitive ash emission limit under 40 CFR 60.55b.

(1) The EPA Reference Method 22 shall be used for determining compliance with the fugitive ash emission limit under 40 CFR 60.55b. The minimum observation time shall be a series of three 1-hour observations. The observation period shall include times when the facility is transferring ash from the municipal waste combustor unit to the area where ash is stored or loaded into containers or trucks.

(2) The average duration of visible emissions per hour shall be calculated from the three 1-hour observations. The average shall be used to determine compliance with 40 CFR 60.55b.

(3) The owner or operator of an affected facility shall conduct an initial performance test for fugitive ash emissions as required under 40 CFR 60.8.

(4) Following the date that the initial performance test for fugitive ash emissions is completed or is required to be completed under Sec. 60.8 for an affected facility, the owner or operator shall conduct a performance test for fugitive ash emissions on an annual basis (no more than 12 calendar months following the previous performance test).
[40 CFR 60.38b and 40 CFR 60.58b(k)]

A.61. Required Number of Test Runs. For mass emission limitations, a compliance test shall consist of three complete and separate determinations of the total air pollutant emission rate through the test section of the stack or duct and three complete and separate determinations of any applicable process variables corresponding to the three distinct time periods during which the stack emission rate was measured provided, however, that three complete and separate determinations shall not be required if the process variables are not subject to variation during a compliance test, or if three determinations are not necessary in order to calculate the unit's emission rate. The three required test runs shall be completed within one consecutive five-day period. In the event that a sample is lost or one of the three runs must be discontinued because of circumstances beyond the control of the owner or operator, and a valid third run cannot be obtained within the five day period allowed for the test, the Secretary or his or her designee may accept the results of the two complete runs as proof of compliance, provided that the arithmetic mean of the results of the two complete runs is at least 20 percent below the allowable emission limiting standards.

[Rule 62-297.310(1), F.A.C.]

A.62. Operating Rate During Testing. Testing of emissions shall be conducted with the emissions unit operation at permitted capacity, which is defined as 90 to 100 percent of the maximum operation rate allowed by the permit. If it is impracticable to test at permitted capacity, an emissions unit may be tested at less than the minimum permitted capacity; in this case, subsequent emissions unit operation is limited to 110 percent of the test load until a new test is conducted. Once the emissions unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purpose of additional compliance testing to regain the authority to operate at the permitted capacity.

[Rules 62-297.310(2) & (2)(b), F.A.C.]

A.63. Calculation of Emission Rate. The indicated emission rate or concentration shall be the arithmetic average of the emission rate or concentration determined by each of the three separate test runs unless otherwise specified in a particular test method or applicable rule.

[Rule 62-297.310(3), F.A.C.]

A.64. Applicable Test Procedures.

(a) **Required Sampling Time.**

1. Unless otherwise specified in the applicable rule, the required sampling time for each test run shall be no less than one hour and no greater than four hours, and the sampling time at each sampling point shall be of equal intervals of at least two minutes.

2. **Opacity Compliance Tests.** When either EPA Method 9 or DEP Method 9 is specified as the applicable opacity test method, the required minimum period of observation for a compliance test shall be sixty (60) minutes for emissions units which emit or have the potential to emit 100 tons per year or more of particulate matter, and thirty (30) minutes for emissions units which have potential emissions less than 100 tons per year of particulate matter and are not subject to a multiple-valued opacity standard. The opacity test observation period shall include the period during which the highest opacity emissions can reasonably be expected to occur. Exceptions to these requirements are as follows:

a. For batch, cyclical processes, or other operations which are normally completed within less than the minimum observation period and do not recur within that time, the period of observation shall be equal to the duration of the batch cycle or operation completion time.

- b. The observation period for special opacity tests that are conducted to provide data to establish a surrogate standard pursuant to Rule 62-297.310(5)(k), F.A.C., Waiver of Compliance Test Requirements, shall be established as necessary to properly establish the relationship between a proposed surrogate standard and an existing mass emission limiting standard.
- c. The minimum observation period for opacity tests conducted by employees or agents of the Department to verify the day-to-day continuing compliance of a unit or activity with an applicable opacity standard shall be twelve minutes.
- (b) Minimum Sample Volume. Unless otherwise specified in the applicable rule, the minimum sample volume per run shall be 25 dry standard cubic feet. (See Specific Condition A.46.)
- (c) Required Flow Rate Range. For EPA Method 5 particulate sampling, acid mist/sulfur dioxide, and fluoride sampling which uses Greenburg Smith type impingers, the sampling nozzle and sampling time shall be selected such that the average sampling rate will be between 0.5 and 1.0 actual cubic feet per minute, and the required minimum sampling volume will be obtained.
- (d) Calibration of Sampling Equipment. Calibration of the sampling train equipment shall be conducted in accordance with the schedule shown in Table 297.310-1, attached as part of this permit.
- (e) Allowed Modification to EPA Method 5. When EPA Method 5 is required, the following modification is allowed: the heated filter may be separated from the impingers by a flexible tube.
[Rule 62-297.310(4), F.A.C.]

A.65. Required Stack Sampling Facilities. When a mass emissions stack test is required, the permittee shall comply with the requirements contained in Appendix SS-1, Stack Sampling Facilities, attached to this permit.
[Rule 62-297.310(6), F.A.C.]

A.66.0. Frequency of Compliance Tests. The following provisions apply only to those emissions units that are subject to an emissions limiting standard for which compliance testing is required.

(a) General Compliance Testing.

3. The owner or operator of an emissions unit that is subject to any emission limiting standard shall conduct a compliance test that demonstrates compliance with the applicable emission limiting standard prior to obtaining a renewed operation permit. Emissions units that are required to conduct an annual compliance test may submit the most recent annual compliance test to satisfy the requirements of this provision. In renewing an air operation permit pursuant to Rule 62-210.300(2)(a)3.b., c., or d., F.A.C., the Department shall not require submission of emission compliance test results for any emissions unit that, during the year prior to renewal:

- a. Did not operate; or
 - b. In the case of a fuel burning emissions unit, burned liquid and/or solid fuel for a total of no more than 400 hours.
4. During each federal fiscal year (October 1 - September 30), unless otherwise specified by rule, order, or permit, the owner or operator of each emissions unit shall have a formal compliance test conducted for:
- a. Visible emissions, if there is an applicable standard;
 - b. Each of the following pollutants, if there is an applicable standard, and if the emissions unit emits or has the potential to emit: 5 tons per year or more of lead or lead compounds measured as elemental lead; or 100 tons per year or more of any other regulated air pollutant; and
 - c. Each NESHAP pollutant, if there is an applicable emission standard.
5. An annual compliance test for particulate matter emissions shall not be required for any fuel burning emissions unit that, in a federal fiscal year, does not burn liquid and/or solid fuel, other than during startup, for a total of more than 400 hours.
9. The owner or operator shall notify the Department, at least 15 days prior to the date on which each formal compliance test is to begin, of the date, time, and place of each such test, and the test contact

person who will be responsible for coordinating and having such test conducted for the owner or operator.

(b) Special Compliance Tests. When the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in a Department rule or in a permit issued pursuant to those rules is being violated, it may require the owner or operator of the emissions unit to conduct compliance tests which identify the nature and quantity of pollutant emissions from the emissions unit and to provide a report on the results of said tests to the Department.

(c) Waiver of Compliance Test Requirements. If the owner or operator of an emissions unit that is subject to a compliance test requirement demonstrates to the Department, pursuant to the procedure established in Rule 62-297.620, F.A.C., that the compliance of the emissions unit with an applicable weight emission limiting standard can be adequately determined by means other than the designated test procedure, such as specifying a surrogate standard of no visible emissions for particulate matter sources equipped with a bag house or specifying a fuel analysis for sulfur dioxide emissions, the Department shall waive the compliance test requirements for such emissions units and order that the alternate means of determining compliance be used, provided, however, the provisions of Rule 62-297.310(7)(b), F.A.C., shall apply.

[Rule 62-297.310(7), F.A.C.; and, SIP approved]

A.66.1. Compliance with the emission limitations of this permit shall be determined by annual emission testing, except that testing for arsenic, beryllium, fluoride, sulfuric acid mist, ammonia and VOC shall be performed prior to renewal of each operation permit. Testing of the MWC units for particulate matter shall be performed using three one-hour test runs so that two one-hour runs are conducted during normal operation and one one-hour run is conducted during soot blowing conditions. Compliance for visible emissions shall be determined in accordance with Rule 62-297.310(4)(a), F.A.C.

[Rules 62-4.070(3), 62-297.310(4)(a), and 62-297.310(7)(a)3, F.A.C.; PSD-FL-151A; PSD-FL-151B; and, request of the applicant]

Compliance With Standards and Maintenance Requirements

A.67. Compliance with standards in 40 CFR 60, other than opacity standards, shall be determined by performance tests established by 40 CFR 60.8, unless otherwise specified in the applicable standard.
[40 CFR 60.11(a)]

A.68. Compliance with opacity standards in 40 CFR 60 shall be determined by conducting observations in accordance with Reference Method 9 in Appendix A of 40 CFR 60, any alternative method that is approved by the Administrator, or as provided in 40 CFR 60.11(e)(5).
[40 CFR 60.11(b)]

A.69. The owner or operator of an affected facility subject to an opacity standard may submit, for compliance purposes, continuous opacity monitoring system (COMS) data results produced during any performance test required under 40 CFR 60.8 in lieu of EPA Method 9 observation data. If an owner or operator elects to submit COMS data for compliance with the opacity standard, he or she shall notify the Administrator of that decision, in writing, at least 30 days before any performance test required under 40 CFR 60.8 is conducted. Once the owner or operator of an affected facility has notified the Administrator to that effect, the COMS data results will be used to determine opacity compliance during subsequent tests required under 40 CFR 60.8 until the owner or operator notifies the Administrator, in writing, to the contrary. For the purpose of determining compliance with the opacity standard during a performance test required under 40 CFR 60.8 using COMS data, the minimum total time of COMS data collection shall be averages of all 6-minute continuous periods within the duration of the mass emission performance test. Results of the COMS opacity determinations shall be submitted along with the results of the performance

test required under 60.8. The owner or operator of an affected facility using a COMS for compliance purposes is responsible for demonstrating that the COMS meets the requirements specified in 40 CFR 60.13(c), that the COMS has been properly maintained and operated, and that the resulting data have not been altered in any way. If COMS data results are submitted for compliance with the opacity standard for a period of time during which EPA Method 9 data indicates noncompliance, the EPA Method 9 data will be used to determine opacity compliance.

[40 CFR 60.11(e)(5)]

Monitoring Requirements

A.70. All baghouses, except for the lime silo dust collector and the baghouses for containing hydrated lime, soda ash, and activated charcoal for the facility's water treatment system, shall be equipped with pressure drop monitoring equipment.

[PSD-FL-151A]

A.71. Continuous emission monitors with recorders shall be installed, calibrated, maintained and operated subject to approval by the Department for the following pollutants: Carbon monoxide, oxygen, nitrogen oxide, opacity, and sulfur dioxide.

[PSD-FL-151]

A.72. For the purposes of 40 CFR 60.13, all continuous monitoring systems (CMS) required under applicable subparts shall be subject to the provisions of 40 CFR 60.13 upon promulgation of performance specifications for continuous monitoring systems under Appendix B of 40 CFR 60 and, if the continuous monitoring system is used to demonstrate compliance with emission limits on a continuous basis, Appendix F of 40 CFR 60, unless otherwise specified in an applicable subpart or by the Administrator. Appendix F is applicable December 4, 1987.

[40 CFR 60.13(a)]

A.73. If the owner or operator of an affected facility elects to submit continuous opacity monitoring system (COMS) data for compliance with the opacity standard as provided under 40 CFR 60.11(e)(5), he shall conduct a performance evaluation of the COMS as specified in Performance Specification 1, Appendix B, of 40 CFR 60 before the performance test required under 40 CFR 60.8 is conducted. Otherwise, the owner or operator of an affected facility shall conduct a performance evaluation of the COMS or continuous emission monitoring system (CEMS) during any performance test required under 40 CFR 60.8 or within 30 days thereafter in accordance with the applicable performance specification in Appendix B of 40 CFR 60. The owner or operator of an affected facility shall conduct COMS or CEMS performance evaluations at such other times as may be required by the Administrator under section 114 of the Act.

(1) The owner or operator of an affected facility using a COMS to determine opacity compliance during any performance test required under 60.8 and as described in 40 CFR 60.11(e)(5) shall furnish the Administrator two or, upon request, more copies of a written report of the results of the COMS performance evaluation described in 40 CFR 60.13(c) at least 10 days before the performance test required under 60.8 is conducted.

[40 CFR 60.13(c)(1)]

A.74. (1) Owners and operators of all continuous emission monitoring systems (CEMS) installed in accordance with the provisions of this part shall check the zero (or low-level value between 0 and 20 percent of span value) and span (50 to 100 percent of span value) calibration drifts at least once daily in accordance with a written procedure. The zero and span shall, as a minimum, be adjusted whenever the 24-hour zero drift or 24-hour span drift exceeds two times the limits of the applicable performance specifications in Appendix B. The system must allow the amount of excess zero and span drift measured

at the 24-hour interval checks to be recorded and quantified, whenever specified. For continuous monitoring systems measuring opacity of emissions, the optical surfaces exposed to the effluent gases shall be cleaned prior to performing the zero and span drift adjustments except that for systems using automatic zero adjustments. The optical surfaces shall be cleaned when the cumulative automatic zero compensation exceeds 4 percent opacity.

(2) Unless otherwise approved by the Administrator, the following procedures shall be followed for continuous monitoring systems measuring opacity of emissions. Minimum procedures shall include a method for producing a simulated zero opacity condition and an upscale (span) opacity condition using a certified neutral density filter or other related technique to produce a known obscuration of the light beam. Such procedures shall provide a system check of the analyzer internal optical surfaces and all electronic circuitry including the lamp and photo detector assembly.

[40 CFR 60.13(d)(1) and (2)]

A.75. Except for system breakdowns, repairs, calibration checks, and zero and span adjustments required under 40 CFR 60.13(d), all continuous monitoring systems (CMS) shall be in continuous operation and shall meet minimum frequency of operation requirements as follows:

(1) All continuous monitoring systems referenced by 40 CFR 60.13(c) for measuring opacity of emissions shall complete a minimum of one cycle of sampling and analyzing for each successive 10-second period and one cycle of data recording for each successive 6-minute period.

(2) All continuous monitoring systems referenced by 40 CFR 60.13(c) for measuring emissions, except opacity, shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period.

[40 CFR 60.13(e)(1) and (2)]

A.76. All continuous monitoring systems (CMS) or monitoring devices shall be installed such that representative measurements of emissions or process parameters from the affected facility are obtained. Additional procedures for location of continuous monitoring systems contained in the applicable Performance Specifications of Appendix B of 40 CFR 60 shall be used.

[40 CFR 60.13(f)]

A.77. When the effluents from a single affected facility or two or more affected facilities subject to the same emission standards are combined before being released to the atmosphere, the owner or operator may install applicable continuous monitoring systems (CMS) on each effluent or on the combined effluent. When the affected facilities are not subject to the same emission standards, separate continuous monitoring systems shall be installed on each effluent. When the effluent from one affected facility is released to the atmosphere through more than one point, the owner or operator shall install an applicable continuous monitoring system on each separate effluent unless the installation of fewer systems is approved by the Administrator. When more than one continuous monitoring system is used to measure the emissions from one affected facility (e.g., multiple breechings, multiple outlets), the owner or operator shall report the results as required from each continuous monitoring system.

[40 CFR 60.13(g)]

A.78. Owners or operators of all continuous monitoring systems for measurement of opacity shall reduce all data to 6-minute averages and for continuous monitoring systems other than opacity to 1-hour averages for time periods as defined in 40 CFR 60.2. Six-minute opacity averages shall be calculated from 36 or more data points equally spaced over each 6-minute period. For continuous monitoring systems other than opacity, 1-hour averages shall be computed from four or more data points equally spaced over each 1-hour period. Data recorded during periods of continuous monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments shall not be included in the data averages computed under this paragraph. An arithmetic or integrated average of all data may be used. The data may be recorded in reduced or non-reduced form (e.g., ppm pollutant and percent O₂ or ng/J of

pollutant). All excess emissions shall be converted into units of the standard using the applicable conversion procedures specified in subparts. After conversion into units of the standard, the data may be rounded to the same number of significant digits as used in the applicable subparts to specify the emission limit (e.g., rounded to the nearest 1 percent opacity).

[40 CFR 60.13(h)]

A.79. Determination of Process Variables.

(a) Required Equipment. The owner or operator of an emissions unit for which compliance tests are required shall install, operate, and maintain equipment or instruments necessary to determine process variables, such as process weight input or heat input, when such data are needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.

(b) Accuracy of Equipment. Equipment or instruments used to directly or indirectly determine process variables, including devices such as belt scales, weight hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value.

[Rule 62-297.310(5), F.A.C.]

CEM for Oxygen or Carbon Dioxide

A.80. The owner or operator of an affected facility shall install, calibrate, maintain, and operate a continuous emission monitoring system and record the output of the system for measuring the oxygen or carbon dioxide content of the flue gas at each location where carbon monoxide, sulfur dioxide, or nitrogen oxides emissions are monitored and shall comply with the test procedures and test methods specified in paragraphs (1) through (7).

(1) The span value of the oxygen (or carbon dioxide) monitor shall be 25 percent oxygen (or carbon dioxide).

(2) The monitor shall be installed, evaluated, and operated in accordance with 40 CFR 60.13.

(4) The monitor shall conform to Performance Specification 3 in appendix B of 40 CFR 60 except for section 2.3 (relative accuracy requirement).

(5) The quality assurance procedures of appendix F of 40 CFR 60 except for section 5.1.1 (relative accuracy test audit) shall apply to the monitor.

(6) If carbon dioxide is selected for use in diluent corrections, the relationship between oxygen and carbon dioxide levels shall be established during the initial performance test according to the procedures and methods specified in paragraphs(i) through(iv). This relationship may be reestablished during performance compliance tests.

(i) The fuel factor equation in Method 3B shall be used to determine the relationship between oxygen and carbon dioxide at a sampling location. Method 3, 3A, or 3B, as applicable, shall be used to determine the oxygen concentration at the same location as the carbon dioxide monitor.

(ii) Samples shall be taken for at least 30 minutes in each hour.

(iii) Each sample shall represent a 1-hour average.

(iv) A minimum of three runs shall be performed.

(7) The relationship between carbon dioxide and oxygen concentrations that is established in accordance with paragraph (6) shall be submitted to the EPA Administrator as part of the initial performance test report and, if applicable, as part of the annual test report if the relationship is reestablished during the annual performance test.

[40 CFR 60.38b and 40 CFR 60.58b(b)]

Recordkeeping and Reporting Requirements

A.81. The owner or operator subject to the provisions of 40 CFR 60 shall furnish the Administrator written notification as follows:

(4) A notification of any physical or operational change to an existing facility which may increase the emission rate of any air pollutant to which a standard applies, unless that change is specifically exempted under an applicable subpart or in 40 CFR 60.14(e). This notice shall be postmarked 60 days or as soon as practicable before the change is commenced and shall include information describing the precise nature of the change, present and proposed emission control systems, productive capacity of the facility before and after the change, and the expected completion date of the change. The Administrator may request additional relevant information subsequent to this notice.

[40 CFR 60.7(a)(4)]

A.82. The owner or operator subject to the provisions of 40 CFR 60 shall maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of an affected facility; any malfunction of the air pollution control equipment; or, any periods during which a continuous monitoring system or monitoring device is inoperative.

[40 CFR 60.7(b)]

A.83. Each owner or operator required to install a continuous monitoring system (CMS) or monitoring device shall submit an excess emissions and monitoring systems performance report (excess emissions are defined in applicable subparts) and/or a summary report form [see 40 CFR 60.7(d)] to the Administrator semiannually, except when: more frequent reporting is specifically required by an applicable subpart; or, the CMS data are to be used directly for compliance determination, in which case quarterly reports shall be submitted; or, the Administrator, on a case-by-case basis, determines that more frequent reporting is necessary to accurately assess the compliance status of the source. All reports shall be postmarked by the 30th day following the end of each calendar half (or quarter, as appropriate). Written reports of excess emissions shall include the following information:

(1) The magnitude of excess emissions computed in accordance with 40 CFR 60.13(h), any conversion factor(s) used, and the date and time of commencement and completion of each time period of excess emissions. The process operating time during the reporting period.

(2) Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the affected facility. The nature and cause of any malfunction (if known), the corrective action taken or preventative measures adopted.

(3) The date and time identifying each period during which the continuous monitoring system was inoperative except for zero and span checks and the nature of the system repairs or adjustments.

(4) When no excess emissions have occurred or the continuous monitoring system(s) have not been inoperative, repaired, or adjusted, such information shall be stated in the report.

[40 CFR 60.7(c)(1), (2), (3), and (4)]

A.84. The summary report form shall contain the information and be in the format shown in Figure 1 (attached) unless otherwise specified by the Administrator. One summary report form shall be submitted for each pollutant monitored at each affected facility.

(1) If the total duration of excess emissions for the reporting period is less than 1 percent of the total operating time for the reporting period and CMS downtime for the reporting period is less than 5 percent of the total operating time for the reporting period, only the summary report form shall be submitted and the excess emission report described in 40 CFR 60.7(c) need not be submitted unless requested by the Administrator.

(2) If the total duration of excess emissions for the reporting period is 1 percent or greater of the total operating time for the reporting period or the total CMS downtime for the reporting period is 5 percent or

greater of the total operating time for the reporting period, the summary report form and the excess emission report described in 40 CFR 60.7(c) shall both be submitted.

[40 CFR 60.7(d)(1) and (2)]

{See attached Figure 1: Summary Report-Gaseous and Opacity Excess Emission and Monitoring System Performance}

A.85. (1) Notwithstanding the frequency of reporting requirements specified in 40 CFR 60.7(c), an owner or operator who is required by an applicable subpart to submit excess emissions and monitoring systems performance reports (and summary reports) on a quarterly (or more frequent) basis may reduce the frequency of reporting for that standard to semiannual if the following conditions are met:

(i) For 1 full year (e.g., 4 quarterly or 12 monthly reporting periods) the affected facility's excess emissions and monitoring systems reports submitted to comply with a standard under this part continually demonstrate that the facility is in compliance with the applicable standard;

(ii) The owner or operator continues to comply with all recordkeeping and monitoring requirements specified in 40 CFR 60, Subpart A, and the applicable standard; and

(iii) The Administrator does not object to a reduced frequency of reporting for the affected facility, as provided in 40 CFR 60.7(e)(2).

(2) The frequency of reporting of excess emissions and monitoring systems performance (and summary) reports may be reduced only after the owner or operator notifies the Administrator in writing of his or her intention to make such a change and the Administrator does not object to the intended change. In deciding whether to approve a reduced frequency of reporting, the Administrator may review information concerning the source's entire previous performance history during the required recordkeeping period prior to the intended change, including performance test results, monitoring data, and evaluations of an owner or operator's conformance with operation and maintenance requirements. Such information may be used by the Administrator to make a judgment about the source's potential for noncompliance in the future. If the Administrator disapproves the owner or operator's request to reduce the frequency of reporting, the Administrator will notify the owner or operator in writing within 45 days after receiving notice of the owner or operator's intention. The notification from the Administrator to the owner or operator will specify the grounds on which the disapproval is based. In the absence of a notice of disapproval within 45 days, approval is automatically granted.

(3) As soon as monitoring data indicate that the affected facility is not in compliance with any emission limitation or operating parameter specified in the applicable standard, the frequency of reporting shall revert to the frequency specified in the applicable standard, and the owner or operator shall submit an excess emissions and monitoring systems performance report (and summary report, if required) at the next appropriate reporting period following the noncomplying event. After demonstrating compliance with the applicable standard for another full year, the owner or operator may again request approval from the Administrator to reduce the frequency of reporting for that standard as provided for in 40 CFR 60.7(e)(1) and (e)(2).

[40 CFR 60.7(e)(1)]

A.86. Any owner or operator subject to the provisions of 40 CFR 60 shall maintain a file of all measurements, including continuous monitoring system, monitoring device, and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and, all other information required by 40 CFR 60 recorded in a permanent form suitable for inspection. The file shall be retained for at least 5 (five) years following the date of such measurements, maintenance, reports, and records.

[40 CFR 60.7(f); Rule 62-213.440(1)(b)2.b., F.A.C.]

A.87. Notification of Construction or Reconstruction. The owner or operator of an affected facility with a capacity to combust greater than 250 tons per day shall submit a notification of construction, which includes the information specified in paragraphs (1) through (4).

- (1) Intent to construct.
 - (2) Planned initial startup date.
 - (3) The types of fuels that the owner or operator plans to combust in the affected facility.
 - (4) The municipal waste combustor unit capacity and supporting capacity calculations prepared in accordance with 40 CFR 60.58b(j).
- [40 CFR 60.39b and 40 CFR 60.59b(b)]

A.88. The owner or operator of an affected facility subject to the standards under 40 CFR 60.53b, 60.54b, and 60.55b shall maintain records of the information specified in paragraphs (1) through (15), as applicable, for each affected facility for a period of at least 5 years.

- (1) The calendar date of each record.
- (2) The emission concentrations and parameters measured using continuous monitoring systems as specified under paragraphs (i) and (ii).
 - (i) The measurements specified in paragraphs (A) through (D) shall be recorded and be available for submittal to the Administrator or review onsite by an inspector.
 - (A) All 6-minute average opacity levels as specified under 40 CFR 60.58b(c).
 - (B) All 1-hour average sulfur dioxide emission concentrations as specified under 40 CFR 60.58b(e).
 - (C) All 1-hour average nitrogen oxides emission concentrations as specified under 40 CFR 60.58b(h).
 - (D) All 1-hour average carbon monoxide emission concentrations, municipal waste combustor unit load measurements, and particulate matter control device inlet temperatures as specified under 40 CFR 60.58b(i).
 - (ii) The average concentrations and percent reductions, as applicable, specified in paragraphs (2)(ii)(A) through (2)(ii)(D) shall be computed and recorded, and shall be available for submittal to the Administrator or review on-site by an inspector.
 - (A) All 24-hour daily geometric average sulfur dioxide emission concentrations and all 24-hour daily geometric average percent reductions in sulfur dioxide emissions as specified under 40 CFR 60.58b(e).
 - (B) All 24-hour daily arithmetic average nitrogen oxides emission concentrations as specified under 40 CFR 60.58b(h).
 - (C) All 4-hour block or 24-hour daily arithmetic average carbon monoxide emission concentrations, as applicable, as specified under 40 CFR 60.58b(i).
 - (D) All 4-hour block arithmetic average municipal waste combustor unit load levels and particulate matter control device inlet temperatures as specified under 40 CFR 60.58b(i).
- (3) Identification of the calendar dates when any of the average emission concentrations, percent reductions, or operating parameters recorded under paragraphs (2)(ii)(A) through (2)(ii)(D), or the opacity levels recorded under paragraph (2)(i)(A) are above the applicable limits, with reasons for such exceedances and a description of corrective actions taken.
- (4) For affected facilities that apply activated carbon for mercury or dioxin/furan control, the records specified in paragraphs (i) through (v).
 - (i) The average carbon mass feed rate (in kilograms per hour or pounds per hour) estimated as required under 40 CFR 60.58b(m)(1)(i) during the initial mercury performance test and all subsequent annual performance tests, with supporting calculations.
 - (ii) The average carbon mass feed rate (in kilograms per hour or pounds per hour) estimated as required under 40 CFR 60.58b(m)(1)(ii) during the initial dioxin/furan performance test and all subsequent annual performance tests, with supporting calculations.

- (iii) The average carbon mass feed rate (in kilograms per hour or pounds per hour) estimated for each hour of operation as required under 40 CFR 60.58b(m)(3)(ii), with supporting calculations.
- (iv) The total carbon usage for each calendar quarter estimated as specified by 40 CFR 60.58b(m)(3), with supporting calculations.
- (v) Carbon injection system operating parameter data for the parameter(s) that are the primary indicator(s) of carbon feed rate (e.g., screw feeder speed).
- (5) [Reserved]
- (6) Identification of the calendar dates for which the minimum number of hours of any of the data specified in paragraphs (i) through (v) have not been obtained including reasons for not obtaining sufficient data and a description of corrective actions taken.
 - (i) Sulfur dioxide emissions data;
 - (ii) Nitrogen oxides emissions data;
 - (iii) Carbon monoxide emissions data;
 - (iv) Municipal waste combustor unit load data; and
 - (v) Particulate matter control device temperature data.
- (7) Identification of each occurrence that sulfur dioxide emissions data, nitrogen oxides emissions data (large municipal waste combustors only), or operational data (i.e., carbon monoxide emissions, unit load, and particulate matter control device temperature) have been excluded from the calculation of average emission concentrations or parameters, and the reasons for excluding the data.
- (8) The results of daily drift tests and quarterly accuracy determinations for sulfur dioxide, nitrogen oxides, and carbon monoxide continuous emission monitoring systems, as required under appendix F of this part, procedure 1.
- (9) The test reports documenting the results of the initial performance test and all annual performance tests listed in paragraphs (i) and (ii) shall be recorded along with supporting calculations.
 - (i) The results of the initial performance test and all annual performance tests conducted to determine compliance with the particulate matter, opacity, cadmium, lead, mercury, dioxins/furans, hydrogen chloride, and fugitive ash emission limits.
 - (ii) For the initial dioxin/furan performance test and all subsequent dioxin/furan performance tests recorded under paragraph (9)(i), the maximum demonstrated municipal waste combustor unit load and maximum demonstrated particulate matter control device temperature (for each particulate matter control device).
- (10) [Reserved]
- (12) The records specified in paragraphs (i) through (iii).
 - (i) Records showing the names of the municipal waste combustor chief facility operator, shift supervisors, and control room operators who have been provisionally certified by the American Society of Mechanical Engineers or an equivalent State-approved certification program as required by 40 CFR 60.54b(a) including the dates of initial and renewal certifications and documentation of current certification.
 - (ii) Records showing the names of the municipal waste combustor chief facility operator, shift supervisors, and control room operators who have been fully certified by the American Society of Mechanical Engineers or an equivalent State-approved certification program as required by 40 CFR 60.54b(b) including the dates of initial and renewal certifications and documentation of current certification.
 - (iii) Records showing the names of the municipal waste combustor chief facility operator, shift supervisors, and control room operators who have completed the EPA municipal waste combustor operator training course or a State-approved equivalent course as required by 40 CFR 60.54b(d) including documentation of training completion.
- (13) Records showing the names of persons who have completed a review of the operating manual as required by 40 CFR 60.54b(f) including the date of the initial review and subsequent annual reviews.
- (14) For affected facilities that apply activated carbon for mercury or dioxin/furan control, identification of the calendar dates when the average carbon mass feed rates recorded under (4)(iii) were less than either

of the hourly carbon feed rates estimated during performance tests for mercury or dioxin/furan emissions and recorded under paragraphs (4)(i) and (4)(ii), respectively, with reasons for such feed rates and a description of corrective actions taken.

(15) For affected facilities that apply activated carbon for mercury or dioxin/furan control, identification of the calendar dates when the carbon injection system operating parameter(s) that are the primary indicator(s) of carbon mass feed rate (e.g., screw feeder speed) recorded under paragraph (4)(v) are below the level(s) estimated during the performance tests as specified in 40 CFR 60.58b(m)(1)(i) and 40 CFR 60.58b(m)(1)(ii), with reasons for such occurrences and a description of corrective actions taken.
[40 CFR 60.39b and 40 CFR 60.59b(d)]

A.89. The owner or operator of an affected facility shall submit the information specified in paragraphs (1) through (6) in the initial performance test report.

(1) The initial performance test data as recorded under 40 CFR 60.59b(d)(2)(ii)(A) through (d)(2)(ii)(D) for the initial performance test for sulfur dioxide, nitrogen oxides, carbon monoxide, municipal waste combustor unit load level, and particulate matter control device inlet temperature.

(2) The test report documenting the initial performance test recorded under 40 CFR 60.59b(d)(9) for particulate matter, opacity, cadmium, lead, mercury, dioxins/furans, hydrogen chloride, and fugitive ash emissions.

(3) The performance evaluation of the continuous emission monitoring system using the applicable performance specifications in appendix B of this part.

(4) The maximum demonstrated municipal waste combustor unit load and maximum demonstrated particulate matter control device inlet temperature(s) established during the initial dioxin/furan performance test as recorded under 40 CFR 60.59b(d)(9).

(5) For affected facilities that apply activated carbon injection for mercury control, the owner or operator shall submit the average carbon mass feed rate recorded under 40 CFR 60.59b(d)(4)(i).

(6) For those affected facilities that apply activated carbon injection for dioxin/furan control, the owner or operator shall submit the average carbon mass feed rate recorded under 40 CFR 60.59b(d)(4)(ii).

[40 CFR 60.39b and 40 CFR 60.59b(f)]

A.90. Following the first year of municipal combustor operation, the owner or operator of an affected facility shall submit an annual report including the information specified in paragraphs (1) through (4), as applicable, no later than February 1 of each year following the calendar year in which the data were collected (once the unit is subject to permitting requirements under Title V of the Act, the owner or operator of an affected facility must submit these reports semiannually).

(1) A summary of data collected for all pollutants and parameters regulated under this subpart, which includes the information specified in paragraphs (i) through (v).

(i) A list of the particulate matter, opacity, cadmium, lead, mercury, dioxins/furans, hydrogen chloride, and fugitive ash emission levels achieved during the performance tests recorded under 40 CFR 60.59b (d)(9).

(ii) A list of the highest emission level recorded for sulfur dioxide, nitrogen oxides, carbon monoxide, municipal waste combustor unit load level, and particulate matter control device inlet temperature based on the data recorded under 40 CFR 60.59b(d)(2)(ii)(A) through (d)(2)(ii)(D).

(iii) List the highest opacity level measured, based on the data recorded under 40 CFR 60.59b(d)(2)(i)(A).

(iv) The total number of days that the minimum number of hours of data for sulfur dioxide, nitrogen oxides, carbon monoxide, municipal waste combustor unit load, and particulate matter control device temperature data were not obtained based on the data recorded under 40 CFR 60.59b(d)(6).

(v) The total number of hours that data for sulfur dioxide, nitrogen oxides, carbon monoxide, municipal waste combustor unit load, and particulate matter control device temperature were excluded from the calculation of average emission concentrations or parameters based on the data recorded under 40 CFR 60.59b(d)(7).

(2) The summary of data reported under paragraph (1) shall also provide the types of data specified in paragraphs (1)(i) through (1)(vi) for the calendar year preceding the year being reported, in order to provide the Administrator with a summary of the performance of the affected facility over a 2-year period.

(3) The summary of data including the information specified in paragraphs (1) and (2) shall highlight any emission or parameter levels that did not achieve the emission or parameter limits specified under this subpart.

(4) A notification of intent to begin the reduced dioxin/furan performance testing schedule specified in 40 CFR 60.58b(g)(5)(iii) during the following calendar year.

[40 CFR 60.39b and 40 CFR 60.59b(g)]

A.91. The owner or operator of an affected facility shall submit a semiannual report that includes the information specified in paragraphs (1) through (5) for any recorded pollutant or parameter that does not comply with the pollutant or parameter limit specified under this subpart, according to the schedule specified under paragraph (6).

(1) The semiannual report shall include information recorded under 40 CFR 60.59b(d)(3) for sulfur dioxide, nitrogen oxides, carbon monoxide, municipal waste combustor unit load level, particulate matter control device inlet temperature, and opacity.

(2) For each date recorded as required by 40 CFR 60.59b(d)(3) and reported as required by paragraph (1), the semiannual report shall include the sulfur dioxide, nitrogen oxides, carbon monoxide, municipal waste combustor unit load level, particulate matter control device inlet temperature, or opacity data, as applicable, recorded under 40 CFR 60.59b(d)(2)(ii)(A) through (d)(2)(ii)(D) and (d)(2)(i)(A), as applicable.

(3) If the test reports recorded under 40 CFR 60.59b(d)(9) document any particulate matter, opacity, cadmium, lead, mercury, dioxins/furans, hydrogen chloride, and fugitive ash emission levels that were above the applicable pollutant limits, the semiannual report shall include a copy of the test report documenting the emission levels and the corrective actions taken.

(4) The semiannual report shall include the information recorded under 40 CFR 60.59b(d)(15) for the carbon injection system operating parameter(s) that are the primary indicator(s) of carbon mass feed rate.

(5) For each operating date reported as required by paragraph (4), the semiannual report shall include the carbon feed rate data recorded under 40 CFR 60.59b(d)(4)(iii).

(6) Semiannual reports required by this condition shall be submitted according to the schedule specified in paragraphs (i) and (ii).

(i) If the data reported in accordance with paragraphs (1) through (5) were collected during the first calendar half, then the report shall be submitted by August 1 following the first calendar half.

(ii) If the data reported in accordance with paragraphs (1) through (5) were collected during the second calendar half, then the report shall be submitted by February 1 following the second calendar half.

[40 CFR 60.39b and 40 CFR 60.59b(h)]

A.92. All reports specified under 40 CFR 60.59b(a), (b), (c), (f), (g), (h), and (i) shall be submitted as a paper copy, postmarked on or before the submittal dates specified under these paragraphs, and maintained onsite as a paper copy for a period of 5 years.

[40 CFR 60.39b and 40 CFR 60.59b(j)]

A.93. All records specified under 40 CFR 60.59b(d) and (e) shall be maintained onsite in either paper copy or computer-readable format, unless an alternative format is approved by the Administrator.

[40 CFR 60.39b and 40 CFR 60.59b(k)]

A.94. If the owner or operator of an affected facility would prefer a different annual or semiannual date for submitting the periodic reports required by 40 CFR 60.59b(g), (h) and (i), then the dates may be

changed by mutual agreement between the owner or operator and the Administrator according to the procedures specified in 40 CFR 60.19(c) of subpart A of this part.
[40 CFR 60.39b and 40 CFR 60.59b(l)]

A.95. In the case of excess emissions resulting from malfunctions, each owner or operator shall notify the Department in accordance with Rule 62-4.130, F.A.C. A full written report on the malfunctions shall be submitted in a quarterly report, if requested by the Department.
Rule 62-210.700(6), F.A.C.]

A.96. Submit to the Department a written report of emissions in excess of emission limiting for each calendar quarter. The nature and cause of the excess emissions shall be explained. If there are no excess emissions during the calendar quarter, the owner or operator shall submit a report quarterly stating that no excess emissions occurred. This report does not relieve the owner or operator of the legal liability for violations. All recorded data shall be maintained on file by the Source for a period of five years.
[Rule 62-213.440(1)(b)2.b., F.A.C., PSD-FL-151]

A.97. Test Reports.

(a) The owner or operator of an emissions unit for which a compliance test is required shall file a report with the Department on the results of each such test.
(b) The required test report shall be filed with the Department as soon as practical but no later than 45 days after the last sampling run of each test is completed.
(c) The test report shall provide sufficient detail on the emissions unit tested and the test procedures used to allow the Department to determine if the test was properly conducted and the test results properly computed. As a minimum, the test report, other than for an EPA or DEP Method 9 test, shall provide the following information:

1. The type, location, and designation of the emissions unit tested.
2. The facility at which the emissions unit is located.
3. The owner or operator of the emissions unit.
4. The normal type and amount of fuels used and materials processed, and the types and amounts of fuels used and material processed during each test run.
5. The means, raw data and computations used to determine the amount of fuels used and materials processed, if necessary to determine compliance with an applicable emission limiting standard.
6. The type of air pollution control devices installed on the emissions unit, their general condition, their normal operating parameters (pressure drops, total operating current and GPM scrubber water), and their operating parameters during each test run.
7. A sketch of the duct within 8 stack diameters upstream and 2 stack diameters downstream of the sampling ports, including the distance to any upstream and downstream bends or other flow disturbances.
8. The date, starting time and duration of each sampling run.
9. The test procedures used, including any alternative procedures authorized pursuant to Rule 62-297.620, F.A.C. Where optional procedures are authorized in this chapter, indicate which option was used.
10. The number of points sampled and configuration and location of the sampling plane.
11. For each sampling point for each run, the dry gas meter reading, velocity head, pressure drop across the stack, temperatures, average meter temperatures and sample time per point.
12. The type, manufacturer and configuration of the sampling equipment used.
13. Data related to the required calibration of the test equipment.
14. Data on the identification, processing and weights of all filters used.
15. Data on the types and amounts of any chemical solutions used.
16. Data on the amount of pollutant collected from each sampling probe, the filters, and the impingers, are reported separately for the compliance test.

17. The names of individuals who furnished the process variable data, conducted the test, analyzed the samples and prepared the report.
18. All measured and calculated data required to be determined by each applicable test procedure for each run.
19. The detailed calculations for one run that relate the collected data to the calculated emission rate.
20. The applicable emission standard, and the resulting maximum allowable emission rate for the emissions unit, plus the test result in the same form and unit of measure.
21. A certification that, to the knowledge of the owner or his authorized agent, all data submitted are true and correct. When a compliance test is conducted for the Department or its agent, the person who conducts the test shall provide the certification with respect to the test procedures used. The owner or his authorized agent shall certify that all data required and provided to the person conducting the test are true and correct to his knowledge.

[Rule 62-297.310(8), F.A.C.]

A.98. Lee County Solid Waste Energy recovery Facility shall maintain a central file containing all measurements, records, and other data that are required to be collected pursuant to the conditions of this permit. This file shall include but not be limited to:

- (i) the data collected from in-stack monitoring requirements,
- (ii) the records on MSW input rate,
- (iii) the amount of propane gas burned per unit,
- (iv) the results of all source tests or performance tests,
- (v) the amount of ammonia, activated carbon, or other chemicals used for NO_x and mercury control,
- (vi) calibration logs for all instruments,
- (vii) maintenance/repair logs for any work performed which is subject to this permit.

All measurements, records, and other data required to be maintained by the facility shall be retained for at least five years following the date on which such measurements, records, or data are recorded and made available to the Department upon request. The permittee shall keep accurate records of MSW being fired to each combustor along with the weight percent of used tires in the waste stream being combusted on an estimated weekly basis for the entire life of this facility. The South District office of the Department and the Bureau of Air Regulation shall be notified at least 30 days prior to any compliance testing.

[Rule 62-213.440(1)(b)2.b., F.A.C.; PSD-FL-151]

A.99. The Permittee shall submit to the Department's South Florida District Office and to the Bureau of Air Regulation within thirty (30) days after it becomes available, copies of technical data pertaining to the selected emissions control systems. These data should include, but not be limited to, guaranteed efficiency and emission rates, and major design parameters

[PSD-FL-151]

Mercury Control Requirements

A.100. The permittee must operate the pollution control equipment at the facility under procedures designed to minimize emissions of mercury and maximize the removal of mercury from the flue gas of the facility. An activated carbon injection system for mercury control approved by the Department shall be operated continuously whenever MSW is burned at the facility. The emissions of mercury from the facility shall not exceed the standard established in the conditions of this permit.

[PSD-FL-151]

A.101. The permittee shall determine through Department approved operational testing the feed rate for activated carbon injection which provides the most effective mercury removal over the normal operating regime for the facility while achieving the levels stated hereafter. Following determination of the feed rate, the permittee shall not reduce it without specific written permission from the Department.

[PSD-FL-151]

A.102. If the Department proposes to reduce the mercury emission standard for the facility to a level below 70 ug/dscm at 7% O₂ or its equivalent, it shall proceed in accordance with the provisions of Section 403.516(1), Florida Statutes.

[PSD-FL-151]

Miscellaneous Requirements.

Activated Carbon Injection

A.103. The owner or operator of an affected facility where activated carbon injection is used to comply with the mercury emission limit, or the dioxin/furan emission limits, or the dioxin/furan emission level specified in 40 CFR 60.58b(g)(5)(iii) shall follow the procedures specified in paragraphs (1) through (3).

(1) During the performance tests for dioxins/furans and mercury, as applicable, the owner or operator shall estimate an average carbon mass feed rate based on carbon injection system operating parameters such as the screw feeder speed, hopper volume, hopper refill frequency, or other parameters appropriate to the feed system being employed, as specified in paragraphs (i) and (ii).

(i) An average carbon mass feed rate in kilograms per hour or pounds per hour shall be estimated during the initial performance test for mercury emissions and each subsequent performance test for mercury emissions.

(ii) An average carbon mass feed rate in kilograms per hour or pounds per hour shall be estimated during the initial performance test for dioxin/furan emissions and each subsequent performance test for dioxin/furan emissions.

(2) During operation of the affected facility, the carbon injection system operating parameter(s) that are the primary indicator(s) of the carbon mass feed rate (e.g., screw feeder setting) must equal or exceed the level(s) documented during the performance tests specified under paragraphs (1)(i) and (1)(ii).

(3) The owner or operator of an affected facility shall estimate the total carbon usage of the plant (kilograms or pounds) for each calendar quarter by two independent methods, according to the procedures in paragraphs (i) and (ii).

(i) The weight of carbon delivered to the plant.

(ii) Estimate the average carbon mass feed rate in kilograms per hour or pounds per hour for each hour of operation for each affected facility based on the parameters specified under paragraph (1), and sum the results for all affected facilities at the plant for the total number of hours of operation during the calendar quarter.

[40 CFR 60.38b and 40 CFR 60.58b(m)]

A.104. The height of the boiler exhaust stack shall not be less than 275 feet above grade or the height determined to be good engineering practice.

[PSD-FL-151]

A.105. Acid Rain Part Application. For any unit which was a solid waste incinerator, burning less than 20 percent fossil fuel as described in 40 CFR 72.6(b)(7), adopted and incorporated by reference at Rule 62-204.800, F.A.C. the designated representative of the source containing the unit shall submit a complete Acid Rain Part application governing such unit to the Department before the later of January 1, 1998, or March 1 of the year following the three calendar year period in which the incinerator consumed 20 percent or more fossil fuel on a British thermal unit (BTU) basis.

[Rule 62-214.320(1)(h), F.A.C.]

Subsection B. This section addresses the following emissions unit.

E.U. ID No.	Brief Description
-003	Lime Silo

This emissions unit is used to store lime at the facility. The silo was manufactured by Pittsburgh Tank Corporation. Emissions from the lime silo are controlled by a baghouse. Pebble size lime (CaO) is delivered to the plant via self-contained pneumatic truck trailers. The lime is unloaded from the truck trailer to the lime silo, which is above the lime preparation area. The silo is sized to hold enough lime to maintain several days worth of lime at the maximum combustion rate of the boilers. The lime silo has one conical discharge.

Lime is used at the facility to make a lime slurry for use in the sulfur dioxide and acid neutralization process. The lime is used in a sufficient quantity to maintain continuous flue gas treatment in the spray dryer absorber.

{Permitting Note: The consumption of lime varies based on combustion unit load and component variables in the solid waste materials. The silo can hold 60 tons of lime. The lime silo baghouse is only operational during silo filling operations.}

General

B.1. Circumvention. No owner or operator subject to the provisions of 40 CFR 60 shall build, erect, install, or use any article, machine, equipment or process, the use of which conceals an emission which would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous diluents to achieve compliance with an opacity standard or with a standard which is based on the concentration of a pollutant in the gases discharged to the atmosphere.
[40 CFR 60.12]

Essential Potential to Emit (PTE) Parameters

B.2. Hours of Operation. This emissions unit are allowed to operate continuously, i.e., 8,760 hours/year.
[Rule 62-210.200(PTE), F.A.C.; and PSD-FL-151]

Emission Limitations and Standards

{Permitting note: Table 1-1, Summary of Air Pollutant Standards and Terms, summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.}

B.3. Visible Emissions. There shall be no visible emissions during operations of the lime silo (i.e., less than 5% opacity).
[PSD-FL-151]

Test Methods and Procedures

B.4. Visible Emissions. Compliance with the visible emission limitation shall be determined using EPA Method 9. The test shall consist of at least one truck unloading into the lime silo (from start to finish). Tests shall be conducted annually. At least one 30-minute run to be conducted for the lime silo

baghouse while a truck is unloading lime into the lime silo. If the unloading is completed before 30 minutes duration, the duration of unloading shall be sufficient to meet this requirement, provided it exceeds 12 minutes.

[PSD-FL-151; PSD-FL-151B]

B.5. Operating Rate During Testing. Testing of emissions shall be conducted with the emissions unit operation at permitted capacity, which is defined as 90 to 100 percent of the maximum operation rate allowed by the permit. If it is impracticable to test at permitted capacity, an emissions unit may be tested at less than the minimum permitted capacity; in this case, subsequent emissions unit operation is limited to 110 percent of the test load until a new test is conducted. Once the emissions unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purpose of additional compliance testing to regain the authority to operate at the permitted capacity.

[Rules 62-297.310(2) & (2)(b), F.A.C.]

B.6. Applicable Test Procedures.

(a) Required Sampling Time.

1. Unless otherwise specified in the applicable rule, the required sampling time for each test run shall be no less than one hour and no greater than four hours, and the sampling time at each sampling point shall be of equal intervals of at least two minutes.

2. **Opacity Compliance Tests.** When either EPA Method 9 or DEP Method 9 is specified as the applicable opacity test method, the required minimum period of observation for a compliance test shall be sixty (60) minutes for emissions units which emit or have the potential to emit 100 tons per year or more of particulate matter, and thirty (30) minutes for emissions units which have potential emissions less than 100 tons per year of particulate matter and are not subject to a multiple-valued opacity standard. The opacity test observation period shall include the period during which the highest opacity emissions can reasonably be expected to occur. Exceptions to these requirements are as follows:

a. For batch, cyclical processes, or other operations which are normally completed within less than the minimum observation period and do not recur within that time, the period of observation shall be equal to the duration of the batch cycle or operation completion time.

b. The observation period for special opacity tests that are conducted to provide data to establish a surrogate standard pursuant to Rule 62-297.310(5)(k), F.A.C., Waiver of Compliance Test Requirements, shall be established as necessary to properly establish the relationship between a proposed surrogate standard and an existing mass emission limiting standard.

c. The minimum observation period for opacity tests conducted by employees or agents of the Department to verify the day-to-day continuing compliance of a unit or activity with an applicable opacity standard shall be twelve minutes.

(b) Minimum Sample Volume. Unless otherwise specified in the applicable rule, the minimum sample volume per run shall be 25 dry standard cubic feet.

(c) Required Flow Rate Range. For EPA Method 5 particulate sampling, acid mist/sulfur dioxide, and fluoride sampling which uses Greenburg Smith type impingers, the sampling nozzle and sampling time shall be selected such that the average sampling rate will be between 0.5 and 1.0 actual cubic feet per minute, and the required minimum sampling volume will be obtained.

(d) Calibration of Sampling Equipment. Calibration of the sampling train equipment shall be conducted in accordance with the schedule shown in Table 297.310-1, attached as part of this permit.

(e) Allowed Modification to EPA Method 5. When EPA Method 5 is required, the following modification is allowed: the heated filter may be separated from the impingers by a flexible tube.

[Rule 62-297.310(4), F.A.C.]

B.7. Required Stack Sampling Facilities. When a mass emissions stack test is required, the permittee shall comply with the requirements contained in Appendix SS-1, Stack Sampling Facilities, attached to this permit.

[Rule 62-297.310(6), F.A.C.]

B.8. Frequency of Compliance Tests. The following provisions apply only to those emissions units that are subject to an emissions limiting standard for which compliance testing is required.

(a) General Compliance Testing.

3. The owner or operator of an emissions unit that is subject to any emission limiting standard shall conduct a compliance test that demonstrates compliance with the applicable emission limiting standard prior to obtaining a renewed operation permit. Emissions units that are required to conduct an annual compliance test may submit the most recent annual compliance test to satisfy the requirements of this provision. In renewing an air operation permit pursuant to Rule 62-210.300(2)(a)3.b., c., or d., F.A.C., the Department shall not require submission of emission compliance test results for any emissions unit that, during the year prior to renewal:

a. Did not operate; or

b. In the case of a fuel burning emissions unit, burned liquid and/or solid fuel for a total of no more than 400 hours.

4. During each federal fiscal year (October 1 - September 30), unless otherwise specified by rule, order, or permit, the owner or operator of each emissions unit shall have a formal compliance test conducted for:

a. Visible emissions, if there is an applicable standard;

b. Each of the following pollutants, if there is an applicable standard, and if the emissions unit emits or has the potential to emit: 5 tons per year or more of lead or lead compounds measured as elemental lead; or 100 tons per year or more of any other regulated air pollutant; and

c. Each NESHAP pollutant, if there is an applicable emission standard.

5. An annual compliance test for particulate matter emissions shall not be required for any fuel burning emissions unit that, in a federal fiscal year, does not burn liquid and/or solid fuel, other than during startup, for a total of more than 400 hours.

9. The owner or operator shall notify the Department, at least 15 days prior to the date on which each formal compliance test is to begin, of the date, time, and place of each such test, and the test contact person who will be responsible for coordinating and having such test conducted for the owner or operator.

(b) Special Compliance Tests. When the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in a Department rule or in a permit issued pursuant to those rules is being violated, it may require the owner or operator of the emissions unit to conduct compliance tests which identify the nature and quantity of pollutant emissions from the emissions unit and to provide a report on the results of said tests to the Department.

(c) Waiver of Compliance Test Requirements. If the owner or operator of an emissions unit that is subject to a compliance test requirement demonstrates to the Department, pursuant to the procedure established in Rule 62-297.620, F.A.C., that the compliance of the emissions unit with an applicable weight emission limiting standard can be adequately determined by means other than the designated test procedure, such as specifying a surrogate standard of no visible emissions for particulate matter sources equipped with a bag house or specifying a fuel analysis for sulfur dioxide emissions, the Department shall waive the compliance test requirements for such emissions units and order that the alternate means of determining compliance be used, provided, however, the provisions of Rule 62-297.310(7)(b), F.A.C., shall apply.

[Rule 62-297.310(7), F.A.C.; and, SIP approved]

B.9. Determination of Process Variables.

(a) Required Equipment. The owner or operator of an emissions unit for which compliance tests are required shall install, operate, and maintain equipment or instruments necessary to determine process variables, such as process weight input or heat input, when such data are needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.

(b) Accuracy of Equipment. Equipment or instruments used to directly or indirectly determine process variables, including devices such as belt scales, weight hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value.

[Rule 62-297.310(5), F.A.C.]

Recordkeeping and Reporting Requirements

B.10. The Department's South District Office and the Bureau of Air Regulation shall be notified in writing at least 30 days prior to any compliance testing.
[PSD-FL-151]

B.11. Test Reports.

(a) The owner or operator of an emissions unit for which a compliance test is required shall file a report with the Department on the results of each such test.

(b) The required test report shall be filed with the Department as soon as practical but no later than 45 days after the last sampling run of each test is completed.

(c) The test report shall provide sufficient detail on the emissions unit tested and the test procedures used to allow the Department to determine if the test was properly conducted and the test results properly computed. As a minimum, the test report, other than for an EPA or DEP Method 9 test, shall provide the following information:

1. The type, location, and designation of the emissions unit tested.
2. The facility at which the emissions unit is located.
3. The owner or operator of the emissions unit.
4. The normal type and amount of fuels used and materials processed, and the types and amounts of fuels used and material processed during each test run.
5. The means, raw data and computations used to determine the amount of fuels used and materials processed, if necessary to determine compliance with an applicable emission limiting standard.
6. The type of air pollution control devices installed on the emissions unit, their general condition, their normal operating parameters (pressure drops, total operating current and GPM scrubber water); and their operating parameters during each test run.
7. A sketch of the duct within 8 stack diameters upstream and 2 stack diameters downstream of the sampling ports, including the distance to any upstream and downstream bends or other flow disturbances.
8. The date, starting time and duration of each sampling run.
9. The test procedures used, including any alternative procedures authorized pursuant to Rule 62-297.620, F.A.C. Where optional procedures are authorized in this chapter, indicate which option was used.
10. The number of points sampled and configuration and location of the sampling plane.
11. For each sampling point for each run, the dry gas meter reading, velocity head, pressure drop across the stack, temperatures, average meter temperatures and sample time per point.
12. The type, manufacturer and configuration of the sampling equipment used.
13. Data related to the required calibration of the test equipment.
14. Data on the identification, processing and weights of all filters used.
15. Data on the types and amounts of any chemical solutions used.

16. Data on the amount of pollutant collected from each sampling probe, the filters, and the impingers, are reported separately for the compliance test.

17. The names of individuals who furnished the process variable data, conducted the test, analyzed the samples and prepared the report.

18. All measured and calculated data required to be determined by each applicable test procedure for each run.

19. The detailed calculations for one run that relate the collected data to the calculated emission rate.

20. The applicable emission standard, and the resulting maximum allowable emission rate for the emissions unit, plus the test result in the same form and unit of measure.

21. A certification that, to the knowledge of the owner or his authorized agent, all data submitted are true and correct. When a compliance test is conducted for the Department or its agent, the person who conducts the test shall provide the certification with respect to the test procedures used. The owner or his authorized agent shall certify that all data required and provided to the person conducting the test are true and correct to his knowledge.

[Rule 62-297.310(8), F.A.C.]

Subsection C. This section addresses the following emissions unit.

E.U. ID No.	Brief Description
-004	Ash Handling System

The facility operates an ash handling system. The system is comprised of conveyors, scalpers and a ferrous and non-ferrous removal system. The ash handling building system at this facility has a single emissions point at the ash building baghouse vent. The emissions are controlled by a baghouse, which was manufactured by Beaumont Birch, Model No. CR-93103.

{Permitting Note: This unit began initial operation on August 24, 1994. Stack height = 59 feet, exit diameter = 3.0 feet, exit temperature = 70 °F, volumetric flow rate = 26,290 acfm and 24,720dscfm.

Essential Potential to Emit (PTE) Parameters

C.1. Hours of Operation. These emissions units are allowed to operate continuously, i.e., 8,760 hours/year.

[Rule 62-210.200(PTE), F.A.C.; PSD-FL-151]

Emission Limitations and Standards

{Permitting note: Table 1-1, Summary of Air Pollutant Standards and Terms, summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.}

C.2. Visible Emissions. In no case shall visible emissions from the ash handling building baghouse exceed 5% opacity.

[PSD-FL-151]

C.3. Particulate Matter. In no case shall particulate matter emissions from the ash handling building baghouse exceed a limit of 0.010 grains/dscf.

[PSD-FL-151]

Test Methods and Procedures

C.4. Compliance testing for particulate matter emissions from the ash handling building baghouse is waived, and an alternative standard of 5% opacity is imposed, pursuant to Rule 62-297.620(4), F.A.C. If the Department has reason to believe that the particulate weight emission standard is not being met, it shall require that compliance be demonstrated using EPA Method 5. Compliance testing for visible emissions from the ash handling building baghouse and the lime silo baghouse shall be conducted annually. At least one 30-minute run to be conducted for the ash handling building baghouse. The test method for visible emissions shall be DEP Method 9, incorporated in Chapter 62-297, F.A.C.

[Rules 62-4.070(3) and 62-297.620(4), F.A.C.; PSD-FL-151; PSD-FL-151B; and, request of the applicant]

C.5. Required Number of Test Runs. For mass emission limitations, a compliance test shall consist of three complete and separate determinations of the total air pollutant emission rate through the test section of the stack or duct and three complete and separate determinations of any applicable process variables corresponding to the three distinct time periods during which the stack emission rate was measured

provided, however, that three complete and separate determinations shall not be required if the process variables are not subject to variation during a compliance test, or if three determinations are not necessary in order to calculate the unit's emission rate. The three required test runs shall be completed within one consecutive five day period. In the event that a sample is lost or one of the three runs must be discontinued because of circumstances beyond the control of the owner or operator, and a valid third run cannot be obtained within the five day period allowed for the test, the Secretary or his or her designee may accept the results of the two complete runs as proof of compliance, provided that the arithmetic mean of the results of the two complete runs is at least 20 percent below the allowable emission limiting standards.

[Rule 62-297.310(1), F.A.C.]

C.6. Operating Rate During Testing. Testing of emissions shall be conducted with the emissions unit operation at permitted capacity, which is defined as 90 to 100 percent of the maximum operation rate allowed by the permit. If it is impracticable to test at permitted capacity, an emissions unit may be tested at less than the minimum permitted capacity; in this case, subsequent emissions unit operation is limited to 110 percent of the test load until a new test is conducted. Once the emissions unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purpose of additional compliance testing to regain the authority to operate at the permitted capacity.

[Rules 62-297.310(2) & (2)(b), F.A.C.]

C.7. Calculation of Emission Rate. The indicated emission rate or concentration shall be the arithmetic average of the emission rate or concentration determined by each of the three separate test runs unless otherwise specified in a particular test method or applicable rule.

[Rule 62-297.310(3), F.A.C.]

C.8. Applicable Test Procedures.

(a) Required Sampling Time.

1. Unless otherwise specified in the applicable rule, the required sampling time for each test run shall be no less than one hour and no greater than four hours, and the sampling time at each sampling point shall be of equal intervals of at least two minutes.

2. **Opacity Compliance Tests.** When either EPA Method 9 or DEP Method 9 is specified as the applicable opacity test method, the required minimum period of observation for a compliance test shall be sixty (60) minutes for emissions units which emit or have the potential to emit 100 tons per year or more of particulate matter, and thirty (30) minutes for emissions units which have potential emissions less than 100 tons per year of particulate matter and are not subject to a multiple-valued opacity standard. The opacity test observation period shall include the period during which the highest opacity emissions can reasonably be expected to occur. Exceptions to these requirements are as follows:

a. For batch, cyclical processes, or other operations which are normally completed within less than the minimum observation period and do not recur within that time, the period of observation shall be equal to the duration of the batch cycle or operation completion time.

b. The observation period for special opacity tests that are conducted to provide data to establish a surrogate standard pursuant to Rule 62-297.310(5)(k), F.A.C., Waiver of Compliance Test Requirements, shall be established as necessary to properly establish the relationship between a proposed surrogate standard and an existing mass emission limiting standard.

c. The minimum observation period for opacity tests conducted by employees or agents of the Department to verify the day-to-day continuing compliance of a unit or activity with an applicable opacity standard shall be twelve minutes.

(b) Minimum Sample Volume. Unless otherwise specified in the applicable rule, the minimum sample volume per run shall be 25 dry standard cubic feet.

(c) Required Flow Rate Range. For EPA Method 5 particulate sampling, acid mist/sulfur dioxide, and fluoride sampling which uses Greenburg Smith type impingers, the sampling nozzle and sampling time shall be selected such that the average sampling rate will be between 0.5 and 1.0 actual cubic feet per minute, and the required minimum sampling volume will be obtained.

(d) Calibration of Sampling Equipment. Calibration of the sampling train equipment shall be conducted in accordance with the schedule shown in Table 297.310-1, attached as part of this permit.

(e) Allowed Modification to EPA Method 5. When EPA Method 5 is required, the following modification is allowed: the heated filter may be separated from the impingers by a flexible tube.

[Rule 62-297.310(4), F.A.C.]

C.9. Required Stack Sampling Facilities. When a mass emissions stack test is required, the permittee shall comply with the requirements contained in Appendix SS-1, Stack Sampling Facilities, attached to this permit.

[Rule 62-297.310(6), F.A.C.]

C.10. Frequency of Compliance Tests. The following provisions apply only to those emissions units that are subject to an emissions limiting standard for which compliance testing is required.

(a) General Compliance Testing.

3. The owner or operator of an emissions unit that is subject to any emission limiting standard shall conduct a compliance test that demonstrates compliance with the applicable emission limiting standard prior to obtaining a renewed operation permit. Emissions units that are required to conduct an annual compliance test may submit the most recent annual compliance test to satisfy the requirements of this provision. In renewing an air operation permit pursuant to Rule 62-210.300(2)(a)3.b., c., or d., F.A.C., the Department shall not require submission of emission compliance test results for any emissions unit that, during the year prior to renewal:

a. Did not operate; or

b. In the case of a fuel burning emissions unit, burned liquid and/or solid fuel for a total of no more than 400 hours.

4. During each federal fiscal year (October 1 - September 30), unless otherwise specified by rule, order, or permit, the owner or operator of each emissions unit shall have a formal compliance test conducted for:

a. Visible emissions, if there is an applicable standard;

b. Each of the following pollutants, if there is an applicable standard, and if the emissions unit emits or has the potential to emit: 5 tons per year or more of lead or lead compounds measured as elemental lead; or 100 tons per year or more of any other regulated air pollutant; and

c. Each NESHAP pollutant, if there is an applicable emission standard.

5. An annual compliance test for particulate matter emissions shall not be required for any fuel burning emissions unit that, in a federal fiscal year, does not burn liquid and/or solid fuel, other than during startup, for a total of more than 400 hours.

9. The owner or operator shall notify the Department, at least 15 days prior to the date on which each formal compliance test is to begin, of the date, time, and place of each such test, and the test contact person who will be responsible for coordinating and having such test conducted for the owner or operator.

(b) Special Compliance Tests. When the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in a Department rule or in a permit issued pursuant to those rules is being violated, it may require the owner or operator of the emissions unit to conduct compliance tests which identify the nature and quantity of pollutant emissions from the emissions unit and to provide a report on the results of said tests to the Department.

(c) Waiver of Compliance Test Requirements. If the owner or operator of an emissions unit that is subject to a compliance test requirement demonstrates to the Department, pursuant to the procedure

established in Rule 62-297.620, F.A.C., that the compliance of the emissions unit with an applicable weight emission limiting standard can be adequately determined by means other than the designated test procedure, such as specifying a surrogate standard of no visible emissions for particulate matter sources equipped with a bag house or specifying a fuel analysis for sulfur dioxide emissions, the Department shall waive the compliance test requirements for such emissions units and order that the alternate means of determining compliance be used, provided, however, the provisions of Rule 62-297.310(7)(b), F.A.C., shall apply.

[Rule 62-297.310(7), F.A.C.; and, SIP approved]

C.11. Determination of Process Variables.

(a) Required Equipment. The owner or operator of an emissions unit for which compliance tests are required shall install, operate, and maintain equipment or instruments necessary to determine process variables, such as process weight input or heat input, when such data are needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.

(b) Accuracy of Equipment. Equipment or instruments used to directly or indirectly determine process variables, including devices such as belt scales, weight hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value.

[Rule 62-297.310(5), F.A.C.]

Recordkeeping and Reporting Requirements

C.12. The Department's South District Office and the Bureau of Air Regulation shall be notified in writing at least 30 days prior to any compliance testing.

[PSD-FL-151]

C.13. Test Reports.

(a) The owner or operator of an emissions unit for which a compliance test is required shall file a report with the Department on the results of each such test.

(b) The required test report shall be filed with the Department as soon as practical but no later than 45 days after the last sampling run of each test is completed.

(c) The test report shall provide sufficient detail on the emissions unit tested and the test procedures used to allow the Department to determine if the test was properly conducted and the test results properly computed. As a minimum, the test report, other than for an EPA or DEP Method 9 test, shall provide the following information:

1. The type, location, and designation of the emissions unit tested.
2. The facility at which the emissions unit is located.
3. The owner or operator of the emissions unit.
4. The normal type and amount of fuels used and materials processed, and the types and amounts of fuels used and material processed during each test run.
5. The means, raw data and computations used to determine the amount of fuels used and materials processed, if necessary to determine compliance with an applicable emission limiting standard.
6. The type of air pollution control devices installed on the emissions unit, their general condition, their normal operating parameters (pressure drops, total operating current and GPM scrubber water), and their operating parameters during each test run.
7. A sketch of the duct within 8 stack diameters upstream and 2 stack diameters downstream of the sampling ports, including the distance to any upstream and downstream bends or other flow disturbances.
8. The date, starting time and duration of each sampling run.

9. The test procedures used, including any alternative procedures authorized pursuant to Rule 62-297.620, F.A.C. Where optional procedures are authorized in this chapter, indicate which option was used.
10. The number of points sampled and configuration and location of the sampling plane.
11. For each sampling point for each run, the dry gas meter reading, velocity head, pressure drop across the stack, temperatures, average meter temperatures and sample time per point.
12. The type, manufacturer and configuration of the sampling equipment used.
13. Data related to the required calibration of the test equipment.
14. Data on the identification, processing and weights of all filters used.
15. Data on the types and amounts of any chemical solutions used.
16. Data on the amount of pollutant collected from each sampling probe, the filters, and the impingers, are reported separately for the compliance test.
17. The names of individuals who furnished the process variable data, conducted the test, analyzed the samples and prepared the report.
18. All measured and calculated data required to be determined by each applicable test procedure for each run.
19. The detailed calculations for one run that relate the collected data to the calculated emission rate.
20. The applicable emission standard, and the resulting maximum allowable emission rate for the emissions unit, plus the test result in the same form and unit of measure.
21. A certification that, to the knowledge of the owner or his authorized agent, all data submitted are true and correct. When a compliance test is conducted for the Department or its agent, the person who conducts the test shall provide the certification with respect to the test procedures used. The owner or his authorized agent shall certify that all data required and provided to the person conducting the test are true and correct to his knowledge.

[Rule 62-297.310(8), F.A.C.]

Miscellaneous Requirements

C.14. All baghouses, except for the lime silo dust collector and the baghouses for containing hydrated lime, soda ash, and activated charcoal for the facility's water treatment system, shall be equipped with pressure drop monitoring equipment.

[PSD-FL-151A]

Appendix U-1. List of Unregulated Emissions Units and/or Activities.

Unregulated Emissions Units and/or Activities. An emissions unit which emits no “emissions-limited pollutant” and which is subject to no unit-specific work practice standard, though it may be subject to regulations applied on a facility-wide basis (e.g., unconfined emissions, odor, general opacity) or to regulations that require only that it be able to prove exemption from unit-specific emissions or work practice standards.

The below listed emissions unit and/or activity is neither a ‘regulated emissions unit’ nor an ‘insignificant emissions unit’.

E.U. ID No.	Brief Description
-005	Cooling Tower

Appendix I-1. List of Insignificant Emissions Units and/or Activities.

The facilities, emissions units, or pollutant-emitting activities listed in Rule 62-210.300(3)(a), F.A.C., Categorical Exemptions, are exempt from the permitting requirements of Chapters 62-210 and 62-4, F.A.C.; provided, however, that exempt emissions units shall be subject to any applicable emission limiting standards and the emissions from exempt emissions units or activities shall be considered in determining the potential emissions of the facility containing such emissions units. Emissions units and pollutant-emitting activities exempt from permitting under Rule 62-210.300(3)(a), F.A.C., shall not be exempt from the permitting requirements of Chapter 62-213, F.A.C., if they are contained within a Title V source; however, such emissions units and activities shall be considered insignificant for Title V purposes provided they also meet the criteria of Rule 62-213.430(6)(b), F.A.C. No emissions unit shall be entitled to an exemption from permitting under Rule 62-210.300(3)(a), F.A.C., if its emissions, in combination with the emissions of other units and activities at the facility, would cause the facility to emit or have the potential to emit any pollutant in such amount as to make the facility a Title V source.

The below listed emissions units and/or activities are considered insignificant pursuant to Rule 62-213.430(6), F.A.C.

	Brief Description of Emissions Units and/or Activities
1	Ferrous Sulfate Tank
2	Caustic Soda Tank
3	Sulfuric Acid Tank
4	Boiler Chemicals
5	Cooling Tower Chemicals
6	Solvent Degreaser
7	Soda Ash Silo
8	Carbon Silo
9	Truck Traffic
10	Hydrated Lime Silo (Associated with water treatment plant)[Pending P.E. Certification]

Appendix H-1, Permit History/ID Number Changes

Lee County
Lee County Resource Recovery Facility

FINAL Permit No.: 0710119-001-AV
Facility ID No.: 0710119

Permit History (for tracking purposes):

<u>E.U. ID No</u>	<u>Description</u>	<u>Permit No.</u>	<u>Issue Date</u>	<u>Expiration Date</u>	<u>Extended Date^{1,2}</u>	<u>Revised Date(s)</u>
-001	MSW Incinerator #1	PSD-FL-151	7/20/92			
		PA-90-30	6/17/92			3/31/95, 8/14/96
		PSD-FL-151A(1)	5/2/94			
		PSD-FL-151A(2)	10/11/94			
		PSD-FI-151A(3)	4/20/95			
		PSD-FL-151B	3/21/00			
-002	MSW Incinerator #2	PSD-FL-151	7/20/92			
		PA-90-30	6/17/92			3/31/95, 8/14/96
		PSD-FL-151A(1)	5/2/94			
		PSD-FL-151A(2)	10/11/94			
		PSD-FI-151A(3)	4/20/95			
		PSD-FL-151B	3/21/00			
-101	Lime Storage Silo	PSD-FL-151	7/20/92			
-100	Ash Building & Handling System	PSD-FL-151	7/20/92			

Notes:

1 - AO permit(s) automatic extension(s) in Rule 62-210.300(2)(a)3.a., F.A.C., effective 03/21/96.

2 - AC permit(s) automatic extension(s) in Rule 62-213.420(1)(a)4., F.A.C., effective 03/20/96.

{Rule 62-213.420(1)(b)2., F.A.C., allows Title V Sources to operate under existing valid permits that were in effect at the time of application until the Title V permit becomes effective}

Referenced Attachments

Appendix A-1, Abbreviations, Definitions, Citations, and Identification Numbers

Appendix BW, Biomedical Waste Definitions

Appendix SS-1, Stack Sampling Facilities (version dated 10/7/96)

Appendix TV-3, Title V Conditions (version dated 4/30/99)

**Figure 1: Summary Report Gaseous and Opacity Excess Emission and Monitoring
System Performance (40 CFR 60, July, 1996)**

Table 297.310-1, Calibration Schedule (version dated 10/07/96)

Table 1-1, Summary of Air Pollutant Standards and Terms

Table 2-1, Summary of Compliance Requirements

Appendix A-1,
Abbreviations, Definitions, Citations, and Identification Numbers
(Version Dated 2/5/97)

Appendix A-1, Abbreviations, Acronyms, Citations, and Identification Numbers (version dated 02/05/97)

Abbreviations and Acronyms:

°F: Degrees Fahrenheit
BACT: Best Available Control Technology
CFR: Code of Federal Regulations
DEP: State of Florida, Department of Environmental Protection
DARM: Division of Air Resource Management
EPA: United States Environmental Protection Agency
F.A.C.: Florida Administrative Code
F.S.: Florida Statute
ISO: International Standards Organization
LAT: Latitude
LONG: Longitude
MMBtu: million British thermal units
MW: Megawatt
ORIS: Office of Regulatory Information Systems
SOA: Specific Operating Agreement
UTM: Universal Transverse Mercator

Citations:

The following examples illustrate the methods used in this permit to abbreviate and cite the references of rules, regulations, guidance memorandums, permit numbers, and ID numbers.

Code of Federal Regulations:

Example: [40 CFR 60.334]

Where:	40	reference to	Title 40
	CFR	reference to	Code of Federal Regulations
	60	reference to	Part 60
	60.334	reference to	Regulation 60.334

Florida Administrative Code (F.A.C.) Rules:

Example: [Rule 62-213, F.A.C.]

Where:	62	reference to	Title 62
	62-213	reference to	Chapter 62-213
	62-213.205	reference to	Rule 62-213.205, F.A.C.

ISO: International Standards Organization refers to those conditions at 288 degrees K, 60 percent relative humidity, and 101.3 kilopascals pressure.

Appendix A-1, Abbreviations, Acronyms, Citations, and Identification Numbers
(version dated 02/05/97) (continued)

Identification Numbers:

Facility Identification (ID) Number:

Example: Facility ID No.: 1050221

Where:

105 = 3-digit number code identifying the facility is located in Polk County
0221 = 4-digit number assigned by state database.

Permit Numbers:

Example: 1050221-002-AV, or
1050221-001-AC

Where:

AC = Air Construction Permit
AV = Air Operation Permit (Title V Source)
105 = 3-digit number code identifying the facility is located in Polk County
0221 = 4-digit number assigned by permit tracking database
001 or 002 = 3-digit sequential project number assigned by permit tracking database

Example: PSD-FL-185
PA95-01
AC53-208321

Where:

PSD = Prevention of Significant Deterioration Permit
PA = Power Plant Siting Act Permit
AC = old Air Construction Permit numbering

Appendix BW,
Biomedical Waste Definitions

Appendix BW, Biomedical Waste Definitions

Lee County
Lee County Resource Recovery Facility

FINAL Permit No.: 0710119-001-AV
Facility ID No.: 0710119

The following definitions are excerpted from Rule 64E-16.002 Definitions, Florida Administrative Code (version dated 6/3/97). For ease of reference, the rule numbering has been retained.

- (2) Biomedical Waste -- Any solid or liquid waste which may present a threat of infection to humans, including nonliquid tissue, body parts, blood, blood products, and body fluids from humans and other primates; laboratory and veterinary wastes which contain human disease-causing agents; and discarded sharps. The following are also included:
 - (a) Used, absorbent materials saturated with blood, blood products, body fluids, or excretions or secretions contaminated with visible blood; and absorbent materials saturated with blood or blood products that have dried.
 - (b) Non-absorbent, disposable devices that have been contaminated with blood, body fluids, or secretions or excretions visibly contaminated with blood, but have not been treated by an approved method.
- (3) Biomedical Waste Generator -- A facility or person that produces biomedical waste. The term includes hospitals, skilled nursing or convalescent hospitals, intermediate care facilities, clinics, dialysis clinics, dental offices, health maintenance organizations, surgical clinics, medical buildings, physicians' offices, laboratories, veterinary clinics and funeral homes.
 - (a) Mobile health care units, such as bloodmobiles, that are part of a stationary biomedical waste generator, are not considered individual biomedical waste generators.
 - (b) Funeral homes that do not practice embalming are not considered biomedical waste generators.
- (4) Body Fluids -- Those fluids which have the potential to harbor pathogens, such as human immunodeficiency virus and hepatitis B virus and include blood, blood products, lymph, semen, vaginal secretions, cerebrospinal, synovial, pleural, peritoneal, pericardial and amniotic fluids. In instances where identification of the fluid cannot be made, it shall be considered to be a regulated body fluid. Body excretions such as feces and secretions such as nasal discharges, saliva, sputum, sweat, tears, urine, and vomitus shall not be considered biomedical waste unless visibly contaminated with blood.

Appendix SS-1,
Stack Sampling Facilities (version dated 10/7/96)

IMAGE QUALITY

**PLEASE NOTE
THE ORIGINAL DOCUMENTS
SCANNED FOR THIS RECORD
WERE OF POOR QUALITY.**

APPENDIX SS-1, STACK SAMPLING FACILITIES (version dated 10/07/96)

Stack Sampling Facilities Provided by the Owner of an Emissions Unit. This section describes the minimum requirements for stack sampling facilities that are necessary to sample point emissions units. Sampling facilities include sampling ports, work platforms, access to work platforms, electrical power, and sampling equipment support. Emissions units must provide these facilities at their expense. All stack sampling facilities must meet any Occupational Safety and Health Administration (OSHA) Safety and Health Standards described in 29 CFR Part 1910, Subparts D and E.

(a) Permanent Test Facilities. The owner or operator of an emissions unit for which a compliance test, other than a visible emissions test, is required on at least an annual basis, shall install and maintain permanent stack sampling facilities.

(b) Temporary Test Facilities. The owner or operator of an emissions unit that is not required to conduct a compliance test on at least an annual basis may use permanent or temporary stack sampling facilities. If the owner chooses to use temporary sampling facilities on an emissions unit, and the Department elects to test the unit, such temporary facilities shall be installed on the emissions unit within 5 days of a request by the Department and remain on the emissions unit until the test is completed.

(c) Sampling Ports.

1. All sampling ports shall have a minimum inside diameter of 3 inches.
2. The ports shall be capable of being sealed when not in use.
3. The sampling ports shall be located in the stack at least 2 stack diameters or equivalent diameters downstream and at least 0.5 stack diameter or equivalent diameter upstream from any fan, bend, constriction or other flow disturbance.
4. For emissions units for which a complete application to construct has been filed prior to December 1, 1980, at least two sampling ports, 90 degrees apart, shall be installed at each sampling location on all circular stacks that have an outside diameter of 15 feet or less. For stacks with a larger diameter, four sampling ports, each 90 degrees apart, shall be installed. For emissions units for which a complete application to construct is filed on or after December 1, 1980, at least two sampling ports, 90 degrees apart, shall be installed at each sampling location on all circular stacks that have an outside diameter of 10 feet or less. For stacks with larger diameters, four sampling ports, each 90 degrees apart, shall be installed. On horizontal circular ducts, the ports shall be located so that the probe can enter the stack vertically, horizontally or at a 45 degree angle.

5. On rectangular ducts, the cross sectional area shall be divided into the number of equal areas in accordance with EPA Method 1. Sampling ports shall be provided which allow access to each sampling point. The ports shall be located so that the probe can be inserted perpendicular to the gas flow.

(d) Work Platforms.

1. Minimum size of the working platform shall be 24 square feet in area. Platforms shall be at least 3 feet wide.
2. On circular stacks with 2 sampling ports, the platform shall extend at least 110 degrees around the stack.
3. On circular stacks with more than two sampling ports, the work platform shall extend 360 degrees around the stack.
4. All platforms shall be equipped with an adequate safety rail (ropes are not acceptable), toeboard, and hinged floor-opening cover if ladder access is used to reach the platform. The safety rail directly in line with the sampling ports shall be removable so that no obstruction exists in an area 14 inches below each sample port and 6 inches on either side of the sampling port.

(e) Access to Work Platform.

APPENDIX SS-1, STACK SAMPLING FACILITIES (version dated 10/07/96)
(continued)

1. Ladders to the work platform exceeding 15 feet in length shall have safety cages or fall arresters with a minimum of 3 compatible safety belts available for use by sampling personnel.

2. Walkways over free-fall areas shall be equipped with safety rails and toeboards.

(f) Electrical Power.

1. A minimum of two 120-volt AC, 20-amp outlets shall be provided at the sampling platform within 20 feet of each sampling port.

2. If extension cords are used to provide the electrical power, they shall be kept on the plant's property and be available immediately upon request by sampling personnel.

(g) Sampling Equipment Support.

1. A three-quarter inch eyebolt and an angle bracket shall be attached directly above each port on vertical stacks and above each row of sampling ports on the sides of horizontal ducts.

a. The bracket shall be a standard 3 inch x 3 inch x one-quarter inch equal-legs bracket which is 1 and one-half inches wide. A hole that is one-half inch in diameter shall be drilled through the exact center of the horizontal portion of the bracket. The horizontal portion of the bracket shall be located 14 inches above the centerline of the sampling port.

b. A three-eighth inch bolt which protrudes 2 inches from the stack may be substituted for the required bracket. The bolt shall be located 15 and one-half inches above the centerline of the sampling port.

c. The three-quarter inch eyebolt shall be capable of supporting a 500 pound working load. For stacks that are less than 12 feet in diameter, the eyebolt shall be located 48 inches above the horizontal portion of the angle bracket. For stacks that are greater than or equal to 12 feet in diameter, the eyebolt shall be located 60 inches above the horizontal portion of the angle bracket. If the eyebolt is more than 120 inches above the platform, a length of chain shall be attached to it to bring the free end of the chain to within safe reach from the platform.

2. A complete monorail or dualrail arrangement may be substituted for the eyebolt and bracket.

3. When the sample ports are located in the top of a horizontal duct, a frame shall be provided above the port to allow the sample probe to be secured during the test.

[Rule 62-297.310(6), F.A.C.]

Appendix TV-3,
Title V Conditions (version dated 4/30/99)

APPENDIX TV-3, TITLE V CONDITIONS (version dated 04/30/99)

[Note: This attachment includes "canned conditions" developed from the "Title V Core List."]

{Permitting note: APPENDIX TV-3, TITLE V CONDITIONS, is distributed to the permittee only. Other persons requesting copies of these conditions shall be provided one copy when requested or otherwise appropriate.}

Chapter 62-4, F.A.C.

1. **Not federally enforceable. General Prohibition.** Any stationary installation which will reasonably be expected to be a source of pollution shall not be operated, maintained, or modified without the appropriate and valid permits issued by the Department, unless the source is exempted by Department rule. The Department may issue a permit only after it receives reasonable assurance that the installation will not cause pollution in violation of any of the provisions of Chapter 403, F.S., or the rules promulgated thereunder. A permitted installation may only be operated, maintained, constructed, expanded or modified in a manner that is consistent with the terms of the permit.

[Rule 62-4.030, Florida Administrative Code (F.A.C.); Section 403.087, Florida Statute (F.S.)]

2. **Not federally enforceable. Procedure to Obtain Permits; Application.**

(1) Any person desiring to obtain a permit from the Department shall apply on forms prescribed by the Department and shall submit such additional information as the Department by law may require.

(2) All applications and supporting documents shall be filed in quadruplicate with the Department.

(3) To ensure protection of public health, safety, and welfare, any construction, modification, or operation of an installation which may be a source of pollution shall be in accordance with sound professional engineering practices pursuant to Chapter 471, F.S. All applications for a Department permit shall be certified by a professional engineer registered in the State of Florida except when the application is for renewal of an air pollution operation permit at a minor facility as defined in Rule 62-210.200, F.A.C., or where professional engineering is not required by Chapter 471, F.S. Where required by Chapter 471 or 492, F.S., applicable portions of permit applications and supporting documents which are submitted to the Department for public record shall be signed and sealed by the professional(s) who prepared or approved them.

(4) Processing fees for air construction permits shall be in accordance with Rule 62-4.050(4), F.A.C.

(5)(a) To be considered by the Department, each application must be accompanied by the proper processing fee. The fee shall be paid by check, payable to the Department of Environmental Protection. The fee is non-refundable except as provided in Section 120.60, F.S., and in this section.

(c) Upon receipt of the proper application fee, the permit processing time requirements of Sections 120.60(2) and 403.0876, F.S., shall begin.

(d) If the applicant does not submit the required fee within ten days of receipt of written notification, the Department shall either return the unprocessed application or arrange with the applicant for the pick up of the application.

(e) If an applicant submits an application fee in excess of the required fee, the permit processing time requirements of Sections 120.60(2) and 403.0876, F.S., shall begin upon receipt, and the Department shall refund to the applicant the amount received in excess of the required fee.

(6) Any substantial modification to a complete application shall require an additional processing fee determined pursuant to the schedule set forth in Rule 62-4.050, F.A.C., and shall restart the time requirements of Sections 120.60 and 403.0876, F.S. For purposes of this Subsection, the term "substantial modification" shall mean a modification which is reasonably expected to lead to substantially different environmental impacts which require a detailed review.

(7) Modifications to existing permits proposed by the permittee which require substantial changes in the existing permit or require substantial evaluation by the Department of potential impacts of the proposed modifications shall require the same fee as a new application.

[Rule 62-4.050, F.A.C.]

3. **Standards for Issuing or Denying Permits.** Except as provided at Rule 62-213.460, F.A.C., the issuance of a permit does not relieve any person from complying with the requirements of Chapter 403, F.S., or Department rules.

[Rule 62-4.070(7), F.A.C.]

4. Modification of Permit Conditions.

(1) For good cause and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions and on application of the permittee the Department may grant additional time. For the purpose of this section, good cause shall include, but not be limited to, any of the following: (also, see Condition No. 38)

- (a) A showing that an improvement in effluent or emission quality or quantity can be accomplished because of technological advances without unreasonable hardship.
- (b) A showing that a higher degree of treatment is necessary to effect the intent and purpose of Chapter 403, F.S.
- (c) A showing of any change in the environment or surrounding conditions that requires a modification to conform to applicable air or water quality standards.
- (e) Adoption or revision of Florida Statutes, rules, or standards which require the modification of a permit condition for compliance.

(2) A permittee may request a modification of a permit by applying to the Department.

(3) A permittee may request that a permit be extended as a modification of the permit. Such a request must be submitted to the Department in writing before the expiration of the permit. Upon timely submittal of a request for extension, unless the permit automatically expires by statute or rule, the permit will remain in effect until final agency action is taken on the request. For construction permits, an extension shall be granted if the applicant can demonstrate reasonable assurances that, upon completion, the extended permit will comply with the standards and conditions required by applicable regulation. For all other permits, an extension shall be granted if the applicant can demonstrate reasonable assurances that the extended permit will comply with the standards and conditions applicable to the original permit. A permit for which the permit application fee was prorated in accordance with Rule 62-4.050(4)(1), F.A.C., shall not be extended. In no event shall a permit be extended or remain in effect longer than the time limits established by statute or rule.

[Rule 62-4.080, F.A.C.]

5. Renewals. Prior to one hundred eighty (180) days before the expiration of a permit issued pursuant to Chapter 62-213, F.A.C., the permittee shall apply for a renewal of a permit using forms incorporated by reference in the specific rule chapter for that kind of permit. A renewal application shall be timely and sufficient. If the application is submitted prior to 180 days before expiration of the permit, it will be considered timely and sufficient. If the renewal application is submitted at a later date, it will not be considered timely and sufficient unless it is submitted and made complete prior to the expiration of the operation permit. When the application for renewal is timely and sufficient, the existing permit shall remain in effect until the renewal application has been finally acted upon by the Department or, if there is court review of the Department's final agency action, until a later date is required by Section 120.60, F.S., provided that, for renewal of a permit issued pursuant to Chapter 62-213, F.A.C., the applicant complies with the requirements of Rules 62-213.420(1)(b)3. and 4., F.A.C.

[Rule 62-4.090(1), F.A.C.]

6. Suspension and Revocation.

(1) Permits shall be effective until suspended, revoked, surrendered, or expired and shall be subject to the provisions of Chapter 403, F.S., and rules of the Department.

(2) Failure to comply with pollution control laws and rules shall be grounds for suspension or revocation.

(3) A permit issued pursuant to Chapter 62-4, F.A.C., shall not become a vested property right in the permittee. The Department may revoke any permit issued by it if it finds that the permit holder or the permit holder's agent:

- (a) Submitted false or inaccurate information in application or operational reports.
- (b) Has violated law, Department orders, rules or permit conditions.
- (c) Has failed to submit operational reports or other information required by Department rules.
- (d) Has refused lawful inspection under Section 403.091, F.S.

[Rule 62-4.100, F.A.C.]

7. Not federally enforceable. Financial Responsibility. The Department may require an applicant to submit proof of financial responsibility and may require the applicant to post an appropriate bond to guarantee compliance with the law and Department rules.

[Rule 62-4.110, F.A.C.]

8. Transfer of Permits.

- (1) Within 30 days after the sale or legal transfer of a permitted facility, an "Application for Transfer of Permit" (DEP Form 62-1.201(1)) must be submitted to the Department. This form must be completed with the notarized signatures of both the permittee and the proposed new permittee.
- (2) The Department shall approve the transfer of a permit unless it determines that the proposed new permittee cannot provide reasonable assurances that conditions of the permit will be met. The determination shall be limited solely to the ability of the new permittee to comply with the conditions of the existing permit, and it shall not concern the adequacy of these permit conditions. If the Department proposes to deny the transfer, it shall provide both the permittee and the proposed new permittee a written objection to such transfer together with notice of a right to request a Chapter 120, F.S., proceeding on such determination.
- (3) Within 30 days of receiving a properly completed Application for Transfer of Permit form, the Department shall issue a final determination. The Department may toll the time for making a determination on the transfer by notifying both the permittee and the proposed new permittee that additional information is required to adequately review the transfer request. Such notification shall be served within 30 days of receipt of an Application for Transfer of Permit form, completed pursuant to Rule 62-4.120(1), F.A.C. If the Department fails to take action to approve or deny the transfer within 30 days of receipt of the completed Application for Transfer of Permit form, or within 30 days of receipt of the last item of timely requested additional information, the transfer shall be deemed approved.
- (4) The permittee is encouraged to apply for a permit transfer prior to the sale or legal transfer of a permitted facility. However, the transfer shall not be effective prior to the sale or legal transfer.
- (5) Until this transfer is approved by the Department, the permittee and any other person constructing, operating, or maintaining the permitted facility shall be liable for compliance with the terms of the permit. The permittee transferring the permit shall remain liable for corrective actions that may be required as a result of any violations occurring prior to the sale or legal transfer of the facility.

[Rule 62-4.120, F.A.C.]

9. Plant Operation-Problems. If the permittee is temporarily unable to comply with any of the conditions of the permit due to breakdown of equipment or destruction by hazard of fire, wind or by other cause, the permittee shall immediately notify the Department. Notification shall include pertinent information as to the cause of the problem, and what steps are being taken to correct the problem and to prevent its recurrence, and where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from any liability for failure to comply with Department rules. (also, see Condition No. 10)

[Rule 62-4.130, F.A.C.]

10. For purposes of notification to the Department pursuant to Condition No. 9, Condition No. 12(8), and Rule 62-4.130, F.A.C., Plant Operation-Problems, "immediately" shall mean the same day, if during a workday (i.e., 8:00 a.m. - 5:00 p.m.), or the first business day after the incident, excluding weekends and holidays; and, for purposes of 40 CFR 70.6(a)(3)(iii)(B), "prompt" shall have the same meaning as "immediately". [also, see Conditions Nos. 9 and 12(8)]

[40 CFR 70.6(a)(3)(iii)(B)]

11. Not federally enforceable. Review. Failure to request a hearing within 14 days of receipt of notice of proposed or final agency action on a permit application or as otherwise required in Chapter 62-103, F.A.C., shall be deemed a waiver of the right to an administrative hearing.

[Rule 62-4.150, F.A.C.]

12. Permit Conditions. All permits issued by the Department shall include the following general conditions:

- (1) The terms, conditions, requirements, limitations and restrictions set forth in this permit, are "permit conditions" and are binding and enforceable pursuant to Sections 403.141, 403.727, or 403.859 through 403.861, F.S. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.
- (2) This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.
- (3) As provided in subsections 403.087(6) and 403.722(5), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in this permit.

- (4) This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.
- (5) This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of F.S. and Department rules, unless specifically authorized by an order from the Department.
- (6) The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed and used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.
- (7) The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at reasonable times, access to the premises where the permitted activity is located or conducted to:
- (a) Have access to and copy any records that must be kept under conditions of the permit;
 - (b) Inspect the facility, equipment, practices, or operations regulated or required under this permit; and,
 - (c) Sample or monitor any substances or parameters at any location reasonable necessary to assure compliance with this permit or Department rules. Reasonable time may depend on the nature of the concern being investigated.
- (8) If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information: (also, see Condition No. 10)
- (a) A description of and cause of noncompliance; and,
 - (b) The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance. The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.
- (9) In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the F.S. or Department rules, except where such use is prescribed by Sections 403.111 and 403.73, F.S. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.
- (10) The permittee agrees to comply with changes in Department rules and F.S. after a reasonable time for compliance; provided, however, the permittee does not waive any other rights granted by F.S. or Department rules.
- (11) This permit is transferable only upon Department approval in accordance with Rule 62-4.120, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.
- (12) This permit or a copy thereof shall be kept at the work site of the permitted activity.
- (14) The permittee shall comply with the following:
- (a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.
 - (b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least five (5) years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
 - (c) Records of monitoring information shall include:
 - 1. the date, exact place, and time of sampling or measurements;
 - 2. the person responsible for performing the sampling or measurements;
 - 3. the dates analyses were performed;
 - 4. the person responsible for performing the analyses;
 - 5. the analytical techniques or methods used; and,
 - 6. the results of such analyses.
- (15) When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware the relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly: [Rules 62-4.160 and 62-213.440(1)(b), F.A.C.]

13. Construction Permits.

(1) No person shall construct any installation or facility which will reasonably be expected to be a source of air or water pollution without first applying for and receiving a construction permit from the Department unless exempted by statute or Department rule. In addition to the requirements of Chapter 62-4, F.A.C., applicants for a Department Construction Permit shall submit the following as applicable:

- (a) A completed application on forms furnished by the Department.
- (b) An engineering report covering:
 - 1. plant description and operations,
 - 2. types and quantities of all waste material to be generated whether liquid, gaseous or solid,
 - 3. proposed waste control facilities,
 - 4. the treatment objectives,
 - 5. the design criteria on which the control facilities are based, and,
 - 6. other information deemed relevant.

Design criteria submitted pursuant to Rule 62-4.210(1)(b)5., F.A.C., shall be based on the results of laboratory and pilot-plant scale studies whenever such studies are warranted. The design efficiencies of the proposed waste treatment facilities and the quantities and types of pollutants in the treated effluents or emissions shall be indicated. Work of this nature shall be subject to the requirements of Chapter 471, F.S. Where confidential records are involved, certain information may be kept confidential pursuant to Section 403.111, F.S.

(c) The owners' written guarantee to meet the design criteria as accepted by the Department and to abide by Chapter 403, F.S. and the rules of the Department as to the quantities and types of materials to be discharged from the installation. The owner may be required to post an appropriate bond or other equivalent evidence of financial responsibility to guarantee compliance with such conditions in instances where the owner's financial resources are inadequate or proposed control facilities are experimental in nature.

(2) The construction permit may contain conditions and an expiration date as determined by the Secretary or the Secretary's designee.

(3) When the Department issues a permit to construct, the permittee shall be allowed a period of time, specified in the permit, to construct, and to operate and test to determine compliance with Chapter 403, F.S., and the rules of the Department and, where applicable, to apply for and receive an operation permit. The Department may require tests and evaluations of the treatment facilities by the permittee at his/her expense.

[Rule 62-4.210, F.A.C.]

14. Not federally enforceable. Operation Permit for New Sources. To properly apply for an operation permit for new sources, the applicant shall submit certification that construction was completed noting any deviations from the conditions in the construction permit and test results where appropriate.

[Rule 62-4.220, F.A.C.]

Chapters 28-106 and 62-110, F.A.C.

15. Public Notice, Public Participation, and Proposed Agency Action. The permittee shall comply with all of the requirements for public notice, public participation, and proposed agency action pursuant to Rule 62-110.106 and Rule 62-210.350, F.A.C.

[Rules 62-110.106, 62-210.350 and 62-213.430(1)(b), F.A.C.]

16. Administrative Hearing. The permittee shall comply with all of the requirements for a petition for administrative hearing or waiver of right to administrative proceeding pursuant to Rules 28-106.201, 28-106.301 and 62-110.106, F.A.C.

[Rules 28-106.201, 28-106.301 and 62-110.106, F.A.C.]

Chapter 62-204, F.A.C.

17. Asbestos. This permit does not authorize any demolition or renovation of the facility or its parts or components which involves asbestos removal. This permit does not constitute a waiver of any of the requirements of Chapter 62-257, F.A.C., and 40 CFR Part 61, Subpart M, National Emission Standard for Asbestos, adopted and incorporated by reference in Rule 62-204.800, F.A.C. Compliance with Chapter 62-257, F.A.C., and 40 CFR 61, Subpart M, Section 61.145, is required for any asbestos demolition or renovation at the source.

[40 CFR 61; Rule 62-204.800, F.A.C.; and, Chapter 62-257, F.A.C.]

Chapter 62-210, F.A.C.

18. Permits Required. The owner or operator of any emissions unit which emits or can reasonably be expected to emit any air pollutant shall obtain an appropriate permit from the Department prior to beginning construction, modification, or initial or continued operation of the emissions unit unless exempted pursuant to Department rule or statute. All emissions limitations, controls, and other requirements imposed by such permits shall be at least as stringent as any applicable limitations and requirements contained in or enforceable under the State Implementation Plan (SIP) or that are otherwise federally enforceable. Except as provided at Rule 62-213.460, F.A.C., issuance of a permit does not relieve the owner or operator of an emissions unit from complying with any applicable requirements, any emission limiting standards or other requirements of the air pollution rules of the Department or any other such requirements under federal, state, or local law.

(1) Air Construction Permits.

(a) Unless exempt from permitting pursuant to Rule 62-210.300(3)(a) or (b), F.A.C., or Rule 62-4.040, F.A.C., an air construction permit shall be obtained by the owner or operator of any proposed new or modified facility or emissions unit prior to the beginning of construction or modification, in accordance with all applicable provisions of this chapter, Chapter 62-212, F.A.C., and Chapter 62-4, F.A.C. Except as provided under Rule 62-213.415, F.A.C., the owner or operator of any facility seeking to create or change an air emissions bubble shall obtain an air construction permit in accordance with all the applicable provisions of this chapter, Chapter 62-212, F.A.C., and Chapter 62-4, F.A.C. The construction permit shall be issued for a period of time sufficient to allow construction or modification of the facility or emissions unit and operation while the new or modified facility or emissions unit is conducting tests or otherwise demonstrating initial compliance with the conditions of the construction permit.

(b) Notwithstanding the expiration of an air construction permit, all limitations and requirements of such permit that are applicable to the design and operation of the permitted facility or emissions unit shall remain in effect until the facility or emissions unit is permanently shut down, except for any such limitation or requirement that is obsolete by its nature (such as a requirement for initial compliance testing) or any such limitation or requirement that is changed in accordance with the provisions of Rule 62-210.300(1)(b)1., F.A.C. Either the applicant or the Department can propose that certain conditions be considered obsolete. Any conditions or language in an air construction permit that are included for informational purposes only, if they are transferred to the air operation permit, shall be transferred for informational purposes only and shall not become enforceable conditions unless voluntarily agreed to by the permittee or otherwise required under Department rules.

1. Except for those limitations or requirements that are obsolete, all limitations and requirements of an air construction permit shall be included and identified in any air operation permit for the facility or emissions unit. The limitations and requirements included in the air operation permit can be changed, and thereby superseded, through the issuance of an air construction permit, federally enforceable state air operation permit, federally enforceable air general permit, or Title V air operation permit; provided, however, that:

a. Any change that would constitute an administrative correction may be made pursuant to Rule 62-210.360, F.A.C.;

b. Any change that would constitute a modification, as defined at Rule 62-210.200, F.A.C., shall be accomplished only through the issuance of an air construction permit; and

c. Any change in a permit limitation or requirement that originates from a permit issued pursuant to 40 CFR 52.21, Rule 62-204.800(10)(d)2., F.A.C., Rule 62-212.400, F.A.C., Rule 62-212.500, F.A.C., or any former codification of Rule 62-212.400 or 62-212.500, F.A.C., shall be accomplished only through the issuance of a new or revised air construction permit under Rule 62-204.800(10)(d)2., F.A.C., 62-212.400 or 62-212.500, F.A.C., as appropriate.

2. The force and effect of any change in a permit limitation or requirement made in accordance with the provisions of Rule 62-210.300(1)(b)1., F.A.C., shall be the same as if such change were made to the original air construction permit.

3. Nothing in Rule 62-210.300(1)(b), F.A.C., shall be construed as to allow operation of a facility or emissions unit without a valid air operation permit.

(2) Air Operation Permits. Upon expiration of the air operation permit for any existing facility or emissions unit, subsequent to construction or modification and demonstration of initial compliance with the conditions of the construction permit for any new or modified facility or emissions unit, or as otherwise provided in Chapter 62-210 or Chapter 62-213, the owner or operator of such facility or emissions unit shall obtain a renewal air operation permit, an initial air operation permit, or an administrative correction or revision of an existing air operation permit, whichever is appropriate, in accordance with all applicable provisions of Chapter 62-210, Chapter 62-213, and Chapter 62-4, F.A.C.

(a) Minimum Requirements for All Air Operation Permits. At a minimum, a permit issued pursuant to this subsection shall:

1. Specify the manner, nature, volume and frequency of the emissions permitted, and the applicable emission limiting standards or performance standards, if any;

2. Require proper operation and maintenance of any pollution control equipment by qualified personnel, where applicable in accordance with the provisions of any operation and maintenance plan required by the air pollution rules of the Department.

3. Contain an effective date stated in the permit which shall not be earlier than the date final action is taken on the application and be issued for a period, beginning on the effective date, as provided below.

a. The operation permit for an emissions unit which is in compliance with all applicable rules and in operational condition, and which the owner or operator intends to continue operating, shall be issued or renewed for a five-year period, except that, for Title V sources subject to Rule 62-213.420(1)(a)1., F.A.C., operation permits shall be extended until 60 days after the due date for submittal of the facility's Title V permit application as specified in Rule 62-213.420(1)(a)1., F.A.C.

b. Except as provided in Rule 62-210.300(2)(a)3.d., F.A.C., the operation permit for an emissions unit which has been shut down for six months or more prior to the expiration date of the current operation permit, shall be renewed for a period not to exceed five years from the date of shutdown, even if the emissions unit is not maintained in operational condition, provided:

- (i) the owner or operator of the emissions unit demonstrates to the Department that the emissions unit may need to be reactivated and used, or that it is the owner's or operator's intent to apply to the Department for a permit to construct a new emissions unit at the facility before the end of the extension period; and,
- (ii) the owner or operator of the emissions unit agrees to and is legally prohibited from providing the allowable emission permitted by the renewed permit as an emissions offset to any other person under Rule 62-212.500, F.A.C.; and,
- (iii) the emissions unit was operating in compliance with all applicable rules as of the time the source was shut down.

c. Except as provided in Rule 62-210.300(2)(a)3.d., F.A.C., the operation permit for an emissions unit which has been shut down for five years or more prior to the expiration date of the current operation permit shall be renewed for a maximum period not to exceed ten years from the date of shutdown, even if the emissions unit is not maintained in operational condition, provided the conditions given in Rule 62-210.300(2)(a)3.b., F.A.C., are met and the owner or operator demonstrates to the Department that failure to renew the permit would constitute a hardship, which may include economic hardship.

d. The operation permit for an electric utility generating unit on cold standby or long-term reserve shutdown shall be renewed for a five-year period, and additional five-year periods, even if the unit is not maintained in operational condition, provided the conditions given in Rules 62-210.300(2)(a)3.b.(i) through (iii), F.A.C., are met.

4. In the case of an emissions unit permitted pursuant to Rules 62-210.300(2)(a)3.b., c., and d., F.A.C., include reasonable notification and compliance testing requirements for reactivation of such emissions unit and provide that the owner or operator demonstrate to the Department prior to reactivation that such reactivation would not constitute reconstruction pursuant to Rule 62-204.800(7), F.A.C.

[Rules 62-210.300(1) & (2), F.A.C.]

19. **Not federally enforceable. Notification of Startup.** The owner or operator of any emissions unit or facility which has a valid air operation permit and which has been shut down more than one (1) year, shall notify the Department in writing of the intent to start up such emissions unit or facility, a minimum of sixty (60) days prior to the intended startup date.

(a) The notification shall include the planned startup date, anticipated emission rates or pollutants released, changes to processes or control devices which will result in changes to emission rates, and any other conditions which may differ from the valid outstanding operation permit.

(b) If, due to an emergency, a startup date is not known 60 days prior thereto, the owner shall notify the Department as soon as possible after the date of such startup is ascertained.

[Rule 62-210.300(5), F.A.C.]

20. **Emissions Unit Reclassification.**

(a) Any emissions unit whose operation permit has been revoked as provided for in Chapter 62-4, F.A.C., shall be deemed permanently shut down for purposes of Rule 62-212.500, F.A.C. Any emissions unit whose permit to operate has expired without timely renewal or transfer may be deemed permanently shut down, provided, however, that no such emissions unit shall be deemed permanently shut down if, within 20 days after receipt of written notice from the Department, the emissions unit owner or operator demonstrates that the permit expiration resulted from inadvertent failure to comply with the requirements of Rule 62-4.090, F.A.C., and that the owner or operator intends to continue the emissions unit in operation, and either submits an application for an air operation permit or complies with permit transfer requirements, if applicable.

(b) If the owner or operator of an emissions unit which is so permanently shut down, applies to the Department for a permit to reactivate or operate such emissions unit, the emissions unit will be reviewed and permitted as a new emissions unit.

[Rule 62-210.300(6), F.A.C.]

21. Public Notice and Comment.

(1) Public Notice of Proposed Agency Action.

(a) A notice of proposed agency action on permit application, where the proposed agency action is to issue the permit, shall be published by any applicant for:

1. An air construction permit;
2. An air operation permit, permit renewal or permit revision subject to Rule 62-210.300(2)(b), F.A.C., (i.e., a FESOP), except as provided in Rule 62-210.300(2)(b)1.b., F.A.C.; or
3. An air operation permit, permit renewal, or permit revision subject to Chapter 62-213, F.A.C., except those permit revisions meeting the requirements of Rule 62-213.412(1), F.A.C.

(b) The notice required by Rule 62-210.350(1)(a), F.A.C., shall be published in accordance with all otherwise applicable provisions of Rule 62-110.106, F.A.C. A public notice under Rule 62-210.350(1)(a)1., F.A.C., for an air construction permit may be combined with any required public notice under Rule 62-210.350(1)(a)2. or 3., F.A.C., for air operation permits. If such notices are combined, the public notice must comply with the requirements for both notices.

(c) Except as otherwise provided at Rules 62-210.350(2) and (5), F.A.C., each notice of intent to issue an air construction permit shall provide a 14-day period for submittal of public comments.

(2) Additional Public Notice Requirements for Emissions Units Subject to Prevention of Significant Deterioration or Nonattainment - Area Preconstruction Review.

(a) Before taking final agency action on a construction permit application for any proposed new or modified facility or emissions unit subject to the preconstruction review requirements of Rule 62-212.400 or 62-212.500, F.A.C., the Department shall comply with all applicable provisions of Rule 62-110.106, F.A.C., and provide an opportunity for public comment which shall include as a minimum the following:

1. A complete file available for public inspection in at least one location in the district affected which includes the information submitted by the owner or operator, exclusive of confidential records under Section 403.111, F.S., and the Department's analysis of the effect of the proposed construction or modification on ambient air quality, including the Department's preliminary determination of whether the permit should be approved or disapproved;
2. A 30-day period for submittal of public comments; and,
3. A notice, by advertisement in a newspaper of general circulation in the county affected, specifying the nature and location of the proposed facility or emissions unit, whether BACT or LAER has been determined, the degree of PSD increment consumption expected, if applicable, and the location of the information specified in paragraph 1. above; and notifying the public of the opportunity for submitting comments and requesting a public hearing.

(b) The notice provided for in Rule 62-210.350(2)(a)3., F.A.C., shall be prepared by the Department and published by the applicant in accordance with all applicable provisions of Rule 62-110.106, F.A.C., except that the applicant shall cause the notice to be published no later than thirty (30) days prior to final agency action.

(c) A copy of the notice provided for in Rule 62-210.350(2)(a)3., F.A.C., shall also be sent by the Department to the Regional Office of the U. S. Environmental Protection Agency and to all other state and local officials or agencies having cognizance over the location of such new or modified facility or emissions unit, including local air pollution control agencies, chief executives of city or county government, regional land use planning agencies, and any other state, Federal Land Manager, or Indian Governing Body whose lands may be affected by emissions from the new or modified facility or emissions unit.

(d) A copy of the notice provided for in Rule 62-210.350(2)(a)3., F.A.C., shall be displayed in the appropriate district, branch and local program offices.

(e) An opportunity for public hearing shall be provided in accordance with Chapter 120, F.S., and Rule 62-110.106, F.A.C.

(f) Any public comments received shall be made available for public inspection in the location where the information specified in Rule 62-210.350(2)(a)1., F.A.C., is available and shall be considered by the Department in making a final determination to approve or deny the permit.

(g) The final determination shall be made available for public inspection at the same location where the information specified in Rule 62-210.350(2)(a)1., F.A.C., was made available.

(h) For a proposed new or modified emissions unit which would be located within 100 kilometers of any Federal Class I area or whose emissions may affect any Federal Class I area, and which would be subject to the preconstruction review requirements of Rule 62-212.400, F.A.C., or Rule 62-212.500, F.A.C.:

1. The Department shall mail or transmit to the Administrator a copy of the initial application for an air construction permit and notice of every action related to the consideration of the permit application.
2. The Department shall mail or transmit to the Federal Land Manager of each affected Class I area a copy of any written notice of intent to apply for an air construction permit; the initial application for an air construction permit, including all required analyses and demonstrations; any subsequently submitted information related to the application; the preliminary determination and notice of proposed agency action on the permit application; and any petition for an administrative hearing regarding the application or the Department's proposed action. Each such document shall be mailed or transmitted to the Federal Land Manager within fourteen (14) days after its receipt by the Department.

(3) Additional Public Notice Requirements for Facilities Subject to Operation Permits for Title V Sources.

(a) Before taking final agency action to issue a new, renewed, or revised air operation permit subject to Chapter 62-213, F.A.C., the Department shall comply with all applicable provisions of Rule 62-110.106, F.A.C., and provide an opportunity for public comment which shall include as a minimum the following:

1. A complete file available for public inspection in at least one location in the district affected which includes the information submitted by the owner or operator, exclusive of confidential records under Section 403.111, F.S.; and,
2. A 30-day period for submittal of public comments.

(b) The notice provided for in Rule 62-210.350(3)(a), F.A.C., shall be prepared by the Department and published by the applicant in accordance with all applicable provisions of Rule 62-110.106, F.A.C., except that the applicant shall cause the notice to be published no later than thirty (30) days prior to final agency action.

(c) The notice shall identify:

1. The facility;
2. The name and address of the office at which processing of the permit occurs;
3. The activity or activities involved in the permit action;
4. The emissions change involved in any permit revision;
5. The name, address, and telephone number of a Department representative from whom interested persons may obtain additional information, including copies of the permit draft, the application, and all relevant supporting materials, including any permit application, compliance plan, permit, monitoring report, and compliance statement required pursuant to Chapter 62-213, F.A.C. (except for information entitled to confidential treatment pursuant to Section 403.111, F.S.), and all other materials available to the Department that are relevant to the permit decision;
6. A brief description of the comment procedures required by Rule 62-210.350(3), F.A.C.;
7. The time and place of any hearing that may be held, including a statement of procedure to request a hearing (unless a hearing has already been scheduled); and,
8. The procedures by which persons may petition the Administrator to object to the issuance of the proposed permit after expiration of the Administrator's 45-day review period.

[Rule 62-210.350, F.A.C.]

22. Administrative Permit Corrections.

(1) A facility owner shall notify the Department by letter of minor corrections to information contained in a permit. Such notifications shall include:

- (a) Typographical errors noted in the permit;
- (b) Name, address or phone number change from that in the permit;
- (c) A change requiring more frequent monitoring or reporting by the permittee;
- (d) Changes listed at 40 CFR 72.83(a)(1), (2), (6), (9) and (10), hereby adopted and incorporated by reference, to Title V sources subject to emissions limitations or reductions pursuant to 42 USC ss. 7651-7651o;
- (e) Changes listed at 40 CFR 72.83(a)(11), hereby adopted and incorporated by reference, to Title V sources subject to emissions limitations or reductions pursuant to 42 USC ss. 7651-7651o, provided the notification is accompanied by a copy of any EPA determination concerning the similarity of the change to those listed at Rule 62-210.360(1)(d), F.A.C.; and
- (f) Any other similar minor administrative change at the source.

(2) Upon receipt of any such notification the Department shall within 60 days correct the permit and provide a corrected copy to the owner.

(3) After first notifying the owner, the Department shall correct any permit in which it discovers errors of the types listed at Rule 62-210.360(1)(a) and (b), F.A.C., and provide a corrected copy to the owner.

(4) For Title V source permits, other than general permits, a copy of the corrected permit shall be provided to EPA and any approved local air program in the county where the facility or any part of the facility is located.

APPENDIX TV-3, TITLE V CONDITIONS (version dated 04/30/99) (continued)

(5) The Department shall incorporate requirements resulting from issuance of a new or revised construction permit into an existing Title V source permit, if the construction permit or permit revision incorporates requirements of federally enforceable preconstruction review, and if the applicant requests at the time of application that all of the requirements of Rule 62-213.430(1), F.A.C., be complied with in conjunction with the processing of the construction permit application.

[Rule 62-210.360, F.A.C.]

23. Reports.

(3) Annual Operating Report for Air Pollutant Emitting Facility.

(a) The Annual Operating Report for Air Pollutant Emitting Facility (DEP Form No. 62-210.900(5)) shall be completed each year.

(c) The annual operating report shall be submitted to the appropriate Department District or Department approved local air pollution control program office by March 1 of the following year unless otherwise indicated by permit condition or Department request.

[Rule 62-210.370(3), F.A.C.]

24. Circumvention. No person shall circumvent any air pollution control device, or allow the emission of air pollutants without the applicable air pollution control device operating properly.

[Rule 62-210.650, F.A.C.]

25. Forms and Instructions. The forms used by the Department in the stationary source control program are adopted and incorporated by reference in this section. The forms are listed by rule number, which is also the form number, with the subject, title and effective date. Forms 62-210.900(1),(3),(4) and (5), F.A.C., including instructions, are available from the Department as hard-copy documents or executable files on computer diskettes. Copies of forms (hard-copy or diskette) may be obtained by writing to the Department of Environmental Protection, Division of Air Resources Management, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Notwithstanding the requirement of Rule 62-4.050(2), F.A.C., to file application forms in quadruplicate, if an air permit application is submitted using the Department's electronic application form, only one copy of the diskette and signature pages is required to be submitted.

(1) Application for Air Permit - Title V Source, Form and Instructions (Effective 2-11-99).

(a) Acid Rain Part (Phase II), Form and Instructions (Effective 7-1-95).

1. Repowering Extension Plan, Form and Instructions (Effective 7-1-95).

2. New Unit Exemption, Form and Instructions (Effective 7-1-95).

3. Retired Unit Exemption, Form and Instructions (Effective 7-1-95).

4. Phase II NOx Compliance Plan, Form and Instructions (Effective 1-6-98).

5. Phase II NOx Averaging Plan, Form (Effective 1-6-98).

(b) Reserved.

(5) Annual Operating Report for Air Pollutant Emitting Facility, Form and Instructions (Effective 2-11-99).

[Rule 62-210.900, F.A.C.]

Chapter 62-213, F.A.C.

26. Annual Emissions Fee. Each Title V source permitted to operate in Florida must pay between January 15 and March 1 of each year, upon written notice from the Department, an annual emissions fee in accordance with Rule 62-213.205, F.A.C., and the appropriate form and associated instructions.

[Rules 62-213.205 and 62-213.900(1), F.A.C.]

27. Annual Emissions Fee. Failure to pay timely any required annual emissions fee, penalty, or interest constitutes grounds for permit revocation pursuant to Rule 62-4.100, F.A.C.

[Rule 62-213.205(1)(g), F.A.C.]

28. Annual Emissions Fee. Any documentation of actual hours of operation, actual material or heat input, actual production amount, or actual emissions used to calculate the annual emissions fee shall be retained by the owner for a minimum of five (5) years and shall be made available to the Department upon request.

[Rule 62-213.205(1)(j), F.A.C.]

29. Annual Emissions Fee. A completed DEP Form 62-213.900(1), F.A.C., "Major Air Pollution Source Annual Emissions Fee Form", must be submitted by the responsible official with the annual emissions fee.

[Rule 62-213.205(1)(k), F.A.C.]

30. Air Operation Permit Fees. After December 31, 1992, no permit application processing fee, renewal fee, modification fee or amendment fee is required for an operation permit for a Title V source.

[Rule 62-213.205(4), F.A.C.]

31. Permits and Permit Revisions Required. All Title V sources are subject to the permit requirements of Chapter 62-213, F.A.C.

(1) No Title V source may operate except in compliance with Chapter 62-213, F.A.C.

(2) Except as provided in Rule 62-213.410, F.A.C., no source with a permit issued under the provisions of this chapter shall make any changes in its operation without first applying for and receiving a permit revision if the change meets any of the following:

- (a) Constitutes a modification;
- (b) Violates any applicable requirement;
- (c) Exceeds the allowable emissions of any air pollutant from any unit within the source;
- (d) Contravenes any permit term or condition for monitoring, testing, recordkeeping, reporting or of a compliance certification requirement;
- (e) Requires a case-by-case determination of an emission limitation or other standard or a source specific determination of ambient impacts, or a visibility or increment analysis under the provisions of Chapters 62-212 or 62-296, F.A.C.;
- (f) Violates a permit term or condition which the source has assumed for which there is no corresponding underlying applicable requirement to which the source would otherwise be subject;
- (g) Results in the trading of emissions among units within a source except as specifically authorized pursuant to Rule 62-213.415, F.A.C.
- (h) Results in the change of location of any relocatable facility identified as a Title V source pursuant to paragraph (a)-(e), (g) or (h) of the definition of "major source of air pollution" at Rule 62-210.200, F.A.C.
- (i) Constitutes a change at an Acid Rain Source under the provisions of 40 CFR 72.81(a)(1),(2), or (3), (b)(1) or (b)(3), hereby incorporated by reference;
- (j) Constitutes a change in a repowering plan, nitrogen oxides averaging plan, or nitrogen oxides compliance deadline extension at an Acid Rain Source.
- (k) Is a request for exemption pursuant to Rule 62-214.340, F.A.C.

[Rule 62-213.400(1) & (2), F.A.C.]

32. Changes Without Permit Revision. Title V sources having a valid permit issued pursuant to Chapter 62-213, F.A.C., may make the following changes without permit revision, provided that sources shall maintain source logs or records to verify periods of operation in each alternative method of operation:

- (1) Permitted sources may change among those alternative methods of operation allowed by the source's permit as provided by the terms of the permit;
- (2) Permitted sources may implement the terms or conditions of a new or revised construction permit if:
 - (a) The application for construction permit complied with the requirements of Rule 62-213.420(3) and (4), F.A.C.;
 - (b) The terms or conditions were subject to federally enforceable preconstruction review pursuant to Chapter 62-212, F.A.C.; and,
 - (c) The new or revised construction permit was issued after the Department and the applicant complied with all the requirements of Rule 62-213.430(1), F.A.C.;
- (3) A permitted source may implement operating changes after the source submits any forms required by any applicable requirement and provides the Department and EPA with at least 7 days written notice prior to implementation. The source and the Department shall attach each notice to the relevant permit;
 - (a) The written notice shall include the date on which the change will occur, and a description of the change within the permitted source, the pollutants emitted and any change in emissions, and any term or condition becoming applicable or no longer applicable as a result of the change;
 - (b) The permit shield described in Rule 62-213.460, F.A.C., shall not apply to such changes;
- (4) Permitted sources may implement changes involving modes of operation only in accordance with Rule 62-213.415, F.A.C.

[Rule 62-213.410, F.A.C.]

33. Immediate Implementation Pending Revision Process.

(1) Those permitted Title V sources making any change that constitutes a modification pursuant to the definition of modification at Rule 62-210.200, F.A.C., but which would not constitute a modification pursuant to 42 USC 7412(a) or to 40 CFR 52.01, 60.2, or 61.15, adopted and incorporated by reference at Rule 62-204.800, F.A.C., may implement such change prior to final issuance of a permit revision in accordance with this section, provided the change:

- (a) Does not violate any applicable requirement;
- (b) Does not contravene any permit term or condition for monitoring, testing, recordkeeping or reporting, or any compliance certification requirement;

- (c) Does not require or change a case-by-case determination of an emission limitation or other standard, or a source-specific determination of ambient impacts, or a visibility or increment analysis under the provisions of Chapter 62-212 or 62-296, F.A.C.;
 - (d) Does not seek to establish or change a permit term or condition for which there is no corresponding underlying applicable requirement and that the source has assumed to avoid an applicable requirement to which the source would otherwise be subject including any federally enforceable emissions cap or federally enforceable alternative emissions limit.
 - (2) A Title V source may immediately implement such changes after they have been incorporated into the terms and conditions of a new or revised construction permit issued pursuant to Chapter 62-212, F.A.C., and after the source provides to EPA, the Department, each affected state and any approved local air program having geographic jurisdiction over the source, a copy of the source's application for operation permit revision. The Title V source may conform its application for construction permit to include all information required by Rule 62-213.420, F.A.C., in lieu of submitting separate application forms.
 - (3) The Department shall process the application for operation permit revision in accordance with the provisions of Chapter 62-213, F.A.C., except that the Department shall issue a draft permit revision or a determination to deny the revision within 60 days of receipt of a complete application for operation permit revision or, if the Title V source has submitted a construction permit application conforming to the requirements of Rule 62-213.420, F.A.C., the Department shall issue a draft permit or a determination to deny the revision at the same time the Department issues its determination on issuance or denial of the construction permit application. The Department shall not take final action until all the requirements of Rule 62-213.430(1)(a), (c), (d), and (e), F.A.C., have been complied with.
 - (4) Pending final action on the operation permit revision application, the source shall implement the changes in accordance with the terms and conditions of the source's new or revised construction permit.
 - (5) The permit shield described in Rule 62-213.460, F.A.C., shall not apply to such changes until after the Department takes final action to issue the operation permit revision.
 - (6) If the Department denies the source's application for operation permit revision, the source shall cease implementation of the proposed changes.
- [Rule 62-213.412, F.A.C.]

34. Permit Applications.

- (1) **Duty to Apply.** For each Title V source, the owner or operator shall submit a timely and complete permit application in compliance with the requirements of Rules 62-213.420, 62-4.050(1) & (2), and 62-210.900, F.A.C.
 - (a) **Timely Application.**
 - 3. For purposes of permit renewal, a timely application is one that is submitted in accordance with Rule 62-4.090, F.A.C.
 - (b) **Complete Application.**
 - 1. Any applicant for a Title V permit, permit revision or permit renewal must submit an application on DEP Form No. 62-210.900(1), which must include all the information specified by Rule 62-213.420(3), F.A.C., except that an application for permit revision must contain only that information related to the proposed change. The applicant shall include information concerning fugitive emissions and stack emissions in the application. Each application for permit, permit revision or permit renewal shall be certified by a responsible official in accordance with Rule 62-213.420(4), F.A.C.
 - 2. For those applicants submitting initial permit applications pursuant to Rule 62-213.420(1)(a)1., F.A.C., a complete application shall be an application that substantially addresses all the information required by the application form number 62-210.900(1), and such applications shall be deemed complete within sixty days of receipt of a signed and certified application unless the Department notifies the applicant of incompleteness within that time. For all other applicants, the applications shall be deemed complete sixty days after receipt, unless the Department, within sixty days after receipt of a signed application for permit, permit revision or permit renewal, requests additional documentation or information needed to process the application. An applicant making timely and complete application for permit, or timely application for permit renewal as described by Rule 62-4.090(1), F.A.C., shall continue to operate the source under the authority and provisions of any existing valid permit or Florida Electrical Power Plant Siting Certification, provided the applicant complies with all the provisions of Rules 62-213.420(1)(b)3. and 4. F.A.C. Failure of the Department to request additional information within sixty days of receipt of a properly signed application shall not impair the Department's ability to request additional information pursuant to Rules 62-213.420(1)(b)3. and 4., F.A.C.

3. For those permit applications submitted pursuant to the provisions of Rule 62-213.420(1)(a)1., F.A.C., the Department shall notify the applicant if the Department becomes aware at any time during processing of the application that the application contains incorrect or incomplete information. The applicant shall submit the corrected or supplementary information to the Department within ninety days unless the applicant has requested and been granted additional time to submit the information. Failure of an applicant to submit corrected or supplementary information requested by the Department within ninety days or such additional time as requested and granted shall render the application incomplete.

4. For all applications other than those addressed at Rule 62-213.420(1)(b)3., F.A.C., should the Department become aware, during processing of any application that the application contains incorrect information, or should the Department become aware, as a result of comment from an affected State, an approved local air program, EPA, or the public that additional information is needed to evaluate the application, the Department shall notify the applicant within 30 days. When an applicant becomes aware that an application contains incorrect or incomplete information, the applicant shall submit the corrected or supplementary information to the Department. If the Department notifies an applicant that corrected or supplementary information is necessary to process the permit, and requests a response, the applicant shall provide the information to the Department within ninety days of the Department request unless the applicant has requested and been granted additional time to submit the information or, the applicant shall, within ninety days, submit a written request that the Department process the application without the information. Failure of an applicant to submit corrected or supplementary information requested by the Department within ninety days, or such additional time as requested and granted, or to demand in writing within ninety days that the application be processed without the information shall render the application incomplete. Nothing in this section shall limit any other remedies available to the Department.

[Rules 62-213.420(1)(a)3. and 62-213.420(1)(b)1., 2., 3. & 4., F.A.C.]

35. Confidential Information. Whenever an applicant submits information under a claim of confidentiality pursuant to Section 403.111, F.S., the applicant shall also submit a copy of all such information and claim directly to EPA. (also, see Condition No. 50.)

[Rule 62-213.420(2), F.A.C.]

36. Standard Application Form and Required Information. Applications shall be submitted under Chapter 62-213, F.A.C., on forms provided by the Department and adopted by reference in Rule 62-210.900(1), F.A.C. The information as described in Rule 62-210.900(1), F.A.C., shall be included for the Title V source and each emissions unit. An application must include information sufficient to determine all applicable requirements for the Title V source and each emissions unit and to evaluate a fee amount pursuant to Rule 62-213.205, F.A.C.

[Rule 62-213.420(3), F.A.C.]

37. Certification by Responsible Official (RO). In addition to the professional engineering certification required for applications by Rule 62-4.050(3), F.A.C., any application form, report, compliance statement, compliance plan and compliance schedule submitted pursuant to Chapter 62-213, F.A.C., shall contain a certification signed by a responsible official that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

[Rule 62-213.420(4), F.A.C.]

38. a. Permit Renewal and Expiration. Permits being renewed are subject to the same requirements that apply to permit issuance at the time of application for renewal. Permit renewal applications shall contain that information identified in Rules 62-210.900(1) and 62-213.420(3), F.A.C. Unless a Title V source submits a timely application for permit renewal in accordance with the requirements of Rule 62-4.090(1), F.A.C., the existing permit shall expire and the source's right to operate shall terminate.

b. Permit Revision Procedures. Permit revisions shall meet all requirements of Chapter 62-213, F.A.C., including those for content of applications, public participation, review by approved local programs and affected states, and review by EPA, as they apply to permit issuance and renewal, except that permit revisions for those activities implemented pursuant to Rule 62-213.412, F.A.C., need not meet the requirements of Rule 62-213.430(1)(b), F.A.C. The Department shall require permit revision in accordance with the provisions of Rule 62-4.080, F.A.C., and 40 CFR 70.7(f), whenever any source becomes subject to any condition listed at 40 CFR 70.7(f)(1), hereby adopted and incorporated by reference. The below requirements from 40 CFR 70.7(f) are adopted and incorporated by reference in Rule 62-213.430(4), F.A.C.:

o 40 CFR 70.7(f): Reopening for Cause. (also, see Condition No. 4)

(1) This section contains provisions from 40 CFR 70.7(f) that specify the conditions under which a Title V permit shall be reopened prior to the expiration of the permit. A Title V permit shall be reopened and revised under any of the following circumstances:

(i) Additional applicable requirements under the Act become applicable to a major Part 70 source with a remaining permit term of 3 or more years. Such a reopening shall be completed not later than 18 months after promulgation of the applicable requirement. No such reopening is required if the effective date of the requirement is later than the date on which the permit is due to expire, unless the original permit or any of its terms and conditions has been extended pursuant to 40 CFR 70.4(b)(10)(i) or (ii).

(ii) Additional requirements (including excess emissions requirements) become applicable to an affected source under the acid rain program. Upon approved by the Administrator, excess emissions offset plans shall be deemed to be incorporated into the permit.

(iii) The permitting authority or EPA determines that the permit contains a material mistake or that inaccurate statements were made in establishing the emissions standards or other terms or conditions of the permit.

(iv) The Administrator or the permitting authority determines that the permit must be revised or revoked to assure compliance with the applicable requirements.

(2) Proceedings to reopen and issue a permit shall follow the same procedures as apply to initial permit issuance and shall affect only those parts of the permit for which cause to reopen exists. Such reopening shall be made as expeditiously as practicable.

(3) Reopenings under 40 CFR 70.7(f)(1) shall not be initiated before a notice of such intent is provided to the Part 70 source by the permitting authority at least 30 days in advance of the date that the permit is to be reopened, except that the permitting authority may provide a shorter time period in the case of an emergency.

[Rules 62-213.430(3) & (4), F.A.C.; and, 40 CFR 70.7(f)]

39. Insignificant Emissions Units or Pollutant-Emitting Activities.

(a) All requests for determination of insignificant emissions units or activities made pursuant to Rule 62-213.420(3)(m), F.A.C., shall be processed in conjunction with the permit, permit renewal or permit revision application submitted pursuant to Chapter 62-213, F.A.C. Insignificant emissions units or activities shall be approved by the Department consistent with the provisions of Rule 62-4.040(1)(b), F.A.C. Emissions units or activities which are added to a Title V source after issuance of a permit under Chapter 62-213, F.A.C., shall be incorporated into the permit at its next renewal, provided such emissions units or activities have been exempted from the requirement to obtain an air construction permit and also qualify as insignificant pursuant to Rule 62-213.430(6), F.A.C.

(b) An emissions unit or activity shall be considered insignificant if:

1. Such unit or activity would be subject to no unit-specific applicable requirement;
2. Such unit or activity, in combination with other units or activities proposed as insignificant, would not cause the facility to exceed any major source threshold(s) as defined in Rule 62-213.420(3)(c)1., F.A.C., unless it is acknowledged in the permit application that such units or activities would cause the facility to exceed such threshold(s); and
3. Such unit or activity would not emit or have the potential to emit:
 - a. 500 pounds per year or more of lead and lead compounds expressed as lead;
 - b. 1,000 pounds per year or more of any hazardous air pollutant;
 - c. 2,500 pounds per year or more of total hazardous air pollutants; or
 - d. 5.0 tons per year or more of any other regulated pollutant.

[Rule 62-213.430(6), F.A.C.]

40. Permit Duration. Operation permits for Title V sources may not be extended as provided in Rule 62-4.080(3), F.A.C., if such extension will result in a permit term greater than five (5) years.

[Rule 62-213.440(1)(a), F.A.C.]

41. Monitoring Information. All records of monitoring information shall specify the date, place, and time of sampling or measurement and the operating conditions at the time of sampling or measurement, the date(s) analyses were performed, the company or entity that performed the analyses, the analytical techniques or methods used, and the results of such analyses.
[Rule 62-213.440(1)(b)2.a., F.A.C.]

42. Retention of Records. Retention of records of all monitoring data and support information shall be for a period of at least 5 years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by the permit.
[Rule 62-213.440(1)(b)2.b., F.A.C.]

43. Monitoring Reports. The permittee shall submit reports of any required monitoring at least every six (6) months. All instances of deviations from permit requirements must be clearly identified in such reports.
[Rule 62-213.440(1)(b)3.a., F.A.C.]

44. Deviation from Permit Requirements Reports. The permittee shall report in accordance with the requirements of Rules 62-210.700(6) and 62-4.130, F.A.C., any deviations from permit requirements, including those attributable to upset conditions as defined in the permit. Reports shall include the probable cause of such deviations, and any corrective actions or preventive measures taken.
[Rule 62-213.440(1)(b)3.b., F.A.C.]

45. Reports. All reports shall be accompanied by a certification by a responsible official, pursuant to Rule 62-213.420(4), F.A.C.
[Rule 62-213.440(1)(b)3.c., F.A.C.]

46. If any portion of the final permit is invalidated, the remainder of the permit shall remain in effect.
[Rule 62-213.440(1)(d)1., F.A.C.]

47. It shall not be a defense for a permittee in an enforcement action that maintaining compliance with any permit condition would necessitate halting of or reduction of the source activity.
[Rule 62-213.440(1)(d)3., F.A.C.]

48. A Title V source shall comply with all the terms and conditions of the existing permit until the Department has taken final action on any permit renewal or any requested permit revision, except as provided at Rule 62-213.412(2), F.A.C.
[Rule 62-213.440(1)(d)4., F.A.C.]

49. A situation arising from sudden and unforeseeable events beyond the control of the source which causes an exceedance of a technology-based emissions limitation because of unavoidable increases in emissions attributable to the situation and which requires immediate corrective action to restore normal operation, shall be an affirmative defense to an enforcement action in accordance with the provisions and requirements of 40 CFR 70.6(g)(2) and (3), hereby adopted and incorporated by reference.
[Rule 62-213.440(1)(d)5., F.A.C.]

50. Confidentiality Claims. Any permittee may claim confidentiality of any data or other information by complying with Rule 62-213.420(2), F.A.C. (also, see Condition No. 35.)
[Rule 62-213.440(1)(d)6., F.A.C.]

51. Statement of Compliance. The permittee shall submit a statement of compliance with all terms and conditions of the permit. Such statements shall be submitted to the Department and EPA annually, or more frequently if specified by Rule 62-213.440(2), F.A.C., or by any other applicable requirement. Such statements shall be accompanied by a certification in accordance with Rule 62-213.420(4), F.A.C. The statement of compliance shall include all the provisions of 40 CFR 70.6(c)(5)(iii), incorporated by reference at Rule 62-204.800, F.A.C.

o 40 CFR 70.6(c)(5)(iii). The compliance certification shall include all of the following (provided that the identification of applicable information may cross-reference the permit or previous reports, as applicable):

(A) The identification of each term or condition of the permit that is the basis of the certification;

(B) The identification of the method(s) or other means used by the owner or operator for determining the compliance status with each term and condition during the certification period, and whether such methods or other means provide continuous or intermittent data. Such methods and other means shall include, at a minimum, the methods and means required under 40 CFR 70.6(a)(3). If necessary, the owner or operator also shall identify any other material information that must be included in the certification to comply with section 113(c)(2) of the Act, which prohibits knowingly making a false certification or omitting material information;

(C) The status of compliance with the terms and conditions of the permit for the period covered by the certification, based on the method or means designated in paragraph (c)(5)(iii)(B) of this section. The certification shall identify each deviation and take it into account in the compliance certification. The certification shall also identify as possible exceptions to compliance any periods during which compliance is required and in which an excursion or exceedance as defined under part 64 of this chapter occurred; and

(D) Such other facts as the permitting authority may require to determine the compliance status of the source.

The statement shall be accompanied by a certification by a responsible official, in accordance with Rule 62-213.420(4), F.A.C. The responsible official may treat compliance with all other applicable requirements as a surrogate for compliance with Rule 62-296.320(2), Objectionable Odor Prohibited.

[Rule 62-213.440(3), F.A.C.]

52. Permit Shield. Except as provided in Chapter 62-213, F.A.C., compliance with the terms and conditions of a permit issued pursuant to Chapter 62-213, F.A.C., shall be deemed compliance with any applicable requirements in effect as of the date of permit issuance, provided that the source included such applicable requirements in the permit application. Nothing in Rule 62-213.460, F.A.C., or in any permit shall alter or affect the ability of EPA or the Department to deal with an emergency, the liability of an owner or operator of a source for any violation of applicable requirements prior to or at the time of permit issuance, or the requirements of the Federal Acid Rain Program.

(Permitting note: The permit shield is not in effect until the effective date of the permit.)

[Rule 62-213.460, F.A.C.]

53. Forms and Instructions. The forms used by the Department in the Title V source operation program are adopted and incorporated by reference in Rule 62-213.900, F.A.C. The form is listed by rule number, which is also the form number, and with the subject, title, and effective date. Copies of forms may be obtained by writing to the Department of Environmental Protection, Division of Air Resources Management, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, or by contacting the appropriate permitting authority.

(1) Major Air Pollution Source Annual Emissions Fee (AEF) Form.

[Rule 62-213.900(1), F.A.C.]

Chapter 62-256, F.A.C.

54. Not federally enforceable. Open Burning. This permit does not authorize any open burning nor does it constitute any waiver of the requirements of Chapter 62-256, F.A.C. Source shall comply with Chapter 62-256, F.A.C., for any open burning at the source.

[Chapter 62-256, F.A.C.]

Chapter 62-281, F.A.C.

55. Refrigerant Requirements. Any facility having refrigeration equipment, including air conditioning equipment, which uses a Class I or II substance (listed at 40 CFR 82, Subpart A, Appendices A and B), and any facility which maintains, services, or repairs motor vehicles using a Class I or Class II substance as refrigerant must comply with all requirements of 40 CFR 82, Subparts B and F, and with Rule 62-281.100, F.A.C. Those requirements include the following restrictions:

(1) Any facility having any refrigeration equipment normally containing 50 (fifty) pounds of refrigerant, or more, must keep servicing records documenting the date and type of all service and the quantity of any refrigerant added pursuant to 40 CFR 82.166;

- (2) No person repairing or servicing a motor vehicle may perform any service on a motor vehicle air conditioner (MVAC) involving the refrigerant for such air conditioner unless the person has been properly trained and certified as provided at 40 CFR 82.34 and 40 CFR 82.40, and properly uses equipment approved pursuant to 40 CFR 82.36 and 40 CFR 82.38, and complies with 40 CFR 82.42;
- (3) No person may sell or distribute, or offer for sale or distribution, any substance listed as a Class I or Class II substance at 40 CFR 82, Subpart A, Appendices A and B, except in compliance with Rule 62-281.100, F.A.C., and 40 CFR 82.34(b), 40 CFR 82.42, and/or 40 CFR 82.166;
- (4) No person maintaining, servicing, repairing, or disposing of appliances may knowingly vent or otherwise release into the atmosphere any Class I or Class II substance used as a refrigerant in such equipment and no other person may open appliances (except MVACs as defined at 40 CFR 82.152) for service, maintenance or repair unless the person has been properly trained and certified pursuant to 40 CFR 82.161 and unless the person uses equipment certified for that type of appliance pursuant to 40 CFR 82.158 and unless the person observes the practices set forth at 40 CFR 82.156 and 40 CFR 82.166;
- (5) No person may dispose of appliances (except small appliances, as defined at 40 CFR 82.152) without using equipment certified for that type of appliance pursuant to 40 CFR 82.158 and without observing the practices set forth at 40 CFR 82.156 and 40 CFR 82.166;
- (6) No person may recover refrigerant from small appliances, MVACs and MVAC-like appliances (as defined at 40 CFR 82.152), except in compliance with the requirements of 40 CFR 82, Subpart F.
- [40 CFR 82; and, Chapter 62-281, F.A.C. (Chapter 62-281, F.A.C., is not federally enforceable)]

Chapter 62-296, F.A.C.

56. Industrial, Commercial, and Municipal Open Burning Prohibited. Open burning in connection with industrial, commercial, or municipal operations is prohibited, except when:

- (a) Open burning is determined by the Department to be the only feasible method of operation and is authorized by an air permit issued pursuant to Chapter 62-210 or 62-213, F.A.C.; or
- (b) An emergency exists which requires immediate action to protect human health and safety; or
- (c) A county or municipality would use a portable air curtain incinerator to burn yard trash generated by a hurricane, tornado, fire or other disaster and the air curtain incinerator would otherwise be operated in accordance with the permitting exemption criteria of Rule 62-210.300(3), F.A.C.

[Rule 62-296.320(3), F.A.C.]

57. Unconfined Emissions of Particulate Matter.

(4)(c)1. No person shall cause, let, permit, suffer or allow the emissions of unconfined particulate matter from any emissions unit whatsoever, including, but not limited to, vehicular movement, transportation of materials, construction, alteration, demolition or wrecking, or industrially related activities such as loading, unloading, storing or handling, without taking reasonable precautions to prevent such emission.

3. Reasonable precautions may include, but shall not be limited to the following:

- a. Paving and maintenance of roads, parking areas and yards.
- b. Application of water or chemicals to control emissions from such activities as demolition of buildings, grading roads, construction, and land clearing.
- c. Application of asphalt, water, oil, chemicals or other dust suppressants to unpaved roads, yards, open stock piles and similar emissions units.
- d. Removal of particulate matter from roads and other paved areas under the control of the owner or operator of the emissions unit to prevent reentrainment, and from buildings or work areas to prevent particulate from becoming airborne.
- e. Landscaping or planting of vegetation.
- f. Use of hoods, fans, filters, and similar equipment to contain, capture and/or vent particulate matter.
- g. Confining abrasive blasting where possible.
- h. Enclosure or covering of conveyor systems.

4. In determining what constitutes reasonable precautions for a particular facility, the Department shall consider the cost of the control technique or work practice, the environmental impacts of the technique or practice, and the degree of reduction of emissions expected from a particular technique or practice.

[Rules 62-296.320(4)(c)1., 3., & 4. F.A.C.]

Figure 1: Summary Report-
Gaseous and Opacity Excess Emission and Monitoring System
Performance

FIGURE 1--SUMMARY REPORT--GASEOUS AND OPACITY EXCESS EMISSION AND MONITORING SYSTEM PERFORMANCE

[Note: This form is referenced in 40 CFR 60.7, Subpart A-General Provisions]

Pollutant (Circle One): SO₂ NO_x TRS H₂S CO Opacity

Reporting period dates: From _____ to _____

Company: _____

Emission Limitation: _____

Address: _____

Monitor Manufacturer: _____

Model No.: _____

Date of Latest CMS Certification or Audit: _____

Process Unit(s) Description: _____

Total source operating time in reporting period ¹: _____

Emission data summary ¹	CMS performance summary ¹
1. Duration of excess emissions in reporting period due to:	1. CMS downtime in reporting period due to:
a. Startup/shutdown	a. Monitor equipment malfunctions
b. Control equipment problems	b. Non-Monitor equipment malfunctions
c. Process problems	c. Quality assurance calibration
d. Other known causes	d. Other known causes
e. Unknown causes	e. Unknown causes
2. Total duration of excess emissions	2. Total CMS Downtime
3. Total duration of excess emissions x (100) / [Total source operating time] % ²	3. [Total CMS Downtime] x (100) / [Total source operating time] % ²

¹ For opacity, record all times in minutes. For gases, record all times in hours.

² For the reporting period: If the total duration of excess emissions is 1 percent or greater of the total operating time or the total CMS downtime is 5 percent or greater of the total operating time, both the summary report form and the excess emission report described in 40 CFR 60.7(c) shall be submitted.

Note: On a separate page, describe any changes since last quarter in CMS, process or controls.

I certify that the information contained in this report is true, accurate, and complete.

Name: _____

Signature: _____ Date: _____

Title: _____

Table 297.310-1,
Calibration Schedule (version dated 10/07/96)

TABLE 297.310-1 CALIBRATION SCHEDULE
(version dated 10/07/96)

[Note: This table is referenced in Rule 62-297.310, F.A.C.]

ITEM	MINIMUM CALIBRATION FREQUENCY	REFERENCE INSTRUMENT	TOLERANCE
Liquid in glass thermometer	Annually	ASTM Hg in glass ref. thermometer or equivalent, or thermometric points	+/-2%
Bimetallic thermometer	Quarterly	Calib. liq. in glass thermometer	5 degrees F
Thermocouple	Annually	ASTM Hg in glass ref. thermometer, NBS calibrated reference and potentiometer	5 degrees F
Barometer	Monthly	Hg barometer or NOAA station	+/-1% scale
Pitot Tube	When required or when damaged	By construction or measurements in wind tunnel D greater than 16" and standard pitot tube	See EPA Method 2, Fig. 2-2 & 2-3
Probe Nozzles	Before each test or when nicked, dented, or corroded	Micrometer	+/-0.001" mean of at least three readings Max. deviation between readings .004"
Dry Gas Meter and Orifice Meter	1. Full Scale: When received, When 5% change observed, Annually 2. One Point: Semiannually 3. Check after each test series	Spirometer or calibrated wet test or dry gas test meter	2%
		Comparison check	5%

Table 1-1, Summary of Air Pollutant Standards and Terms

Table 1-1, Summary of Air Pollutant Standards and Terms

Lee County
Lee County Resource Recovery Facility

FINAL Permit No.: 0710119-001-AV
Facility ID No.: 0710119

This table summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.

E.U. ID No.	Brief Description
[001]	Unit 1, 660 Ton Per Day Mass Burn Unit
[002]	Unit 2, 660 Ton Per Day Mass Burn Unit

Pollutant Name	Fuel(s)	Hours/Year	Allowable Emissions			Equivalent Emissions*		Regulatory Citation(s)	See permit condition(s)
			Standard(s)	lbs./hour	TPY	lbs./hour	TPY		
Particulate Matter	all	8,760	0.010 gr/DSCF, corrected to 7% O ₂	5.34	21.30			PSD-FL-151	A.21.
Sulfur Dioxide	all	8,760	29 ppm or 80% reduction, at 7% O ₂	41.0		41.0	163.30	PSD-FL-151	A.30.
Nitrogen Oxides	all	8,760	180 ppm, corrected to 7% O ₂	80.0	320.0			PSD-FL-151	A.33.
Volatile Organic Compounds	all	8,760	37 ppm, corrected to 7% O ₂	5.80	23.0			PSD-FL-151	A.29.
Carbon Monoxide	all	8,760	100 ppm, corrected to 7% O ₂	27.2	108			PSD-FL-151	A.34.
Mercury	all	8,760	0.070 mg/dscm, or 85% reduction	0.0379	0.166			40 CFR 60.33b(a)(3)	A.24., A.25.
Beryllium	all	8,760	1.35 x 10 ⁻⁷ lb/MMBtu heat input	3.7 x 10 ⁻⁵	1.47 x 10 ⁻⁴			PSD-FL-151	A.28.
Visible Emissions	all	8,760	10 %, 6 minute average					40 CFR 60.33b(a)(1)(iii)	A.22.
Cadmium	all	8,760	0.040 mg/dscm, corrected to 7% O ₂					40 CFR 60.33b(a)(2)(i)	A.23.
Lead	all	8,760	0.0060 lbs/MMBtu	0.165	0.66			PSD-FL-151	A.26.
Hydrogen Chloride	all	8,760	25 ppm or 95% reduction to 7% O ₂					PSD-FL-151	A.31.
Dioxin/Furan	all	8,760	30 ng/dscm, corrected to 7% O ₂	7.0 x 10 ⁻⁶	2.8 x 10 ⁻⁵			PSD-FL-151	A.32.
Fluoride	all	8,760	5.0 ppm corrected to 7% O ₂	0.96	3.8			PSD-FL-151	A.27.
Sulfuric Acid Mist	all	8,760	0.036 lb/MMBtu	9.85	39.3			PSD-FL-151	A.35.
Arsenic	all	8,760	9.1 x 10 ⁻⁶ lbs/MMBtu	2.5 x 10 ⁻³	0.01			PSD-FL-151	A.36.
Ammonia	all	8,760	50 ppm, by volume					PSD-FL-151	A.37.
Fugitive Ash	all	8,760	5%					40 CFR 60.36b	A.38.

Notes:

* The "Equivalent Emissions" listed are for informational purposes only.

The emissions limits in pounds per hour and tons per year are for each Unit.

Table 1-1, Summary of Air Pollutant Standards and Terms

Lee County
Lee County Resource Recovery Facility

FINAL Permit No.: 0710119-001-AV
Facility ID No.: 0710119

This table summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.

E.U. ID No. **Brief Description**
[003] Lime Storage Silo

Pollutant Name	Fuel(s)	Hours/Year	Allowable Emissions			Equivalent Emissions*		Regulatory Citation(s)	See permit condition(s)
			Standard(s)	lbs./hour	TPY	lbs./hour	TPY		
Visible Emissions	N/A	8760	5% opacity					PSD-FL-151	B.3.
Notes: * The "Equivalent Emissions" listed are for informational purposes only.									

Table 1-1, Summary of Air Pollutant Standards and Terms

Lee County

Lee County Resource Recovery Facility

FINAL Permit No.: 0710119-001-AV

Facility ID No.: 0710119

This table summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.

E.U. ID No. **Brief Description**

[004] Ash Handling System

Pollutant Name	Fuel(s)	Hours/Year	Allowable Emissions			Equivalent Emissions*		Regulatory Citation(s)	See permit condition(s)
			Standard(s)	lbs./hour	TPY	lbs./hour	TPY		
Particulate Matter	N/A	8760	0.010 grains/dscf			2.12	9.28	PSD-FL-151	C.3.
Visible Emissions	N/A	8760	5% opacity					PSD-FL-151	C.2.

Notes:

* The "Equivalent Emissions" listed are for informational purposes only.

Table 2-1, Summary of Compliance Requirements

Table 2-1, Summary of Compliance Requirements

Lee County

FINAL Permit No.: 0710119-001-AV

Lee County Resource Recovery Facility

Facility ID No.: 0710119

This table summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.

E.U. ID No.	Brief Description
[-001]	Unit 1, 660 Ton Per Day Mass Burn Unit
[-002]	Unit 2, 660 Ton Per Day Mass Burn Unit

Pollutant Name or Parameter	Fuel(s)	Compliance Method	Testing Time	Frequency	Min. Compliance Test	CMS**	See permit condition(s)
			Frequency	Base Date *	Duration		
Particulate Matter	all	Method 5	Annual		60 min.		A.46.
Sulfur Dioxide	all	Methods 6, 6A, or 6C; & 19	Annual		60 min.	YES	A.49.
Nitrogen Oxides	all	Methods 19 & 7E	Annual		60 min.	YES	A.52.
Volatile Organic Compounds	all	Method 25A or 25B	Renewal		60 min.		A.55., A.66.1.
Carbon Monoxide	all	Method 10	Annual		60 min.	YES	A.56.
Mercury	all	Method 29	Annual		60 min.		A.47., A.48.
Beryllium	all	Method 29	Renewal		60 min.		A.54., A.66.1.
Visible Emissions	all	Method 9	Annual		60 min.	YES	A.46.
Cadmium	all	Method 29	Annual		60 min.		A.47.
Lead	all	Method 29	Annual		60 min.		A.47.
Hydrogen Chloride	all	Method 26 or 26A	Annual		60 min.		A.50.
Dioxin/Furan	all	Method 23	Annual		4 hours		A.51.
Fluoride	all	Method 13A or 13B	Renewal		60 min.		A.53., A.66.1.
Sulfuric Acid Mist	all	Method 8	Renewal		60 min.		A.57., A.66.1.
Arsenic	all	Method 29	Renewal		60 min.		A.58., A.66.1.
Ammonia	all	Conditional Test Method (CTM-027)	Renewal		60 min.		A.59., A.66.1.
Fugitive Ash	all	Method 22	Annual		60 min.		A.60.

Notes:

* The frequency base date is established for planning purposes only; see Rule 62-297.310, F.A.C.

**CMS [=] continuous monitoring system

Table 2-1, Summary of Compliance Requirements

Lee County

FINAL Permit No.: 0710119-001-AV

Lee County Resource Recovery Facility

Facility ID No.: 0710119

This table summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.

E.U. ID No. Brief Description
[-003] Lime Storage Silo

Pollutant Name or Parameter	Fuel(s)	Compliance Method	Testing Time Frequency	Frequency Base Date ¹	Min. Compliance Test Duration	CMS ²	See permit condition(s)
Visible Emissions	N/A	Method 9	Annual		30 min. ³		B.4. & B.10.

Notes:

¹ The frequency base date is established for planning purposes only; see Rule 62-297.310, F.A.C., this date is to be established (TBE) by the initial compliance test.

² CMS [=] continuous monitoring system

³ If it takes less than 30 minutes to unload the lime truck, shorter test periods are allowed as long as the test lasts a minimum of 12 minutes.

Table 2-1, Summary of Compliance Requirements

Lee County

Lee County Resource Recovery Facility

FINAL Permit No.: 0710119-001-AV

Facility ID No.: 0710119

This table summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.

E.U. ID No.	Brief Description
[-004]	Ash Handling System

Pollutant Name or Parameter	Fuel(s)	Compliance Method	Testing Time	Frequency	Base	Min. Compliance	CMS ²	See permit condition(s)
			Frequency	Date ¹	Test	Duration		
Particulate Matter	N/A	Method 5	Annual ³			60 min.		C.4. & C.10.
Visible Emissions	N/A	Method 9	Annual			30 min.		C.4. & C.10

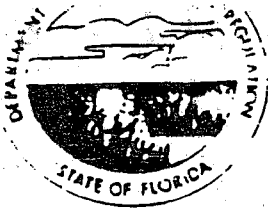
Notes:

¹ The frequency base date is established for planning purposes only; see Rule 62-297.310, F.A.C., this date is to be established (TBE) by the initial compliance test.

² CMS [=] continuous monitoring system

³ Compliance testing for PM is waived as long as the unit maintains Visible Emissions less than 5%. If the Department has reason to believe that the particulate weight emission standard is not being met, it shall require that compliance be demonstrated using EPA Method 5.

7.3 - PSD Permit



Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399

Lawton Chiles, Governor

Carol M. Browner, Secretary

PERMITTEE:
Lee County Utilities
2178 McGregor Blvd.
Ft. Myers, FL 33902

Permit Number: PSD-FL-151

County: Lee

Latitude/Longitude: 26°37'54"N
81°45'41"W

Project: Lee County Waste to Energy
Recovery Facility Units
1 and 2

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the construction of the Lee County Solid Waste Energy Recovery Facility located at Buckingham Road and State Road 82, in Fort Myers, Florida consisting of two mass-burn Municipal Waste Combustors (MWC) with two units to be constructed initially and the third unit to be installed in the future. These mass-burn units shall have a maximum permitted capacity of 660 tons/day, each unit, for a total capacity for both units not to exceed 1320 tons/day; and a maximum heat input of 275 MMBtu/hr, per unit, for a total heat input for both units not to exceed 550 MMBtu/hr, based on a municipal solid waste average heating value of 5000 Btu/lb.

Each combustor unit shall be of Stoker Waterwall design (or equivalent) capable of generating 20 MW for a total of 40 MW from both units. Each unit shall be allowed to produce a maximum of 186,200 lbs of steam per hour at 865 psig and 830°F. Each combustor unit shall be equipped with auxiliary burners to be fired by only propane gas. Emissions from each combustor shall be controlled by a slaked lime scrubber followed by a baghouse. NO_x emissions shall be controlled by a SNCR System. Mercury emissions shall be controlled by injecting activated carbon.

The permittee must submit four copies of complete information prior to purchase and installation of any combustor and related equipment. Such information shall include the following: make and model numbers of each MWC and all pollution control and continuous emissions monitoring devices and related equipment.

PERMITTEE: Lee County

Permit Number: PSD-FL-151

The power plant site certification number for this facility is PA90-30.

This source shall be constructed in accordance with the permit application; plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions:

Attachments are as follows:

Power Plant Site Certification package filed on June 29, 1990 and related correspondence.

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it all

GENERAL CONDITIONS:

the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

6. The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

- a. Have access to and copy any records that must be kept under the conditions of the permit;
- b. Inspect the facility, equipment, practices, or operations regulated or required under this permit; and
- c. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

- a. a description of and cause of non-compliance; and
- b. the period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.120 and 17-30.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit or a copy thereof shall be kept at the work site of the permitted activity.

13. This permit also constitutes:

- (x) Determination of Best Available Control Technology (BACT)
- (x) Determination of Prevention of Significant Deterioration (PSD)
- (x) Compliance with New Source Performance Standards (NSPS)

14. The permittee shall comply with the following:

- a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

GENERAL CONDITIONS:

b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report or application unless otherwise specified by Department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the dates analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

SPECIFIC CONDITIONS:

1. This facility shall be allowed to operate continuously (i.e. 8760 hours/year).

2. Emission Standards

Based on the permitted capacities mentioned in the project description the stack emissions from each unit shall not exceed any of the following limitations:

- a. Particulate matter: Particulate emissions from the baghouse shall not exceed 0.010 grains/dry standard cubic

SPECIFIC CONDITIONS:

- foot, corrected to 7% O₂; 5.34 lbs/hr per unit; and 21.3 tons/year per unit.
- b. PM₁₀: In no case shall PM₁₀ emissions exceed 0.010 gr/dry cubic standard foot, corrected to 7% O₂ for the fraction of particles less than 10 microns in diameter; 5.34 lbs/hr per unit; and 21.3 tons/year per unit.
 - c. *Opacity: In no case shall visible emissions from each baghouse exhaust exceed 10% opacity (six minute average).
 - d. *SO₂: 30 ppmdv corrected to 7% O₂, 24 hour daily geometric average or at least 80% removal efficiency, whichever is least restrictive. In no case shall SO₂ emissions exceed 0.150 lbs/MMBtu per unit, 41 lbs/hr/unit, and 163.3 tons/year, per unit.
 - e. *NO_x: 180 ppmdv corrected to 7% O₂, 24 hour daily block average (midnight to midnight). In no case shall NO_x emissions exceed 0.290 lb/MMBtu, 80 lbs/hr per unit, and 320 tons/year, per unit.
 - f. *Carbon Monoxide: 100 ppmdv at 7% O₂, 4-hour block average beginning at midnight. In no case shall CO emissions exceed .10 lb/MMBtu, 27.2 lbs/hr/unit, and 108 tons/year, per unit.
 - g. *VOC (Hydrocarbons): 37 ppmdv at 7% O₂. In no case shall VOC emissions exceed 0.021 lb/MMBtu, 5.80 lbs/hr/unit and 23 tons/year, per unit.
 - h. HCl: 25 ppmdv at 7% O₂, or at least 95% removal efficiency, which ever is least restrictive. In no case shall HCl emissions exceed 0.064 lb/MMBtu, 17.70 lbs/hr/unit, and 70.70 tons/year, per unit.
 - i. H₂SO₄ (sulfuric acid mist): In no case shall H₂SO₄ emissions exceed 0.036 lb/MMBtu, 9.85 lbs/hr/unit and 39.3 tons/year per unit.
 - j. *F (fluoride): 5.0 ppmdv at 7% O₂. In no case shall F emissions exceed 0.0035 lb/MMBtu, 0.96 lbs/hr/unit, and 3.8 tons/year, per unit.

PERMITTEE: Lee County

Permit Number: PSD-FL-151

SPECIFIC CONDITIONS:

- k. *Pb (lead): In no case shall lead emissions exceed 0.00060 lbs/MBtu, 0.165 lbs/hr/unit and 0.66 tons/yr., per unit.
- l. *Be (Beryllium): In no case shall Be emissions exceed 1.35×10^{-7} lbs/MMBtu, 3.70×10^{-5} lbs/hr/unit, and 1.47×10^{-4} tons/year, per unit.
- m. *Hg (Mercury): In no case shall mercury emissions exceed 0.000138 lbs/MMBtu, 0.0379 lbs/hr/unit, and 0.166 tons/yr per unit at 140 ug/dscm at 7% O₂ or at least 70 percent removal efficiency by weight.
- n. As (Arsenic): In no case shall arsenic emissions exceed 9.10×10^{-6} lbs/MMBtu, 2.50×10^{-3} lbs/hr/unit, and 0.01 tons/year, per unit.
- o. *Dioxins/Furans: In no case shall emissions of total (tetra thru octa-chlorinated dibenzo-p dioxins and dibenzofurans) exceed 30 ng/dscm @ 7% O₂, 2.54×10^{-8} lbs/MMBtu, 7.0×10^{-6} lbs/hr/unit, and 2.80×10^{-5} tons/year, per unit.
- p. *NH₃: In no case shall ammonia slip from exhaust gases exceed 50 ppmv.
- q. There shall be no visible emissions (less than 5% opacity) during the operations of the lime silo.
- r. In no case shall emissions from the ash handling building baghouse exceed a particulate limit of 0.010 grains/dscf and visible emissions of 5% opacity.
- * Pursuant to Rule 17-4.080 F.A.C., for good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions for the pollutants CO, VOC, F, NH₃, SO₂, NOx, Pb, Be, Hg, dioxins and furans, and visible emissions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time.

SPECIFIC CONDITIONS:

3. Test Methods/Continuous Emissions Monitoring System (CEMS)/Testing Frequency/Sampling Ports/Record Keeping/Reporting of Excess Emissions and Malfunctions.

a. Test Methods

Compliance with emission limiting standards mentioned in Specific Condition No. 2 shall be demonstrated using EPA Methods, as contained in 40 CFR Part 60 (Standards of Performance for New Stationary Sources), or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants), or any other method as approved by the Department, in accordance with F.A.C. Rule 17-2.700(3). A test protocol shall be submitted for approval to the South Florida District and to the Bureau of Air Regulation at least 90 days prior to testing. This protocol shall include details on how the weight percentage of used tires in the MSW stream will be accounted for during the compliance testing.

EPA Method

For Determination of

- | | |
|-------------------|--|
| 1 | Selection of sample site and velocity traverses |
| 2 | Stack gas flow rate when converting concentrations to or from mass emission limits. |
| 3 or 3A | Gas analysis when needed for calculation of molecular weight or percent O ₂ . |
| 4 | Moisture content when converting stack velocity to dry volumetric flow rate for use in converting concentrations in dry gases to or from mass emission limits. |
| 5 | Particulate matter concentration and mass emissions. |
| ✓ 201 or 201A | PM ₁₀ emissions. |
| 6, 6C, or 19 | Sulfur dioxide emissions from stationary sources. |
| 7, 7C or 19
E? | Nitrogen oxide emissions from stationary sources. |

SPECIFIC CONDITIONS:

- 9 Visible emission determination of opacity.
 - At least three one hour runs to be conducted simultaneously with particulate testing for the emissions from dry scrubber/baghouse, and ash handling building baghouse.
 - At least one lime truck unloading into the lime silo (start to finish).
- 10 Carbon monoxide emissions from stationary sources.
- 12 Lead concentration from stationary sources.
- 13A or 13B Fluoride emissions from stationary sources.
- 23 7 Dioxin/furan concentration.
- 18 or 25 (A) Volatile organic compounds concentration.
- 26, 26a HCl emissions or other methods approved by DER.
- 101A Mercury emissions based on an average of three runs.
- 29 Antimony, Cadmium
- 104 Beryllium emission rate and associated moisture content.
- 108 Arsenic

Note: The weight of MSW being fed to each combustor during the stack test shall be continuously monitored and recorded by a weighing device which is properly calibrated. Stack tests shall be conducted upstream and downstream of the applicable control device for SO₂, Hg and HCl. Soot blowers shall be operated in a mode consistent with the normal cleaning requirements of the system during the compliance testing.

b. Continuous Emissions Monitoring System (CEMS)

Continuous emission monitors with recorders shall be installed, calibrated, maintained and operated subject to approval by the Department for the following:

SPECIFIC CONDITIONS:

Carbon Monoxide, Oxygen, Nitrogen Oxide, Opacity, and Sulfur Dioxide (for SO₂ one monitor shall be located upstream of the scrubber and one shall be located downstream of the baghouse), as specified in 40 CFR 60, Appendix B; total steam production (lbs/hr, pressure, and temperature) and power generation (MW) for each unit; ammonia injection rate; slaked lime; activated carbon injection or usage rates; and thermocouple to measure temperature of combustion zone (to be specified by the vendor). The monitoring devices shall meet the applicable requirements of Chapter 17-2, Section 17-2.710, F.A.C. and 40 CFR 60.45, and 40 CFR 60.13, including certification of each device in accordance with 40 CFR 60, Appendix B, Performance Specifications and 40 CFR 60.7 (a)(5). Data on monitoring equipment specifications, manufacturer, type, calibration and maintenance needs, and its proposed location after the economizer or in the air pollution control equipment outlet duct shall be provided to the South District Office for review prior to installation together with and subject to the same provisions as submittal of air pollution control equipment as mentioned earlier.

c. Testing Frequency

Compliance with emission standards contained in Specific Condition 2 shall be determined by conducting stack tests within 120 days of completion of construction and initial operation and annually thereafter. In addition to the three test runs conducted under normal operation, three compliance test runs shall be conducted annually under soot blowing conditions for particulate and VE. Each soot blowing test run shall be a representative of normal soot blowing operation. The compliance tests may be staggered throughout the year with the approval of the Bureau of Air Regulation. Pursuant to Rule 17-2.700(2)(b), when the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in this permit is being violated, it may require the owner or operator of the source to conduct compliance tests which identify the nature and quantity of pollutant emissions from the source and to provide a report on the results of said tests to the Department. Compliance testing for the flyash handling building (baghouse) and the lime silo loading operation (V.E. test) shall be conducted within 120 days of completion of

PERMITTEE: Lee County

Permit Number: PSD-FL-151

SPECIFIC CONDITIONS:

construction and initial operation and annually thereafter. All notification requirements of 40 CFR parts 60 and 61 shall be complied with by the owner/operator of the SWERF.

d. Sampling Ports

The Permittee shall provide sampling ports in the air pollution control equipment outlet duct or stack and shall provide access to the sampling ports in accordance with Section 17-2.700, F.A.C. Drawings of testing facilities including sampling port locations as required by Section 17-2.700 shall be submitted to the South District Office for approval at least 60 days prior to construction of the sampling ports and stack.

e. Record Keeping

Lee County Solid Waste Energy Recovery Facility shall maintain a central file containing all measurements, records, and other data that are required to be collected pursuant to the various specific conditions of this permit. This file shall include but not be limited to:

- (i) the data collected from in-stack monitoring instruments,
- (ii) the records on MSW input rate,
- (iii) the amount of propane gas burned per unit,
- (iv) the results of all source tests or performance tests,
- (v) the amount of ammonia, activated carbon, or other chemicals used for NOx and mercury control,
- (vi) calibration logs for all instruments,
- (vii) maintenance/repair logs for any work performed which is subject to this permit.

All measurements, records, and other data required to be maintained by SWERF shall be retained for at least two years following the date on which such measurements, records, or data are recorded and made available to the Department upon request. The permittee shall keep accurate records of MSW being fired to each combustor along with the weight percent of used tires in the waste stream being combusted on an estimated weekly basis

SPECIFIC CONDITIONS:

for the entire life of this facility. The South District office of the Department and the Bureau of Air Regulation shall be notified in writing at least 30 days prior to any compliance testing.

f. Reporting of Excess Emissions and Malfunctions

(i) A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation, any other preventable upset condition, or preventable equipment breakdown shall not be considered malfunctions.

(ii) Excess emissions resulting from startup, shutdown or malfunction of any source shall be permitted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized but in no case exceed two hours in 24 hour period unless specifically authorized by the Department for longer duration (Rule 17-2.250(1), F.A.C.).

(iii) Excess emissions which are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure which may reasonably be prevented during startup, shutdown, or malfunction shall be prohibited (Rule 17-2.250(4), F.A.C.).

(iv) In case of excess emissions resulting from malfunctions, each source shall notify the Department or the appropriate Local Program in accordance with Section 17-4.130, Florida Administrative Code. A full written report on the malfunctions shall be submitted in a quarterly report (Rule 17-2.250(6), F.A.C.).

(v) The owner or operator shall submit excess emission reports for any calendar quarter during which there are excess emissions from the facility. If there are no excess emissions during the calendar quarter, the owner or operator shall submit a report quarterly stating that no excess emissions occurred during the quarterly reporting period. The report shall include the following:

(A) The magnitude of excess emissions computed in accordance with 40 CFR 60.13(h), any conversion factors used, and the

PERMITTEE: Lee County

Permit Number: PSD-FL-151

SPECIFIC CONDITIONS:

- date and time of commencement and completion of each period of excess emissions [40 CFR60.7(c)(1)].
- (B) Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the furnace boiler system. The nature and cause of any malfunction (if known) and the corrective action taken or preventive measures adopted [40CFR60.7(c)(2)].
 - (C) The date and time identifying each period during which the continuous monitoring system was inoperative except for zero and span checks, and the nature of the system repairs or adjustments [40CFR60.7(c)(3)].
 - (D) When no excess emissions have occurred or the continuous monitoring system has not been inoperative, repaired, or adjusted, such information shall be stated in the report [40CFR60.7(c)(4)].
 - (E) The owner or operator shall maintain a file of all measurements, including continuous monitoring systems performance evaluations; monitoring systems or monitoring device calibration; checks; adjustments and maintenance performed on these systems or devices; and all other information required by this permit recorded in a permanent form suitable for inspection [40CFR60.7(d)].

4. Miscellaneous Requirements

a. Start-up and Shut-down Procedures

During start-up procedures, propane gas shall be used to preheat the combustion zone to achieve a furnace roof temperature of 1270°F and a minimum temperature of 1800°F above the grate (at a height to be specified by the vendor) prior to the ignition of MSW.

During all shut-down procedures, propane gas shall be used to ensure that the temperature above the grate, as specified above, does not drop below 1800°F and the furnace roof temperature is maintained above 1270° while any MSW is still burning.

SPECIFIC CONDITIONS:

b. Operating Procedures

Operating procedures shall include good combustion practices and proper training and certification of all operators. The good combustion practices shall meet the guidelines established in 40 CFR 60, Subpart Ea and procedures as established by the equipment manufacturers. All operators (including supervisors) of air pollution control devices shall be properly trained and certified in accordance with the manufacturers guidelines. A list of all such certified personnel shall be submitted to the South District Office. The Permittee/Operator shall inform the District office of any planned training sessions so that Department staff may attend any such training sessions related to operation and maintenance of air pollution control devices.

The emission standards for this facility shall apply at all times, except during periods of start-up, shut-down, or malfunctions, provided that the duration of start-up, shut-down, or malfunction shall not exceed 2 hours within 24 hour period. The start-up period commences when the affected facility begins the continuous burning of MSW and does not include any warm-up period when the affected facility is combusting only propane gas and no MSW is being combusted. During all startups, shutdowns and malfunctions the owner/operator shall use best operational practices to minimize air pollutant emissions. Within 90 days prior to commencing commercial operations of this facility, the permittee shall submit to the South District Office for approval a operational procedures manual that identifies and describes best operational practices that will be used during startup, shutdown, and malfunctions of this facility.

c. Odor Control

No objectionable odors are allowed from this facility pursuant to F.A.C. Rule 17-2.620. The truck access doors to the facility shall remain closed except during normal working shifts when MSW is being received near the storage pit area to allow vehicle passage. To minimize odors at the facility, a negative pressure shall be maintained on the tipping floor and air from within the building will be used as combustion air.

SPECIFIC CONDITIONS:

d. Auxiliary Burners

Auxiliary burners for each unit shall be fired only by propane gas and shall not exceed the 10% capacity factor as determined by 40 CFR 60.44b(d).

e. Baghouse Operations

All baghouses (except for lime silo dust collector) shall be equipped with pressure drop monitoring equipment. Baghouses shall have a maximum air to cloth ratio of 4:1. Extra bags shall be maintained at the site for emergency purposes.

f. Restriction for Type of Wastes Combusted

No biological waste, medical waste, bio-hazardous waste, sewage sludge or hazardous or unauthorized wastes shall be received or combusted at this facility without obtaining proper modification to the power plant site certification and this permit. The Permittee may combust up to 3% (by weight) of used tires along with the MSW. If the applicant wishes to combust used tires in excess of 3% (by weight) a modification to the construction permit will be required prior to increasing the feed rate of the tires. The County shall establish a household battery collection program to be specified by the applicant prior to start of construction, to further minimize mercury emissions. Chromium compounds shall not be used as an additive in the cooling tower water.

g. Fugitive (Unconfined) Emissions

Fugitive emissions at this facility shall be adequately controlled at all times. All roads shall be adequately paved and vacuum swept if appropriate, to keep free of visible dust. Speed limit signs shall be posted. Residue from the grates, grate siftings, and ash from the combustor/boiler and fabric filter hoppers during normal operations shall be discharged into the ash quenching system so as to minimize visible dust. The ash/residue in the ash handling building shall remain sufficiently moist to prevent dust during storage and handling operations.

SPECIFIC CONDITIONS:

- h. The height of the boiler exhaust stack shall not be less than 275 feet above grade or the height determined to be Good Engineering Practice.
- i. The SWERF's boilers shall not be loaded in excess of their permitted capacity of 55,000 lb/hr. of MSW per unit, and 275×10^6 Btu per hour, each unit, and 186,200 lb/hour of steam, based on heating value of 5000 Btu/lb of MSW.
- j. The combustor boilers shall have a metal name plate affixed in a conspicuous place on the shell showing manufacturer, model number, type waste, and rated capacity.
- k. Combustion efficiency shall be calculated by: $\%CE = (1/(1+(CO/CO_2))) \times 100$, and shall be at least 99.5% for an 8 hour average.

5. Emission Control Equipment

- a. The combustor's particulate control baghouse shall be designed, constructed and operated to achieve a maximum emission rate of 0.010 grains per dscf corrected to 7% O₂.
- b. The facility shall be equipped with dry scrubbers which are designed, constructed and operated to remove SO₂ at an efficiency of 80% by weight or to achieve an emission rate of 30 ppmdv at 7% O₂, 24 hour daily geometric average, which ever is less stringent and to cool the flue gases to an average temperature not to exceed 300°F (3-hour rolling average).
- c. The Permittee shall submit to the South Florida District and to the Bureau of Air Regulation within thirty (30) days after it becomes available, copies of technical data pertaining to the selected emissions control systems. These data should include, but not be limited to, guaranteed efficiency and emission rates, and major design parameters.

6. Stack Test Reports

- a. Two copies of the results of the emissions tests for the pollutants listed in Specific Condition No. 2 shall be submitted within forty-five days of the last sampling run

PERMITTEE: Lee County

Permit Number: PSD-FL-151

SPECIFIC CONDITIONS:

to the South District Office, and one copy of the test results shall be submitted to the Bureau of Air Regulation in Tallahassee.

- b. Emissions monitoring shall be reported to the South District Office on a quarterly basis in accordance with Section 17-2.710, F.A.C., 40 CFR, part 60, Subsection 60.7 or 40 CFR part 61 as appropriate.
 - c. Notice of anticipated and actual start-up dates of each waste combustor boiler shall be submitted to the DER South District Office and the Bureau of Air Regulation.
7. Pursuant to Recommended Order on Remand (DOAH Case No. 90-3942 EPP), Appendix B, Exhibit 96, dated May 21, 1992, evaluation test methodology for the mercury control process at this facility shall be subject to the following:
- A. The permittee must operate the pollution control equipment at the facility under procedures designed to minimize emissions of mercury and maximize the removal of mercury from the flue gas of the facility. An activated carbon injection system for mercury control approved by the Department in accordance with Specific Condition No. 2 shall be operated continuously whenever MSW is burned at the facility. The emissions of mercury from the facility shall not exceed the standard established in Specific Condition No. 2(m).
 - B. The permittee shall determine through Department-approved operational testing the feed rate for activated carbon injection which provides the most effective mercury removal over the normal operating regime for the facility while achieving the levels stated hereafter. Following determination of this feed rate, the permittee shall not reduce it without specific written permission from the Department.
 - C. The permittee acknowledges and agrees that the 140 ug/dscm mercury emission standard established by Specific Condition No. 2(m) may be reduced to a level no lower than 70 ug/dscm at 7% O₂ or its equivalent upon written notice to the permittee that Departmental review of at least four operational test results (specified according to protocol) from the facility shows that a reduction of the 140 ug/dscm

PERMITTEE: Lee County

Permit Number: PSD-FL-151

SPECIFIC CONDITIONS:

standard is statistically achievable as determined by the student T-test at the 99 percent confidence limit and is in the public interest. If the Department elects to proceed under this provision, the procedures of Section 403.516(1), Florida Statutes, shall not apply unless the permittee disputes the factual basis for the Department's determination.

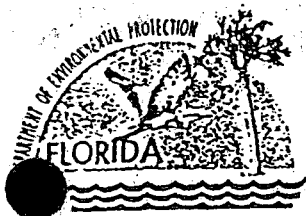
- D. If the Department proposes to reduce the 140 ug/dscm mercury emission standard for the facility to a level below 70 ug/dscm at 7% O₂ or its equivalent, it shall proceed in accordance with the provisions of Section 403.516(1), Florida Statutes.

Issued this 20th day
of July, 1992

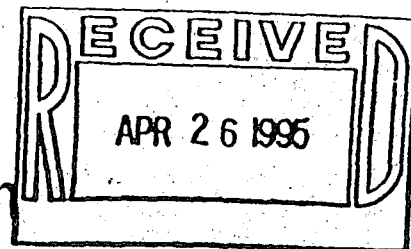
STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION



Carol M. Browner, Secretary



Department of Environmental Protection



Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

April 20, 1995

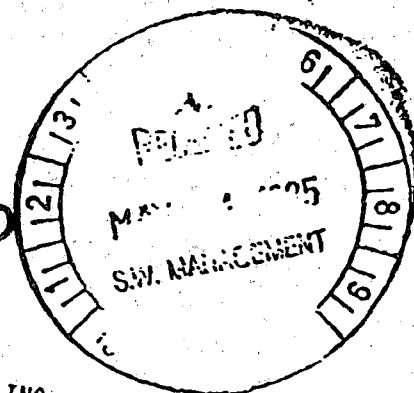
CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. David S. Dee, Esquire
Landers and Parsons
310 West College Avenue
Tallahassee, Florida 32301

RECEIVED

MAY 03 1995

OGDEN MARTIN SYSTEMS OF LEE, INC.



Dear Mr. Dee:

Re: Amendments to PSD-FL-151(A)
Lee County Solid Waste Energy Recovery Project

The Department received your request dated September 28, 1994, for minor amendments to the subject construction permit. The permit is amended as shown:

Specific Condition No. 4.a.

FROM:

4.a. Start-up and Shut-down Procedures

During start-up procedures, propane gas shall be used to preheat the combustion zone to achieve a furnace roof temperature of 1270°F and a minimum temperature of 1800°F above the grate (at a height to be specified by the vendor) prior to the ignition of MSW.

During all shut-down procedures, propane gas shall be used to ensure that the temperature above the grate, as specified above, does not drop below 1800°F and the furnace roof temperature is maintained above 1270° while any MSW is still burning.

TO:

4.a. Start-up and Shut-down Procedures

During start-up procedures, propane gas shall be used to preheat the combustion zone to achieve a minimum furnace roof temperature and a minimum temperature of 1800 degrees F above the grate (at a height to be specified by the vendor) prior to ignition of MSW. The appropriate minimum furnace roof

Mr. David Dee
April 20, 1995
Page 2 of 3

temperature shall be established by the Department, based on the test data collected during the facility's initial start-up operations, and shall be correlated to the minimum temperature of 1800 degrees F above the grate.

During all shutdown procedures, propane gas shall be used to ensure that the temperature above the grate, as specified above, does not drop below 1800 degrees F and the furnace roof temperature is maintained above the correlated minimum furnace roof temperature while any MSW is burning.

Specific Condition No. 4.e.

FROM:

4.e. Baghouse Operations

All baghouses (except for lime silo dust collector) shall be equipped with pressure drop monitoring equipment. Baghouses shall have a maximum air to cloth ratio of 4:1. Extra bags shall be maintained at the site for emergency purposes.

TO:

4.e. Baghouse Operations

All baghouses, except for the lime silo dust collector and the baghouses for the silos containing hydrated lime, soda ash, and activated charcoal for the facility's water treatment system, shall be equipped with pressure drop monitoring equipment.

Specific Condition No. 5.b.

FROM:

- 5.b. The facility shall be equipped with dry scrubbers which are designed, constructed and operated to remove SO₂ at an efficiency of 80% by weight or to achieve an emission rate of 30 ppmvd at 7% O₂, 24 hour daily geometric average, whichever is less stringent and to cool the flue gases to an average temperature not to exceed 300°F (3-hour rolling average).

Mr. David Dee
April 20, 1995
Page 3 of 3

TO:

- 5.b. The facility shall be equipped with dry scrubbers which are designed, constructed and operated to remove SO₂ at an efficiency of 80%, by weight, or to achieve an emission rate of 30 ppmvd at 7% O₂, 24 hour geometric average, whichever is less stringent. Except during a malfunction, the maximum flue gas temperature at the final particulate matter control device inlet, during the combustion of solid waste, shall not exceed the maximum temperature established by Rule 62-296.416(4)(a), F.A.C.

A copy of this letter shall be attached to Permit PSD-FL-151(A) and shall become a part of that permit.

Sincerely,



Howard L. Rhodes, Director
Division of Air Resources
Management

HLR/jr/t

cc: D. Knowles, SD
J. Harper, EPA
J. Bunyak, NPS
H. Oven, PPS

Final Determination
PSD-FL-151(A)
Lee County Solid Waste Energy Recovery Project

The proposed permit amendments for the subject facility located in Lee County, Florida, were distributed on March 21, 1995. The Notice of Intent to Issue was published in the Ft. Myers News-press on March 30, 1995. Copies of the amendments were available for public inspection at the Department offices in Ft. Myers and Tallahassee.

No comments were submitted by the National Park Service, the U.S. Environmental Protection Agency, the applicant, or the public.

The final action of the Department will be to issue the permit amendments as proposed.



LEE COUNTY
SOUTHWEST FLORIDA

BOARD OF COUNTY COMMISSIONERS

John E. Manning
District One

Douglas R. St. Cerny
District Two

Ray Judah
District Three

Andrew W. Coy
District Four

John E. Albion
District Five

Donald D. Stilwell
County Manager

James G. Yaeger
County Attorney

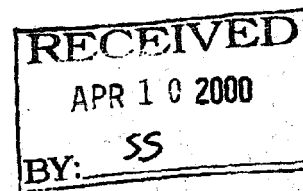
Diana M. Parker
County Hearing
Examiner

April 5, 2000

Mr. Tom Eriksen
Ogden Martin Systems of Lee, Inc.
10500 Buckingham Rd.
Ft. Myers, Fl. 33905

(941) 479-8181

Writer's Direct Dial Number: _____



SUBJECT: Lee WTE, Modified Air Permit, PSD-FL-151B

Dear Tom:

Attached please find a copy of the final revised PSD permit for the Lee waste to energy facility. Please incorporate all changes that this permit addresses into the operating, testing, and reporting functions of the plant's operations.

If you have any questions, please call me.

Sincerely,

ENVIRONMENTAL SERVICES DEPARTMENT

Lindsey J. Sampson, P.E., Director
Solid Waste Division

LJS:

cc: David Owen
Scott Shannon, MPI
Becky Bigari, OMSL - Tampa
H E 112

DOCUMENT 2



Jeb Bush
Governor

Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

David B. Struhs
Secretary

March 15, 2000

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Lindsey Sampson, P.E.
Deputy Director, Solid Waste
Lee County
PO Box 398
Ft. Myers, Florida 33902-0398

Re: Modification of Permit No. PSD-FL-151 and PSD-FL-151A
Lee County Resource Recovery Facility
PSD-FL-151B

The applicant applied on August 6, 1999 to the Department for a modification to PSD permits number PSD-FL-151 and PSD-FL-151A for its Lee County Resource Recovery Facility located at 10500 Buckingham Rd., Fort Myers, Lee County, 33905. This project is PSD-FL-151B. The Department mailed an initial intent to issue and draft PSD permit modification to the applicant on October 18, 1999, and the applicant published the public notice on November 6, 1999 but subsequently commented on the initial draft. This modification addresses the original and subsequent requests of the applicant. This modification is to reduce testing requirements for certain pollutants with emissions that are well below limitations, consolidate testing for particulate matter emissions and make other minor changes to testing requirements, revise certain requirements to conform to federal standards for municipal waste combustion facilities, delete the minimum roof temperature requirement, allow for the use of natural gas as an auxiliary fuel, and revise the definition of allowable solid waste fuels. The Department has reviewed the modification requests and the referenced permits are hereby modified as follows:

Specific condition 2.m. Emission Standards.

The paragraph for this condition for mercury shall be replaced entirely by the following.

Hg (Mercury): In no case shall mercury emissions exceed 70 ug/dscm @ 7% O₂ or 85% reduction by weight, whichever is less stringent. Emissions of mercury shall also not exceed 1.38×10^{-4} lb/mmBtu, 0.0379 lb/hr per unit, and 0.166 tons/year per unit.

[Rules 62-296.416(3)(a)1 and 62-204.800(8)(b)3.d, F.A.C., 40 CFR 60.33b(a)(3) and PSD-FL-151]

Specific condition 3.a. Test Methods.

The table entry for Method 101A shall be replaced by Method 29. The table entry for Method 12 shall be replaced by Method 29. The table entry for EPA Method 25 shall be replaced by Method 25A to demonstrate compliance with VOC emissions. The table entries for EPA Methods 104 and 108 (beryllium and arsenic) shall each be replaced by EPA Method 29. The table entry for EPA Methods 7, 7C, or 19 shall be supplemented with Method 7E to demonstrate compliance with nitrogen oxides. The table entries for EPA Methods 201 and 201A shall be supplemented with Method 5 to demonstrate compliance with PM₁₀ emissions.

The table entry for 'Visible emission determination of opacity.' shall be replaced in its entirety by the following:

Lee County Resource Recovery Facility
PSD-FL-151B
Page 2 of 6

9. Visible emission determination of opacity.

- At least one one-hour run to be conducted simultaneously with particulate testing for the emissions from the dry scrubber/baghouse.
- At least one 30-minute run to be conducted for the ash handling building baghouse.
- At least one 30-minute run to be conducted for the lime silo baghouse while a truck is unloading lime into the lime silo. If the unloading is completed before 30 minutes duration, the duration of unloading shall be sufficient to meet this requirement, provided it exceeds 12 minutes.

[Rules 62-4.070(3), 62-296.416(3)(d)1, and 62-297.310(4)(a)2., F.A.C., 40 CFR 60.38b and 40 CFR 60.58b, and applicant request]

Specific condition 3.c. Testing Frequency.

The first through fourth sentences of this condition, starting with "Compliance with emission standards ..." and ending with "... approval of the Bureau of Air Regulation.", shall be replaced entirely by the following:

Compliance with the emission limitations of specific condition 2 of this permit shall be determined by annual emission testing, except that testing for arsenic, beryllium, fluoride, sulfuric acid mist, ammonia and VOC shall be performed prior to renewal of each operation permit. Testing of the MWC units for particulate matter shall be performed using three one-hour test runs so that two one-hour runs are conducted during normal operation and one one-hour run is conducted during soot blowing conditions. Compliance for visible emissions shall be determined in accordance with Rule 62-297.310(4)(a), F.A.C. [Rules 62-4.070(3), 62-297.310(4)(a), and 62-297.310(7)(a)3, F.A.C., and request of the applicant]

The sixth sentence of this condition, "Compliance testing for the flyash handling building (baghouse) and the lime silo loading operation (V.E. test) shall be conducted within 120 days of completion of construction and annually thereafter.", shall be replaced entirely by the following:

Compliance testing for particulate matter emissions from the ash handling building baghouse is waived, and an alternative standard of 5% opacity is imposed, pursuant to Rule 62-297.620(4), F.A.C. If the Department has reason to believe that the particulate weight emission standard is not being met, it shall require that compliance be demonstrated using EPA Method 5. Compliance testing for visible emissions from the ash handling building baghouse and the lime silo baghouse shall be conducted annually. [Rules 62-4.070(3) and 62-297.620(4), F.A.C., and request of the applicant]

Specific condition 4.a. Start-up and Shut-down Procedures.

This condition shall be replaced entirely by the following:

4.a. Start-up and Shut-down Procedures. During start-up and shut-down, the auxiliary burners shall be fired as needed to ensure proper combustion of wastes consistent with good operating practices as specified in 40 CFR 60.53b.

Specific condition 4.b. Operating Procedures.

The second paragraph of this condition shall be replaced entirely by the following:

The emission limitations for this facility shall apply at all times, except during periods of startup, shut down, or malfunctions, provided that the duration of startup, shut down and malfunction periods shall not exceed three hours per occurrence. The startup period commences when the affected facility begins the continuous burning of municipal solid waste and does not include any warm-up period when the affected

Lee County Resource Recovery Facility
PSD-FL-151B
Page 3 of 6

facility is combusting natural gas or propane, and no municipal solid waste is being fed to the combustor. Continuous burning is the continuous, semi-continuous, or batch feeding of municipal solid waste for purposes of waste disposal, energy production, or providing heat to the combustion system in preparation for waste disposal or energy production. The use of municipal solid waste solely to provide thermal protection of the grate or hearth during the startup period when municipal solid waste is not being fed to the grate is not considered to be continuous burning. During all periods of startup, shut down and malfunction, the owner or operator shall use best operational practices to minimize air pollutant emissions. The owner or operator shall maintain a manual that identifies and describes best operational practices that will be used during periods of startup, shut down and malfunction at this facility. [Rules 62-4.070(3), and 62-210.700(1) and (5), F.A.C., 40 CFR 60.38b and 40 CFR 60.58b(a), and request of the applicant]

4.d. Auxiliary Burners.

This condition shall be replaced entirely by the following:

These devices shall be used at startup during the introduction of MSW fuel until design furnace gas temperature is achieved. They shall be fueled only with natural gas or propane. If the annual capacity factor for natural gas is greater than 10%, as determined by 40 CFR 60.41b, the facility shall be subject to 40 CFR 60.44b(d), Standards for Nitrogen Oxides. [Rules 62-4.070(3), 62-4.160(2) and 62-210.200, F.A.C., and 40 CFR 60.40b(d)]

Specific condition 4.f. Restriction for Types of Wastes Combusted.

This condition shall be replaced entirely by the following:

4.f. Allowable Fuels. The only fuels allowed to be burned in the MWC units are solid wastes allowed by this permit, and natural gas and propane as auxiliary fuels. Other wastes shall not be burned without written prior approval from the Department. Lee County shall minimize emissions of mercury through a battery collection program. Chromium compounds shall not be used as an additive in the cooling tower water.

The primary fuel for the facility is municipal solid waste (MSW), including the items and materials that fit within the definition of MSW contained in either 40 CFR 60.51b or Section 403.706(5), Florida Statutes (1995).

Subject to the limitations contained in this permit, the authorized fuels for the facility also include the other solid wastes that are not MSW which are described below. However, the facility shall not burn:

- (a) those materials that are prohibited by state or federal law;
- (b) those materials that are prohibited by this permit;
- (c) lead acid batteries;
- (d) hazardous waste;
- (e) nuclear waste;
- (f) radioactive waste;
- (g) sewage sludge;
- (h) explosives;

Further, the facility shall not knowingly burn:

- (i) nickel-cadmium batteries pursuant to Section 403.7192(3);
- (j) mercury containing devices and lamps pursuant to Sections 403.7186(2) & (3).

The fuel may be received either as a mixture or as a single-item stream (segregated load) of discarded materials. If the facility intends to use an authorized fuel that is segregated non-MSW material, the fuel shall be either:

7.4 – Discontinuance of Surface Water Monitoring Requirements



LEE COUNTY

SOUTHWEST FLORIDA

BOARD OF COUNTY COMMISSIONERS

II E 110

(941) 479-8181

Writer's Direct Dial Number: _____

John E. Manning
District One

May 27, 1999

Douglas R. St. Cerny
District Two

Ray Judah
District Three

Andrew W. Coy
District Four

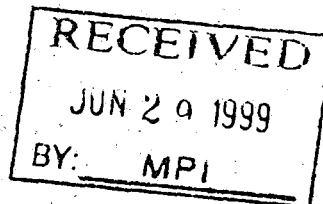
John E. Albion
District Five

Donald D. Stilwell
County Manager

James G. Yaeger
County Attorney

Diana M. Parker
County Hearing
Examiner

Mr. Ben Pratt, Area Manager
South Florida Water Management District
2301 McGregor Blvd.
Fort Myers, Fl 33901



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**SUBJECT: LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY
DISCONTINUANCE OF SURFACE WATER MONITORING
REQUIREMENTS**

Dear Mr. Pratt:

The Final order approving certification for the Lee County Solid Waste Energy Recovery Facility (Facility) was issued by the Siting Board on June 16, 1992. That certification order approved the construction and operation of the Facility located at Buckingham Road and State Road 82, Ft. Myers, Florida. The "Lee County Solid Waste Energy Recovery Facility, Case No. PA 90-30, "Conditions of Certification" requires the development and implementation of a surface water quality monitoring program. The "Lee county Solid Waste Energy Recovery Facility Groundwater and Surface Water Monitoring Plan", dated August, 1992, prepared by Malcolm Pirnie, Inc., addresses this monitoring plan requirement. Lee County (County) commenced implementation of the Surface Water Monitoring Plan in July, 1993 after approval of the Monitoring Plan by the SFWMD.

The County is requesting that the South Florida Water Management District (SFWMD) discontinue the surface water monitoring requirements for the Facility. The Facility Conditions of Certification, Section XV.C.3c "Surface Water Quality Monitoring Program" indicates the required sampling parameters, frequencies, and reporting requirements to be included in the Facility's surface water monitoring plan. Additionally, in Section XV.C.3c(4), it is stated that "After a minimum of two years of sampling, the applicant may request a reduction in monitoring frequencies and parameters". The surface water data collected at the Facility to date reveals no obvious indication of negative impact from Facility operations.

The attached "Surface Water Monitoring Completion Request Report" (Report), provides the following information:

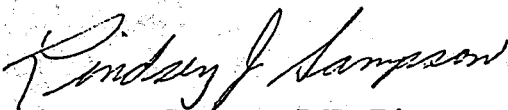
- Overview of Facility operations;
- Summary of the Facility surface water monitoring program;
- Facility surface water analytical data; and
- Discussion of the analytical results and justification for discontinuance of the surface water monitoring program.

In addition to the SFWMD surface water monitoring requirements included in the Conditions of Certification, the Facility has a NPDES Multi-Sector General (group) Permit (MSGP), Sector O with the USEPA. This MSGP has specific monitoring requirements associated with storm water discharge from the facility's single control structure. The requirements of this MSGP will continue to be adhered to by the facility.

Please contact us with any questions or concerns regarding this proposed discontinuance of the Facility's SFWMD surface water monitoring requirements. We are looking forward to your positive response.

Sincerely,

ENVIRONMENTAL SERVICES DEPARTMENT



Lindsey J. Sampson, P.E., Director
Solid Waste Division

LJS:lm

cc: David Knowles, DEP
David Dee
Keith Kibbey
Tom Eriksen
Larry Johnson, W/O Attachment
David Owen, W/O Attachment
II E110

**LEE COUNTY
SOLID WASTE ENERGY RECOVERY
FACILITY**

**SURFACE WATER MONITORING REVIEW
AND
JUSTIFICATION FOR DISCONTINUANCE**

Malcolm Pirnie, Inc.
1901 N. 13th Street
Tampa, Florida 33605

May 1999

**LEE COUNTY
SOLID WASTE ENERGY RECOVERY FACILITY**

**SURFACE WATER MONITORING REVIEW AND JUSTIFICATION
FOR DISCONTINUANCE**

TABLE OF CONTENTS

	<u>Page</u>
1.0 OVERVIEW OF FACILITY OPERATIONS	1-1
2.0 BASIS FOR DISCONTINUANCE OF SURFACE WATER MONITORING	2-1
3.0 SUMMARY OF SWERF SURFACE WATER MONITORING PROGRAM	3-1
3.1 Introduction	3-1
3.2 Surface Water Classification and Applicable Criteria	3-1
3.3 Sampling and Reporting Procedures	3-2
4.0 SWERF SURFACE WATER ANALYTICAL DATA	4-1
5.0 DISCUSSION AND CONCLUSIONS	5-1
5.1 Surface Water Test Results	5-1
5.1.1 Organics	5-1
5.1.2 Oil and Grease	5-1
5.1.3 Metals	5-2
5.1.4 Surface Water Quality Parameters (tested every other month) .	5-2
5.2 Conclusions	5-4

LIST OF TABLES AND APPENDICES

Table No.	Description	Page
3-1	Sampling Parameters and Schedule of Sampling	3-2
4-1	Maximum Concentration Limits of Parameters (every other month) ..	4-1
4-2	Maximum Concentration Limits of Semi-Annual Parameters	4-3

Appendix

Surface Water Data Summary Spreadsheets
Graphs of Specific Parameters

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1.0 OVERVIEW OF FACILITY OPERATIONS

The Lee County Solid Waste Energy Recovery Facility (SWERF) is located on a 155 acre site at 10500 Buckingham Road, in central Lee County, Florida. The SWERF contains two municipal waste combustion lines, which burn approximately 375,000 tons of municipal solid waste annually or 500 tons per day each, producing approximately 610 kWh/ton of electrical energy.

The Facility is operated by Ogden Martin Systems of Lee (OMSL) through a contract with Lee County. All processing activities at the SWERF are performed indoors. Hazardous waste is not accepted for processing at the SWERF.

2.0 BASIS FOR DISCONTINUANCE OF SURFACE WATER MONITORING

The Lee County SWERF Conditions of Certification, Section XV.C.3c(4) states, "After a minimum of two years of sampling, the applicant may request a reduction in monitoring frequencies and parameters." Lee County (County) has conducted surface water monitoring at the SWERF since their baseline sampling event of July 1993, which was prior to the SWERF accepting solid waste for combustion. Therefore, the minimum two years time period, as indicated in the Conditions of Certification, has been fulfilled. Since the start of the surface water monitoring program at the SWERF, only two discharges have occurred from the one (only) discharge control structure. The control structure includes a three inch diameter pipe equipped with a manual gate valve that remains closed and locked at all times.

In addition to the SFWMD surface water monitoring requirements specified in the Conditions of Certification, the SWERF has a National Pollutant Discharge Elimination System (NPDES) Multi-Sector General Permit (MSGP) issued by the US EPA Region IV. The SWERF NPDES Permit number is FLR05B588. In accordance with the NPDES MSGP the SWERF performs the required monitoring and sampling and has a site specific pollution prevention plan (PPP) that is implemented as required.

The SFWMD issued a letter to the County, dated April 7, 1999, which states that "The 9.5 acre wetland restoration area located at the southeast corner of the property has met the success criteria outlined in the mitigation plan. Further monitoring of this conservation area is not required." It is obvious, based on the SFWMD letter, that no evidence of negative impact to this wetland restoration area has been observed and the mitigation is a success.

In summary, the County requests the elimination of their SFWMD surface water sampling requirements (indicated in the Conditions of Certification) for the following reasons:

- The surface water monitoring program at the SWERF has been on-going since 1993 and this fulfills the required minimum two year monitoring period, prior to requesting a reduction in monitoring, as indicated in the Conditions of Certification.
- The SWERF has a NPDES MSGP and adheres to its' required monitoring, sampling, and pollution prevention procedures. The SFWMD sampling point is located within the storm water control feature (retention pond) where the control structure is situated. The NPDES required monitoring is also performed at this control structure. The SWERF will continue adherence to all the requirements of their NPDES MSGP.
- The SFWMD recently (as per their April 1999 correspondence) discontinued the wetlands mitigation monitoring requirements for the 9.5 acre wetland restoration area at the southeast corner of the SWERF. This implies that no obvious adverse impacts to this downstream wetlands area have been observed.

The items listed above substantiate the discontinuation of the SFWMD surface water sampling requirements at the SWERF. The summary and discussion of the SWERF surface water sampling data in the following sections of this document will further substantiate the discontinuance of the sampling requirements.

3.0 SUMMARY OF SWERF SURFACE WATER MONITORING PROGRAM

3.1 Introduction

Pursuant to the Conditions of Certification requiring a surface water quality monitoring program for the SWERF, Lee County submitted the "Lee County Solid Waste Energy Recovery Facility Ground Water and Surface Water Monitoring Plan", dated August, 1992, to the South Florida Water Management District (SFWMD). The intent of the surface water monitoring program is to control all discharges from the surface water management system into the Buckingham Road drainage system. The Conditions of Certification further requires that surface water discharged from the SWERF is monitored at the point of surface discharge from the detention area to the wetland area.

From the drainage swale along Buckingham Road, the water enters Six Mile Cypress Slough, which is part of the wetland area. Additional sampling points are located in the wetlands to the south and west of the SWERF.

3.2 Surface Water Classification and Applicable Criteria

The on-site surface water and Six Mile Cypress Slough are designated by the Florida Department of Environmental Protection (FDEP) as Class III Surface Waters. The specific criteria applicable to Class III Waters are the following:

- Section 62-302.500, Florida Administrative Code (F.A.C.): "Surface Waters: Minimum Criteria, General Criteria ", and;
- Section 62-302.530, F.A.C.: "Table: Surface Water Criteria".

3.3 Sampling and Reporting Procedures

The surface water discharge location and the wetland monitoring locations are monitored in accordance with the sampling parameters and schedule included in the Conditions of Certification. Table 3-1 lists the parameters to be analyzed and the associated sampling schedule for the surface water discharge location. One sampling location at the SWERF is monitored.

TABLE 3-1 SAMPLING PARAMETERS AND SCHEDULE OF SAMPLING	
MONITOR TYPE AND SCHEDULE	PARAMETERS
A. GENERAL (Every other month)	Total Organic Carbon, Dissolved Oxygen, pH, Turbidity, Specific Conductance, Chemical Oxygen Demand, Total Suspended Solids, and Alkalinity.
B. ORGANICS (Semi-Annual)	Oil and Grease Detergents, EPA Methods 601 and 602.
C. METALS (Semi-Annual)	Aluminum, Antimony, Beryllium, Cadmium, Copper, Cyanide, Iron, Lead, Mercury, Nickel, Selenium, Silver, and Zinc.

Water quality samples are to be taken at the monitoring locations, in accordance with the schedule in Table 3-1, during periods of discharge. Lee County has exceeded this requirement by conducting sampling whether or not there is a discharge from the control structure. As previously stated in Section 2.0 of this document, only two discharges from the control structure have occurred throughout the duration of the surface water monitoring plan implementation (since 1993). The surface water monitoring plan indicates that during a period of discharge, Lee County will provide SFWMD such information as volumes of water discharged, including total volume discharged during the days of sampling, and the total discharges from the property surface waters of the state. Reports are then submitted to the SFWMD.

4.0 SWERF SURFACE WATER ANALYTICAL DATA

A summary of the surface water analytical results from 1993 through 1999 is included in the Appendix of this report. The Surface Water Data Table A-1 in the Appendix provides the analytical results for the parameters: alkalinity, chemical oxygen demand, pH, specific conductance at 25°C, total organic carbon, total suspended solids, turbidity, and dissolved oxygen. These parameters are analyzed in the surface water sample collected every other month.

Table 4-1 lists the criteria for the parameters tested every other month that are included in Chapter 62-302.530, F.A.C. for Class III Surface Waters, predominantly fresh water.

TABLE 4-1 MAXIMUM CONCENTRATION LIMITS OF PARAMETERS (every other month)		
PARAMETER	UNITS	MAXIMUM CONCENTRATION- not to be exceeded at any time
Alkalinity	mg/L as CaCO ₃	Shall not be depressed below 20.
Specific Conductance	µmhos/cm	Shall not be increased more than 50% above background or to 1275, whichever is greater.
Dissolved Oxygen	mg/L	Shall not be less than 5.0. Normal daily and seasonal fluctuations above these levels shall be maintained.
Total Suspended Solids	mg/L	Not established.
Total Organic Carbon	mg/L	Not established.
Chemical Oxygen Demand	mg/L	Not established
Turbidity	NTU	Shall be less than or equal to 29 above natural background conditions.
pH	pH units	Shall not vary more than one unit above or below natural background of coastal waters as defined in Section 62-302.520(3)(b), F.A.C., or more than two-tenths unit above or below natural background of open waters as defined in Section 62-302.520(3)(f), F.A.C., provided that the pH is not lowered to less than 6.5 or raised above 8.5

The surface water sampling at the SWERF is performed at the retention pond located at the southeastern portion of the Facility. This is the pond with the Facility's only control structure. The laboratory reports refer to the sample identification as WTESW and WTESW2. These samples are collected from one location, the WTESW2 identification is used to differentiate the every other month sampling from the semi-annual sampling (WTESW-every other month, WTESW2-semi-annual).

Surface Water Analytical Results Summary, Table A-2, in the Appendix contains, in addition to the parameters listed in Table A-1, the analytical results for: oil and grease, aluminum, antimony, beryllium, cadmium, copper, cyanide, iron, lead, mercury, nickel, selenium, silver, and zinc. The surface water samples collected at the SWERF are analyzed for these aforementioned parameters semi-annually. Purgeable hydrocarbons and aromatics are also tested semi-annually but are not included in Table A-2, as none of these parameters have been present, in detectable concentrations, in the samples from the surface water discharge testing location.

Table 4-2 lists the criteria for the parameters included in the Lee County SWERF semi-annually testing requirements, as per Chapter 62-302.530, F.A.C. for Class III Surface Waters, predominantly fresh water.

TABLE 4-2 MAXIMUM CONCENTRATION LIMITS OF SEMI-ANNUAL PARAMETERS		
PARAMETER	UNITS	MAXIMUM CONCENTRATION - not to be exceeded at any time
Oil and Grease	mg/L	Dissolved or emulsified oils and greases shall not exceed 5.0. No undissolved oil, or visible oil defined as iridescence, shall be present so as to cause taste or odor, or otherwise interfere with the beneficial use of waters.
Aluminum	mg/L	Not established.
Antimony	µg/L	Shall be less than or equal to 4,300
Beryllium	µg/L	Shall be less than or equal to 0.13 as an annual average.
Cadmium	mg/L	Shall be less than or equal to $e(0.7852[\ln H]-3.49)$. ¹
Copper	mg/L	Shall be less than or equal to $e(0.8545[\ln H]-1.465)$. ¹
Cyanide	mg/L	Shall be less than or equal to 5.2.
Iron	mg/L	Shall be less than or equal to 1.0.
Lead	µg/L	Shall be less than or equal to $e(1.273[\ln H]-4.705)$. ¹
Mercury	µg/L	Shall be less than or equal to 0.012.
Nickel	µg/L	Shall be less than or equal to $e(0.846[\ln H]+1.1645)$. ¹
Selenium	mg/L	Shall be less than or equal to 5.0.
Silver	mg/L	Shall be less than or equal to 0.07.
Zinc	mg/L	Shall be less than or equal to $e(0.8473[\ln H]+0.7614)$.

¹"ln H" means the natural logarithm of total hardness expressed as mg/L of CaCO₃.

5.0 DISCUSSION AND CONCLUSIONS

As stated in Section 1.0, the Conditions of Certification indicate that Lee County may, after a minimum of two years of sampling, request a reduction in monitoring frequencies and parameters for the SWERF. The documentation provided in support of the request must show "sufficient reasonable assurances to support a reduction" to the satisfaction of SFWMD. This section discusses the Lee County SWERF surface water data and the conclusions of the data evaluation regarding removal of the surface water monitoring requirements.

5.1 Surface Water Test Results

The following summarizes the analytical results and trends to date of the specified surface water monitoring parameters at the Facility.

5.1.1 Organics

A surface water sample (WTESW2) is collected at the Facility semi-annually for analysis of organic compounds by EPA methods 601 and 602. No detectable concentrations of the organic parameters analyzed have been present during any of the sampling events. Therefore, based on the analytical data, discontinuance of this monitoring requirement appears appropriate.

5.1.2 Oil and Grease

Oil and grease analysis is performed on the surface water sample collected semi-annually. No detectable concentration of oil and grease has been present in the surface water sample, with the exception of one sampling event. The surface water sample collected on August 5, 1997 revealed an oil and grease concentration of 31 mg/l. The sampling events conducted prior to, and after this August 5, 1997 event indicated no detectable concentration of oil and grease in the surface water. This anomalous oil and grease concentration does not appear to be of concern at this time based on the overall "non-detected" results for this parameter. Therefore, based on the analytical data, discontinuance of this monitoring requirement appears appropriate.

5.1.3 Metals

The semi-annual surface water monitoring includes thirteen metals as shown in Table 3-2. The following metals have not been detected above the laboratory method detection limit (MDL) during any of the semi-annual sampling events: antimony, beryllium, cadmium, cyanide, mercury, nickel, and silver. Lead has not been detected above the MDL during any sampling events with the exception of the February 10, 1996 event where lead was found at the concentration of 1 mg/l which is the detection limit. Concentrations of zinc were only found during these sampling events, all other results were "not detected" above the MDL. During each of the three events when detectable zinc levels were found, the concentration was 0.01 mg/l which is the detection limit. Copper was detected during only one sampling event at a concentration of 0.02 mg/l, the MDL is 0.01 mg/l.

Selenium was detected in the surface water sample for two of the sampling events, each time at a concentration of 0.005 mg/l. The maximum concentration level (MCL) for selenium, as per 62-302.530, F.A.C. is 5.0 mg/l, so the results are well below the MCL.

Aluminum concentrations ranging from not detected to 0.22 mg/l have been present in the surface water samples. There is currently no established MCL for aluminum, as per 62-302.530, F.A.C.

Iron has been detected at varying concentrations during the semi-annual surface water sampling events. However, none of these iron concentrations have exceeded the MCL established for iron of 1.0 mg/l.

Based on the aforementioned metals analytical results, it appears appropriate to discontinue monitoring the thirteen metals.

5.1.4 Surface Water Quality Parameters (tested every other month)

The every other month surface water sampling and analysis includes the parameters: alkalinity, chemical oxygen demand (COD), dissolved oxygen (DO), pH, specific conductance, total organic carbon, total suspended solids, and turbidity. Surface water samples have been collected from the southeast retention pond since 1993, which is before the Facility began accepting waste. Therefore, there is sufficient background data for each parameter.

The alkalinity results have consistently met the concentration criteria in 62-302.530, F.A.C. The specific conductance values have also consistently been in alignment with the established standard for Class III Surface Waters, predominantly fresh water (62-302.530, F.A.C.). The DO standard for Class III Surface Water, predominantly fresh water, states "DO shall not be less than 5.0 mg/l, normal daily and seasonal fluctuations above these levels shall be maintained." The dissolved oxygen levels in the surface water samples collected since 1993 have been below 5.0 mg/l during only nine sampling events with the lowest level measurement of 2.8 mg/l. Overall, the DO concentrations have been relatively consistent.

There is no established maximum (or minimum) concentration criteria for C.O.D., total suspended solids, and total organic carbon. However, as can be seen from the graphs in the Appendix, the concentrations of these parameters in the tested surface water samples have remained relatively consistent throughout the six years of monitoring with only random infrequent deviations.

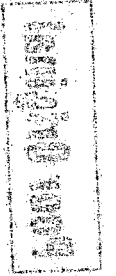
The turbidity maximum concentration criteria is less than or equal to 29 above natural background conditions. The surface water turbidity analytical results have been in alignment with this criteria throughout the six years of monitoring. One anomalously elevated turbidity measurement of 350 NTU was present during the October 22, 1993 sampling event. This sampling event was prior to the Facility accepting waste and therefore could be considered background, however, other "background" data and data collected during Facility operation is more than 300 NTU lower than this measurement. Therefore, it is not considered significant to the overall surface water quality.

The pH concentrations in the surface water samples have remained largely consistent with the background levels. Only one sampling event revealed a pH level greater than 1 unit above background, which was 1.4 units above background. The pH results have shown no levels below 6.5 units and only infrequent levels above 8.5 units.

Overall, the graphs and data summary tables in the Appendix indicate relatively consistent results for each of the parameters monitored. The data also shows many parameters that have not been detected throughout the monitoring period or that have met the applicable surface water criteria as per 62-302.530, F.A.C.

5.2 Conclusions

The surface water sampling program has been performed in accordance with the parameters and frequencies included in the Facility Conditions of Certification. The results of the surface water monitoring performed both semi-annually (extended list of parameters) and every other month, since 1993, indicates that discontinuance of the monitoring program appears appropriate.



APPENDIX

SURFACE WATER DATA

LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY
Surface Water Analysis
(Semi-Annual)

Poor Original

SAMPLE ID: WTESW2

TEST PARAMETER*	UNITS	TEST	TEST	TEST	TEST	TEST	DETECTION
		RESULT	RESULT	RESULT	RESULT	RESULT	LIMITS
		7/28/93	8/11/94	2/3/95	8/15/95	2/14/96	8/6/96
ALKALINITY	MG/L AS CaCO_3	180	132	108	48	57	1
CHEMICAL OXYGEN DEMAND	MG/L	25	12	25	20	10	1
OXYGEN, DISSOLVED	MG/L	5	5	6.8	5.6	8.6	0.1
PH	PH UNITS	8.3	8.4	6.8	9.2	8.8	
SPECIFIC CONDUCTANCE @ 25°C	$\mu\text{MHOS}/\text{CM}$	874	430	250	200	188	1
TOTAL ORGANIC CARBON	MG/L	32.5	18	21	18	20	1
TOTAL SUSPENDED SOLIDS	MG/L	4	119	7	6	5	1
TURBIDITY	NTU	7.7	9.3	6.4	4.4	2	0.01
OIL & GREASE	MG/L	ND	ND	ND	ND	ND	5
ALUMINUM	MG/L	0.1	ND	0.04	0.14	0.06	0.01
ANTIMONY	MG/L	ND	ND	ND	ND	ND	0.2
BERYLLIUM	$\mu\text{G}/\text{L}$	ND	ND	ND	ND	ND	5
CADMIUM	MG/L	ND	ND	ND	ND	ND	0.005
COPPER	MG/L	ND	ND	ND	ND	ND	0.01
CYANIDE	MG/L	ND	ND	ND	ND	ND	0.005
IRON	MG/L	0.15	0.05	0.13	ND	ND	0.03
LEAD	$\mu\text{G}/\text{L}$	ND	ND	ND	ND	ND	1
MERCURY	$\mu\text{G}/\text{L}$	ND	ND	ND	ND	ND	0.2
NICKEL	MG/L	ND	0.04	ND	ND	ND	0.04
SELENIUM	MG/L	ND	0.002	ND	0.003	ND	0.002
SILVER	MG/L	ND	ND	ND	ND	ND	0.01
ZINC	MG/L	0.01	ND	0.01	ND	0.01	0.01

* SAMPLE ALSO ANALYZED DURING EACH SAMPLING EVENT FOR SELECT PURGEABLE AROMATICS AND HALOCARBONS. NO DETECTABLE CONCENTRATIONS OF ANY OF THESE COMPOUNDS WERE IDENTIFIED.

DETECTION LIMITS WERE NOT AVAILABLE FOR ALL ANALYTICAL DATA.

IMAGE QUALITY

**AS YOU REVIEW THE NEXT GROUP OF IMAGES, PLEASE NOTE
THAT THE ORIGINAL DOCUMENTS WERE OF POOR QUALITY.**

LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY
Surface Water Analysis
(Semi-Annual)

SAMPLE ID: WTESW2

TEST PARAMETER *	UNITS	TEST	DETECTION	TEST	TEST	DETECTION	TEST
		RESULT	LIMITS	RESULT	RESULTS	LIMITS	RESULT
		8/6/96	2/4/97	2/4/97	8/5/97	2/10/98	2/10/98
ALKALINITY	MG/L AS CaCO_3	80	1	52	126	1	81
CHEMICAL OXYGEN DEMAND	MG/L	24	1	10	40	1	5
OXYGEN, DISSOLVED	MG/L	3.8	0.1	8	2.4	0.1	5.4
PH	PH UNITS	7.6		9.8	7.3		7.3
SPECIFIC CONDUCTANCE @ 25°C	µMHOS/CM	240	1	170	360	1	172
TOTAL ORGANIC CARBON	MG/L	24	1	8.9	8.7	1	4.7
TOTAL SUSPENDED SOLIDS	MG/L	12	1	6	128	1	2
TURBIDITY	NTU	2	0.01	4.6	4	0.01	3
OIL & GREASE	MG/L	ND	5	ND	31	5	ND
ALUMINUM	MG/L	ND	0.01	0.1	0.05	0.01	0.06
ANTIMONY	MG/L	ND	0.2	ND	ND	0.2	ND
BERYLLIUM	µG/L	ND	5	ND	ND	5	ND
CADMIUM	MG/L	ND	0.005	ND	ND	0.005	ND
COPPER	MG/L	ND	0.01	ND	0.02	0.01	ND
CYANIDE	MG/L	ND	0.005	ND	ND	0.005	ND
IRON	MG/L	ND	0.03	0.13	0.55	0.03	0.13
LEAD	µG/L	ND	1	ND	ND	1	1
MERCURY	µG/L	ND	0.2	ND	ND	0.2	ND
NICKEL	MG/L	ND	0.04	ND	ND	0.04	ND
SELENIUM	MG/L	0.005	0.002	0.005	ND	0.002	ND
SILVER	MG/L	ND	0.01	ND	ND	0.01	ND
ZINC	MG/L	0.01	0.01	0.01	ND	0.01	ND

* SAMPLE ALSO ANALYZED DURING EACH SAMPLING EVENT FOR SELECT PURGEABLE AROMATICS AND HALOCARBONS. NO DETECTABLE CONCENTRATIONS OF ANY OF THESE COMPOUNDS WERE IDENTIFIED.

DETECTION LIMITS WERE NOT AVAILABLE FOR ALL ANALYTICAL DATA.

LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY
Surface Water Analysis
(Semi-Annual)

SAMPLE ID: WTESW2

TEST PARAMETER*	UNITS	DETECTION	TEST	TEST
		LIMITS	RESULT	RESULT
		8/11/98	8/11/98	2/9/99
ALKALINITY	MG/L AS CaCO ₃	1	113	99
CHEMICAL OXYGEN DEMAND	MG/L	1	10	ND
OXYGEN, DISSOLVED	MG/L	0.1	5.2	5.2
PH	PH UNITS		7.8	7.8
SPECIFIC CONDUCTANCE @ 25°C	µMHOS/CM	1	323	202
TOTAL ORGANIC CARBON	MG/L	1	7.7	4.7
TOTAL SUSPENDED SOLIDS	MG/L	1	17	10
TURBIDITY	NTU	0.01	2.5	3.5
OIL & GREASE	MG/L	5	ND	ND
ALUMINUM	MG/L	0.01	0.06	0.22
ANTIMONY	MG/L	0.2	ND	ND
BERYLLIUM	µG/L	5	ND	ND
CADMIUM	MG/L	0.005	ND	ND
COPPER	MG/L	0.01	ND	ND
CYANIDE	MG/L	0.005	ND	ND
IRON	MG/L	0.04	0.35	0.15
LEAD	µG/L	1	ND	ND
MERCURY	µG/L	0.2	ND	ND
NICKEL	MG/L	0.04	ND	ND
SELENIUM	MG/L	0.003	ND	ND
SILVER	MG/L	0.01	ND	ND
ZINC	MG/L	0.01	0.01	ND

* SAMPLE ALSO ANALYZED DURING EACH SAMPLING EVENT FOR SELECT PURGEABLE AROMATICS AND HALOCARBONS. NO DETECTABLE CONCENTRATIONS OF ANY OF THESE COMPOUNDS WERE IDENTIFIED.

DETECTION LIMITS WERE NOT AVAILABLE FOR ALL ANALYTICAL DATA.

LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY
Surface Water Analysis

SAMPLE ID: WTESW

TEST PARAMETER:	ALKALINITY	CHEMICAL OXYGEN DEMAND	OXYGEN, DISSOLVED, ELECTRODE	PH	SPECIFIC CONDUCTANCE @ 25°C	TOTAL ORGANIC CARBON	TOTAL SUSPENDED SOLIDS	TURBIDITY (NEPHELOMETRI C)
UNITS:	MG/L AS CaCO ₃	MG/L	MG/L	PH UNITS	µMHOS/CM	MG/L	MG/L	NTU
7/28/93	180	25	5	8.3	874	32.5	4	7.7
8/3/93	NT	NT	NT	NT	NT	19	NT	NT
10/22/93	NT	NT	NT	8.4	NT	NT	NT	350
12/1/93	107	8	6.2	8.3	435	11	7	9.7
1/19/94	NT	NT	NT	NT	NT	30	NT	29
2/3/94	170	8	7	7	465	26	18	36
4/1/94	92	23	8	8.2	462	16	3	3.7
6/1/94	80	18	6	7.4	400	11	21	27
8/11/94	132	12	5	8.4	430	18	119	9.3
10/5/94	122	18	5.4	NT	337	8	14	18.2
12/2/94	126	41	7.8	8.3	388	18	10	8.8
2/3/95	108	25	6.8	6.8	250	21	7	6.4
4/18/95	82	22	8.2	7.5	350	18	16	8.7
6/2/95	72	45	5.4	8.2	250	21	10	6.3
8/15/95	48	20	5.6	9.2	200	18	6	4.4
10/20/95	62	30	4	7.1	240	20	ND	0.94
12/1/95	68	25	7.4	8.4	182	10	1	2.9
2/14/96	57	10	8.6	8.8	188	20	5	2
4/3/96	50	75	8.2	9.4	195	21	5	2.9
6/6/96	52	25	4.6	7.9	200	19	9	2.4
8/6/96	80	24	3.8	7.6	240	24	12	2

ND - Not detected above laboratory method detection limit

NT - Not tested

LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY
Surface Water Analysis

SAMPLE ID: WTESW

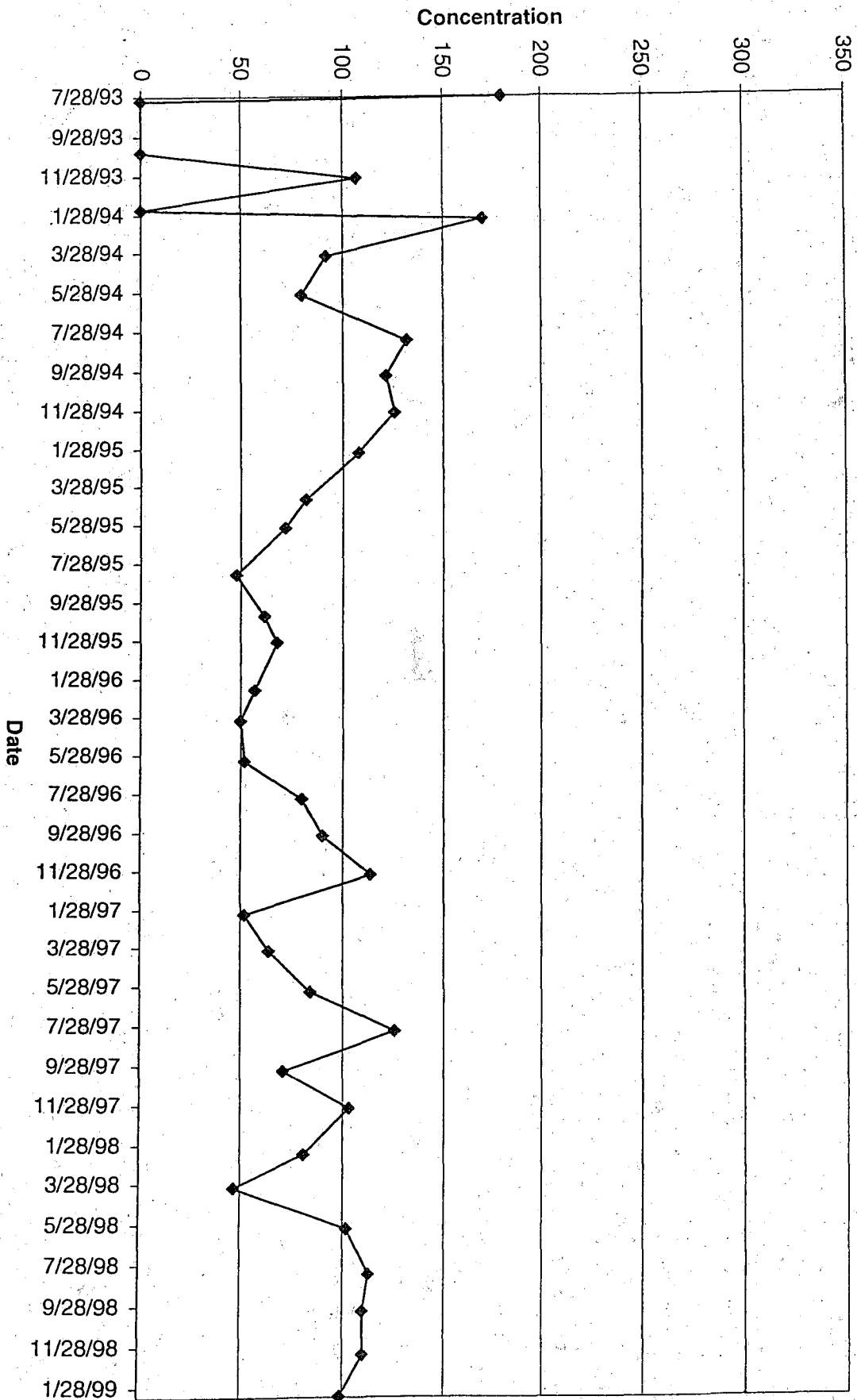
TEST PARAMETER:	ALKALINITY	CHEMICAL OXYGEN DEMAND	OXYGEN, DISSOLVED, ELECTRODE	PH	SPECIFIC CONDUCTANCE @ 25°C	TOTAL ORGANIC CARBON	TOTAL SUSPENDED SOLIDS	TURBIDITY (NEPHELOMETRI C)
UNITS:	MG/L AS CaCO ₃	MG/L	MG/L	PH UNITS	µMHOS/CM	MG/L	MG/L	NTU
10/3/96	90	22	4.2	7.1	260	8.9	8	14.4
12/4/96	114	19	6.4	7.4	266	8	15	8.2
2/4/97	52	10	8	9.8	170	8.9	6	4.6
4/2/97	64	52	9.6	9.4	244	16	21.5	48
6/5/97	84	71	5.8	8.4	300	13	54	23
8/5/97	126	40	2.4	7.3	360	8.7	128	4
10/6/97	71	27	3.2	7.6	215	5.9	4	2
12/2/97	103	27	4.4	7.4	253	6.9	3	7.5
2/10/98	81	5	5.4	7.3	172	4.7	2	3
4/2/98	47	20	6	8.6	155	6	ND	1.3
6/3/98	102	60	5.8	7.5	310	8.5	16	2.7
8/11/98	113	10	5.2	7.8	323	7.7	17	2.5
10/5/98	110	15	2.8	7.2	290	10	1	2
12/9/98	110	15	2.8	7.2	290	10	1	2
2/9/99	99	ND	5.2	7.8	202	4.7	10	3.5

ND - Not detected above laboratory method detection limit

NT - Not tested

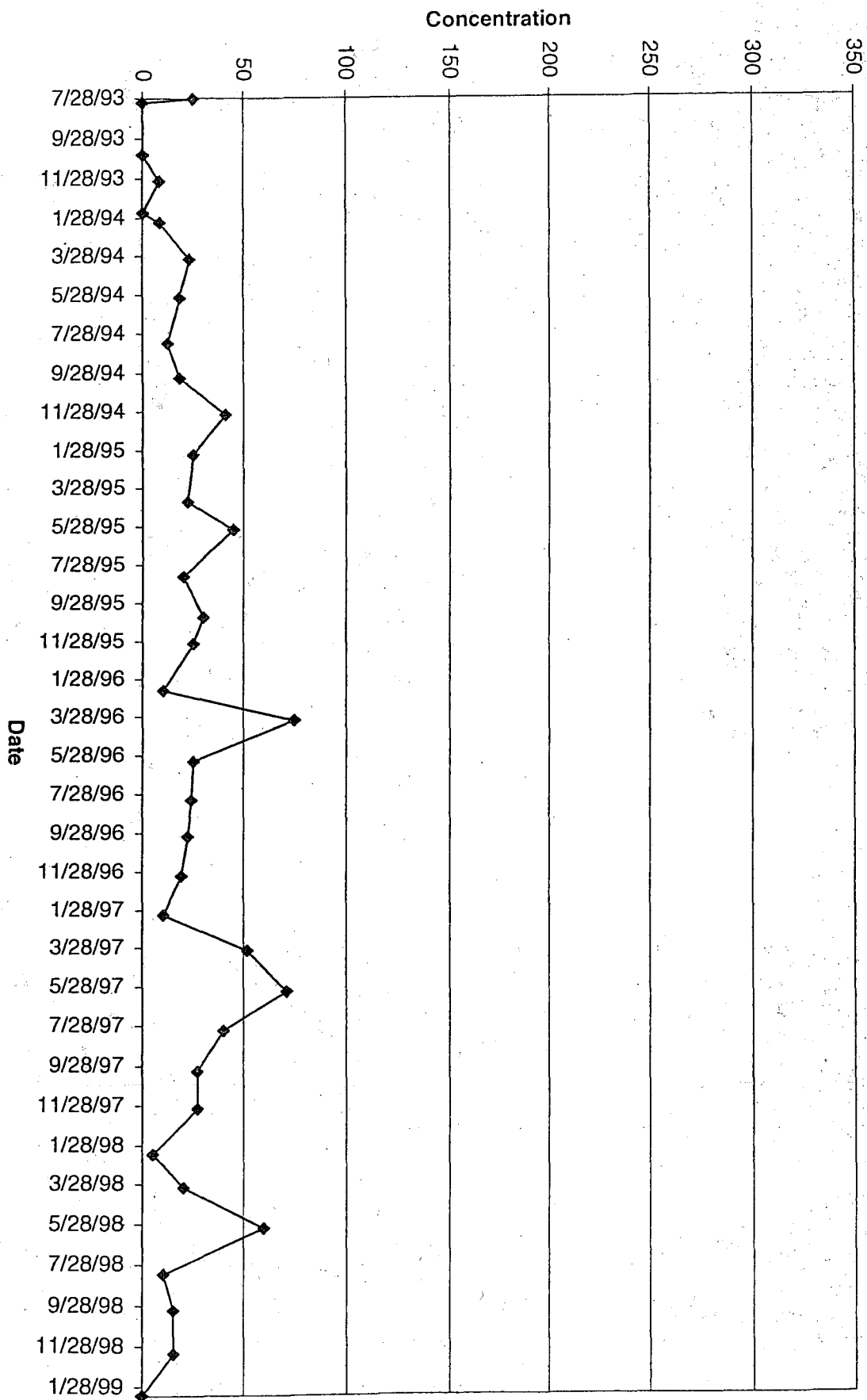
LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY

Alkalinity in mg/L as CaCO₃



Note: Zero values are dates when this parameter was not tested

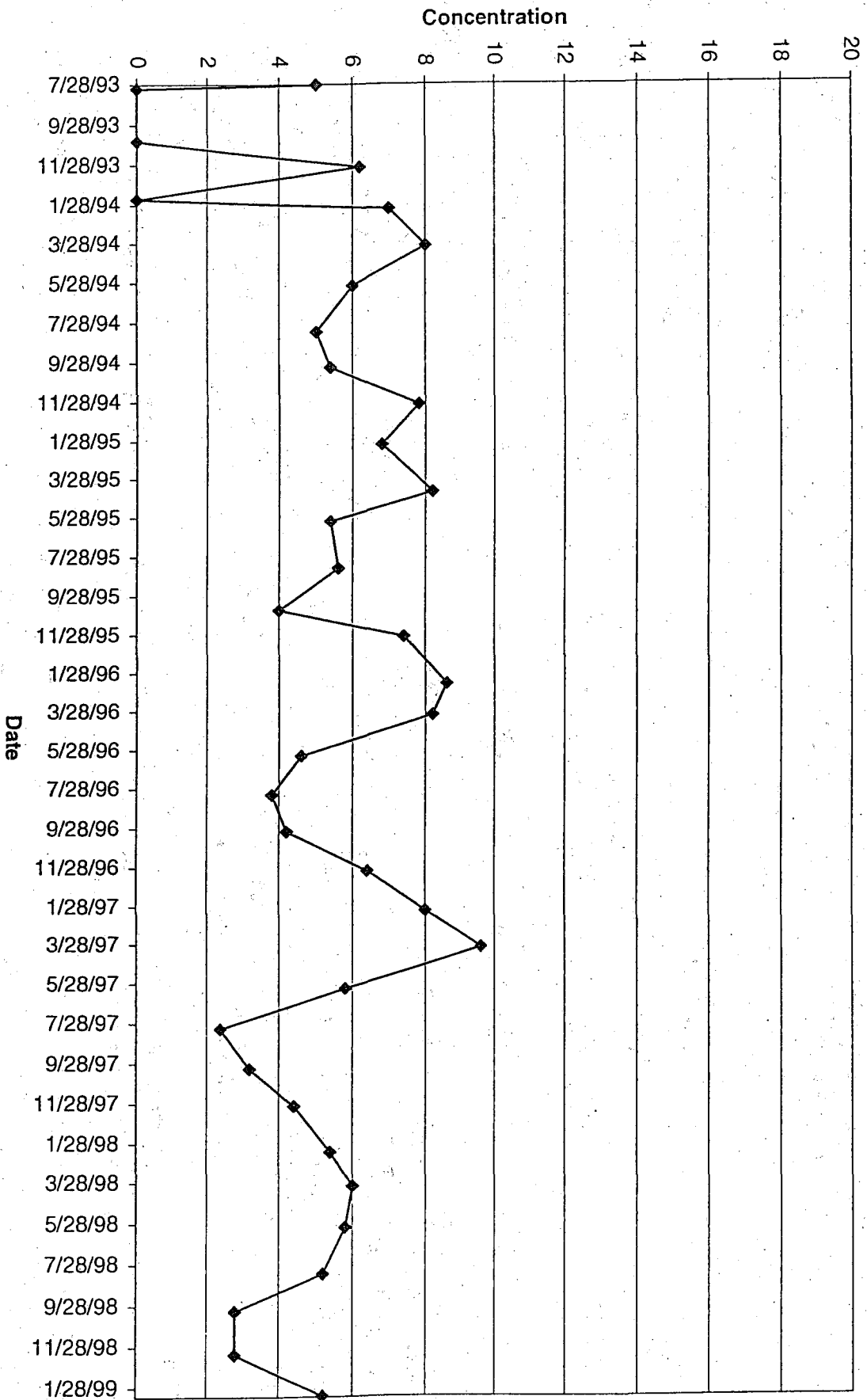
LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY Chemical Oxygen Demand in mg/L



Not o values are dates when this parameter was not tested o non-detectable.

LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY

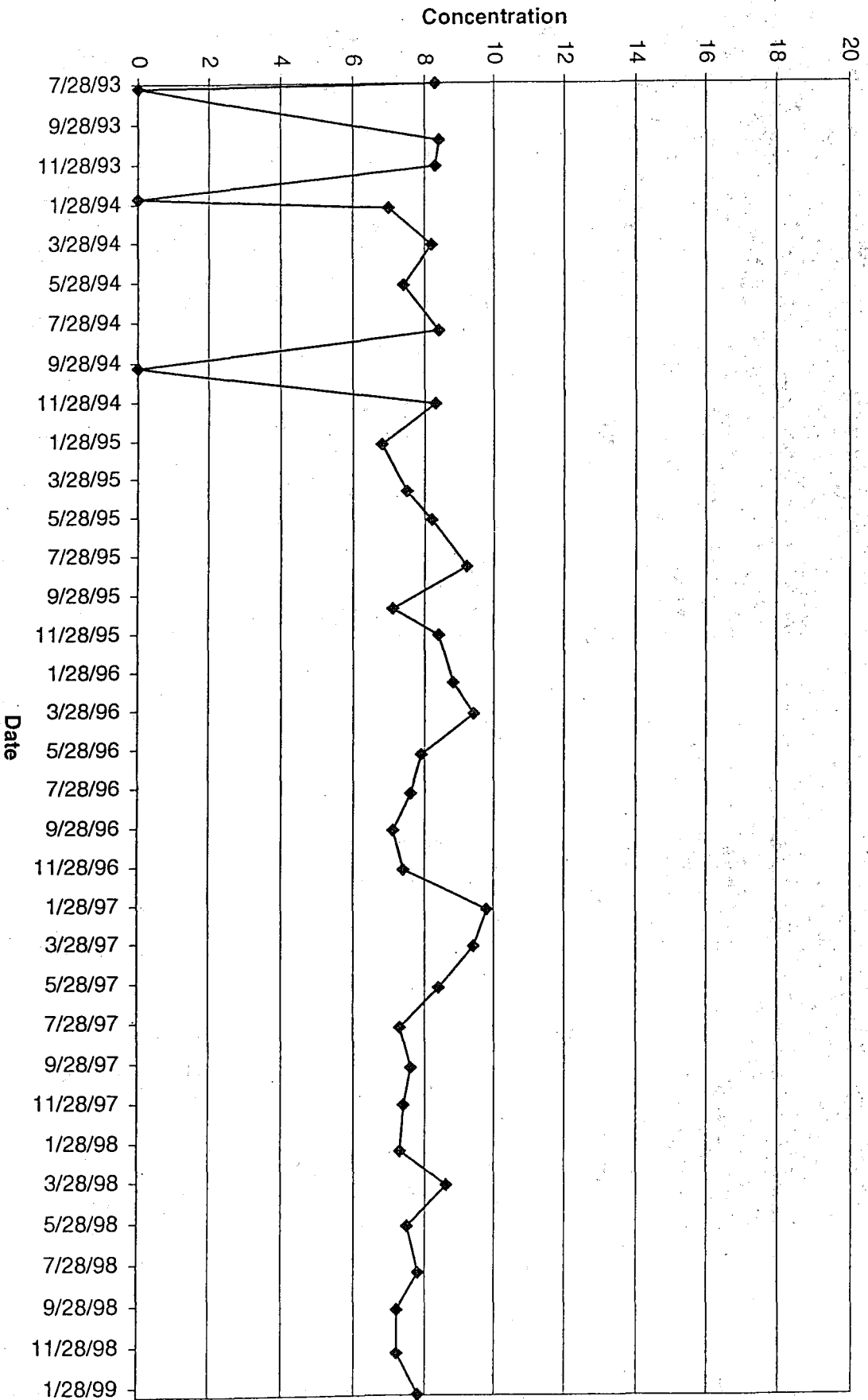
Oxygen, Dissolved, Electrode in mg/L



Note: Zero values are dates when this parameter was not tested.

LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY

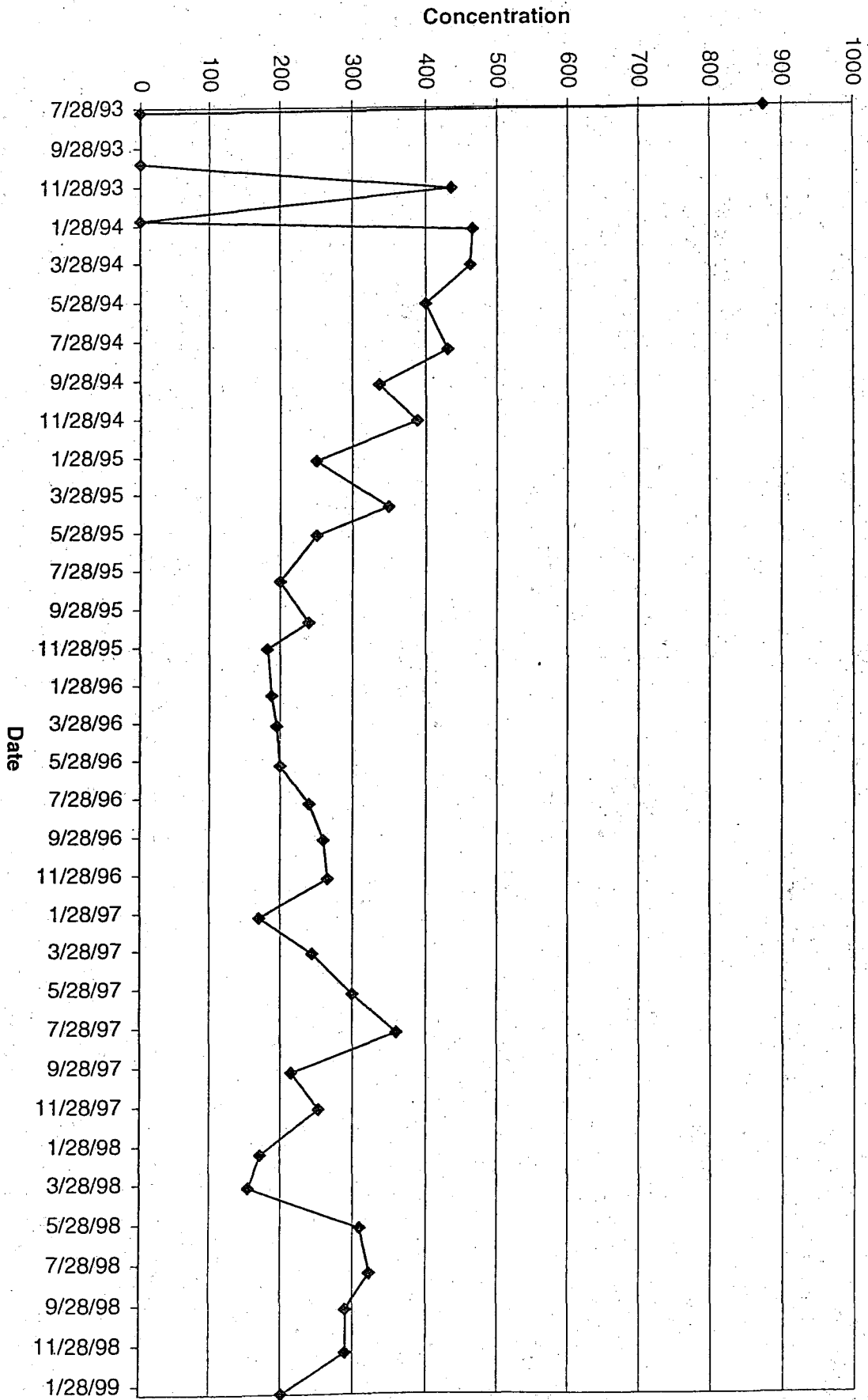
pH



Note: No values are dates when this parameter was not tested.

LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY

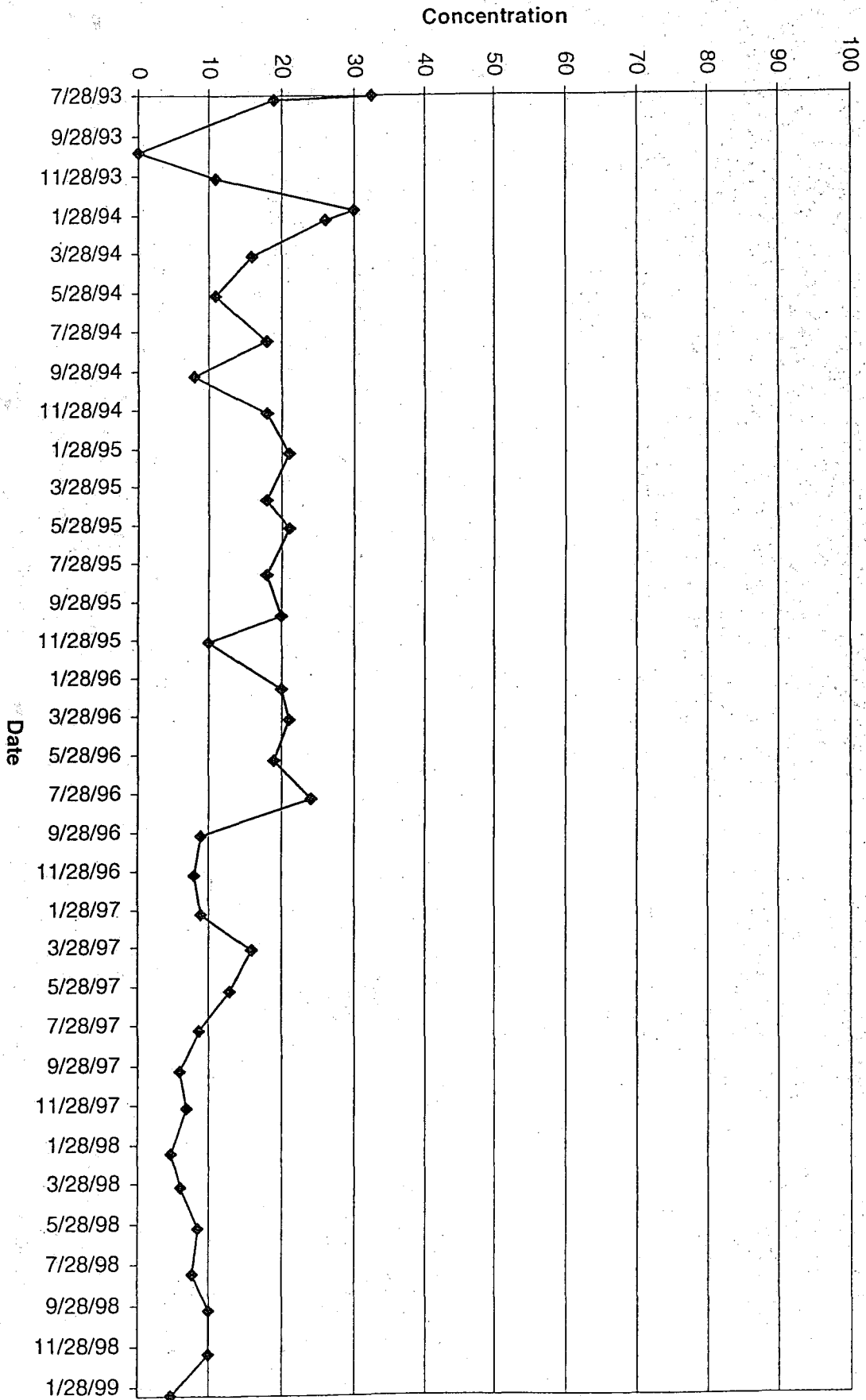
Specific Conductance @ 250C mmhos/cm



Note: Zero values are dates when this parameter was not tested.

LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY

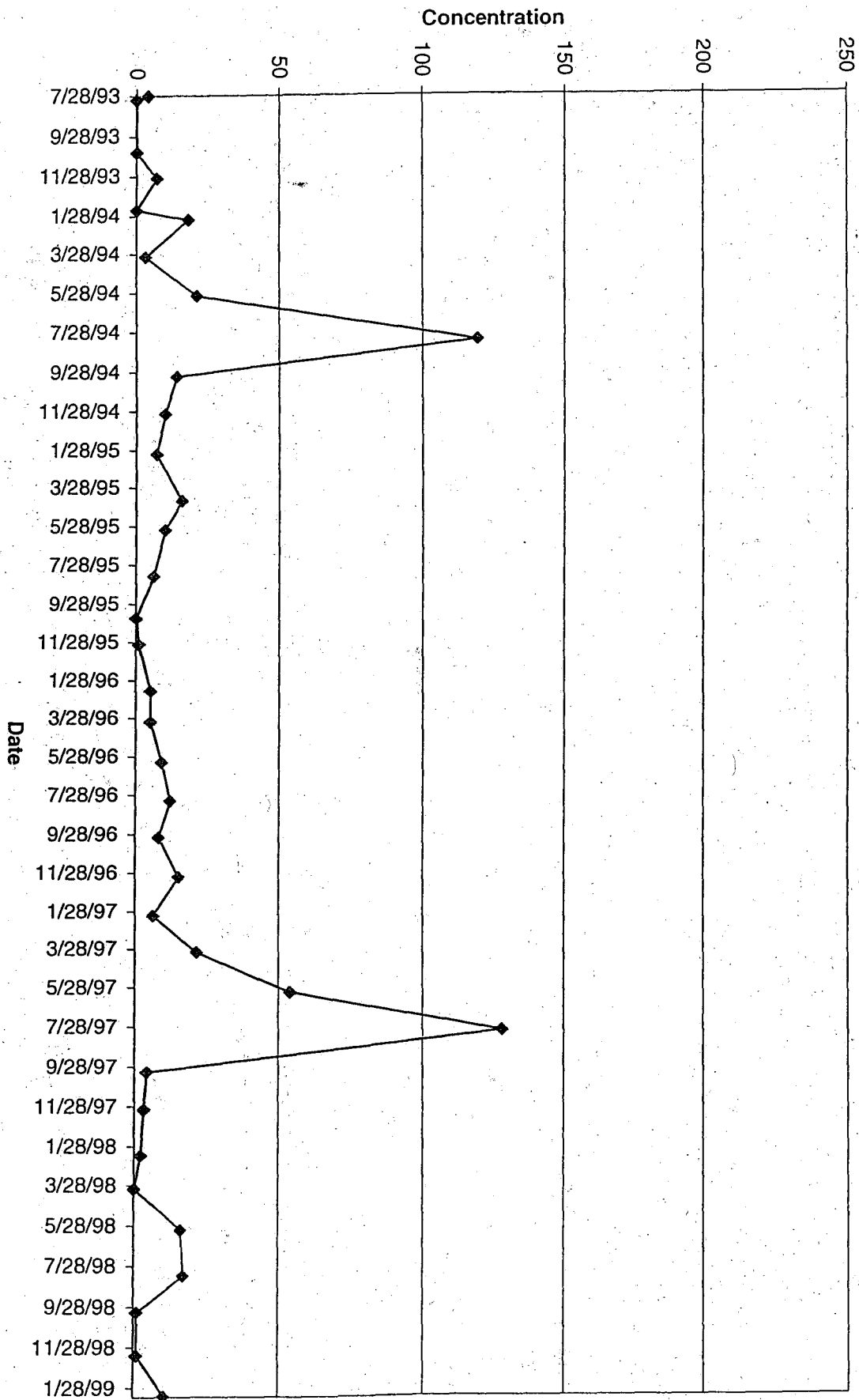
Total Organic Carbon (mg/L)



Note: No values represent dates on which this parameter was not tested.

LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY

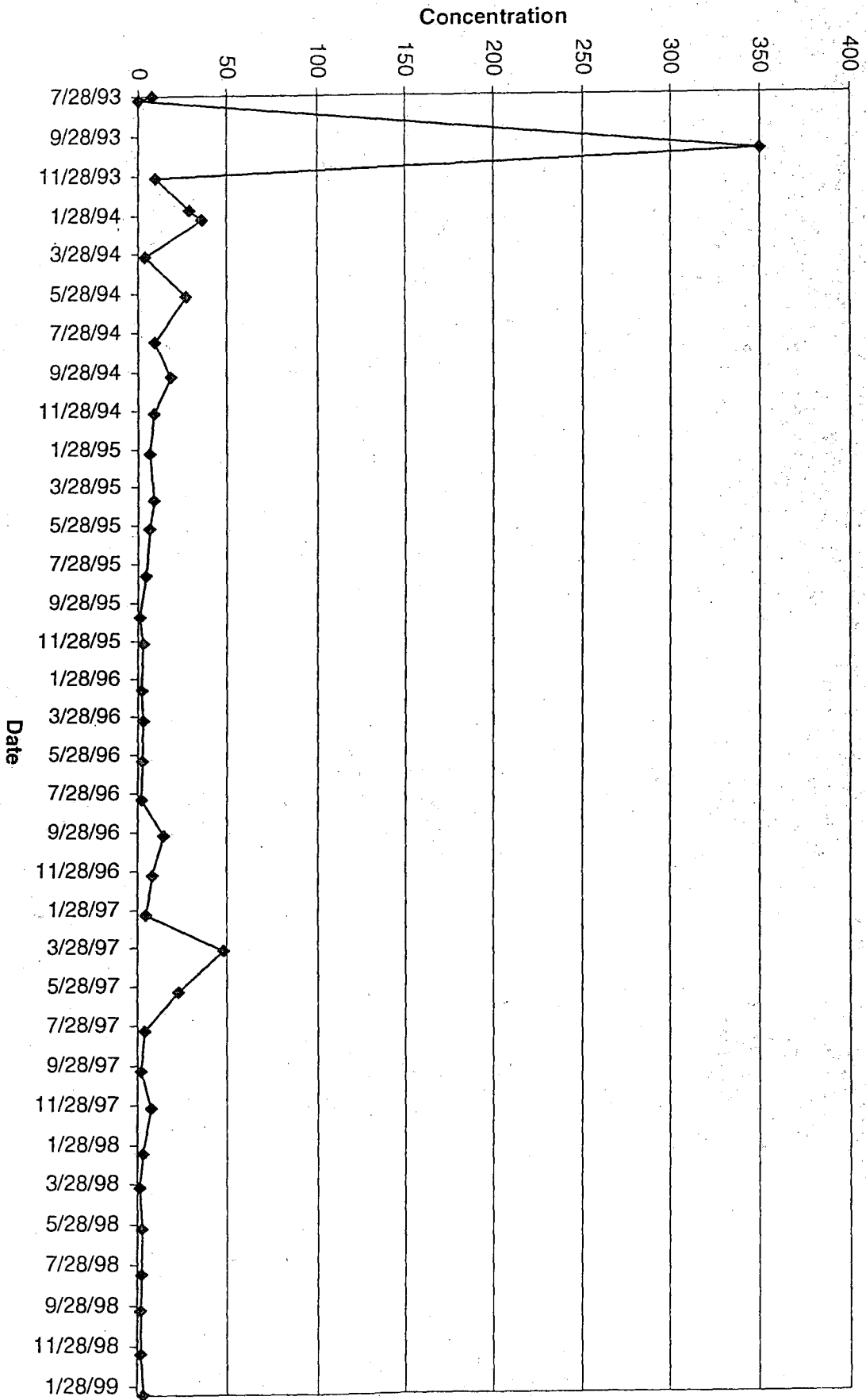
Total Suspended Solids (mg/L)



Note: Zero values represent dates on which this parameter was not tested or was non-detectable.

LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY

Turbidity (Nephelometric) (NTU)



Note: Values represent dates on which this parameter was not

7.5 - Grant of Perpetual Conservation Easement and Agreement

46.50
This Instrument Prepared by:

Office of the County Attorney
Lee County, Florida

P. O. Box 398
Fort Myers, Florida 33902-0398

Parcel: _____
Project: _____
STRAP No.: _____

3344120

This Space for Recording

GRANT OF PERPETUAL

CONSERVATION EASEMENT & AGREEMENT

THIS PERPETUAL CONSERVATION EASEMENT is entered into this 14th day of January, 1993 by and between LEE COUNTY, a political subdivision of the State of Florida ("GRANTOR"), and the SOUTH FLORIDA WATER MANAGEMENT DISTRICT, a political corporation of the State of Florida, created under Chapter 373, Florida Statutes, and whose principal address is 3301 Gun Club Road, West Palm Beach, Florida 33406, ("GRANTEE").

Pursuant to the provisions of Section 704.06, Florida Statutes, and in consideration for the issuance of a State of Florida Power Plant Site Certification issued to Lee County on June 16, 1992, and the conditions therein, specifically Condition XV.D.2.B.(7) and c.(6), GRANTOR hereby grants to GRANTEE, a Perpetual Conservation Easement over the real property as described in Exhibit "A" of this Easement and Agreement (the "Property"), for itself, its successors and assigns.

GRANTOR hereby grants to GRANTEE the following Easement rights and privileges with respect to the Property (to include naturally occurring and created wetlands), in perpetuity:

1. The right to use and regulate the Property in keeping with the policies declared in Section 373.016, Florida Statutes.

2. The right of view of the Property in its natural and open condition.

3. The right of GRANTEE, in a reasonable manner and at reasonable times, to enter upon and inspect the Property in order to determine if GRANTOR or its successors or assigns is complying with the covenants and prohibitions contained in this Easement and the conditions pursuant to the State of Florida Power Plant Site Certification as outlined above, and incorporated in their entirety herein by reference.

4. The right of GRANTEE to proceed, either at law or in equity, to enforce the terms of this Easement and Agreement, including but not limited to, the right to require GRANTOR to restore the Property to the condition at the time of this Easement, provided, however, that GRANTOR shall not be liable for any changes in the Property due to natural causes beyond GRANTOR'S control, such as changes occurring by reason of fire, flood, storm or other acts of God.

IN FURTHERANCE of the foregoing, affirmative rights are hereby granted to GRANTEE in this Easement, and GRANTOR, as owner of the underlying fee simple title to the PROPERTY, hereby makes the following covenants on behalf of itself, its successors and assigns, for the benefit of GRANTEE, its successors and assigns, which

covenants shall run with and bind the Property, in perpetuity. The following activities are prohibited ("Prohibited Activities"), except such activities which may be contemplated in the management plan to be adopted by GRANTOR and approved by GRANTEE in regard to the Property, and except as to any other such activities which are permitted in writing by GRANTEE.

The following are Prohibited Activities:

1. There shall be no construction or placing of buildings, roads, utilities or other improvements on, above or under the ground of the Property.
2. There shall be no dumping or placing of soil or other substance or material as landfill, or dumping or placing of trash, waste or unsightly or offensive material.
3. There shall be no removal or destruction of trees, scrubs or other vegetation, other than the specified removal of exotic pest species as outlined in the Conditions of Certification for the Lee County Power Plant Site Certification issued on June 16, 1992.
4. There shall be no excavation, dredging or removal of peat, gravel, soil, rock or other material in such a manner as to affect the surface of the Property.
5. There shall be no surface use except uses which permit the Property to remain predominantly in its natural condition.
6. There shall be no activity detrimental to drainage, flood control, water conservation, erosion control, soil conservation or fish and wildlife habitat preservation.

7. There shall be no uses detrimental to the preservation of any wetlands within the Property.

GRANTOR agrees that it will not sell the Property which is subject to this Easement without giving GRANTEE at least sixty (60) days written notice prior to transfer of title.

GRANTOR reserves to itself, its heirs, successors or assigns all rights as fee owner of the Property including the right to engage in all uses of the Property that are not expressly prohibited herein and are not inconsistent with the purpose of this Easement as set forth in Section 704.06, Florida Statutes.

GRANTEE agrees that it will hold this Easement exclusively for conservation purposes and that it will not assign its rights and obligations under this Easement except to another organization qualified to hold such interests under applicable state and federal laws and committed to holding this Easement exclusively for conservation purposes.

GRANTOR agrees to bear all reasonable costs related to the operation, upkeep and maintenance of the Property.

If any provision of this Easement or the application thereof to any person or circumstance is found to be invalid, the remainder of the provisions of this Easement, and the applications of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

All notices, consents, approvals or other communications hereunder shall be in writing and shall be deemed properly given if sent by United States certified mail, return receipt requested, addressed to

the appropriate party or successor-in-interest, at the addresses above set forth or such new addresses as either party may in writing deliver to the other.

It is agreed between GRANTOR and GRANTEE that GRANTEE'S approval of the management plan and amendments thereto, and written requests of GRANTOR, will be based upon consideration of water resource management and conservation policies as expressed in Chapter 373, Florida Statutes.

This Easement and Agreement may be modified only by mutual written agreement between GRANTOR and GRANTEE or their successors, at and for the convenience of the parties.

ATTEST: CHARLIE GREEN
CLERK OF THE COURT

By: Lisa S. Pierce

Deputy Clerk

Poor Original



AS TO GRANTOR

BOARD OF COUNTY COMMISSIONERS
OF LEE COUNTY, FLORIDA

By: J. Manning

Chairman

AS TO GRANTEE

GOVERNING BOARD FOR THE
SOUTH FLORIDA WATER MANAGEMENT
DISTRICT

By: J. Marvin

Title: Deputy Executive Director

APPROVED AS TO FORM:

Office of Lee County Attorney

By: [Signature]
Assistant County Attorney

APPROVED AS TO FORM:

Office of General Counsel,
South Florida Water Management
District

By: [Signature]
Assistant General Counsel

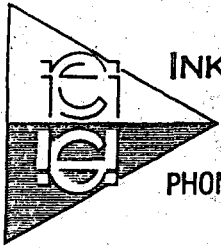
FILED WITH THE CLERK OF THE SOUTH
FLORIDA WATER MANAGEMENT DISTRICT

ON 1-28-93
BY [Signature]
DEPUTY CLERK

LEGAL FORM APPROVED
SFWMD OFFICE OF COUNSEL

BY [Signature] DATE 1/28/93





INK ENGINEERING INC.

ENGINEERS

SURVEYORS

PLANNERS

PHONE (813) 995-8500

6320 BEAU DRIVE

NORTH FORT MYERS, FLORIDA 33903

EXHIBIT A-1

JOB NUMBER 9133

9/30/92

LEE COUNTY ENERGY RECOVERY SITE
CONSERVATION EASEMENT # 1

DESCRIPTION

A TRACT OR PARCEL OF LAND LYING IN THE SOUTHEAST ONE-QUARTER OF SECTION 24, TOWNSHIP 44 SOUTH, RANGE 25 EAST, LEE COUNTY, FLORIDA; MORE PARTICULARLY DESCRIBED AS FOLLOWS:

FROM THE POINT OF COMMENCEMENT AT THE SOUTHWEST CORNER OF THE SOUTHEAST ONE-QUARTER OF SAID SECTION 24; THENCE N.88°44'55"E. FOR 250.01 FEET ALONG THE SOUTH LINE OF SAID SOUTHEAST ONE-QUARTER TO AN INTERSECTION WITH THE EASTERLY LINE OF A FLORIDA POWER AND LIGHT COMPANY RIGHT-OF-WAY AS RECORDED IN OFFICIAL RECORD BOOK 814, AT PAGE 673 OF THE PUBLIC RECORDS OF LEE COUNTY, FLORIDA; THENCE N.00°45'41"W. FOR 803.69 FEET ALONG SAID EASTERLY LINE TO THE POINT OF BEGINNING.

FROM SAID POINT OF BEGINNING; THENCE CONTINUE N.00°45'41"W. FOR 573.85 FEET; THENCE N.65°11'55"E. FOR 408.42 FEET; THENCE N.55°28'14"E. FOR 170.76 FEET; THENCE N.65°34'06"E. FOR 302.55 FEET; THENCE N.74°57'35"E. FOR 294.17 FEET; THENCE N.70°53'57"E. FOR 149.54 FEET; THENCE S.73°15'50"E. FOR 87.58 FEET; THENCE S.00°00'00"E. FOR 142.08 FEET; THENCE S.31°57'24"E. FOR 58.29 FEET; THENCE S.58°14'35"E. FOR 165.73 FEET; THENCE S.17°43'13"W. FOR 214.51 FEET; THENCE S.89°02'10"W. FOR 185.17 FEET; THENCE S.51°30'52"W. FOR 272.87 FEET; THENCE S.76°58'18"W. FOR 258.63 FEET; THENCE S.00°00'00"E. FOR 217.78 FEET; THENCE S.22°30'00"W. FOR 103.32 FEET; THENCE S.67°30'00"W. FOR 103.32 FEET; THENCE S.90°00'00"W. FOR 609.31' TO THE POINT OF BEGINNING.

CONTAINING 21.005 ACRES MORE OR LESS.

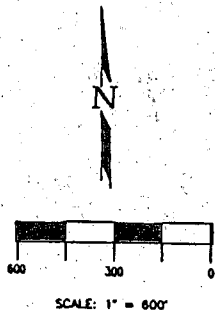
THE BEARINGS MENTIONED HEREIN ARE BASED UPON THE PLAT OF BUCKINGHAM PARK ENTRANCE ROADS AS RECORDED IN PLAT BOOK 9, PAGE 98, LEE COUNTY PUBLIC RECORDS, LEE COUNTY, FLORIDA. THE CENTERLINE OF BUCKINGHAM ROAD BEING THE RECORD PLAT BEARING OF N.88°47'W.

SUBJECT TO EXISTING EASEMENTS, RESTRICTIONS, RESERVATIONS, AND RIGHTS OF WAY OF RECORD.

REFER TO 8 1/2" X 11" SKETCH

ENGINEERING, INC.

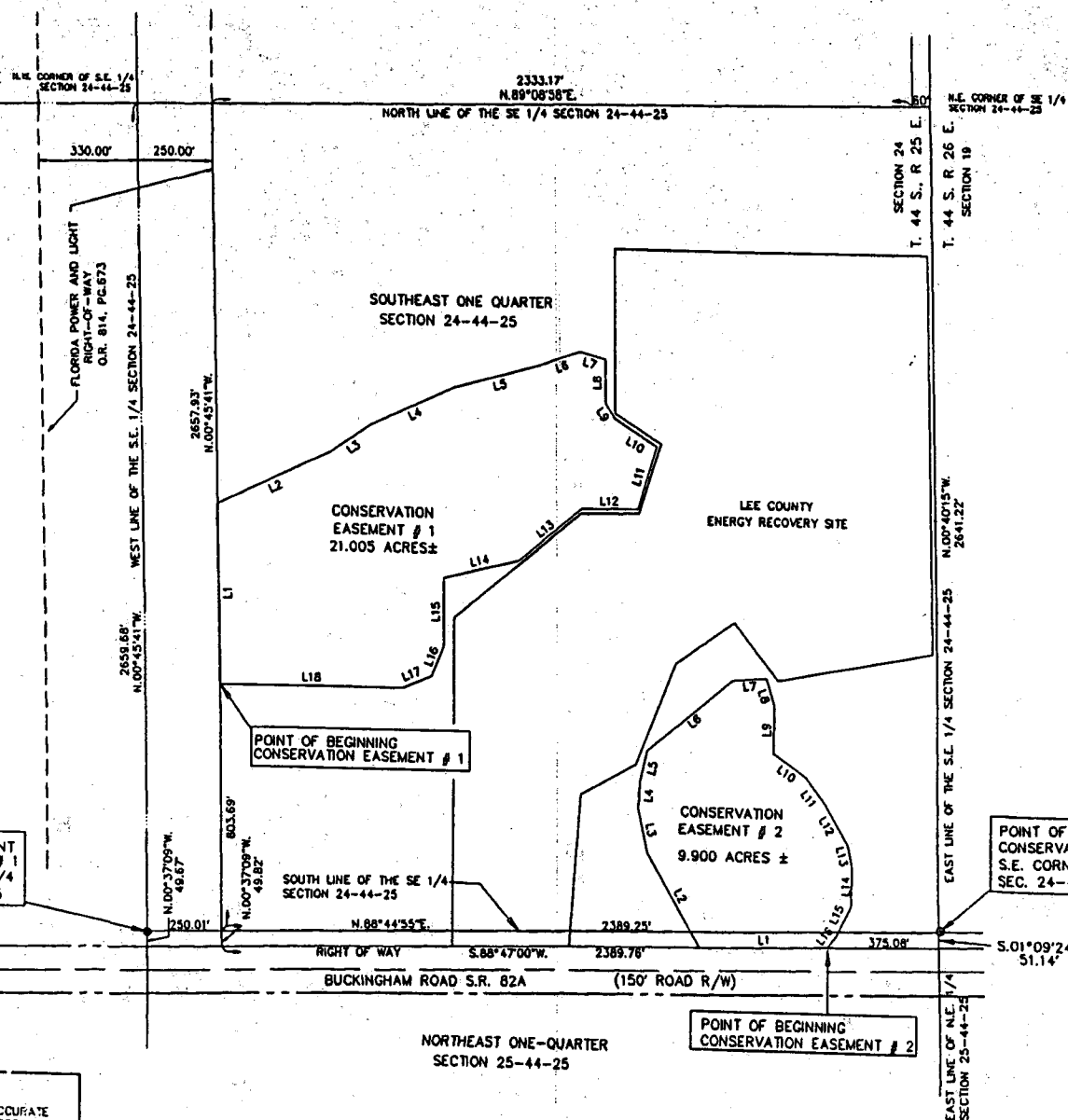
Nick Poulos 9/30/92
NICK POULOS, FOR THE FIRM
PROFESSIONAL LAND SURVEYOR
FLORIDA CERTIFICATE NO. 4568



CONSERVATION EASEMENT # 1
LINE TABLE

Line	Bearing	Distance
L1	N.00°45'41"W.	573.85'
L2	N.65°11'55"E.	408.42'
L3	N.55°28'14"E.	170.76'
L4	N.65°34'06"E.	302.55'
L5	N.74°57'35"E.	294.17'
L6	N.70°53'57"E.	149.54'
L7	S.73°15'50"E.	87.58'
L8	SOUTH	142.08'
L9	S.31°57'24"E.	58.29'
L10	S.58°14'35"E.	165.73'
L11	S.17°43'13"W.	214.51'
L12	S.89°02'10"W.	185.17'
L13	S.51°30'52"W.	272.87'
L14	S.76°58'18"W.	258.63'
L15	SOUTH	217.78'
L16	S.22°30'00"W.	103.32'
L17	S.67°30'00"W.	103.32'
L18	WEST	609.31'

POINT OF COMMENCEMENT
CONSERVATION EASEMENT # 1
S.W. COR. S.E. 1/4
SEC. 24-44-25



LEGEND:

SEC	SECTION
T.	TOWNSHIP
R.	RANGE
P.O.B.	POINT OF BEGINNING
O.R.	OFFICIAL RECORD BOOK
P.G.	PAGE
P.B.	LICENSED BUSINESS
P.B.	PLAT BOOK
(D)	DEED
(C)	CALCULATED
(P)	PLAT
COR	CORNER
R/W	RIGHT OF WAY
S.R.	STATE ROAD
SFWM	SOUTH FLORIDA WATER MANAGEMENT DISTRICT

L1 (TYPICAL) DENOTES LINE NUMBER IN LINE TABLE

CONSERVATION EASEMENT # 2
LINE TABLE

Line	Bearing	Distance
L1	S.88°47'00"W.	419.46'
L2	N.30°19'02"W.	345.30'
L3	N.12°24'38"W.	146.77'
L4	N.02°57'49"E.	85.59'
L5	N.12°54'36"E.	107.12'
L6	N.49°41'39"E.	368.56'
L7	N.85°56'01"E.	109.82'
L8	S.18°20'01"E.	91.96'
L9	S.00°08'17"W.	156.74'
L10	S.55°13'15"E.	131.20'
L11	S.36°12'25"E.	110.70'
L12	S.30°06'58"E.	150.88'
L13	S.12°58'37"E.	68.47'
L14	S.00°59'01"W.	128.23'
L15	S.27°36'35"W.	113.30'
L16	S.40°33'04"W.	44.24'

POINT OF COMMENCEMENT
CONSERVATION EASEMENT # 2
S.E. CORNER
SEC. 24-44-25

POINT OF BEGINNING
CONSERVATION EASEMENT # 2

SURVEYOR'S CERTIFICATE

WE HEREBY CERTIFY THAT THE ATTACHED SKETCH IS AN ACCURATE REPRESENTATION OF THE LANDS DESCRIBED HEREON, WAS PREPARED IN ACCORDANCE WITH THE MINIMUM TECHNICAL STANDARDS FOR LAND SURVEYING, CHAPTER 21 HH-6 FAC, AND AS PREPARED UNDER THE DIRECT SUPERVISION OF THE UNDERSIGNED REGISTERED LAND SURVEYOR, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

INK ENGINEERING, INC.

DATE: 10/2/92

Nick Poulos

NICK POULOS, FOR THE FIRM
PROFESSIONAL LAND SURVEYOR

REFER TO ATTACHED DESCRIPTION

SUBJECT TO EXISTING EASEMENTS, RESTRICTIONS, RESERVATIONS AND RIGHTS OF WAY OF RECORD

BEARING BASIS:

BEARINGS SHOWN HEREON ARE BASED UPON THE PLAT OF BUCKINGHAM PARK ENTRANCE ROADS AS RECORDED IN PLAT BOOK 9, PAGE 98, LEE COUNTY PUBLIC RECORDS, LEE COUNTY

SKETCH OF DESCRIPTION

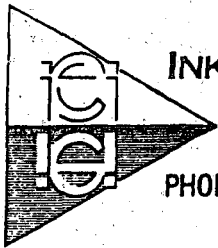
(NOT A SURVEY)
CONSERVATION EASEMENT
LEE COUNTY ENERGY RECOVERY SITE

NOTE: SECTIONAL INFORMATION SHOWN HEREON IS AS SHOWN ON A BOUNDARY SURVEY OF PART SECTIONS 24 & 25, T. 44 S. R. 25 E. PERFORMED BY THE FIRM OF AGNOLI, BARBER BRUNDAGE, INC. AND DATED JUNE 22, 1990.

INK ENGINEERING, INC.
ENGINEERS • SURVEYORS

DATE: 9/30/1992
DRAWING NUMBER

OR2364 Pg1424



INK ENGINEERING INC.

OR2364 PG1425

ENGINEERS • SURVEYORS • PLANNERS

PHONE (813) 995-8500

6320 BEAU DRIVE

NORTH FORT MYERS, FLORIDA 33903

EXHIBIT A-2

JOB NUMBER 9133

9/30/92

LEE COUNTY ENERGY RECOVERY SITE
CONSERVATION EASEMENT # 2

DESCRIPTION

A TRACT OR PARCEL OF LAND LYING IN THE SOUTHEAST ONE-QUARTER OF SECTION 24, TOWNSHIP 44 SOUTH, RANGE 25 EAST, AND THE NORTHEAST ONE-QUARTER OF SECTION 25, TOWNSHIP 44 SOUTH RANGE 25 EAST, LEE COUNTY, FLORIDA; MORE PARTICULARLY DESCRIBED AS FOLLOWS:

FROM THE POINT OF COMMENCEMENT AT THE SOUTHEAST CORNER OF SAID SECTION 24; THENCE S.01°09'24"E. FOR 51.14 FEET ALONG THE EAST LINE OF SAID NORTHEAST ONE-QUARTER OF SAID SECTION 25 TO AN INTERSECTION WITH THE NORTHERLY RIGHT-OF-WAY OF BUCKINGHAM ROAD (S.R. 82A); THENCE S.88°47'00"W. FOR 375.08 FEET ALONG SAID NORTHERLY RIGHT OF WAY (75.00 FEET FROM CENTERLINE) TO THE POINT OF BEGINNING.

FROM SAID POINT OF BEGINNING; THENCE CONTINUE S.88°47'00"W. FOR 419.46 FEET; THENCE N.30°19'02"W. FOR 345.30 FEET; THENCE N.12°24'38"W. FOR 146.77 FEET; THENCE N.02°57'49"E. FOR 85.59 FEET; THENCE N.12°54'36"E. FOR 107.12 FEET; THENCE N.49°41'39"E. FOR 368.56 FEET; THENCE N.85°56'01"E. FOR 109.82 FEET; THENCE S.16°20'01"E. FOR 91.96 FEET; THENCE S.00°08'17"W. FOR 156.74 FEET; THENCE S.55°13'15"E. FOR 131.20 FEET; THENCE S.36°12'25"E. FOR 110.70 FEET; THENCE S.30°06'56"E. FOR 150.88 FEET; THENCE S.12°58'37"E. FOR 68.47 FEET; THENCE S.00°59'01"W. FOR 128.23 FEET; THENCE S.27°36'35"W. FOR 113.30 FEET; THENCE S.40°33'04"W. FOR 44.24 FEET TO THE POINT OF BEGINNING.

CONTAINING 9.900 ACRES MORE OR LESS.

THE BEARINGS MENTIONED HEREIN ARE BASED UPON THE PLAT OF BUCKINGHAM PARK ENTRANCE ROADS AS RECORDED IN PLAT BOOK 9, PAGE 98, LEE COUNTY PUBLIC RECORDS, LEE COUNTY, FLORIDA. THE CENTERLINE OF BUCKINGHAM ROAD BEING THE RECORD PLAT BEARING OF N.88°47'W.

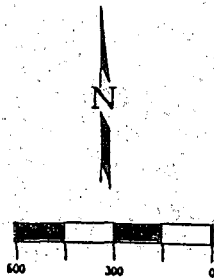
SUBJECT TO EXISTING EASEMENTS, RESTRICTIONS, RESERVATIONS, AND RIGHTS OF WAY OF RECORD.

REFER TO 8 1/2" X 11" SKETCH

INK ENGINEERING, INC.

Michael Poulos 10/2/92
MICHAEL POULOS, FOR THE FIRM
PROFESSIONAL LAND SURVEYOR
FLORIDA CERTIFICATE NO. 4568

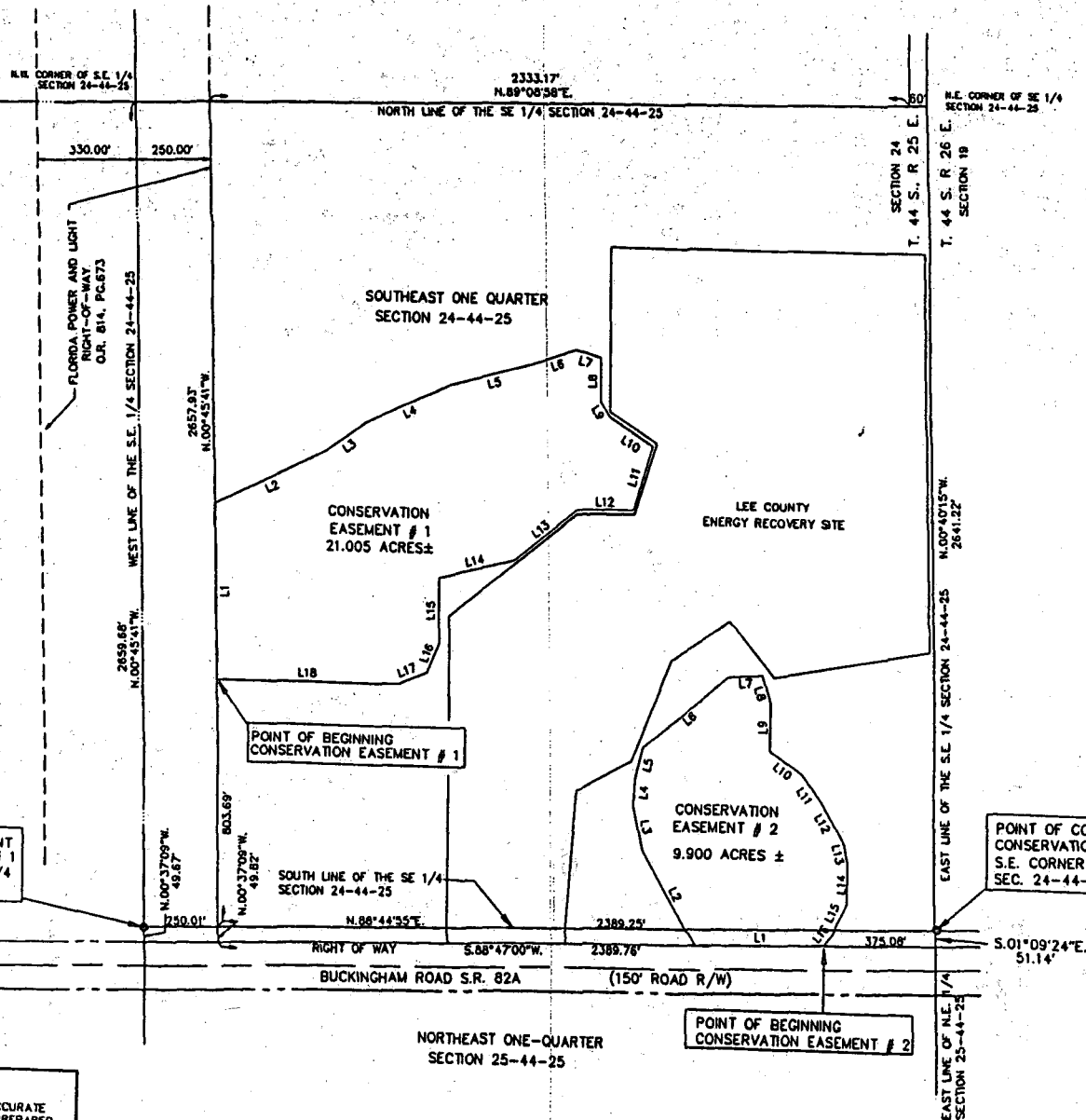
93 FEB 25 PM 1:11



SCALE: 1" = 600'

CONSERVATION EASEMENT # 1 LINE TABLE		
Line	Bearing	Distance
L1	N.00°45'41"W.	573.85'
L2	N.65°11'55"E.	408.42'
L3	N.55°28'14"E.	170.76'
L4	N.65°34'06"E.	302.55'
L5	N.74°57'35"E.	294.17'
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L7	S.73°15'50"E.	87.58'
L8	SOUTH	142.08'
L9	S.31°57'24"E.	58.29'
L10	S.58°14'35"E.	165.73'
L11	S.17°43'13"W.	214.51'
L12	S.89°02'10"W.	185.17'
L13	S.51°30'52"W.	272.87'
L14	S.76°58'18"W.	258.63'
L15	SOUTH	217.78'
L16	S.22°30'00"W.	103.32'
L17	S.67°30'00"W.	103.32'
L18	WEST	609.31'

POINT OF COMMENCEMENT
CONSERVATION EASEMENT # 1
S.W. COR. S.E. 1/4
SEC. 24-44-25



LEGEND:	
SEC	SECTION
T.	TOWNSHIP
R.	RANGE
P.O.B.	POINT OF BEGINNING
O.R.B.	OFFICIAL RECORD BOOK
P.G.	PAGE
LB	LICENSED BUSINESS
P.B.	PLAT BOOK
(D)	DEED
(C)	CALCULATED
(P)	PLAT
COR	CORNER
R/W	RIGHT OF WAY
S.R.	STATE ROAD
SFWM	SOUTH FLORIDA WATER MANAGEMENT DISTRICT
L1 (TYPICAL) DENOTES LINE NUMBER IN LINE TABLE	

CONSERVATION EASEMENT # 2 LINE TABLE		
Line	Bearing	Distance
L1	S.88°47'00"W.	419.46'
L2	N.30°19'02"W.	345.30'
L3	N.12°24'38"W.	146.77'
L4	N.02°57'49"E.	85.59'
L5	N.12°54'36"E.	107.12'
L6	N.49°41'39"E.	368.56'
L7	N.85°56'01"E.	109.82'
L8	S.16°20'01"E.	91.98'
L9	S.00°08'17"W.	156.74'
L10	S.55°13'15"E.	131.20'
L11	S.36°12'25"E.	110.70'
L12	S.30°06'58"E.	150.88'
L13	S.12°58'37"E.	68.47'
L14	S.00°59'01"W.	128.23'
L15	S.27°36'35"W.	113.30'
L16	S.40°33'04"W.	44.24'

POINT OF COMMENCEMENT
CONSERVATION EASEMENT # 2
S.E. CORNER
SEC. 24-44-25

SURVEYOR'S CERTIFICATE

WE HEREBY CERTIFY THAT THE ATTACHED SKETCH IS AN ACCURATE REPRESENTATION OF THE LANDS DESCRIBED HEREON, WAS PREPARED IN ACCORDANCE WITH THE MINIMUM TECHNICAL STANDARDS FOR LAND SURVEYING, CHAPTER 21 H&S F.S., AND AS PREPARED UNDER THE DIRECT SUPERVISION OF THE UNDERSIGNED REGISTERED LAND SURVEYOR, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

INK ENGINEERING, INC.

DATE: 10/2/92

NICK POULOS, FOR THE FIRM
PROFESSIONAL LAND SURVEYOR
FLA. CERTIFICATE NO. 4548

REFER TO ATTACHED DESCRIPTION

SUBJECT TO EXISTING EASEMENTS, RESTRICTIONS, RESERVATIONS AND RIGHTS OF WAY OF RECORD

BEARING BASIS:

BEARINGS SHOWN HEREON ARE BASED UPON
THE PLAT OF BUCKINGHAM PARK ENTRANCE
ROADS AS RECORDED IN PLAT BOOK 9, PAGE
58, LEE COUNTY PUBLIC RECORDS, LEE COUNTY,
FLORIDA, THE CENTERLINE OF BUCKINGHAM ROAD

SKETCH OF DESCRIPTION

(NOT A SURVEY)
CONSERVATION EASEMENT
LEE COUNTY ENERGY RECOVERY SITE

INK ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS

NOTE: SECTIONAL INFORMATION SHOWN HEREON IS AS SHOWN ON A BOUNDARY SURVEY OF PART SECTIONS 24 & 25, T 44 S. R. 25 E. PERFORMED BY THE FIRM OF AGNOLI, BARBER BRUNDAGE, INC. AND DATED JUNE 22, 1990.

DATE: 9/30/1992

DRAWING NUMBER

OR2364 Pg 1426

7.6 – Revised Stormwater Calculations

February 25, 2002

Mr. Richard Thompson
South Florida Water Management District
2301 McGregor Blvd.
Fort Myers, FL 33901

**Subject: Lee County Solid Waste Energy Recovery Facility (PA90-30)
Construction Plans for Facility Expansion**

Dear Mr. Thompson,

The Lee County Solid Waste Division is proposing to expand the capacity of the above-referenced facility from 1,200 tons per day (tpd) to 1,800 tpd. The proposed expansion will add two buildings (to house a new boiler and the emissions control system) and one cooling tower in onsite areas previously developed for this purpose. Design drawings for this project have not been completed at this time, but the stormwater modeling was based on the maximum additional roof area that would be required for the project. Actual roof area will be less than or equal to the modeled parameters.

The proposed additional impermeable (roof and pavement) area totals 0.014 acres, and made de minimis changes (less than 0.5%) to the stormwater runoff volumes calculated for a 25-year, 72-hour storm event.

Per your previous discussions with Chris Tilman, submitted for your review please find the following information on the above referenced project:

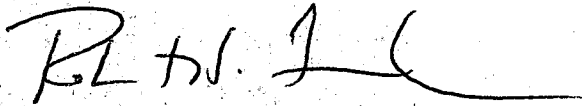
- Appendix 1: A conceptual plan for the proposed expansion.
- Appendix 2: An overall site plan, showing the basin and sub-basin boundaries used in the ADICPR stormwater model.
- Appendix 3: ADICPR model stormwater data for the site, including pre- and post-development stormwater flows, input data, and basin and link discharge data.

Mr. Richard Thompson
South Florida Water Management District
February 25, 2002
Page 2

If you have any questions or need any additional information, please contact me at
(941) 332-1300.

Sincerely,

MALCOLM PIRNIE, INC.

A handwritten signature in black ink, appearing to read "R.H. French", with a long horizontal flourish extending to the right.

Robert H. French, P.E.
Senior Engineer

Enclosures

Cc: Lindsey Sampson, P.E.
Mike Avoglia
David Cerrato
Sam Rosania

Appendix 1

Conceptual Site Plan

OVERSIZE
DOCUMENT WAS
REMOVED AND
INSERTED INTO
OCULUS
SEPARATELY.

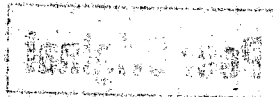
Appendix 2

Basin and Sub-Basin Boundaries

OVERSIZE
DOCUMENT WAS
REMOVED AND
INSERTED INTO
OCULUS
SEPARATELY.

Appendix 3

ADICPR Modeling Data



Pre-development 25-yr, 72-hr storm

***** Basin Results Summary - SIM2572 *****

Basin Name	Time Max (hrs)	Flow Max (cfs)	Runoff Volume (in)	Runoff Volume (cf)
PL1	60.02	5.54	8.97	40723
PL2	60.02	4.77	7.71	32184
PL3	60.02	2.74	7.71	18471
PL4	60.02	2.57	7.71	17351
E1	60.02	14.44	5.47	86701
E2	60.02	1.68	5.20	9995
E3	60.02	1.75	5.20	10372
E4	60.02	2.26	5.20	13389
E5	60.02	4.67	5.20	27722
E6	60.02	3.18	5.20	18858
E7	60.02	1.68	5.20	9995
E8	60.02	17.64	5.20	104663
A1	60.02	17.21	7.58	115300
W1	60.02	39.88	6.40	250542
W2	60.02	0.44	5.20	2640
W3	60.02	103.80	8.35	729973

Poor Original

IMAGE QUALITY

**AS YOU REVIEW THE NEXT GROUP OF IMAGES, PLEASE NOTE
THAT THE ORIGINAL DOCUMENTS WERE OF POOR QUALITY.**

Post-development 25-yr, 72-hr storm

***** Basin Results Summary - SIM2572 *****

Basin Name	Time Max (hrs)	Flow Max (cfs)	Runoff Volume (in)	Runoff Volume (cf)
PL1	60.02	5.54	8.97	40723
PL2	60.02	4.77	7.71	32184
PL3	60.02	2.74	7.71	18471
PL4	60.02	2.57	7.71	17351
E1	60.02	14.44	5.47	86701
E2	60.02	1.68	5.20	9995
E3	60.02	1.75	5.20	10372
E4	60.02	2.26	5.20	13389
E5	60.02	4.67	5.20	27722
E6	60.02	3.18	5.20	18858
E7	60.02	1.68	5.20	9995
E8	60.02	17.64	5.20	104663
A1	60.02	17.37	7.71	117261
W1	60.02	40.43	6.54	255726
W2	60.02	0.44	5.20	2640
W3	60.02	103.80	8.35	729973

Lee Co. WTE Expansion

***** Input Report *****

-----Class: Node-----

Name: ARCH Base Flow(cfs): 0 Init Stage(ft): 21.4
Group: BASE Warn Stage(ft): 24
Comment:

Stage(ft)	Area(ac)
21.4	0.9
22	0.9
24.2	2.5

-----Class: Node-----

Name: BNDRY Base Flow(cfs): 0 Init Stage(ft): 21
Group: BASE Warn Stage(ft): 21
Comment:

Time(hrs)	Stage(ft)
1	21
1000	21

-----Class: Node-----

Name: DP-E Base Flow(cfs): 0 Init Stage(ft): 21.4
Group: BASE Warn Stage(ft): 22
Comment:

Stage(ft)	Area(ac)
21.4	0.93
22	0.93
22.9	5.55
23.9	5.55

-----Class: Node-----

Name: DP-W Base Flow(cfs): 0 Init Stage(ft): 21.4
Group: BASE Warn Stage(ft): 22.5
Comment:

Stage(ft)	Area(ac)
21.4	3.53
22	3.53
22.7	8.5
23.9	10.1

-----Class: Node-----

Name: EC-1 Base Flow(cfs): 0 Init Stage(ft): 22.7
Group: BASE Warn Stage(ft): 23
Comment:

Stage(ft)	Area(ac)
22.7	0.172
22.9	0.53
23.9	0.53

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Lee Co. WTE Expansion

***** Input Report *****

-----Class: Node-----

Name: EC-2 Base Flow(cfs): 0 Init Stage(ft): 22.6
Group: BASE Warn Stage(ft): 23
Comment:

Stage(ft)	Area(ac)
22.6	0.172
22.9	0.55
23.9	0.55

-----Class: Node-----

Name: EC-3 Base Flow(cfs): 0 Init Stage(ft): 22.5
Group: BASE Warn Stage(ft): 23
Comment:

Stage(ft)	Area(ac)
22.5	0.172
22.9	0.71
23.9	0.71

-----Class: Node-----

Name: EC-4 Base Flow(cfs): 0 Init Stage(ft): 22.4
Group: BASE Warn Stage(ft): 23
Comment:

Stage(ft)	Area(ac)
22.4	0.172
22.9	1.47
23.9	1.47

-----Class: Node-----

Name: EC-5 Base Flow(cfs): 0 Init Stage(ft): 22.3
Group: BASE Warn Stage(ft): 23
Comment:

Stage(ft)	Area(ac)
22.3	0.178
22.9	1
23.9	1

-----Class: Node-----

Name: EC-6 Base Flow(cfs): 0 Init Stage(ft): 22.2
Group: BASE Warn Stage(ft): 23
Comment:

Stage(ft)	Area(ac)
22.2	0.172
22.9	0.53
23.9	0.53

Lee Co. WTE Expansion

***** Input Report *****

-----Class: Node-----

Name: P1 Base Flow(cfs): 0 Init Stage(ft): 21.9
Group: BASE Warn Stage(ft): 24
Comment:

Stage(ft)	Area(ac)
21.9	0.25
22	0.5
23	0.5
24	0.5

-----Class: Node-----

Name: P2 Base Flow(cfs): 0 Init Stage(ft): 21.8
Group: BASE Warn Stage(ft): 24
Comment:

Stage(ft)	Area(ac)
21.8	0.25
24	1.15

-----Class: Node-----

Name: P3 Base Flow(cfs): 0 Init Stage(ft): 21.7
Group: BASE Warn Stage(ft): 24
Comment:

Stage(ft)	Area(ac)
21.7	0.25
24	0.66

-----Class: Node-----

Name: P4 Base Flow(cfs): 0 Init Stage(ft): 21.6
Group: BASE Warn Stage(ft): 24
Comment:

Stage(ft)	Area(ac)
21.6	0.25
24	0.62

-----Class: Node-----

Name: RP-E Base Flow(cfs): 0 Init Stage(ft): 21.4
Group: BASE Warn Stage(ft): 22
Comment:

Stage(ft)	Area(ac)
21.4	0.74
22	0.74
22.9	3.6
24	3.6

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***** Input Report *****

-----Class: Node-----

Name: RP-W Base Flow(cfs): 0 Init Stage(ft): 21.4
 Group: BASE Warn Stage(ft): 22
 Comment:

Stage(ft)	Area(ac)
21.4	1.58
22	1.58
22.7	5.5
24	5.5

-----Class: Node-----

Name: WC-1 Base Flow(cfs): 0 Init Stage(ft): 22.4
 Group: BASE Warn Stage(ft): 22.7
 Comment:

Stage(ft)	Area(ac)
22.4	0.14
22.7	0.14
23.9	0.14

-----Class: Pipe-----

Name: SET1 From Node: P4 Length(ft): 60
 Group: BASE To Node: DP-E Count: 2

UPSTREAM		DOWNSTREAM		Equation: Average K
Geometry: Circular		Circular		Flow: Positive
Span(in): 12		12		Entrance Loss Coef: 0
Rise(in): 12		12		Exit Loss Coef: 0
Invert(ft): 21.6		21.5		Bend Loss Coef: 0
Manning's N: 0.13		0.13		Outlet Cntrl Spec: Use dc or
Top Clip(in): 0		0		Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0		0		Stabilizer Option: None

Upstream FHWA Inlet Edge Description:

Circular Concrete: Square edge w/ headwall	1	1
--	---	---

Downstream FHWA Inlet Edge Description:

Circular Concrete: Square edge w/ headwall	1	1
--	---	---

Lee Co. WTE Expansion

***** Input Report *****

-----Class: Pipe-----

Name: SET2	From Node: ARCH	Length(ft): 60
Group: BASE	To Node: DP-W	Count: 2
UPSTREAM	DOWNSTREAM	Equation: Average
Geometry: Circular	Circular	Flow: Positive
Span(in): 12	12	Entrance Loss Coef: 0
Rise(in): 12	12	Exit Loss Coef: 0
Invert(ft): 21.6	21.5	Bend Loss Coef: 0
Manning's N: 0.13	0.13	Outlet Cntrl Spec: Use dc or
Top Clip(in): 0	0	Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0	0	Stabilizer Option: None

Upstream FHWA Inlet Edge Description:

Circular Concrete: Square edge w/ headwall 1 1

Downstream FHWA Inlet Edge Description:

Circular Concrete: Square edge w/ headwall 1 1

-----Class: Pipe-----

Name: SET3	From Node: DP-W	Length(ft): 80
Group: BASE	To Node: DP-E	Count: 2
UPSTREAM	DOWNSTREAM	Equation: Average K
Geometry: Circular	Circular	Flow: Positive
Span(in): 12	12	Entrance Loss Coef: 0
Rise(in): 12	12	Exit Loss Coef: 0
Invert(ft): 18	17.5	Bend Loss Coef: 0
Manning's N: 0.13	0.13	Outlet Cntrl Spec: Use dc or
Top Clip(in): 0	0	Inlet Cntrl Spec: Use dn
Bottom Clip(in): 0	0	Stabilizer Option: None

Upstream FHWA Inlet Edge Description:

Circular Concrete: Square edge w/ headwall 1 1

Downstream FHWA Inlet Edge Description:

Circular Concrete: Square edge w/ headwall 1 1

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***** Input Report *****

-----Class: Weir-----

Name: ORIFICE

From Node: DP-E

Group: BASE

To Node: BNDRY

Count: 1

Type: Fread Flow: Positive Geometry: Circular

Span(in): 6

Rise(in): 6

Invert(ft): 21.4

Control Elev(ft): 21.4

TABLE

Bottom Clip(in): 0

Top Clip(in): 0

Weir Discharge Coef: 3.13

Orifice Discharge Coef: 0.6

-----Class: Weir-----

Name: RP-1

From Node: RP-W

Group: BASE

To Node: RP-E

Count: 1

Type: Fread Flow: Both Geometry: Trapezoidal

Bottom Width(ft): 200

Left Side Slope(h/v): 3

Right Side Slope(h/v): 3

Invert(ft): 22

Control Elev(ft): 22

StructOpeningDim(ft): 9999

TABLE

Bottom Clip(ft): 0

Top Clip(ft): 0

Weir Discharge Coef: 3.13

Orifice Discharge Coef: 0.6

Lee Co. WTE Expansion

***** Input Report *****

-----Class: Weir-----

Name: RP-2

From Node: RP-W

Group: BASE

To Node: WC-1

Count: 1

Type: Fread Flow: Positive Geometry: Trapezoidal

Bottom Width(ft): 10

Left Side Slope(h/v): 3

Right Side Slope(h/v): 3

Invert(ft): 22.7

Control Elev(ft): 22.7

StructOpeningDim(ft): 9999

TABLE

Bottom Clip(ft): 0

Top Clip(ft): 0

Weir Discharge Coef: 3.13

Orifice Discharge Coef: 0.6

-----Class: Weir-----

Name: RP-3

From Node: RP-E

Group: BASE

To Node: EC-1

Count: 1

Type: Fread Flow: Positive Geometry: Trapezoidal

Bottom Width(ft): 50

Left Side Slope(h/v): 3

Right Side Slope(h/v): 3

Invert(ft): 22.9

Control Elev(ft): 22.9

StructOpeningDim(ft): 9999

TABLE

Bottom Clip(ft): 0

Top Clip(ft): 0

Weir Discharge Coef: 3.13

Orifice Discharge Coef: 0.6

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Lee Co. WTE Expansion

***** Input Report *****

-----Class: Weir-----

Name: WEIR

From Node: DP-E

Group: BASE

To Node: BNDRY

Count: 1

Type: Fread Flow: Positive Geometry: Rectangular

Span(in): 36

Rise(in): 7

Invert(ft): 24.1

Control Elev(ft): 24.1

TABLE

Bottom Clip(in): 0

Top Clip(in): 0

Weir Discharge Coef: 3.13

Orifice Discharge Coef: 0.6

-----Class: Simulation-----

C:\ICPR2\LEEWTE\SIM2572

Execution: Both

Header: Post-development 25-yr, 72-hr storm

-----HYDRAULICS-----

Max Delta Z (ft): 1

Delta Z Factor: 0.05

Time Step Optimizer: 10

Drop Structure Optimizer: 0

Sim Start Time(hrs): 0

Sim End Time(hrs): 336

Min Calc Time(sec): 1

Max Calc Time(sec): 31

To Hour: PInc(min):

336 15

-----HYDROLOGY-----

Override Defaults: No

To Hour: PInc(min):

336 15

-----GROUP SELECTIONS-----

+ BASE [01/29/02]

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Lee Co. WTE Expansion

***** Input Report *****

-----Class: Weir-----

Name: WEIR

From Node: DP-E

Group: BASE

To Node: BNDRY

Count: 1

Type: Fread Flow: Positive Geometry: Rectangular

Span(in): 36

Rise(in): 7

Invert(ft): 24.1

Control Elev(ft): 24.1

TABLE

Bottom Clip(in): 0

Top Clip(in): 0

Weir Discharge Coef: 3.13

Orifice Discharge Coef: 0.6

-----Class: Simulation-----

C:\ICPR2\LEEWTE\SIM2572

Execution: Both

Header: Post-development 25-yr, 72-hr storm

-----HYDRAULICS-----

Max Delta Z (ft): 1

Delta Z Factor: 0.05

Time Step Optimizer: 10

Drop Structure Optimizer: 0

Sim Start Time(hrs): 0

Sim End Time(hrs): 336

Min Calc Time(sec): 1

Max Calc Time(sec): 31

To Hour: PInc(min):

336 15

-----HYDROLOGY-----

Override Defaults: No

To Hour: PInc(min):

336 15

-----GROUP SELECTIONS-----

+ BASE [01/29/02]

Post-development 25-yr, 72-hr storm

***** Node Maximum Conditions - SIM2572 *****

(Time units - hours)

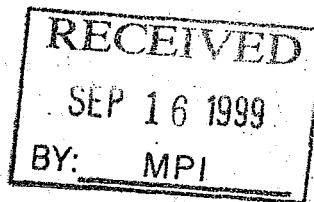
Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Ar
ARCH	BASE	73.00	23.49	24.00	0.0084	8
BNDRY	BASE	0.00	21.00	21.00	0.0000	
DP-E	BASE	77.17	22.85	22.00	0.0042	23
DP-W	BASE	72.31	23.66	22.50	0.0083	42
EC-1	BASE	60.89	23.01	23.00	0.0018	2
EC-2	BASE	62.09	22.92	23.00	0.0018	3
EC-3	BASE	62.32	22.88	23.00	0.0022	3
EC-4	BASE	77.92	22.85	23.00	0.0025	6
EC-5	BASE	77.65	22.85	23.00	0.0026	4
EC-6	BASE	77.38	22.85	23.00	0.0024	2
P1	BASE	72.17	22.89	24.00	0.0064	2
P2	BASE	72.18	22.89	24.00	0.0055	3
P3	BASE	72.18	22.89	24.00	0.0049	2
P4	BASE	72.19	22.89	24.00	0.0048	2
RP-E	BASE	72.44	22.99	22.00	0.0056	156
RP-W	BASE	72.44	22.99	22.00	0.0056	240
WC-1	BASE	73.03	22.99	22.70	0.0027	6

Post-development 25-yr, 72-hr storm

***** Link Maximum Conditions - SIM2572 *****

(Time units - hours)						
Link Name	Group Name	Max Time Flow	Max Flow (cfs)	Max Delta Q (cfs)	Max Time U/S Stage	Ma
E-1	BASE	60.93	0.31	0.03	60.89	
E-2	BASE	61.74	0.41	-0.01	62.09	
E-3	BASE	62.51	0.57	-0.01	62.32	
E-4	BASE	61.39	0.95	0.01	77.92	
E-5	BASE	61.08	1.17	0.01	77.65	
E-6	BASE	61.49	1.07	0.01	77.38	
ORIFICE	BASE	77.17	1.03	0.00	77.17	
P-1	BASE	60.41	1.13	-0.03	72.17	
P-2	BASE	60.46	1.19	0.02	72.18	
P-3	BASE	60.59	0.72	-0.04	72.18	
RP-1	BASE	60.00	4.59	-1.75	72.44	
RP-2	BASE	60.89	0.44	-0.05	72.44	
RP-3	BASE	72.00	0.29	0.05	72.44	
SET1	BASE	61.47	0.33	0.00	72.19	
SET2	BASE	118.56	0.11	0.00	73.00	
SET3	BASE	72.18	0.72	-0.00	72.31	
WEIR	BASE	0.00	0.00	0.00	77.17	
WEST	BASE	60.72	0.07	0.03	72.44	

7.7 – Groundwater and Surface Water Monitoring Plan



MVDH

**LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY
GROUND WATER AND SURFACE WATER MONITORING PLAN**

**Power Plant Siting Act Permit Application PA 90-30
Lee County, Florida**

August, 1992
Project 1971-011-130

**MALCOLM
PIRNIE**

ENVIRONMENTAL ENGINEERS, SCIENTISTS & PLANNERS

TABLE OF CONTENTS

	Page
1.0 INTRODUCTION	1-1
2.0 HYDROGEOLOGY	2-1
2.1 Regional Aquifer System	2-1
2.1.1 Surficial Aquifer System	2-1
2.1.2 Intermediate Aquifer System	2-2
2.1.3 Floridan Aquifer System	2-3
2.2 Site Specific Hydrogeology	2-3
3.0 MONITORING PLAN REQUIREMENTS	3-1
3.1 Hydrogeologic, Physical and Chemical Data	3-1
3.1.1 Direction and Rate of Ground Water Flow in Water Table Aquifer	3-1
3.1.2 Direction and Rate of Ground Water Flow in Sandstone Aquifer	3-2
3.1.3 Background Water Quality	3-3
3.1.4 Porosity, Horizontal and Vertical Hydraulic Conductivity of Aquifer	3-3
3.1.5 Depth to, and Lithology of, the Uppermost Confining Bed	3-4
3.1.6 Vertical Hydraulic Conductivity, Thickness and Extent of the Confining Unit	3-4
3.1.7 Topography	3-4
3.1.8 Soil Information	3-4
3.1.9 Surface Water Drainage System	3-5
3.2 Waste Disposal Rate and Frequency, Chemical Composition, Method of Discharge, Pond Volume, Spray-Field Dimension, or Other Applicable Site Specific Information	3-6
3.3 Toxicity of Waste	3-7
3.4 Present and Anticipated Wastewater Value, Seepage Rate to the Receiving Ground Water; Physical, Chemical, Microbiological (Whichever is applicable) Characteristics of the Leachate	3-8
3.5 Disposal System Water Balance	3-8
3.6 Present and Reasonable Expected Future Pollution Sources Located Within One Mile Radius of the Site	3-9

TABLE OF CONTENTS (Continued)

	Page
3.7	Inventory Depth, Construction Details, and Cones of Depression of Water Levels and Monitor Wells Located Within One Mile Radius of the Site
	3-9
3.7.1	Location of Monitor Wells Within One Mile
	3-10
3.7.2	Location of On-Site Monitor Wells
	3-10
3.7.3	On-Site Monitor Well Construction
	3-10
3.8	Site Specific Economic and Feasibility Considerations
	3-11
3.9	Chronological Information on Water Levels in the Monitor Wells and Water Quality Data on Water Supplies Collected From the Water Supply and Monitor Wells
	3-12
3.10	Type and Number of Waste Disposal Facilities Within the Installation
	3-12
3.11	Chronological Information of Surface Water Flows and Water Quality Upstream and Downstream From the Site
	3-12
3.12	Construction and Operation Details of Disposal Facilities
	3-13
3.13	History of Construction and Land Development in the Vicinity of the Site
	3-13
4.0	GROUND WATER MONITORING
	4-1
4.1	Monitoring Well Locations
	4-1
4.2	Aquifer Classifications
	4-1
4.3	Applicable Criteria and Standards
	4-2
4.4	Sampling and Reporting Procedures
	4-2
5.0	SURFACE WATER MONITORING
	5-1
5.1	Surface Water Sampling Locations
	5-1
5.2	Surface Water Classification
	5-1
5.3	Applicable Criteria
	5-1
5.4	Sampling and Reporting Procedures
	5-1

TABLE OF CONTENTS (Continued)
LIST OF TABLES

Table No.	Description	Following Page
1	Summary of Soil Borings	2-4
4-1	Proposed Annual Water Quality Parameters for Ground Water Monitor Wells	4-2
5-1	Monitor Type and Schedule/Parameters	5-2

LIST OF FIGURES

Figure No.	Description	Following Page
1	Site Location Map	1-1
2	Generalized Geologic Stratigraphy	2-1
3	Water Table Aquifer Water Level (Ft-NGVD) Wet Season	3-1
4	Water Table Aquifer Water Level (Ft-NGVD) Dry Season	3-1
5	Water Level (Ft-NGVD) Wet Season	3-2
6	Water Level (Ft-NGVD) Dry Season	3-2
7	Existing and Abandoned Landfills	3-9
8	Permitted Wells Within A Five Mile Radius	3-9
9	Monitor Wells at Inactive Landfill	3-10
10	Typical Construction Detail of Shallow Monitoring Well	3-11
11	Typical Construction Detail of Intermediate or Deep Monitor Well	3-11
12	Abutting Properties	3-13
13	Proposed On-Site Monitoring Locations	4-1

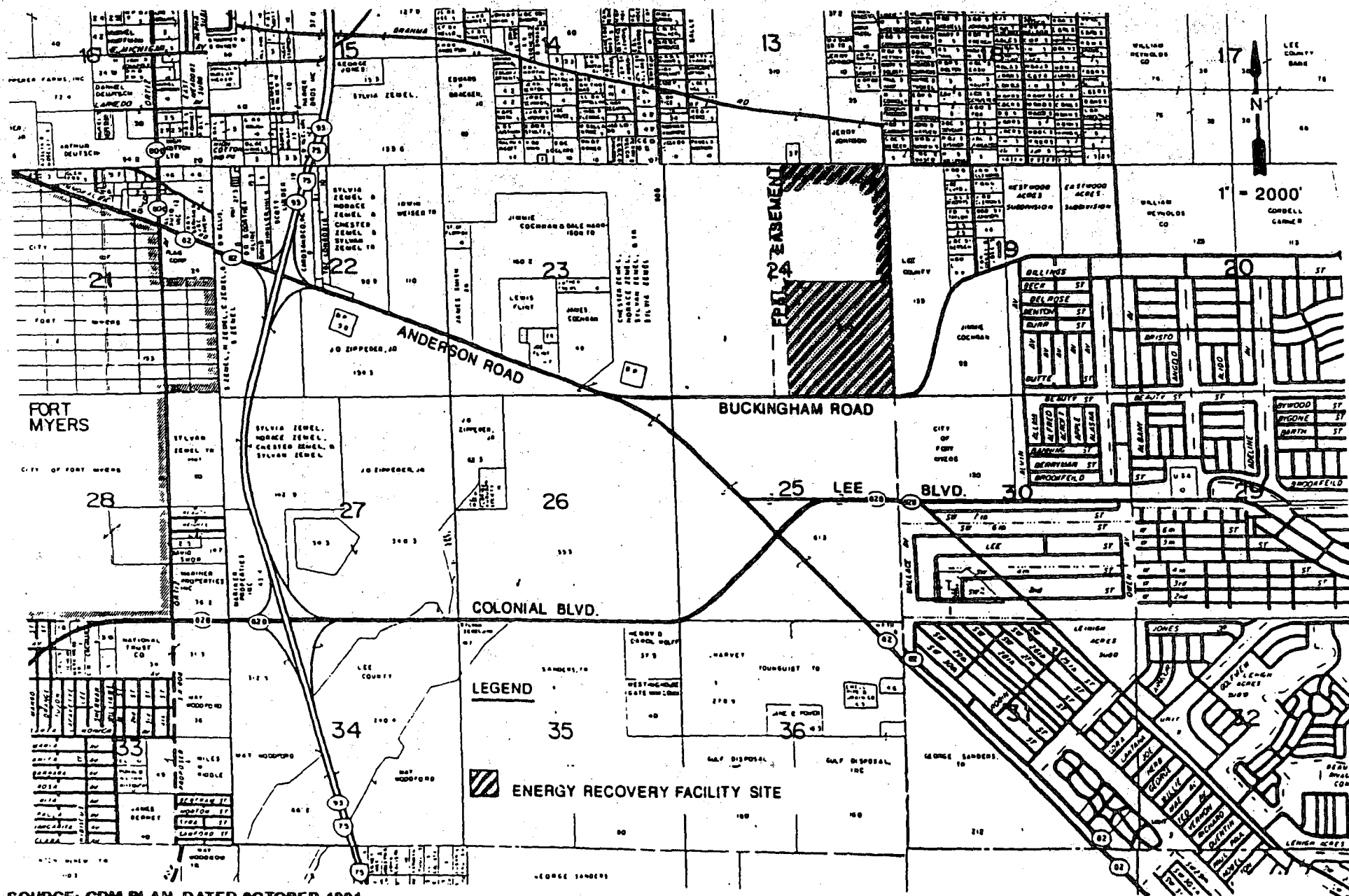
1.0 INTRODUCTION

Lee County Board of County Commissioners is seeking authorization to construct and operate a Solid Waste Energy Recovery Facility (SWERF) on a 155 acre site located in central Lee County, Florida. The location of the planned site is illustrated in Figure 1. The property is located north of Buckingham Road, approximately 2.5 miles east of the intersection of I-75 and State Road 82.

This document is an expansion of the Ground Water and Surface Water Monitoring Plan previously prepared by Camp Dresser & McKee, Inc. (CDM) dated October 4, 1991 and is incorporated by reference. This document also incorporates the Conditions of Certification (Case No. PA 90-30) issued to the facility by the Florida Department of Environmental Regulation (FDER).

Section 2 of this document provides a summary description of the geology and hydrogeology of the area as originally reported in the CDM Plan. Section 3 provides responses to the regulatory requirements for the contents of a ground water monitoring plan at a solid waste facility to meet the requirements contained in Section 17-28.700(d) 1-13 F.A.C. Section 3 of this document references the entire Section 3 of the CDM Plan, as no changes were made to this section. Section 4 describes the proposed ground water monitoring requirements and sampling procedures and Section 5 describes the proposed surface water monitoring requirements and sampling procedures for the SWERF.

As stated in the CDM Plan, a limited surface water monitoring plan will be required for areas surrounding the SWERF. The storm water management system will discharge into an on-site detention pond that will discharge to wetland areas outside the SWERF boundary. Active portions of the facility, including storage areas for solid waste and ash, will be enclosed and will not be exposed to storm water runoff.



2.0 HYDROGEOLOGY

The following is a summary description of the regional and site-specific hydrogeology as originally reported in the October 4, 1991 CDM Plan. Specific references noted in this section can be found in the CDM Plan.

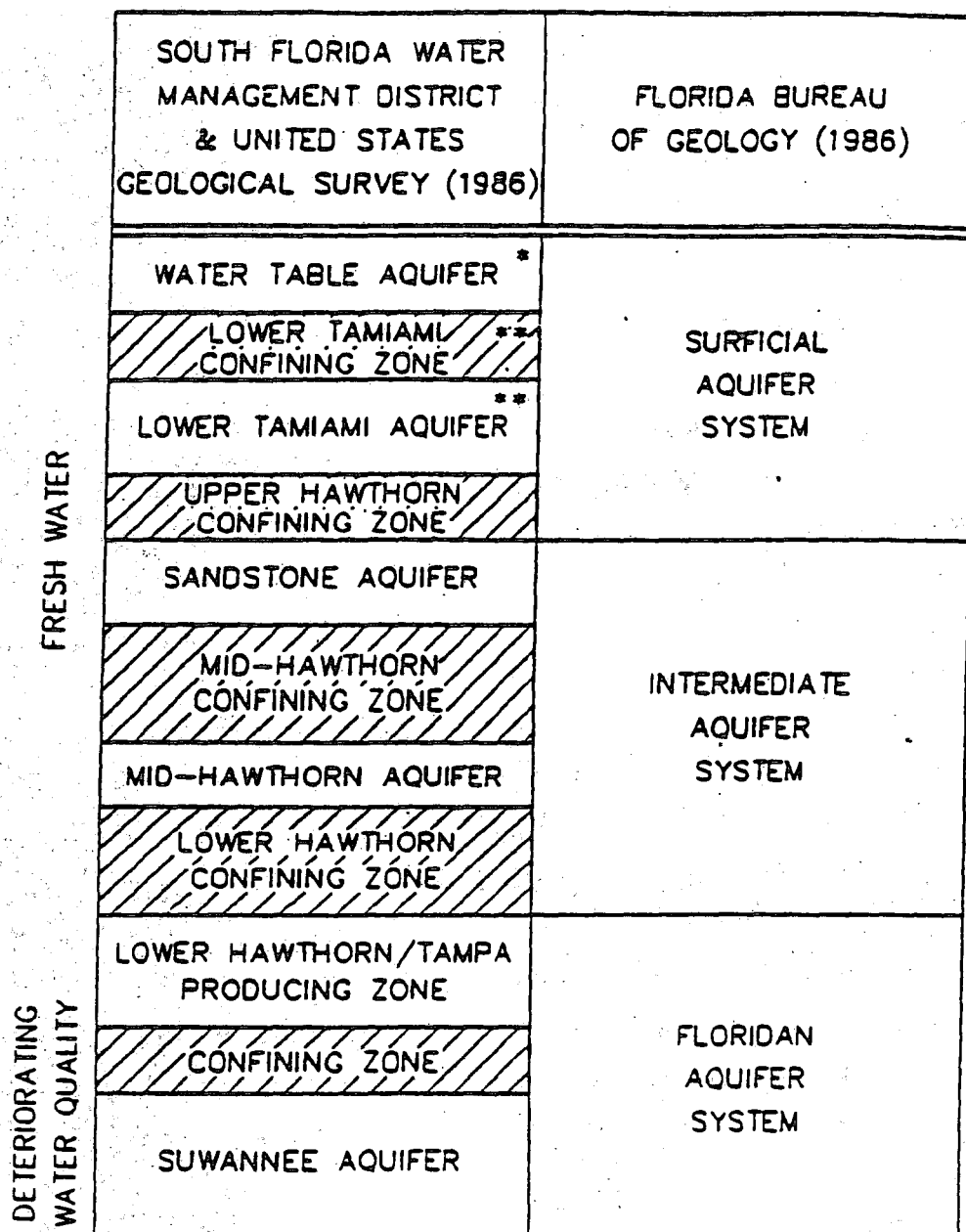
2.1 Regional Aquifer Systems

The geologic deposits in the Lee County region contain three major aquifer systems separated by low permeability confining units. These major aquifer systems, the surficial, intermediate and Floridan, are depicted in Figure 2. The hydrogeology of this region is characterized by layered, nonuniform series of aquifers and confining units created in erosional and depositional environments associated with fluctuating sea levels.

2.1.1 Surficial Aquifer System

The surficial aquifer system is composed of the water table aquifer and, in the southern part of the Lee County, the lower Tamiami aquifer. The leaky Tamiami confining bed is not present in the area of the planned SWERF site. In this area the lower Tamiami aquifer becomes unconfined and is therefore considered part of the water table aquifer. In general, the water table and lower Tamiami aquifers, and the intervening lower Tamiami confining zone, consist of unconsolidated sands, sandstones, shell beds, and limestones, of the undifferentiated Quaternary Age surficial deposits and the Tertiary Age Tamiami formation.

Recharge to the surficial aquifer system in Lee County comes from four principal sources: 1) direct infiltration of precipitation, 2) inflow from surface water bodies, 3) subsurface flow from adjacent areas, and 4) upward leakage from semi-confined aquifers. Direct infiltration from precipitation is the major source of recharge to the aquifer. Surface water bodies (rivers, canals, lakes, and rock quarries) may act as recharge sources when their water levels exceed the ground water levels. The generally high ground water levels compared to the elevation of surface water bodies suggest that the ground water may recharge surface water bodies (Wedderburn et al., 1982).



- * INCLUDES LOWER TAMIAMI AQUIFER NORTH OF BONITA SPRINGS AREA
 ** ONLY PRESENT IN BONITA SPRINGS AREA

NOT TO SCALE

SOURCE: CDM, 1987

SOURCE: CDM PLAN, DATED OCTOBER 1991

**MALCOLM
PIRNIE**

LEE COUNTY - FORT MYERS, FLORIDA
 ENERGY RECOVERY FACILITY

MALCOLM PIRNIE, INC

GENERALIZED GEOLOGIC STRATIGRAPHY

FIGURE 2

2.1.2 Intermediate Aquifer System

The intermediate aquifer system underlies the surficial aquifer system across the entire County and acts as a regional confining sequence for the deeper Floridan aquifer system (Knapp et al., 1986). This aquifer system is composed predominantly of low permeability clays, dolosilts, limestones, and mixtures of these lithologies. The intermediate aquifer system is capped by an areally extensive zone of very low permeability greenish-gray phosphatic, clayey dolosilts and is termed the Upper Hawthorn confining unit. The first appearance of the greenish-gray phosphatic clayey dolosilts is recognized as the top of the Hawthorn formation in Lee County.

The intermediate aquifer system can be subdivided into two aquifers (the sandstone and mid-Hawthorn) separated by the semi-confining mid-Hawthorn zone. The sandstone aquifer underlies the Upper Hawthorn confining zone in nearly all of Lee County but pinches out in the northwestern part of the County (See Figure 2). Although the term "sandstone" has been applied to the aquifer, in reality this aquifer is composed of two distinct lithofacies: a clastic (sandstone) and a subordinate carbonate (limestone), which are confined above and below by clayey dolosilts.

Major recharge to the sandstone aquifer comes from downward leakage from the surficial aquifer system. A hydraulic connection appears to exist between the surficial aquifer system and the sandstone aquifer based on the similar hydrograph shapes in adjacent wells in both aquifers (Bogges and Watkins, 1986). The underlying mid-Hawthorn aquifer has higher potentiometric levels than the sandstone aquifer, but upward leakage is considered minimal due to the better confining properties of the mid-Hawthorn confining zone overlying the mid-Hawthorn aquifer (Waterborne et al., 1982).

The mid-Hawthorn confining zone underlies the sandstone aquifer in Lee County and is composed of a relatively thick sequence of clayey dolosilts locally interbedded with thin seams of porous limestone, dolostone, and sand. The unit effectively separates the mid-Hawthorn aquifer from overlying hydrostratigraphic units. The mid-Hawthorn aquifer lies below this confining zone and is present throughout the County. Lithologically the unit consists of sandy and phosphatic limestones and dolostones which exhibit intergranular, moldic, and possible fracture and solution porosity. Over most of the County, the potentiometric surface of the mid-Hawthorn aquifer is above land surface, creating flowing artesian conditions in wells which penetrate it.

The lower Hawthorn confining zone lies below the mid-Hawthorn aquifer, and consists of sandy, phosphatic, poorly indurated limestones interbedded with phosphatic dolosilts. The low permeability of this unit results from the fine-grained nature of the rocks, although localized zones of high permeability limestones, dolostones, and sandstones do occur.

2.1.3 Floridan Aquifer System

The Floridan aquifer system lies hydrostratigraphically below the intermediate aquifer system. In the upper portions of the aquifer system in Lee County the Floridan aquifer system can be subdivided into the lower Hawthorn/Tampa producing zone and the Suwannee aquifer.

Water quality in the lower Hawthorn/Tampa producing zone is brackish to saline. Most of the recharge to the lower Hawthorn/Tampa producing zone originates from outside Lee County, probably in the Polk County highlands and adjacent areas where the aquifer crops out at higher elevations. Beds of low permeability micrites are present at the base of the lower Hawthorn/Tampa producing zone which separates this zone from the underlying Suwannee aquifer.

The Suwannee aquifer occurs within the interbedded poorly indurated micrites, phosphatic dolosilts, sands, and sandstones of the Suwannee Limestone (Oligocene). The Suwannee aquifer contains nonpotable water throughout all of Lee County. From the top of the lower Hawthorn/Tampa producing zone, water quality usually deteriorates with depth into the Suwannee and deeper aquifers.

2.2 SITE SPECIFIC HYDROGEOLOGY

A geotechnical firm, Mortensen Engineering, Inc. of Tampa, Florida, conducted a site-specific investigation of the planned SWERF during April 1990. The scope of work for this geotechnical subconsultant included installation of five standard penetration test (SPT) borings to a depth of 80 feet (done between April 4 to 6, 1990), classification of soils, and laboratory measurement of amounts of fine particles in selected samples. The geotechnical report that presents the field work results and findings is included in Appendix A of the CDM Plan. The following paragraphs summarize some of the findings as reported in the CDM Plan.

Boring logs from five borings installed on-site are included as Plates 2, 3 and 4 in Appendix A of the CDM Plan. The borings were sited in locations to provide geotechnical information about soil conditions of the planned facility structures. The boring logs demonstrate consistency in the site geology, but it should be noted that all five borings were constructed in a small area of about 250 feet north to south, and about 500 feet east to west. All of the borings encountered the same soil or rock formations at similar depths. The geotechnical subconsultant summarized the site stratigraphy which is presented in Table 1. The sands, sandy silt, and clayey silt of the upper three strata make up the soils of the uppermost water table (or surficial) aquifer. The so-called caprock in stratum 2 may encourage infiltrating water to perch above that strata but it is part of the uppermost aquifer. The silty clayey soil of stratum 4 comprises the confining unit (aquitard) between the water table aquifer and the underlying sandstone aquifer (stratum 7). Stratum 4 is not illustrated on the boring log for boring B-3 but is possibly present between the 15 and 25 foot sampling depths. The confining unit is part of the upper Hawthorn formation. Strata 5 and 6 are transitional soils between the confining unit and the sandstone aquifer. The upper portion of the strata may behave hydraulically as part of the confining unit. Although they are composed of silts and silty clays, the lower portion of the strata may behave hydraulically as part of the underlying sandstone aquifer (personal communication, R. Mortensen, Mortensen Engineering, Inc., May 2, 1990).

The water table was approximately 2 1/2 to 4 feet below ground surface during this geotechnical field investigation. After completion of the borings, each was grouted to ground surface with Portland cement.

TABLE 1			
SUMMARY OF SOIL BORINGS			
Approximate Depth	Stratum Number	Material Description	Material Relative Density or Consistency
0 to 3 feet	1	Fine SAND to slightly silty fine SAND	Loose
3 to 6 1/2 feet	2	Clayey/calcareous SAND and limestone fragments (CAPROCK)	Medium-dense
6 1/2 to 20 feet	3	Sandy/clayey SILT, with limestone fragments (MARL)	Soft
20 to 25 feet	4	Silty CLAY	Soft/Firm
25 to 67 feet	5/6	Silty to slightly clayey fine SAND with trace phosphates	Very loose to loose (limited medium-dense)
67 to 80 feet	7	Weathered SANDSTONE	Medium - Dense (limited dense)

3.0 MONITORING PLAN REQUIREMENTS

The information in this section was provided in the CDM Plan in response to the requirements of Section 17-28.700(6)(d), Items 1 to 13 F.A.C. The following is a brief summary of the sections and the findings as presented in the CDM Plan. Specific references noted in this section can be found in the CDM Plan.

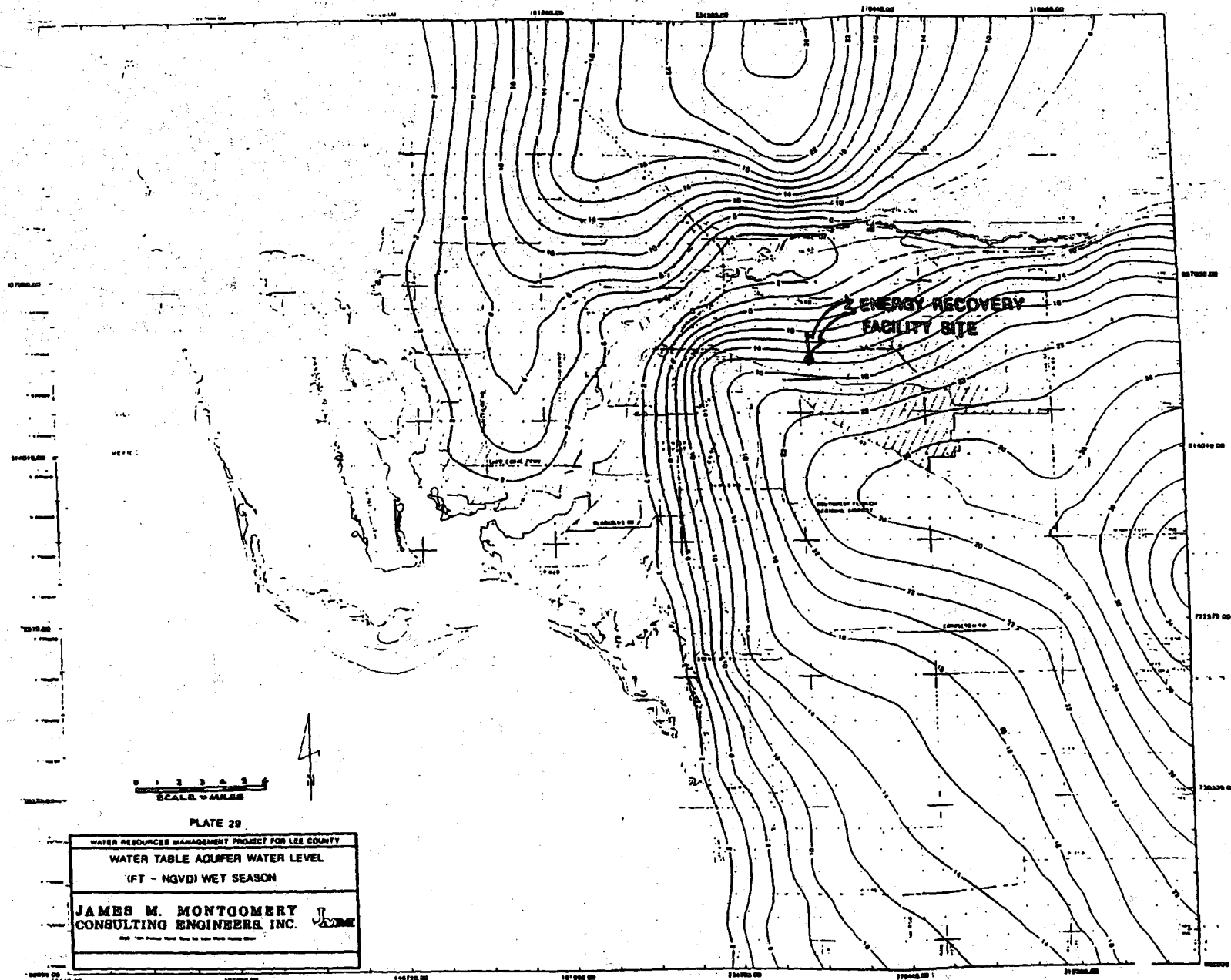
3.1 HYDROGEOLOGIC, PHYSICAL AND CHEMICAL DATA

3.1.1 Direction and Rate of Ground Water Flow in Water Table Aquifer

The uppermost aquifer at the site is the water table aquifer. It is the aquifer that will receive primary interest in meeting the regulatory requirements and evaluating impacts of the site SWERF.

The near surface hydrogeology is characterized by a close interrelationship between surface water and ground water in the water table aquifer. The wetlands on-site are formed by overland flow of surface water in sloughs during rainy periods, and by ground water discharge when the water table elevation is higher than the ground surface elevation in the wetlands. The seasonal ground water elevations may vary on the order of three feet (USDA, 1984). The Lee County Water Resources Management Project included maps of the dry and wet season water elevations for major aquifers. Figures 3 and 4 show the water level elevations for the water table aquifer in the wet and dry seasons, respectively. A comparison of the two figures indicates that the difference between the wet and dry season water level elevations near the planned SWERF is about two feet (from about 16 feet NGVD during the wet season to 14 feet NGVD during the dry season). The figures also clearly show the regional ground water flow gradient at the site is northward toward the Caloosahatchee River. The hydraulic gradient in the vicinity of the site is about 0.001 feet/foot.

The hydraulic transmissivity of the water table aquifer may be about 80,000 gallons per day/foot (gpd/foot) (JMM, 1988) which, for a 20 to 30 foot thick aquifer, equates to a value of hydraulic conductivity of about 400 to 550 feet/day. The SWERF site lies within an area where the hydraulic conductivity of the water table aquifer was estimated to be about 900 feet/day in a County-wide modeling study (CDM, 1987).



SOURCE: CDM PLAN, DATED OCTOBER 1991

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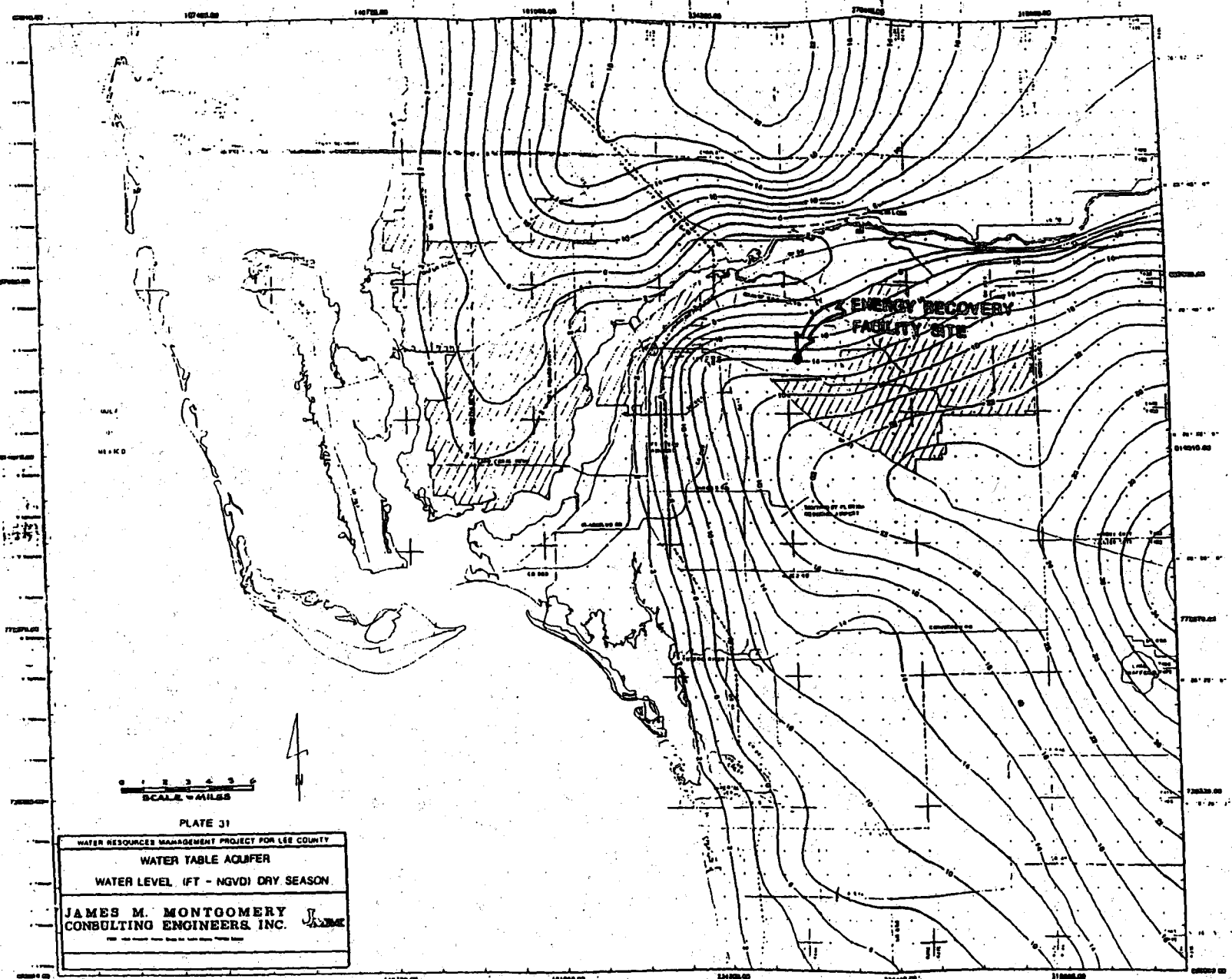
LEE COUNTY - FORT MYERS, FLORIDA

ENERGY RECOVERY FACILITY

WATER TABLE AQUIFER WATER LEVEL (FT-NGVD) WET SEASON

MALCOLM PIRNIE, INC.

FIGURE 3



SOURCE: CDM PLAN, DATED OCTOBER 1991

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LEE COUNTY - FORT MYERS, FLORIDA
ENERGY RECOVERY FACILITY
WATER TABLE AQUIFER WATER LEVEL (FT-NGVD) DRY SEASON

MALCOLM PIRNIE, INC.

FIGURE 4

By substituting the ranges of values for hydraulic conductivity, hydraulic gradient, and effective porosity into the equation for ground water flow, the ground water flow rates in the water table aquifer range from 1.0×10^{-3} cm/sec (2.85 feet/day) to 2.6×10^{-3} cm/sec (7.5 feet/day).

3.1.2 Direction and Rate of Ground Water Flow in Sandstone Aquifer

The sandstone aquifer is a confined aquifer. It is recharged from the overlying water table aquifer and from upgradient areas within the formation. Figures 5 and 6 depict the ground water potentiometric surface of the sandstone aquifer during the wet and dry seasons. The ground water potentiometric head in the sandstone aquifer below the site ranges from about 18.5 feet NGVD during the wet season to 14.5 feet NGVD during the dry season (JMM, 1988). These elevations are slightly higher than the water table elevations (2.5 feet and 0.5 feet) which indicates there is an upward hydraulic flow gradient through the Upper Hawthorn confining unit during the wet season and maybe during the dry season also.

The ground water flow direction in the sandstone aquifer below the site is generally to the north-northwest (JMM, 1988). The hydraulic gradient in the vicinity ranges from about 0.0002 to 0.0003 feet/foot during the dry season to 0.0002 feet/foot during the wet season.

The thickness of the sandstone aquifer in the vicinity of the proposed site is between 25 and 50 feet (SFWMD, 1982), or between 40 and 60 feet (JMM, 1988). For estimation purposes, it would be reasonable to assume that the average thickness of the sandstone aquifer is 50 feet at the site.

The hydraulic transmissivity of the sandstone aquifer is about 10,000 gpd/feet (JMM, 1988) which, for a 50 foot thick aquifer, equates to a value of hydraulic conductivity of about 30 feet/day. The planned SWERF lies in an area where the hydraulic conductivity of the sandstone aquifer was estimated to be about 50 feet/day in a country-wide modeling study (CDM, 1987). The coefficient of storativity ranges between 0.00024 to 0.00036 (unitless) (JMM, 1988). Another value for aquifer transmissivity within four miles south of the site area has been given as 20,000 gpd/feet (Westinghouse Gateway Communities, 1984).

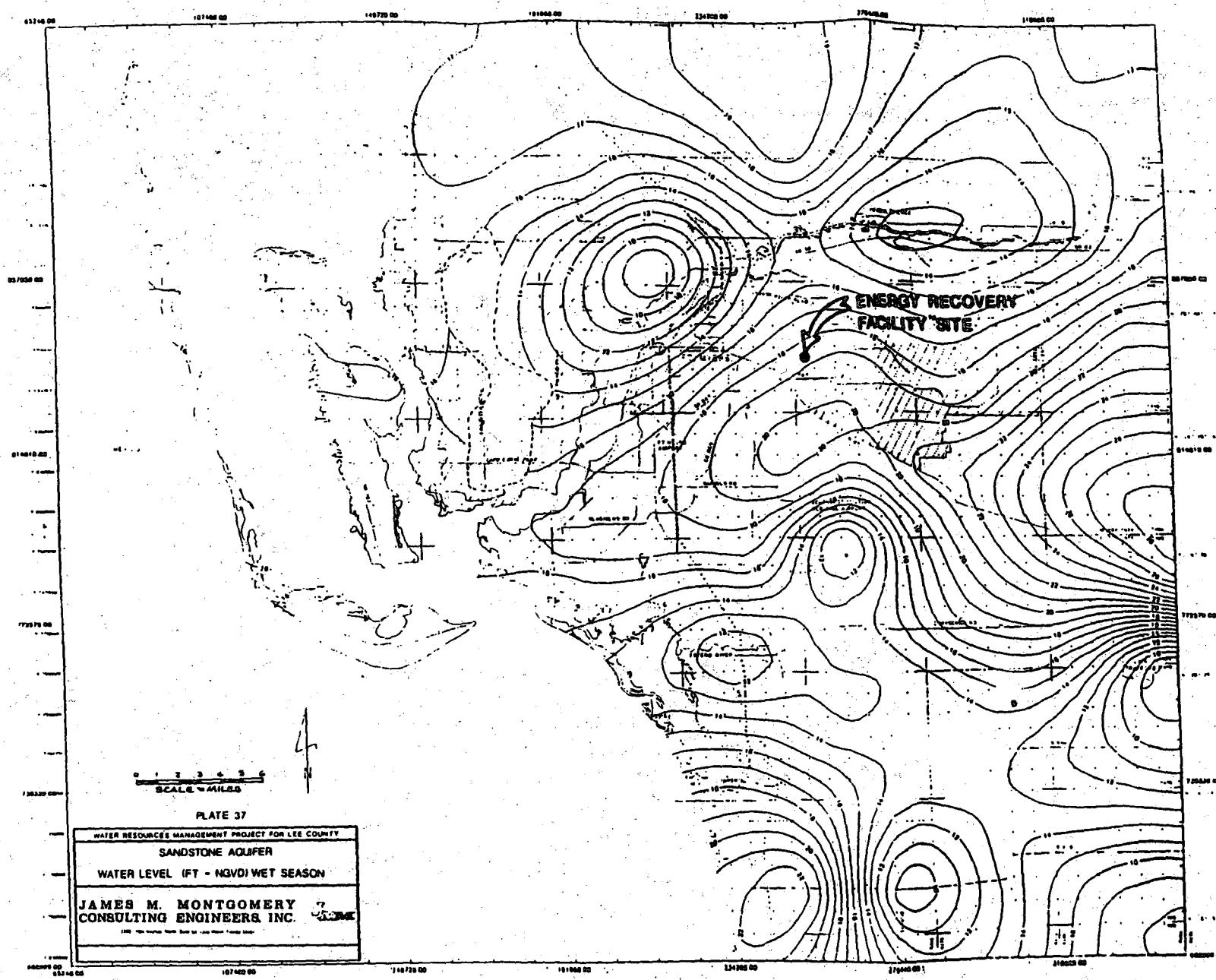


PLATE 37
 WATER RESOURCES MANAGEMENT PROJECT FOR LEE COUNTY
 SANDSTONE AQUIFER
 WATER LEVEL (FT - NGVD) WET SEASON
 JAMES M. MONTGOMERY
 CONSULTING ENGINEERS, INC.

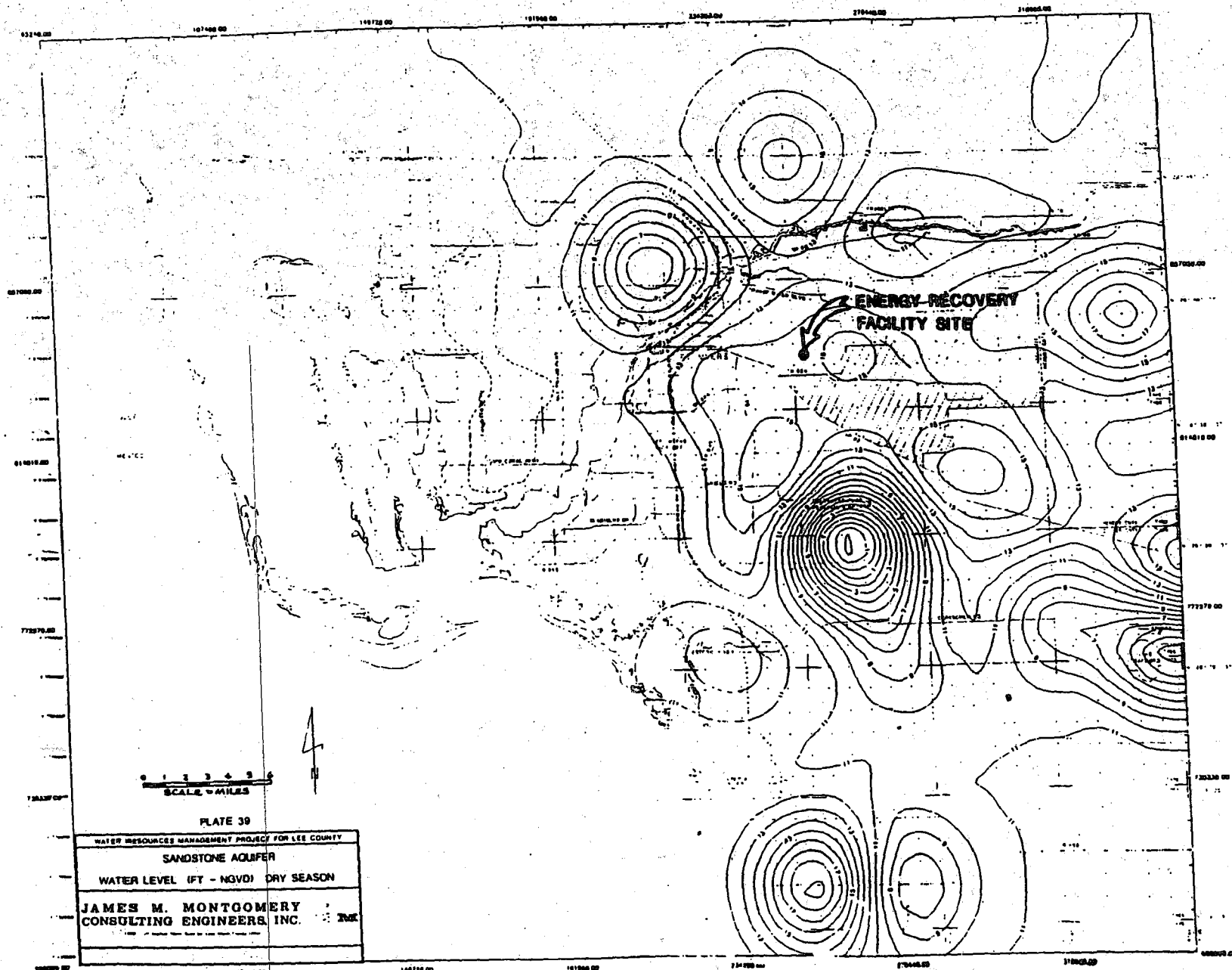
NRCE: CDM PLAN, DATED OCTOBER 1991

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LEE COUNTY - FORT MYERS, FLORIDA
 ENERGY RECOVERY FACILITY
 WATER LEVEL (FT-NGVD) WET SEASON

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FIGURE 5



SOURCE: CDM PLAN, DATED OCTOBER 1991

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LEE COUNTY - FORT MYERS, FLORIDA
ENERGY RECOVERY FACILITY
WATER LEVEL (FT-NGVD) DRY SEASON

MALCOLM PIRNIE, INC.

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By substituting the ranges of values for hydraulic conductivity, hydraulic gradient, and effective porosity into the equation for ground water flow, the ground water flow rates in the sandstone aquifer range from 5.9×10^{-3} cm/sec (17 feet/day) to 2.2×10^{-2} cm/sec (62 feet/day).

3.1.3 Background Water Quality

There are several USGS-monitored ground water quality monitor wells located near the proposed site (Boggess and Watkins, 1986). Water levels and water samples from these wells are collected periodically. Additional wells have been installed to monitor a former landfill area located southeast of the site. A USGS-sponsored study was performed to evaluate the impact the landfill had on ground water quality (Boggess, 1975). The County continues to monitor ground water quality in monitor wells installed around the former landfill area.

The geologic deposits that make up the aquifer system in southwest Florida, principally limestone, dolomite and carbonate materials, contribute dissolved solids to the ground water. The dissolved solids in the sandstone aquifer range from about 236 to 2,360 mg/L in the eastern part of the County (Boggess and Watkins, 1986). Concentrations of total dissolved solids greater than 800 mg/L are considered to be an indication of saltwater contamination, possibly from underlying aquifers of brackish water. Concentrations of chloride usually range between 26 and 100 mg/L (Boggess and Watkins, 1986). Saltwater from the Caloosahatchee River and underlying brackish aquifers can influence local chloride concentrations.

3.1.4 Porosity, Horizontal and Vertical Hydraulic Conductivity of Aquifer

The uppermost aquifer, the water table aquifer, is composed primarily of fine sands and silty fine sands. The water table aquifer is composed on Strata Nos. 1, 2 and 3 as illustrated on Table 1.

The hydraulic transmissivity of the water table aquifer may be about 80,000 gallons per day/foot (gpd/foot) (JMM, 1988) which, for a 20 to 30 foot thick aquifer, equates to a value of hydraulic conductivity of about 400 to 550 feet/day. The planned SWERF site lies within an area where the hydraulic conductivity of the water table aquifer was estimated to be about 900 feet/day in a County-wide modeling study (CDM, 1987). The specific yield of the water table aquifer is probably between 0.12 to 0.14 (unitless) (JMM, 1988). Other

values for aquifer transmissivity and special yield within four miles south of in the site area have been given as 150,000 gpd/feet and 0.15 (unitless) (Westinghouse Gateway Communities, 1984). There have been no measurements of vertical hydraulic conductivity on-site.

3.1.5 Depth to, and Lithology of, the Uppermost Confining Bed

The site is underlain by a confining unit composed of silty clay and gray-green silty fine sand. The confining unit is composed of stratum No. 4 and probably all or part of strata Nos. 5 and 6 as illustrated on Table 1. The depth to the top of the confining unit is about 20 to 30 feet below ground surface.

3.1.6 Vertical Hydraulic Conductivity, Thickness and Extent of the Confining Unit

The thickness of the confining unit in the vicinity of the site is about 50 feet (SFWMD, 1982). The on-site borings indicate that the confining unit composed of stratum No. 4 (See Table 1) ranges in thickness from about three to eight feet. This confining unit underlies the entire site.

The Upper Hawthorn confining unit does allow some ground water to be transmitted through the formation, but the water travels at a much slower rate. Ground water moves through the confining unit when there is a hydraulic gradient across the layer, and it is typically assumed that the water flow is vertical. The vertical hydraulic conductivity of the confining unit is on the order of 0.0005 feet/day (CDM, 1987).

3.1.7 Topography

Site topography information appears in the following fold out section.

3.1.8 Soil Information

The U.S. Soil Conservation Service (SCS) has published a soil survey for Lee County (USDA, 1984) that was used to identify the characteristic soils on-site. The predominant soil series association in the area of the site is the Oldsmar-Malabar-Immokalee series. This association is composed of nearly level, poorly drained, deep sandy soils with a loamy subsoil in some locations. The major soil units on-site include the following:

<u>Unit No.</u>	<u>Soil Unit</u>
13	Boca fine sand
14	Valkaria fine sand
26	Pineda fine sand
27	Pompano fine sand, depressional
34	Malabar fine sand
44	Malabar fine sand
74	Boca fine sand; slough
75	Hallandale fine sand, slough
77	Pineda fine sand, limestone substratum

Most of the site is composed of soils from the Boca and Malabar series (soil units 13, 74, 34 and 44 on the map) with isolated areas of Valkaria fine sand (soil unit 14), and Hallandale fine sand (soil unit 75) in slough throughout. There are small areas of Pineda fine sand (soil units 26 and 77) along the southern border of the site including an area with a limestone substratum at depths beyond 50 inches in the southwestern corner. The principal soil series on-site are Malabar, Valkaria, Pompano, and Boca. Each series is summarized below.

For all of these soils, site development is hampered by severe wetness or ponding, seasonal drought, potential for site flooding, and the lack of stability and cohesiveness of soils during excavation; and the Boca series is further limited by the shallow depth to rock (USDA, 1984; Tables 10 and 11). The soils are generally poor materials for roadfill (due to wetness) and are too sandy for gravel or topsoil, but are generally good sources of sand materials (USDA, 1984; Table 12).

3.1.9 Surface Water Drainage System

The planned SWERF site has not existing surface water bodies located within its proposed fence boundary. FDER jurisdictional wetlands are present along the western edge of the site. An isolated wetland encompasses approximately nine acres in the southern portion of the site. Existing surface water runoff sheet flows into these wetlands which provides some degree of storage. For large rainfall events, runoff flows westerly in a series of connected wetlands, or along the Buckingham Road swale which eventually flows under SR 82 into the Six Mile Cypress slough.

Under average conditions the maximum runoff will occur during the rainy season (June through September). However, runoff may occur throughout the year based on

current climatic conditions. The average annual runoff from the site is estimated to be in the range of 7.97 to 10.21 inches. These estimates are similar to those found in the Lee County Water Resources Management Project (JMM, 1988).

The stormwater management system for the planned SWERF is designed to use as much of the natural drainage pattern as possible while protecting the existing wetlands on-site. During large rain events, stormwater runoff discharges to the southwest (through a series of wetlands) and west (along Buckingham Road where it eventually flows under Buckingham Road (two 10 feet x 2.2 feet box culverts) and SR 82 (two 10 feet x 4 feet box culverts) into the six Mile Cypress slough.

3.2 WASTE DISPOSAL RATE AND FREQUENCY, CHEMICAL COMPOSITION, METHOD OF DISCHARGE, POND VOLUME, SPRAY-FIELD DIMENSION, OR OTHER APPLICABLE SITE SPECIFIC INFORMATION

The planned SWERF is a mass-burn municipal solid waste management facility designed to initially process 1,200 tpd with expansion capability to ultimately process 1,800 tpd. The facility will be owned by Lee County but will be designed, constructed, and operated for a 20-year period by a private vendor experienced in the design, construction, and operation of solid waste energy recovery facilities. The projected in-service date of the facility is December 1994.

Municipal solid waste collected in Lee and Hendry Counties by private and municipal waste haulers will be delivered to the SWERF on a six-day per week basis. The SWERF will have a refuse storage bunker sized to hold a minimum of three days operating fuel at the expanded facility size of 1,800 tpd. All solid waste receiving, storage, processing, and residue handling facilities will be completely enclosed.

The facility will be designed to process a minimum of 85 percent of the maximum daily rates capacity of an annual average basis. The residue of combustion will consist of noncombustible by-products, fly ash, spent lime, bottom ash, and siftings. The residue handling system will be designed to remove these materials from the combustion system for disposal. The bottom ash siftings from the combustion units will be quenched in a fully enclosed quench tank to prevent ash siftings from becoming airborne. The quenched ash will be drained of free water, and will then be mechanically loaded into an enclosed conveyor system which will transport the ash and residue to the enclosed ash storage building. A back-up system for ash transport to the ash storage building will be provided.

Fly ash will be handled in the same manner. Ash removal conveyors (fully enclosed) will transport fly ash from the boilers, dry scrubbers, and bag house to the residue water quench system. The combined ash is quenched and taken to the ash storage building. The floor of the ash building will be watertight. Any free liquid which is generated by the storage piles will be fully enclosed to keep out precipitation and enclosed to prevent wind blown emissions. The ash will be stored in piles inside the building.

The transfer of the ash from the storage piles to the covered watertight vehicles for transport to the landfill will be accomplished by using rubber tire front-end loaders. All loading and preparation for ash transport will occur within the fully enclosed ash storage building. The ash residue will be transported from the SWERF in covered watertight trucks to the proposed landfill/ashfill located approximately 15 miles from the SWERF. The residue to be disposed of at the landfill/ashfill will meet all local, state, and federal regulations which govern such disposal.

Because of the moist nature of the ash materials, dust will not be generated by the ash handling, conveying, and transport activities. The consistency and appearance of the quenched ash material will be that of wet aggregate. This condition will continue to be maintained during transport to the landfill, unloading via hydraulic lift truck beds and spreading in relatively thin layers (lifts) of approximately 12 to 24 inch thickness.

The estimated quantity of ash residue requiring disposal when the energy recovery facility capability is operating at its initial capacity of 1,200 tons per day is 360 tons per day or approximately 131,000 tons per year.

3.3 TOXICITY OF WASTE

Hazardous waste, as defined by the U.S. Environmental Protection Agency (USEPA) and the FDER, are not permitted to be disposed at the proposed landfill/ashfill. The small amounts of household chemicals contained in typical community solid waste form a minor reaction of the total mass of wastes. The overall toxicity of the solid waste is expected to be low.

The ash residue will be managed in compliance with Chapter 17-702, F.A.C., and in a manner (i.e., wet) such that an extremely low potential for inhalation, ingestion, or direct dermal contact will exist. The selected vendor will be required to develop a detailed and specific employee safety training program. This program will provide effective personal

respiratory protection equipment, if necessary, to promote a high degree of protection to all persons who may have contact with the ash material, including landfill personnel. This program will be continuously updated as new information and equipment is developed to ensure compliance with all applicable OSHA standards and FDER requirements. After quenching and draining of free water from the residual materials the ash will still contain about 30 percent moisture which will remain through the period of short-term storage and disposal. The mechanical nature of the ash handling and disposal operation, in enclosed combined systems when possible with the employee safety program, will minimize the potential for inhalation, ingestion or body contact with the material.

3.4 PRESENT AND ANTICIPATED WASTEWATER VALUE, SEEPAGE RATE TO THE RECEIVING GROUND WATER; PHYSICAL, CHEMICAL, MICROBIOLOGICAL (WHICHEVER IS APPLICABLE) CHARACTERISTICS OF THE LEACHATE

Both anti-corrosion and anti-fouling agents will be used at the SWERF in the boilers and cooling tower. Blowdown will be treated and reused at the SWERF. There will be no discharges from chemical processing, spent processing water treatment, or waste piles as a result of the plant operation that may enter the local environment.

To meet its process and water needs at the initial design capacity of 1,200 tpd, the facility will use approximately 1.2 mgd of advanced-treated effluent from the Fort Myers Central Waste Water Treatment Plant (WWTP). The SWERF will use this reclaimed water for cooling purposes and will treat and reuse the spent process water to achieve a limited discharge from the process train. All residue liquid wastes will become part of the returned sanitary and process flows for treatment at the Fort Myers WWTP.

3.5 DISPOSAL SYSTEM WATER BALANCE

The climate is humid and subtropical with an average annual temperature of about 74°F. Annual precipitation is variable, averaging about 53 inches per year at the Fort Myers station over a 98-year period, most of the annual rain usually falls between May and September.

The monthly ground water recharge was estimated based on the available water capacity for the soil types found on the SWERF site. The evaporation potential and the

ground water recharge potential are subtracted from the average monthly precipitation, resulting in estimates of runoff. Runoff quantities are presented for ground water recharge rates of 0.25 and 0.56 inches per month with a total of 10.21 and 7.97 inches per year, respectively.

This above discussion of water balance is most applicable to issues regarding storm water management. Runoff collected in the storm water detention basins following start-up of the SWERF operations will be collected via a drainage system from vegetated areas, paved surfaces, and roof tops. All refuse or residue storage areas will be enclosed so that no runoff will occur from these surfaces. Ground water and surface water quality is thereby protected from unprocessed waste and residue.

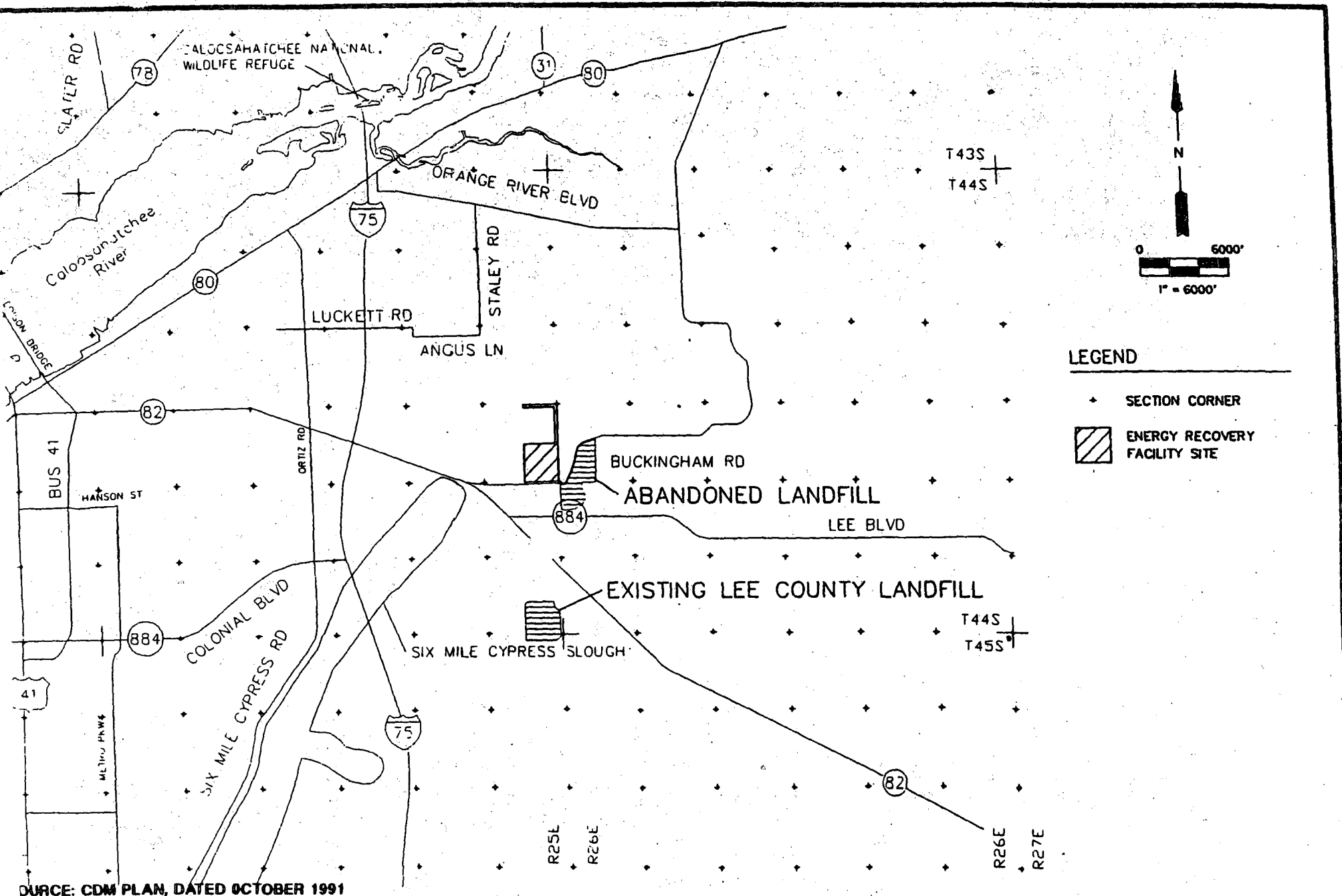
3.6 PRESENT AND REASONABLE EXPECTED FUTURE POLLUTION SOURCES LOCATED WITHIN ONE MILE RADIUS OF THE SITE

There are potential sources of off-site upgradient contamination including the current site of the County landfill located three miles south of the SWERF site, and a former landfill area located one-half mile east and southeast of the SWERF site along Buckingham Road. There are active ground water quality monitoring programs at these locations. The locations of these landfills are depicted on Figure 7.

3.7 INVENTORY DEPTH, CONSTRUCTION DETAILS, AND CONES OF DEPRESSION OF WATER LEVELS AND MONITOR WELLS LOCATED WITHIN ONE MILE RADIUS OF THE SITE

The South Florida Water Management District (SFWMD) provided a map of consumptive use permits and water management permits issued for wells located within five miles of the proposed site. Figure 8 depicts locations of permitted ground water wells with withdrawals greater than 500,000 gallons/month that are within five miles of the proposed site as of 1991. The figure shows that Permit No. 36-00151-SW is on property located adjacent to the northeastern corner of the power line easement that connects the active portion of the site to the nearest power substation. Permit No. 36-00151-SW served 10 acres and had a maximum monthly withdrawal of 7.95 million gallons from the shallow aquifer. That permit expired in 1987.

Appendix 9.2 of the application for power plant certification lists private wells recorded by Lee County Division of Water Resources. None of the County-permitted



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EXISTING AND ABANDONED LANDFILLS

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private wells are within 1,000 feet of any portion of the proposed facility site.

The property appraiser's plant maps (dated April 1988) indicate that there are no private residences within 1,000 feet of the facility. Therefore, it is unlikely that there are any non-permitted, private domestic wells within 1,000 feet of the facility.

3.7.1 Location of Monitor Wells Within One Mile

The monitoring well network for the former landfill area is located within one mile of portions of the facility site. Figure 9 depicts the locations of the monitor wells with respect to the facility site.

3.7.2 Location of On-Site Monitor Wells

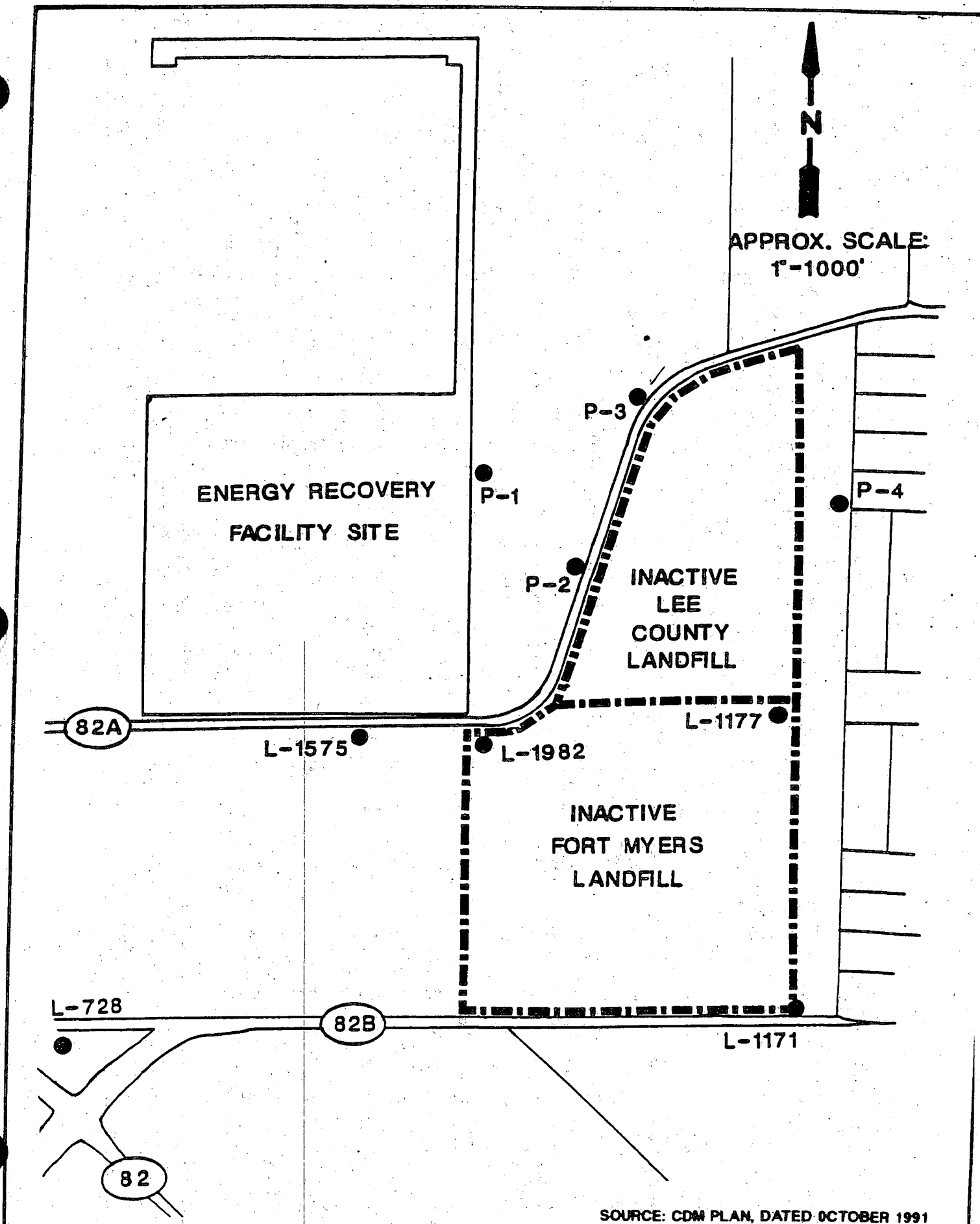
There is one existing ground water well at the project site. It has been used in small quantity applications to support previous agricultural practices. The on-site well is a two-inch diameter well that flows at ground surface. It has an existing shut-off valve. This well will not be used for on-site operations and will be abandoned and grouted in accordance with SFWMD requirements.

3.7.3 On-Site Monitor Well Construction

The proposed monitoring wells will be constructed in accordance with 40E-3 Part II F.A.C. Locations of the proposed monitoring wells are discussed in Section 4 of this document.

The shallow monitoring wells (water table aquifer) will be constructed of threaded two-inch diameter 0.010-inch slot Schedule 40 PVC well screen and threaded two-inch Schedule 40 PVC riser. The sand pack will consist of 20/30 silica sand extending two feet above the well screen. A two foot bentonite seal will be placed above the sand pack and the remainder of the borehole will be grouted. The well will be completed with a six-inch thick by 18-inch thick square concrete collar and a four-inch diameter steel protective casing with a locking cap. Concrete guard posts will be installed around the protective casing.

The deep monitoring wells (intermediate aquifer) will be constructed by grouting into place a six-inch steel casing into the confining unit at the base of the surficial aquifer (Upper Hawthorn confining zone). A four-inch diameter borehole will be continued through the six-inch casing into the sandstone aquifer layer where the screen will be set. The monitoring well will consist of threaded two-inch diameter 0.010-inch slot Schedule 40 PVC



SOURCE: CDM PLAN, DATED OCTOBER 1991

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ENERGY RECOVERY FACILITY

MALCOLM PIRNE, INC

MONITOR WELLS AT INACTIVE LANDFILL

FIGURE 9

well screen and threaded two-inch Schedule 40 PVC riser. The sand pack will consist of 20/30 silica sand extending two feet above the well screen. A minimum three foot bentonite seal will be placed above the sand pack and the remainder of the borehole will be grouted. The well will be completed with a 6-inch thick by 30-inch square concrete collar and a 4-inch diameter steel protective casing with a locking cap. Concrete guard posts will be installed around the protective casing.

Grout will be Type I or Type III Portland cement mixed with three to four percent (by volume) of bentonite clay. Only potable water shall be used to mix grout. Grout will be tremied in deep monitor wells.

The monitoring wells will be fully developed by surging or interrupted over-pumping. Only decontaminated materials can be used in the well for development; and rubber hoses will not be allowed to come into contact with water in the well.

The following information shall be submitted to the FDER and SFWMD for all ground water monitoring wells constructed:

Well Identification
Latitude/Longitude
Aquifer Monitored
Screen Type & Slot Size
Elevation at Top of Pipe

Elevation at Land Surface
Elevation of Top and Bottom
of Collection Zone (Screen)

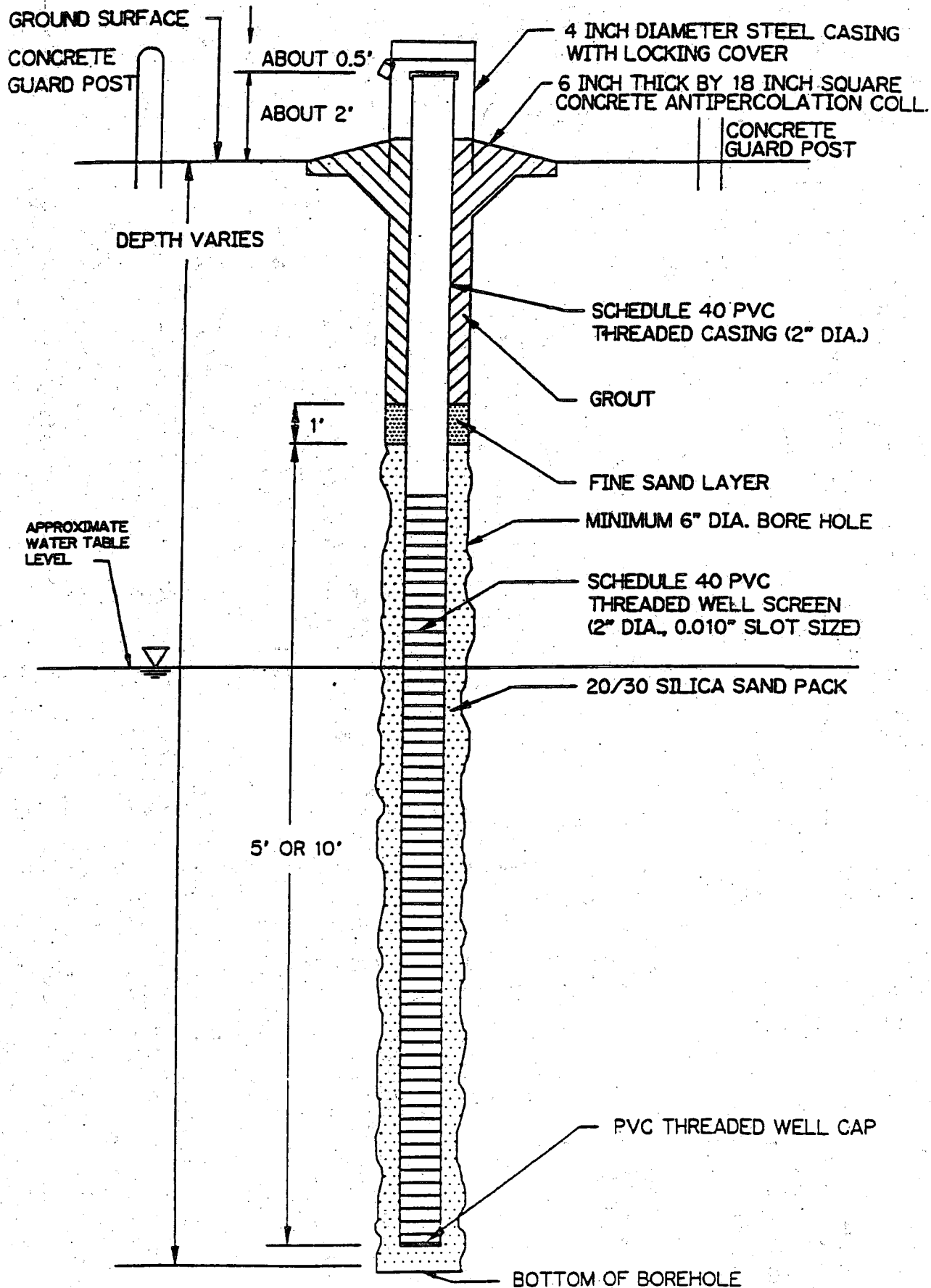
Driller's Log
Total Depth of Well
Casing Diameter
Casing Type and Length
Direction of Ground Water Flow
in Screened Zone
Well Construction Permit Numbers
Site Map Showing Well Locations

Typical well construction details are illustrated in Figures 10 and 11.

3.8 SITE SPECIFIC ECONOMIC AND FEASIBILITY CONSIDERATIONS

In 1989, CDM completed a Solid Waste Master Plan for Lee County. The Master Plan evaluated technical, environmental, social-political, economic, and financial considerations for the management of the County's solid waste through the year 2030.

The results of the Master Plan study and subsequent evaluations were that the proposed facility provides the most reliable, environmentally-safe and economically feasible option for managing solid waste from Lee County and Hendry County. The planned SWERF is part of an overall master plan including recycling, composting and landfilling.



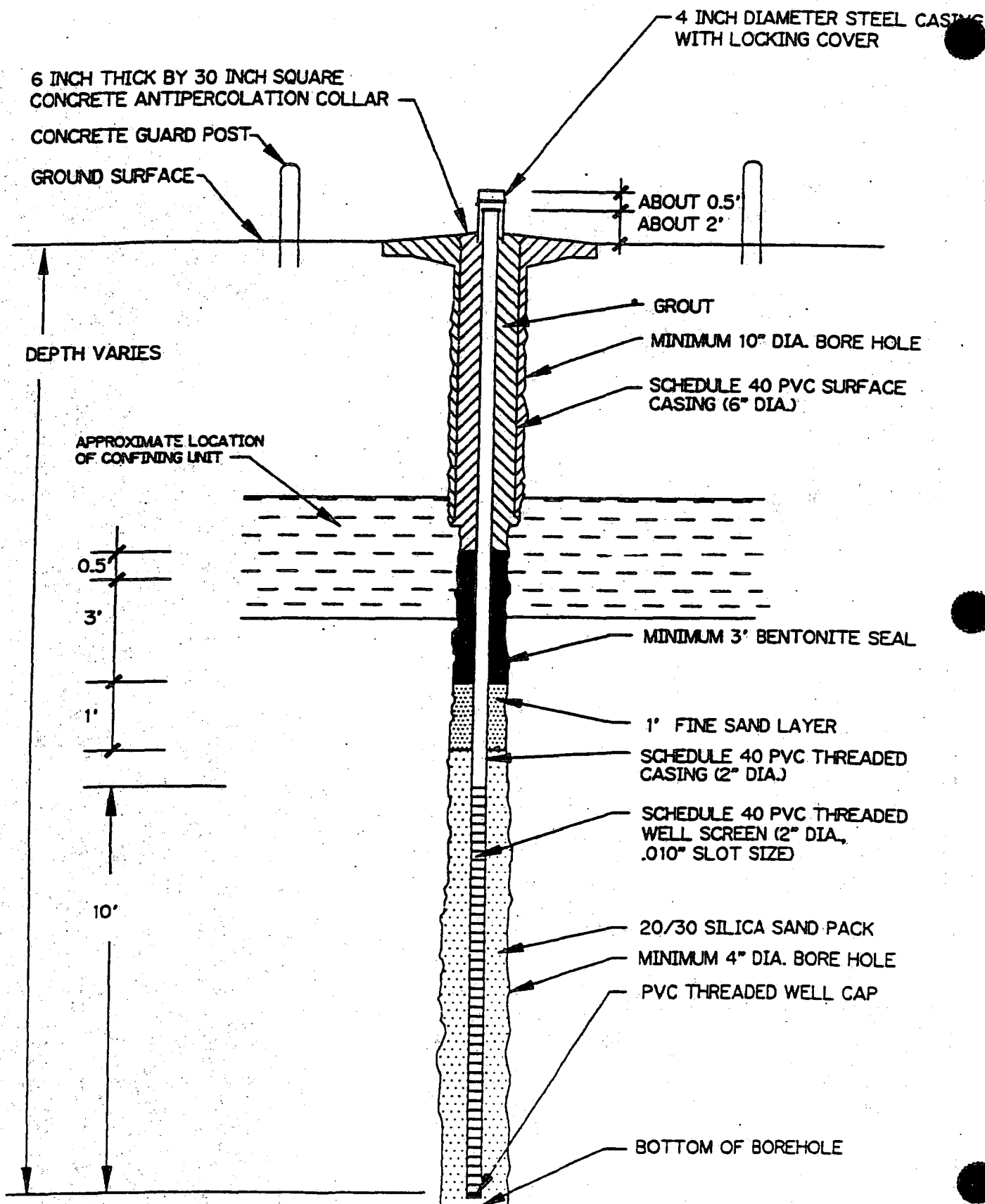
SOURCE: CDM PLAN, DATED OCTOBER 1991

**MALCOLM
PIRNIE**

LEE COUNTY - FORT MYERS, FLORIDA
ENERGY RECOVERY FACILITY
TYPICAL CONSTRUCTION DETAIL OF

MALCOLM PIRNIE, INC.

FIGURE 10



SOURCE: CDM PLAN, DATED OCTOBER 1991

**MALCOLM
PIRNIE**

LEE COUNTY - FORT MYERS, FLORIDA
ENERGY RECOVERY FACILITY
TYPICAL CONSTRUCTION DETAIL OF
INTERMEDIATE OR DEEP MONITOR WELL

MALCOLM PIRNIE, INC.

REVISED FIGURE 11

3.9 CHRONOLOGICAL INFORMATION ON WATER LEVELS IN THE MONITOR WELLS AND WATER QUALITY DATA ON WATER SUPPLIES COLLECTED FROM THE WATER SUPPLY AND MONITOR WELLS

There are no on-site monitor wells. There are no records of water level elevations or water quality data for the existing, on-site flowing well.

3.10 TYPE AND NUMBER OF WASTE DISPOSAL FACILITIES WITHIN THE INSTALLATION

There are no waste disposal facilities within the installation. Ash generated at the site will be transported to the ashfill/landfill portion of the proposed Lee/Hendry County Regional Solid Waste Disposal Facility for disposal.

3.11 CHRONOLOGICAL INFORMATION OF SURFACE WATER FLOWS AND WATER QUALITY UPSTREAM AND DOWNSTREAM FROM THE SITE

Surface water runoff from the planned site currently originates from the site only. At the point of discharge into the swale along Buckingham Road, there are no records of quantity or quality of flow from upgradient sites (the proposed Buckingham Park). Six Mile Cypress Slough is located approximately 3,500 feet downgradient of the site. Water quality data is available from sampling locations in the slough.

Studies of the Six Mile Cypress Slough water quality have been reported (CDM, February 1990). The first study was conducted by Kevin Erwin (Inc. Consulting ecologist) during the period April through October 1981. A total of 11 stations, including two shallow well stations, were sampled monthly for physio-chemical and nutrients during this period. In addition, heavy metals, organics and bacteria colonies were monitored once during this period.

Lee County Environmental Laboratory began sample collection from five stations in October 1988 and has continued sampling through 1991. Samples were analyzed for nutrients and physio-chemical parameters. Lead, copper, and zinc have subsequently been recently added. In addition, a single scan of 11 heavy metals was conducted in August 1989.

3.12 CONSTRUCTION AND OPERATION DETAILS OF DISPOSAL FACILITIES

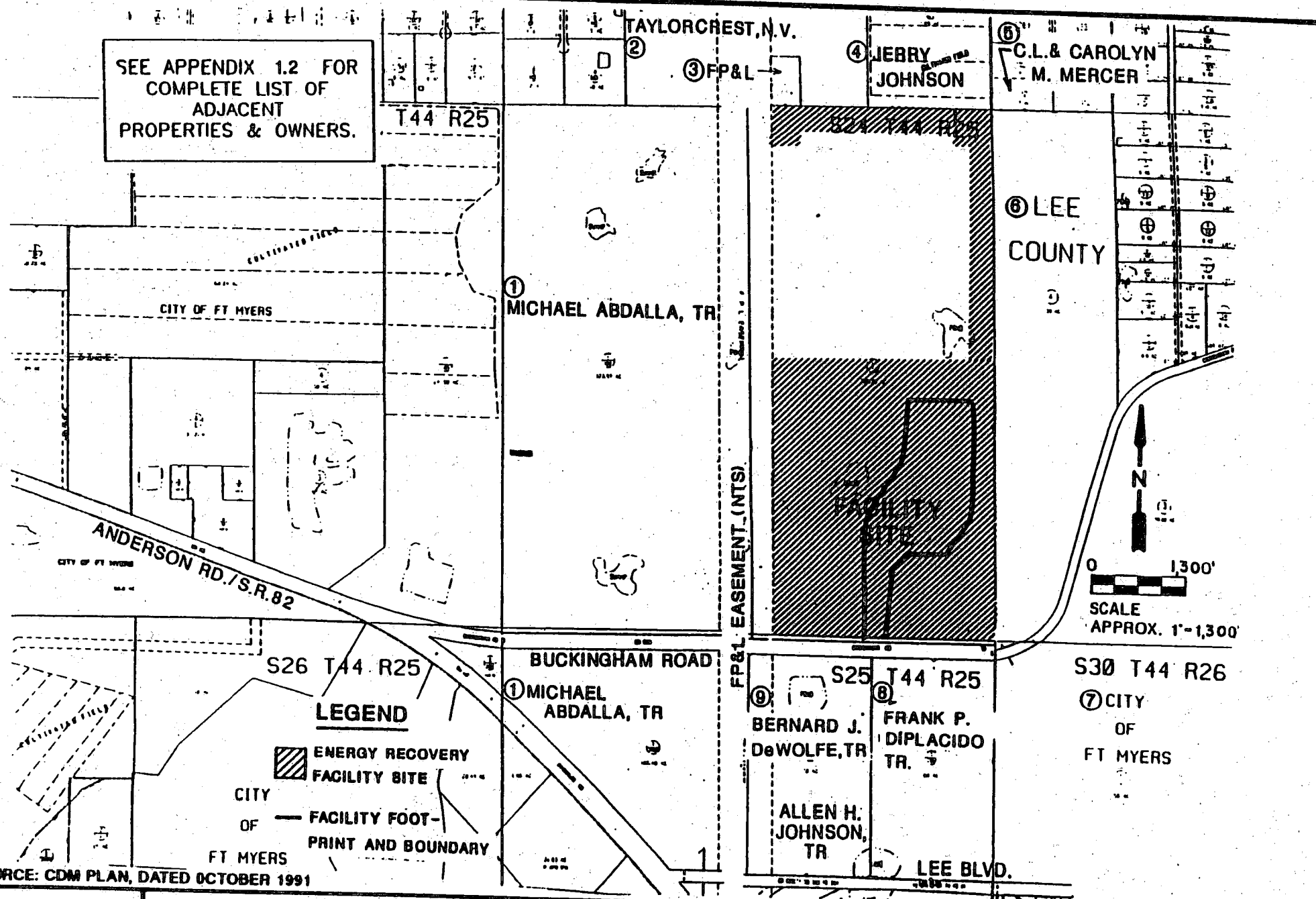
Section 3.0 through 5.0 of the application for construction/operation of the Lee/Hendry County Regional Solid Waste Disposal Facility was submitted to FDER on July 25, 1990. It contained a detailed discussion of the SWERF design, performance standards and operating plan. This facility will be on a different site and permitted separately.

The Class I landfill and ashfill is designed as a double lined landfill with leachate collection system. The C&D disposal facility is designed as a single lined facility with leachate collection system. The Class III facility is not lined.

3.13 HISTORY OF CONSTRUCTION AND LAND DEVELOPMENT IN THE VICINITY OF THE SITE

Properties abutting the SWERF site boundary are shown on Figure 10. The site is bounded on its western side by a Florida Power and Light (FP&L) easement containing power transmission lines. Approximately 3/4-miles to the west is a mining operation where limerock, fill and topsoil materials are obtained. To the east, the site is bordered by property owned by Lee County slated for a future park. An adjacent parcel southeast of the site was previously used as a sanitary landfill. The Gulf Coast Sanitary Landfill is located three miles directly south of the site and is currently contracted by Lee County for solid waste disposal.

The 155-acre facility site includes approximately 123 acres of upland and 32 acres of wetland vegetation. Upland areas are predominantly by farm pasture, wax myrtle, palmetto prairie, and pine flatwoods. Wetland habitats include cypress, cypress/pine, wet pine flatwoods, and wet prairie. A survey of the SWERF site revealed that land had been used primarily for raising livestock and rural residences. The site itself is presently used for grazing cattle. There are no usable residences currently on the site.



**MALCOLM
PIRNIE**

LEE COUNTY - FORT MYERS, FLORIDA
ENERGY RECOVERY FACILITY
ABUTTING PROPERTIES

MALCOLM PIRNIE, INC.

FIGURE 12

4.0 GROUND WATER MONITORING

4.1 MONITORING WELL LOCATIONS

A ground water monitoring network (as required by Conditions of Certification) consisting of 12 nested monitor wells in six locations will be installed for the SWERF. The wells will be nested so that there will be six shallow (surficial aquifer) and six intermediate (sandstone aquifer) wells. No deep monitoring wells are proposed below the intermediate wells because of the higher potentiometric surface of the mid-Hawthorn aquifer. The upward vertical gradient reduces the possibility of contamination migrating to the lower aquifer. The monitoring wells will serve as the permanent ground water monitoring network for the facility. Water levels at three surface water elevation locations will also be monitored.

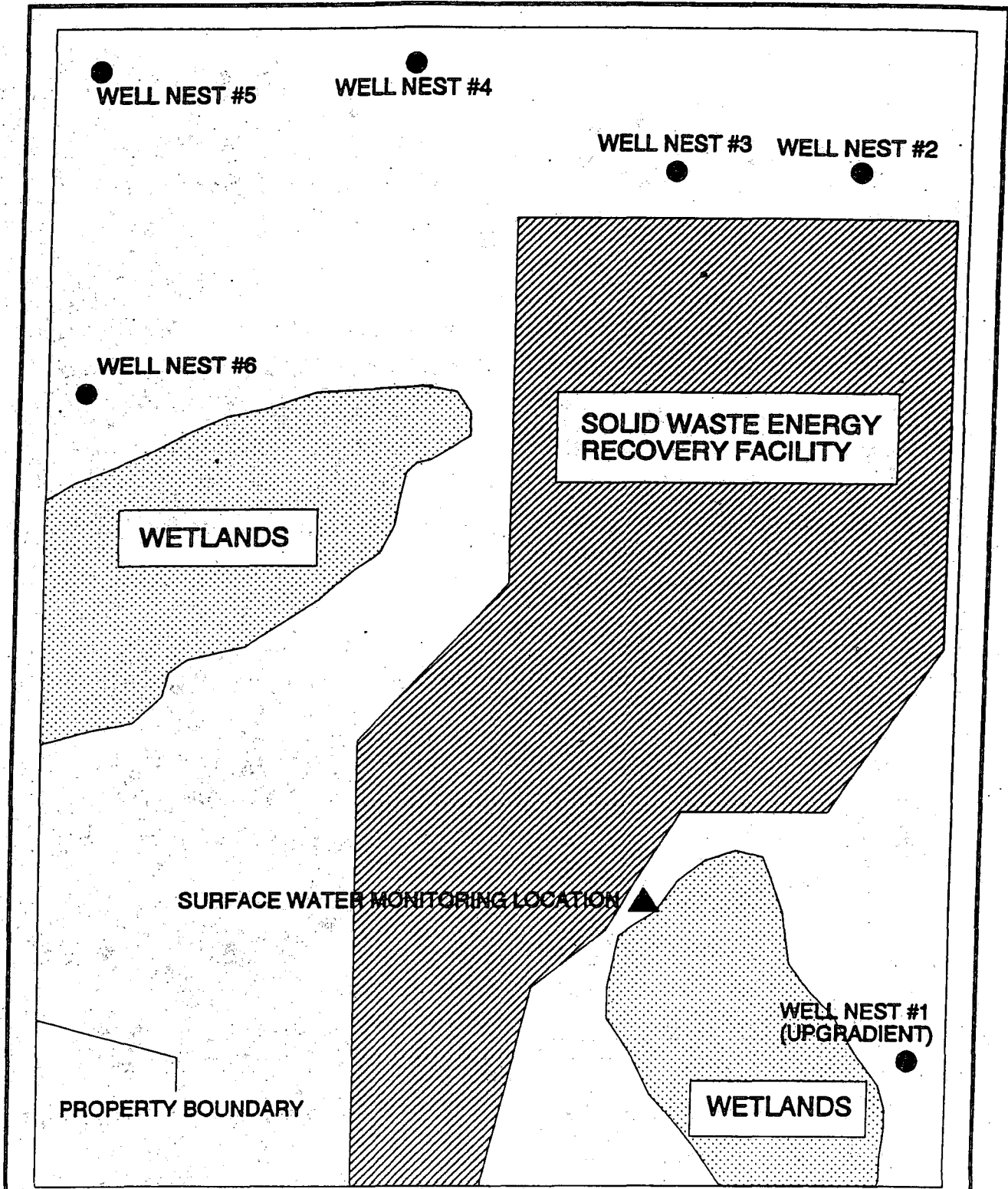
The Conditions of Certification require that one well nest be located up the hydrologic slope from the landfill area to provide current background data. Other wells shall be located down the hydrologic slope from the ground water discharge areas (retention ponds at the north end of the facility).

The regional ground water flow direction is generally to the north and therefore, the upgradient well nest will be placed to the south of the facility. The additional five well nests will be located to the north and west of the facility. The proposed locations of the monitoring wells are illustrated on Figure 13.

4.2 AQUIFER CLASSIFICATIONS

The water table aquifer is the aquifer of concern in the vicinity of the proposed landfill/ashfill. This aquifer is designed as Class G-II according to Chapter 17-3, F.A.C., even though there is no known use of the water table aquifer for potable water use near the site. Class G-II ground water is characterized as:

"Class G-II. Potable water use, ground water in aquifers which has a total dissolved solids content of less than 10,000 mg/l, unless otherwise classified by the Commission."



**MALCOLM
PIRNIE**

LEE COUNTY - FORT MYERS FLORIDA
PROPOSED ON-SITE
MONITORING LOCATIONS

MALCOLM PIRNIE, INC

FIGURE 13

TABLE 4-1

**PROPOSED ANNUAL WATER QUALITY PARAMETERS
FOR GROUND WATER MONITOR WELLS***

BASIS	PARAMETERS	
Section 17-550.310, F.A.C., for Primary Maximum Contaminant Levels for Drinking Water		
Subsection (1) (a)	Chromium Lead	Sodium
Subsection (2) (d)	Trichloroethene Tetrachloroethene Carbon tetrachloride Vinyl chloride 1,1,1-trichloroethane	1,2-dichloroethane Benzene Ethylene dibromide p-dichlorobenzene 1,1-dichloroethene
Section 17-550.320, F.A.C., for Secondary Maximum Contaminant Levels for Drinking Water:		
	Chloride Iron pH Zinc	Manganese Sulfate Total Dissolved Solids
General Indicators	Total Organic Carbon Ammonia (as N) Specific Conductance Total Kjeldahl Nitrogen (as N)	Arsenic Selenium Mercury
* Results from analyses will be evaluated after the initial characterization, and after each annual sampling event, to re-evaluate appropriate, individual constituents for continued monitoring.		

taken after a minimum of three to five well volumes of water have been removed (purged). This will ensure that formation water is being sampled.

The quarterly ground water monitoring analyses shall be reported on the FDER Form 17-1.215(2), Quarterly Report on Ground Water Monitoring. The results shall be submitted to the FDER no later than the fifteenth (15) day of the month immediately following the end of the sampling period. Approved sampling and testing methods as published by the FDER or in EPA Standard Methods shall be used.

In the event that a monitor well becomes damaged or inoperable, the FDER shall be notified immediately and a detailed written report shall follow within seven (7) days indicating the problem that has occurred and remedial measures that have been taken to prevent the recurrence. All monitoring well design and replacement shall be approved by the agencies prior to installation.

5.0 SURFACE WATER MONITORING

5.1 SURFACE WATER SAMPLING LOCATIONS

Surface water discharge from the proposed facility will be monitored at the point of surface discharge from the detention area to the wetland area as specified by the Conditions of Certification. Both surface water quality and quantity discharge will be monitored in accordance with the Conditions of Certification (SFWMD and FDER). Additional sampling points will be located in the wetlands to the south and west of the facility to monitor water quality and quantity. The sample locations are illustrated in Figure 13.

5.2 SURFACE WATER CLASSIFICATION

The on-site stormwater management system will discharge to the south and flow in the drainage swale along Buckingham Road until it enters the Six Mile Cypress Slough drainage. The on-site surface water and Six Mile Cypress Slough are designated by the FDER as Class III Surface Waters.

5.3 APPLICABLE CRITERIA

The specific criteria applicable to Class III Waters are the following:

- a. Section 17-302.500, F.A.C.: "Minimum Criteria for Surface Waters";
- b. Section 17-302.510, F.A.C.: "Surface Waters: General Criteria"; and
- c. Section 17-302.560, F.A.C.: "Criteria: Class III Waters - Fresh".

It should be noted that these criteria are only applicable to "Surface Waters of the State" and not to waters within a "mixing zone."

5.4 SAMPLING AND REPORTING PROCEDURES

The surface water discharge location will be monitored in accordance with the sampling parameters and schedule established in the Conditions of Certification (SFWMD

and FDER). Table 5-1 lists the parameters to be sampled and the associated sampling schedule for the surface water discharge location. Other applicable sampling and reporting procedures, as discussed in Section 4.0 of this monitoring plan, will be followed.

In addition to the above reported data, the Conditions of Certification call for the provision of the following information: The total volume of water discharged, including the volume of water discharged during the days of sampling, the total discharges from the property or into surface waters of the state. The above information will be provided to the SFWMD on a semi-annual basis in conjunction with the sampling data.

TABLE 5-1	
** MONITOR TYPE AND SCHEDULE	PARAMETERS
A. GENERAL (Every other month)	Total Organic Carbon, Dissolved Oxygen, pH, Turbidity, Specific Conductance, Chemical Oxygen Demand, Total Suspended Solids and Alkalinity.
B. ORGANICS (Semi-Annual)	Oil and Grease Detergents, EPA Methods 601 and 602
C. METALS (Semi-Annual)	Aluminum, Antimony, Beryllium, Cadmium, Copper, Cyanide, Iron, Lead, Mercury, Nickel, Selenium, Silver, and Zinc.

7.8 – Consumptive Use Report

June 12, 2002

Elizabeth T. Ellis
Water Supply Division
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406-3089

Re: Lee County Solid Waste Resource Recovery Facility
Consumptive Use Report, Permit Number 36-00002-O

Dear Ms. Ellis:

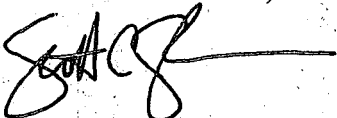
Enclosed please find the Consumptive Use Report for the Lee County Solid Waste Resource Recovery Facility for the operational period of June 1992 through May 2002. This report has been prepared by Malcolm Pirnie, and is submitted on behalf of Lee County (Permittee).

The Consumptive Use Report has been prepared in accordance with the Facility's Conditions of Certification, modified on August 21, 2000 to include Section XV.B.2.d. This Section requires the Permittee to submit, within ten years of Certification and every ten years thereafter, to the SFWMD "a report on the project's consumptive water use which contains the information required by Chapter 40E-2, F.A.C. in effect at that time. Within 90 days after receipt of the completed report, the SFWMD shall evaluate the information contained therein and issue a written notification to the Department (of Environmental Protection) and the Permittee as to whether the groundwater withdrawals for consumptive use authorized by this Certification remain in compliance with the provisions of Chapter 373, F.S., and Chapter 40-2, F.A.C., in effect at that time."

We believe the attached report contains all of the information that the SFWMD requires. If you require clarification or need any additional information, please do not hesitate to contact us.

Very truly yours,

MALCOLM PIRNIE, INC.



Scott C. Shannon, P.E.
Project Engineer

**MALCOLM
PIRNIE**

Elizabeth T. Ellis
South Florida Water Management District

June 12, 2002
Page 2

Enclosures
1971033

c: Lindsey Sampson, Lee County Dept. of Solid Waste
Terry Bengtsson, SFWMD (Ft. Myers)
Hamilton Owen, FDEP (Tallahassee)
Tom Eriksen, Covanta Lee
David Dee, Landers & Parsons (Tallahassee)
Rob French, Malcolm Pirnie (Ft. Myers)

CONSUMPTIVE USE REPORT

June 1992 – May 2002

**Lee County Solid Waste Resource Recovery Facility
10500 Buckingham Road
Fort Myers, Florida**



LEE COUNTY
S O U T H W E S T F L O R I D A

**DEP Case No. PA90-30
June 2002**

**Malcolm Pirnie, Inc.
1533 Hendry Street, 2nd Floor
Ft. Myers, Florida 33901**

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this report is to summarize the consumptive use of the Lee County Solid Waste Resource Recovery Facility (Facility) during the operational period of June 1992 through May 2002. This report has been prepared in accordance with the Facility's Conditions of Certification, modified on August 21, 2000 to include Section XV.B.2.d. This Section requires Lee County to submit within ten years of Certification and every ten years thereafter, a report on the project's consumptive water use to the South Florida Water Management District (SFWMD). This report has been prepared in accordance with Chapter 40E-2, F.A.C, amended September 10, 2001.

1.2 FACILITY DESCRIPTION

The Lee County Solid Waste Resource Recovery Facility is located at 10500 Buckingham Road, Fort Myers, in Lee County, Florida. A site location map is provided as Figure 1. The Facility receives, stores, and combusts municipal solid waste and produces electricity. It utilizes a technology generally known as "mass-burning," in which solid waste is burned with little or no pre-combustion processing.

Table 1 summarizes the significant uses of water at the Facility, and indicates the source and design flow rates for each use. As Table 1 shows, makeup water for the majority of the Facility's processes is treated effluent, or "reclaimed water," from the City of Fort Myers' wastewater treatment plant. Groundwater is used only as an emergency backup water supply for this reclaimed water. Approximately five percent of the water the Facility uses is potable water for domestic use and boiler process makeup. The Facility has a wastewater treatment system on site, which minimizes the amount of makeup water needed by recycling the wastewater back to the cooling tower.

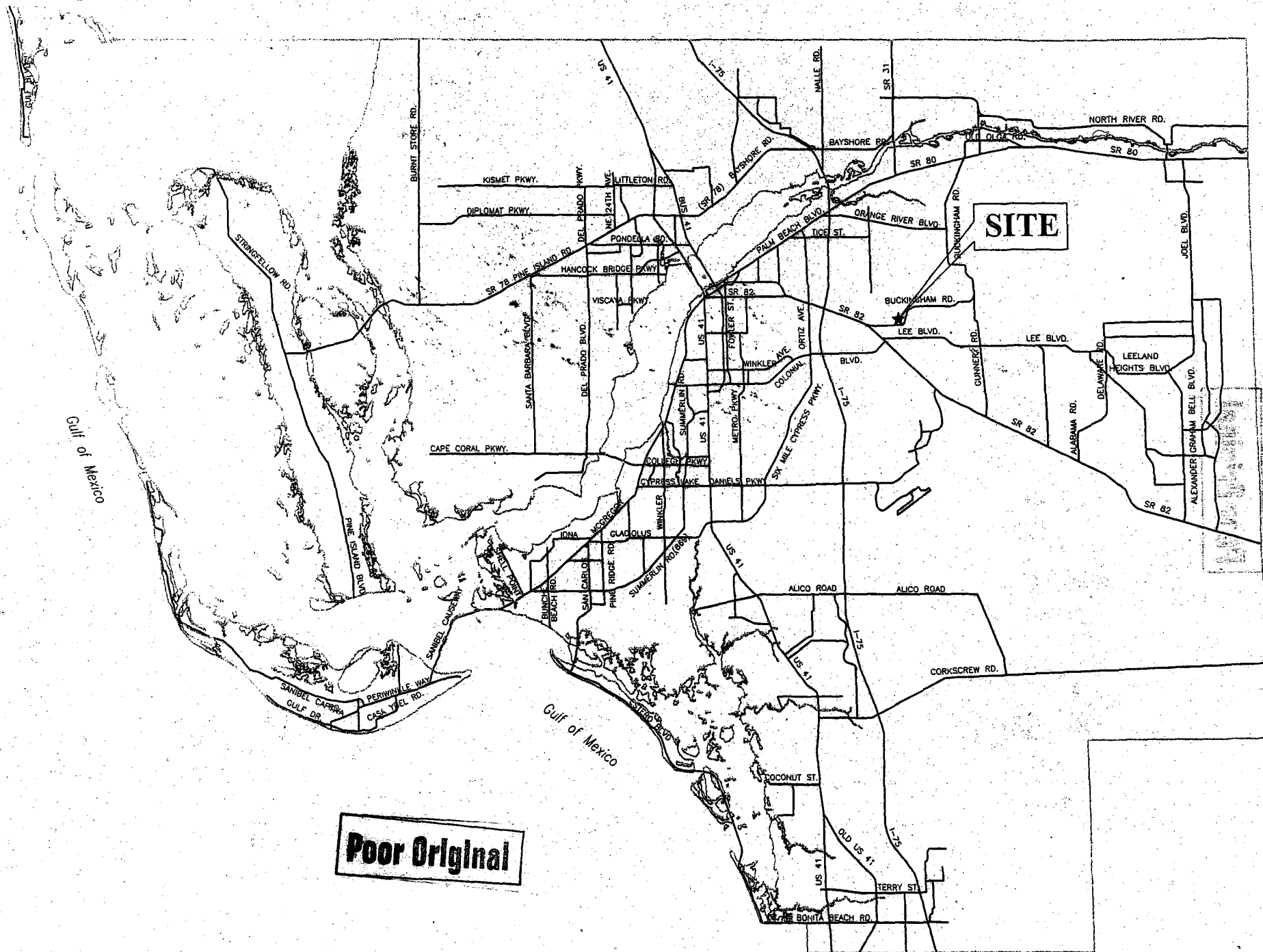


Figure 1

Site Location Map

Poor Original**Table 1. Summary of Water Uses at Lee County Resource Recovery Facility**

<i>Process</i>	<i>Water Demand</i>		<i>Water Source</i>
	<i>Normal Operation</i>	<i>Peak</i>	
<i>Cooling Tower</i>	463 gpm	825 gpm	Reclaimed*
<i>Fire Protection System</i>	0 gpm	625 gpm	Reclaimed*
<i>Boiler Process Makeup</i>	26 gpm	172 gpm	Potable
<i>Spray Dryer Absorbers</i>	57 gpm	113 gpm	Reclaimed*
<i>Irrigation</i>	0 gpm	85 gpm	Reclaimed*
<i>Domestic</i>	2 gpm	75 gpm	Potable
<i>Ash Discharger Quench</i>	16 gpm	36 gpm	Reclaimed*

* Groundwater used as backup water supply

1.3 COMPLIANCE WITH CONSUMPTIVE USE RULES

Since operation began in 1994, the Facility has met and continues to meet all requirements of Section 301 (Conditions for Issuance of Permits), Chapter 40E-2, F.A.C. In summary, the Facility's past and present water use:

- 
- (a) Will not cause significant saline water intrusion, since the withdrawals are within the permit limits;
 - (b) Will not adversely impact offsite land uses since reclaimed water is the primary water source, and the facility has zero process discharge.
 - (c) Will not cause adverse environmental impacts, rather it is a beneficial reuse of the reclaimed wastewater;
 - (d) Will not cause pollution of the water resources since it discharges to the sewer system;

- (e) Is a reasonable-beneficial use as defined in subsection 373.019(13), F.S. "Reasonable-beneficial use" means the use of water in such quantity as is necessary for economic and efficient utilization for a purpose and in a manner which is both reasonable and consistent with the public interest. The water is used for the public benefit of processing solid waste while producing electricity;
- (f) Will not interfere with presently existing legal uses;
- (g) Is in accordance with the Water Resource Implementation Rule on water transport since the transfer or use of water does not cross District boundaries;
- (h) Makes use of a reclaimed water source;
- (i) Is consistent with Sections 373.016, 373.036, Florida Statutes, and otherwise is consistent with the public interest as prescribed by Chapter 373, F.S. and Chapter 40E-2, F.A.C.

2.0 DESIGN INFORMATION

Groundwater wells were installed for makeup water supply during emergency conditions, when reclaimed water is not available from the City of Fort Myers. Four of the six permitted wells have been installed, each 8-inches in diameter and 150-feet deep. The wells are cased to 80 feet, withdrawing from the Sandstone aquifer. Each well has a pumping capacity of 175 gpm. The Conditions of Certification authorizes a maximum daily withdrawal of 1.5 mgd from the Sandstone aquifer for process cooling, ash quenching, and landscape irrigation purposes, for a period not to exceed a total of ten days within any twelve-month period. The Certification authorizes a maximum annual withdrawal of 15.8 million gallons from the Sandstone aquifer for process cooling, ash quenching, landscape irrigation, and maintenance exercising of the on-site wells.

3.0 HISTORICAL GROUNDWATER WITHDRAWALS

Groundwater withdrawals are only used when treated effluent is not available from the City of Fort Myers or when the wells are being exercised for maintenance purposes. The wells are exercised every two to three months for maintenance purposes, at which time each well is generally operated for less than one hour and pumps less than 10,000 gallons. With the exception of these maintenance withdrawals, groundwater withdrawals for operational purposes were made in only 12 months over the past ten years.

Table 2 summarizes the operational groundwater withdrawals made by the Facility during the past ten years. None of these withdrawals exceeded the maximum daily and annual Certification requirements.

**Table 2. Historical Operational Groundwater Withdrawals
Lee County Resource Recovery Facility**

DATE	WELL	HOURS ON	GALLONS PUMPED
January 1995	A	8.5	101,182
	B	0.5	7,195
	C	0	0
	D	6.0	61,905
March 1995	A	6.6	112,158
	B	4.2	47,652
	C	9.9	184,045
	D	0	0
August 1995	A	5.9	67,988
	B	4.4	59,992
	C	6.2	67,494
	D	5.2	36,111
November 1995	A	30.35	338,315
	B	23.3	234,368
	C	0.1	676
	D	24.2	278,843
December 1995	A	0.66	9,804
	B	4.4	78,485
	C	16.6	233,474
	D	9.8	125,232
January 1996	A	0	0
	B	14.1	262,475
	C	16.0	191,554
	D	0	0
February 1996	A	20.04	276,090
	B	6.43	132,135
	C	5.13	45,658
	D	22.85	207,552
June 1996	A	3.66	55,000
	B	11.41	159,659
	C	18.79	250,182
	D	10.04	128,391

**Table 2, continued. Historical Operational Groundwater Withdrawals
Lee County Resource Recovery Facility**

DATE	WELL	HOURS ON	GALLONS PUMPED
September 1996	A	7.24	90,931
	B	5.49	85,537
	C	5.89	71,724
	D	4.65	85,815
October 1996	A	6.5	65,910
	B	6.5	74,490
	C	3.5	28,980
	D	4.9	78,498
December 1996	A	4.75	51,300
	B	4.25	45,900
	C	3.75	40,500
	D	3.92	42,336
April 2000	A	9.15	168,735
	B	12.67	179,128
	C	10.22	166,046
	D	9.68	188,791

7.9 – Water Conservation Plan

August 13, 2002

Elizabeth T. Ellis
Water Supply Division
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406-3089

Re: Lee County Solid Waste Resource Recovery Facility
Water Conservation Plan

Dear Ms. Ellis:

Enclosed please find the Water Conservation Plan for the Lee County Solid Waste Resource Recovery Facility. This Plan has been prepared in accordance with the Facility's Conditions of Certification, modified on August 21, 2000 to include Section XV.B.3.e. This Section requires the Permittee to submit a Water Conservation Plan to the SFWMD, within two years of issuance of the modified Certification Order. This report has been prepared by Malcolm Pirnie, and is submitted on behalf of Lee County, the Permittee.

We believe the attached report contains all of the information that the SFWMD requires. If you require clarification or need any additional information, please do not hesitate to contact us.

Very truly yours,

MALCOLM PIRNIE, INC.



Scott C. Shannon, P.E.
Project Engineer

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David Dee, Landers & Parsons (Tallahassee)
Rob French, Malcolm Pirnie (Fort Myers)

→ Sam Rosania, FHI

WATER CONSERVATION PLAN

**Lee County Solid Waste Resource Recovery Facility
10500 Buckingham Road
Fort Myers, Florida**



**DEP Case No. PA90-30
August 2002**

**Malcolm Pirnie, Inc.
1533 Hendry Street, 2nd Floor
Ft. Myers, Florida 33901**

1.0 INTRODUCTION

This report has been prepared in accordance with the Conditions of Certification of the Lee County Solid Waste Resource Recovery Facility. The Conditions of Certification were modified on August 21, 2000 to include Section XV.B.3.e. This section requires that Lee County to submit, within two years of the modified Certification Order, a Water Conservation Plan to the South Florida Water Management District (SFWMD). This Water Conservation Plan has been prepared in accordance with Chapter 40E-2, F.A.C., amended September 10, 2001.

The Lee County Solid Waste Resource Recovery Facility is located at 10500 Buckingham Road, Fort Myers, in Lee County, Florida. A site location map is provided as Figure 1. The Facility receives, stores, and combusts municipal solid waste and produces electricity. It utilizes a technology generally known as "mass-burning," in which solid waste is burned with little or no pre-combustion processing.

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Gulf of Mexico

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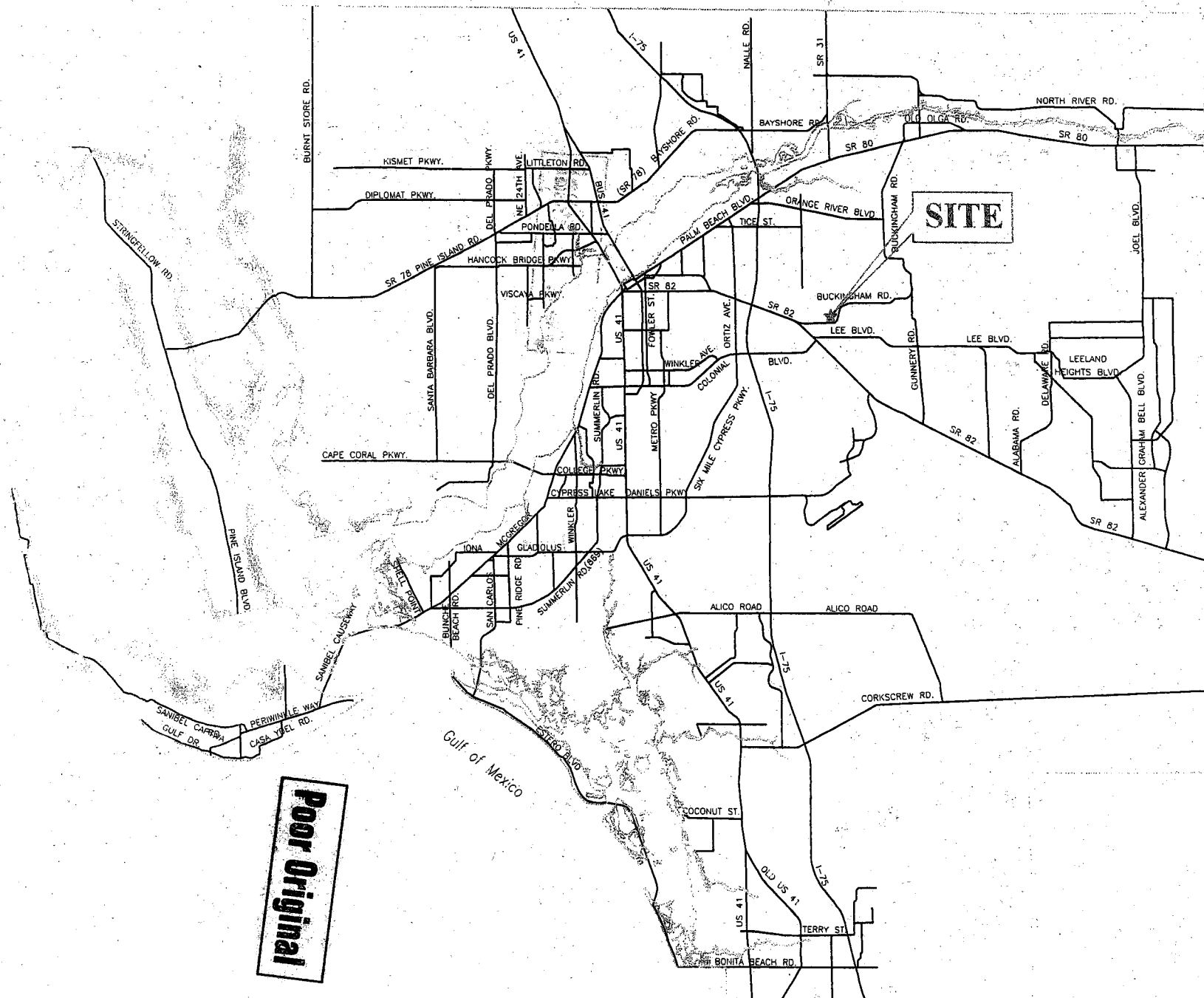


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<i>Domestic</i>	2 gpm	75 gpm	Potable
<i>Ash Discharger Quench</i>	16 gpm	36 gpm	Reclaimed*

* Groundwater used as backup water supply

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2.0 WATER AUDIT

An audit of the amount of water used by the Facility on a monthly basis was conducted for the period from July 2000 through June 2002. Table 2 summarizes the results of this water audit. As shown in Table 2, the Facility used an average of 1,725,000 gallons per month of potable water. This equates to a flow rate of 40 gallons per minute (gpm), well within the design range of 28 to 247 gpm shown in Table 1.

For those processes that utilize reclaimed water (with groundwater as a backup supply), the Facility used an average of 15,539,000 gallons per month, less than one hundredth of one percent of which was groundwater. This equates to a flow rate of 360 gpm, well below the design usage of 536 gpm under normal operation.

Table 2. Results of Water Audit

Month	Water Usage (kgals)			Total
	Potable	Groundwater	Reclaimed	
Jul-00	2,553	0.0	16,603	19,156
Aug-00	2,243	0.0	16,440	18,683
Sep-00	1,929	0.0	16,245	18,174
Oct-00	2,123	0.0	10,759	12,882
Nov-00	1,739	1.3	13,023	14,763
Dec-00	1,708	0.0	16,238	17,946
Jan-01	1,999	0.0	15,620	17,619
Feb-01	1,566	1.1	15,446	17,013
Mar-01	1,577	0.0	16,128	17,705
Apr-01	1,559	0.0	11,510	13,069
May-01	1,464	0.9	18,476	19,941
Jun-01	1,359	0.0	16,905	18,264
Jul-01	1,258	0.0	16,659	17,917
Aug-01	1,266	12.5	17,916	19,195
Sep-01	1,305	16.6	17,379	18,701
Oct-01	2,059	0.0	16,245	18,304
Nov-01	2,023	0.0	10,078	12,101
Dec-01	1,789	0.0	13,748	15,537
Jan-02	1,914	0.0	17,948	19,862
Feb-02	1,704	0.0	15,770	17,474
Mar-02	1,822	0.0	16,082	17,904
Apr-02	1,509	0.0	15,289	16,798
May-02	1,249	0.0	11,685	12,934
Jun-02	1,683	0.0	20,751	22,434
Average	1,725	1	15,539	17,266

Poor Original

3.0 WATER CONSERVATION PLAN

In accordance with the *Basis of Review for Water Use Permit Applications within the South Florida Water Management District*, the following water conservation measures have been considered for implementation at the Facility:

3.1 Leak Detection and Repair Program

The Facility operator has had a leak detection and repair program in place since the Facility began operating in 1994. Under this program, any leaks observed during routine inspections of the Facility are documented in a maintenance work order. Repair work is scheduled upon issuance of the work order. Upon completion of the repair, the work order is closed out.

3.2 Recovery/Recycling Program

The Facility currently recycles process water to the maximum extent. This includes the treatment of cooling tower blowdown with a reverse osmosis system to maximize the amount of cycles, thus minimizing makeup water needs. Additional cycles could not be expected, as a reverse osmosis system is presently the best practice for industrial solids removal, and therefore additional pollutant removal could not be achieved with current removal technology.

In addition, the Facility collects wastewater resulting from demineralizer regeneration, reverse osmosis concentrate, and equipment washdowns and reuses it in the spray dryer absorbers and to quench combustor ash. As a result, all process wastewater is recycled and the Facility has had zero process discharge.

3.3 Processes to Decrease Water Consumption.

As shown in Table 2, the Facility's average water demand is 17,266,000 gallons per month. Ninety percent of this demand (including all cooling water and irrigation) is met using reclaimed water, decreasing the need to consume more than 15 million gallons per month of potable water or groundwater. Groundwater is used for process makeup water only when reclaimed water is not available.

Potable water is used only for domestic use and for boiler makeup. Potable water must be demineralized prior to being used as boiler makeup. The Facility treats potable water using a reverse osmosis system prior to demineralization. This improves the water quality to the demineralizers and reduces the frequency required for regeneration. This decreases the consumption of potable water, which is used to regenerate and backwash the demineralizer system.

3.4 Employee Awareness Program Concerning Water Conservation

Effective August 2002, an employee awareness program concerning water conservation will be implemented at the Facility. This program will include the presentation and discussion of water conservation topics at safety meetings held monthly for all Facility employees.



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

APPENDIX 8.0

CORRESPONDENCE FROM FEDERAL, STATE, AND LOCAL AGENCIES

8.1 – Correspondence From Federal, State, and Local Agencies

8.2 – Correspondence From South Florida Water Management District

8.1 – Correspondence From Federal, State, and Local Agencies



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

FORT MYERS SERVICE CENTER 2301 McGregor Boulevard, Fort Myers, FL 33901
(941) 338-2929 • FL WATS 1-800-248-1201 • Suncom 748-2929 • Fax (941) 3

www.sfwmd.gov/org/exo/ftmyers/

CON 24-05

ENVIRONMENTAL RESOURCE REGULATION

July 8, 2002

Mr. Lindsey Sampson
Lee County Solid Waste Dept.
P.O. Box 398
Fort Myers, FL 33902

Dear Mr. Sampson:

SUBJECT: NOTICE OF COMPLIANCE (FINAL MONITORING REPORT)
Solid Waste Energy Recovery Facility
Lee County S24/T44S/R25E

Thank you for your recent submittal regarding the environmental monitoring special conditions for the Energy Recovery Facility.

Below is a table of monitoring reports we have received and monitoring reports due.

Report Title	Date Due	Date Received
Baseline Report	Prior to Wetland Creation	March 8, 1993
Time Zero Report	Completion of Planning	March 25, 1994
First Monitoring Report	December 31, 1994	January 5, 1995
Second Monitoring Report	December 31, 1995	March 25, 1996
Third Monitoring Report	December 31, 1996	February 27, 1997
Fourth Monitoring Report	December 31, 1997	January 5, 1998
Fifth Monitoring Report	December 31, 1998	March 19, 1999
Site Inspection	December 31, 1998	March 29, 1999
Sixth Monitoring Report	December 31, 1999	January 18, 2000
Seventh Monitoring Report	December 31, 2000	April 23, 2001
Eighth Monitoring Report	December 31, 2001	January 29, 2002
Final Site Inspection	Call to Schedule	

This letter is written in response to the eighth annual wetland monitoring report. The information submitted complies with the terms agreed upon at previous site inspections and correspondence found in the file. The data in the report shows the herbaceous vegetation percentages have increased significantly since the last report. As a result, the

GOVERNING BOARD

Trudi K. Williams, P.E., *Chair*
Lennart E. Lindahl, P.E., *Vice-Chair*
Pamela Brooks-Thomas

Michael Collins
Hugh M. English
Gerardo B. Fernández

Patrick J. Gleason, Ph.D., P.C.
Nicolás J. Gutiérrez, Jr., Esq.
Harkley R. Thornton

Henry Dean, *Executive Director*

8.2 – Correspondence From South Florida Water Management District



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

FORT MYERS SERVICE CENTER 2301 McGregor Boulevard, Fort Myers, FL 33901
(941) 338-2929 • FL WATS 1-800-248-1201 • Suncom 748-2929 • Fax (941) 338-2936 • www.sfwmd.gov/org/exo/ftmyers/

CON 24-05

ENVIRONMENTAL RESOURCE REGULATION

August 20, 2002

Mr. Lindsey Sampson
Lee County Solid Waste Dept.
P.O. Box 398
Fort Myers, FL 33902

Dear Mr. Sampson:

SUBJECT: NOTICE OF COMPLIANCE (FINAL INSPECTION)
Solid Waste Energy Recovery Facility
Lee County S24/T44S/R25E

This letter is written to inform you that a July 25, 2002 inspection and a review of our files indicate that all District requirements for the wetlands have been satisfied.

As a reminder, the mitigation areas are to be maintained free of exotic vegetation and no more than 10 percent total cover of nuisance in perpetuity.

The District appreciates your efforts to maintain compliance with all the requirements for this project.

Should you have any questions or require further assistance, please contact me at (239) 338-2929.

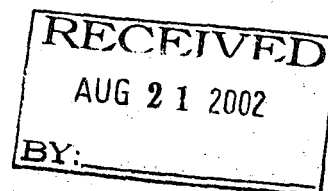
Sincerely,

A handwritten signature in cursive script that reads "Shawn McCarthy".

Shawn McCarthy, Environmental Analyst
Fort Myers Service Center

SJM/sjm

C: Jennifer Culbertson/USACOE/Jacksonville
Dan VanNorman/FDEP/Fort Myers



GOVERNING BOARD

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Harkley R. Thornton

EXECUTIVE OFFICE

Henry Dean, *Executive Director*



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

APPENDIX 9.0

GROUNDWATER WELL INVENTORY

**9.1 – Permitted Wells
(>500,000 gpd)**

**9.2 - Permitted Wells
(<500,000 gpd)**

9.1 – Permitted Wells (>500,000 gpd)

Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

PWS Well Latitude/Longitude Search

To SEARCH...Enter Mile Radius>> 5.00 Latitude>>26:37:54 Longitude>>81:45:41		
Latitude 26:41:55	Longitude 81:50:2.	PWS ID: 5360016 BAYSHORE UTILITY COMP SrcType:GROUND Plant ID / Name:1 -BAYSHORE UTILITY COMPANY Status:A Well ID / Name:1 -BAYSHORE UTILITY COMPANY Status:A
Latitude 26:41:55	Longitude 81:50:2.	PWS ID: 5360016 BAYSHORE UTILITY COMP SrcType:GROUND Plant ID / Name:1 BAYSHORE UTILITY COMPANY Status:A Well ID / Name:2 BAYSHORE UTILITY COMPANY Status:A
Latitude 26:38:20	Longitude 81:50:0	PWS ID: 5360059 CORALWOOD VILLAGE SrcType:GROUND Plant ID / Name:1 CORALWOOD VILLAGE WTP Status:A Well ID / Name:1 CORAL CAPE MOBILE WELL Status:A
Latitude 26:38:20	Longitude 81:50:0	PWS ID: 5360059 CORALWOOD VILLAGE SrcType:GROUND Plant ID / Name:1 CORALWOOD VILLAGE WTP Status:A Well ID / Name:2 CORAL CAPE MOBILE WELL Status:A

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PWS Well Latitude/Longitude Search

To SEARCH...Enter Mile Radius>> 5.00 Latitude>>26:37:54 Longitude>>81:45:41

Latitude 26:39:40	Longitude 81:43:40	PWS ID: 5360092 LEE MAX TRAILER PARK SrcType:GROUND Plant ID / Name:1 -BUCKINGHAM RD. Status:A Well ID / Name:1 -ROBERT L FOSTER TR WELL Status:A
Latitude 26:41:40	Longitude 81:46:40	PWS ID: 5360097 FLORIDA POWER & LIGHT SrcType:GROUND Plant ID / Name:1 FLORIDA POWER & LIGHT WTP Status:I Well ID / Name:1 FLORIDA POWER & LIGHT WEL Status:I
Latitude 26:38:7.	Longitude 81:48:53	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:10 FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:34	Longitude 81:49:17	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:1 FORT MYERS WATER DEPT. WE Status:A

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Latitude 26:37:13	Longitude 81:49:15	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 -FORT MYERS WATER DEPT. WT Status:A Well ID / Name:2 -FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:30	Longitude 81:49:20	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:3 FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:58	Longitude 81:48:51	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:4 FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:54	Longitude 81:48:46	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:5 FORT MYERS WATER DEPT. WE Status:A

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PWS Well Latitude/Longitude Search

To SEARCH...Enter Mile Radius>> 5.00 Latitude>>26:37:54 Longitude>>81:45:11

Latitude 26:37:48	Longitude 81:48:54	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 -FORT MYERS WATER DEPT. WT Status:A Well ID / Name:6 -FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:39	Longitude 81:49:9.	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:7 FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:41	Longitude 81:49:3.	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:8 FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:19	Longitude 81:49:15	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:9 FORT MYERS WATER DEPT. WE Status:A

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PWS Well Latitude/Longitude Search

To SEARCH...Enter Mile Radius>> 5.00 Latitude>>26:37:54 Longitude>>81:45:41

Latitude 26:38:10	Longitude 81:48:59	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 -FORT MYERS WATER DEPT. WT Status:A Well ID / Name:11 -FORT MYERS WATER DEPT. WE Status:A
Latitude 26:38:4.	Longitude 81:48:57	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:12 FORT MYERS WATER DEPT. WE Status:A
Latitude 26:38:6.	Longitude 81:49:2.	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:13 FORT MYERS WATER DEPT. WE Status:A
Latitude 26:38:1.	Longitude 81:49:1.	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:14 FORT MYERS WATER DEPT. WE Status:A

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PWS Well Latitude/Longitude Search

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Latitude 26:38:2.	Longitude 81:49:6.	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 -FORT MYERS WATER DEPT. WT Status:A Well ID / Name:15 -FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:57	Longitude 81:49:4.	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:16 FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:58	Longitude 81:49:10	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:17 FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:54	Longitude 81:49:8.	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:18 FORT MYERS WATER DEPT. WE Status:A

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PWS Well Latitude/Longitude Search

To SEARCH...Enter Mile Radius>> 5.00 Latitude>>26:37:54 Longitude>>81:45:41

Latitude 26:37:60	Longitude 81:48:57	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 -FORT MYERS WATER DEPT. WT Status:A Well ID / Name:19 -FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:59	Longitude 81:48:51	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:20 FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:54	Longitude 81:48:54	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:21 FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:51	Longitude 81:48:53	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:22 FORT MYERS WATER DEPT. WE Status:A

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PWS Well Latitude/Longitude Search

To SEARCH...Enter Mile Radius>> 5.00 Latitude>>26:37:54 Longitude>>81:4

Latitude 26:37:47	Longitude 81:48:56	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 -FORT MYERS WATER DEPT. WT Status:A Well ID / Name:23 -FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:48	Longitude 81:49:2.	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:24 FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:55	Longitude 81:49:14	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:25 FORT MYERS WATER DEPT. WE Status:A
Latitude 26:38:10	Longitude 81:49:4.	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:26 FORT MYERS WATER DEPT. WE Status:A

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PWS Well Latitude/Longitude Search

To SEARCH...Enter Mile Radius>> 5.00 Latitude>>26:37:54 Longitude>>81:45:41

Latitude 26:37:51	Longitude 81:48:57	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 -FORT MYERS WATER DEPT. WT Status:A Well ID / Name:27 -FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:53	Longitude 81:49:2.	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:28 FORT MYERS WATER DEPT. WE Status:A
Latitude 26:38:2.	Longitude 81:48:53	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:29 FORT MYERS WATER DEPT. WE Status:A
Latitude 26:37:43	Longitude 81:49:31	PWS ID: 5360102 FORT MYERS WATER DEPA SrcType:GROUND Plant ID / Name:1 FORT MYERS WATER DEPT. WT Status:A Well ID / Name:30 FORT MYERS WATER DEPT. WE Status:A

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PWS Well Latitude/Longitude Search

To SEARCH...Enter Mile Radius>> 5.00 Latitude>>26:37:54 Longitude>>81:45:41

Latitude 26:40:7.	Longitude 81:43:59	PWS ID: 5360140 HUT RESTAURANT Plant ID / Name:1 -HUT RESTAURANT WTP Well ID / Name:1 -HUT RESTAURANT WELL	SrcType:GROUND Status:A Status:A
Latitude 26:38:10	Longitude 81:48:.0	PWS ID: 5360178 EDIO LONGORIA MIGRANT Plant ID / Name:1 EDIO LONGORIA MIGRANT CAM Well ID / Name:1 EDIO LONGORIA MIGRANT CP.	SrcType:GROUND Status:A Status:I
Latitude 26:41:34	Longitude 81:47:42	PWS ID: 5360207 ORANGE HARBOR MOBILE Plant ID / Name:1 ORANGE HARBOR MHP WTP Well ID / Name:3 ORANGE HARBOR MHP WELLS #	SrcType:GROUND Status:A Status:A
Latitude 26:41:22	Longitude 81:47:23	PWS ID: 5360207 ORANGE HARBOR MOBILE Plant ID / Name:1 ORANGE HARBOR MHP WTP Well ID / Name:1 ORANGE HARBOR MHP WELLS #	SrcType:GROUND Status:A Status:A

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PWS Well Latitude/Longitude Search

To SEARCH...Enter Mile Radius>> 5.00 Latitude>>26:37:54 Longitude>>81:45:41

Latitude 26:41:32	Longitude 81:47:36	PWS ID: 5360207 ORANGE HARBOR MOBILE SrcType:GROUND Plant ID / Name:1 -ORANGE HARBOR MHP WTP Status:A Well ID / Name:2 -ORANGE HARBOR MHP WELLS # Status:A
Latitude 26:41:23	Longitude 81:47:42	PWS ID: 5360207 ORANGE HARBOR MOBILE SrcType:GROUND Plant ID / Name:1 ORANGE HARBOR MHP WTP Status:A Well ID / Name:4 ORANGE HARBOR WELL #2 Status:A
Latitude 26:41:23	Longitude 81:47:42	PWS ID: 5360207 ORANGE HARBOR MOBILE SrcType:GROUND Plant ID / Name:1 ORANGE HARBOR MHP WTP Status:A Well ID / Name:5 ORANGE HARBOR WELL #3 Status:A
Latitude 26:38:20	Longitude 81:48:20	PWS ID: 5360210 OUTPOST BAR SrcType:GROUND Plant ID / Name:1 OUTPOST BAR WTP Status:I Well ID / Name:1 OUTPOST BAR WELL Status:I

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PWS Well Latitude/Longitude Search

To SEARCH...Enter Mile Radius>> 5.00 Latitude>>26:37:54 Longitude>>81:45:1

Latitude 26:39:45	Longitude 81:43:53	PWS ID: 5360269 BUCKINGHAM BAR Plant ID / Name:1 -BUCKINGHAM BAR WTP Well ID / Name:1 -BUCKINGHAM BAR WELL	SrcType:GROUND Status:A Status:A
Latitude 26:39:22	Longitude 81:44:42	PWS ID: 5360275 GULF COAST CENTER Plant ID / Name:1 GULF COAST CENTER WTP Well ID / Name:2 GULF COAST CENTER WELLS	SrcType:GROUND Status:A Status:A
Latitude 26:39:21	Longitude 81:44:47	PWS ID: 5360275 GULF COAST CENTER Plant ID / Name:1 GULF COAST CENTER WTP Well ID / Name:1 GULF COAST CENTER WELLS	SrcType:GROUND Status:A Status:A
Latitude 26:39:21	Longitude 81:44:38	PWS ID: 5360275 GULF COAST CENTER Plant ID / Name:1 GULF COAST CENTER WTP Well ID / Name:3 GULF COAST CENTER WELLS	SrcType:GROUND Status:A Status:A

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PAGE 14

PWS Well Latitude/Longitude Search

To SEARCH...Enter Mile Radius>> 5.00 Latitude>>26:37:54 Longitude>>81:45:41

Latitude 26:40:10	Longitude 81:48:0	PWS ID: 5364060 WONDERLAND MOTEL Plant ID / Name:1 -WONDERLAND MOTEL WTP Well ID / Name:2 -WONDERLAND MOTEL WELL # 2	SrcType:GROUND Status:A Status:A
Latitude 26:38:37	Longitude 81:42:32	PWS ID: 5364064 LEE COUNTY MOSQUITO C Plant ID / Name:1 LEE COUNTY MOSQUITO CNTL Well ID / Name:1 LEE COUNTY MOSQUITO CNTL.	SrcType:GROUND Status:A Status:A
Latitude 26:38:37	Longitude 81:42:31	PWS ID: 5364064 LEE COUNTY MOSQUITO C Plant ID / Name:1 LEE COUNTY MOSQUITO CNTL Well ID / Name:2 LEE COUNTY MOSQUITO CNTL.	SrcType:GROUND Status:A Status:A
Latitude 26:38:36	Longitude 81:42:32	PWS ID: 5364064 LEE COUNTY MOSQUITO C Plant ID / Name:1 LEE COUNTY MOSQUITO CNTL Well ID / Name:3 LEE COUNTY MOSQUITO CNTL.	SrcType:GROUND Status:A Status:A

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PAGE 15

PWS Well Latitude/Longitude Search

To SEARCH...Enter Mile Radius>> 5.00 Latitude>>26:37:54 Longitude>>81:4

Latitude 26:38:6.	Longitude 81:47:59	PWS ID: 5364069 TOMAS LONGORIA MIGRAN SrcType:GROUND Plant ID / Name:1 -TOMAS LONGORIA MIGRANT CP Status:A Well ID / Name:1 -TOMAS LONGORIA MIGRANT CP Status:A
Latitude 26:42:0	Longitude 81:48:0	PWS ID: 5364080 PALM BEACH CHURCH OF SrcType:GROUND Plant ID / Name:1 PALM BCH CHCH OF CHRIST D Status:A Well ID / Name:1 PALM BCH OF CHCH OF CHRIS Status:A
Latitude 26:37:5.	Longitude 81:41:.8	PWS ID: 5364091 FLEET RESERVE SrcType:GROUND Plant ID / Name:1 FLEET RESERVE WATER PLANT Status:A Well ID / Name:1 FLEET RESERVE WELL Status:A
Latitude 26:38:0	Longitude 81:49:0	PWS ID: 5364093 BASS BUILDING SrcType:GROUND Plant ID / Name:1 BASS BUILDING WTP Status:A Well ID / Name:1 BASS BUILDING WELL Status:A

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PWS Well Latitude/Longitude Search

To SEARCH...Enter Mile Radius>> 5.00 Latitude>>26:37:54 Longitude>>81:45:41		
Latitude 26:40:19	Longitude 81:47:18	PWS ID: 5364094 KINGDOM HALL OF JEHOV SrcType:GROUND Plant ID / Name:1 -KINGDOM HALL WTP Status:A Well ID / Name:1 -KINGDOM HALL WELL Status:A
Latitude 26:34:18	Longitude 81:49:35	PWS ID: 5364099 SIX MILE CYPRESS SLOU SrcType:GROUND Plant ID / Name:1 SIX MILE CYPRESS SLOUGH W Status:A Well ID / Name:1 SIX MILE CYPRESS SLOUGH W Status:A
Latitude 26:37:25	Longitude 81:50:23	PWS ID: 5364101 PRESS PRINTING SrcType:GROUND Plant ID / Name:1 PRESS PRINTING WTP Status:A Well ID / Name:1 PRESS PRINTING WELL Status:A
Latitude 26:37:40	Longitude 81:41:25	PWS ID: 5364110 YEARGIN INC. LEE CO. SrcType:GROUND Plant ID / Name:1 LEE CO. SOLID WASTE WTP Status:I Well ID / Name:1 LEE CO. SOLID WASTE WELL Status:I

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PAGE 17

PWS Well Latitude/Longitude Search

To SEARCH...Enter Mile Radius>> 5.00 Latitude>>26:37:54 Longitude>>81:45:11

Latitude 26:36:19	Longitude 81:45:41	PWS ID: 5364111 GULF DISPOSAL INC. SrcType:GROUND Plant ID / Name:1 -GULF DISPOSAL INC. WATER Status:A Well ID / Name:1 -GULF DISPOSAL INC. WELL Status:A
Latitude 26:40:28	Longitude 81:43:53	PWS ID: 5364114 TINY'S BILLIARDS SrcType:GROUND Plant ID / Name:1 TINY'S BILLIARDS WTP Status:C Well ID / Name:1 TINY'S BILLIARDS WELL Status:C
Latitude 26:40:44	Longitude 81:46:35	PWS ID: 5364117 REVIVAL TABERNACLE CH SrcType:GROUND Plant ID / Name:1 REVIVAL TABERNACLE CHURCH Status:A Well ID / Name:1 REVIVAL TABERNACLE CHURCH Status:A
Latitude 26:41:47	Longitude 81:46:25	PWS ID: 5364118 TICE & SHORES MOOSE L SrcType:GROUND Plant ID / Name:1 TICE & SHORES MOOSE LDG. Status:I Well ID / Name:1 TICE & SHORES MOOSE LDG. Status:I

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PWS Well Latitude/Longitude Search

To SEARCH...Enter Mile Radius>> 5.00 Latitude>>26:37:54 Longitude>>81:45:4

Latitude 26:40:44	Longitude 81:46:35	PWS ID: 5364117 REVIVAL TABERNACLE CH SrcType:GROUND Plant ID / Name:1 -REVIVAL TABERNACLE CHURCH Status:A Well ID / Name:1 -REVIVAL TABERNACLE CHURCH Status:A
Latitude 26:41:47	Longitude 81:46:25	PWS ID: 5364118 TICE & SHORES MOOSE L SrcType:GROUND Plant ID / Name:1 TICE & SHORES MOOSE LDG. Status:I Well ID / Name:1 TICE & SHORES MOOSE LDG. Status:I
Latitude 26:40:19	Longitude 81:43:53	PWS ID: 5364138 KUNTRY KUBBARD-FT.MYE SrcType:GROUND Plant ID / Name:1 KUNTRY KUBBARD FM-FM Status:A Well ID / Name:1 KUNTRY KUBBARD WELL Status:A
Latitude 26:38:30	Longitude 81:43:30	PWS ID: 5364144 LEHIGH ACRES CHURCH O SrcType:GROUND Plant ID / Name:1 LEHIGH ACRES CHURCH OF CH Status:N Well ID / Name:1 Status:N

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Count: *66 ^

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9.2 - Permitted Wells (<500,000 gpd)

01432200000040000	WEL000022934	5/8/95	5/15/95	3150 MATECOME KEY RD	8	300	780	IRRIG	900		500
01432200000040000	WEL000023664	12/14/95	1/3/95	3150 MATECUMBE KEY RD	8	300	820	IRRIG	810		
24432602000000100	WEL000026660	3/24/98	4/6/98	1991 MITCHELL AV	4	70	80	DOMES	370	FLOW	100
24432603000000120	WEL000009454	4/17/87	6/23/87	GOODE AV	4	80	95	DOMES	304	FLOW	50
24432603000000270	WEL000022082	10/5/94	10/28/94	1961 GOOD AVENUE	4	70	100	DOMES	270		75
24432603000000280	WEL2001-01628	10/29/01	1/14/02	1981 GOODE AV LOTS 28 & 29	4	75	90	DOMES	320		50
244326040000000240	WEL000008000	5/22/86		GOODE RD	2	63	85	DOMES			
244326040000000240	WEL000009125	2/12/87	2/19/87	GOODE RD	2	72	85	DOMES	292		50
24432700000010010	WEL000027366	9/11/98	9/30/98	23050 N RIVER RD	4	115	145	DOMES	588		100
24432700000010040	WEL2001-01838	2/5/02	2/7/02	23100 N RIVER RD	4	110	160	IRRIG	695		100
24432700000010050	WEL2001-01443	10/12/01	10/24/01	23150 N RIVER RD	4	100	140	DOMES			80
24432700000040000	WEL000029132	10/7/99	10/22/99	23930 N RIVER RD		60	100	DOMES	510		50
24432700000040000	WEL199910790	10/18/99		23930 N RIVER RD							
24432700000040010	WEL000015338	2/4/90	4/25/90	SR 78	8	141	200	IRRIG	880		
24432700000040010	WEL000029133	10/7/99	10/13/99	23960 N RIVER RD		82	110	DOMES	510		50
24432700000040010	WEL2000-01397	7/11/00		SR 78				OTH			
24432700000020000	WEL000018244	10/15/91	10/15/91	4491 PINE ISLAND RD			20	TEST			
24432203000010010	WEL2001-01824	12/4/01	12/10/01	4643 PINE ISLAND RD NW	2	12	12	MONIT			
24442212000004070	WEL000009003	1/14/87		2734 JANET ST N.W	4	185	230	IRRIG	1150		60
24442500000010000	WEL000020106	5/5/93	5/5/93	BUCKINGHAM RD-JNCENERATOR SITE	4	60	76	PUBL	140		100
24442500000010000	WEL000020735	10/29/93	1/4/94	10500 BUCKINGHAM RD				GEO			
24442500000010000	WEL000020736	10/29/93	1/4/94	10500 BUCKINGHAM RD			150	GEO	380		
24442500000010000	WEL2000-00638	6/6/00	6/22/00	10500 BUCKINGHAM RD				TBORE			
24442500000010000	WEL2000-01882	12/15/00	12/21/00	10500 BUCKINGHAM RD	20	21	21	ELEV			
24442500000010000	WEL2000-01892	12/15/00	7/2/01	10500 BUCKINGHAM RD	20	21	21	ELEV			
24442500000010000	WEL2001-01420	9/24/01	10/2/01	10500 BUCKINGHAM RD	2	5	12	MONIT			
24442602001100160	WEL000024197	5/21/96	5/20/96	2912 28TH ST. W.	4	50	70	DOMES	121		50
24442603000180010	WEL000016268	7/12/90	1/31/91	2100 LAURA LANE	4	60	100	DOMES			
24442603000180050	WEL000022806	4/10/95	5/9/95	2108 LAURA LANE	4	60	65	DOMES	68		50
24442604000025A040	WEL000018114	6/12/90	9/25/90	3003 20TH ST W	2	63	80	DOMES			
244426040000260170	WEL000027469	10/8/98	10/8/98	3012 18TH ST W	4	54	70	DOMES	82		50
24442604000270010	WEL2002-00121	1/22/02	1/28/02	3018 17TH ST W	4	55	65	DOMES	60		50
24442604000270150	WEL000024373	7/1/96	8/22/96	3008 17ST W	4	62	70	DOMES	66		50
24442604000280010	WEL000029212	11/2/99	11/3/99	3721 11TH ST W		58	74	DOMES	61		50
24442604000280010	WEL000029213	11/2/99	11/3/99	3019 17TH ST W		52	70	DOMES	66		50
24442604000280010	WEL199910482	10/6/99		3019 17TH ST W							
24442604000290040	WEL2001-01120	11/1/01	11/7/01	3012 16TH ST W	4	53	63	DOMES	77		50
24442605000340020	WEL2002-00183	2/1/02	2/5/02	2909 20TH ST W LOT 2	4	60	75	DOMES	73		50
24442605000340100	WEL2000-01035	6/19/00	7/26/00	2908 19TH ST W	4	62	70	DOMES	90		60
24442605000370090	WEL000026077	9/23/97	9/28/97	2802 17TH ST W	4	65	67	DOMES	86		40
24442605000390070	WEL2001-00489	5/2/01	4/27/01	2707 20TH ST W	4	53	65	DOMES	120		100
24442605000430070	WEL000026149	10/10/97	10/20/97	2708 16TH ST	4	58	62	DOMES	89		50
244426060000510130	WEL000020148	5/14/93	5/17/93	2704 21 ST WEST	4	52	56	DOMES	100		100
244426060000510140	WEL000018348	11/20/91		2706 21ST ST WEST	4	60	70	DOMES			
244426060000510140	WEL000018763	3/25/92	4/2/92	2706 21ST ST WEST	4	55	60	DOMES	97		100
244426080000650020	WEL000028000	2/24/99	3/29/99	2802 GENE AV N	4	60	80	DOMES	80		50
24442609000750030	WEL000013650	4/11/89	7/7/89	2804 BETH AV	4	61	61	DOMES	90		50
24442609000750030	WEL000014278	7/27/89	9/27/89	2804 BETH AV	4	68	80	DOMES			
24442609000790080	WEL000022253	11/15/94	11/18/94	2810 ANN AVENUE NORTH	4	60	80	DOMES	70		50
24442610000880010	WEL2001-01281	8/16/01	8/21/01	2302 ANN AV N LOT 1 BLK 88	4	55	58	DOMES			50
24442611000990030	WEL2001-01283	8/16/01	8/21/01	2004 ANN AV N LOT 3	4	50	60	DOMES	36		50
24442611000990040	WEL2001-01282	8/16/01	8/21/01	2006 ANN AV N LOT 4	4	55	58	DOMES	30		50
24442612001030090	WEL000026068	9/19/97	12/8/97	2803 17TH ST W	4	60	65	DOMES	84		50
24442615001010020	WEL000027805	1/7/99	1/13/99	802 CHAMPION AV	4	68	73	DOMES	84		60
24442701000010120	WEL000026165	10/20/97	10/28/97	800 WELLINGTON AV	4	45	55	DOMES	222		100
24442701000040200	WEL000009581	5/8/87	5/9/87	815 SCOTT AV	2	42	50	DOMES	355		50
24442702000070020	WEL000013468	3/14/89	12/18/89	820 LOUIS AV	2	42	57	DOMES	390		50
24442702000070050	WEL2002-00167	1/29/02		814 LOUIS AV LOT 5 BLK 7							
24442702000070100	WEL000024219	5/20/96	5/22/96	804 LOUIS AVE.	4	47	61	IRRIG	274		40
24442703000090080	WEL000008598	10/1/88	10/6/88	IRVING	2	42	55	DOMES			
24442703000100190	WEL000016261	7/11/90		813 FITCH AV	2	60	80	DOMES			
24442703000100190	WEL000018855	11/16/90	12/26/90	813 FITCH AV	4	145	170	DOMES	760		50
2444270300010024A	WEL000012582	10/20/88	10/21/88	4404 9TH ST E	2	42	48	DOMES	465		
24442704000140160	WEL000011305	3/22/88	7/6/88	909 HINES AV	2	42	50	DOMES	268		
24442704000140160	WEL000012179	8/3/88	9/9/88	907 HINES AV	2	42	50	DOMES			
24442705000170090	WEL000011515	4/25/88	7/7/88	906 WELLS AVE	2	49	55	DOMES	314		50
24442705000180110	WEL000017809	6/24/91	9/4/91	902 LOUIS AVENUE	4	130	150	DOMES	850		75
24442705000190190	WEL2001-01122	7/11/01	7/16/01	913 LOUIS AV	4	132	153	DOMES	650		80
24442705000200050	WEL000012007	7/8/88	9/21/88	914 SCOTT AV	4	125	145	DOMES	640		50
24442705000200220	WEL000025729	6/18/97	6/19/97	919 MOORE AV	4	47	76	DOMES	430		50
24442706000210190	WEL000012893	12/7/88	2/22/89	913 SCOTT AV N	4	55	60	DOMES	395		40
24442706000210190	WEL2000-01612	8/25/00	8/28/00	913 SCOTT AV	4	120	140	DOMES	800		100
2444270600021024A	WEL000021076	2/10/94	2/14/94	3804 E 10TH ST	4	54	62	DOMES	350		20
24442706000240020	WEL000021400	5/3/94	5/9/94	920 WELLINGTON AVENUE	4	50	70	DOMES	400		50
2444270600024013B	WEL000024805	11/12/96	11/12/96	3507 E 9TH ST	4		100	DOMES	272		
24442707000250090	WEL000008255	7/11/86	12/4/86	WELLINGTON	4	48	55	DOMES	330		100
24442707000280190	WEL1999-00074	12/20/99	3/20/00	1013 SCOTT AV	4	40	60	DOMES			30
24442708000290030	WEL000012422	9/21/88	11/18/88	106 SCOTT AV	4	58	65	DOMES	370		30
24442708000290220	WEL000027268	8/17/98	8/18/98	623 HENRY AV	4	55	60	DOMES	294		40



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

APPENDIX 10.0

GEOTECHNICAL REPORTS AND ARCHAEOLOGICAL REPORT

10.1 – Geotechnical Reports

10.2 – Archaeological Report

10.1 – Geotechnical Reports

**SUBSURFACE SOIL EXPLORATION
ANALYSIS AND RECOMMENDATIONS
LEE COUNTY RECOVERED MATERIALS
PROCESSING FACILITY
LEE COUNTY, FLORIDA**



Ardaman & Associates, Inc.

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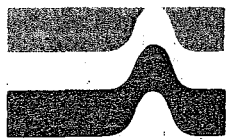
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American Concrete Institute

American Society for Testing and Materials

Florida Institute of Consulting Engineers



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

June 27, 2000

Ardaman File No. 00-4576

MALCOLM PIRNIE, INC.
1533 Hendry Street, Suite 201
Fort Myers, Florida 33901

Attention: Mr. Robert H. French, P.E.

**SUBJECT: Subsurface Soil Exploration
Analysis and Recommendations
Lee County Recovered Materials Processing Facility
Lee County, Florida**

Gentlemen:

As requested by PITMAN HARTENSTEIN & ASSOCIATES, INC. and authorized by MALCOLM PIRNIE, INC., Ardaman & Associates has completed the subsurface soil exploration program for the subject project. The purposes of this program were to evaluate the general subsurface conditions at the site and provide recommendations for site preparation and foundation design.

This report documents our findings and conclusions. It has been prepared for the exclusive use of MALCOLM PIRNIE, INC. and their consultants for specific application to the subject project in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

SCOPE

The scope of our services was limited to the following items:

1. Conducting six (6) Standard Penetration Test borings and ten (10) hand auger borings to determine the nature and condition of the subsurface soils.
2. Reviewing each soil sample obtained in our field testing program by a geotechnical engineer in our laboratory for further identification and assignment of laboratory tests, if required.

3. Analyzing the existing soil conditions with respect to the proposed construction as it relates to foundation design.
4. Preparing this report to document the results of our field exploration, engineering analysis and foundation design recommendations.

SITE LOCATION

The proposed recovered materials processing facility will be located southwest of the existing Lee County incinerator and along the north side of Buckingham Road, Lee County, Florida. The site had been cleared and was generally accessible to our truck mounted drilling equipment

FIELD EXPLORATION PROGRAM

Our field exploration consisted of performing six Standard Penetration Test (SPT) borings. The SPT borings were drilled to a maximum depth of 30 feet below the existing ground surface. The SPT borings were conducted using methods consistent with ASTM D-1586. The equipment and procedures used in the SPT borings are described in detail in the Appendix.

In addition, our field exploration included ten shallow hand auger borings utilizing a hand held bucket auger. The hand auger borings were located within the parking and drive areas surrounding the proposed facility. Borings were advanced to a depth of 5 feet below the ground surface, or to refusal on rock. The hand auger boring logs are appended to this report.

The locations of the borings are shown on the attached Boring Location Plan. We were provided with a copy of a site plan marked with the proposed boring locations. The boring locations were located in the field by Ardaman & Associates, Inc. personnel by measuring from existing site features as shown on the Partial Site Plan provided by MALCOLM PIRNIE, INC. Therefore, the locations indicated should be considered accurate only to the degree implied by the method of measurement used. If a more precise location of the borings is desired, then we recommend that a registered land surveyor be employed to locate the borings on site.

GENERAL SUBSURFACE CONDITIONS

The general subsurface conditions encountered during the field exploration are shown on the attached soil boring logs. Soil stratification is based on examination of recovered soil samples and

interpretation of the field boring logs. The stratification lines represent the approximate boundaries between the soil types; the actual transitions may be gradual.

A generalization of subsurface soil conditions encountered in the borings is described below.

<u>DEPTH</u>		<u>SOIL DESCRIPTION</u>
<u>FROM</u>	<u>TO</u>	
Ground Surface	0.5'-4'	Fine sand (SP), slightly silty fine sand and slightly silty fine sand with gravel (limestone) (SP-SM), sandy silt (ML), and clayey fine sand (SC).
0.5'-4'	1.5'-3.5'	Weathered or fractured limestone and hard bedded limestone.
1.5'-3.5'	6'-7.5'	Fine sand and fine sand with gravel (shell) (SP), clayey fine sand (SC), slightly silty fine sand and slightly silty fine sand with gravel (shell) (SP-SM).
6'-7.5'	TERM	Sandy silt and sandy silt with gravel (limestone and shell) (ML) and very clayey fine sand (SC).

Groundwater was encountered in the boreholes at a depth 5 to 5.5 feet below the existing ground surface at the time of our field exploration (6/16, 20 & 21/00). The groundwater depths shown on the boring logs represent the groundwater surface encountered on the dates shown. Fluctuations in groundwater level should be anticipated throughout the year due to seasonal variations in rainfall, and other factors.

LABORATORY TESTING PROGRAM

Representative soil samples obtained during our field sampling operation were packaged and transferred to our office and, thereafter, examined by a geotechnical engineer to obtain more accurate descriptions of the existing soil strata. Laboratory testing was performed on selected surficial soil samples as deemed necessary to aid in soil classification and to further define the engineering properties of the soils. The laboratory tests consisted of LBR tests. The test results are presented on separate sheets and appended to this report. The soil descriptions shown on the logs are based upon visual-manual procedures in accordance with local practice. Soil classification is in general accordance with the Unified Soil Classification System (ASTM D-2487) and is also based on visual-manual procedures.

PROPOSED CONSTRUCTION

We understand the proposed waste processing facility will consist of a pre-engineered metal building with surrounding paved parking and drive areas. We understand the structure will utilize a 6-inch thick slab-on-grade. The floor slab may have several pits, or troughs, for sorting waste materials. For the purposes of evaluating the bearing capacity and settlement values, we were provided with maximum column loads of 120 kips. The recommendations contained in this report will not necessarily apply if loading conditions are in excess of the loading conditions provided.

ANALYSIS AND RECOMMENDATIONS

In view of our findings, subsurface soil conditions appear to be adequate to allow use of a shallow footing foundation system with slab-on-grade. We understand that some additional fill soils will be placed within the proposed areas of development. Generally, compaction of the surface soils is recommended to increase the soil bearing capacity and minimize foundation settlement.

The following are our recommendations for overall site preparation and foundation design which we feel are best suited for the proposed facility and existing soil conditions. These recommendations are made as a guide for the design engineer and/or architect, parts of which should be incorporated into the project's general specifications.

SITE PREPARATION:

1. The cleared surfaces in construction areas should be proofrolled using the appropriate compaction equipment for site and soil conditions. Adjust the moisture content of the soil, as necessary, to aid compaction. Sufficient passes should be made to develop a minimum dry density of 95 percent of the Modified Proctor Maximum Dry Density (ASTM D-1557) to a depth of 12 inches below the compacted surface. Replace all material, if determined to be deleterious, in areas that "yield" during the proofrolling operation and replace with suitable fill material conforming to that stated in Item 4.
2. After satisfactory proofrolling of the cleared surface in accordance with the above, filling with suitable material may proceed. Fill material should conform to that stated in Item 4 below. The fill should be placed in level lifts not exceeding 12 inches in uncompacted thickness. Each lift should be compacted by repeated passes with

appropriate compaction equipment to achieve at least 95 percent of the Modified Proctor Maximum Dry Density (ASTM D-1557). The filling and compaction operations should continue until the desired elevation(s) is achieved.

3. Fill material should preferably consist of clean to slightly silty or clayey fine sands, free of organic or other deleterious materials, with less than 12 percent passing the U.S. Sieve No. 200.
4. Excavate the continuous wall footing lines and/or column footings to the proposed bottom of footing elevations and, thereafter, verify the in-place compaction. If necessary, compact the bottom of the excavations to achieve a minimum dry density of 95 percent of the Modified Proctor Maximum Dry Density (ASTM D-1557). This density should be developed to a minimum depth of 12 inches below the bottom of the footings. Overexcavate and recompact, as necessary, to fulfill the above compaction criteria. The moisture content of the foundation soils must be controlled during the compaction procedure to aid compaction. The moisture content should be within the range of +2 to -4 percent of the optimum moisture as established by the Modified Proctor Dry Density test.
5. Ardaman & Associates, Inc. should be employed by the Owner to observe and test all prepared and compacted areas to document that all unsuitable soils are removed and that the natural foundation and fill soils are prepared and compacted in accordance with the above recommendations.

FOUNDATION DESIGN:

Foundation soils prepared in accordance with the above recommendations should be suitable for supporting the proposed structure on an economical and conventionally designed shallow foundation system. The foundations may be designed for an allowable net soil contact pressure of 3,000 pounds per square foot (psf) or less.

Column footings should be a minimum of 24 inches wide and wall footings should be a minimum of 18 inches wide. A minimum soil coverage of 12 inches should be maintained from the bottom of the exterior foundations to the adjacent outside finished grades.

Based on the boring information and the assumed loading conditions, the recommended allowable net soil contact pressure will yield a minimum factor of safety in excess of two against bearing capacity failure. The total settlement is estimated to be 1 inch or less, and differential settlement between adjacent footings is estimated to be 0.75 inch or less. Because foundation soils are mostly coarse-grained, the majority of settlement will occur during construction as the load is being applied.

PAVEMENT DESIGN:

Limerock Bearing Ratio (LBR) tests were performed on two sand samples from areas described on the appended reports. One sample represented the natural ground and the other was an imported fill material stockpiled on site. Both samples were similar in texture and a similar LBR value was obtained: 37 and 45. Based upon correlation studies, the modulus of subgrade reaction of the soil type is approximately 225 psi per inch. To consistently achieve this design value, we recommend all subgrade soils be prepared and compacted as discussed under SITE PREPARATION items 1 through 3.

GENERAL COMMENTS

The analysis and recommendations in this report are based on the data obtained from the sixteen soil borings performed at the approximate locations indicated on the attached Boring Location Plan.

This report does not reflect any variations which may occur between the borings. The nature and extent of variations may not become evident until during the course of construction. If variations then appear evident, it will be necessary for a reevaluation of the recommendations of this report to be made after performing on-site observations during the construction period and noting the characteristics of any variations.

When the final design and specifications are completed, we would like the opportunity to review them in order to determine whether changes in the original concept may have affected the validity of our recommendations and whether these recommendations have been implemented in the design and specifications.

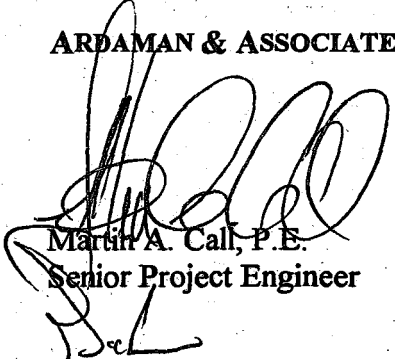
MALCOLM PIRNIE, INC.
Ardaman File No. 00-4576
June 27, 2000

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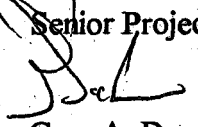
If you have any questions about this report, please contact this office.

Very truly yours,

ARDAMAN & ASSOCIATES, INC.



Martin A. Call, P.E.
Senior Project Engineer



Gary A. Drew, P.E.
Branch Manager

MAC/GAD:egs

IPC-PITMAN-HARTENSTEIN & ASSOCIATES, INC.
Mr. George R. Brinson, Jr., P.E.

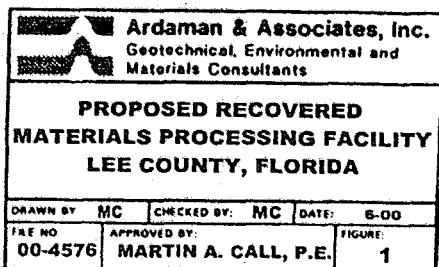
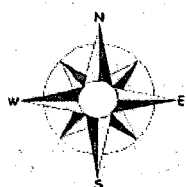
Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

SPT BORING LOGS

AND

BORING LOCATION PLAN



BORING LOCATION: See Boring Location Plan

CLIENT: Malcolm Pirnie, Inc.

DATE DRILLED: 6-20-00 START:

FINISH:

PROJECT: Lee Co. Recov. Materials Proc. Fac.

GROUND SURFACE ELEVATION:

LOCATION: Lee County, Florida

WATER TABLE DEPTH: N.R. TIME:

DATE: 6-20-00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A. Call

DRILL MAKE & MODEL: CME-55

BIT: 2-15/16" Tri. Roll.

DRILLING RODS: AW

DRILLING METHOD: Rotary with Drilling Mud

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	BLOWS PER SIX INCHES	SPT N-VALUE	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS	% WATER CONTENT	PERCENT FINES	% ORGANIC CONTENT	LIQUID LIMIT	PLAST. INDEX
0	2-2-50/3"		1		SP	Poorly Graded Sand - Pale brown fine sand.						
						Hard Bedded Limestone.						
	9-16-15	31	2		SP	Poorly Graded Sand - Pale brown fine sand, trace gravel (shell).						
5	12-9-13	22										
	14-12-20	32	3		ML	Sandy Silt - Pale gray sandy silt, trace gravel (limestone).						
	16-5-5	10	4		ML	Sandy Silt - Pale gray sandy silt.						
10	2-2-2	4										
15	1/18"	5										
20	2-1-2	3	6		SC	Clayey Sand - Gray very clayey fine sand.						
25	1-1-4	5	7									
30	1-1-2	3	8									
						BORING TERMINATED AT 30.5'						
5												

PAGE 1 OF 1



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E. FILE NO: 00-4576

BORING NO.: SPT-1

BORING LOCATION: See Boring Location Plan

CLIENT: Malcolm Pirnie, Inc.

PROJECT: Lee Co. Recov. Materials Proc. Fac.

LOCATION: Lee County, Florida

DATE DRILLED: 6-20-00 START:

FINISH:

GROUND SURFACE ELEVATION:

WATER TABLE DEPTH: 5.0' TIME:

DATE: 6-20-00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A.

DRILL MAKE & MODEL: CME-55

BIT: 2-15/16" Tri. Roll.

DRILLING RODS: AW

DRILLING METHOD: Rotary with Drilling Mud

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	BLOWS PER SIX INCHES	SPT N-VALUE	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS	% WATER CONTENT	PERCENT FINES	% ORGANIC CONTENT	LIQUID LIMIT	PLAST. INDEX
0	4-4-5	9	1		SP	Poorly Graded Sand - Pale brown fine sand.						
	5-9-7	16	2		SC	Clayey Sand - Brown clayey fine sand, trace gravel (shell and limestone).						
	8-8-7	15			SP	Poorly Graded Sand - Pale brown fine sand, trace gravel (shell).						
5	5-5-7	12	3									
	8-10-10	20			ML	Sandy Silt - Pale gray sandy silt, trace gravel (limestone).						
	6-10-6	16	4									
	1-1-1	2	5		ML	Sandy Silt - Pale gray sandy silt.						
10												
	1/12"-1											
15												
	1-2-1	3	6									
20												
	1-2-2	4	7									
25												
					SC	Clayey Sand - Gray very clayey fine sand.						
	2-2-2	4	8									
30						BORING TERMINATED AT 30.5'						
35												

PAGE 1 OF 1



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E. FILE NO: 00-4576

BORING NO.: SPT-2

BORING LOCATION: See Boring Location Plan

CLIENT: Malcolm Pirnie, Inc.

DATE DRILLED: 6-20-00 START:

FINISH:

PROJECT: Lee Co. Recov. Materials Proc. Fac.

GROUND SURFACE ELEVATION:

LOCATION: Lee County, Florida

WATER TABLE DEPTH: 5.5' TIME:

DATE: 6-20-00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A. Call

DRILL MAKE & MODEL: CME-55

BIT: 2-15/16" Tri. Roll.

DRILLING RODS: AW

DRILLING METHOD: Rotary with Drilling Mud

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	BLOWS PER SIX INCHES	SPT N-VALUE	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS	% WATER CONTENT	PERCENT FINES	% ORGANIC CONTENT	LIQUID LIMIT	PLAST. INDEX
0	4-4-7	11	1		SP	Poorly Graded Sand - Pale brown fine sand.						
8-45-50/3"			2		SC	Clayey Sand - Yellowish-brown clayey fine sand.						
					SP	Hard Bedded Limestone.						
5	3-3-3	6	3		SP	Poorly Graded Sand - Pale brown fine sand, trace gravel (shell).						
	8-22-7	29	4		ML	Sandy Silt - Pale gray sandy silt, trace gravel (limestone).						
	3-3-3	6			ML	Sandy Silt - Pale gray sandy silt.						
10	3-3-2	5	5		ML	Sandy Silt - Pale gray sandy silt.						
	1/12"-1				ML	Sandy Silt - Pale gray sandy silt, trace gravel (limestone).						
15					ML	Sandy Silt - Pale gray sandy silt.						
20	1-2-2	4	6		ML	Sandy Silt - Pale gray sandy silt.						
					SC	Clayey Sand - Gray very clayey fine sand.						
25	1-5-1	6	7		SC	Clayey Sand - Gray very clayey fine sand.						
30	2-2-2	4	8		SC	Clayey Sand - Gray very clayey fine sand.						
						BORING TERMINATED AT 30.5'						

PAGE 1 OF 1



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E. FILE NO: 00-4576

BORING NO.: SPT-3

BORING LOCATION: See Boring Location Plan

CLIENT: Malcolm Pirnie, Inc.

DATE DRILLED: 6-21-00 START:

FINISH:

PROJECT: Lee Co. Recov. Materials Proc. Fac.

GROUND SURFACE ELEVATION:

LOCATION: Lee County, Florida

WATER TABLE DEPTH: 5.5' TIME:

DATE: 6-21-00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A.

DRILL MAKE & MODEL: CME-55

BIT: 2-15/16" Tri. Roll.

DRILLING RODS: AW

DRILLING METHOD: Rotary with Drilling Mud

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	BLOWS PER SIX INCHES	SPT N-VALUE	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS	% WATER CONTENT	PERCENT FINES	% ORGANIC CONTENT	LIQUID LIMIT	PLAST INDEX
0	2-50/1"		1		SP	Poorly Graded Sand - Gray fine sand. Hard Bedded Limestone.						
	4-4-5	9	2		SC	Clayey Sand - Pale brown clayey fine sand.						
	4-5-10	15										
5	7-6-7	13	3		SP-SM	Poorly Graded Sand with Silt - Pale brown slightly silty fine sand, trace gravel (limestone).						
	7-8-7	15										
	2-2-3	5	4		ML	Sandy Silt - Pale gray sandy silt, trace gravel (limestone).						
10	2-1-1	2										
					ML	Sandy Silt - Pale gray sandy silt.						
15	1/12"-1		5									
					ML	Sandy Silt - Pale gray sandy silt, trace gravel (limestone).						
20	1-4-1	5	6		ML	Sandy Silt - Pale gray sandy silt.						
					ML	Sandy Silt - Pale gray sandy silt.						
25	1-1-1	2	7									
					SC	Clayey Sand - Gray very clayey fine sand.						
30	1-3-1	4	8									
						BORING TERMINATED AT 30.5'						
35												

PAGE 1 OF 1



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E. FILE NO: 00-4576

BORING NO.: SPT-4

BORING LOCATION: See Boring Location Plan

CLIENT: Malcolm Pirnie, Inc.

DATE DRILLED: 6-21-00 START:

FINISH:

PROJECT: Lee Co. Recov. Materials Proc. Fac.

GROUND SURFACE ELEVATION:

LOCATION: Lee County, Florida

WATER TABLE DEPTH: 5.0' TIME:

DATE: 6/21/00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A. Call

DRILL MAKE & MODEL: CME-55

BIT: 2-15/16" Tri. Roll.

DRILLING RODS: AW

DRILLING METHOD: Rotary with Drilling Mud

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	BLOWS PER SIX INCHES	SPT N-VALUE	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS	% WATER CONTENT	PERCENT FINES	% ORGANIC CONTENT	LIQUID LIMIT	PLAST. INDEX
0	2-2-50	52	1		SP	Poorly Graded Sand - Brown fine sand.						
						Weathered or Fractured Limestone.						
	13-8-9	17	2		SP	Poorly Graded Sand - Reddish-brown fine sand.						
	9-8-8	16			SP	Poorly Graded Sand - Pale brown fine sand, trace gravel (shell).						
5	9-6-6	12										
	10-2-2	4	3									
	2-16-13	29	4		ML	Sandy Silt - Pale gray sandy silt, trace gravel (limestone).						
10	3-2-3	5										
					ML	Sandy Silt - Pale gray sandy silt.						
15	1/12"-2	5										
20	1/12"-1	6										
25	1-1-1	2	7									
					SC	Clayey Sand - Gray very clayey fine sand.						
30	1-2-2	4	8									
						BORING TERMINATED AT 30.5'						

PAGE 1 OF 1



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E.

FILE NO: 00-4576

BORING NO.: SPT-5

BORING LOCATION: See Boring Location Plan

CLIENT: Malcolm Pirnie, Inc.

DATE DRILLED: 6-21-00 START:

FINISH:

PROJECT: Lee Co. Recov. Materials Proc. Fac.

GROUND SURFACE ELEVATION:

LOCATION: Lee County, Florida

WATER TABLE DEPTH: 5.0' TIME:

DATE: 6/21/00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A.

DRILL MAKE & MODEL: CME-55

BIT: 2-15/16" Tri. Roll.

DRILLING RODS: AW

DRILLING METHOD: Rotary with Drilling Mud

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	BLOWS PER SIX INCHES	SPT N-VALUE	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS	% WATER CONTENT	PERCENT FINES	% ORGANIC CONTENT	LIQUID LIMIT	PLAST. INDEX
0	2-2-17	19	1		SP-SM	Poorly Graded Sand with Silt - Pale brown slightly silty fine sand.						
	23-13-11	24	2		SP-SM	Poorly Graded Sand with Silt - Pale brown slightly silty fine sand, trace gravel (limestone).						
	9-9-10	19	3		SP-SM	Weathered or Fractured Limestone.						
	4-4-5	9	4		SP	Poorly Graded Sand with Silt - Reddish-brown slightly silty fine sand.						
5	7-7-6	13	5		SP	Poorly Graded Sand - Pale brown fine sand.						
	4-3-2	5			ML	Pale gray sandy silt.						
10	2-2-2	4	6									
15	2-1-2	3	7									
20	1-1-1	2	8									
25	1-1-1	2	9									
					SC	Clayey Sand - Gray very clayey fine sand.						
30	1-2-2	4	10			BORING TERMINATED AT 30.5'						
35												

PAGE 1 OF 1



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E. FILE NO: 00-4576

BORING NO.: SPT-6

BORING LOCATION: See Boring Location Plan

CLIENT: Malcolm Pirnie, Inc.

DATE DRILLED: 6-16-00 START:

FINISH:

PROJECT: Lee Co. Recov. Materials Proc. Fac.

GROUND SURFACE ELEVATION:

LOCATION: Lee County, Florida

WATER TABLE DEPTH: N.E. TIME:

DATE: 6-16-00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A. Call

DRILL MAKE & MODEL: n/a

BIT: n/a

DRILLING RODS: n/a

DRILLING METHOD: Hand-held Bucket Auger

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS
0			SP	Poorly Graded Sand - Pale brown fine sand.	
1	1				
2					
3					
4	2		SC	Clayey Sand - Brown clayey fine sand.	
5			SP	Poorly Graded Sand - Pale brown fine sand, trace gravel (shell).	
6	3			HAND AUGER BORING TERMINATED AT 5.0'	
7					

PAGE 1 OF 1



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E. FILE NO: 00-4576

BORING NO.: A-1

BORING LOCATION: See Boring Location Plan

CLIENT: Malcolm Pirnie, Inc.

DATE DRILLED: 6-16-00 START:

FINISH:

PROJECT: Lee Co. Recov. Materials Proc. Fac.

GROUND SURFACE ELEVATION:

LOCATION: Lee County, Florida

WATER TABLE DEPTH: N.E. TIME:

DATE: 6-16-00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A.

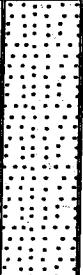
DRILL MAKE & MODEL: n/a

BIT: n/a

DRILLING RODS: n/a

DRILLING METHOD: Hand-held Bucket Auger

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS
0	1		SP	Poorly Graded Sand - Pale brown fine sand.	
1					
2	2		ML	Sandy Silt - Brown sandy silt.	
2				HAND AUGER BORING TERMINATED ON ROCK AT 2.0'	
3					
4					
5					
6					
7					

PAGE 1 OF 1



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E. FILE NO: 00-4576

BORING NO.: A-2

BORING LOCATION: See Boring Location Plan

CLIENT: Malcolm Pirnie, Inc.

DATE DRILLED: 6-16-00 START:

FINISH:

PROJECT: Lee Co. Recov. Materials Proc. Fac.

GROUND SURFACE ELEVATION:

LOCATION: Lee County, Florida

WATER TABLE DEPTH: N.E. TIME:

DATE: 6-16-00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A. Call

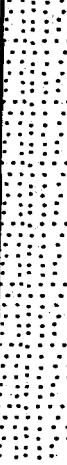
DRILL MAKE & MODEL: n/a

BIT: n/a

DRILLING RODS: n/a

DRILLING METHOD: Hand-held Bucket Auger

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS
0	1		SP	Poorly Graded Sand - Pale brown fine sand.	
1					
2	2				
3				HAND AUGER BORING TERMINATED AT 2.5' ON ROCK	
4					
5					
6					
7					

PAGE 1 OF 1



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E. FILE NO: 00-4576

BORING NO.: A-3

BORING LOCATION: See Boring Location Plan

CLIENT: Malcom Pirnie, Inc.

DATE DRILLED: 6-16-00 START:

FINISH:

PROJECT: Lee Co. Recov. Materials Proc. Fac.

GROUND SURFACE ELEVATION:

LOCATION: Lee County, Florida

WATER TABLE DEPTH: N.E. TIME:

DATE: 6-16-00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A. Call

DRILL MAKE & MODEL: n/a

BIT: n/a

DRILLING RODS: n/a

DRILLING METHOD: Hand-held Bucket Auger

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS
0	1		SP	Poorly Graded Sand - Pale brown fine sand.	
1					
2					
3	2		SC	Clayey Sandy - Brown very clayey fine sand.	
4				HAND AUGER BORING TERMINATED ON ROCK AT 3.5'	
5					
6					
7					

PAGE 1 OF 1



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E. FILE NO: 00-4576

BORING NO.: A-4

BORING LOCATION: See Boring Location Plan

CLIENT: Malcom Pirnie, Inc.

DATE DRILLED: 6-16-00 START:

FINISH:

PROJECT: Lee Co. Recov. Materials Proc. Fac.

GROUND SURFACE ELEVATION:

LOCATION: Lee County, Florida

WATER TABLE DEPTH: N.E. TIME:

DATE: 6-16-00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A. Cal.

DRILL MAKE & MODEL: n/a

BIT: n/a

DRILLING RODS: n/a

DRILLING METHOD: Hand-held Bucket Auger

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS
0	1		SP	Poorly Graded Sand - Pale brown fine sand.	
1	1				
2					
2	2		SC	Clayey Sand - Brown clayey fine sand.	
3				HAND AUGER BORING TERMINATED ON ROCK AT 3.0'	
4					
5					
6					
7					

PAGE 1 OF 1



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E. FILE NO: 00-4576

BORING NO.: A-5

BORING LOCATION: See Boring Location Plan

CLIENT: Malcom Pirnie, Inc.

DATE DRILLED: 6-16-00 START:

FINISH:

PROJECT: Lee Co. Recov. Materials Proc. Fac.

GROUND SURFACE ELEVATION:

LOCATION: Lee County, Florida

WATER TABLE DEPTH: N.E. TIME:

DATE: 6-16-00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A.

DRILL MAKE & MODEL: n/a

BIT: n/a

DRILLING RODS: n/a

DRILLING METHOD: Hand-held Bucket Auger

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS
0	1		SP	Poorly Graded Sand - Pale gray fine sand.	
1	1				
2					
2	2		SC	Clayey Sand - Brown clayey fine sand.	
3				HAND AUGER BORING TERMINATED ON ROCK AT 3.0'	
4					
5					
6					
7					

PAGE 1 OF 1



Ardaman & Associates, Inc.



Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E.

FILE NO: 00-4576

BORING NO.: A-6

BORING LOCATION: See Boring Location Plan

CLIENT: Malcom Pirnie, Inc.

DATE DRILLED: 6-16-00 START:

FINISH:

PROJECT: Lee Co. Recov. Materials Proc. Fac.

GROUND SURFACE ELEVATION:

LOCATION: Lee County, Florida

WATER TABLE DEPTH: N.E. TIME:

DATE: 6-16-00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A. Call

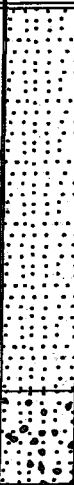
DRILL MAKE & MODEL: n/a

BIT: n/a

DRILLING RODS: n/a

DRILLING METHOD: Hand-held Bucket Auger

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS
0	1		SP	Poorly Graded Sand - Pale brown fine sand.	
1	1				
2	2		SP	Poorly Graded Sand - Pale brown fine sand, trace gravel (limestone).	
3				HAND AUGER BORING TERMINATED AT 2.5'	
4					
5					
6					
7					

PAGE 1 OF 1



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E. FILE NO: 00-4576

BORING NO.: A-7

BORING LOCATION: See Boring Location Plan

CLIENT: Malcom Pirnie, Inc.

DATE DRILLED: 6-16-00 START:

FINISH:

PROJECT: Lee Co. Recov. Materials Proc. Fac.

GROUND SURFACE ELEVATION:

LOCATION: Lee County, Florida

WATER TABLE DEPTH: N.E. TIME:

DATE: 6-16-00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A.

DRILL MAKE & MODEL: n/a

BIT: n/a

DRILLING RODS: n/a

DRILLING METHOD: Hand-held Bucket Auger

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS
0			SP	Poorly Graded Sand - Pale brown fine sand.	
1	1				
2					
3	2		SP	Poorly Graded Sand - Pale brown fine sand, trace gravel (shell).	
4				HAND AUGER BORING TERMINATED ON ROCK 4.0'	
5					
6					
7					



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E. FILE NO: 00-4576

PAGE 1 OF 1

BORING NO.: A-8

BORING LOCATION: See Boring Location Plan

CLIENT: Malcom Pirnie, Inc.

DATE DRILLED: 6-16-00 START:

FINISH:

PROJECT: Lee Co. Recov. Materials Proc. Fac.

GROUND SURFACE ELEVATION:

LOCATION: Lee County, Florida

WATER TABLE DEPTH: N.E. TIME:

DATE: 6-16-00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A. Call

DRILL MAKE & MODEL: n/a

BIT: n/a

DRILLING RODS: n/a

DRILLING METHOD: Hand-held Bucket Auger

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS
0	1		SP	Poorly Graded Sand - Pale brown fine sand.	
1					
2					
3					
4	2		SP	Poorly Graded Sand - Pale brown fine sand, trace gravel (shell).	
5				HAND AUGER BORING TERMINATED AT 5.0'	
6					
7					

PAGE 1 OF 1



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E. FILE NO: 00-4576

BORING NO.: A-9

BORING LOCATION: See Boring Location Plan

CLIENT: Malcolm Pirnie, Inc.

PROJECT: Lee Co. Recov. Materials Proc. Fac.

LOCATION: Lee County, Florida

DATE DRILLED: 6-16-00 START:

FINISH:

GROUND SURFACE ELEVATION:

WATER TABLE DEPTH: N.E. TIME:

DATE: 6-16-00

DRILL CREW: Wooten/Roten

LOGGED BY: M.A.

DRILL MAKE & MODEL: n/a

BIT: n/a

DRILLING RODS: n/a

DRILLING METHOD: Hand-held Bucket Auger

WEATHER CONDITIONS: Partly Cloudy/Hot

DEPTH, FT.	SAMPLE NO.	GRAPHIC LOG	USCS	SOIL DESCRIPTION	REMARKS
0	1		SP	Poorly Graded Sand - Pale brown fine sand.	
1					
2					
2	2		SP	Poorly Graded Sand - Yellowish-brown fine sand.	
3					
4			SP	Poorly Graded Sand - Pale brown fine sand, trace gravel (shell).	
5	3				
6				HAND AUGER BORING TERMINATED AT 5.0'	
7					

PAGE 1 OF 1



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

REVIEWED BY: Martin A. Call, P.E.

FILE NO: 00-4576

BORING NO.: A-10

LIMEROCK BEARING RATIO TEST RESULTS
AND
SIEVE ANALYSIS SHEETS



Ardaman & Associates, Inc.

9970 Bavaria Road
Fort Myers, Florida 33913
(941)768-6600
Fax (941)768-0409

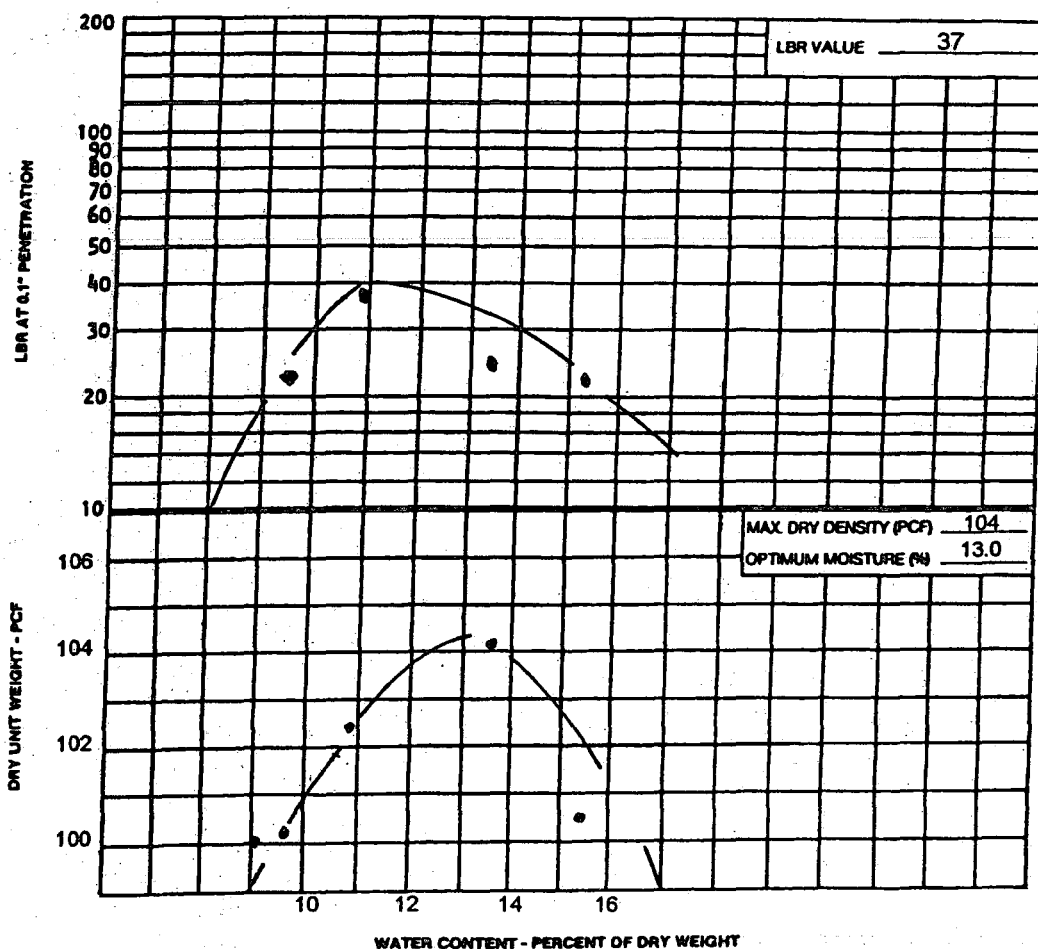
REPORT OF LIMEROCK BEARING RATIO DESIGNATION FM 5-515

PROJECT: Lee County Recovered Materials Processing Facility
Lee County, Florida

FILE NO.: 00-4576

CC. Pitman-Hartenstein & Associates, Inc.
Mr. George R. Brinson, Jr., P.E.

REPORTED TO: Malcolm Pirnie, Inc.
1533 Hendry Street, Suite 201
Fort Myers, Florida 33901
Attention: Mr. Robert H. French, P.E.



SAMPLE NO. 1 SAMPLE LOCATION Building Area - natural ground

DESCRIPTION Dark gray fine sand.

PROPOSED USE Natural Ground

DATE SAMPLED 6/23/00

BY: C.W.

REMARKS:

GARY A. DREW, P.E., BRANCH MANAGER
LICENSE NO. 35504



Ardaman & Associates, Inc.

9970 Bavaria Road
Fort Myers, Florida 33913
(941)768-6600
Fax (941)768-0409



REPORT OF SIEVE ANALYSIS

PROJECT: Lee County Recovered Materials Processing Facility
Lee County, Florida

FILE NO.: 00-4576

CC. Pitman-Hartenstein & Associates, Inc.
Mr. George R. Brinson, Jr., P.E.

REPORTED TO: Malcolm Pirnie, Inc.
1533 Hendry Street, Suite 201
Fort Myers, Florida 33901
Attention: Mr. Robert H. French, P.E.

SIEVE SIZE	PERCENT RETAINED	PERCENT PASSING	SPECIFIED RANGE
3 1/2 inch			
2 1/2 inch			
2 inch			
1 1/2 inch			
1 inch			
3/4 inch			
1/2 inch	0.0	100.0	
3/8 inch	0.3	99.7	
No. 4	0.3	99.7	
No. 8			
No. 10	0.6	99.4	
No. 16			
No. 30			
No. 40	8.0	92.0	
No. 50			
No. 60	25.3	74.7	
No. 80			
No. 100	58.3	41.7	
No. 200	96.6	3.4	

REMARKS:

Tare No. 553

TOTAL DRY WEIGHT 223.0 grams

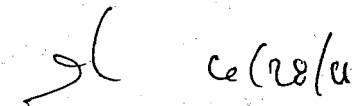
SAMPLE NO. 1 SAMPLE LOCATION Building Area - natural ground

DESCRIPTION Dark gray fine sand.

PROPOSED USE Natural Ground

DATE SAMPLED 6/23/00

BY: C.W.


GARY A. DREW, P.E. - BRANCH MANAGER
LICENSE NO. 35504



Ardaman & Associates, Inc.

9970 Bavaria Road
Fort Myers, Florida 33913
(941)768-6600
Fax (941)768-0409

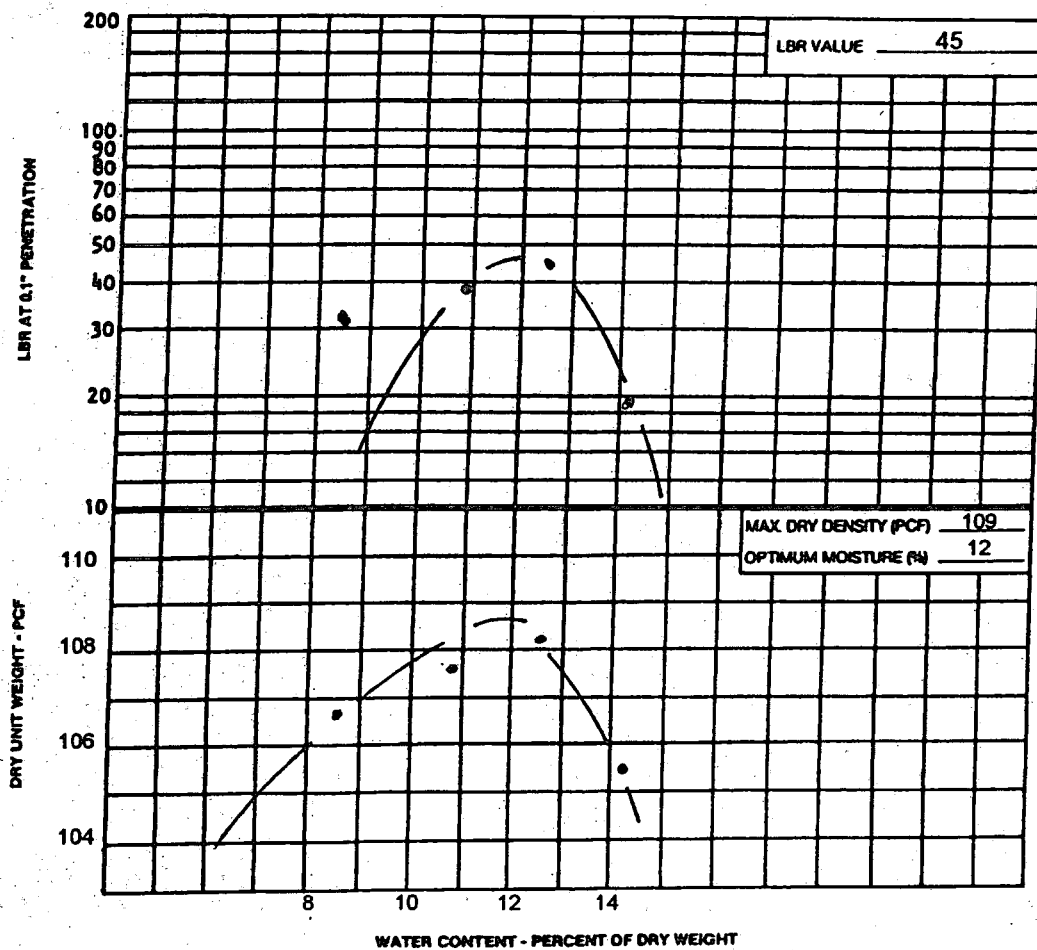
REPORT OF LIMEROCK BEARING RATIO DESIGNATION FM 5-515

PROJECT: Lee County Recovered Materials Processing Facility
Lee County, Florida

FILE NO.: 00-4576

CC. Pitman-Hartenstein & Associates, Inc.
Mr. George R. Brinson, Jr., P.E.

REPORTED TO: Malcolm Pirnie, Inc.
1533 Hendry Street, Suite 201
Fort Myers, Florida 33901
Attention: Mr. Robert H. French, P.E.



SAMPLE NO. 2 SAMPLE LOCATION Import fill material stockpiled on site.

DESCRIPTION Dark olive brown fine sand, some gravel (rock and shell fragments).

PROPOSED USE Stabilized Subgrade DATE SAMPLED 6/23/00 BY: C.W.

REMARKS:

GARY A. DREW, P.E., BRANCH MANAGER
LICENSE NO. 35504



Ardaman & Associates, Inc.

9970 Bavaria Road
Fort Myers, Florida 33913
(941)768-6600
Fax (941)768-0409

REPORT OF SIEVE ANALYSIS

PROJECT: Lee County Recovered Materials Processing Facility
Lee County, Florida

FILE NO.: 00-4576

CC. Pitman-Hartenstein & Associates, Inc.
Mr. George R. Brinson, Jr., P.E.

REPORTED TO: Malcolm Pirnie, Inc.
1533 Hendry Street, Suite 201
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SIEVE SIZE	PERCENT RETAINED	PERCENT PASSING	SPECIFIED RANGE
3 1/2 inch			
2 1/2 inch			
2 inch			
1 1/2 inch			
1 inch			
3/4 inch	0.0	100.0	
1/2 inch	7.1	92.9	
3/8 inch	0.8	99.2	
No. 4	12.7	87.3	
No. 8			
No. 10	17.0	83.0	
No. 16			
No. 30			
No. 40	23.6	76.4	
No. 50			
No. 60	35.1	64.9	
No. 80			
No. 100	57.6	42.4	
No. 200	96.2	3.8	

REMARKS:

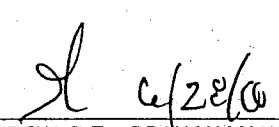
Tare No. 212

TOTAL DRY WEIGHT 337.5 grams

SAMPLE NO. 2 SAMPLE LOCATION Import fill material stockpiled on site.

DESCRIPTION Dark olive brown fine sand, some gravel (rock and shell fragments).

PROPOSED USE Stabilized Subgrade DATE SAMPLED 6/23/00 BY: C.W.


GARY A. DREW, P.E. - BRANCH MANAGER
LICENSE NO. 35504

APPENDIX

SOIL BORING, SAMPLING AND TESTING METHODS

STANDARD PENETRATION TEST

The Standard Penetration Test (SPT) is a widely accepted method of in situ testing of foundation soils (ASTM D-1586). A 2-foot (0.6 m) long, 2-inch (50 mm) O.D. split-barrel sampler attached to the end of a string of drilling rods is driven 18 inches (0.45 m) into the ground by successive blows of a 140-pound (63.5 Kg) hammer freely dropping 30 inches (0.76 m). The number of blows needed for each 6 inches (0.15 m) of penetration is recorded. The sum of the blows required for penetration of the second and third 6-inch (0.15 m) increments penetration constitutes the test result or N-value. After the test, the sampler is extracted from the ground and opened to allow visual description of the retained soil sample. The N-value has been empirically correlated with various soil properties allowing a conservative estimate of the behavior of soils under load. The following tables relate N-values to a qualitative description of soil density and, for cohesive soils, an approximate unconfined compressive strength (Q_u):

Cohesionless Soils:	<u>N-Value</u>	<u>Description</u>
	0 to 4	Very loose
	4 to 10	Loose
	10 to 30	Medium dense
	30 to 50	Dense
	Above 50	Very dense

Cohesive Soils:	<u>N-Value</u>	<u>Description</u>	<u>Q_u</u>
	0 to 2	Very soft	Below 0.25 tsf (25 kPa)
	2 to 4	Soft	0.25 to 0.50 tsf (25 to 50 kPa)
	4 to 8	Medium stiff	0.50 to 1.0 tsf (50 to 100 kPa)
	8 to 15	Stiff	1.0 to 2.0 tsf (100 to 200 kPa)
	15 to 30	Very stiff	2.0 to 4.0 tsf (200 to 400 kPa)
	Above 30	Hard	Above 4.0 tsf (400 kPa)

The tests are usually performed at 5-foot (1.5 m) intervals. However, more frequent or continuous testing is done by our firm through depths where a more accurate definition of the soils is required. The test holes are advanced to the test elevations by rotary drilling with a cutting bit, using circulating fluid to remove the cuttings and hold the fine grains in suspension. The circulating fluid, which is bentonitic drilling mud, is also used to keep the hole open below the water table by maintaining an excess hydrostatic pressure inside the hole. In some soil deposits, particularly highly pervious ones, flush-coupled casing must be driven to just above the testing depth to keep the hole open and/or prevent the loss of circulating fluid. After completion of a test boring, the hole is kept open until a steady state groundwater level is recorded. The hole is then sealed by backfilling with neat cement.

Representative split-spoon samples from each sampling interval and from different strata are brought to our laboratory in air-tight jars for classification and testing, if necessary. Afterwards, the samples are discarded unless prior arrangements have been made.

POWER AUGER BORINGS

Auger borings are used when a relatively large, continuous sampling of soil strata close to the ground surface is desired. A 4-inch (100 mm) diameter, continuous flight, helical auger with a cutting head at its end is screwed into the ground in 5-foot (1.5 m) sections. It is powered by the

rotary drill rig. The sample is recovered by withdrawing the auger out of the ground without rotating it. The soil sample so obtained, is described and representative samples put in bags or jars and returned to the laboratory for classification and testing, if necessary.

HAND AUGER BORINGS

Hand auger borings are used, if soil conditions are favorable, when the soil strata are to be determined within a shallow (approximately 5-foot [1.5 m]) depth or when access is not available to power drilling equipment. A 3-inch (75 mm) diameter hand bucket auger with a cutting head is simultaneously turned and pressed into the ground. The bucket auger is retrieved at approximately 6-inch (0.15 m) intervals and its contents emptied for inspection. Sometimes post-hole diggers are used, especially in the upper 3 feet (1 m) or so. The soil sample obtained is described and representative samples put in bags or jars and transported to the laboratory for classification and testing, if necessary.

UNDISTURBED SAMPLING

Undisturbed sampling implies the recovery of soil samples in a state as close to their natural condition as possible. Complete preservation of in situ conditions cannot be realized; however, with careful handling and proper sampling techniques, disturbance during sampling can be minimized for most geotechnical engineering purposes. Testing of undisturbed samples gives a more accurate estimate of in situ behavior than is possible with disturbed samples.

Normally, we obtain undisturbed samples by pushing a 2.875-inch (73 mm) I.D., thin wall seamless steel tube 24 inches (0.6 m) into the soil with a single stroke of a hydraulic ram. The sampler, which is a Shelby tube, is 30 (0.8 m) inches long. After the sampler is retrieved, the ends are sealed in the field and it is transported to our laboratory for visual description and testing, as needed. Undisturbed sampling is noted on the boring logs as thus "U-".

LABORATORY TEST METHODS

Soil samples returned to our laboratory are looked at again by a geotechnical engineer or geotechnician to obtain more accurate descriptions of the soil strata. Laboratory testing is performed on selected samples as deemed necessary to aid in soil classification and to help define engineering properties of the soils. The test results are presented on the soil boring logs at the depths at which the respective sample was recovered, except that grain size distributions or selected other test results may be presented on separate tables, figures or plates as discussed in this report. The soil descriptions shown on the logs are based upon visual-manual procedures in accordance with local practice. Soil classification is in general accordance with the Unified Soil Classification System (ASTM D-2487) and is also based on visual-manual procedures. Following is a list of abbreviations that may appear in the Remarks column on the boring logs indicating additional laboratory testing was performed.

- DD - Dry Density of Undisturbed Sample
- k - Hydraulic Conductivity (Coefficient of Permeability)
- Qu - Unconfined Compression Strength; ASTM D-2166 (soil), D-2938 (rock)
- Consol - One-Dimensional Consolidation test performed on subsample from undisturbed sample; ASTM D-2425 (report usually presented in Appendix)

THE PROJECT SOIL DESCRIPTION PROCEDURE FOR SOUTHWEST FLORIDA⁽¹⁾
For use with the ASTM D 2487 Unified Soil Classification System

CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES

ORGANIC SOILS (Continued):

Organic Content	Descriptive Adjectives	Classification
5 - 30%	organic	SM with organic fines Organic Silt (OL) Organic Clay (OL) Organic Silt (OH) Organic Clay (OH)

HIGHLY ORGANIC SOILS AND MATTER

	Description	
30-75%	sandy peat silty peat	Peat (PT) Peat (PT)
> 75%	amorphous peat fibrous peat	Peat (PT) Peat (PT)

STRATIFICATION AND STRUCTURE

<u>Descriptive Term</u>	<u>Thickness</u>
with interbedded seam	-- less than 1/2-inch (13 mm) thick
layer	-- 1/2 to 12-inches (13 to 300 mm) thick
stratum	-- more than 12-inches (300 mm) thick
pocket	-- small, erratic deposit, usually less than 1-foot
lens	-- lenticular deposits
occasional	-- one or less per foot of thickness
frequent	-- more than one per foot of thickness
calcareous	-- containing calcium carbonate (reaction to diluted HCL)
hardpan	-- spodic horizon usually medium dense
marl	-- mixture of carbonate clays, silts, shells and sands.

ROCK CLASSIFICATION (FLORIDA) CHART

<u>Symbol</u>	<u>Typical Description</u>
LS	Hard Bedded Limestone or Caprock
WLS	Fractured or Weathered Limestone
LR	Limerock (gravel, sand, silt and clay mixture)
SLS	Stratified Limestone and Soils

(1) This soil description procedure was developed specifically for projects in southwest Florida because it is believed that the terminology will be better understood as a result of local practice. It is not intended to supplant other visual-manual classification procedures for description and identification of soils such as ASTM D 2488.

THE PROJECT SOIL DESCRIPTION PROCEDURE FOR SOUTHWEST FLORIDA⁽¹⁾
For use with the ASTM D 2487 Unified Soil Classification System

CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES

BOULDERS (> 12" [300 mm]) and COBBLES (3" [75 mm] TO 12" [300 mm]):

GRAVEL: Coarse Gravel: 3/4" (19 mm) to 3" (75 mm)
Fine Gravel: No. 4 (4.75 mm) Sieve to 3/4" (19 mm)

Descriptive adjectives:

0 - 5% -- no mention of gravel in description
5 - 15% -- trace
15 - 29% -- some
30 - 49% -- gravelly (shell, limerock, cemented sands)

SANDS

COARSE SAND: No. 10 (2 mm) Sieve to No. 4 (4.75 mm) Sieve
MEDIUM SAND: No. 40 (425 μ m) Sieve to No. 10 (2 mm) Sieve
FINE SAND: No. 200 (75 μ m) Sieve to No. 40 (425 μ m) Sieve

Descriptive adjectives:

0 - 5% -- no mention of sand in description
5 - 15% -- trace
15 - 29% -- some
30 - 49% -- sandy

SILT/CLAY: < #200 (75 μ m) sieve

SILTY OR SILT: $PI < 4$

SILTY CLAYEY OR SILTY CLAY: $4 \leq PI \leq 7$

CLAYEY OR CLAY: $PI > 7$

Descriptive adjectives/adverbs:

< - 5% -- clean (no mention of silt or clay in description).
5 - 12% -- slightly
to 15%
16 - 35% -- clayey, silty, or silty clayey
36 - 49% -- very

ORGANIC SOILS

Organic Content	Descriptive Adjectives	Classification
0 - 2.5%	usually no mention of organics in description	See Above
2.6 - 5%	slightly organic	add "with organic fines" to group name

TABLE 1 Soil Classification Chart

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^a				Soil Classification	
				Group Symbol	Group Name ^b
COARSE-GRAINED SOILS More than 50 % retained on No. 200 sieve	Gravels More than 50 % of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5 % fines ^c	$Cu \geq 4$ and $1 \leq Cc \leq 3^e$	GW	Well-graded gravel ^f
			$Cu < 4$ and/or $1 > Cc > 3^e$	GP	Poorly graded gravel ^f
		Gravels with Fines More than 12 % fines ^c	Fines classify as ML or MH	GM	Silty gravel ^{f, O, M}
			Fines classify as CL or CH	GC	Clayey gravel ^{f, O, M}
	Sands 50 % or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5 % fines ^d	$Cu \geq 6$ and $1 \leq Cc \leq 3^e$	SW	Well-graded sand ^f
			$Cu < 6$ and/or $1 > Cc > 3^e$	SP	Poorly graded sand ^f
		Sands with Fines More than 12 % fines ^d	Fines classify as ML or MH	SM	Silty sand ^{f, O, M}
			Fines classify as CL or CH	SC	Clayey sand ^{f, O, M}
FINE-GRAINED SOILS 50 % or more passes the No. 200 sieve	Silt and Clays Liquid limit less than 50	Inorganic	$PI > 7$ and plots on or above "A" line ^f	CL	Lean clay ^{CL, M, N}
			$PI < 4$ or plots below "A" line ^f	ML	Silt ^{CL, M, N}
		organic	Liquid limit - oven dried Liquid limit - not dried < 0.75	OL	Organic clay ^{CL, M, N} Organic silt ^{CL, M, N}
	Silt and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay ^{CL, M, N}
			PI plots below "A" line	MH	Elastic silt ^{CL, M, N}
		organic	Liquid limit - oven dried Liquid limit - not dried < 0.75	OH	Organic clay ^{CL, M, N} Organic silt ^{CL, M, N}
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor			PT	Peat

^a Based on the material passing the 3-in. (75-mm) sieve.

^b If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^c Gravels with 5 to 12 % fines require dual symbols:

GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

^d Sands with 5 to 12 % fines require dual symbols:

SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

$$C_u = D_{60}/D_{10} \quad C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

^e If soil contains ≥ 15 % sand, add "with sand" to group name.

^f If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^g If fines are organic, add "with organic fines" to group name.

^h If soil contains ≥ 15 % gravel, add "with gravel" to group name.

ⁱ If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.

^j If soil contains 15 to 29 % plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^k If soil contains ≥ 30 % plus No. 200, predominantly sand, add "sandy" to group name.

^l If soil contains ≥ 30 % plus No. 200, predominantly gravel, add "gravelly" to group name.

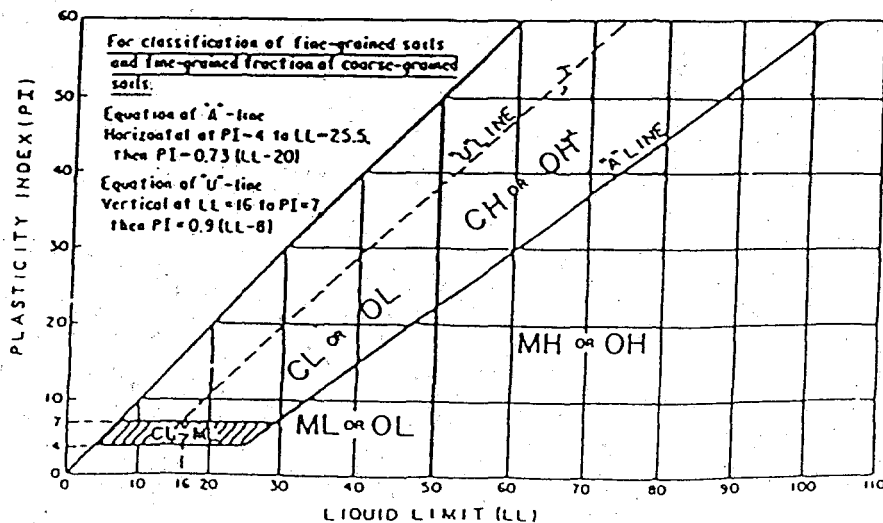
^m $PI \geq 4$ and plots on or above "A" line.

ⁿ $PI < 4$ or plots below "A" line.

^o PI plots on or above "A" line.

^p PI plots below "A" line.

Poor Original





MORTENSEN ENGINEERING, INC.

RECEIVED

APR 17 1990

CAMP DRESSER & MCKEE
FT. MYERS, FLORIDA

April 16, 1990
Project No. 90-0413

TO: Camp, Dresser & McKee, Inc.
1620 Medical Lane, Suite 221
Ft. Myers, Florida 33907

Attention: Mr. Mike Ihnat, P.E.

SUBJECT: Preliminary Foundation and Soils Study
Proposed Resource Recovery Plant
Buckingham Road Site
Lee County, Florida
CDM Project No.: 6685-38-PT-PRMF

Dear Mr. Ihnat:

In accordance with our authorized proposal to you dated March 27, 1990, we have completed the preliminary foundation and soils study for the above referenced resource recovery plant facility at the Buckingham Road site in Lee County, Florida.

The following summary report presents the results of our study, including our preliminary evaluation of the soil and groundwater conditions encountered at the site, and our subsequent preliminary discussions, evaluations and foundation system alternative recommendations for the proposed resource recovery plant. We have very much appreciated this opportunity to perform this study and to work with you during the preliminary phase of this significant project.

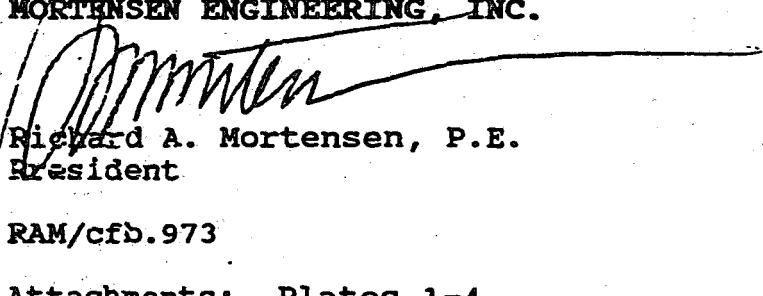
813-889-8606 FAX 813-882-0256
5706 Benjamin Center Dr. Suite 120 Tampa, Florida 33634

Geotechnical • Hydrogeologic • Materials Testing
Environmental/Contamination Assessments

If you have any questions about the enclosed report, or if we can be of further service to you or Lee County as site development plans progress, please do not hesitate to give us a call.

Sincerely,

MORTENSEN ENGINEERING, INC.



Richard A. Mortensen, P.E.
President

RAM/cfd.973

Attachments: Plates 1-4
Appendix

xc: Camp, Dresser & McKee, Inc. (Tampa)
Attn: Mr. Bob Tietz

PURPOSE AND SCOPE

The objective of this preliminary foundation and soils study was to obtain general information about subsurface conditions over the proposed resource recovery plant facility area, in order to provide preliminary geotechnical engineering estimates and discussions in each of the following areas:

1. Assess and evaluate the feasibility of the subject site to support the anticipated resource recovery plant structures.
2. Determine and evaluate the soil and rock conditions over the facility area, and discuss potential subsurface capabilities and limitations.
3. Discuss preliminary foundation system alternatives for the resource recovery plant structures; including conventional shallow spread foundations, end bearing and friction piling; and, if necessary, other special foundation systems and subsurface improvement requirements. Provide some preliminary foundation system design data and discussion.
4. Discuss some potential foundation construction considerations and problems, and assess the shallow groundwater conditions over the facility area.
5. Provide some guidelines that should be considered during the final level geotechnical study in the actual structure areas, considering the results of the preliminary study herein (i.e. recommended SPT boring and cone sounding depths, boring or sounding spacing and frequency, sampling considerations, physical testing, etc.).

The scope of our work for this study included the following activities:

1. Collected and reviewed available regional geologic data from USGS and from the Water Management District, and reviewed other available geotechnical data in the site vicinity.

2. Performed five (5) deep Standard Penetration Test (SPT) borings, each to a depth of 80 feet within the proposed facility area.
3. Visually classified collected soil samples and conducted a limited program of laboratory physical testing.
4. Performed geotechnical engineering evaluations and analyses in order to develop preliminary recommendations in each of the pertinent areas previously discussed.
5. Prepared a formal preliminary engineering report which summarizes the course of the study pursued, the field and laboratory data generated, the subsurface soil and groundwater conditions encountered, and our preliminary geotechnical engineering evaluations and recommendations in each of the pertinent topic areas.

PROJECT AND SITE DESCRIPTION

The proposed Lee County resource recovery plant facility is being planned along the north side of Buckingham Road, on a 100 acre (+/-) tract of land. The subject site is basically flat, vacant and undeveloped pastureland, somewhat poorly drained, and surrounded by wetland/conservation areas. The proposed facility layout is shown approximately on Plate 1. The subject site is about 1 mile east of I-75.

It is our understanding based on our familiarity with similar projects, the data provided by Camp, Dresser & McKee, Inc., and the conceptual facility layout plan developed by Camp, Dresser & McKee, Inc. (included on Plate 1), that the resource recovery plant facility will be a significant structure comparable to the Pasco and Hillsborough County Resource Recovery Plants. The approximate configuration/layout of the various parts of the structure are included on Plate 1. No specific structure loading or elevation data is available at this time.

However, we understand based on previous discussions with Camp, Dresser & McKee, Inc., that the refuse pit area (borings B-4 and B-5) will likely have a heavy uniformly distributed floor loading of approximately 3,000 to 4,000

psf spread over a large area. A large and high embankment ramp, up to a height of approximately 30 feet, will likely be required to reach the refuse bunker pit and tipping floor area (boring B-1). At this time, preliminary finished floor elevations have not yet been established. We understand that much of the equipment and the building frames for the various structures will likely be sensitive to small differential settlements; therefore, differential settlement potential will be a major foundation design criteria. A large steel frame structure is anticipated for the major portion of the facility, rigidly tied together, with heavy sustained foundation loadings. A large and high exhaust or vent stack will be located in the vicinity of boring B-5 as shown on Plate 1. The exact height of this stack and the stack loading information is also unknown at this time. Again, because the facility is in a very preliminary stage at this time, structure isolated column loadings and strip footing loadings, etc. for the various parts of the facility are unknown.

SUBSURFACE EXPLORATION PROGRAM

The field investigation for this preliminary study was conducted between April 4 and April 6, 1990. Five (5) deep Standard Penetration Test (SPT) borings (B-1 to B-5) were performed over the proposed resource recovery plant site at the approximate locations indicated on Plate 1, each to a depth of 80 feet, after encountering at least 10 feet of weathered sandstone. The boring locations were staked in the field by Camp, Dresser & McKee, Inc. Each borehole was grouted to the land surface upon completion.

The SPT boring procedure was conducted in general accordance with ASTM D-1586. Closely spaced soil sampling using a 1-3/8 inch I.D. split-barrel sampler was performed in the upper 10 feet in selected borings, with successive sampling at 5 or 10 foot intervals used thereafter. The number of successive blows required to drive the sampler into the soil constitutes the test result commonly referred to as the "N"-value. The "N"-value has been empirically correlated with various soil properties and is considered to be indicative of the relative density of cohesionless soils and the consistency of cohesive soils. The recovered split-barrel soil samples were visually classified in the field with representative samples collected and transported to our office for evaluation by the project geotechnical engineer.

LABORATORY TESTING PROGRAM

The recovered soil samples were visually classified and stratified in the laboratory by the project geotechnical engineer using the Unified Soil Classification System. Several soil samples were selected for wash gradation testing to measure the percent passing the U.S. No. 200 sieve, or the silt and clay fines content. The amount of silt and clay in a soil affects its engineering properties, and provides a general basis for evaluation of various subsurface soil improvement techniques to be discussed later. The laboratory testing results are presented on the soil boring profiles included on Plates 2 and 3.

GENERALIZED SUBSURFACE CONDITIONS

The results of our preliminary field exploration program including the stratification profiles and some pertinent exploration information are graphically presented on Plates 2 and 3. A legend describing the different soil types encountered is included on Plate 4. Soil stratification was based on the review of recovered soil samples and interpretation of the field boring logs by the project geotechnical engineer. The stratification lines shown on Plates 2 and 3 represent the approximate boundaries between different soil or rock types, the actual transition may be gradual. Minor variations not considered important to our preliminary engineering evaluations or judgments may have been abbreviated or omitted for clarity.

Based on the results of our five (5) deep SPT borings, it appears that the subsurface conditions over the facility area, to a depth of about 80 feet (+/-) are fairly consistent and uniform in terms of material type, consistency or relative density, and depth below the ground surface. Basically, all five (5) of the SPT borings encountered essentially the same soil or rock material types at nearly the same depths. The following summarizes and describes the general subsurface conditions over the proposed resource recovery plant facility area:

Camp, Dresser & McKee, Inc.
Project No. 90-0413

<u>Depth (+/-)</u>	<u>Stratum No.</u>	<u>Material Description</u>	<u>Material Relative Density or Consistency</u>
0 to 3 Ft.	1	Fine SAND to slightly silty fine SAND	Loose
3 to 6-1/2 Ft.	2	Clayey/calcareous SAND and limestone fragments (CAPROCK)	Medium-Dense
6-1/2 to 20 Ft.	3	Sandy/clayey SILT, with limestone fragments (MARL)	Soft
20 to 25 Ft.	4	Silty CLAY	Soft/Firm
25 to 67 Ft.	5/6	Silty to slightly clayey fine SAND trace phosphates	Very loose to loose (limited medium-dense)
67 to 80 Ft. (+/-)	7	Weathered SANDSTONE	Medium-dense (limited dense)

The shallow groundwater level was measured in an offset hand auger boring at each SPT boring location, with the results shown on Plates 2 and 3. At the time of our field work, the shallow groundwater level was generally 2-1/2 to 4 feet below the ground surface. During normal wet seasons, we anticipate that the average normal wet season high groundwater levels over the facility area would be 1 to 2 feet above the levels reported herein. The shallow groundwater level will be a major design and construction consideration.

PRELIMINARY GEOTECHNICAL EVALUATIONS AND RECOMMENDATIONS

Because the various components of the resource recovery plant facility have not yet been preliminarily designed, and the structure types, column layout, loading data, support levels, fill heights, etc. are not known, we are presenting below some discussion relative to two (2) feasible foundation system alternatives, considering the discovered and future anticipated subsurface conditions. Ultimately, because of the size and complexity of this type structure, a combination of several types of foundation systems are anticipated, due to the variability in loading conditions and differential settlement tolerances. The discussion presented below relates primarily to the major facility components or structures.

Considering the anticipated sizes of the various structures and the heavy foundation loadings, and the presence of basically soft and/or loose subsurface soil conditions over the entire facility area to a depth of almost consistently 67 feet (+/-); it is our opinion that conventional shallow or spread foundation system support of the major resource recovery plant structures will not be suitable or appropriate, unless the shallow and deeper subsurface conditions are significantly improved as discussed below. The presence of a significant zone (13 to 14 feet thick +/-) of soft to very soft clayey silts (Stratum 3), beneath shallow, fractured and weakly cemented "caprock" of Stratum 2; the presence of a thin layer (5 feet thick +/-) of soft, highly plastic and near-normally consolidated silty clay (Stratum 4) beneath Stratum 3; and the presence of a very thick layer (40 feet +/-) of loose silty to slightly clayey fine sand (Strata 5 and 6) to a depth of 67 feet (+/-), all pose and produce significant total and differential settlement concern for conventional shallow foundations, with conventional subgrade improvement processes. Therefore, it is our opinion that there are basically two (2) feasible foundation system alternatives for the major components of the resource recovery plant facility:

1. Treat and improve the shallow and deep subsurface conditions with insitu "vibro-replacement" techniques, and install or make "stone columns" over the major structure areas; then utilize a shallow foundation system for support of the various structure components.
2. Deep end-bearing and/or friction piling foundation systems.

It is our opinion, at this time, considering the above two (2) alternatives, our experience or knowledge about both systems, and our preliminary discussions with foundation system contractors, that the vibro-replacement/stone column/shallow foundation system option is likely the most appropriate and likely the most economical foundation system option for the major components of resource recovery plant facility at the subject site.

Vibro-replacement is similar to other deep vibratory compaction processes conducted in sandy soils; however, this process is proven effective in silty sands, silts and soft clays, as it utilizes gravel or stone as backfill

along the vibrating probe to form "stone columns" in the ground. To make the "stone columns", a cylindrical vibratory probe (2 feet in diameter +/-) is used to form a hole to a selected depth, densifying loose sandy materials or displacing soft silts or clays that may be present; gravel or stone is then introduced as backfill along the vibrator, and the gravel or stone is compacted-in among the soils requiring improvement, as the vibrator is worked and withdrawn. The gravel or stone is pushed laterally by the probe into the soft silts and clays, reducing compressibility potential and improving shear strength and bearing capacity. The amount of gravel or stone backfill and the energy demand of the vibrator is recorded as an indication of the effectiveness of the process.

Depending upon specific structure loading conditions, column layout, and differential settlement tolerance, the stone columns at the subject site could be 35 to 70 feet deep (+/-), and spaced 8 to 12 feet (+/-) on centers. Additional information about the vibro-replacement/stone column technique as provided by a specialty foundation contractor is included in the Appendix of this report. Stone columns should only be installed by a specialty foundation contractor, with significant stone column construction experience acceptable to the project geotechnical consultant. The project geotechnical consultant should work closely with the stone column contractor and project structural engineer during the final design phase, as significant geotechnical engineering evaluation and settlement analyses will be necessary to support specific stone column and shallow foundation system design and construction criteria, to meet structure differential settlement tolerances. For a project of this size and area, 2 or 3 stone column field load tests should be conducted to confirm or improve the foundation design criteria and settlement analyses. With a properly designed and constructed stone column system over the facility area to improve the shallow and deeper subsurface conditions, conventional strip and pad shallow foundations could be designed to support the various structure components, likely with contact bearing pressures on the order of 3 to 7 kips per square foot (kips/ft.²). The stone columns should also speed up the subsurface silt and clay (Strata 3 and 4) consolidation settlement processes in areas of high structural or embankment fills; this is another significant benefit of porous stone columns.

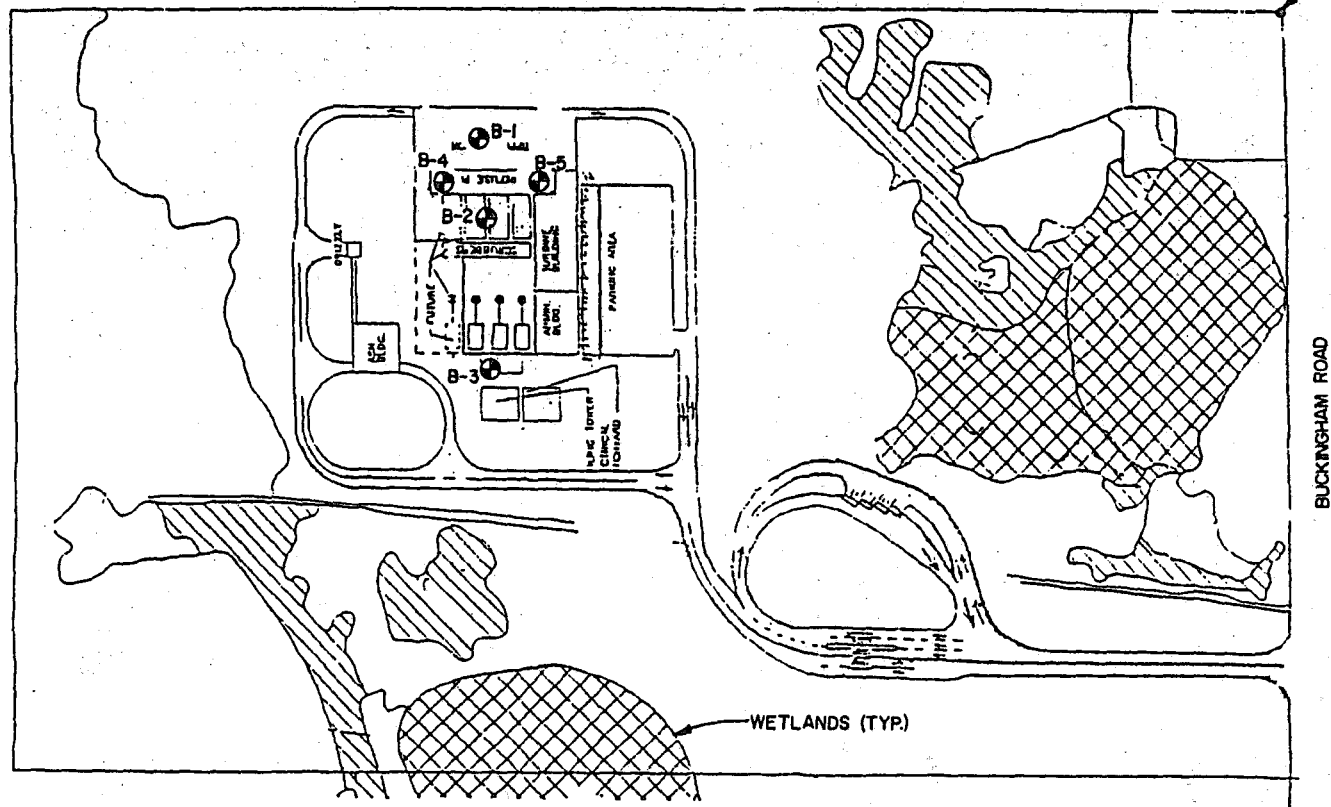
Regarding deep piling foundation systems, it is our opinion at this time, depending upon many factors unknown (foundation loadings, foundation levels, etc.) that piling would need to be driven at least 80 feet below present grade, and likely an additional 20 feet (or more) further into the weathered sandstone layer of Stratum 7, if Stratum 7 is substantial and competent. A deep well log in the site vicinity suggests that this sandstone layer may only be on the order of 30 feet (+/-) thick. It should be noted that there is some question as to the thickness and end bearing capacity of the weathered sandstone layer (Stratum 7) in the site vicinity based on available geologic publications; as it is believed that Stratum 7 may only be an intermediate thin sandstone layer within the Tamiami Formation. The Tamiami Formation in the site vicinity is believed to be on the order of 200 feet thick, with no consistent limestone unit or formation (like the Tampa Limestone Formation) to a depth of at least 150 feet. Deeper test borings and NX coring and strength testing of the sandstone layer (Stratum 7) will be necessary to evaluate deep piling foundations in more detail. Deep piling in high structural fill or embankment areas will need to consider the additional loadings due to negative skin friction, primarily caused by the consolidating cohesive soils of Stratum 3 and 4. It is our opinion at this time, that driven displacement piles such as square prestressed, precast concrete piles, closed or open-end concrete-filled steel pipe piles; non-displacement piles such as steel H piles; and cast-in-place piling such as augercast piling are all possible deep piling foundation system alternatives. The possible need to rely on friction capacity, as well as end bearing capacity, might rule out steel pipe and steel H piles. Deep piling foundations should be evaluated during the final design phase; however, it is our opinion that they will be too costly compared with vibro-replacement/stone columns and conventional shallow foundations, primarily because of their limited capacity and the required depth to competent bearing material.

FUTURE GEOTECHNICAL STUDY

The primary intent of our limited field exploration work and assessment work herein was to provide the design/build contractor with some preliminary or general subsurface information and preliminary foundation system option and design discussions. A final level geotechnical foundation study must be undertaken which, when combined with structural information and settlement tolerance criteria, can be used to generate specific foundation system recommendations for the proposed resource recovery plant facility.

With this in mind, we recommend that the final level geotechnical study include deep SPT borings on the order of 80 to 150 feet deep, spaced no more than approximately 100 feet apart, with other SPT borings at specific settlement sensitive locations or high loading areas. SPT borings should extend into sandstone or limestone until at least 20 feet (+/-) of suitable end-bearing or competent material is penetrated. The deeper sandstone and limestone materials should be cored and strength tested in the laboratory. We recommend that undisturbed Shelby tube sampling of the silts and clays (Strata 3 and 4) be conducted, and subsequent laboratory consolidation testing will be necessary to estimate and evaluate silt and clay consolidation settlements. Cone penetrometer testing (CPT) to depths of 80 to 150 feet is recommended at some grid locations over the facility area for additional design information. CPT and SPT data should be collected at alternating points over a uniform grid, with test locations no more than 100 feet apart over the facility area, except as mentioned above. A qualified Florida geotechnical consultant, familiar with the site and subsurface conditions should be retained by the design/build contractor. An adequate geotechnical exploration program, with prudent analyses and proper structural engineering input, can provide the framework for the most suitable and economical foundation system for the proposed resource recovery plant facility.

SE Corner of Sec. 24
T. 44 S. R. 25 E.



BUCKINGHAM ROAD

WETLANDS (TYP.)

LEGEND

⊕ Approximate SPT boring location

□ Proposed Major Structure Area

BORING LOCATION PLAN

N.T.S.



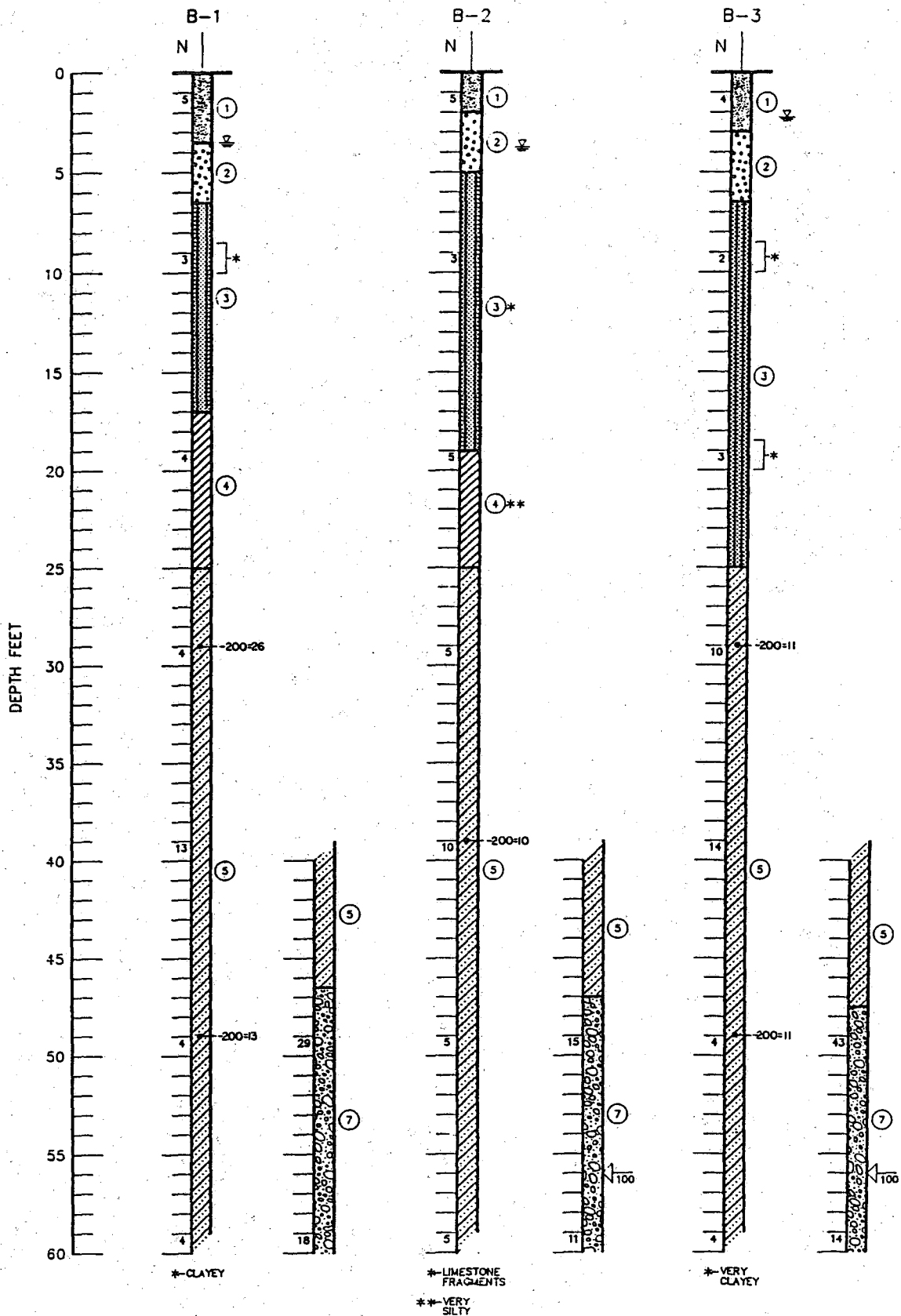
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DATE	BY	REVISION

PRELIMINARY FOUNDATION AND SOILS STUDY
PROPOSED RESOURCE RECOVERY PLANT
LEE COUNTY, FLORIDA

MEI MORTENSEN
Engineering, Inc.

DATE: APRIL 90 PROJ. NO: 90-0413 PLATE 1



SOIL PROFILES

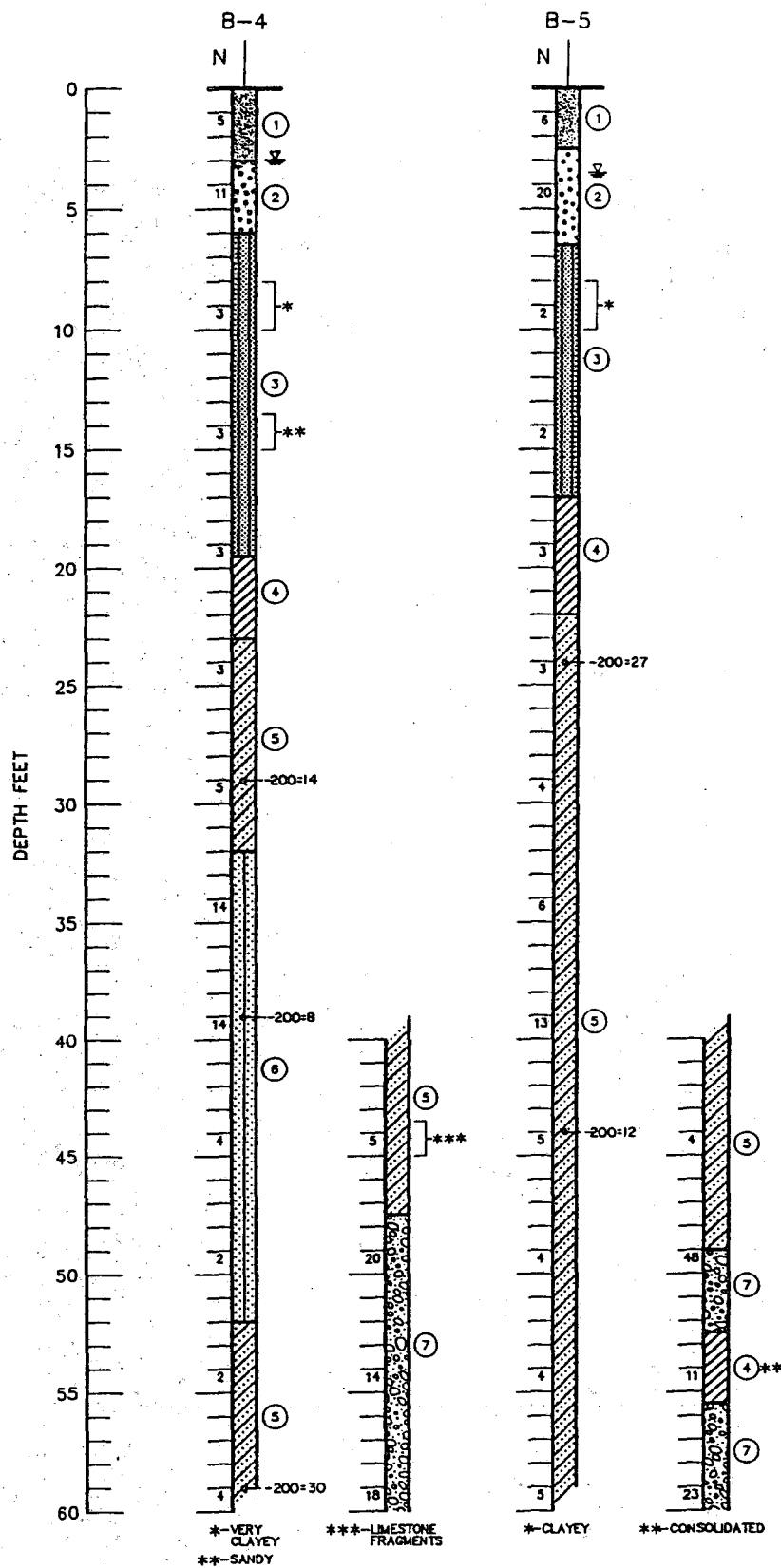
VERTICAL SCALE: 1"=5'

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PRELIMINARY FOUNDATION AND SOILS STUDY
PROPOSED RESOURCE RECOVERY PLANT
 LEE COUNTY, FLORIDA

MORTENSEN
 Engineering, Inc.

DATE: APRIL 90 PROJ. NO: 90-0413 PLATE 2



DRAWN BY:	PWV
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APPROVED:	RAM
SCALE:	NOTED

PRELIMINARY FOUNDATION AND SOILS STUDY		
PROPOSED RESOURCE RECOVERY PLANT		
LEE COUNTY, FLORIDA		
 MORTENSEN Engineering, Inc.		
DATE: APRIL 90	PROJ. NO: 90-0413	PLATE 3

LEGEND

- ①  Light brown to brown fine SAND to slightly silty fine SAND (SP/SP-SM)
- ②  Light brown to brown silty to slightly clayey and calcareous fine SAND and limestone fragments (CAPROCK)
- ③  White to gray calcareous and sandy to clayey SILT, with limestone fragments and trace phosphates (MARL)(ML/MH)
- ④  Greenish gray silty CLAY (CH)
- ⑤  Gray-green to gray silty to slightly clayey fine SAND, trace phosphates (SM-SC/SC)
- ⑥  Gray-green to gray slightly silty to silty fine SAND, trace phosphates (SP/SM-SM)
- ⑦  Gray weathered SANDSTONE

≡ Groundwater level, April 1990

SP Unified Soil Classification group symbol as determined by visual review

-200 Fines passing No. 200 sieve (%)

← Loss of circulation (%)

PRELIMINARY FOUNDATION AND SOILS STUDY
PROPOSED RESOURCE RECOVERY PLANT
 LEE COUNTY, FLORIDA

MEI MORTENSEN
 Engineering, Inc.

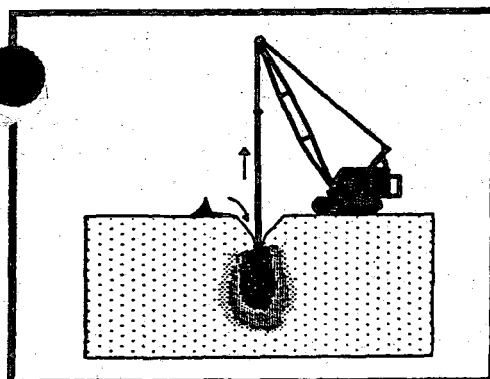
DRAWN: PWV	SCALE: ----	PROJ. NO: 90-0413
CHKD: RAM	DATE: APRIL 90	PLATE 4

APPENDIX

Vibro-Compaction & Vibro-Replacement

Vibro-Compaction

Vibro-Compaction is used for in-situ densification of loose sands to depths of as much as 115 ft below surface level. The granular soils are rearranged into a dense condition under influence of specially designed down-hole vibrators. The action of the vibrator, often accompanied by water jetting, reduces the inter-granular forces between the soil particles, allowing them to move into a more compact configuration as illustrated below. Compaction takes place without setting up internal stresses in the soil, thus ensuring permanent densification, and is achieved above and below the water table.



Typically, the basic vibrator is between 10 and 15 ft long and weighs approximately 2 tons. Extension tubes are added to permit penetration of the vibrator to the required depth. The complete assembly is supported from a standard crane or a specially built hydraulic crawler crane.

The vibrator is inserted into the ground to the maximum depth requiring densification and the soil is compacted in lifts from the bottom up. As the soils become more dense, a crater generally forms at the surface around the vibrator, giving visual evidence of the effectiveness of the compaction process. The diameter of influence of the vibrator is up to 14 ft.

The technique permits the use of economical spread footings with bearing capacities generally of up to 3 tons/ft² or even 5 tons/ft² in exceptional cases. The technique has also been utilized below planned pile tips to increase the design pile capacity.

Design Principles

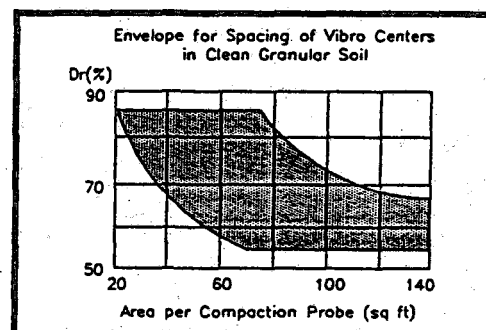
The significant engineering properties of a granular soil - compressibility, shear resistance, permeability, resistance to dynamic loading - are mainly dependent on the state of compaction, typically expressed in terms of relative density.

High relative density leads to high safe bearing capacity with low settlement. In the case of seismic loading, resistance to liquefaction in granular soil is a function of relative density. In earth retaining problems, active pressure decreases and passive resistance increases as relative density rises.

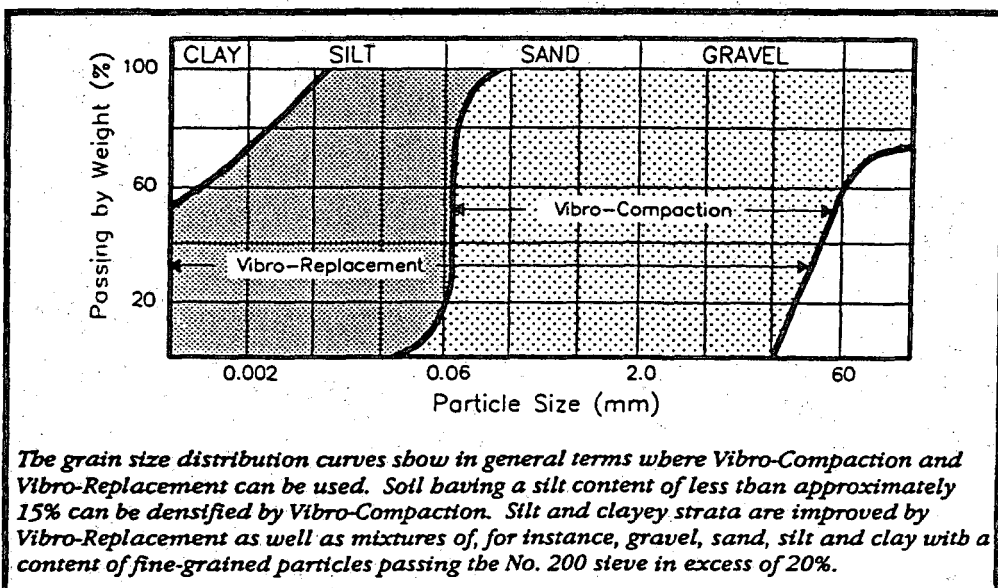
The angle of internal friction is increased on average between 5 and 10 degrees, resulting in much higher shear resistance. The modulus of deformation is often increased to around 1,000 tons/ft² and in some cases even higher, so that settlements are greatly reduced.

Apart from soil gradation, the area covered by each compaction point for a specified relative density depends on the compaction method used and the specific characteristics of the vibrator.

The diagram below shows the envelope within which treatment centers are likely for the area treatment of a clean granular soil. In practice, it is unlikely, even for heavy loading, that it will be necessary to achieve a relative density above 85 percent, while 55 percent may be regarded as a lower limit.



The effectiveness of Vibro-Compaction in granular soil can be readily verified using standard test methods such as Standard Penetration Testing, Cone Penetrometer soundings or load tests.

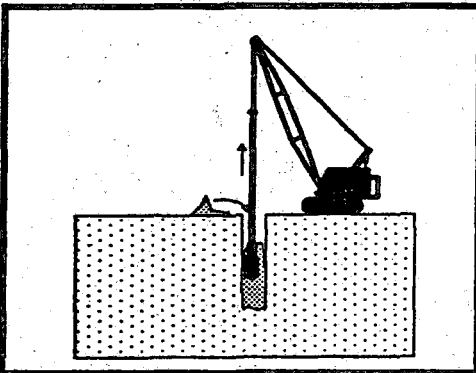


The grain size distribution curves show in general terms where Vibro-Compaction and Vibro-Replacement can be used. Soil having a silt content of less than approximately 15% can be densified by Vibro-Compaction. Silt and clayey strata are improved by Vibro-Replacement as well as mixtures of, for instance, gravel, sand, silt and clay with a content of fine-grained particles passing the No. 200 sieve in excess of 20%.

Vibro-Replacement

Because of their cohesion and low permeability, clays, silts and many mixed or layered soils cannot be compacted by vibration alone. Vibro-Replacement greatly extends the range of soil and foundation combinations that can be improved by this technology.

During Vibro-Replacement, the cavity resulting from the penetration of the vibrator is filled with gravel or crushed stone. This backfill material is compacted in lifts. A "stone column" is thus formed in which the stone is laterally pressed into the soil. The dense stone column and the in-situ soils form an integrated system having lower compressibility and higher shear strength. In addition, the stone columns act as drains to dissipate excess pore pressures. For this reason, the smaller settlements will occur faster and more uniformly than in untreated soils.



There are three main methods of Vibro-Replacement: 1) The dry method, when the hole formed by the vibrator remains open, generally assisted by expulsion of compressed air; 2) The wet method, where the soils are fully saturated and the flushing water removes soft material, stabilizes the bore hole and ensures that the stone backfill reaches the bottom of the vibrator; and 3) The bottom feed method, where the stone backfill is fed via a hopper and supply tube directly to the bottom of the vibrator.

An indication of the effectiveness of the treatment is the quantity of backfill material used. Other control procedures are available such as load or penetration tests.

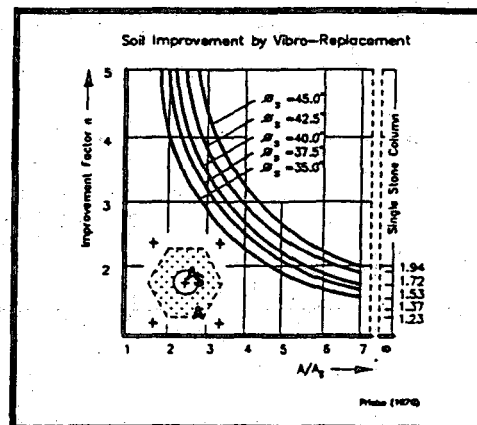
Design Principles

In the Vibro-Replacement process, soil improvement is achieved by partially replacing weak material with densely compacted granular columns tightly interlocked with surrounding soils. Normally, the columns fully penetrate the weak layer with the result that the stone columns/natural soil combination develops greatly enhanced bearing capacity and settlement characteristics.

Design involves two principal aspects. First, a balance must be reached between the column loading and the strength of the restraining soil, taking into account column size, friction and characteristics of the backfill. Second, the settlement of the stabilized soil must be checked for acceptability.

The stone columns can be arranged to suit varying combination of loads, soil type and performance requirements, but in general, spacings are in the range of 5 to 10 ft. The actual load on each column varies according to soil conditions, performance requirements and rate of loading, but generally will fall in the range of 10 to 40 tons. A high angle of friction is developed within the stone column material and field tests have given values in the range of 38 to 45 degrees.

The degree of settlement improvement that is expected in normal application of the Vibro-Replacement process is illustrated below.



An interesting special application arises in slope stability problems where consideration of column loading and settlement is not relevant. In this case, partial replacement of the soil in a critical area by stone columns can raise the shear resistance (slope stability) to the desired level.

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GKN Hayward Baker INC.
GROUND MODIFICATION

10.2 – Archaeological Report

IMAGE QUALITY

**PLEASE NOTE
THE ORIGINAL DOCUMENTS
SCANNED FOR THIS RECORD
WERE OF POOR QUALITY.**

**CULTURAL RESOURCE ASSESSMENT SURVEY OF THE
PROPOSED LEE COUNTY RESOURCE RECOVERY SITE F,
LEE COUNTY, FLORIDA**

**Conducted for
Camp, Dresser, & McKee, Inc.
Ft. Myers, Florida**

**by
Charles Fuhrmeister and Robert J. Austin**

**PIPER ARCHAEOLOGICAL RESEARCH, INC.
St. Petersburg, Florida**

May 1990

TABLE OF CONTENTS

	<u>Page</u>
List of Figures	ii
List of Tables	ii
Introduction	1
Cultural Prehistory	4
Historical Review	13
Environmental Setting	22
Research Considerations and Field Methods	26
Results	31
Summary	34
References Cited	35
Appendix A: Completed Florida Master Site File Forms	41

LIST OF FIGURES

	<u>Page</u>
Figure 1: Map of Lee County Resource Recovery Site F showing archaeological site and historic structure located during the survey.	3
Figure 2: Map of the Circum-Glades, Okeechobee Basin and Caloosahatchee archaeological regions (after Milanich and Fairbanks 1980:22).	5

LIST OF TABLES

Table 1: Glades Cultural Sequence (after Milanich and Fairbanks 1980: Table 4).	9
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INTRODUCTION

An archaeological and historical survey of the Lee County Resource Recovery Site F was conducted for Camp, Dresser, & McKee, Inc. to satisfy the requirements of an Application for development Approval for a Development of Regional Impact (ADA/DRI). The purpose of the survey was to locate any previously unrecorded archaeological and/or historic sites and assess their potential eligibility for nomination to the National Register of Historic Places.

The project area (Figure 1) encompasses approximately 330 acres and is located in the eastern portion of Section 24, Township 44 South, Range 25 East, Lee County, Florida. The proposed resource recovery site is slated for purchase by Lee County. The project area is bounded on the west by a power corridor, and on the other three sides by the section lines. Buckingham Road runs east-west parallel to the southern end of the property. There is one unimproved dirt road on the property, and a raised grade, possibly an historic tram line, both leading to several small structures near the center of the project area.

A review of the Florida Master Site Files (FMSF) revealed that there were no previously recorded archaeological sites or historic structures on the property. Since the area had never been subjected to a systematic, professional cultural resource assessment survey to locate and record potentially significant sites, such work was recommended by the Florida Department of Historical Resources and the Lee County Planning Department in order to locate any unrecorded sites.

Prior to entering the field, areas of high archaeological site potential were identified by PAR using environmental variables such as soil type and drainage, vegetation, and availability of natural resources (food and water) known to be associated with prehistoric and early historic sites. Although the entire project area was investigated, the field survey concentrated on these areas of highest potential, shown on Figure 1. Both pedestrian

reconnaissance and subsurface shovel testing were incorporated during the survey, which resulted in the discovery of one prehistoric archaeological site and one historic structure.

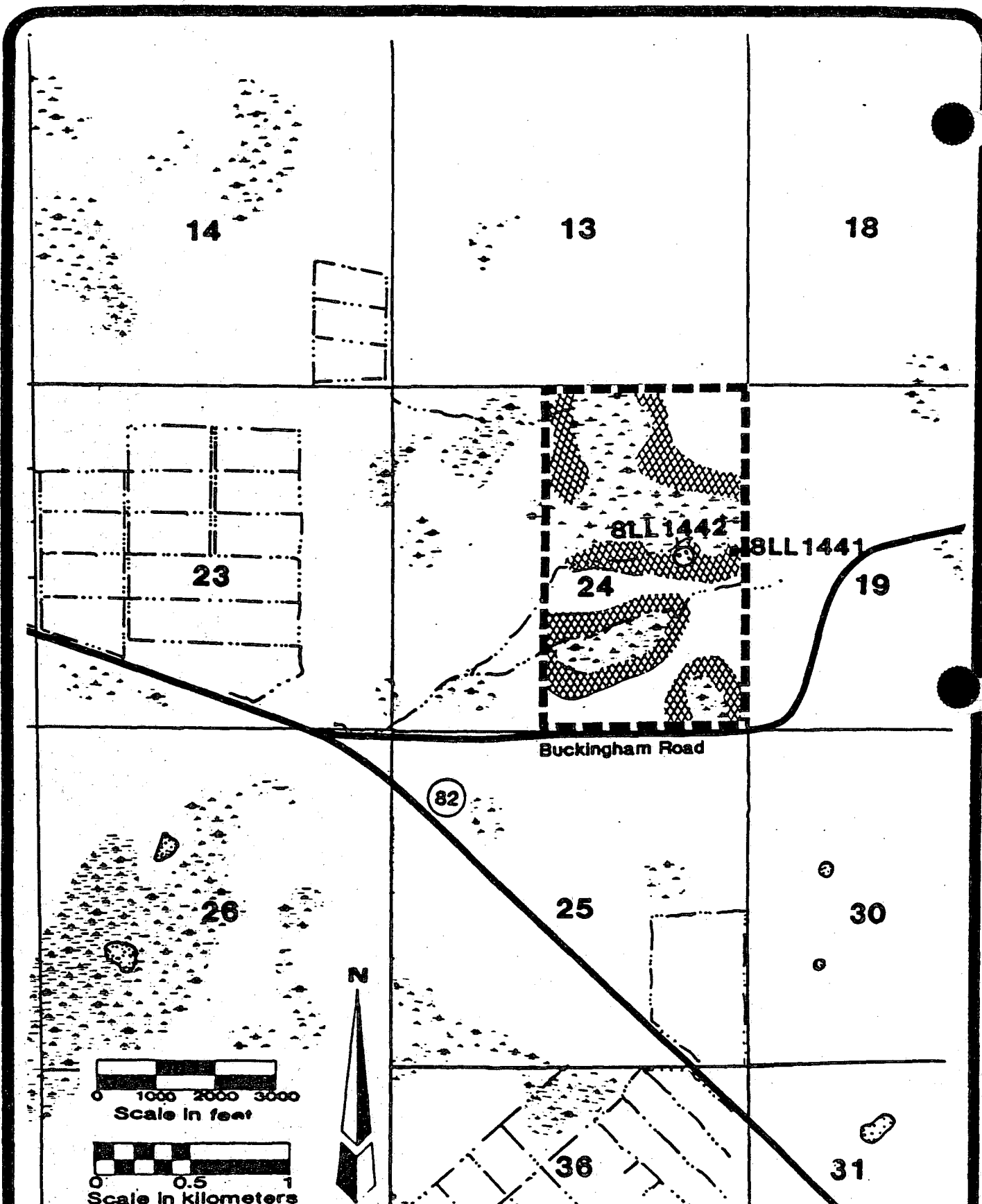


Figure 1: Map of Lee County Resource Recovery Site F showing archaeological site & historic structure. Cross-hatching indicates survey areas.

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CULTURAL PREHISTORY

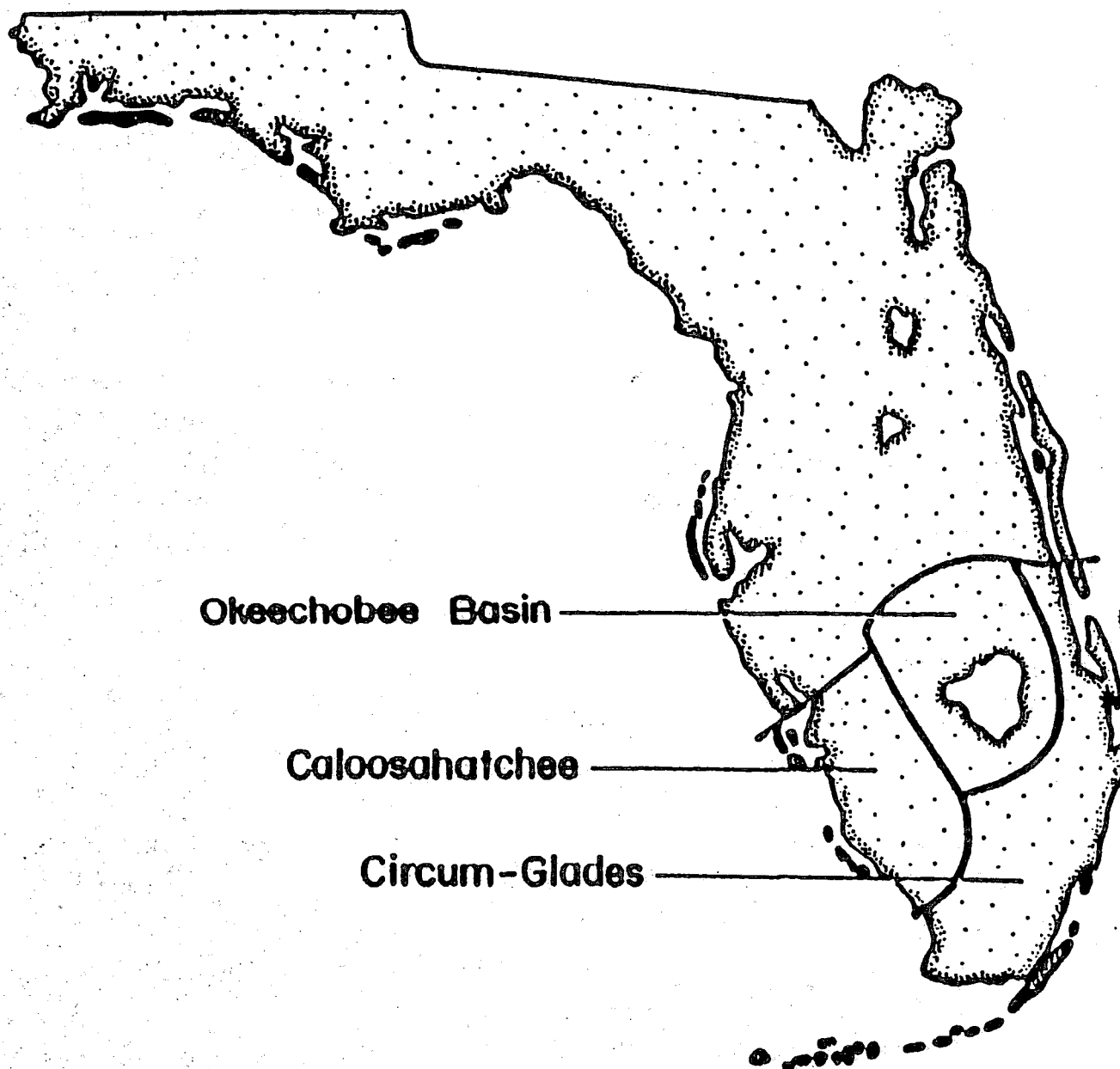
The following review of the region's prehistory will serve as a framework for understanding any prehistoric sites located during this survey. Aboriginal peoples have inhabited Florida for at least 14,000 years. The earliest cultural stages are pan-Florida in extent while later cultures exhibited differing cultural traits in the various archaeological areas of the state.

The Lee County Resource Recovery Site F is located in the Glades archaeological region of Florida as defined by John Goggin (1947, 1949b). Originally thought to be relatively homogeneous, archaeological evidence now indicates the presence of at least three cultural sub-areas - the Caloosahatchee, Lake Okeechobee Basin, and Circum-Glades (Griffin 1974; Milanich and Fairbanks 1980). The project area lies within the Caloosahatchee sub-area (Figure 2) which extends along the coast from Charlotte Harbor south to Cape Sable. The interior boundary is not well defined but generally follows Shark River Slough into the Everglades to an undetermined point south of Lake Okeechobee (Griffin 1974:342).

Paleo-Indian Stage

The earliest documented evidence for human occupation in Florida comes from the Warm Mineral and Little Salt Springs sites in Sarasota County, where radio-carbon dates of 10,000 B.C. have been obtained (Cockrell and Murphy 1978; Clausen et al. 1979). Research conducted at these sites and at Harney Flats in Hillsborough County (Daniel and Wisenbaker 1987) has contributed much important data on the culture and environment of this little known period. Although no intact Paleo-Indian sites have as yet been identified in the Caloosahatchee area, transitional late Paleo - early Archaic side-notched projectile points have been recovered. Recent excavations at the Cutler site in Dade County document the presence of human populations in South Florida during the late Pleistocene era (Carr 1986).

Figure 2



Map of the Circum-Glades, Okeechobee Basin,
and Caloosahatchee archaeological regions.
(after Milanich and Fairbanks 1980:22)

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The climate of the region during this period was cooler and drier than at present, and the level of the sea was as much as 35 meters lower (Milanich and Fairbanks 1980:37). Rising sea levels are assumed to have inundated many coastal sites (Ruppe 1980; Goodyear and Warren 1972) of the Paleo-Indian period, so that the dependence of these groups on estuarine and littoral resources is unknown.

The prevailing view of Paleo-Indian existence, based on the uniformity of the known tool kit and the small size of most sites, is that of a nomadic existence dependent on hunting and gathering, including hunting of the now extinct Pleistocene megafauna. Recent excavations in Hillsborough County, however, have contributed to the development of increasingly sophisticated models of early hunter-gatherer settlement (e.g. Daniel 1985; Chance 1983) which take into account the adaptive responses of human populations to both short and long term environmental change. These models suggest that some Paleo-Indian groups may have practiced a more sedentary lifestyle than had previously been believed (Daniel 1985:264).

Archaic Stage

The Archaic stage of cultural development was characterized by a shift in adaptive strategies stimulated by the onset of the Holocene and the establishment of increasingly modern climate and biota. It is generally believed to have begun in Florida around 6500 B.C. (Milanich and Fairbanks 1980:48). This stage is further characterized by an efficient, seasonal exploitation of a wider range of food resources including deer and other small game, hardwood nuts and mollusks, and a larger but less carefully worked tool kit.

Archaic Indian groups are thought to have utilized a more restricted territory than their Paleo-Indian predecessors, with some groups leading at least a semi-sedentary existence. Archaic site types include base camps, hunting camps, butchering sites, quarries, and cemeteries.

Evidence for the Archaic occupation of southwest Florida is scant. John Beriault has recorded several Archaic period sites (Beriault et al. 1981:54) and has directed salvage investigations at the Bay West site, an inundated Archaic period (ca. 4500 B.C.) cemetery (Beriault et al. 1981); all are located in interior Collier County. Recent work at Useppa Island (Milanich et al. 1984) and Horrs Island (McMichael 1982; Russo 1989) has resulted in the discovery and excavation of shell middens which have been dated to the late pre-ceramic Archaic.

Orange Phase: The introduction of a crude fiber-tempered pottery into the artifact assemblage of the Archaic aboriginals marks the beginning of the Orange phase around 2000 B.C. The basic hunting and foraging subsistence pattern of the Archaic stage continued relatively unchanged. Habitation along the Gulf Coast had increased significantly by this time and this shift in prehistoric settlement and subsistence strategies is documented in southwest Florida at Marco Island (Cockrell 1970 cited in McMichael 1982), Horrs Island (McMichael 1982), and Cape Haze (Bullen and Bullen 1956).

Formative Stage

During the late Orange phase, also known as the Florida Transitional Period (1200-500 B.C.), changes in pottery and technology occurred in Florida which mark the beginning of the Formative Stage. Fiber-tempered wares were replaced by sand-tempered, limestone-tempered, and chalky temperless ceramics and three different projectile point styles - basally-notched, corner-notched, and stemmed - also occur in relatively contemporaneous contexts. This profusion of ceramic and tool traditions is suggestive of population movement and social interaction between culture areas.

Glades Cultural Tradition: Milanich and Fairbanks (1980:20) state that "The Formative Stage, denoting a beginning of formal,

settled communities, with the gradual development of more complex forms of political and religious community organization, is marked by a great deal more regional diversity than the earlier stages."

This regional diversity, due primarily to local adaptation to more varied ecological conditions within the state, has traditionally been described in terms of cultural periods based on variations in ceramic types. The ceramic tradition for south Florida, characterized by sand-tempered bowls with incurvate rims, is known as the Glades cultural tradition. A ceramic sequence for the Glades region was established by John Goggin on the basis of work he conducted from the 1930s to early 1950s. Subsequent research has only served to refine his basic chronological framework.

The most recent revision is presented by John Griffin and is based on a series of radiocarbon dates from the Granada site in Dade County (Griffin et al. 1984). Griffin is quick to point out that the Glades sequence represents a chronology of stylistic and technological changes in ceramics to which other cultural traits have been added as data have permitted. While the basic Glades sequence appears to be supported by excavations conducted at the Turner River site in Collier County (Ehrenhard et al. 1978), it is also true that the southwest coast of Florida is perhaps the least known archaeologically of any in the state. As a result, the applicability of the Glades sequence to the Caloosahatchee sub-area has been a subject of debate and its refinement at the regional level will continue to be an impetus for future research.

Table 1 presents the currently accepted chronological framework for south Florida and summarizes the ceramic markers associated with each period. Griffin's version referenced above differs from the one presented below only in regard to the date ranges for the various periods which tend to be earlier (Griffin et al. 1984: Table 5, however, a recent re-evaluation of these dates by Griffin [1989] indicates that his 1984 temporal scheme should be

disregarded. Except for a slightly earlier inception for Glades I, he has returned to the basic framework of Milanich and Fairbanks.).

A number of archaeological sites dating to the Glades period are located along the southwestern coast of Florida with some of the smaller islands and keys composed almost entirely of shellworks

TABLE 1: GLADES CULTURAL SEQUENCE (after Milanich and Fairbanks 1980: Table 4)

<u>Period</u>	<u>Dates</u>	<u>Distinguishing Ceramics</u>
Glades I early	500 B.C. - A.D. 500	First appearance of sand-tempered pottery; no decorations
Glades I late	A.D. 500-750	First appearance of decorated pottery; Fort Drum Incised and Fort Drum Punctated
Glades IIa	A.D. 750-900	Appearance of Key Largo Incised, Sanibel Incised, Opa Locka Incised, Miami Incised
Glades IIb	A.D. 900-1000	Key Largo Incised still dominant; Matecumbe Incised appears
Glades II	A.D. 1000-1200	Almost no decorated ceramics; some grooved lips; Plantation Pinched appears
Glades IIIa	A.D. 1200-1400	Appearance of Surfside Incised
Glades IIIb	A.D. 1400-1513	Almost no decorated ceramics; Glades Tooled rims
Glades IIIc	A.D. 1513-1700	Appearance of European artifacts

and shell middens with enclosed plazas. The most famous of these is the Key Marco site where a large number of perishable

artifacts were found preserved in the muck of a mangrove swamp (Durnford 1895; Cushing 1897; Gilliland 1975). Carved wooden masks and vessels, cordage, netting, bone and shell tools, and the remains of wooden structures were recovered providing a wealth of information about aspects of prehistoric life that are rarely represented at typical archaeological sites in Florida. The ceramic assemblage indicates a late 15th century, pre-contact period occupation (i.e. Glades IIIB).

Other Glades period sites include those at Gordon's Pass (Goggin 1939), Goodland Point (Goggin 1949a), Marco Island (Van Beck and Van Beck 1965), Useppa Island (Milanich et al. 1984), Horrs Island (McMichael 1982), Sanibel Island (Fradkin 1976), and at the mouth of the Turner River (Sears 1956). An interesting feature of these large coastal sites is the progressive movement of habitation areas toward the water (e.g. Cushing 1897; Goggin 1949a; Sears 1956) and indications are that dwellings may have been built to extend out over the water.

Inland sites consist of shell and dirt middens along major water courses (e.g. Laxson 1966) and small dirt middens containing animal bone and ceramic sherds in oak/palm hammocks or palm islands associated with freshwater marshes.

The coastal Glades subsistence pattern is typified by the exploitation of fish and shellfish, wild plant food, and inland game, while Glades sites in the Big Cypress Swamp show a greater if not exclusive reliance on interior resources.

Acculturative Stage

At the time of the Spanish arrival in Florida in the early 16th century, the most important aboriginal group in south Florida was the Calusa, the historic descendants of the prehistoric Glades period culture in the Caloosahatchee region. They inhabited the Gulf Coast area from Charlotte Harbor to the Ten Thousand Islands and their political influence extended inland along the Caloosahatchee River and included the Lake Okeechobee

Basin. Efforts to extend their domain to the north are implied by the presence of late Glades period sites north of Charlotte Harbor, and it is known that warfare between the Tocobago Indians of that area and the Calusa was occurring in the 1560s (Milanich and Fairbanks 1980:242). Alliances between the Calusa and other South Florida tribes, such as the Tequesta, were commonly forged through marriage. As a result, the Calusa influence extended over most of south Florida.

According to ethnographic accounts, this vast domain was ruled by a single chief who resided in the capital city of Calos on Mound Key in Estero Bay near Fort Myers Beach (Goggin and Sturtevant 1964; Lewis 1978). Milanich and Fairbanks (1980:243) speculate that the complexity of the Calusa political system was tied to the necessity of maintaining exchange routes for the redistribution of food between coastal and interior locales. By exploiting the subsistence potential of the coast as well as the wetlands and savannahs of the Okeechobee Basin, food surpluses could be created, stored, and moved from place to place as needed.

Calusa sites are located primarily along the coast and consist of two types: shell middens on the mainland particularly around inlets, as well as on offshore keys or islands; and larger sites combining shell middens with mounds, platforms, causeways, embankments, and plazas. Sites dating to this period are located on Useppa Island, Sanibel Island, Josselyn Island, Marco Island, Mound Key and Buck Key among others, but excavations of historic Calusa sites, such as the above, have occurred at comparatively few (Griffin 1949; Fradkin 1976).

Repeated conflicts with the Europeans and exposure to European diseases resulted in the decimation of the Calusa by the middle of the 18th century. Some may have joined the Cuban-Spanish fishermen who were active in the Charlotte Harbor area during the first half of the 18th century (Hammond 1973).

By the early 1700s, groups of Creek Indians who came to be known as Seminoles moved into Florida to escape the political and population pressures of the expanding American frontier. Subsequent armed conflict with pioneers, homesteaders, and eventually the U.S. Army resulted in the removal of most of the Seminole from Florida and forced the withdrawal of the remaining Indians to the inhospitable environments of the Everglades and Big Cypress Swamp by the late 19th century. Numerous Seminole Indian villages and garden plots have been located on tree islands throughout Big Cypress Swamp overlying earlier Glades period components (Taylor 1980).

HISTORICAL REVIEW

European contact with the Calusa Indians first occurred in the early 16th century when explorers Ponce de Leon, Miruelo and Cordova landed in south Florida during the period 1513-1521 (Swanton 1979:101-102; Smith and Gottlob 1978:2). The open hostility of the Calusa made contact very brief (Ponce de Leon was killed by the Calusa during his second voyage in 1521). The Calusa were also noted for capturing and mistreating shipwrecked sailors. One sailor who did survive, Fontaneda, managed to escape after living among them for 15 years. He later wrote an account of his experience and much of what we know today about the Calusa culture comes from Fontaneda's observations.

In the 1540s, pirates of many nationalities began attacking the Spanish shipping lanes in the Caribbean and taking Indians for slaves. By 1549, the Spanish thought that the fierce Calusa Indians would be a valuable ally, and four Dominican missionaries, led by Father Luis de Camer, were sent in from Veracruz to subdue and Christianize the Indians where the conquistadors had failed. The Calusa, now wary of any Europeans, attacked the four missionaries as they prayed on the beach upon arrival (Grismer 1949:28).

In 1561, Spain was ready to abandon all Florida projects, but the next year, news of French settlement in Florida brought about a swift policy reversal (Smith and Gottlob 1978:5). Pedro Menendez de Aviles was placed in charge of the Florida provinces and given the directive to evangelize the natives. Assisted by the Jesuit order, Menendez put into action his "religious plan for Florida" (Lewis 1978:25). Menendez first met the Calusa in 1566 while exploring the Gulf coast in search of his missing son believed to have been shipwrecked in the area. In order to cement an alliance with the tribe, he went so far as to go through the pretense of a "marriage" with the Calusa chief Carlos' sister (Lewis 1978:27). His efforts, however, did little to insure that Spaniards would be accepted by the Calusa.

Spanish attempts at establishing a fort at Calos were not very successful; and in 1570 Esteban de las Alas, acting governor of Florida, ordered it abandoned (Lewis 1978:30).

It has been estimated that the Calusa population approximated 6000-7000 until well into the 17th century (Goggin and Sturtevant 1964:186-187; Lewis 1978:30). In 1763, Spain ceded Florida to Great Britain in exchange for Cuba. Great Britain enlisted the aid of Captain Bernard Romaine to survey and map the new territory. During this time, he re-named many of the geographic landmarks in English, of which only Charlotte Harbor and Cape Romano still bear his mark. His field notes describe the Calusa as being "driven back into the mangroves and keys." This withdrawal of, and decline in, Calusa population in the latter half of the 17th century can be attributed mainly to contact with European diseases and pressures exerted by early 18th century slave raids around the Mayaimi Lagoon (Lake Okeechobee) area by British soldiers and Creek Indians from the more northern colonies of Georgia and Carolina.

Florida's southwest coast remained relatively uninhabited by European-Americans until the latter part of the 19th century. Although some Spanish fishermen from Cuba established fishing ranchos along the coast at Boca Grande, Useppa Island, Punta Rassa and San Carlos Bay (Hammond 1973:364-365), and welcomed some of the later missionaries, few other European-Americans travelled to the area until the Second Seminole War (1835-1842). Caxambas Pass, at the south end of Marco Island appears on maps of southern Florida as early as 1771 but there is no indication of permanent settlement at that time (Tebeau 1966:152). Cuban fishing boats often stopped in the area to fill their water casks, and that would seem to be the reason for its early designation on maps.

The Seminoles, once part of the Creek nation, moved into northern Florida during the 18th century, filling a void left by the decimated aboriginal population. Their presence went unchallenged until the first part of the 19th century when a

greater number of Anglo-Americans began to settle in the region. The United States acquired Florida from Spain in 1821 and almost immediately, steps were taken to remove the Seminoles and relocate them in the western territories. Hostility escalated, culminating finally in the Dade Massacre in 1835, which heralded the beginning of the Second Seminole War. During the first part of the war, the Seminoles were entrenched in north-central Florida in the Cove of the Withlacoochee, but by 1837 they began to retreat south into the swampy regions of south Florida. United States soldiers pursued them, and as a result of these maneuvers, a great deal of information was generated in the form of maps, journals, and other military records about the flora, fauna, and topography of the area.

In May 1838, General Macomb traveled to Biscayne Bay in hopes of ending the "War of Indian Removal." A treaty was set up that stated that the Indians must move into a district permanently. This district was roughly defined as the area within Punta Rassa and the Caloosahatchee River north to Charlotte Harbor and the Peace River, and east to Lake Okeechobee (Fritz 1964:54, 55).

In July 1839, a group headed by Lt. Col. Harney sailed up the Caloosahatchee to erect a military encampment and trading house on the north shore of the river, across from where Ft. Myers stands today. Incensed by this disregard for the treaty made little more than a year before, the Indians attacked the small settlement, taking prisoners, killing others, and looting the trading post. Colonel Harney managed to escape, along with eight dragoons. Headed by a Calusa Indian, Chekiki, this event is known alternatively as the Harney Point Massacre or the Caloosahatchee Massacre, and marks the entrance of the remaining Calusa Indians into the war, joining forces with the Seminoles.

Across from the site of the Harney Point Massacre, Fort Harvie was erected in 1841 with breastworks surrounding the fort in a half-moon crescent, extending along what are now Lee, Main and Hendry Streets in Fort Myers. Other forts were erected or

reinstated upriver (Fort Denaud and Fort Thompson) and south of the Caloosahatchee, in the Corkscrew and Big Cypress swamps (Fort Simmons, Fort Shackelford, Fort Simon Drum) (Fritz 1964:58).

At the war's conclusion, a few hundred Seminoles managed to escape deportation and were allowed to remain in the Everglades. In 1850, Fort Myers was erected on the site of the abandoned Fort Harvie. It was to be the first move of a plan to systematically squeeze the Indians out of the area, with subsequent moves to include cattlemen and homesteaders. However, the soldiers of Fort Myers became friends of the Indians, trading within the fort during the day, and telling war stories during the evening. An uneasy peace was maintained until 1855 when the Third Seminole War began. Known also as Billy Bowleg's War, most of the military activity occurred south of the Caloosahatchee, and was not as intense as that which occurred in the previous war. The war came to a close in 1858 with nearly all of the Seminoles being deported. Forts Myers and Dulaney were abandoned shortly after the capture of Billy Bowlegs.

It is estimated that only about 200 Indians escaped this final wave of deportation (Tebeau 1966:50). These few lived south of the Caloosahatchee River, around and south of Lake Okeechobee. Because of their isolation, they were able to maintain a culture fairly resistant to outside influence until well into the 20th century (Tebeau 1966:50).

During the Civil War, the Caloosahatchee region served equally as a resource to both the Confederate States of America and profiteers. Feral cattle, descendants of escapees from the Spanish conquistadors, were rounded up and sent north by train to be sold to the confederates for eight dollars, confederate script, per head. Others, such as Captain James McKay and Jake Summerlin, saw better profits for running the Federal blockades to Cuba, and trading cattle (worth \$30 in Spanish gold) for such needed supplies as flour and sugar (bringing upwards to \$125 and \$40 a barrel, respectively). News of the run was distributed upon leaving to allow for the poor overland travel conditions in

southwest Florida, and the goods were sold for more cattle at Punta Rassa upon returning (Fritz 1964:70).

The Armed Occupation Act of 1842 and subsequent homestead acts brought more settlers to Florida, but most located north of Charlotte Harbor. The terrain of south Florida was too swampy to attract serious homesteaders interested in farming. Fishing continued along the coast and a few nomads established temporary camps along the southwest shoreline.

Government Plat map surveys carried out in the late 1860s and early 1870s show no trails or habitations within the project area, although the 1979 edition of the USGS Ft. Myers quadrangle map shows a trail labeled as "Old Railroad Line" running east-west just north of the project area. Tract book records show that the land within the east half of Section 24 was first deeded to Silver Springs Ocala Gulf Railroad in March of 1888.

In 1876, the village of Fort Myers was granted a post office by the federal government, but was refused to be recognized as Fort Myers, and so was officially known as Myers, Florida until shortly after the turn of the century.

In 1881 the State of Florida faced a financial crisis involving title to public lands. On the eve of the Civil War, land had been pledged by the Internal Improvement Fund to underwrite railroad bonds. After the war, when the railroads failed, the land reverted to the state. Almost one million dollars was needed by the state to pay off the principal and accumulated interest on the debt, thereby giving clear title. Hamilton Disston, a wealthy Philadelphian, provided the solution to the problem when he entered into an agreement with the State of Florida whereby he would drain land in south Florida for one-half of the acreage he could reclaim. When Governor Bloxham realized that the court would not approve the transfer of the land under the contract, he persuaded Disston to purchase 4 million acres at 25 cents an acre (Tebeau 1971:278). Although controversy surrounded this transaction, the sale managed to provide funds to pay bondholders and clear the title to state

lands (Tebeau 1971:278). During the period 1881-1885 Disston made 40 miles of canal and river improvements which brought about changes in both the topography and economy of south Florida (Tebeau 1971:278).

Other early settlers included squatters, many of whom never applied for title until their possessions were threatened (Tebeau 1966:167). In the 1880s, the settlement picture changed in southwest Florida. Following Disston's lead, land speculators moved into the region and railroad construction was initiated by men like H.B. Plant and Henry Flagler, offering promise of better transportation to the remote regions south of Tampa. Attracted by the area's reputation for good hunting and fishing, tourists visited the southwest Gulf coast, often living aboard their yachts based near rail and telegraph heads like Punta Gorda, Punta Rassa, or Tampa.

The nearby town of Buckingham was renamed from Twelve Mile Creek in 1889 by the postmaster, Edward M. Williams, when the government objected to the descriptive name for postal delivery (Morris 1974:29).

Thomas Edison surveyed the Caloosahatchee river area in March 1885. Within 24 hours of seeing the budding town of Fort Myers, he had agreed to purchase the old Summerlin place on the river to use as a laboratory. The town was excited over the prospect of being one of the first municipalities in the world to have electric street lighting, as Edison promised. However, Edison moved away after a two year stay, not to return for another 15 years, leaving the town with newly acquired but not installed lights and generators.

A census of the township and surrounding areas was taken in the summer of 1885, and the population was calculated to be in excess of 340 people. This led to the decision to incorporate the area under a local governing body, which would then be able to produce much needed public improvements and law enforcement. Until now, Fort Myers was within Marion County, so when the schoolhouse burned in 1886, the town council had to travel to Key

West (the county seat of Monroe County), and ask for money to sponsor rebuilding. The money was refused and the city was chided for being careless with county property. Infuriated by this lack of concern for other areas of the county, the city leaders petitioned Tallahassee to be incorporated into a new county, requesting that it be named after General Robert E. Lee, under whom many of them had served. The petition was granted in May of 1887 (Fritz 1964:96-97).

In 1898, the telegraph station at Punta Rassa relayed to Washington the message of the immolation of the U.S. Battleship Maine, which instigated the Spanish-American War. This was a blessing for the area, as the demand for south Florida's cattle skyrocketed from the U.S. occupation of Cuba (Grismer 1949:147). The cattlemen, with their newfound wealth, initiated a building boom.

During this boom, Fort Myers received charter to become a city, the post office was officially changed to Fort Myers, and the railroad moved into the Caloosahatchee region. The population along the Caloosahatchee River grew to 7000, and the railroad and ports of Fort Myers and Punta Rassa carried all the materials and people associated with this boom (Fritz 1964:109).

Henry Ford was a good friend of Thomas Edison, who was once again living in Fort Myers. Ford purchased the land next to Edison's, and imported three of his Model-T's to the city. These cars were the first suggestion that rail and waterway transportation could not satisfy the ever growing Caloosahatchee area. Before World War I, both Lee and Dade Counties had budgeted money for an overland route that would ideally connect Tampa and Miami. In Spring of 1923, a group of motorists called the "Trail Blazers" set off to drive across the flooded and rock-bottomed prairies of the Everglades. This epic journey took 23 days, and captivated the attention of the nation as daily reports were wired to the press (Fritz 1964:124). The Tamiami Trail was completed five years later.

Also in 1923, Lee County was splintered to make Collier and Hendry counties. The area that is now the Collier County was purchased in 1922 by Barron G. Collier with promises of a completed leg of the Tamiami Trail, and whispers of power plants, boat lines, and a railroad.

The appearance of overland routes and the ever increasing communication, and the advertisement of the "civility" of the Fort Myers area, brought droves of people coming to settle. The pioneer families and ranchers became businessmen, selling building supplies and real estate. The optimism and extravagance of the 1920s reached Fort Myers as Estero Island was developed under the name of Fort Myers Beach, in expectation that the city would soon stretch that far. A casino, boardwalk, and beach cottages were put up, and bootleg and nude parties were held from dusk to dawn (Fritz 1964:141).

Reality blew ashore with the hurricane of September 1926. It washed away the casino and beach cottages on Estero Island, and worse, the docks and wooden bridges across the Caloosahatchee River of the Tamiami Trail and Dixie Highway. The city of Fort Myers was flooded for a time.

Land prices plummeted, and the boom turned into a bust for a while. To Fort Myers' benefit however, the boom had left many credits, such as paved roads, sidewalks, a municipal bathing pool, and most importantly, railroad tracks and the completed Tamiami Trail (Grismer 1949:232).

Rebuilding was slow but steady. WPA money helped build a new harbor, and a new post office was erected on the site of the original Fort Myers. The new Edison Bridge was completed in 1927 to replace the wooden bridges lost to the hurricanes of the late Twenties. Eventually, airmail and commercial air routes were developed, and a radio station was opened.

During World War II, Page Field, to the east of Fort Myers, and two miles east of the project area, housed a training school for the Air Force. The Air Force spread out into old cattle pastures around Buckingham to build hangars, hospitals, barracks,

and several other associated structures. The war also spawned the development of two industries in south Florida: the familiar cattle farms were revived (along with cattle rustling and black market beef) to face the food shortages and rations, and the collection of rattlesnake venom for the production of snake antivenom to be distributed to soldiers fighting in the jungle. Both of these were considered important by the government, and thus brought both attention and money to the area (Fritz 1964:166).

After the war, the Fort Myers area has grown quickly and steadily to match the rest of the Florida Gulf Coast. The major industries are tourism, cattle, and agriculture.

Based on the historical documentary review, there was a moderate probability that Seminole War Period or related sites could be on the Lee County Resource Recovery Site F property. The likelihood of recovering cultural material from early homestead sites was also considered possible. Artifacts related to modern land use such as timbering, stock raising, and hunting however, were considered most likely to be encountered during the survey.

ENVIRONMENTAL SETTING

Environmental and ecological factors through time had a direct influence on the choice of sites for occupation by prehistoric populations and early historic settlers. Thus, geologic, hydrologic, and meteorologic processes that may have affected the survey area and its biotic resources are important elements in the formulation of a settlement/subsistence model for prehistoric and early historic peoples. Present day environmental variables can be used to reconstruct past conditions that may have influenced early human occupation of the Lee County Resource Recovery property area, and so are included in this study.

Regional Environment

The study area is located at the interface of the physiographic provinces known as the Caloosahatchee Valley and the Immokolee Rise (Puri and Vernon 1964). Associated provinces include the Southwestern Slope to the south, the Caloosahatchee Incline to the north, and the Gulf Barrier Islands to the west.

The Caloosahatchee Valley consists of a low, wide, limestone-floored floodplain harboring many sinkholes and artesian springs. The river empties into San Carlos Bay, which is part of a series of lagoons and estuaries separating a chain of barrier islands of Pleistocene and Holocene origin from the mainland. The town of Fort Myers lies on the bar of a bend in the river, about four miles from the river's mouth. Mangrove swamps have formed within the past 4000 years (Scholl 1964a, 1964b) on the landward side of these barrier islands along interior channels and inlets. In contrast, the coast south of Cape Romano is low energy, gently profiled, limestone-floored, and marshy with mangrove swamps fronting the Gulf (White 1970).

The Southwestern Slope is a relatively flat terrace formed during the Pamlico transgression. Near the coast, and on the offshore islands, sand ridges are present which are probably remnants of beach dunes formed by wind action during the late

Pleistocene. Prehistoric archaeological sites are often found on these Pleistocene ridges from Charlotte Harbor to Marco Island.

The drainage characteristics of south Florida are controlled largely by the underlying bedrock formations and the nature of the surficial sediments. In western Lee County the surface lithology is composed of undifferentiated deposits of sand, shell and clay of Pleistocene and Recent age which are underlain by limestones and marls of the Pliocene age Tamiami Formation and the highly variable Hawthorne Formation of Miocene age. Limestone is at, or very near the surface, throughout much of Lee County (Lane 1980). While exposures of silicified limestone, or chert, were often exploited by prehistoric peoples as a raw material source for the manufacture of stone tools, no significant outcrops of chert are known for southwest Florida (Upchurch et al. 1982:22; Lane 1980).

Water resources consist of both ground and surface water. The principal ground water for all of Florida is the Floridan aquifer which occurs under artesian conditions with slowly permeable clays and sands forming a confining layer that effectively prevents the vertical movement of water from the surficial to the ground water aquifer.

Secondary ground water resources include the shallow aquifer which is semi-confined and contains water under artesian conditions, and the water-table aquifer which is unconfined and subject to atmospheric pressure. The shallow artesian aquifer is the main source of ground water for much of south Florida. There is, however, some confusion regarding the distinction between the water-table aquifer and the shallow aquifer. Lane (1980) considers the water-table or unconfined aquifer to be associated with the Tamiami Formation west of the Everglades. McCoy (1962:24) does not distinguish between the water table and shallow aquifers, considering the shallow aquifer to be composed of the Pamlico sands, the Anastasia Formation, and the upper part of the Tamiami Formation; the same Formations that Klein (1954:15) associates with the unconfined, nonartesian water-table

aquifer. The confusion regarding aquifer designations may be due to the fact that in some areas the two freshwater aquifers appear to be interconnected to form a single hydrological unit (Klein 1954:18).

Almost 90% of south Florida is covered by surficial water which is extremely sensitive to fluctuations in climate and weather. The region is susceptible to periods of both flooding and severe drought. Surface runoff, evapotranspiration, and vertical recharge of the aquifers are natural factors that operate to remove surface water from the peninsula. During prehistoric times, the availability of surface water would have been an important factor in the scheduling of aboriginal subsistence activities and the location of sites.

Environment of the Project Area

The Lee County Resource Recovery Site F property contains two distinct environments of pine flatwoods and freshwater wetland prairies. The present natural land contours range from 20 feet (6 meters) to about 25 feet (7.5 meters) above mean sea level.

Much of the project area is covered in either pine/palmetto flatwoods or freshwater wetland prairies, although some xeric oak scrub vegetation is present. Large cypress heads are present, and small marsh ponds occur throughout the property.

In addition to providing a potential source of fresh water for animals and humans alike, the ponds and marshes would have supported abundant floral life suitable for aboriginal exploitation. The larger ponds and cypress heads would have been especially important sources of water during the dry season.

The principal soil association for the project area is the Oldsmar-Malabar-Immokalee, which consists of nearly level, poorly drained soils. Soils that occur on the project area are Boca, Valkaria, Pompano, Malabar, and Hallandale, which are all poorly or very poorly drained. The drainage characteristics of soils

have been used successfully by several researchers in the formulation of predictive models for prehistoric site location.

Vegetation consists of slash pine, saw palmetto, gallberry, and scattered sabal palm in the low lying flatlands, and cypress, red maple, sweet bay, sabal palm, and water oak in the hardwood swamp communities. Introduced or exotic plant species include Australian pine, and Brazilian pepper. The floral community of the study area was probably stable during prehistoric times after the last major environmental change about 5000 years ago (Watts 1971; Long 1974). Many of these plants would have been utilized as a food or shelter resource by prehistoric inhabitants. The range of habitat diversity of the land in the immediate vicinity of the project area would have supported a relatively wide and abundant range of terrestrial faunal resources, while the productivity of the nearby lagoons and estuaries would have provided fish and shellfish.

RESEARCH CONSIDERATIONS AND FIELD METHODS

The background and literature review, in conjunction with pertinent environmental variables, contributed to the formulation of project specific field methods designed to locate and evaluate previously unrecorded archaeological sites within the Lee County Resource Recovery Site F area. The designation of probability zones and decisions regarding site significance were based on previous research conducted within the Caloosahatchee region.

Research Considerations

Among the fundamental concerns of students of prehistory and history is the relationship between human social groups and the environment. Interpretations of observed settlement patterns have often been dependent largely on the relationship between site location and the natural environment with such interpretations sometimes tantamount to environmental determinism. Nevertheless, this assumed environmental-settlement relationship does appear to be valid when considering prehistoric hunter-gatherer and early historic societies with subsistence rather than market-oriented economies.

In southwest Florida, a major research emphasis is the development of Calusa society, seen by some as a "response to the material conditions of habitation in the coastal region of southwest Florida, and as such [is] adaptive in nature" (Widmer 1983:439). In other words, presented with an extraordinarily rich resource base, it was possible for people to choose a relatively sedentary existence with little or no labor-intensive food production necessary. This, in turn stimulated a rapid rate of population growth necessitating a centralization of power and organization to resolve disputes and redistribute food and other resources effectively (Widmer 1983:439-448).

An alternative, or supplementary, point of view is provided by William Marquardt (1984) who feels that social, cultural, and

economic factors should be given equal weight in explaining the development of aboriginal societies. Accordingly, the social stratification, interregional warfare, and political hegemony which characterized Calusa society may be better understood by considering the dynamic relationships among human societies. In order to fully understand the complex factors which influenced the development of local chiefdom societies, it will be necessary to study sites in southwest Florida using both the ecological and sociocultural approaches.

A second major research emphasis that falls within the theoretical realm of cultural ecology is the study of prehistoric settlement and utilization of the interior portions of this region. Recent investigations by the National Park Service have shown that the Big Cypress Swamp has been occupied continuously from at least as early as the late Archaic (ca. 2000 B.C.) with some sites indicating permanent habitation (Taylor 1980). Although the Big Cypress sites appear to represent a separate interior Glades adaptation, shell tools and other items of marine origin indicate interaction with the coastal zone. The nature of this relationship as viewed from cultural, economic and adaptive perspectives is of considerable interest to archaeologists.

A third area of needed research revolves around the need for a cultural/temporal framework that is specific to the southwest coast. Attempts to force local assemblages into the general framework of Goggin's Glades chronology continues to result in an uncomfortable fit. As regional culture sequences become more refined, it is inevitable that further subdivision of the Glades region into cultural subareas will result. This was predicted by William Sears in 1967 and he has been instrumental in defining the boundaries and characteristics of one such subarea, the Okeechobee Basin. A subdivision of the Caloosahatchee region has recently been proposed by Carr and Beriault (1984).

The traditional method for identifying cultural variability has been the analysis of changing pottery styles and decorative motifs through time and space. This method is based on the

assumption that stylistic similarities associated in space and time reflect some degree of cultural or ethnic affinity. Refining the local sequences in south Florida is impeded because most of the pottery is undecorated and therefore difficult to classify using conventional stylistic or decorative attributes. Recent ceramic research has focused on this problem by using a variety of technological and functional, as well as stylistic, attributes (e.g., Luer and Almy 1980; Milanich et al. 1984) to monitor change in ceramic types.

One of the research needs for the Southwest Coast then is the location and excavation of stratified sites containing ceramics, and preferably dateable organics, such as charcoal, to correlate with the artifacts, in an effort to test the validity of these attributes as time sensitive markers and to refine the regional chronology.

Site File Search and Literature Review

A review of the Florida Master Site File listings revealed that no sites are recorded within a 2½ mile radius of the project area. However, there are two sites recorded in the general vicinity of the town of Buckingham, 8L120 and 8L121, they are considered to be small sand mounds of aboriginal manufacture, though little else is known about them. The banks and islands of the Caloosahatchee river hold numerous prehistoric sites, including shell middens, shell mounds, and village sites.

Field Methods

Data from recent cultural resource assessment surveys throughout Florida have repeatedly demonstrated the validity of using environmental variables as predictors of prehistoric site location. These have shown that in coastal areas prehistoric sites tend to be located adjacent to bays and estuaries, and on elevated, better drained soils usually identified by the presence of hammock vegetation. On the mainland, prehistoric sites are frequently located on well drained soils on upland slopes

adjacent to freshwater swamps with a source of potable water nearby. A significant percentage of sites are also associated with somewhat poorly to poorly drained soils or are located in oak/palm hammocks associated with a freshwater marsh or wetland prairie.

The environmental factors pertinent to the project area may be summarized as follows:

a) all of the soils in the project area are poorly to very poorly drained;

b) areas adjacent to ponds, marshes and sloughs would have provided an abundance of natural resources suitable for exploitation including deer and other small game, turtle, alligator and a variety of fish and birds;

c) these same wetland areas would have provided a potable fresh water source for humans;

Locations where any of these conditions existed, either singly or in combination, were considered to have a potential for containing prehistoric sites. During the field survey particular attention was paid to the areas of higher elevation relative to the surrounding terrain within the pine flatwoods and scrubby flatwoods, and to oak/palm hammocks adjacent to marshes and ponds. Areas of low elevation relative to the surrounding terrain were considered less likely to contain evidence of prehistoric occupation, while those areas which are poorly drained were considered generally unsuitable for either habitation or cultivation within aboriginal or early historic technological limitations.

The field survey combined both subsurface shovel testing with surface reconnaissance of all areas shown in Figure 1. Shovel tests, extending to an average depth of one meter and measuring approximately 40 centimeters in diameter, were placed judgmentally in areas of high site potential with particular attention given to topographic highs. In areas of minimal vegetation and/or upturned soil, such as cleared areas, borrow pits, dirt roads, and animal burrows, a careful surface

inspection was made. When cultural material were encountered, additional shovel tests were excavated to determine the horizontal and vertical extent of the deposits. Excavated soil was screened through 1/4" mesh hardware cloth.

RESULTS

The archaeological and historical assessment survey of the Lee County Resource Recovery Site resulted in the identification of one previously unrecorded prehistoric archaeological site, and the location and evaluation of one historic structure. This section of the report provides a brief description and evaluation of these cultural resources. Significance assessments are based on the criteria set forth in the DHR's "Guidelines for Archaeological and Historic Site Assessment Survey...and Report Content for Projects Conducted in the State of Florida" (Florida Department of State 1982). Locations of all sites are shown on Figure 1.

8L1 1441, Buckingham Road site.

The Buckingham Road site is located in T44S, R25E, Section 24 NE/SE/SE (USGS 7.5' Estero Quadrangle). The site consists of a single chert waste flake, recovered from subsurface testing. These type flakes are the result of the manufacture or repair of a stone tools. A large cypress head and wetland prairie is located about 115 feet (30 meters) to the northwest.

Elevation at the site is about 20 feet (6.5 meters) above mean sea level. The vegetation on the site area is cypress, scrub oak, cabbage palm, and such exotics as brazilian pepper and australian pine. Soil stratigraphy is typically 20 centimeters of gray sand underlain by a 20 centimeter layer of light gray sand, a 10 centimeter layer of dark brown hardpan, 40 centimeters of orange sand, and tan clayey sand extending beyond one meter.

The location of this site near a wetland, and the artifact associated with it probably represent a short-term occupation of a favorable location for the exploitation of available resources in the immediate area. Lithic waste flakes, such as the one recovered here, are poor indicators of temporal or cultural affiliation, as they are ubiquitous to almost all of Florida's prehistoric sites.

Because of the sparse and unexceptional nature of the Buckingham Road site's artifact assemblage, the potential for additional significant research or information at this site is considered to be low. While the recorded location of this site constitutes useful data for regional settlement pattern studies, the site is not considered regionally significant and, therefore, is not eligible for the National Register of Historic Places.

8L1 1442, The Buckingham Road Farmstead.

The Buckingham Road Farmstead is located in T44S, R25E, Section 24 SE/NE/NW (USGS 7.5' Estero Quadrangle). The farmstead contains one small single family house, located on the northern side of the compound, a board and batten garage/equipment shed located about 300 feet (91 meters) to the SSW of the house, and a frame gable roofed barn about 320 feet (97 meters) to the south of the house in a fenced corral, with a well on its north side. A large cypress head and wetland prairie is located about 115 feet (30 meters) to the north. The farmstead complex is now vacant and deteriorated.

The house is rectangular in plan, about 16 feet by 50 feet (4.9 meters by 15.1 meters), and is raised 36 inches (0.9 meter) above grade on concrete block foundation piers. The structural system of the house is wood balloon frame and the exterior is clad in novelty type weatherboard, except for a one room area on the southeast corner of the house that is probably an addition. The addition is clad in board and batten. The roof is a low pitched gable, covered in sheet metal roofing with projecting eaves that have exposed rafter ends. The windows are a mixture of wood double hung sash with 1/1 light, wood casement 1 light, and replacement jalousie type with metal frames. The window sizes and placement are very irregular.

This farmstead complex appears to date from the early 20th century (1910-1930), as evidenced by the construction materials and techniques. The house, garage, and barn are of crude construction and are typical in size and design of modest early

20th century central and south Florida farmsteads.

Although the recorded location and description of these historic structures may provide valuable information for regional syntheses of early Florida pioneer and rural farmstead settlement practices, these buildings have no known association with historic persons or events of regional or local significance. Based upon this information, the Buckingham Road Farmstead Complex is not considered eligible for listing in the National Register of Historic Places.

SUMMARY

A cultural resource assessment survey was conducted of the proposed Lee County Resource Recovery Site F, Lee County, Florida. One prehistoric archaeological site and one historic structure were discovered during the survey. Neither of these sites is considered to be a regionally significant cultural resource. Based on the results of this survey, damage to or destruction of these sites would not constitute an adverse impact to National Register eligible resources.

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Appendix A:
COMPLETED FLORIDA MASTER SITE FILE FORMS

ARCHAEOLOGICAL SITE FORM FLORIDA MASTER SITE FILE

Site # 8 L1 1441

Recorder # _____

Field Date _____

☒ original
____ update

Version 1.1: 11/88

SITE NAME(S) Buckingham Rd. Archaeological site

PROJECT NAME Lee County Resource Recovery

DHR# _____

OWNERSHIP ☐ private-profit ☐ priv-nonprof ☐ priv-indiv ☐ priv-unsp ☐ city ☒ county ☐ state ☐ federal

USGS MAP NAME Ft. Myers

CITY Ft. Myers

UTM: ZONE 16 / 17

EASTING /4/2/4/3/2/0/

NORTHING /4/6/0/0/0/8/0/

COUNTY Lee

TWP 44 S RANGE 25 E SECTION 24 ☐ NE ☐ SE ☐ SW

(Optional) LATITUDE d m s

LONGITUDE d m s

ADDRESS/VICINITY OF/ROUTE TO South on SR 82 to buckingham Rd. 1 mile E to unimproved dirt road. N 1/2 mile. Site is on SE edge of wetland

TYPE OF SITE (All that apply) ☒ prehist unspecified ☐ hist aboriginal ☐ hist nonaboriginal ☐ hist unspecified

SETTING

☒ land site

☐ wetland fresh

☐ wetland salt/tidal

☐ underwater

STRUCTURES OR FEATURES

☐ aboriginal boat

☐ agric/farm bldg

☐ burial mound

☐ building remains

☐ cemetery/grave

☐ dump/refuse

☐ earthworks

☐ fort

☐ midden

☐ mill unspecified

☐ mission

☐ mound unspcif

☐ plantation

☐ platform mound

☐ road segment

☐ shell midden

☐ shell mound

☐ shipwreck

☐ subsurface features

☐ well

☐ wharf/dock

FUNCTION

☒ none specified

☐ campeite

☐ extractive site

☐ habitatn/homestead

☐ farmstead

☐ village/town

☐ quarry

DENSITY

☐ unknown

☒ single artifact

☐ diffuse scatter

☐ dense scatter > 2/m²

☐ variable density

OTHER _____

HISTORIC CONTEXTS (All that apply)

☐ unknown culture

☒ aboriginal unspcif

☐ hist unspecified

ABORIGINAL:

☐ Alachua ☐ Early Swift Creek
☐ Archaic unspc. ☐ Englewood
☐ Belle Glade ☐ Fort Walton
☐ Belle Glade I ☐ Glades unspcif
☐ Belle Glade II ☐ Glades I
☐ Belle Glade III ☐ Glades Ia
☐ Belle Glade IV ☐ Glades Ib
☐ Cades Pond ☐ Glades II
☐ Deptford ☐ Glades IIa

☐ Glades IIb
☐ Glades IIc
☐ Glades III
☐ Glades IIIa
☐ Glades IIIb
☐ Glades IIIc
☐ Hickory Pond
☐ Late Archaic
☐ Late Swift Creek
☐ Leon-Jefferson

☐ Manasota
☐ Middle Archaic
☐ Mount Taylor
☐ Norwood
☐ Orange
☐ Paleo-Indian
☐ Pensacola
☐ Perico Island
☐ Safety Harbor
☐ St. Augustine

☐ St. Johns unspcif
☐ St. Johns I
☐ St. Johns Ia
☐ St. Johns Ib
☐ St. Johns II
☐ St. Johns IIa
☐ St. Johns IIb
☐ St. Johns IIc
☐ Santa Rosa
☐ Seminole

☐ Swift Creek
☐ Transitional
☐ Weeden Island
☐ Weeden Island I
☐ Weeden Island II

☐ prehistc-aceramic
☐ prehistc-ceramic

NONABORIGINAL:

☐ 1st Spn 1700-63
☐ 1st Spanish unsp
☐ 1st Spn 1513-99
☐ 1st Spn 1600-99

☐ Amer Terr 1821-44
☐ Statehood 1845-60
☐ Civil War 1861-65
☐ Reconstr 1866-79

☐ Postrecn 1880-97
☐ SpWar 1898-1916
☐ WW I 1917-1920
☐ Boom 1921-1929

☐ Depress 1930-40
☐ WW II 1941-49
☐ Modern 1950-

☐ American 1821-
☐ American 1821-99
☐ American 1900-
☐ Afro-American

OTHER _____

Poor Original

RECORDER'S EVALUATION OF SITE

Eligible for National Register? ☐ yes ☒ no

Significant as part of district? ☐ yes ☒ no

Significant at the local level? ☐ yes ☒ no

☐ likely, need information

☐ likely, need information

☐ likely, need information

☐ insufficient information

☐ insufficient information

☐ insufficient information

SIGNIFICANCE STATEMENT FOR COMPUTER FILES (Limit to 3 lines here; attach full justification)

DHR USE ONLY

DATE LISTED
ON NAT REG.

KEEPER DETERMINATION OF ELIGIBILITY:

SHPO EVALUATION OF ELIGIBILITY:

LOCAL DETERMINATION OF ELIGIBILITY:

Local Office _____

DHR USE ONLY

Yes ☐ No ☐ Date _____

Yes ☐ No ☐ Date _____

Yes ☐ No ☐ Date _____

Poor Original

ARCHAEOLOGICAL SITE FORM
Division of Historical Resources, Florida Department of State

Site # 8L1 1441

METHODS FOR SITE DETECTION

☐ no field check ☐ exposed ground ☒ screened shovel
☐ literature search ☐ posthole digger _____
☐ informant report ☐ auger--size: _____
☐ remote sensing ☐ unscreend shovel _____
Other/Remarks (#, size, depth, pattern of units; screen size) 40 x 40 x 100cm shovel tests, 1/2 inch screen
8 shovel tests

METHODS FOR SITE BOUNDARIES

☐ bounds unknown ☐ remote sensing ☐ unscreened shovel
☐ none by recorder ☐ insp exposed ground ☒ screened shovel
☐ literature search ☐ posthole digger ☐ block excavns
☐ informant report ☐ auger--size: _____ ☐ guess

COLLECTION STRATEGY

☐ unknown ☒ unselective (all artifacts)
☐ selective (some artifacts)
☐ uncollected ☐ general (not by subarea)
☐ controlled (by subarea)

Other (Strategy, Categories) _____

ARTIFACT CATEGORIES

☐ unknown ☐ daub ☐ nonlocal-exotic ☐ bone-unspec
☒ lithics ☐ brick/bldg matl ☐ metal ☐ unworked shell
☐ ceramic-aborig ☐ glass ☐ bone-human ☐ worked shell
☐ ceramic-nonabo ☐ prec metal/coin ☐ bone-animal ☐ subsurf feats

SITE EXTENT Size (m²) Unk Depth/Stratigraphy of Cultural Deposit 30cm

Perpendicular Dimensions _____ m direction by _____ m direction

SPACE COLLECTED Surface: #units _____, total area _____ m². Excavation: #units _____, total vol _____ m³

TOTAL ARTIFACTS Count or Estimate? Surface # _____ Subsurface # 1

DIAGNOSTICS (TYPE OR MODE & FREQUENCY) 4 _____ N= _____

1 _____ N= _____ 5 _____ N= _____

2 _____ N= _____ 6 _____ N= _____

3 _____ N= _____ 7 _____ N= _____

Remarks _____

TEMPORAL INTERPRETATION Components: ☒ single ☐ prob single ☐ prob multiple ☐ multiple ☐ uncertain

Describe each occupation spatially. For each, estimate begin, end dates BP; basis; if absolute dates, give method, lab, id, date, range, etc.

ENVIRONMENT Nearest Fresh Water UID wetland Distance (m) 50m NW

Natural Community Xeric scrub

Local Vegetation Slash and longleaf pine, scrub oak

Topographic Setting Scrubby flatland

Present Land Use N/A rural

SCS Soil Series Hallendale Soil Association 0-dsmar-Malabar- Immokalee

SITE INTEGRITY Overall Disturbance: ☐ none seen ☒ minor ☐ substantial ☐ major ☐ redeposited

Nature of Disturbances/Threats _____

INFORMANT(S) Contact Information _____

REPOSITORY Field Notes, Artifacts PAR

Photographs (negative nos) _____

MANUSCRIPTS OR PUBLICATIONS ON THE SITE Fuhrmeister & Austin 1990 Cultural Resource Assessment Survey of the Proposed Lee County Resource Recovery Site F, Lee County, Florida

RECORDER(S): Name C. Fuhrmeister Date of Form 5/14/90

Affiliation/Address/Phone PAR

RECOMMENDATIONS FOR SITE No further work recommended

NARRATIVE DESCRIPTION: Attach information on site discovery, history, current integrity, apparent threats, environment, and your temporal and functional interpretations.

DISCUSSION OF SIGNIFICANCE: Attach justification for recorder's evaluation (Page 1).

REQUIRED: USGS MAP OR COPY WITH SITE LOCATION MARKED

Poor Original

HISTORICAL STRUCTURE FORM
FLORIDA MASTER SITE FILE

Site 8L1 1442

XXX original
update

Recorder #

SITE NAME Buckingham Road Farmstead Complex
HISTORIC CONTEXTS Room Times
NAT. REGISTER CATEGORY Building
OTHER NAMES OR MSF NOS none
COUNTY Lee OWNERSHIP TYPE
PROJECT NAME DHR NO
LOCATION (Attach copy of USGS map, sketch-map of immediate area)
ADDRESS N/A CITY
VICINITY OF / ROUTE TO South on SR 82 to Buckingham Rd. 1 mile E to
unimproved dirt road. N 1/2 mile.
SUBDIVISION N/A BLOCK NO LOT NO
PLAT OR OTHER MAP N/A
TOWNSHIP 44S RANGE 25E SECTION 24 1/4 SE 1/4-1/4 NE
IRREGULAR SEC? Y XX n LAND GRANT
USGS 7.5' MAP Ft. Myers
UTM: ZONE EASTING 42490 NORTHING 2946020
COORDINATES: LATITUDE D M S LONGITUDE D M S

HISTORY

ARCHITECT: F M L unknown
BUILDER: F M L unknown
CONST DATE 1920 CIRCA C RESTORATION DATE(S): N/A
MODIFICATION DATE(S): unknown
MOVE: DATE ORIG LOCATION
ORIGINAL USE(S) farmstead
PRESENT USES(S) vacant

DESCRIPTION

STYLE Frame Vernacular
PLAN: EXTERIOR rectangular
INTERIOR irregular
NO.: STORIES 1 OUTBLDGS 2 PORCHES 0 DORMERS 0
STRUCTURAL SYSTEM(S) wood frame-balloon
EXTERIOR FABRIC(S) wood, novelty siding, board and batten
FOUNDATION: TYPE piers MATLS concrete block
INFILL none
PORCHES none
ROOF: TYPE gable SURFACING sheet metal, v-crimp
SECONDARY STRUCS. none
CHIMNEY: NO 0 MTLs LOCNS
WINDOWS wood, DHS 1/1, casement 1 light, jalousie
EXTERIOR ORNAMENT none
CONDITION deteriorated SURROUNDINGS rural
NARRATIVE (general, interior, landscape, context; 3 lines only)
A small, crudely built house with detached board and batten garage and
frame barn now clad in asbestos shingles.

ARCHAEOLOGICAL REMAINS AT THE SITE

FMSF ARCHAEOLOGICAL FORM COMPLETED? Y N (IF Y, ATTACH)
ARTIFACTS OR OTHER REMAINS

RECORDER'S EVALUATION OF SITE

AREAS OF SIGNIFICANCE History

ELIGIBLE FOR NAT. REGISTER? y xxn likely, need info insf inf
 SIGNIF. AS PART OF DISTRICT? y xxn likely, need info insf inf
 SIGNIFICANT AT LOCAL LEVEL? y xxn likely, need info insf inf

SUMMARY ON SIGNIFICANCE (Limit to three lines provided; see page 3)

No architectural significance. No historical significance. It is typical of
 a humble early Twe-tieth century farmstead.

* * *DHR USE ONLY* * * * * DHR USE ONLY * *
 *
 * DATE LISTED ON NR *
 * KEEPER DETERMINATION OF ELIG.(DATE): -YES _____ -NO _____ *
 * SHPO EVALUATION OF ELIGIBILITY (DATE): -YES _____ -NO _____ *
 * LOCAL DETERMINATION OF ELIG.(DATE): -YES _____ -NO _____ *
 * OFFICE _____ *
 * * *DHR USE ONLY* * * * * DHR USE ONLY * *

RECORDER INFORMATION: NAME F Howard M F. L Hansen
 DATE: MO 5 YR 90 AFFILIATION PAR

PHOTOGRAPHS (Attach a labeled print bigger than contact size)

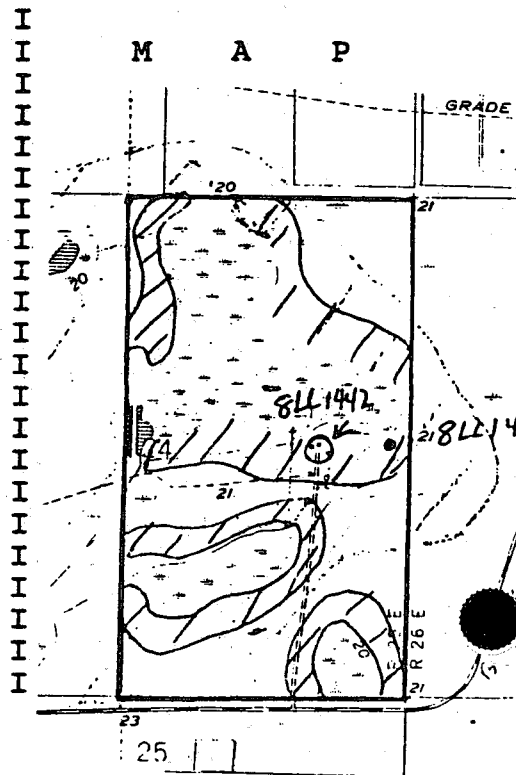
LOCATION OF NEGATIVES PAR

NEGATIVE NUMBERS _____

P H O T O G R A P H

Poor Original

Attach a B/W photographic print here if available. Please label the print itself with at least: the FMSF site number (survey number or site name if not available), direction and date of photograph. Prints larger than contact size are preferable.





**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

APPENDIX 11.0

NOISE STUDIES AND TRAFFIC IMPACT STUDY

11.1 – Noise Impact Study

11.2 – Operational Noise Study Report

11.3 – Traffic Impact Study

11.1 – Noise Impact Study

APPENDIX 11

NOISE STUDY

1.0 PURPOSE OF NOISE STUDY AND BACKGROUND INFORMATION

1.1 INTRODUCTION

The purpose of this noise study is to assess the predicted noise impacts from the construction and operation of the Lee County Energy Recovery Facility.

The proposed Lee County Energy Recovery Facility (ERF), which will be capable of processing 2,400 tons per day (tpd) of solid waste, could be a source of three types of noise:

- o Temporary noise generated by construction equipment during Facility construction;
- o Long-term noise generated by Facility machinery, primarily trucks moving on the tipping floor, ventilation fans, boilers, steam turbine, generator, condensers, deaerators, cooling tower, and residual handling area; and
- o Noise generated by truck traffic on adjacent local roadways.

The purpose of this noise assessment is to identify and characterize each type of potential noise source, and to determine the extent to which appropriate combinations of these sources will be:

- o Audible or annoying at site property boundaries;
- o Audible or annoying at sensitive receptors (residences, other residential uses, schools, hospitals, and parks, for example) nearest the site and nearest affected roadways; and

- o In conformance with noise regulations contained in the Lee County Noise Ordinance, and with the requirements of the Florida Department of Environmental Regulation Instruction Guide for Certification Application: Electrical Power Plant Site, Associated Facilities, and Associated Transmission Lines [DER Form 17-1.211(1)].

This study provides the background information necessary to evaluate, quantify, and locate any potentially discernible increase in noise levels. The noise analysis is divided into three phases.

The first phase is the development of a noise assessment protocol. The discussion of this phase includes a description of sensitive receptors, noise monitoring stations and instrumentation, and noise impact assessment methodology.

The second phase is the field monitoring and analysis to measure background noise levels. The background noise level is the sound level prior to Facility operation, and is used in conjunction with estimated Facility noise levels to determine if Facility operations will cause a discernible noise impact.

The third phase is the determination of Facility noise levels, calculations of overall noise levels (background plus Facility) at each sensitive receptor, and the assessment of noise impacts from the Facility on the community surrounding the site. The assessment includes a comparison of background noise levels at each site and a discussion of possible mitigation measures.

1.2 DEFINITIONS

Many terms used in this report are fundamental to studying the impact of noise on a community. Therefore, to facilitate a better understanding of the noise analysis, a few key terms are defined below.

- Attenuation
 - the reduction of sound levels by absorption and reflection over distance. This reduction is measured in decibels.
- A-Weighting
 - a method which is used to adjust sound level readings to represent the sensitivity of the human ear. A-weighting is accomplished by adjusting each octave band level by a specified weighting value from the flat response (dB) to account for the sensitivity of the human ear. A-weighted sound levels are measured in A-weighted decibels (dBA).
- Decibels
 - a unit used to express relative difference in sound pressure levels. A decibel is 10 times the common logarithm (base 10) of the ratio of sound intensity to a reference intensity. The unit symbol is dB for a flat response reading and dBA for an A-weighted reading.
- Equivalent Continuous Sound Level L_{eq}
 - The level of a steady sound which has the same A-weighted sound energy as the time-varying sound.
- Flat Response
 - sound level readings which are not weighted and are therefore independent of frequency range. The human ear is not equally sensitive to noise at all frequencies, but a flat response measures sound levels at all frequencies with equal sensitivity.
- Frequency
 - the number of times in one second that a periodic event, such as a sound wave, repeats itself.
- Hertz (Hz)
 - the unit of frequency that corresponds to one cycle per second.

- Noise - unwanted sound, caused by numerous sources, often with widely varying sound levels at various frequencies.
- Noise (Sound) Level - the quantity in decibels (dB or dBA) of noise or sound as measured by a sound level meter. Levels are ratios, and therefore cannot be added directly to find the noise level of a combination of sources. Levels must be converted to intensities to allow for addition. The sound pressure level (SPL) is related to the sound intensity (I) by the following equation:

$$\text{SPL} = 10 \log \left(\frac{I}{10^{-12}} \right)$$

- Pure Tone - a condition where any octave band center frequency sound pressure level exceeds the two adjacent center frequency sound pressure levels by 3 decibels or more.
- Octave Band - a range of frequencies whose basic ratio is 2. For example, in this noise analysis the first octave band median frequency is 31.5 Hz; the next band frequency is 63 Hz (2 times the first); then 125 Hz, 250, 500, 1,000, 2,000, 4,000, 8,000 and 16,000 Hz.

1.3 ATTENUATION

Noise levels outside the Facility will be attenuated by a variety of influences, such as the atmosphere, natural and man-made barriers (such as brush, trees, and walls), and geometrical divergence. To estimate receptor noise levels, a simplified and conservative equation was used to estimate the sound pressure level at a receptor based on the initial sound power level and various attenuation factors. The equation is:

$$L_A = L_A \text{ ref} - (A_{\text{div}} + A_{\text{trees}} + A_{\text{barrier}} + A_{\text{wall}})$$

where:

L_A = A-weighted sound pressure level at the receptor location (dB)

$L_A \text{ ref}$ = Initial A-weighted sound power level at the source (dB)

A_{div} = Attenuation due to the geometrical divergence of sound from the source (dB)

A_{trees} = Attenuation caused by trees or dense vegetation (dB)

A_{barrier} = Attenuation from barriers between the source and receptor (dB)

A_{wall} = Attenuation from walls surrounding the source (dB)

For each sensitive receptor, the resultant Facility noise level (sound reaching the receptor) was predicted using the above formula. The noise levels from each of the major components of the Facility were added to estimate the total noise level due to the Facility at each receptor.

1.3.1 DIVERGENT ATTENUATION

Sound in a free field (no obstructions) is radiated in spherical waves. The attenuation of sound due to wave divergence is related to the distance from source to the receptor by the equation:

$$A_{\text{div}} = 20 \times \log_{10} (D/D_{\text{ref}})$$

Where D is the distance to the receptor and D_{ref} is the reference distance. For a point source, such as the Facility, radiating equally in all directions, the equation indicates that a doubling of distance reduces the sound level by 6 dB. For a line source, such as traffic, the attenuation is 3 dB per doubling of distance.

1.3.2 EXCESS ATTENUATION

Several factors are involved in excess attenuation including surface vegetation, wind, temperature, wind turbulence, and precipitation.

Forests and dense vegetation reduce noise levels as a function of emission frequency and length of dense forest. The relationship is:

$$A_{div} = 0.01 (f)^{1/3} r$$

Where r is the thickness, in meters, of a dense forest separating the source and receptor, and f is frequency in Hz. Typically a 100-meter deep wooded forest will reduce A-weighted noise levels by 5 to 12 dBA.

Wind, wind turbulence, temperature, and precipitation tend to reduce or attenuate sound levels. During the day, temperature levels decrease with increasing height, while wind velocities increase. A shadow zone develops where sound may be attenuated by up to 20 dB. However, the creation of this shadow zone is a function of wind speed and temperature, and only becomes important at long distances which are not characteristics of this study. Therefore, the effects of wind and temperature gradients will be considered negligible in this study.

Wind turbulence during unstable atmospheric conditions can cause fluctuations in sound reception. However, this is of minor importance; therefore, it is also considered negligible. Additionally, the effect of precipitation, although slightly more significant, only reduces sound levels by 0.5 dB over 100 meters and is also considered negligible.

The assumption that wind, temperature, wind turbulence, and precipitation have negligible effects on sound levels would produce a conservatively high estimate of noise levels off-site. This means that actual sound levels off-site could be less than those predicted.

1.3.3 BARRIER ATTENUATION

A barrier, man-made or natural, is a solid body that blocks the line of sight between the source and the receiver and causes a reduction in noise levels by absorbing sound waves. Barriers include hills, buildings, cliffs, etc. No major natural barriers are present at this site. Barriers may be used to mitigate Facility noise levels. Barriers can typically reduce noise A-weighted noise levels by 5 to 15 dB.

1.3.4 WALL ATTENUATION

Most of the noise producing elements in the Facility are enclosed by at least one wall, in accordance with decisions made by the County to produce a practicable and acceptable Facility. Walls will reduce noise levels reaching receptors outside the site area. Depending upon the material and mass of the wall, noise losses may range from 5 to 40 dBA.

2.0 PHASE I - DEVELOPMENT OF A NOISE ASSESSMENT PROTOCOL

2.1 INTRODUCTION

The determination of existing noise levels is essential to the evaluation of impacts caused by new noise sources. The noise monitoring program is intended to determine the existing background noise levels in the community, and is used as a baseline for the impact analyses. Once existing conditions are determined, the Facility-produced noise levels can be compared to background noise levels, and community impacts may be assessed.

The noise monitoring program is divided into three tasks. The first task involves determining noise monitoring locations which requires an evaluation of zoning, land use and population, existing regulations, and potential sensitive receptors to determine the most appropriate location for the monitoring. The second task includes determining monitoring specifications and obtaining proper equipment. This involves establishing meter calibration and data collection procedures, and determining monitoring periods. The third task is the data collection and analysis phase which involves actual noise monitoring and the determination of various parameters. The details of each part of the program are provided below.

2.2 MONITORING STATION EVALUATION

Assessing noise impacts from the Facility requires that background noise levels be measured first. To accomplish this, a monitoring program has been developed to provide a network for acquiring sound level data. The selection of monitoring sites is a critical step in the development of a representative baseline monitoring program. Three criteria are of concern in establishing monitoring locations. They are: (1) sensitive receptors—concentrations of individuals who may be particularly sensitive to an increase in noise levels (e.g., hospitals, schools, and homes); (2) land use and zoning—an area with a large residential population would be

more heavily monitored than an area that is sparsely populated; and (3) local noise ordinances—Lee County has established local noise levels which may not be exceeded.

2.2.1 LAND USE, POPULATION, AND ZONING

Population, in conjunction with zoning and land use, is used in identifying areas which should be monitored. Areas with large populations or those which are mainly zoned for residential uses would be monitored more heavily than an area with limited population and/or industrial zoning.

The site is located on a 155-acre tract. Surrounding properties consist of dense forest growth to the north, east, and south, and power line rights-of-way to the west. Low density residential areas are established east and southeast of the site.

2.2.2 NOISE REGULATIONS

Regulatory noise criteria and guidelines pertinent to the site include:

- o The Lee County Noise Ordinance, which requires that noise levels not exceed 66 decibels (dBA) during day-time hours, and 55 decibels (dBA) during night-time hours (10:00 p.m. to 7:00 a.m.) at the property boundary of a residential, public space, agricultural, or institutional land use (this is the land use category immediately adjacent to the site);
- o The Florida Department of Environmental Regulation Instruction Guide for Certification Application: Electrical Power Plant Site, Associated Transmission Lines [DER Form 17-1.211(1)], which requires a noise survey at the proposed plant site, calculation of operational facility noise levels at the property boundary, discussion of compliance with local

noise regulations, and discussion of potential impacts to surrounding population;

- o U.S. Environmental Protection Agency, U.S. Department of Transportation, U.S. Department of Housing and Urban Development, U.S. Department of Defense, and the Veterans Administration, June 1980, Guidelines for Considering Noise in Land Use Planning and Control;
- o Department of Housing and Urban Development noise acceptability criteria (Title 24, Code of Federal Regulations, Part 51.103(c), Exterior Standards).

The Lee County Noise Ordinance is an enforceable regulation. The Federal Interagency Committee on Urban Noise and HUD criteria are informational guidelines only, and are not enforceable standards. Noise monitoring was conducted to collect data in forms comparable to the regulations.

2.2.3 SENSITIVE RECEPTORS

A noise sensitive receptor is a location where people live, work, or play. Schools, day care centers, hospitals, and homes are generally identified as sensitive receptors. Businesses and industries are not considered to be sensitive receptors because noise levels at the businesses and industries may be as high or higher than those expected from the Facility. Some of the monitoring stations are used to define noise levels at more than one sensitive receptor.

The goal of the monitoring program is to capture representative samples of existing noise levels at three types of locations:

- o The Facility property boundary (in accordance with FDER guidelines);
- o The nearest sensitive receptors (residences) to the Facility; and

- o Representative sensitive receptor locations along local routes which would carry Facility truck traffic.

Figure 11-1 shows the monitoring locations. Table 11-1 lists these locations, and contains a brief rationale for the selection of each site. Existing noise levels at these locations are used as baselines to which project noise levels will be added (logarithmically) and compared.

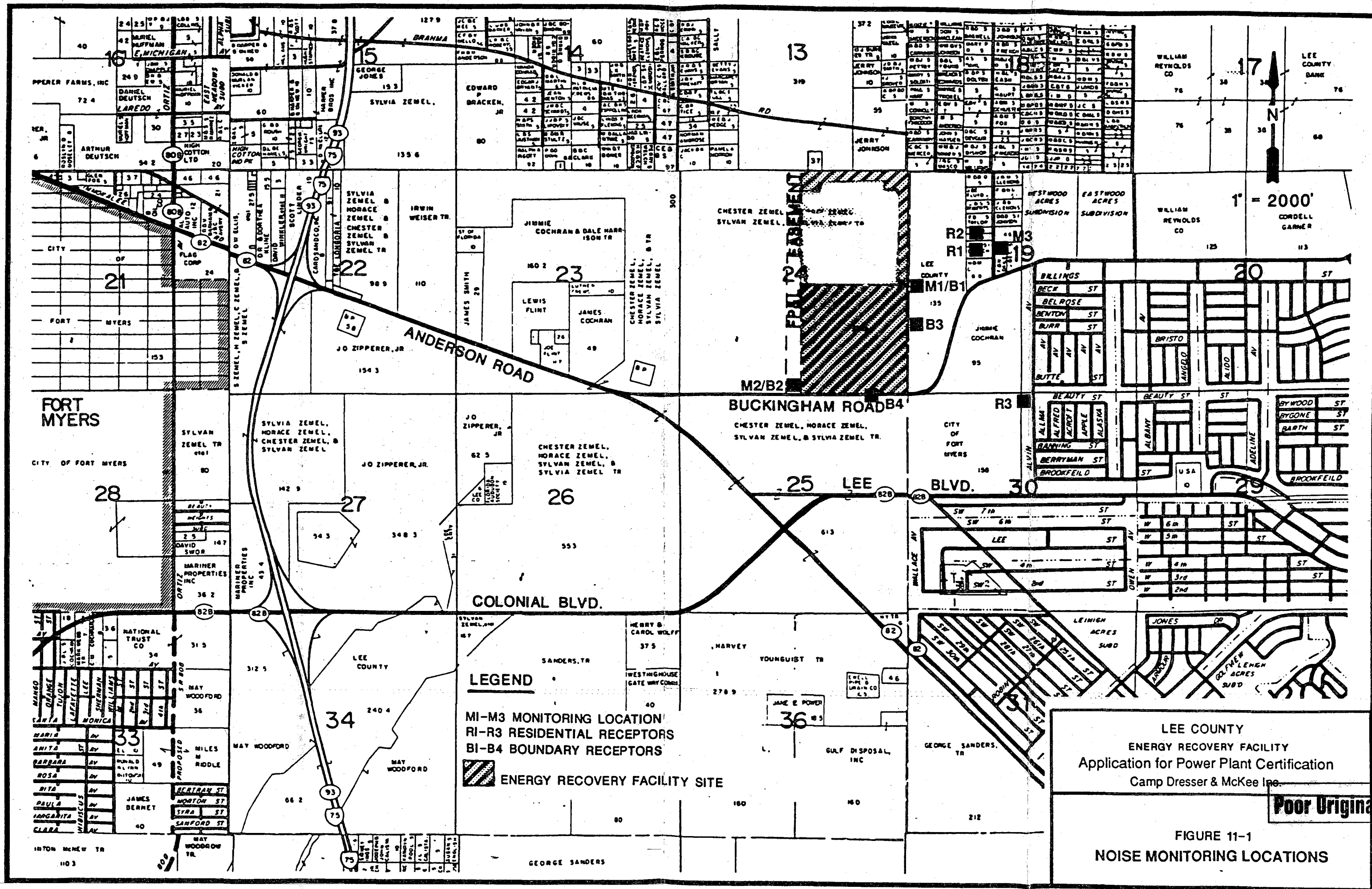
2.3 MONITORING PERIODS AND PROCEDURES

Monitoring occurred over a 24-hour period. Each of the monitoring stations was sampled six times: twice in the morning (9:00 a.m. to 1:00 p.m.); twice in the afternoon (1:00 p.m. to 5:00 p.m.); and twice between 1:00 a.m. and 5:00 a.m., the quietest time of the night. Each sampling period consisted of about 20 minutes of actual monitoring. The following data were gathered during each sampling period:

- o Five two-minute A-weighted equivalent continuous sound levels (L_{eq}).
- o Fifty discrete samples taken once every 10 seconds (approximately eight minutes and 20 seconds) to compute statistical noise levels (L_{90}).

Although the statistical noise level (L_{90}) is not required to be compared with any of the applicable standards for this project, it was taken to provide a more complete picture of noise level distribution at each monitoring location.

If existing noise levels at any location appeared to have any pure-tone or dominant frequency characteristics, octave-band measurements were also taken in order to determine the frequency band and noise level of the pure-tone noise. The transmission line crossing the site was found to have a buzzing sound with pure tone characteristics, and so received octave-band analysis.



LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Certification
Camp Dresser & McKee Inc.

**FIGURE 11-1
NOISE MONITORING LOCATIONS**

Poor Original

TABLE 11-1

LEE COUNTY ENERGY RECOVERY FACILITY
AMBIENT NOISE MONITORING LOCATIONS

Monitoring Site Identifier	Location	Rationale For Selection
M1	Eastern Property Boundary Nearest Facility	Eastern site boundary conditions; closest point of adjacent park to Facility noise sources.
M2	Southwestern Property Boundary	Southern and western site boundaries; existing traffic noise levels along route likely to be used by Facility traffic.
M3	Residential Area East of Site on Neal Road	Residential areas (sensitive receptors) about 3,000 feet to the east on Neal Road and southeast across Buckingham Road.

SOURCE: Camp Dresser & McKee Inc., 1990.

The data collection was conducted as outlined in "Fundamentals and Abatement of Highway Traffic Noise," Report No. FHWA-881-8EV-73-7976-1, Chapter 3, USDOT, Federal Highway Administration, June 1973.

2.3.1 MONITORING EQUIPMENT AND PROCEDURES

A GenRad Model 1988 Precision Integrating Sound Level Meter was calibrated with the GenRad Model 1986 Sound Level Calibrator before the first reading of the day, and once every four hours afterwards.

The sound level meter was equipped with a wind screen, and placed on a tripod at each measurement location. A "random incidence" microphone was used; this microphone is capable of capturing uniformly weighted frequency and power levels for incoming sound from all directions simultaneously if aimed straight up (90° incidence to the sound field). At the beginning of each sampling period, the sound level meter was set for the automatically timed integration mode at fast response. The L_{eq} was continuously integrated for two minutes. Integration was not suspended during any peak events, such as passing construction vehicles or jets overhead, but the event was noted in the field notes.

At completion of the L_{eq} measurement, the sound level meter was set for the continuous mode at slow response. Readings were made and recorded on the field data sheet at ten-second intervals for 500 seconds (50 readings), or about eight minutes and 20 seconds.

The crew, time, windspeed and wind direction, temperature and general weather conditions were noted at each site for each set of readings. Any unusual noise events were noted.

2.3.2 QUALITY ASSURANCE PROCEDURES

Representativeness of each L_{eq} measurement was examined. If any of the two-minute L_{eq} s vary from the ten-minute block L_{eq} by more than 5 dBA and the field notes cannot support its inclusion in the data base, it was discarded.

11-13/0

The procedure for checking the statistical adequacy of the discrete ten-second noise samples for use in computing the L_{90} is as follows. After each group of 50 samples has been taken, the first, fifth, and tenth lowest recorded levels are circled. These three samples constitute the L_{90} , flanked by its upper and lower error limits. If these three test samples fall into three contiguous two-dBA windows on the L_{90} data sheet, then the L_{90} has to be determined to fall between the lower and upper limits within the 95 percent confidence level. If the data set does not meet this criterion, its confidence level will be downgraded, and the data will be used with caution or combined with data from the closest monitoring periods to provide a larger statistical sample ("Fundamentals and Abatement of Highway Traffic Noise," Report No. FHWA-881-8EV-73-7976-1, Chapter 3, USDOT, Federal Highway Administration, June 1973 Chapter 3).

3.0 PHASE II - FIELD MONITORING TO DETERMINE EXISTING CONDITIONS

3.1 DATA ACQUISITION

Six noise level measurements were performed at each of the three monitoring locations on April 26 and 27, 1990.

3.2 ANALYSIS OF NOISE LEVELS

Averages of noise levels over time are helpful in comparing existing noise conditions; statistical formulas yielding single number values are more concise and useful for comparisons. Statistical noise parameters were used to evaluate and compare background noise levels. These same noise descriptors are also used in Section 6.0 to evaluate possible Facility impacts on the surrounding community. There are two basic descriptors which are of value. They are: L_{eq} , the energy-equivalent noise level, which represents the average energy content of sound for a given period; and L_{90} , 90th percentile exceedance level. These descriptors are defined in the subsections that follow.

3.2.1 ENERGY EQUIVALENT SOUND LEVEL

The L_{eq} is the average energy content of sound over a given period, or that constant A-weighted sound level which is equivalent to the time-varying sound over the same periods. L_{eq} s were calculated for three time periods at each monitoring location: day-time (based on four sets of measurements between 7:00 a.m. and 10:00 p.m.), night-time (based on two sets of measurements between 10:00 p.m. and 7:00 a.m.), and 24-hour (based on all six sets of measurements over a continuous 24-hour period). The day-time and night-time periods chosen are identical with those specified in the Lee County Ordinance.

3.2.2 PERCENTILE EXCEEDANCE LEVELS

Percentile exceedance sound levels (L_x) define the sound level that was surpassed x percent of the time. The L_{90} is taken as a measure of the "residual" noise level. The "residual" noise is the steady background noise level upon which single noise events, such as passing traffic, children playing, and machines operating, are superimposed. This data is collected by taking an instantaneous reading every ten seconds for about eight minutes and 20 seconds (50 readings).

3.3 EXISTING NOISE LEVELS

Table 11-2 presents the A-weighted data for the three monitoring stations. For comparison, Table 11-3 shows typical noise levels for various residential neighborhoods.

Station M1 is located on the eastern boundary of the site approximately 2,500 feet north of Buckingham Road (and also 1,400 feet west of Buckingham Road). This station was selected to represent the existing conditions at the site's undeveloped eastern boundary. The 24-hour L_{eq} was calculated to be 46 dBA, generally considered to be quiet (see Table 11-3). The day-time L_{eq} was 48 dBA (and the L_{90} was 39 dBA); the dominant day-time noise sources were jets from the regional airport, distant cars, and birds. The night-time L_{eq} was 35 dBA (and the L_{90} was 31 dBA), and the dominant noise sources were insects and barking dogs.

Station M2 is located on the southwestern boundary of the site approximately 150 feet north of Buckingham Road (100 feet inside the site fence). This station was selected to represent the existing conditions at the site's southwestern boundary, and to measure noise levels caused by traffic on Buckingham Road. The 24-hour L_{eq} was calculated to be 52 dBA. The day-time L_{eq} was 52 dBA (and the L_{90} was 42 dBA); the dominant day-time noise sources were traffic on Buckingham Road and distant traffic on Route 82, and buzzing from the powerlines. The night-time L_{eq} was 50 dBA (and the L_{90} was 32 dBA), and the dominant noise sources were insects and powerline buzz. Infrequently, cars passed by on Buckingham Road; these

TABLE 11-2

LEE COUNTY ENERGY RECOVERY FACILITY
EXISTING NOISE CONDITIONS (dBA)

Monitoring Location	Day-time		Night-time		24-Hour	Dominant Noise Source
	L_{eq}	L_{90}	L_{eq}	L_{90}	L_{eq}	
M1 Eastern Boundary of Site	48	39	35	31	46	
M2 Southwestern Boundary of Site	52	42	50	32	52	Traffic on Buckingham Road
M3 Residences on Neal Street	55	39	42	35	54	Traffic on Neal Road and Buckingham Road

NOTE: Noise sampling was performed with a Genrad sound level meter (Model No. 1988), which can accurately measure noise levels between 25 dBA and 120 dBA. The meter was calibrated with a Genrad sound level calibrator (Model No. 1986) before and after each sampling round. Four day-time and two night-time samples were taken at each location. Each sampling round consisted of L_{eq} measurements which are composites of five two-minute readings and L_{90} measurements were 50 discrete readings every 10 seconds for a duration of 8 minutes 20 seconds.

TABLE 11-3

LEE COUNTY ENERGY RECOVERY FACILITY
TYPICAL 24-HOUR NOISE LEVELS FOR
REPRESENTATIVE RESIDENTIAL DWELLING DENSITIES

Description	L_{eq} Range (dBA)	Average L_{eq} (dBA)	Average Tract Population Density (people/mi ²)
Quite suburban residential	42-46	44	630
Normal suburban residential	47-51	49	2,000
Urban residential	52-56	54	6,300
Noisy urban residential	57-61	59	20,000
Very noisy urban residential	62-66	64	63,000

SOURCE: U.S. EPA, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.
EPA 550/9-74-004. March 1974.

vehicles were quite loud (one minute L_{eq} s as high as 58 dBA) due to their generally high speed.

Station M3 is located in the residential area northeast of the site. The noise meter was placed approximately 50 feet east of Neal Road (about 900 feet north of Buckingham Road). This station was selected to represent existing conditions at the closest residences to the Facility. The 24-hour L_{eq} was calculated to be 54 dBA. The daytime L_{eq} was 55 dBA (and the L_{90}

was 39 dBA); the dominant day-time noise source was traffic on Neal and Buckingham roads. The night-time L_{eq} was 42 dBA (and the L_{90} was 35 dBA), and the dominant noise sources were insects and birds. The large difference in the L_{eq} as compared to the L_{90} is due to vehicles accelerating from the Neal/Buckingham Road intersection.

The only audible pure-tone noise was a buzzing noise at 63 Hz from the powerlines at Station M2.

4.0 PHASE III - DETERMINATION OF FACILITY NOISE LEVELS

4.1 INTRODUCTION

The purpose of this analysis is to estimate the future noise levels produced by the Facility and compare those noise levels to the existing noise levels at each receptor. Future noise levels can be estimated by determining equipment noise levels (obtained from manufacturers), and calculating the noise loss produced by barriers such as walls and the dispersion of noise over distances. The result is an estimate of the increase in noise levels produced by the plant at the receptors.

4.2 PREDICTED NOISE IMPACTS - FACILITY OPERATIONS

The dominant equipment noise sources were identified; this equipment includes the boilers, generators, air pollution control equipment, blowers, tipping floor equipment (crane and trucks), and residual handling equipment. Based upon noise measurements for similar facility operations, the sound levels for the proposed Facility operations were determined. The A-weighted noise levels and the reference distances for these operations are listed in Table 11-4. The references for this information are presented in Table 11-5.

The distance from the process units to each receptor was calculated on the basis of the site plan shown in Volume I, and USGS maps. In instances of multiple process units, the distance between the receptor and the nearest unit was used (minimum distance). This results in conservative (low) estimates of the loss due to divergence, and correspondingly high estimates of the sound levels at the receptor.

Noise losses due to dispersion over the distance to the receptor were computed to estimate the noise level due to the Facility at the receptor. The loss due to divergence (the spreading of the sound waves) is calculated in the following fashion.

TABLE 11-4

LEE COUNTY ENERGY RECOVERY FACILITY
EQUIPMENT NOISE LEVELS

Process	Number of Units ^a	Noise Level ^b (each unit) (dBA)	Reference Distance ^c (feet)
Boiler	1	82	3
Generator	1	100	3
Turbine	1	90	3
Stack	1	75	3
Dry Scrubber/Baghouse	4	85	3
Cooling Tower	1	72	25
Deaerator	1	85	3
Building Vent Fans	17	86	3
Forced Draft Fan	4	98	3
Induced Draft Fan	4	106	3
Draft Fans - Enclosures	8	95	3
Material Handling - Crane	1	82	4
Material Handling - Tipping Floor	1	112	3
Residue Handling	1	90	3
Scale - Trucks Idling	3	89.5	5

^aThe number of units expected to be operated at the Facility.

^bThe noise level is expressed in A-weighted decibels for an individual unit for each process. These values were provided by the equipment manufacturers (see Table 11-5).

^cThe distance at which the noise level was taken; this is used in computing the loss due to divergence.

TABLE 11-5

REFERENCES FOR EQUIPMENT NOISE LEVELS

Type of Equipment	Reference
1. Boilers	Hooter/Eriksen Cogeneration Systems Inc., October 31, 1989
2. Generator, Turbine	Westinghouse Electric Corporation, Power Generation Business Unit, November 2, 1989.
3. Stack	Harris, Cyril M. - Handbook of Noise Control, Chapter 28, McGraw-Hill Book Co., New York, NY
4. Dry Scrubber	Environmental Elements Corporation, November 1, 1989
5. Cooling Tower	Ceramic Cooling Tower Company, October 31, 1989
6. Fans	Twin City Fan and Blower Co., October 13, 1989
7. Material Handling Crane	Whiting Corporation, October 31, 1989
8. Tipping Floor	A-weighted readings obtained at the North Andover resource recovery facility. The distribution over frequencies was determined from Cavanaugh Tocci Associates measurements of unloading activities at the RESCO resource recovery facility, Saugus, MA.
9. Residue Handling	Patterson Industries Inc., October 31, 1989

$$A_{div} = 20 \times \log (D/D_{ref})$$

Where D is the distance to the receptor and D_{ref} is the reference distance. This formula results in a loss of 6 dBA for each doubling of distance, which is true for sound dispersion over hard surfaces; losses over vegetated surfaces are higher and can be as much as 9 dBA for each doubling of distance.

Equipment that is enclosed in the Facility will have an additional loss as the sound travels through the Facility walls. Facility walls will likely be steel or aluminum cladding over steel girders, with windows in the administration building only. Transmission losses through 1/8"-thick aluminum sheeting are about 33 dBA, and through 1/8" steel sheeting, about 45 dBA (Department of the Army Technical Manual, September 1970, Noise Control for Mechanical Equipment, TM 5-805-4). On this basis, losses were conservatively estimated to be 30 dBA through exterior walls for totally enclosed processes (although losses as high as 45 dBA could be expected). Losses of 20 dBA were estimated for the building containing the tipping floor; this lower loss value is due sound escaping out of the open entrance and exit.

Losses of 20 dBA were applied to the exhaust for the forced draft and induced draft fans; this loss is due to the muffling effects of the baghouses and the stack. The noise level due to the Facility was added to the existing (ambient) noise level yielding the predicted noise level at the receptor. The calculation sheets are presented at the end of this appendix. Noise level predictions were calculated for seven receptors; these receptors are shown in Figure 11-1, above. Receptors B1 through B4 are located on Facility property boundaries; B1 is northeast of the Facility at M1; B2 is southwest of the Facility at M2; B3 is east of the facility; and B4 is south of the Facility. Receptors R1, R2, and R3 are the three homes closest to the Facility.

The noise levels at monitoring station M1 were used as the background levels in the predictions for boundary receptors B1 and B3. Monitoring station M2 was used for background levels at the other two boundary

receptors, B2 and B4. The noise levels at monitoring station M3 were used as background levels in the predictions for the three residential receptors, R1, R2, and R3. The predicted noise levels and the increases above the ambient are presented in Table 11-6.

A general rule of thumb is that noise increases of less than 3 dBA are generally imperceptible, increases of 3 to 5 dBA may be perceptible, and increases above 5 dBA are clearly perceptible. A 10-dBA increase is a perceived doubling of the noise level.

On the basis of this rule of thumb, the Facility will not result in a perceptible increase in the day-time noise levels at any of the residences, although the Facility will be audible intermittently at all of the receptors. Increases in night-time noise levels will be clearly perceptible at only two of receptors (B1 and B3). The Facility will likely cause a doubling of noise levels (day and night) at the property boundary closest to the Facility (B3). Day-time noise level increases will be clearly perceptible only at receptor B3. Noises from the tipping floor and refuse pit will likely be the dominant noises at receptors B1 and B3.

Table 11-6 shows that all projected Facility noise levels will be well within the standards of the Lee County Noise Ordinance. In addition, all of the projected noise levels shown in the Table are within the range designated as "compatible" by the Federal Interagency Committee on Urban Noise for residential uses, and within the range designated as "acceptable" by the U.S. Department of Housing and Urban Development for residential uses. Noise increases at the residences should be imperceptible; this is due to the large distances from the Facility to the residences (2,400 to 3,000 feet).

4.3 PREDICTED NOISE IMPACTS - TRANSPORTATION

Refuse truck traffic to and from the Facility will result in perceptible noise increases only immediately along Buckingham Road itself, and generally only during the Facility peak period (1:00 p.m. to 4:00 p.m.). All Facility truck traffic will occur during day-time hours only.

TABLE 11-6

LEE COUNTY ENERGY RECOVERY FACILITY
FACILITY NOISE LEVELS (dBA)

Receptor Location	Distance (feet)	Period	Background Noise Level (L_{eq})	Projected Noise Level (L_{eq})	Increase in Noise Level (L_{eq})
Boundary B1	850	Day	48.0	50.4	2.4
		Night	35.0	44.2	9.2
Boundary B2	2,200	Day	52.0	52.5	0.5
		Night	50.0	50.2	0.2
Boundary B3	200	Day	48.0	57.1	9.1
		Night	35.0	49.6	14.6
Boundary B4	1,500	Day	52.0	53.0	1.0
		Night	50.0	50.4	0.4
Residence R1	2,400	Day	55.0	55.1	0.1
		Night	42.0	42.9	0.9
Residence R2	2,850	Day	55.0	55.1	0.1
		Night	42.0	42.7	0.7
Residence R3	3,000	Day	55.0	55.1	0.1
		Night	42.0	42.6	0.6

NOTE: The applicable Lee County Noise Ordinance maximum permissible noise levels at the property boundary are 66 dBA day-time L_{eq} (7:00 a.m. to 10:00 p.m.) and 55 night-time L_{eq} (10:00 p.m. to 7:00 a.m.). None of the projected Facility equipment noise levels would exceed these levels.

SOURCE: Camp Dresser & McKee Inc., 1990.

Expected daily truck traffic at the Facility is 312 packer trucks, transfer vehicles, and ash trucks. About 50 of these vehicles will enter and exit the site during its peak hour (2:00 p.m. to 3:00 p.m.). Resulting noise levels were modeled for all seven receptors shown in Figure 11-1 with the Federal Highway Administration computer model, STAMINA 2.0. Travel speeds along Buckingham Road were assumed to be the speed limit, 50 mph. Future daily vehicle volume at the time of Facility completion was estimated to be about 3,200 (two-way, without Facility traffic) of which five percent was assumed to be heavy trucks (see transportation analysis in Volume I). Modeling showed that Facility truck traffic would not be audible at any of the nearest residences. At receptor B2, a spot 150 feet from Buckingham Road, the resulting change in noise levels would range from 3 dBA to 7 dBA, depending on the time of day.

4.4 PREDICTED NOISE IMPACTS - CONSTRUCTION

Construction noise at the proposed Facility will affect adjacent receptors temporarily. Heavy construction equipment will generate noise during the day for the duration of the Facility construction period, estimated to be about three years.

It is not possible to precisely determine project construction noise levels. Typical construction equipment noise levels are shown in Table 11-7. Typical noise ranges for various stages of construction are presented in Table 11-8.

The value (89 dBA at 50 feet) for the loudest construction stages [excavation and finishing (including exterior walls, roof, paving, and landscaping)] were used to determine the maximum construction noise levels at the site boundaries and sensitive receptors. The distance used for the calculations was the minimum distance from the closest structural part of the Facility to the receptor. A 5 dBA loss, due to the trees and dense vegetation, was calculated for the construction noise levels at the residences.

TABLE 11-7
CONSTRUCTION EQUIPMENT SOUND LEVELS

Equipment	Sound Level at 50 feet (dBA)
<u>Earth Moving:</u>	
Compactors (Rollers)	72 - 75
Front Loaders	72 - 85
Backhoes	72 - 93
Tractors	76 - 93
Scrapers, Grader	90 - 94
Trucks	83 - 96
<u>Material Handling:</u>	
Concrete Mixers	75 - 89
Concrete Pumps	81 - 85
Cranes (movable)	76 - 87
Cranes (Derrick)	86 - 89
<u>Stationary:</u>	
Pumps	69 - 71
Generators	71 - 83
Compressors	75 - 87
<u>Impact Equipment:</u>	
Pneumatic Wrenches	82 - 89
Jack Hammers & Rock Drills	81 - 98
Impact Pile Drivers (peaks)	95 - 110
<u>Miscellaneous:</u>	
Vibrator	69 - 81
Saws	71 - 82

SOURCE: U.S. Environmental Protection Agency, January 1976.

TABLE 11-8

LEE COUNTY ENERGY RECOVERY FACILITY
TYPICAL COMMERCIAL/INDUSTRIAL CONSTRUCTION NOISE LEVELS (L_{eq})
(at 50 feet from source)

Construction Phase	Noise Level (dBA)
Ground Clearing	84
Excavation	89
Foundations	78
Erection	85
Finishing	89

SOURCE: Bolt, Beranek, and Newman, 1971. Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, U.S. Environmental Protection Agency.

Table 11-9 presents the predicted construction noise levels. Construction noise will not cause a perceptible rise in overall noise levels at any of the residences, although construction noise will be audible intermittently at all of the residences (R1-R3). Noise level increases will occur at the site boundaries; maximum noise levels may be up to 77 dBA at receptor B3.

These estimates are conservative and sound absorption by the vegetation and soft surfaces may well exceed 5 dBA.

TABLE 11-9

LEE COUNTY ENERGY RECOVERY FACILITY
MAXIMUM CONSTRUCTION NOISE LEVELS (dBA)

Receptor	Distance to Receptor	Projected Maximum Background Noise Level (L_{eq})	Construction Noise Level (L_{eq})	Increase in Noise Level
B1	850	48	65	17
B2	2,200	52	58	6
B3	200	48	77	29
B4	1,500	52	60	8
R1	2,450	55	56	1
R2	2,850	55	56	1
R3	2,800	52	54	2

SOURCE: Camp Dresser & McKee Inc., 1990.

APPENDIX 11

ATTACHMENT A
NOISE CALCULATIONS
AND LEE COUNTY NOISE ORDINANCES

The noise spreadsheets presented in this appendix are used to calculate the noise levels at each of the receptors. The following text describes each of the headings and its significance.

Process - This is the particular process that is being analyzed. All of the major noise sources at the Facility are included.

Number of Units - The number of units to be operated at the Facility.

Noise Level - The noise level is expressed in A-weighted decibels for an individual unit for each process. These values are what the noise levels would be under free field conditions; they were provided by the various equipment manufacturers.

Reference Distance - The distance at which the noise level was taken; this is used in computing the loss due to divergence.

Distance to Receptor - Using a site plan, the distances from the process units to the receptors were calculated. In instances of multiple units, the distance used is the distance to the closest unit (minimum distance). This will result in overly conservative (low) estimates of the loss due to divergence, lower than may be the actual case.

Loss Due to Divergence - The loss due to divergence (the spreading of the sound waves) is calculated in the following fashion.

$$\text{Loss} = 20 * \log (D/D_{\text{ref}})$$

Where D is the distance to the receptor,
and D_{ref} is the reference distance.

Loss Due to Enclosure - Equipment that is enclosed in the Facility will have an additional loss as the sound travels through the Facility walls. This value is estimated for the Facility through known values for typical construction materials.

In general, losses were estimated at 30 dBA through exterior walls for totally enclosed processes (although values as high as 45 dBA could be expected). Losses of 20 dBA were estimated for the tipping floor; this lower loss value is due to sound escaping out of the 18-foot wide by 28-foot high openings for the truck entrance and exit.

Losses of 20 dBA were applied to the exhaust for the forced draft and induced draft fans; this loss is due to the muffling effects of the baghouses and the stack. The location of this noise source is assumed to be the top of the stack where the air is exhausting.

Sound Pressure Level - Due to the fact that the noise levels (in dBA) are logarithms, the dBA value must be converted to an absolute value in order to add them together.

Noise Level at Receptor - The noise level for each process is calculated in this column; this provides an easy method for determining what processes contribute the most to the overall Facility noise level.

Facility Noise Level - This is the sum of all of the individual processes.

Ambient Noise Level - This is the existing background noise level monitored at the Facility site.

Future Noise Level - This is the expected future noise level with the Facility operating. This value is calculated by adding the ambient (existing) and Facility noise levels together.

Increase in Noise Level - This is the rise in the noise level that is expected due to the Facility.

Lee County RRF Facility
Receptor B1

DAY Leq
Standard Mitigation

Poor Original

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	950	50.0	30.0	7.90E-12	9.0
Generator	1	100	3	1250	52.4	30.0	5.76E-11	17.6
Turbine	1	90	3	1250	52.4	30.0	5.76E-12	7.6
Stack	1	75	3	1250	52.4		1.82E-10	22.6
Dry Scrubber/Baghouse	5	85	3	1100	51.3	30.0	1.18E-11	10.7
Cooling Tower	1	72	25	1300	34.3		5.86E-09	37.7
Deaerator	1	85	3	1250	52.4	30.0	1.82E-12	2.6
Fans/Vents								
Building Vent Fans	0	86	3	850	49.0		0.00E+00	
Forced Draft Fan	4	98	3	1000	50.5	20.0	2.27E-09	33.6
Induced Draft Fan	4	106	3	1000	50.5	20.0	1.43E-08	41.6
Draft Fans - Enclosure	8	95	3	1000	50.5	30.0	2.28E-10	23.6
Materials Handling								
Material Handling - Crane	1	82	4	850	46.5	20.0	3.51E-11	15.5
Tipping Floor	1	112	3	850	49.0	20.0	1.97E-08	43.0
Residue Handling	1	90	3	950	50.0	20.0	9.97E-11	20.0
Scale - Trucks Idling	1	89.5	5	2350	53.4		4.03E-09	36.1

Predicted noise level due to Facility 4.69E-08 46.7

Ambient (background) noise level 48.0

Future noise level 50.4

Increase in noise level

IMAGE QUALITY

AS YOU REVIEW THE NEXT GROUP OF IMAGES,
PLEASE NOTE THAT THE ORIGINAL
DOCUMENTS WERE OF POOR QUALITY.

**Lee County RRF Facility
Receptor B1
NIGHT Leq
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	950	50.0	30.0	7.90E-12	9.0
Generator	1	100	3	1250	52.4	30.0	5.76E-11	17.6
Turbine	1	90	3	1250	52.4	30.0	5.76E-12	7.6
Stack	1	75	3	1250	52.4		1.82E-10	22.6
Dry Scrubber/Baghouse	5	85	3	1100	51.3	30.0	1.18E-11	10.7
Cooling Tower	1	72	25	1300	34.3		5.86E-09	37.7
Deaerator	1	85	3	1250	52.4	30.0	1.82E-12	2.6
Fans/Vents								
Building Vent Fans	0	86	3	850	49.0		0.00E+00	
Forced Draft Fan	4	98	3	1000	50.5	20.0	2.27E-09	33.6
Induced Draft Fan	4	106	3	1000	50.5	20.0	1.43E-08	41.6
Draft Fans - Enclosure	8	95	3	1000	50.5	30.0	2.28E-10	23.6
Materials Handling								
Material Handling - Crane	1	82	4	850	46.5	20.0	3.51E-11	15.5
Tipping Floor	0	112	3	850	49.0	20.0	0.00E+00	
Residue Handling	1	90	3	950	50.0	20.0	9.97E-11	20.0
Scale - Trucks Idling	0	89.5	5	2350	53.4		0.00E+00	

Predicted noise level due to Facility 2.31E-08 **43.6**

Ambient (background) noise level **35.0**

Future noise level **44.2**

Increase in noise level **9.2**

**Lee County RRF Facility
Receptor B2**

**DAY Leq
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	2550	58.6	30.0	1.10E-12	0.4
Generator	1	100	3	2300	57.7	30.0	1.70E-11	12.3
Turbine	1	90	3	2300	57.7	30.0	1.70E-12	2.3
Stack	1	75	3	2400	58.1		4.94E-11	16.9
Dry Scrubber/Baghouse	5	85	3	2400	58.1	30.0	2.47E-12	3.9
Cooling Tower	1	72	25	2200	38.9		2.05E-09	33.1
Deaerator	1	85	3	2300	57.7	30.0	5.38E-13	

Fans/Vents								
Building Vent Fans	0	86	3	2300	57.7		0.00E+00	
Forced Draft Fan	4	98	3	2500	58.4	20.0	3.63E-10	25.6
Induced Draft Fan	4	106	3	2500	58.4	20.0	2.29E-09	33.6
Draft Fans - Enclosure	8	95	3	2500	58.4	30.0	3.64E-11	15.6

Materials Handling								
Material Handling - Crane	1	82	4	2600	56.3	20.0	3.75E-12	
Tipping Floor	1	112	3	2600	58.8	20.0	2.11E-09	33.2
Residue Handling	1	90	3	2550	58.6	20.0	1.38E-11	11.4
Scale - Trucks Idling	1	89.5	5	1300	48.3		1.32E-08	41.2

Predicted noise level due to Facility 2.01E-08 43.0

Ambient (background) noise level 52.0

Future noise level 50.5

Increase in noise level

**Lee County RRF Facility
Receptor B2
NIGHT Leq
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (walls 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	2550	58.6	30.0	1.10E-12	0.4
Generator	1	100	3	2300	57.7	30.0	1.70E-11	12.3
Turbine	1	90	3	2300	57.7	30.0	1.70E-12	2.3
Stack	1	75	3	2400	58.1		4.94E-11	16.9
Dry Scrubber/Baghouse	5	85	3	2400	58.1	30.0	2.47E-12	3.9
Cooling Tower	1	72	25	2200	38.9		2.05E-09	33.1
Deaerator	1	85	3	2300	57.7	30.0	5.38E-13	
Fans/Vents								
Building Vent Fans	0	86	3	2300	57.7		0.00E+00	
Forced Draft Fan	4	98	3	2500	58.4	20.0	3.63E-10	25.6
Induced Draft Fan	4	106	3	2500	58.4	20.0	2.29E-09	33.6
Draft Fans - Enclosure	8	95	3	2500	58.4	30.0	3.64E-11	15.6
Materials Handling								
Material Handling - Crane	1	82	4	2600	56.3	20.0	3.75E-12	
Tipping Floor	0	112	3	2600	58.8	20.0	0.00E+00	
Residue Handling	1	90	3	2550	58.6	20.0	1.38E-11	11.4
Scale - Trucks Idling	0	89.5	5	1300	48.3		0.00E+00	

Predicted noise level due to Facility	4.83E-09	36.8
Ambient (background) noise level		50.0
Future noise level		50.2
Increase in noise level		0.2

**Lee County RRF Facility
Receptor B3**

**DAY Leq
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	400	42.5	30.0	4.46E-11	16.5
Generator	1	100	3	600	46.0	30.0	2.50E-10	24.0
Turbine	1	90	3	600	46.0	30.0	2.50E-11	14.0
Stack	1	75	3	750	48.0		5.06E-10	27.0
Dry Scrubber/Baghouse	5	85	3	600	46.0	30.0	3.95E-11	16.0
Cooling Tower	1	72	25	800	30.1		1.55E-08	41.9
Deaerator	1	85	3	600	46.0	30.0	7.91E-12	9.0
Fans/Vents								
Building Vent Fans	0	86	3	200	36.5		0.00E+00	
Forced Draft Fan	4	98	3	500	44.4	20.0	9.09E-09	39.6
Induced Draft Fan	4	106	3	500	44.4	20.0	5.73E-08	47.6
Draft Fans - Enclosure	8	95	3	500	44.4	30.0	9.11E-10	29.6
Materials Handling								
Material Handling - Crane	1	82	4	200	34.0	20.0	6.34E-10	28.0
Tipping Floor	1	112	3	200	36.5	20.0	3.57E-07	55.5
Residue Handling	1	90	3	200	36.5	20.0	2.25E-09	33.5
Scale - Trucks Idling	1	89.5	5	1600	50.1		8.70E-09	39.4

Predicted noise level due to Facility 4.52E-07 56.6

Ambient (background) noise level 48.0

Future noise level 57.1

Increase in noise level

Lee County RRF Facility
Receptor B3
 NIGHT Leq
 Standard Mitigation

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	400	42.5	30.0	4.46E-11	16.5
Generator	1	100	3	600	46.0	30.0	2.50E-10	24.0
Turbine	1	90	3	600	46.0	30.0	2.50E-11	14.0
Stack	1	75	3	750	48.0		5.06E-10	27.0
Dry Scrubber/Baghouse	5	85	3	600	46.0	30.0	3.95E-11	16.0
Cooling Tower	1	72	25	800	30.1		1.55E-08	41.9
Deaerator	1	85	3	600	46.0	30.0	7.91E-12	9.0
Fans/Vents								
Building Vent Fans	0	86	3	200	36.5		0.00E+00	
Forced Draft Fan	4	98	3	500	44.4	20.0	9.09E-09	39.6
Induced Draft Fan	4	106	3	500	44.4	20.0	5.73E-08	47.6
Draft Fans - Enclosure	8	95	3	500	44.4	30.0	9.11E-10	29.6
Materials Handling								
Material Handling - Crane	1	82	4	200	34.0	20.0	6.34E-10	28.0
Tipping Floor	0	112	3	200	36.5	20.0	0.00E+00	
Residue Handling	1	90	3	200	36.5	20.0	2.25E-09	33.5
Scale - Trucks Idling	0	89.5	5	1600	50.1		0.00E+00	

Predicted noise level due to Facility	8.66E-08	49.4
Ambient (background) noise level		35.0
Future noise level		49.6
Increase in noise level		14.6

**Lee County RRF Facility
Receptor B4**

**DAY Leq
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	1650	54.8		2.62E-12	4.2
Generator	1	100	3	1500	54.0	30.0	4.00E-11	16.0
Turbine	1	90	3	1500	54.0	30.0	4.00E-12	6.0
Stack	1	75	3	1700	55.1		9.85E-11	19.9
Dry Scrubber/Baghouse	5	85	3	1600	54.5	30.0	5.56E-12	7.4
Cooling Tower	1	72	25	1500	35.6		4.40E-09	36.4
Deaerator	1	85	3	1500	54.0	30.0	1.26E-12	1.0
Fans/Vents								
Building Vent Fans	0	86	3	1500	54.0		0.00E+00	
Forced Draft Fan	4	98	3	1650	54.8	20.0	8.34E-10	29.2
Induced Draft Fan	4	106	3	1650	54.8	20.0	5.26E-09	37.2
Draft Fans - Enclosure	8	95	3	1650	54.8	30.0	8.36E-11	19.2
Materials Handling								
Material Handling - Crane	1	82	4	1550	51.8	20.0	1.06E-11	10.2
Tipping Floor	1	112	3	1550	54.3	20.0	5.94E-09	37.7
Residue Handling	1	90	3	1900	56.0	20.0	2.49E-11	14.0
Scale - Trucks Idling	1	89.5	5	950	45.6		2.47E-08	43.9

Predicted noise level due to Facility 4.14E-08 46.2

Ambient (background) noise level 52.0

Future noise level 53.0

Increase in noise level

**Lee County RRF Facility
Receptor B4
NIGHT Leq
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	1650	54.8	30.0	2.62E-12	4.2
Generator	1	100	3	1500	54.0	30.0	4.00E-11	16.0
Turbine	1	90	3	1500	54.0	30.0	4.00E-12	6.0
Stack	1	75	3	1700	55.1		9.85E-11	19.9
Dry Scrubber/Baghouse	5	85	3	1600	54.5	30.0	5.56E-12	7.4
Cooling Tower	1	72	25	1500	35.6		4.40E-09	36.4
Deaerator	1	85	3	1500	54.0	30.0	1.26E-12	1.0
Fans/Vents								
Building Vent Fans	0	86	3	1500	54.0		0.00E+00	
Forced Draft Fan	4	98	3	1650	54.8	20.0	8.34E-10	29.2
Induced Draft Fan	4	108	3	1650	54.8	20.0	5.26E-09	37.2
Draft Fans - Enclosure	8	95	3	1650	54.8	30.0	8.36E-11	19.2
Materials Handling								
Material Handling - Crane	1	82	4	1550	51.8	20.0	1.06E-11	10.2
Tipping Floor	0	112	3	1550	54.3	20.0	0.00E+00	
Residue Handling	1	90	3	1900	56.0	20.0	2.49E-11	14.0
Scale - Trucks Idling	0	89.5	5	950	45.6		0.00E+00	

Predicted noise level due to Facility	1.08E-08	40.3
Ambient (background) noise level		50.0
Future noise level		50.4
Increase in noise level		0.4

**Lee County RRF Facility
Receptor R1**

**DAY Leq
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	2600	58.8	30.0	1.06E-12	0.2
Generator	1	100	3	2900	59.7	30.0	1.07E-11	10.3
Turbine	1	90	3	2900	59.7	30.0	1.07E-12	0.3
Stack	1	75	3	2950	59.9		3.27E-11	15.1
Dry Scrubber/Baghouse	5	85	3	2800	59.4	30.0	1.82E-12	2.6
Cooling Tower	1	72	25	3050	41.7		1.06E-09	30.3
Deaerator	1	85	3	2900	59.7	30.0	3.38E-13	
Fans/Vents								
Building Vent Fans	0	86	3	2400	58.1		0.00E+00	
Forced Draft Fan	4	98	3	2700	59.1	20.0	3.12E-10	24.9
Induced Draft Fan	4	106	3	2700	59.1	20.0	1.97E-09	32.9
Draft Fans - Enclosure	8	95	3	2700	59.1	30.0	3.12E-11	14.9
Materials Handling								
Material Handling - Crane	1	82	4	2400	55.6	20.0	4.40E-12	
Tipping Floor	1	112	3	2400	58.1	20.0	2.48E-09	33.9
Residue Handling	1	90	3	2700	59.1	20.0	1.23E-11	10.9
Scale - Trucks Idling	1	89.5	5	4000	58.1		1.39E-09	31.4

Predicted noise level due to Facility 7.31E-09 38.6

Ambient (background) noise level 55.0

Future noise level 55.1

Increase in noise level

**Lee County RRF Facility
Receptor R1
NIGHT Leq
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	2600	58.8	30.0	1.06E-12	0.2
Generator	1	100	3	2900	59.7	30.0	1.07E-11	10.3
Turbine	1	90	3	2900	59.7	30.0	1.07E-12	0.3
Stack	1	75	3	2950	59.9		3.27E-11	15.1
Dry Scrubber/Baghouse	5	85	3	2800	59.4	30.0	1.82E-12	2.6
Cooling Tower	1	72	25	3050	41.7		1.06E-09	30.3
Deaerator	1	85	3	2900	59.7	30.0	3.38E-13	
Fans/Vents								
Building Vent Fans	0	86	3	2400	58.1		0.00E+00	
Forced Draft Fan	4	98	3	2700	59.1	20.0	3.12E-10	24.9
Induced Draft Fan	4	106	3	2700	59.1	20.0	1.97E-09	32.9
Draft Fans - Enclosure	8	95	3	2700	59.1	30.0	3.12E-11	14.9
Materials Handling								
Material Handling - Crane	1	82	4	2400	55.6	20.0	4.40E-12	
Tipping Floor	0	112	3	2400	58.1	20.0	0.00E+00	
Residue Handling	1	90	3	2700	59.1	20.0	1.23E-11	10.9
Scale - Trucks Idling	0	89.5	5	4000	58.1		0.00E+00	

Predicted noise level due to Facility 3.44E-09 35.4

Ambient (background) noise level 42.0

Future noise level 42.9

Increase in noise level 0.9

**Lee County RRF Facility
Receptor R2**

**DAY Leq
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	3000	60.0	30.0	7.92E-13	
Generator	1	100	3	3300	60.8	30.0	8.26E-12	9.2
Turbine	1	90	3	3300	60.8	30.0	8.26E-13	
Stack	1	75	3	3300	60.8		2.61E-11	14.2
Dry Scrubber/Baghouse	5	85	3	3200	60.6	30.0	1.39E-12	1.4
Cooling Tower	1	72	25	3400	42.7		8.57E-10	29.3
Deaerator	1	85	3	3300	60.8	30.0	2.61E-13	
Fans/Vents								
Building Vent Fans	0	86	3	2850	59.6		0.00E+00	
Forced Draft Fan	4	98	3	3150	60.4	20.0	2.29E-10	23.6
Induced Draft Fan	4	106	3	3150	60.4	20.0	1.44E-09	31.6
Draft Fans - Enclosure	8	95	3	3150	60.4	30.0	2.29E-11	13.6
Materials Handling								
Material Handling - Crane	1	82	4	2850	57.1	20.0	3.12E-12	
Tipping Floor	1	112	3	2850	59.6	20.0	1.76E-09	32.4
Residue Handling	1	90	3	2850	59.6	20.0	1.11E-11	10.4
Scale - Trucks Idling	1	89.5	5	4400	58.9		1.15E-09	30.6

Predicted noise level due to Facility 5.51E-09 37.4

Ambient (background) noise level 55.0

Future noise level 55.1

Increase in noise level

**Lee County RRF Facility
Receptor R2
NIGHT Leq
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	3000	60.0	30.0	7.92E-13	
Generator	1	100	3	3300	60.8	30.0	8.26E-12	9.2
Turbine	1	90	3	3300	60.8	30.0	8.26E-13	
Stack	1	75	3	3300	60.8		2.61E-11	14.2
Dry Scrubber/Baghouse	5	85	3	3200	60.6	30.0	1.39E-12	1.4
Cooling Tower	1	72	25	3400	42.7		8.57E-10	29.3
Deaerator	1	85	3	3300	60.8	30.0	2.61E-13	
Fans/Vents								
Building Vent Fans	0	86	3	2850	59.6		0.00E+00	
Forced Draft Fan	4	98	3	3150	60.4	20.0	2.29E-10	23.6
Induced Draft Fan	4	106	3	3150	60.4	20.0	1.44E-09	31.6
Draft Fans - Enclosure	8	95	3	3150	60.4	30.0	2.29E-11	13.6
Materials Handling								
Material Handling - Crane	1	82	4	2850	57.1	20.0	3.12E-12	
Tipping Floor	0	112	3	2850	59.6	20.0	0.00E+00	
Residue Handling	1	90	3	2850	59.6	20.0	1.11E-11	10.4
Scale - Trucks Idling	0	89.5	5	4400	58.9		0.00E+00	

Predicted noise level due to Facility 2.61E-09 34.2

Ambient (background) noise level 42.0

Future noise level 42.7

Increase in noise level 0.7

**Lee County RRF Facility
Receptor R3
DAY Leq
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boller/Generator/Stack								
Boller	5	82	3	3200	60.6	30.0	6.96E-13	
Generator	1	100	3	3400	61.1	30.0	7.79E-12	8.9
Turbine	1	90	3	3400	61.1	30.0	7.79E-13	
Stack	1	75	3	3550	61.5		2.26E-11	13.5
Dry Scrubber/Baghouse	5	85	3	3400	61.1	30.0	1.23E-12	0.9
Cooling Tower	1	72	25	3600	43.2		7.64E-10	28.8
Deaerator	1	85	3	3400	61.1	30.0	2.46E-13	
Fans/Vents								
Building Vent Fans	0	86	3	3000	60.0		0.00E+00	
Forced Draft Fan	4	98	3	3500	61.3	20.0	1.85E-10	22.7
Induced Draft Fan	4	106	3	3500	61.3	20.0	1.17E-09	30.7
Draft Fans - Enclosure	8	95	3	3500	61.3	30.0	1.86E-11	12.7
Materials Handling								
Material Handling - Crane	1	82	4	3000	57.5	20.0	2.82E-12	
Tipping Floor	1	112	3	3000	60.0	20.0	1.58E-09	32.0
Residue Handling	1	90	3	3000	60.0	20.0	1.00E-11	
Scale - Trucks Idling	1	89.5	5	4200	58.5		1.26E-09	31.0

Predicted noise level due to Facility 5.03E-09 37.0

Ambient (background) noise level 55.0

Future noise level 55.1

Increase in noise level

**Lee County RRF Facility
Receptor R3
NIGHT Leq
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	3200	60.6	30.0	6.96E-13	
Generator	1	100	3	3400	61.1	30.0	7.79E-12	8.9
Turbine	1	90	3	3400	61.1	30.0	7.79E-13	
Stack	1	75	3	3550	61.5		2.26E-11	13.5
Dry Scrubber/Baghouse	5	85	3	3400	61.1	30.0	1.23E-12	0.9
Cooling Tower	1	72	25	3600	43.2		7.64E-10	28.8
Deaerator	1	85	3	3400	61.1	30.0	2.46E-13	
Fan/Vent								
Building Vent Fans	0	86	3	3000	60.0		0.00E+00	
Forced Draft Fan	4	98	3	3500	61.3	20.0	1.85E-10	22.7
Induced Draft Fan	4	106	3	3500	61.3	20.0	1.17E-09	30.7
Draft Fans - Enclosure	8	95	3	3500	61.3	30.0	1.86E-11	12.7
Materials Handling								
Material Handling - Crane	1	82	4	3000	57.5	20.0	2.82E-12	
Tipping Floor	0	112	3	3000	60.0	20.0	0.00E+00	
Residue Handling	1	90	3	3000	60.0	20.0	1.00E-11	
Scale - Trucks Idling	0	89.5	5	4200	58.5		0.00E+00	

Predicted noise level due to Facility 2.18E-09 33.4

Ambient (background) noise level 42.0

Future noise level 42.6

Increase in noise level 0.6

**Lee County RRF Facility
Receptor B1
DAY L90
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	950	50.0	30.0	7.90E-12	9.0
Generator	1	100	3	1250	52.4	30.0	5.76E-11	17.6
Turbine	1	90	3	1250	52.4	30.0	5.76E-12	7.6
Stack	1	75	3	1250	52.4		1.82E-10	22.6
Dry Scrubber/Baghouse	5	85	3	1100	51.3	30.0	1.18E-11	10.7
Cooling Tower	1	72	25	1300	34.3		5.86E-09	37.7
Deaerator	1	85	3	1250	52.4	30.0	1.82E-12	2.6
Fans/Vents								
Building Vent Fans	0	86	3	850	49.0		0.00E+00	
Forced Draft Fan	4	98	3	1000	50.5	20.0	2.27E-09	33.6
Induced Draft Fan	4	106	3	1000	50.5	20.0	1.43E-08	41.6
Draft Fans - Enclosure	8	95	3	1000	50.5	30.0	2.28E-10	23.6
Materials Handling								
Material Handling - Crane	1	82	4	850	46.5	20.0	3.51E-11	15.5
Tipping Floor	1	112	3	850	49.0	20.0	1.97E-08	43.0
Residue Handling	1	90	3	950	50.0	20.0	9.97E-11	20.0
Scale - Trucks Idling	1	89.5	5	2350	53.4		4.03E-09	36.1

Predicted noise level due to Facility 4.69E-08 46.7

Ambient (background) noise level 38.0

Future noise level 47.3

Increase in noise level

**Lee County RRF Facility
Receptor B1
NIGHT L90
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	950	50.0	30.0	7.90E-12	9.0
Generator	1	100	3	1250	52.4	30.0	5.76E-11	17.6
Turbine	1	90	3	1250	52.4	30.0	5.76E-12	7.6
Stack	1	75	3	1250	52.4		1.82E-10	22.6
Dry Scrubber/Baghouse	5	85	3	1100	51.3	30.0	1.18E-11	10.7
Cooling Tower	1	72	25	1300	34.3		5.86E-09	37.7
Deaerator	1	85	3	1250	52.4	30.0	1.82E-12	2.6
Fans/Vents								
Building Vent Fans	0	86	3	850	49.0		0.00E+00	
Forced Draft Fan	4	98	3	1000	50.5	20.0	2.27E-09	33.6
Induced Draft Fan	4	106	3	1000	50.5	20.0	1.43E-08	41.6
Draft Fans - Enclosure	8	95	3	1000	50.5	30.0	2.28E-10	23.6
Materials Handling								
Material Handling - Crane	1	82	4	850	46.5	20.0	3.51E-11	15.5
Tipping Floor	0	112	3	850	49.0	20.0	0.00E+00	
Residue Handling	1	90	3	950	50.0	20.0	9.97E-11	20.0
Scale - Trucks Idling	0	89.5	5	2350	53.4		0.00E+00	

Predicted noise level due to Facility	2.31E-08	43.6
Ambient (background) noise level		31.0
Future noise level		43.9
Increase in noise level		12.9

**Lee County RRF Facility
Receptor B2
DAY L90
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	2550	58.6	30.0	1.10E-12	0.4
Generator	1	100	3	2300	57.7	30.0	1.70E-11	12.3
Turbine	1	90	3	2300	57.7	30.0	1.70E-12	2.3
Stack	1	75	3	2400	58.1		4.94E-11	16.9
Dry Scrubber/Baghouse	5	85	3	2400	58.1	30.0	2.47E-12	3.9
Cooling Tower	1	72	25	2200	38.9		2.05E-09	33.1
Deaerator	1	85	3	2300	57.7	30.0	5.38E-13	
Fans/Vents								
Building Vent Fans	0	88	3	2300	57.7		0.00E+00	
Forced Draft Fan	4	98	3	2500	58.4	20.0	3.63E-10	25.6
Induced Draft Fan	4	106	3	2500	58.4	20.0	2.29E-09	33.6
Draft Fans - Enclosure	8	95	3	2500	58.4	30.0	3.64E-11	15.6
Materials Handling								
Material Handling - Crane	1	82	4	2600	56.3	20.0	3.75E-12	
Tipping Floor	1	112	3	2600	58.8	20.0	2.11E-09	33.2
Residue Handling	1	90	3	2550	58.6	20.0	1.38E-11	11.4
Scale - Trucks Idling	1	89.5	5	1300	48.3		1.32E-08	41.2
Predicted noise level due to Facility								2.01E-08 43.0
Ambient (background) noise level								42.0
Future noise level								45.6
Increase in noise level								

**Lee County RRF Facility
Receptor B2
NIGHT L90
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	2550	58.6	30.0	1.10E-12	0.4
Generator	1	100	3	2300	57.7	30.0	1.70E-11	12.3
Turbine	1	90	3	2300	57.7	30.0	1.70E-12	2.3
Stack	1	75	3	2400	58.1		4.94E-11	16.9
Dry Scrubber/Baghouse	5	85	3	2400	58.1	30.0	2.47E-12	3.9
Cooling Tower	1	72	25	2200	38.9		2.05E-09	33.1
Deaerator	1	85	3	2300	57.7	30.0	5.38E-13	
Fans/Vents								
Building Vent Fans	0	86	3	2300	57.7		0.00E+00	
Forced Draft Fan	4	98	3	2500	58.4	20.0	3.63E-10	25.6
Induced Draft Fan	4	106	3	2500	58.4	20.0	2.29E-09	33.6
Draft Fans - Enclosure	8	95	3	2500	58.4	30.0	3.64E-11	15.6
Materials Handling								
Material Handling - Crane	1	82	4	2600	56.3	20.0	3.75E-12	
Tipping Floor	0	112	3	2600	58.8	20.0	0.00E+00	
Residue Handling	1	90	3	2550	58.6	20.0	1.38E-11	11.4
Scale - Trucks Idling	0	89.5	5	1300	48.3		0.00E+00	

Predicted noise level due to Facility	4.83E-09	36.8
Ambient (background) noise level		40.0
Future noise level		41.7
Increase in noise level		1.7

**Lee County RRF Facility
Receptor B3**

**DAY L90
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	400	42.5	30.0	4.46E-11	16.5
Generator	1	100	3	600	46.0	30.0	2.50E-10	24.0
Turbine	1	90	3	600	46.0	30.0	2.50E-11	14.0
Stack	1	75	3	750	48.0		5.06E-10	27.0
Dry Scrubber/Baghouse	5	85	3	600	46.0	30.0	3.95E-11	16.0
Cooling Tower	1	72	25	800	30.1		1.55E-08	41.9
Deaerator	1	85	3	600	46.0	30.0	7.91E-12	9.0
Fans/Vents								
Building Vent Fans	0	86	3	200	36.5		0.00E+00	
Forced Draft Fan	4	98	3	500	44.4	20.0	9.09E-09	39.6
Induced Draft Fan	4	106	3	500	44.4	20.0	5.73E-08	47.6
Draft Fans - Enclosure	8	95	3	500	44.4	30.0	9.11E-10	29.6
Materials Handling								
Material Handling - Crane	1	82	4	200	34.0	20.0	6.34E-10	28.0
Tipping Floor	1	112	3	200	36.5	20.0	3.57E-07	55.5
Residue Handling	1	90	3	200	36.5	20.0	2.25E-09	33.5
Scale - Trucks Idling	1	89.5	5	1600	50.1		8.70E-09	39.4

Predicted noise level due to Facility 4.52E-07 56.6

Ambient (background) noise level 38.0

Future noise level 56.6

Increase in noise level 6

**Lee County RRF Facility
Receptor B3
NIGHT L90
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	400	42.5	30.0	4.46E-11	16.5
Generator	1	100	3	600	46.0	30.0	2.50E-10	24.0
Turbine	1	90	3	600	46.0	30.0	2.50E-11	14.0
Stack	1	75	3	750	48.0		5.06E-10	27.0
Dry Scrubber/Baghouse	5	85	3	600	46.0	30.0	3.95E-11	16.0
Cooling Tower	1	72	25	800	30.1		1.55E-08	41.9
Deaerator	1	85	3	600	46.0	30.0	7.91E-12	9.0
Fans/Vents								
Building Vent Fans	0	86	3	200	36.5		0.00E+00	
Forced Draft Fan	4	98	3	500	44.4	20.0	9.09E-09	39.6
Induced Draft Fan	4	106	3	500	44.4	20.0	5.73E-08	47.6
Draft Fans - Enclosure	8	95	3	500	44.4	30.0	9.11E-10	29.6
Materials Handling								
Material Handling - Crane	1	82	4	200	34.0	20.0	6.34E-10	28.0
Tipping Floor	0	112	3	200	36.5	20.0	0.00E+00	
Residue Handling	1	90	3	200	36.5	20.0	2.25E-09	33.5
Scale - Trucks Idling	0	89.5	5	1600	50.1		0.00E+00	

Predicted noise level due to Facility 8.66E-08 49.4

Ambient (background) noise level 35.0

Future noise level 49.5

Increase in noise level 14.5

**Lee County RRF Facility
Receptor B4
DAY L90
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	1650	54.8	30.0	2.62E-12	4.2
Generator	1	100	3	1500	54.0	30.0	4.00E-11	16.0
Turbine	1	90	3	1500	54.0	30.0	4.00E-12	6.0
Stack	1	75	3	1700	55.1		9.85E-11	19.9
Dry Scrubber/Baghouse	5	85	3	1600	54.5	30.0	5.56E-12	7.4
Cooling Tower	1	72	25	1500	35.6		4.40E-09	36.4
Deaerator	1	85	3	1500	54.0	30.0	1.26E-12	1.0
Fans/Vents								
Building Vent Fans	0	86	3	1500	54.0		0.00E+00	
Forced Draft Fan	4	98	3	1650	54.8	20.0	8.34E-10	29.2
Induced Draft Fan	4	106	3	1650	54.8	20.0	5.26E-09	37.2
Draft Fans - Enclosure	8	95	3	1650	54.8	30.0	8.36E-11	19.2
Materials Handling								
Material Handling - Crane	1	82	4	1550	51.8	20.0	1.06E-11	10.2
Tipping Floor	1	112	3	1550	54.3	20.0	5.94E-09	37.7
Residue Handling	1	90	3	1900	56.0	20.0	2.49E-11	14.0
Scale - Trucks Idling	1	89.5	5	950	45.6		2.47E-08	43.9

Predicted noise level due to Facility 4.14E-08 46.2

Ambient (background) noise level 42.0

Future noise level 47.6

Increase in noise level

**Lee County RRF Facility
Receptor B4
NIGHT L90
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boller/Generator/Stack								
Boller	5	82	3	1650	54.8	30.0	2.62E-12	4.2
Generator	1	100	3	1500	54.0	30.0	4.00E-11	16.0
Turbine	1	90	3	1500	54.0	30.0	4.00E-12	6.0
Stack	1	75	3	1700	55.1		9.85E-11	19.9
Dry Scrubber/Baghouse	5	85	3	1600	54.5	30.0	5.56E-12	7.4
Cooling Tower	1	72	25	1500	35.6		4.40E-09	36.4
Deaerator	1	85	3	1500	54.0	30.0	1.26E-12	1.0
Fans/Vents								
Building Vent Fans	0	86	3	1500	54.0		0.00E+00	
Forced Draft Fan	4	98	3	1650	54.8	20.0	8.34E-10	29.2
Induced Draft Fan	4	106	3	1650	54.8	20.0	5.26E-09	37.2
Draft Fans - Enclosure	8	95	3	1650	54.8	30.0	8.36E-11	19.2
Materials Handling								
Material Handling - Crane	1	82	4	1550	51.8	20.0	1.06E-11	10.2
Tipping Floor	0	112	3	1550	54.3	20.0	0.00E+00	
Residue Handling	1	90	3	1900	56.0	20.0	2.49E-11	14.0
Scale - Trucks Idling	0	89.5	5	950	45.6		0.00E+00	

Predicted noise level due to Facility	1.08E-08	40.3
Ambient (background) noise level		32.0
Future noise level		40.9
Increase in noise level		8.9

**Lee County RRF Facility
Receptor R1
DAY L90
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boller/Generator/Stack								
Boller	5	82	3	2600	58.8	30.0	1.06E-12	0.2
Generator	1	100	3	2900	59.7	30.0	1.07E-11	10.3
Turbine	1	90	3	2900	59.7	30.0	1.07E-12	0.3
Stack	1	75	3	2950	59.9		3.27E-11	15.1
Dry Scrubber/Baghouse	5	85	3	2800	59.4	30.0	1.82E-12	2.6
Cooling Tower	1	72	25	3050	41.7		1.06E-09	30.3
Deaerator	1	85	3	2900	59.7	30.0	3.38E-13	
Fans/Vents								
Building Vent Fans	0	86	3	2400	58.1		0.00E+00	
Forced Draft Fan	4	98	3	2700	59.1	20.0	3.12E-10	24.9
Induced Draft Fan	4	106	3	2700	59.1	20.0	1.97E-09	32.9
Draft Fans - Enclosure	8	95	3	2700	59.1	30.0	3.12E-11	14.9
Materials Handling								
Material Handling - Crane	1	82	4	2400	55.6	20.0	4.40E-12	
Tipping Floor	1	112	3	2400	58.1	20.0	2.48E-09	33.9
Residue Handling	1	90	3	2700	59.1	20.0	1.23E-11	10.9
Scale - Trucks Idling	1	89.5	5	4000	58.1		1.39E-09	31.4

Predicted noise level due to Facility 7.31E-09 38.6

Ambient (background) noise level 39.0

Future noise level 41.8

Increase in noise level

**Lee County RRF Facility
Receptor R1
NIGHT L90
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	2600	58.8	30.0	1.06E-12	0.2
Generator	1	100	3	2900	59.7	30.0	1.07E-11	10.3
Turbine	1	90	3	2900	59.7	30.0	1.07E-12	0.3
Stack	1	75	3	2950	59.9		3.27E-11	15.1
Dry Scrubber/Baghouse	5	85	3	2800	59.4	30.0	1.82E-12	2.6
Cooling Tower	1	72	25	3050	41.7		1.06E-09	30.3
Deaerator	1	85	3	2900	59.7	30.0	3.38E-13	
Fans/Vents								
Building Vent Fans	0	86	3	2400	58.1		0.00E+00	
Forced Draft Fan	4	98	3	2700	59.1	20.0	3.12E-10	24.9
Induced Draft Fan	4	106	3	2700	59.1	20.0	1.97E-09	32.9
Draft Fans - Enclosure	8	95	3	2700	59.1	30.0	3.12E-11	14.9
Materials Handling								
Material Handling - Crane	1	82	4	2400	55.6	20.0	4.40E-12	
Tipping Floor	0	112	3	2400	58.1	20.0	0.00E+00	
Residue Handling	1	90	3	2700	59.1	20.0	1.23E-11	10.9
Scale - Trucks Idling	0	89.5	5	4000	58.1		0.00E+00	

Predicted noise level due to Facility 3.44E-09 35.4

Ambient (background) noise level 35.0

Future noise level 38.2

Increase in noise level 3.2

**Lee County RRF Facility
Receptor R2
DAY L90
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boller/Generator/Stack								
Boiler	5	82	3	3000	60.0	30.0	7.92E-13	
Generator	1	100	3	3300	60.8	30.0	8.26E-12	9.2
Turbine	1	90	3	3300	60.8	30.0	8.26E-13	
Stack	1	75	3	3300	60.8		2.61E-11	14.2
Dry Scrubber/Baghouse	5	85	3	3200	60.6	30.0	1.39E-12	1.4
Cooling Tower	1	72	25	3400	42.7		8.57E-10	29.3
Deaerator	1	85	3	3300	60.8	30.0	2.61E-13	
Fans/Vents								
Building Vent Fans	0	86	3	2850	59.6		0.00E+00	
Forced Draft Fan	4	98	3	3150	60.4	20.0	2.29E-10	23.6
Induced Draft Fan	4	106	3	3150	60.4	20.0	1.44E-09	31.6
Draft Fans - Enclosure	8	95	3	3150	60.4	30.0	2.29E-11	13.6
Materials Handling								
Material Handling - Crane	1	82	4	2850	57.1	20.0	3.12E-12	
Tipping Floor	1	112	3	2850	59.6	20.0	1.76E-09	32.4
Residue Handling	1	90	3	2850	59.6	20.0	1.11E-11	10.4
Scale - Trucks Idling	1	89.5	5	4400	58.9		1.15E-09	30.6

Predicted noise level due to Facility 5.51E-09 37.4

Ambient (background) noise level 39.0

Future noise level 41.3

Increase in noise level

**Lee County RRF Facility
Receptor R2
NIGHT L90
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (walls 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	3000	60.0	30.0	7.92E-13	
Generator	1	100	3	3300	60.8	30.0	8.26E-12	9.2
Turbine	1	90	3	3300	60.8	30.0	8.26E-13	
Stack	1	75	3	3300	60.8		2.61E-11	14.2
Dry Scrubber/Baghouse	5	85	3	3200	60.6	30.0	1.39E-12	1.4
Cooling Tower	1	72	25	3400	42.7		8.57E-10	29.3
Deaerator	1	85	3	3300	60.8	30.0	2.61E-13	
Fans/Vent								
Building Vent Fans	0	86	3	2850	59.6		0.00E+00	
Forced Draft Fan	4	98	3	3150	60.4	20.0	2.29E-10	23.6
Induced Draft Fan	4	106	3	3150	60.4	20.0	1.44E-09	31.6
Draft Fans - Enclosure	8	95	3	3150	60.4	30.0	2.29E-11	13.6
Materials Handling								
Material Handling - Crane	1	82	4	2850	57.1	20.0	3.12E-12	
Tipping Floor	0	112	3	2850	59.6	20.0	0.00E+00	
Residue Handling	1	90	3	2850	59.6	20.0	1.11E-11	10.4
Scale - Trucks idling	0	89.5	5	4400	58.9		0.00E+00	

Predicted noise level due to Facility 2.61E-09 34.2

Ambient (background) noise level 35.0

Future noise level 37.6

Increase in noise level 2.6

**Lee County RRF Facility
Receptor R3**

DAY L90

Standard Mitigation

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (walls 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	3200	60.6	30.0	6.96E-13	
Generator	1	100	3	3400	61.1	30.0	7.79E-12	8.9
Turbine	1	90	3	3400	61.1	30.0	7.79E-13	
Stack	1	75	3	3550	61.5		2.26E-11	13.5
Dry Scrubber/Baghouse	5	85	3	3400	61.1	30.0	1.23E-12	0.9
Cooling Tower	1	72	25	3600	43.2		7.64E-10	28.8
Deaerator	1	85	3	3400	61.1	30.0	2.46E-13	
Fans/Vents								
Building Vent Fans	0	86	3	3000	60.0		0.00E+00	
Forced Draft Fan	4	98	3	3500	61.3	20.0	1.85E-10	22.7
Induced Draft Fan	4	106	3	3500	61.3	20.0	1.17E-09	30.7
Draft Fans - Enclosure	8	95	3	3500	61.3	30.0	1.86E-11	12.7
Materials Handling								
Material Handling - Crane	1	82	4	3000	57.5	20.0	2.82E-12	
Tipping Floor	1	112	3	3000	60.0	20.0	1.58E-09	32.0
Residue Handling	1	90	3	3000	60.0	20.0	1.00E-11	
Scale - Trucks Idling	1	89.5	5	4200	58.5		1.26E-09	31.0

Predicted noise level due to Facility 5.03E-09 37.0

Ambient (background) noise level 39.0

Future noise level 41.1

Increase in noise level 1

**Lee County RRF Facility
Receptor R3
NIGHT L90
Standard Mitigation**

Process	Number of units	Noise level (each unit) (dBA)	Reference distance (feet)	distance to receptor (feet)	loss due to divergence (dBA)	loss due to enclosure (dBA)	Sound Pressure Level (watts 10E-12)	Noise Level at Receptor (dBA)
Boiler/Generator/Stack								
Boiler	5	82	3	3200	60.6	30.0	6.96E-13	
Generator	1	100	3	3400	61.1	30.0	7.79E-12	8.9
Turbine	1	90	3	3400	61.1	30.0	7.79E-13	
Stack	1	75	3	3550	61.5		2.26E-11	13.5
Dry Scrubber/Baghouse	5	85	3	3400	61.1	30.0	1.23E-12	0.9
Cooling Tower	1	72	25	3600	43.2		7.64E-10	28.8
Deaerator	1	85	3	3400	61.1	30.0	2.46E-13	
Fans/Vents								
Building Vent Fans	0	86	3	3000	60.0		0.00E+00	
Forced Draft Fan	4	98	3	3500	61.3	20.0	1.85E-10	22.7
Induced Draft Fan	4	106	3	3500	61.3	20.0	1.17E-09	30.7
Draft Fans - Enclosure	8	95	3	3500	61.3	30.0	1.86E-11	12.7
Materials Handling								
Material Handling - Crane	1	82	4	3000	57.5	20.0	2.82E-12	
Tipping Floor	0	112	3	3000	60.0	20.0	0.00E+00	
Residue Handling	1	90	3	3000	60.0	20.0	1.00E-11	
Scale - Trucks Idling	0	89.5	5	4200	58.5		0.00E+00	

Predicted noise level due to Facility 2.18E-09 33.4

Ambient (background) noise level 35.0

Future noise level 37.3

Increase in noise level 2.3

AN ORDINANCE RELATING TO NOISE; DECLARING CERTAIN NOISES TO BE DETRIMENTAL TO THE PUBLIC HEALTH, COMFORT, CONVENIENCE, SAFETY, WELFARE AND PROSPERITY OF THE RESIDENTS OF LEE COUNTY; PROVIDING SHORT TITLE; PROVIDING FOR DEFINITIONS; PROVIDING FOR PROHIBITION OF NOISE DISTURBANCE EXCEEDING TERMS SET FORTH IN THIS ORDINANCE; ESTABLISHING SOUND LEVELS BY RECEIVING LAND USE, CORRECTION FOR CHARACTER OF SOUND, MULTI-FAMILY DWELLINGS, CONSTRUCTION NOISE, AND WAIVERS; PROVIDING FOR EXCEPTIONS; PROVIDING PROCEDURE FOR WAIVERS; PROVIDING PENALTIES; PROVIDING FOR ADDITIONAL CIVIL REMEDIES; PROVIDING FOR THE AREAS TO BE EMBRACED; PROVIDING SEVERABILITY; PROVIDING AN EFFECTIVE DATE.

WHEREAS, the Board of County Commissioners of Lee County, is the governing body in and for Lee County, Florida; and,

WHEREAS, the making and creation of excessive noise is a condition which has existed for some time and is a serious hazard to the public health, welfare and safety, and the quality of life; and,

WHEREAS, the said noises and amount and intensity of said noises are increasing within the area of said County; and,

WHEREAS, the citizens of Lee County, have a right to and should be ensured an environment free from excessive sound that may jeopardize their health or welfare or safety and degrade the quality of life; and,

WHEREAS, it is declared that the provisions and prohibitions hereinafter contained and enacted are in pursuance of and for the purpose of securing and promoting the public health, comfort, safety, and welfare of the inhabitants of said County.

NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF LEE COUNTY, FLORIDA:

SECTION ONE: SHORT TITLE.

This ordinance may be known and cited as the "Lee County Noise Control Ordinance".

SECTION TWO: DECLARATION OF NECESSITY.

It is found and declared that:

A. The making and creation of excessive, unnecessary or unusually loud noises within the unincorporated area of Lee County is a condition which has existed for some time and the amount and intensity of such noises is increasing.

B. The making, creation or maintenance of such excessive unnecessary, unnatural or unusually loud noises which are prolonged, unusual and unnatural in their time, place and use effect are a detriment to the public health, comfort, convenience, safety, welfare and prosperity of the residents of Lee County.

C. The necessity in the public interest for the provisions and prohibitions hereinafter contained and enacted is declared as a matter of legislative determination and public policy, and it is further declared that the provisions and prohibitions hereinafter contained and enacted are in pursuance of and for the purpose of securing and promoting the public health, comfort, safety, welfare and repose of Lee County and its inhabitants.

SECTION THREE: DEFINITIONS.

The words and phrases used in this ordinance are defined as follows:

A. "A-Weighted Level (dBA)" - The total broad band sound level of the noise spectrum as measured using the "A-weighted network" of a sound level meter. The unit of measurement is the dBA. Sound level meter settings shall be for slow response.

B. Ambient Noise - The all encompassing noise associated with a given environment, being usually a composite of sound from many sources near and far.

C. Continuous Noise - A noise which remains essentially constant in level during the period of observation.

D. Decibel - (dB) - A division of a logarithmic scale used to express the ratio of two like quantities

proportional to power or energy. The ratio is expressed in decibels by multiplying its common logarithm by ten.

E. Director, Lee County Code Enforcement, or his designee - is the designated authority charged with administration and enforcement of this Ordinance.

F. Emergency - An occurrence or set of circumstances involving actual or imminent physical trauma or property damage which demands immediate action.

G. Emergency Work - Any work performed for the purpose of preventing or alleviating the physical trauma or property damage threatened or caused by an emergency.

H. Impulsive Sound - A sound of short duration, usually less than one second, with an abrupt onset and rapid decay. Examples of sources of impulsive sound include explosions, drop forge impacts, and the discharge of firearms.

I. Intermittent Noise - A noise whose sound pressure level exceeds the ambient noise level at either regular or irregular intervals.

J. Noise - Any sound which annoys or disturbs humans or causes or tends to cause an adverse psychological effect on humans.

K. Noise Disturbance - One or a group of loud, harsh, nonharmonious sounds or vibrations, that are unpleasant and irritating to the ear which is or may be harmful or injurious to the health or welfare of a reasonable person with normal sensitivities or unreasonably interferes with the enjoyment of life, property or outdoor recreation.

L. Noise Level - As referenced in this Ordinance, the noise level is the sound pressure level as measured in dBA unless otherwise specified. A measurement of noise must be at least 5dB above the ambient noise level.

M. Person - Any individual, natural person, public or private corporation, firm, association, joint venture, partnership, or any other entity whatsoever or any combination of such, jointly and severally.

N. Pure tone - Any sound which can be distinctly heard as a single pitch or a set of single pitches. For the purposes of measurement, a pure tone shall exist if the one-third octave band sound pressure level in the band with the tone exceeds arithmetic value of the sound pressure levels of the two contiguous one-third octave bands by 5dB for center frequencies of 500 Hz and above and by 8dB for center frequencies between 160 and 400 Hz and by 15dB for center frequencies less than or equal to 125 Hz.

O. Real Property Line - An imaginary line along the ground surface, and its vertical plane extension, which separates the real property owned, rented or leased by one person from that owned, rented or leased by another person, excluding intrabuilding real property divisions.

P. RMS Sound Pressure - means the square root of the time averaged square of the sound pressure, denoted P_{rms} .

Q. Sound Level Meter - An instrument to measure the sound pressure level of relatively continuous and broadband noises. The sound level meter used to determine compliance with this Ordinance shall meet or exceed the requirements for type 2 sound level meter in accordance with ANSI Standard S1.4.

R. Sound Pressure Level - means 20 times the logarithm to the base 10 of the ratio of the RMS sound pressure to the reference pressure of 20 micropascals ($20 \times 10^{-6} \text{ N/m}^2$). The sound pressure level is denoted L_p or SPL and is expressed in decibels.

S. Residential Zone - Any geographic area designated for single or multi-family dwelling by the zoning authority having jurisdiction over such area.

T. Commercial Zone - Any geographic area designated for commercial or professional activities by the zoning authority having jurisdiction over such area.

U. Industrial Zone - Any geographic area designated for industrial or manufacturing activities by the zoning authority having jurisdiction over such area.

SECTION FOUR: PROHIBITED ACTS

A. Noise Disturbance Prohibited - No person shall make, continue, or cause to be made or continued any noise disturbance, in accordance with the terms set forth in this Ordinance.

SECTION FIVE: SOUND LEVELS BY RECEIVING LAND USE

A. Maximum Permissible Sound Levels by Receiving Land Use - No person shall operate or cause to be operated any source of sound in such a manner as to create a sound level which exceeds the limits set forth for the receiving land use category in Table 1 when measured at or within the property line of the receiving land use, as specified in Lee County Code of Noise Enforcement Practices, which establish uniform guidelines for measuring and recording sound levels for the enforcement of this Ordinance. These standards shall be established and become a part of the Lee County Administrative Code.

TABLE 1.

SOUND LEVELS BY RECEIVING LAND USE

<u>Receiving Land Use Category</u>	<u>Time</u>	<u>Sound Level Limit dBA</u>
Residential, Public Space, Agricultural or Institutional	7 a.m.-10 p.m.	66
	10 p.m.- 7 a.m.	60
Commercial or Business	7 a.m.-10 p.m.	72
	10 p.m.- 7 a.m.	65
Manufacturing or Industrial	At all times	75

B. Correction for Character of Sound

1. For any source of sound which emits a pure tone, the maximum sound level limits set forth in Table 1 shall be reduced by 5 dBA.

2. For any source of impulsive sound which is of short duration with an abrupt onset, the maximum sound level limits set forth in Table 1 shall be increased by 10 dBA from 7 a.m. to 10 p.m.

C. Multi-family Dwellings

In the case of multi-family dwelling units, it shall be unlawful to create or permit to be created any noise that exceeds 50 dBA, during the hours between 7 a.m. to 10 p.m., or 45 dBA during the hours between 10 p.m. and 7 a.m. daily, measured from a neighbor's dwelling within said multi-family dwelling unit.

D. Construction Noise:

1. No person shall operate or permit to be operated any power driven construction equipment without a muffler or other noise reduction device at least as effective as that recommended by the manufacturer or provided as original equipment. Construction equipment that must be operated near a residentially zoned area on a 24-hour per day basis (i.e. pumps, well tips, generators, etc.) shall be shielded by a barrier to reduce the noise during the hours of 6 p.m. to 7 a.m. unless the unshielded noise level is less than 55 dBA, measured at the closest adjacent residentially zoned property line.

E. Waivers - An exception to the noise levels listed in Table 1 may be permitted by the granting of a waiver, under circumstances in which the activity creating the noise is of such importance to the public welfare, health or safety that the activity cannot be shut down, even though its noise levels exceed those given in Table 1. Responsibility for the granting of such waivers shall lie with the Lee County Board of County Commissioners, or its designee, when the activity creating such noise is located within the unincorporated area of Lee County.

SECTION SIX. EXCEPTIONS

The following shall be permitted:

A. An exception to the noise levels listed in Section

Five, Table 1, shall be permitted in instances where an industry or commercial business had in prior years established its place of business in an area away from a residential development, or rezoning, now finds itself adjoining a residential zone. In instances of this latter nature, the noise ordinance pertaining to industrial-commercial boundaries shall govern, and the business shall not be required to meet those noise levels pertaining to residential boundaries.

B. The operation of warning or emergency signal devices such as sirens, horns, and bells when utilized for their intended purpose.

C. Noises resulting from equipment or operations incidental to the installation, maintenance or repair of facilities or restoration of services such as public utilities or other emergency activities in the public interest.

D. Ordinary noise created by the operation of railways and shipping lanes.

E. Any noise created by the operation of all Lee County Airports. However, this does not exempt Lee County Airports from meeting noise level requirements as set forth in the existing "Lee County Airports Zoning Ordinance", Ordinance No. 78-12.

F. Noises consistent with cultural, sporting, historical or traditional observances, holidays and ceremonies, parades and concerts, provided that any event being operated for profit shall obtain a noise permit prior to such event, from the Lee County Board of County Commissioners, or its designee, and any other applicable permit to operate such event as required by this County.

G. Operation of equipment or conduct of activities normal to residential or agricultural communities such as lawn care, soil cultivation, domestic power tools, lawn mowers, maintenance of trees, hedges, gardens, refuse collection,

saws and tractors, street sweepers, mosquito fogging, tree trimming and limb chipping and other normal community operations, between the hours of 7 a.m., to 10 p.m.

H. The lowing of cattle, clucking of fowl, the neighing of horses, the baying of hounds and other normal sounds of reasonably cared for domestic animals.

SECTION SEVEN. WAIVERS.

Applications for a waiver for relief from the maximum allowable noise level limits designated in this ordinance shall be made in writing. Such applications for waivers shall be made to the Board of County Commissioners or its designee, when the activity creating such noise is located within the unincorporated area of Lee County. Any waiver granted by the Board, or its designee, must be in writing and shall contain all conditions upon which said permit shall be effective. The Board, or its designee, may grant the waiver as applied for under the following conditions:

A. The Board of County Commissioners, or its designee, in granting a permit, may prescribe any reasonable conditions or requirements they deem necessary to minimize adverse effects upon the community or the surrounding neighborhood.

B. Waivers from maximum allowable noise level limits may be granted for noises created within an industrial or commercial zone by operations which were in existence on the effective date of this ordinance.

C. Waivers may be issued for no longer than 180 days, renewable by further application to the Board of County Commissioners, or its designee.

Any party feeling aggrieved by the denial of its application for waiver by the Board, or its designee, may appeal such denial to the Board of County Commissioners of Lee County, Florida, such appeal to be filed within thirty (30) days from the date of denial.

SECTION EIGHT. PENALTIES

Any person or persons, firm or corporation, or any

agent thereof who violates any of the provisions of this ordinance shall upon conviction be subject to a fine not exceeding the sum of Five Hundred Dollars (\$500.00) or imprisonment in the County Jail for a period not exceeding sixty (60) days, or by both such fine and imprisonment. Each day that such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such hereunder.

SECTION NINE. CIVIL REMEDIES

In addition to the criminal penalties provided in Section Eight of this ordinance, the Board of County Commissioners is hereby authorized to institute any appropriate action or proceeding including suit for injunctive relief in order to prevent or abate violations of this ordinance.

SECTION TEN. AREAS EMBRACED.

All territory located within the unincorporated area of Lee County, Florida, shall be embraced by the provisions of this ordinance.

SECTION ELEVEN. SEVERABILITY

If any section, subsection, sentence, clause, phrase or provision of this ordinance is held invalid or unconstitutional, such invalidity or unconstitutionality shall not be so construed as to render invalid or unconstitutional the remaining provisions of this ordinance.

SECTION TWELVE. EFFECTIVE DATE.

This ordinance shall become effective upon action from the Secretary of State that the ordinance has been duly filed.

DULY PASSED AND ADOPTED this 4th day of August, 1982.

ATTEST:
SAL GERACI, CLERK

BOARD OF COUNTY COMMISSIONERS
OF LEE COUNTY, FLORIDA

By: Lisa Kurt
Deputy Clerk

By: [Signature]
Chairman

LEE COUNTY ORDINANCE NO. 81-22

AN ORDINANCE AMENDING SECTION FIVE, SUBSECTION A, OF LEE COUNTY ORDINANCE NO. 82-32 RELATING TO NOISE; PROVIDING SEVERABILITY. PROVIDING AN EFFECTIVE DATE.

NOW, THEREFORE BE IT ORDAINED by the Board of County Commissioners of Lee County, Florida that:

SECTION ONE:

The amendments set forth in the following section are hereby adopted. The addition is illustrated by underlining and deletion by struck through type.

SECTION TWO:

Section Five, Subsection A. of Lee County Ordinance 82-32 is hereby amended to read as follows:

SECTION FIVE: SOUND LEVELS BY RECEIVING LAND USE

A. Maximum Permissible Sound Levels by Receiving Land Use - No person shall operate or cause to be operated any source of sound in such a manner as to create a sound level which exceeds the limits set forth for the receiving land use category in Table 1 when measured at or within the property line of the receiving land use, as specified in Lee County Code of Noise Enforcement Practices, which establish uniform guidelines for measuring and recording sound levels for the enforcement of this Ordinance. These standards shall be established and become a part of the Lee County Administrative Code.

TABLE 1.

SOUND LEVELS BY RECEIVING LAND USE

Receiving Land Use Category	Time	Sound Level Limit dBA
Residential, Public Space, Agricultural or Institutional	7 a.m.-10 p.m.	66
	10 p.m.- 7 a.m.	66 <u>55</u>
Commercial or Business	7 a.m.-10 p.m.	72
	10 p.m.- 7 a.m.	65
Manufacturing or Industrial	At all times	75

SECTION THREE:

The provisions of this ordinance are severable and it is the intention to confer the whole or any part of the powers herein provided for. If any of the provisions of this ordinance shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall

LEE COUNTY ORDINANCE NO. 81-22

AN ORDINANCE AMENDING SECTION FIVE, SUBSECTION A, OF LEE COUNTY ORDINANCE NO. 82-32 RELATING TO NOISE; PROVIDING SEVERABILITY. PROVIDING AN EFFECTIVE DATE.

NOW, THEREFORE BE IT ORDAINED by the Board of County Commissioners of Lee County, Florida that:

SECTION ONE:

The amendments set forth in the following section are hereby adopted. The addition is illustrated by underlining and deletion by struck through type.

SECTION TWO:

Section Five, Subsection A. of Lee County Ordinance 82-32 is hereby amended to read as follows:

SECTION FIVE: SOUND LEVELS BY RECEIVING LAND USE

A. Maximum Permissible Sound Levels by Receiving Land Use - No person shall operate or cause to be operated any source of sound in such a manner as to create a sound level which exceeds the limits set forth for the receiving land use category in Table 1 when measured at or within the property line of the receiving land use, as specified in Lee County Code of Noise Enforcement Practices, which establish uniform guidelines for measuring and recording sound levels for the enforcement of this Ordinance. These standards shall be established and become a part of the Lee County Administrative Code.

TABLE 1.

SOUND LEVELS BY RECEIVING LAND USE

Receiving Land Use Category	Time	Sound Level Limit dBA
Residential, Public Space, Agricultural or Institutional	7 a.m.-10 p.m.	66
	10 p.m.- 7 a.m.	66 55
Commercial or Business	7 a.m.-10 p.m.	72
	10 p.m.- 7 a.m.	65
Manufacturing or Industrial	At all times	75

SECTION THREE:

The provisions of this ordinance are severable and it is the intention to confer the whole or any part of the powers herein provided for. If any of the provisions of this ordinance shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall

not affect or impair any remaining provisions of this ordinance. It is hereby declared to be the legislative intent that this ordinance would have been adopted had such unconstitutional provision not been included therein.

SECTION FOUR: EFFECTIVE DATE

This ordinance shall become effective upon action from the Secretary of State that the ordinance has been duly filed.

DONE AND ADOPTED this 20th day
of July, 1983.

ATTEST:

SAL GERACI, CLERK

BOARD OF COUNTY COMMISSIONERS
OF LEE COUNTY, FLORIDA

By: Bill La Corte

Deputy Clerk

By: Bill La Corte

Chairman

(131-N)

Approved & Co. For
James Upger
County Attorney

LEE COUNTY ORDINANCE # 88-47

AN ORDINANCE AMENDING CERTAIN LEE COUNTY ORDINANCES WHICH ARE ADMINISTERED OR ENFORCED BY THE DIVISION OF CODE ENFORCEMENT SO AS TO PROVIDE FOR THE NAME CHANGE TO THE DIVISION OF CODES AND BUILDING SERVICES; PROVIDING FOR AMENDMENT TO DEVELOPMENT STANDARDS ORDINANCE NO. 82-42, AS AMENDED BY ORDINANCES 83-42, 86-27, 87-21, 88-6, 88-9 AND 88-20 BY AMENDING SECTION A.6. DEFINITIONS; PROVIDING FOR AMENDMENT TO NOISE ORDINANCE NO. 82-32, AS AMENDED BY NO. 83-22 BY AMENDING SECTION THREE: DEFINITIONS; PROVIDING FOR AMENDMENT TO LEE COUNTY CONSTRUCTION BOARD OF ADJUSTMENT AND APPEALS ORDINANCE NO. 83-34, AS AMENDED BY NO. 87-25, BY AMENDING SECTION ONE: APPLICABILITY AND SECTION NINE: APPEALS; PROVIDING FOR AMENDMENT TO LEE COUNTY BLASTING ORDINANCE NO. 85-45 BY AMENDING SECTION TWO: DEFINITIONS AND SECTION EIGHT: MEASUREMENT AND RECORDING; PROVIDING FOR SEVERABILITY, CONFLICT, INCLUSION IN CODE AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the Board of County Commissioners of Lee County, Florida, has adopted certain ordinances which are administered or enforced by the Lee County Division of Code Enforcement; and

WHEREAS, the Division of Code Enforcement has been renamed as the Division of Codes and Building Services; and

WHEREAS, the existing ordinances administered or enforced by the Division of Codes and Building Services shall be so amended to provide for continued administration or enforcement by said renamed Division;

NOW, THEREFORE, BE IT ORDAINED by the Board of County Commissioners of Lee County, Florida that:

SECTION ONE:

The amendments and revisions set forth in the following sections are hereby adopted by showing additions to existing language with underlined type and deletions to existing language with virgules.

SECTION TWO:

Development Standards Ordinance No. 82-42, as amended by Ordinances 83-42, 86-27, 87-21, 88-6, 88-9 and 88-20 is hereby amended as follows:

A. Section A.6. Definitions, subsection a., Analogous Words and Terms is amended by adding a new subsection as follows:

(9) Where this ordinance refers to a specific Federal, State or County agency, department or division, it shall be interpreted to mean "or any succeeding agency authorized to perform similar functions or duties."

SECTION THREE:

Noise Ordinance No. 82-32, as amended by Ordinance No. 83-22 is hereby amended as follows:

A. Section Three: Definitions, subsection E. is amended as follows:

E. Director/ of Lee County Codes and Building Services or its successor agency, Enforcement/ or his designee is the designated authority charged with administration and enforcement of this Ordinance.

SECTION FOUR:

Lee County Construction Board of Adjustment and Appeals Ordinance No. 83-34, as amended by Ordinance No. 87-25, is hereby amended as follows:

A. Section One: Applicability is amended as follows:

This Ordinance shall include, but not be limited to, any contractor, owner, agent, manufacturer or supplier, providing construction services or materials regulated by standard codes and enforced by the Lee County Division of Codes and Building Services or its successor agency ~~Enforcement~~ within the unincorporated areas of Lee County.

B. Section Nine: Appeals, subsection (a) is amended as follows:

(a) Whenever the Building Official or his designee, shall reject or refuse to approve the mode or manner of construction to be followed, or materials to be used, or when it is claimed that the provisions of a code do not apply, or that an equally good or more desirable form of construction can be employed in any specific case, or when it is claimed that the true intent and meaning of a code or any of the regulations thereunder have been misconstrued or wrongly interpreted, the owner of such building or structure, or his duly authorized agent, may appeal from the decision of the Building Official or his designee to the Lee County Board of Adjustment and Appeals. Notice of appeal shall be in writing and filed within ninety (90)

days after the decision is rendered by the Building Official. All requests for Appeal shall be on forms provided by the Division of Codes and Building Services or its successor agency ~~Enforcement~~. A fee of Twenty Five Dollars (\$25.00) shall accompany such notice of appeal.

SECTION FIVE:

Lee County Blasting Ordinance No. 85-45 is hereby amended as follows:

A. Section Two: Definitions, subsection B. is amended as follows:

B. Division - Lee County Division of Codes and Building Services or its successor agency Enforcement.

B. Section Eight: Measurement and Recording, Subsection A., is amended as follows:

A. A continuous monitoring seismic instrument shall be provided and maintained by the Blaster/User. The instrument shall be placed so as to record vibration amplitudes relative to the nearest structure not owned or controlled by the Blaster/User or at a distance of five thousand two hundred eighty (5,280) feet from the blast when the nearest structure not owned or controlled by the Blaster/User is more distant than one (1) mile from the blast. The Division ~~of Codes and Building Services~~ Enforcement may require specific placement of the seismic instrument when deemed necessary by the Division. Each Blaster and/or User shall monitor and record the vibration amplitudes which result from each blasting operation.

SECTION SIX: SEVERABILITY

If any section, subsection, sentence, clause or phrase or if any portion of this ordinance is found for any reason to be invalid, or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate and distinct, an independent provision, and such holding shall not affect the validity of any remaining portions thereof.

SECTION SEVEN: CONFLICT WITH OTHER LAWS

Whenever the requirements or provisions of this Ordinance are in conflict with the requirements or provisions of any other lawfully adopted ordinance, the most restrictive requirements shall apply.

SECTION EIGHT INCLUSION IN CODE

It is the intention of the Board of County Commissioners that the provisions of this ordinance shall become and be made a part of the Lee County Code; and that the sections of this ordinance may be renumbered or relettered and the word "ordinance" may be changed to "section," "article," or such other appropriate word or phrase in order to accomplish such intentions.

SECTION NINE: EFFECTIVE DATE

The provisions of this ordinance shall become effective immediately upon receipt from the Secretary of State that said ordinance has been duly filed with the Secretary of State of the State of Florida.

STATE OF FLORIDA
COUNTY OF LEE

I, Charlie Green, Clerk of Circuit Court, Lee County, Florida, and ex-Officio Clerk of the Board of County Commissioners, Lee County, Florida, do hereby Certify that the above and foregoing, is a true and correct copy of Ordinance No. 88-47 adopted by the Board of Lee County Commissioners, at their meeting held on the 28th day of September 1988, and same filed in the Ordinance Book.

Given under my hand and seal, at Fort Myers, Florida, this 4th day of October, 1988.

CHARLIE GREEN,
Clerk of Circuit Court
Lee County, Florida
By Janet L. Asher
Deputy Clerk

THE FOREGOING ORDINANCE was offered by Commissioner John E. Manning who moved its adoption. The motion was seconded by Commissioner Charles L. Bigelow and, upon being put to a vote, the vote was as follows:

JOHN E. MANNING	<u>AYE</u>
WILLIAM FUSSELL	<u>ABSENT</u>
CHARLES BIGELOW	<u>AYE</u>
MARY ANN WALLACE	<u>AYE</u>
DONALD SLISHER	<u>AYE</u>

DONE AND ADOPTED this 28th day of September, 1988.

ATTEST:
CHARLIE GREEN, CLERK

BOARD OF COUNTY COMMISSIONERS
OF LEE COUNTY, FLORIDA

By: Don S. Ishee
Deputy Clerk

By: Paul J. Alston
Vice Chairman

Approved As To Form

By: [Signature]
Office Of The
County Attorney

STATE OF FLORIDA

COUNTY OF LEE

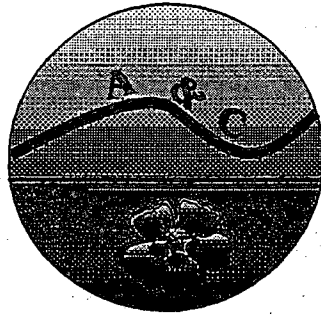
I, Charlie Green, Clerk of the Circuit Court, Lee County, and ex-Officio Clerk to the Board of County Commissioners, Lee County, Florida, do hereby certify that acknowledgement has been received from the Secretary of State on this 7th day of October, 1988, at 6:30 a.m., of the filing of Lee County Ordinance No. 88-47 duly adopted by the Board of County Commissioners at their meeting held on the 28th day of September, 1988.

Given under my hand and seal, at Fort Myers, Florida, this 7th day of October, 1988.

CHARLIE GREEN,
Clerk, Circuit Court
Lee County, Florida

By Janet S. Foster
Deputy Clerk

11.2 – Operational Noise Study Report



**LEE COUNTY SOLID WASTE
RESOURCE RECOVERY FACILITY**

Operational Noise Study Report

Final Report

prepared for

OGDEN MARTIN SYSTEMS of LEE, INC.
Fort Myers, Florida

prepared by

ANALYSIS & COMPUTING, INC.
Hicksville, NY

November, 94

TABLE OF CONTENTS

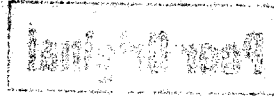
SECTION	Page
LIST OF TABLES	ii
LIST OF FIGURES	iii
1.0 INTRODUCTION.....	1
2.0 THE LEE COUNTY NOISE CONTROL ORDINANCE	4
3.0 NOISE MEASUREMENT PROGRAM	5
3.1 Noise Measurement Program	5
3.2 Noise Monitoring Instrumentation and Procedure.....	7
4.0 RESULTS OF THE NOISE MONITORING PROGRAM.....	9
5.0 CONCLUSION.....	19
APPENDIX A - dB-301 FIELD DATA	A-1
APPENDIX B - dB-308 FIELD DATA	B-1

LIST OF TABLES

Table	Description	Page
2-1	Lee County Noise Control Ordinance (No.82-32)	4
4-1	Turbine-Boiler Building 50-foot Noise Levels	9
4-2	Summary Results of Operational Noise Monitoring	10
4-3	Summary of Noise Levels and Lee County Ordinance 82-32	15

LIST OF FIGURES

<u>Figure</u>	<u>Description</u>	
<u>Page</u>		
1-1	Noise Monitor Locations.....	2
4-1	Time History of Location B1	11
4-2	Time History of Location B1A.....	11
4-3	Time History of Location B2.....	12
4-4	Time History of Location B3.....	13
4-5	Time History of Location B4.....	13
4-6	Time History of Location M3.....	14
4-7	Time History of Location R3.....	15
4-8	One-Third Octave Band Spectra for Boundary Sites	16
4-9	One-Third Octave-Band spectra at Location M3 - Daytime	17
4-10	One-Third Octave-Band spectra at Location M3 - Nighttime.....	17
4-11	One-Third Octave-Band spectra at Location R3 - Daytime.....	18
4-12	One-Third Octave-Band spectra at Location R3 - Nighttime.....	18



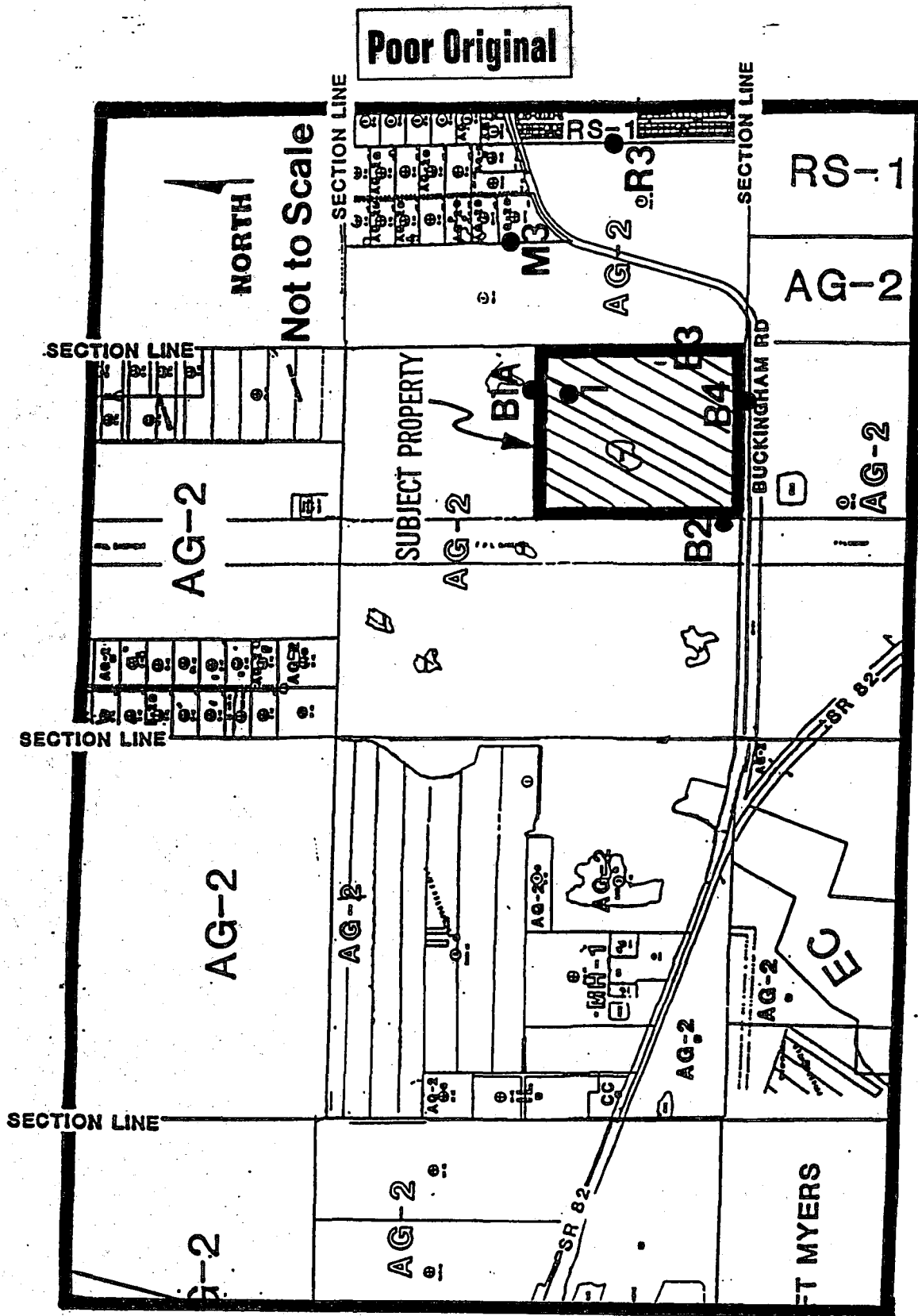
1.0 INTRODUCTION

This report describes the operational noise monitoring program conducted from October 18 to October 20, 1994 at the Lee County Solid Waste Resource Recovery Facility (LCSWRRF), presents the results which depict the noise environment surrounding the facility with the operation of the LCSWRRF at its rated capacity, and reports the findings regarding the facility's compliance with the Lee County Noise Control Ordinance.

The ambient noise environment prior to facility startup was documented in a separate pre-operational noise monitoring program conducted by Camp, Dresser & McKee Inc. (CDM) in 1990¹. The LCSWRRF can be found east of Fort Myers in Lee County, Florida. It is bounded by Buckingham Road to the south, a Florida Power & Light utility easement along the west property line (also utilized as a pasture for cattle grazing), open space to the north, and a recreational facility under development to the east as shown in Figure 1-1. The ambient noise environment in the vicinity of the facility is subject to intermittent aircraft overflies to and from South West Florida International Airport and otherwise dominated by local traffic on Buckingham Road.

The continuous operational noise monitoring in this study, in accordance with the Lee County Service Agreement and in conformance to Lee County Code of Noise Enforcement Practices (AC 12-2), was conducted at four (4) property boundary locations, one (1) fenceline location to the north, and in the vicinity of the two nearest (2) sensitive residential receptors previously identified. The nearest residential receptors are located along Neal Road and Alvin Avenue, approximately 2500 feet to the east-north-east and 3500 feet to the east of the facility, respectively. One-Third Octave Band spectral readings were taken at the two sensitive residential receptor sites to detect the presence of pure tones, three times during the day and three times during the night. The nearest noise sensitive receptor to the LCSWRRF is the recreational facility along the eastern boundary line. At the time of this study, two football/soccer fields were near completion with a bicycling/jogging trail under construction to the northeast.

¹ Camp, Dresser & McKee, Inc., "Noise Study", for Lee County Resource Recovery Facility, January 1990.



Section 2.0 reviews the provisions of the Lee County Noise Control Ordinance. Section 3.0 describes the noise monitoring program, and Section 4.0 presents the results of the operational noise monitoring study. Section 5.0 summarizes the conclusions from this study.

2.0 THE LEE COUNTY NOISE CONTROL ORDINANCE

The Lee County Ordinance No. 82-32 (also cited as The Lee County Noise Control Ordinance) was first enacted August 4th, 1982, and amended in July 20th 1983 and October 4th, 1988. Table 2-1 presents the maximum permissible sound level generated as measured at or within the property line of the receiving property.

Table 2-1. Lee County Noise Control Ordinance (No. 82-32)

Receiving Land Use Category	Time	Sound Level Limit (dBA)
Residential, Public Space, Agricultural or Institutional	7 AM - 10 PM	66
	10 PM - 7 AM	55
Commercial or Business	7 AM - 10 PM	72
	10 PM - 7 AM	65
Manufacturing or Industrial	All Times	75

For the purpose of this study as outlined in the Service Agreement, the maximum sound level has been interpreted to be the maximum sound level generated by the operation of the LCSWRRF exclusive of other sources of noise, such as aircraft overflies, on- and off-site commercial traffic, and local traffic.

In addition, the maximum sound level limits presented in Table 2-1 will be reduced by 5 dBA for pure tones. Pure tones, as defined in the above ordinance, exists if the third octave band sound pressure level arithmetic value in that band exceeds the sound pressure levels of it contiguous neighboring bands by 5 dB for center frequencies of 500 Hz or above, 8 dB for center frequencies between 160 Hz and 400 Hz, and 15dB for center frequencies less than or equal to 125 Hz.

3.0 NOISE MEASUREMENT PROGRAM

The noise measurement program was conducted from October 18 to October 20, 1994. Continuous noise monitoring in A-weighted L_{eq} and L_{90} (3 minute or 10 minute intervals), was performed along the LCSWRRF property boundary and the nearest noise-sensitive residential receptors in the community. In addition, third-octave band sound pressure level measurements were taken at the nearest noise-sensitive residential receptors in the community to determine the presence of pure tones.

As part of the testing protocol, noise levels at 50 feet from the four sides of the Turbine-Boiler-Tipping Building (south, east, north, and west) were also sampled.

3.1 Noise Monitoring Locations

The sampling locations at the sides of the Turbine-Boiler-Tipping Building were located at the approximately 50 feet along the centerline of the Building. The monitoring location to the east was located 50 feet from the Tipping Hall building since the Tipping Hall adjoins the Turbine-Boiler building at that side. The west side location is 50 feet from the Air Pollution Control Area which is housed inside the building. Discrete hand-held sound level readings were taken at these 4 locations.

Noise levels were continuously monitored at one (1) location (labeled B1) along the northern fenceline, four (4) locations along the facility boundary (labeled B1A, B2, B3, and B4), and two (2) locations near residential receptors (labeled M3 and R3). This report has adopted the same labeling convention as the previous studies².

Monitoring location B1 is located along the northern fenceline approximately 400 feet from the eastern property line, approximately in line with the boiler building centerline. This location has been moved from a previously monitored location referred to as M1/B1, located near the northeast corner of the fenceline. The new location avoids the shielding effects of the Tipping Hall Building. Data from this monitoring location is for informational purposes only because additional property has been acquired since the previous ambient noise study, extending the property line further north.

² Camp, Dresser & McKee, "Noise Study" for Lee County Resource Recovery Facility, January 1990 and "Wyle Research Report WR 93-11 Acoustical Analysis for Lee County Solid Waste Resource Recovery Facility", Wyle Research, November 1993.

Monitoring location B1A is located along the new property line to the north, approximately 400 feet west of the eastern property line. This undeveloped area is lightly wooded. The adjacent property is zoned AG-2 (agricultural), composed of vacant wooded tracts and cultivated fields.

Monitoring location B2 is located approximately 300 feet north of Buckingham Road along the western boundary line. This area was previously monitored and referred to as M2/B2. The new monitoring location is located approximately 150 further north than the previous monitoring location to mitigate local traffic noise interference. The adjacent property is zoned AG-2, composed of the Florida Power & Light easement with a wooded tract further to the west. The easement is also utilized for cattle grazing.

Monitoring location B3 is located along the eastern property boundary, approximately 1300 feet north of Buckingham Road. Directly to the east is a recreational facility under development. The present monitoring location is located approximately 400 feet south of the previous receptor location also known as B3. The relocation places B3 along the eastern boundary line, out of the noise "shadow" cast by the Tipping Hall Building from the rooftop vents and is therefore in the line-of-sight to major facility noise sources. The adjacent property was classified as AG-2, but is presently under development as a recreational facility. The recreational facility shares the same level of noise protection as areas zone AG, the strictest applicable in Lee County.

Monitoring Location B4 is located along the south property line along the Buckingham Road right-of-way line, near utility pole 08-270, approximately 400 feet east of the facility entrance. This location is very close to the original B4 receptor location, but further from the influences of truck traffic entering and leaving the facility during the daytime. The neighboring property on the other side of Buckingham Road is zoned AG-2, composed of wooded tracts.

Location M3 is situated in the same general vicinity of the previously monitored location M3, approximately 2500 feet east-north-east from the LCSWRRF. Location M3 was moved to a site approximately 700 feet north of Buckingham Road and 800 feet west of Neal Road. This location places the monitor between the LCSWRRF and the nearest residence (previously designated as R1) on Neal Road. The previous monitoring site was closer to Neal Road. The immediate area around M3 is undeveloped lands with few trees although moderately thick woods stand between the residences and the facility. The area is

zoned AG-2, composed of wood tracts to the west and single-family residences to the east and northeast.

Location R3 is located due east of the facility on Alvin Avenue, between Burr Street and Benton Street. The nearest residence is situated on the west side of Alvin Avenue and approximately 150 feet north of the monitor. The area is sparsely developed; only the one residence was noted west of Alvin Avenue, north of Burr Street. This area is zoned R-1 (residential) and is composed of undeveloped open space with scattered single-family residences, mostly to the east.

3.2 Noise Monitoring Instrumentation and Procedure

Sound pressure levels were measured using the following equipment:

- IVIE IE-30A Audio Spectrum Analyzer
- 1/2 inch Switchcraft Condenser Microphone
- Switchcraft 1/2 inch Wind Screen
- Larson-Davis Laboratories Model 820 Sound Level Meter
- Larson-Davis Laboratories Model 2561 1/2 inch Microphone
- Larson-Davis Laboratories Model 0827 Pre-Amp
- Larson-Davis Laboratories 1/2 inch Wind Screen
- Metrosonics db-301 Metrologgers
- Metrosonics db-308 Metrologgers with 1/2 Microphone
- Metrosonics mk-310P 1/4-inch Boom Microphone
- Metrosonics cl-302 Acoustic Calibrator
- Rion NC-73 Sound Level Calibrator
- Metrosonics ws-301 Wind Screen

The Larson-Davis 820 was selected to measure noise levels at the four sides of the Turbine-Boiler building. This Type I sound level meter possess a sampling rate of 32 samples per second. Sampling was conducted during the absence of extraneous noise such as passing trucks or loud landscaping activities. Each A-weighted, slow response, L_{eq} measurement was culmulatively averaged over a minimum of 10,000 samples.

A-weighted sound levels were measured at a sampling rate of 4 per second using the db-301s and 8 or 16 per second using the db-308s (both ANSI Type II). Continuous monitoring was conducted to yield histograms of sound levels, statistical noise levels, and L_{eq} . An IVIE IE-30A Audio Spectrum Analyzer was deployed for one-third octave band spectral measurements to document the absence or presence of discrete tones as per ANSI S1.13. Spectral measurements were taken averaging over a minimum of 50 spectra.

The Energy Equivalent Sound Levels, L_{eq} , over a ten (10) minute intervals were stored by the 301 Metrologgers. The 10 minute interval in db-301 Metrologgers (3 minute interval for SN 3790) is set in the instrument and cannot be re-programmed as in the db-308 Metrologgers; for the sake of consistency and a finer resolution, a 10-minute storage interval is also used for the db-308 Metrologgers. The db-301 Metrologgers automatically calculate and store the hourly L_{eq} values as well as the 10-minute L_{eq} s as shown in Appendix B. A histogram of the 10-minute L_{eq} s was tabulated and the Ninety Percentile Exceedance Level (L_{90}) for the daytime and nighttime hours determined. The db-308 Metrologgers on the other hand store the L_{eq} , the Maximum Sound Level (L_{max}), the Peak Sound Level (L_{peak}), the Ten Percentile Level (L_{10}), and the Ninety Percentile Level (L_{90}) for each 10-minute interval as shown in the data sheet of Appendix B.

The L_{90} will be used to evaluate the facility as per the Protocol. The Ninety Percentile Exceedance sound level is defined as the noise level which is exceeded 90% of the time. The L_{90} is taken as the "background" noise after removal of short-term intermittent noise due to local traffic, on- and off-site commercial vehicles, temporary on- and off-site construction activities, and audible safety devices. Under normal operating conditions at full capacity, the LCSWRRF operates in a continuous and steady manner, generating a relatively constant noise level as characterized by the L_{90} .

The instruments were calibrated before and after each measurement and operated according to manufacturer's instructions. Site noise monitoring was conducted in accordance with the American National Standards Institute (ANSI) Standard S1.2 - "Method for the Physical Measurement of Sound". All measurements were performed following accepted procedures as documented in equipment manufacturers' manuals.

Weather data during the monitoring period was obtained from local radio and television stations. The temperature ranged from the mid and upper 60's ($^{\circ}$ F) during the night to the high of 90's ($^{\circ}$ F) during the day, with winds varying from 0 mph to 6 mph predominantly from the northeast with Relative Humidity in the 90s.

4.0 RESULTS OF THE NOISE MONITORING PROGRAM

Results of the noise levels sampled at 50' exterior to the sides of the Turbine-Boiler-Tipping Building are presented in Table 4-1. As per the Protocol, these measurements were taken along the south, east, north and west faces of the building during the daytime hours. Noise levels varied from 50.3 dBA at the east side to 64.7 dBA at the north side. Major noise sources from the south side includes the stack, cooling towers, and the rooftop vents which results in a L_{eq} measurement of 60.8 dBA. The Tipping Hall Building to the east acts as a large noise barrier, resulting in a very quiet 50.3 dBA. The north side provided the highest measurement of 64.7 dBA. Major noise sources include the Grizzly Building, inclined conveyor, stack, and the Boiler Building. The west side had a noise level of 63.6 dBA. Much of the noise can be attributed to the Air Pollution Control Building and the stack. The noise levels at the four sampling sites were continuous and steady, and in the low end of typical resource recovery facilities of this size.

Table 4-1. Turbine-Boiler Building 50-foot
Noise Levels

<u>Location</u>	<u>Noise Levels (dBA)</u>
South	60.8
East	50.3
North	64.7
West	63.6

A summary of the noise levels in Table 4-2 presents the Ninety Percentile Exceedence Levels (L_{90}) during the daytime hours (from 7 AM to 10 PM) and nighttime hours (from 10 PM to 7 AM) for each of the 7 monitoring locations from this study as well as a previous study, "Noise Study" by CD&M, 1990. The L_{90} excludes impulsive and intermittent noise and is representative of the steady noise levels of a operating resource recovery facility.

Table 4-2. Summary Results of Operational Noise Monitoring (L_{90} in dBA)

Monitor Locations		Boundary Line or Receiving Property Locations						Lee County	
		B1A	B2	B3	B4	M3	R3	Standard	B1
Daytime	Operational	48	51	49	47	<42 ¹	<43 ¹	66	53
7 AM - 10 PM	Pre-Operational ²	*	42	*	*	39	*	66	39
Nighttime	Operational	48	48	49	48	<42 ¹	<43 ¹	55	53
10 PM - 7 AM	Pre-Operational ²	*	32	*	*	35	*	55	31

(1) Below the lower dynamic monitoring limits of instrument.

(2) From "Noise Study" by CDM, 1990.

* Not monitored in previous study.

At all locations, the noise levels were well below the Lee County Noise Control Ordinance standard of 66 dBA during the day and 55 dBA during the night. With the LCSWRRF running at 105% nominal power, daytime L_{90} 's along the property boundaries ranged from 47 dBA to 51 dBA with the nighttime L_{90} 's ranging from 48 dBA to 49 dBA. Since the plant operates continuously, the difference between daytime and nighttime noise level would be negligible as Table 4-2 illustrates. The L_{90} 's at residential locations M3 and R3 were less than 42 dBA and 43 dBA respectively. The ambient noise levels at those sites were below the dynamic range of the monitors.

Figures 4-1 through 4-7 presents the time history of their respective locations. Figures 4-1 through 4-3 show the L_{eq} with the derived L_{90} drawn for the daytime and the nighttime period. Figures 4-4 through 4-7 presents data from dB-308 monitors, showing both the L_{eq} and the L_{90} for each 10-minute interval. These monitors were sited in locations at residential areas and the boundary location facing the residential areas.

Figure 4-1 shows the time history of Location B1 which is along the northern fence line, approximately 400 feet from the eastern property line. Prior to the construction of the LCSWRRF, this fence line also represented the property line. Since then, additional property north of this point has been acquired. Figure 4-1 is presented for informational purposes only. The time history presents the change in noise levels in L_{eq} over a 24-hr period. A steady base noise level can be distinguished at approximately 53-54 dBA, particularly at night with the subsidence of other intermittent noise. This steady noise level is attributed to the plant, the loudest identified steady noise contributor. Landscaping activities occurred during the day near the monitor. However, this activity ceased by 4:30 PM.

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Figure 4-1. Location B1

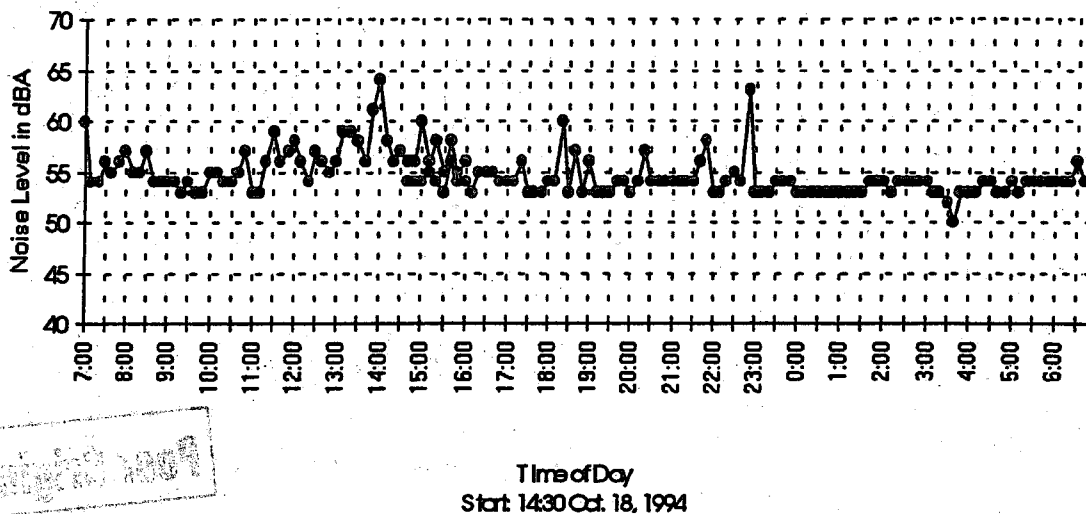
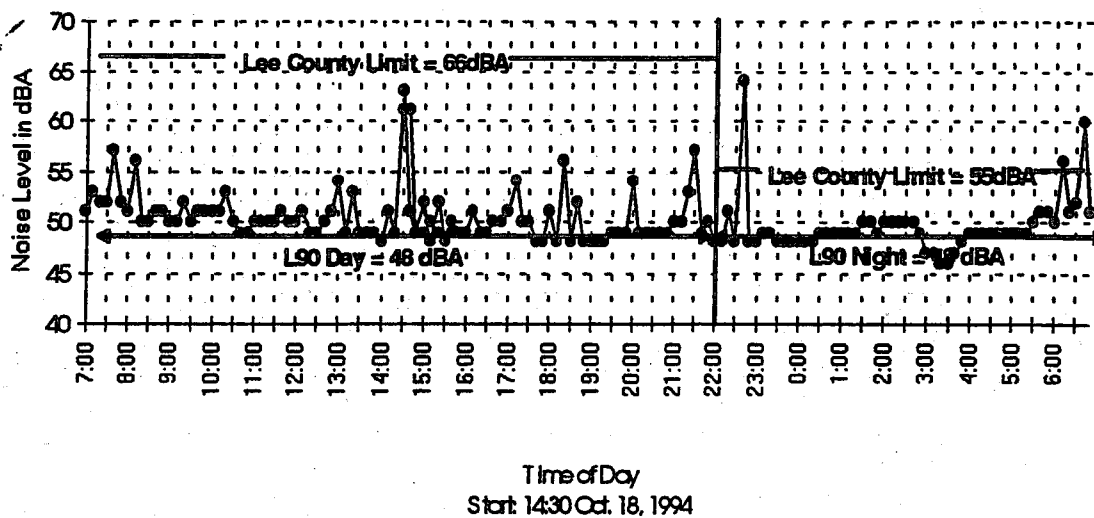


Figure 4-2 presents the time history of Location B1A along the northern property line, 400 feet west of the eastern property line. A L_{90} of 48 dBA represents the base noise level for both the daytime and nighttime, well below the 66 dBA limit for the day and 55 dBA for the night. The increase in L_{eq} beginning at 5:30 AM can be attributed to the garbage

Figure 4-2. Location B1A

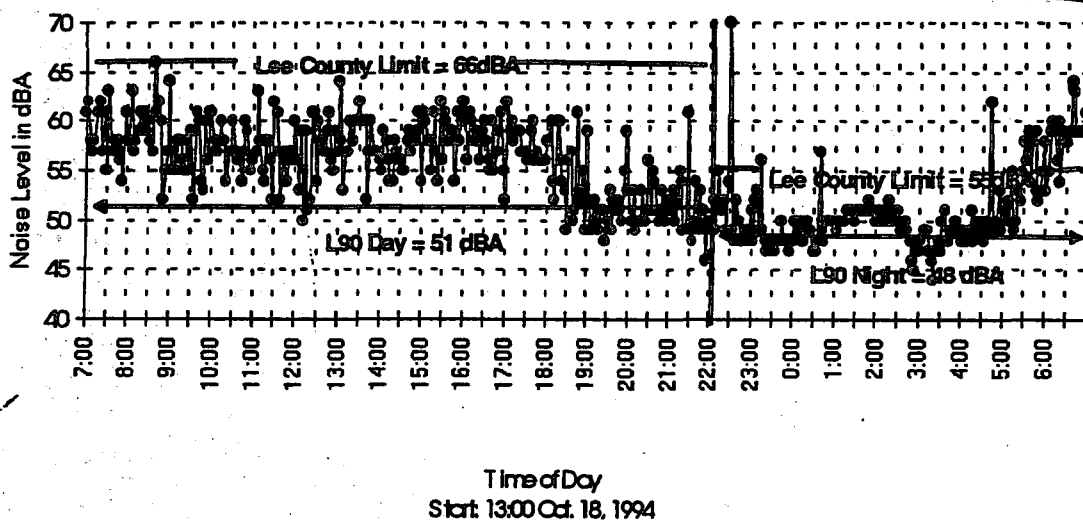


trucks as they begin leaving the Tipping Hall.

Figure 4-3 shows the time history of Location B2, approximately 300 feet north of Buckingham Road along the western boundary line. Traffic dominates the noise environment at this location, especially since most of the commercial truck traffic enroute to and from the LCSWRRF passes by this monitor. The L_{eq} stabilizes at 48 dBA from the hours of approximately 7:00 PM to 5:00 AM. The L_{90} during the nighttime period is 48 dBA. Daytime L_{90} has been statistically derived to be 51 dBA. The daytime and nighttime L_{90} 's from a previous study were 42 dBA and 32 dBA. However, both the daytime and nighttime operational noise levels were well below the limits set by Lee County.

Figure 4-4 presents the time history of Location B3, situated along the eastern boundary

Figure 4-3. Location B2

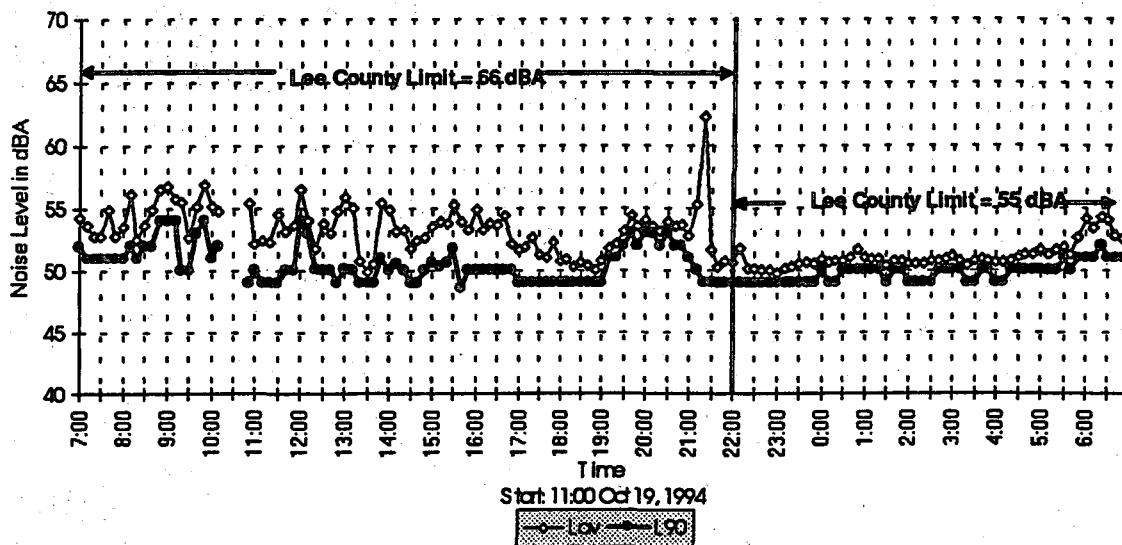


line, approximately 1300 feet north of Buckingham Road. Since this location used a dB-308 metrologger, the L_{90} and L_{eq} are presented at 10-minute intervals. The plant essentially produces a steady 49 dBA day and night. While the L_{90} showed elevated levels at various instances, it never significantly approached the daytime limit of 66 dBA nor the nighttime limit of 55 dBA. Significant data loss due to mounting difficulties occurred on the 18th of October; this chart reflects the time history of the next day, the 19th of October.

Figure 4-5 presents the time history of Location B4, located on the southern boundary line along the right of way of Buckingham Road and approximately 400 feet east of the main

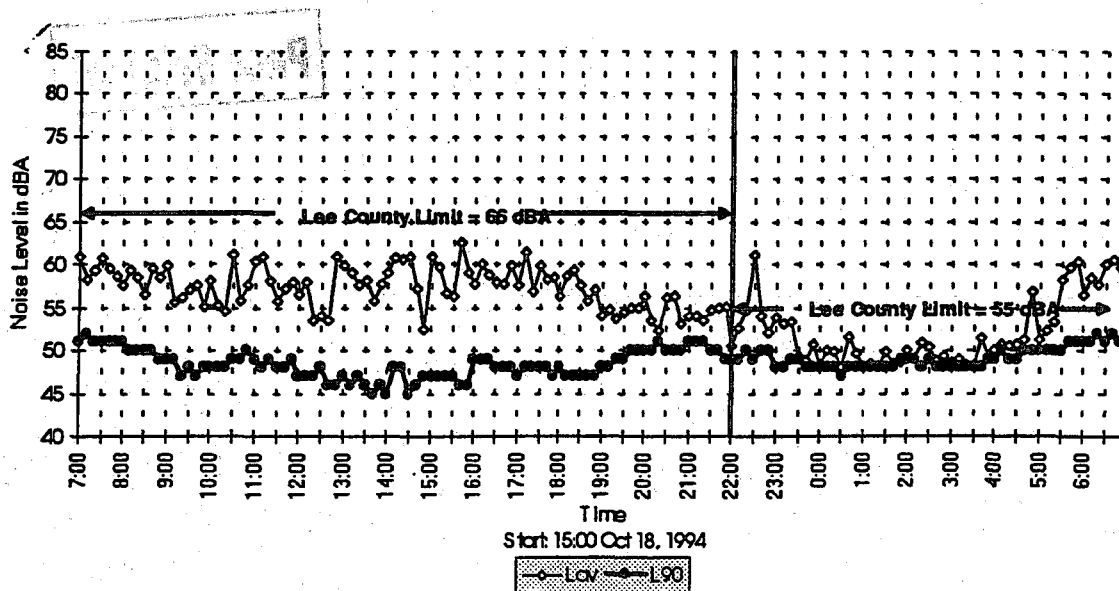
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Figure 4-4. Location B3



entrance to the facility. As expected, the dominant noise source during the day is the traffic on Buckingham Road. This time history clearly illustrates the relationship between intermittent noise and L_{90} . During the day, the L_{eq} is approximately 10 dBA above the L_{90} . However, during the night with few traffic or other intermittent noise, the L_{eq} approaches the L_{90} of 48 dBA. Both the daytime and nighttime L_{90} were well below the Lee County

Figure 4-5. Location B4

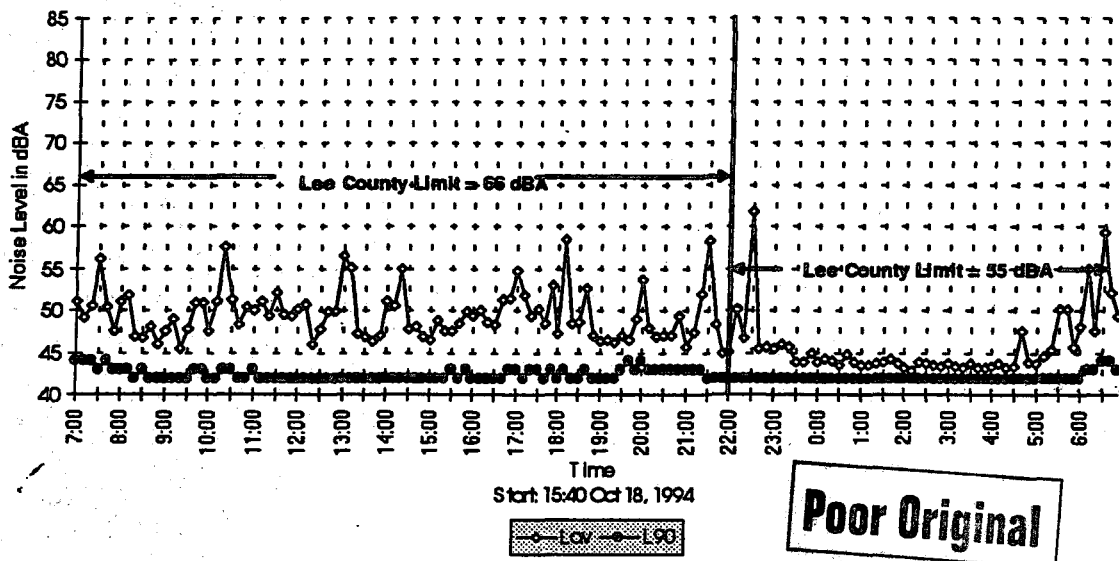


Noise Ordinance standard.

Figure 4-6 presents the time history of Location M3. This location is located at the nearest residential area, approximately 2500 feet east-north-east of the plant. The dominant noise source is the traffic from Buckingham Road to the south and Neal Road to the east. The area is quieter than presented because the lower limit of the monitor (42 dBA) was reached during the day and the night. The study by CD&M places the L_{90} at 39 dBA during the day and 35 dBA during the night.

Like Figure 4-6, Figure 4-7 represents the time history at a residential area, R3. The site is located along Alvin Avenue, between Burr Street and Benton Street, approximately 40 feet from the centerline of Alvin Avenue. While the traffic on Alvin Avenue is much less than either Buckingham Road or Neal Road, both the road surface and the monitor's

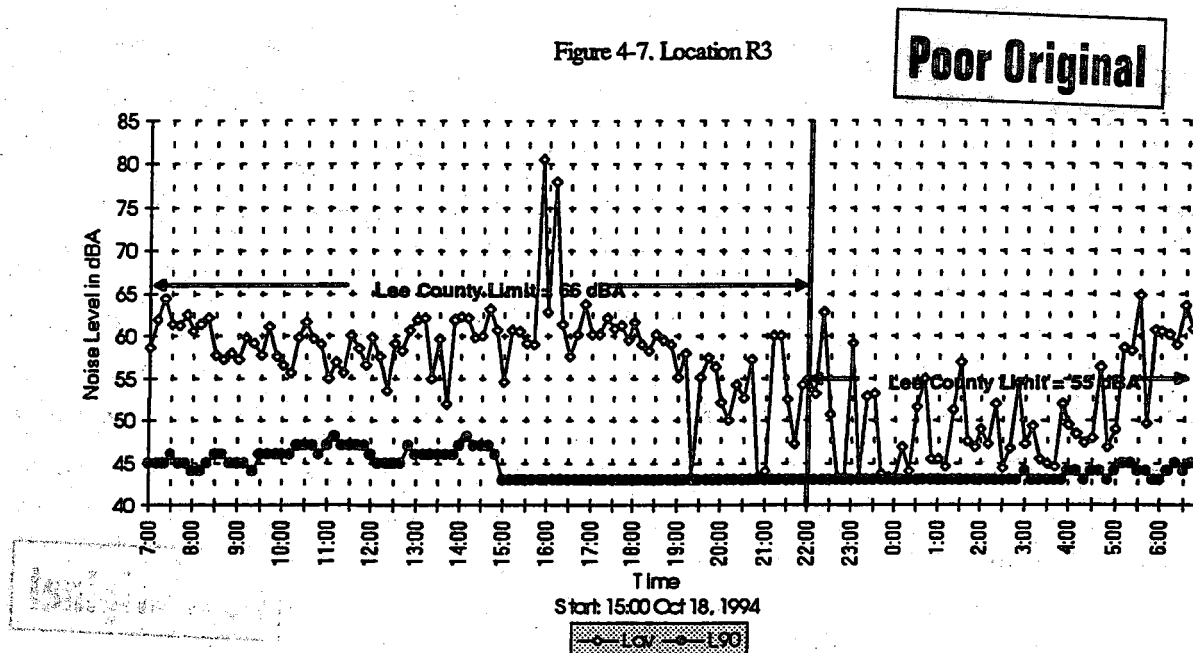
Figure 4-6. Location M3



proximity to the road resulted in a higher L_{eq} than Location M3. The use of the L_{90} allows the intermittent noise to be filtered. Unfortunately, the lower limit of the monitor (43 dBA) was reached, indicating that the ambient noise environment is less than 43 dBA. The elevated noise events do not correspond to any elevated levels in and around the LCSWRRF nor at Location M3.

As shown in Figures 4-2 to 4-5, the operation of the LCSWRRF at or near 105% nominal power level does not result in sound levels along its property line approaching or

Figure 4-7. Location R3



exceeding the standards set by the Lee County Noise Control Ordinance. Figures 4-6 and 4-7 confirms the absence of significant noise levels from the LCSWRRF as measured from these residential areas. Table 4-3 reviews the noise levels measured in this study as well as their conformance to the Lee County Noise Control Ordinance.

Table 4-3. Summary of Noise Levels and Lee County Ordinance 82-32

Location	Measured Noise Level (L_{90} , dBA)		Lee County Noise Limit (82:32) (dBA)		Complies with 82:32?
	Day	Night	Day	Night	
B1A	48	48	66	55	YES
B2	51	48	66	55	YES
B3	49	49	66	55	YES
B4	47	48	66	55	YES
M3	<42 ⁽¹⁾	<42 ⁽¹⁾	66	55	YES
R3	<43 ⁽¹⁾	<43 ⁽¹⁾	66	55	YES

* Not Previously Monitored.

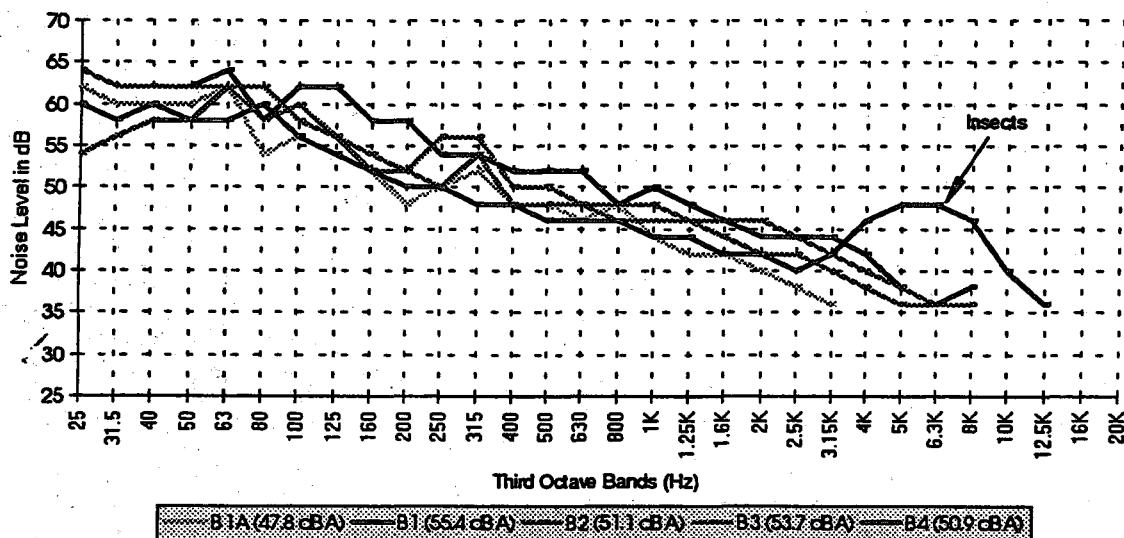
(1) Reflects the lower dynamic limit of monitors. Actual noise levels may be lower.

Figures 4-8 to 4-12 depict the third octave band spectra measured at the boundary locations and the daytime and nighttime octave band spectra measured at the two residential monitoring locations. These spectra were taken to identify the presence of any pure tones and to document the octave band spectra with respect to the Lee County Noise Control Ordinance. The octave-band measurements were made in the absence of identifiable transient noise events such as airplanes, automobiles, or trucks; thus, they represent the spectra corresponding to the quieter moments of daytime and nighttime periods.

The third octave band spectra for the locations B1, B1A, B2, B3, and B4 are presented in Figure 4-8. No pure tones were detected. However, elevated noise levels for the high frequency bands centered around 4,000 to 8,000 Hz was recorded. These high frequencies are typical for noise produced by insects. High levels of high frequency noise are not common to resource recovery facilities and would have been detected at the other boundary locations.

Poor Original

Figure 4-8. Third Octave Band Spectra - Site Boundary Locations



Figures 4-9 to 4-10 shows the third octave band spectra during the daytime and nighttime respectively at Location M3. No pure tone were detected. Elevated levels of high frequencies typical of insects were noted at this location. During the spectra sampling, insects were audible. In addition, a home or automobile alarm could be heard in the distance from the southwest. Spectra samplings were not conducted during the alarm.

Figure 4-9. Third Octave Band Spectra - Location M3 Daytime

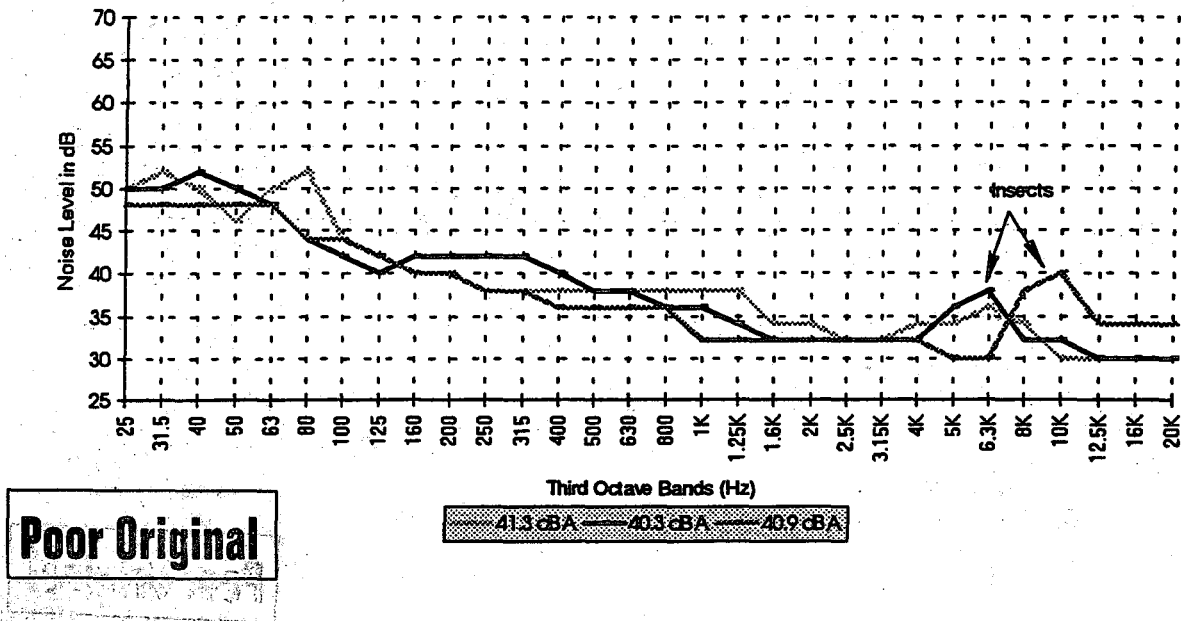
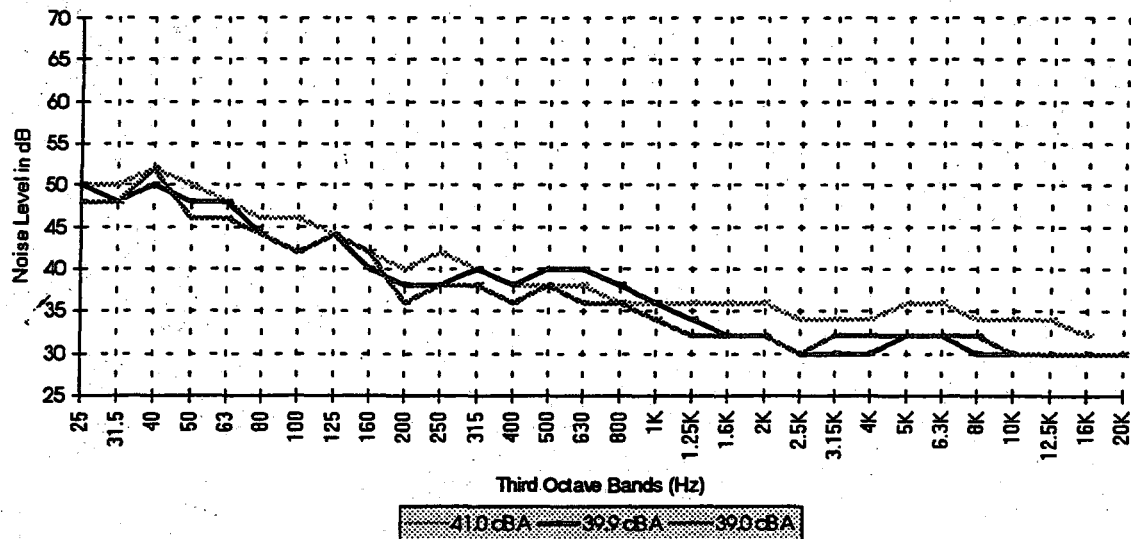
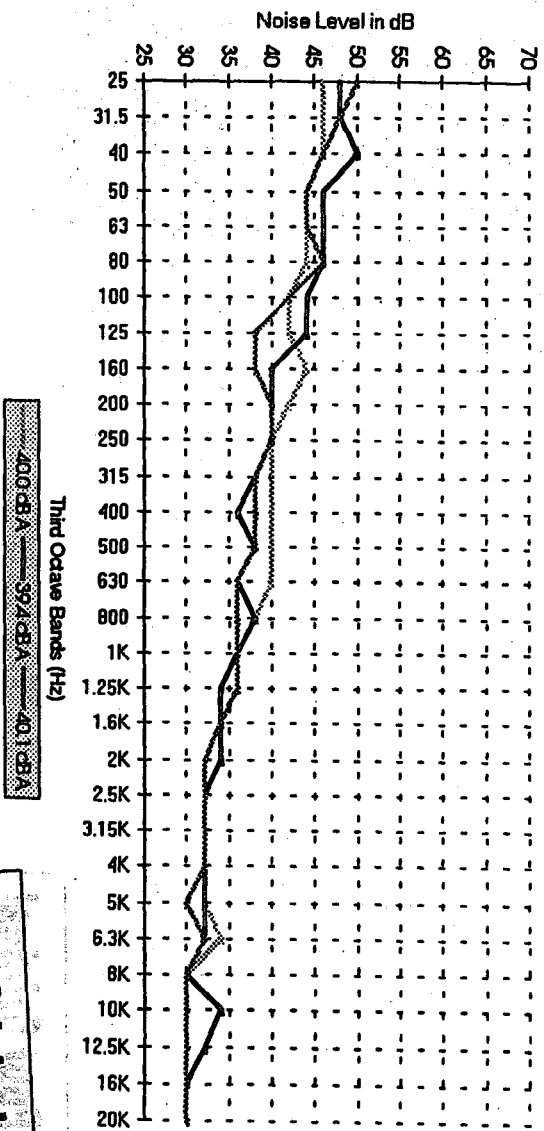


Figure 4-10. Third Octave Band Spectra - Location M3 Nighttime



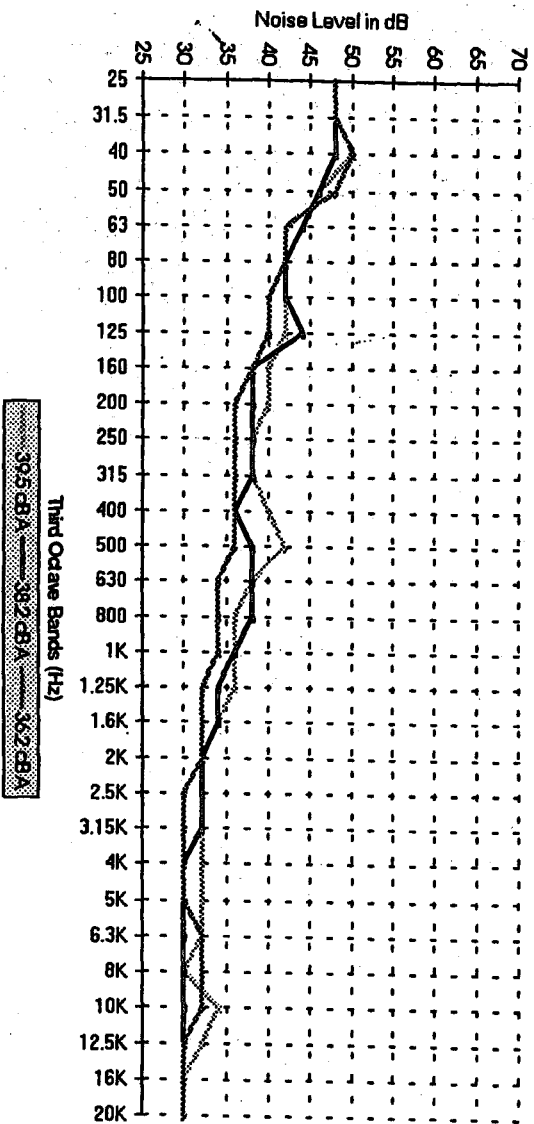
Figures 4-11 and 4-12 shows the third octave band spectra during the daytime and nighttime at location R3. No pure tones were identified. However, a house or automobile alarm was detected from the residence north of this monitoring location. The alarm could be heard at irregular intervals and irregular duration. The third octave band sampling was not conducted while the alarm could be heard.

Figure 4-11. Third Octave Band Spectra - Location R3 Daytime



Poor Original

Figure 4-12. Third Octave Band Spectra - Location R3 Nighttime



5.0 CONCLUSION

Facility operation noise monitoring were conducted at two (2) noise-sensitive residential receptors closest to the LCSWRRF and four (4) property boundary locations around the facility. Operational facility noise levels from LCSWRRF neither approached nor exceeded the daytime limit of 66 dBA nor the nighttime limit of 55 dBA at any of the monitored location and therefore conforms to the Lee County Noise Control Regulation with respect to the overall noise level generated.

No pure tones were detected along the perimeter of the LCSWRRF (B1A, B1, B2, B3, B4) nor at the residential receptors (M3 and R3). Therefore, the LCSWRRF conforms to the Lee County Noise Control Regulation with respect to noise level of pure tones.

1234 5678

APPENDIX A

db - 301 Field Data

DATA COLLECTOR STATUS REPORT

TOTAL DATA SETS: 4

DATA SET LOGGER S/N

1 301/14 3970
2 301/14 1537
3 301/14 1536
4 301/14 1535

METROSONICS dt-390 SN 1056 V1.0 6/86

SN 3970 Location B2

SN 1537 Location B1A

SN 1536 Location B1

SN 1535 Location B1 10:18 10/19/94

LOGGER TYPE: 301/14 S/N: 3970

SAMPLE RATE: 4/sec.

TEST LENGTH: 1 DAYS 0:00:00

STANDBY TIME: 0 DAYS 0:02:32

TEST INTERRUPTIONS: 1

DYNAMIC RANGE: 40 TO 103dB

CUTOFF: NONE

** TIME HISTORY REPORT **

PERIODS COMPLETED: 480

PERIOD LENGTH: 0:03:00

MAXIMUM AVERAGE: 70dB

Leq : 56.8dB

** PERIODIC AND CUMULATIVE Lav **

HOUR	CURRENT Leq	CUMUL Leq
------	----------------	--------------

1	59.1	59.1
2	57.3	58.3
3	58.9	58.5
4	58.8	58.6
5	58.0	58.5
6	56.4	58.2
7	52.9	57.8
8	52.0	57.3
9	52.8	57.0
10	57.9	57.1
11	49.8	56.8
12	50.1	56.5
13	50.7	56.2
14	49.8	56.0
15	48.5	55.7
16	52.2	55.6
17	55.1	55.6
18	59.4	55.9
19	59.4	56.2
20	60.0	56.5
21	58.3	56.6
22	57.8	56.6
23	57.8	56.7
24	58.0	56.8

INT	TIME	La
-----	------	----

1	OD 0:00:00	57
2	OD 0:03:00	64
3	OD 0:06:00	58
4	OD 0:09:00	53
5	OD 0:12:00	57

Poor Original

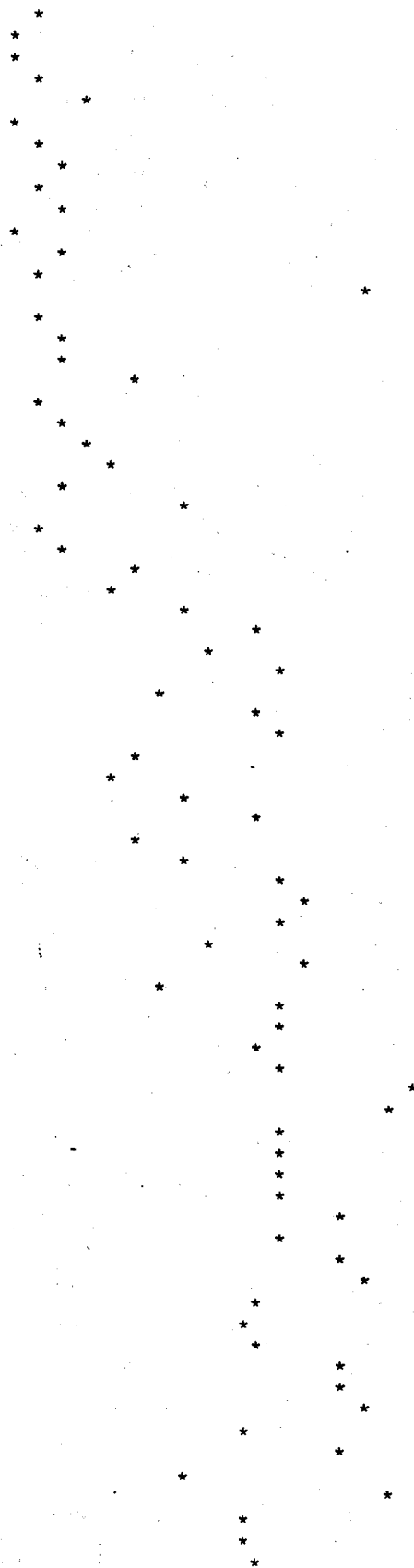
Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

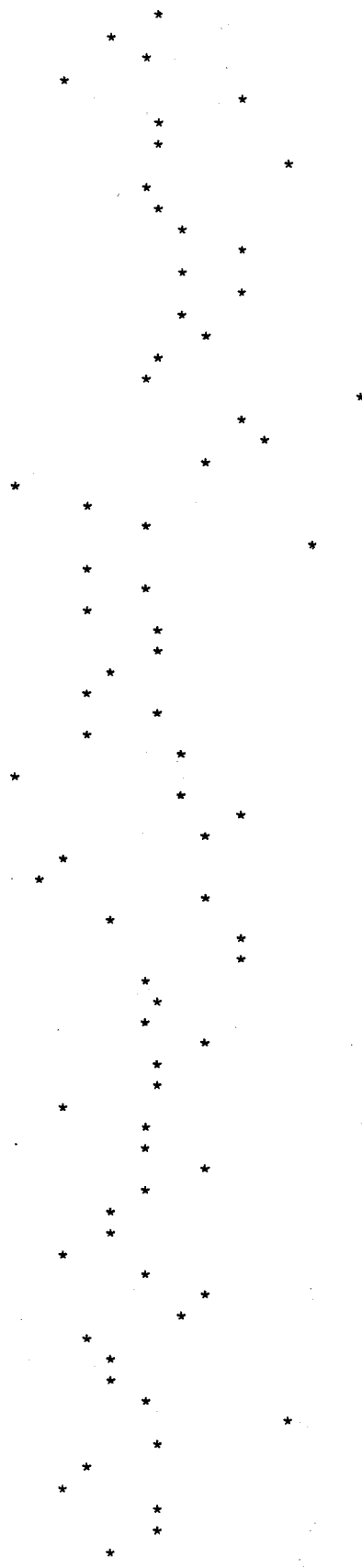
80	OD	3:57:00	55
81	OD	4:00:00	52
82	OD	4:03:00	62
83	OD	4:06:00	59
84	OD	4:09:00	60
85	OD	4:12:00	58
86	OD	4:15:00	59
87	OD	4:18:00	59
88	OD	4:21:00	59
89	OD	4:24:00	57
90	OD	4:27:00	57
91	OD	4:30:00	57
92	OD	4:33:00	56
93	OD	4:36:00	59
94	OD	4:39:00	60
95	OD	4:42:00	56
96	OD	4:45:00	57
97	OD	4:48:00	56
98	OD	4:51:00	56
99	OD	4:54:00	56
100	OD	4:57:00	56
101	OD	5:00:00	58
102	OD	5:03:00	58
103	OD	5:06:00	60
104	OD	5:09:00	54
105	OD	5:12:00	52
106	OD	5:15:00	60
107	OD	5:18:00	60
108	OD	5:21:00	56
109	OD	5:24:00	54
110	OD	5:27:00	53
111	OD	5:30:00	49
112	OD	5:33:00	56
113	OD	5:36:00	57
114	OD	5:39:00	50
115	OD	5:42:00	51
116	OD	5:45:00	61
117	OD	5:48:00	53
118	OD	5:51:00	52
119	OD	5:54:00	55
120	OD	5:57:00	49
121	OD	6:00:00	59
122	OD	6:03:00	52
123	OD	6:06:00	49
124	OD	6:09:00	50
125	OD	6:12:00	52
126	OD	6:15:00	50
127	OD	6:18:00	49
128	OD	6:21:00	51
129	OD	6:24:00	51
130	OD	6:27:00	48
131	OD	6:30:00	50
132	OD	6:33:00	53
133	OD	6:36:00	49
134	OD	6:39:00	52
135	OD	6:42:00	51
136	OD	6:45:00	52
137	OD	6:48:00	51
138	OD	6:51:00	50
139	OD	6:54:00	55
140	OD	6:57:00	59
141	OD	7:00:00	53
142	OD	7:03:00	50
143	OD	7:06:00	50
144	OD	7:09:00	53
145	OD	7:12:00	49
146	OD	7:15:00	50
147	OD	7:18:00	50
148	OD	7:21:00	53
149	OD	7:24:00	50
150	OD	7:27:00	51
151	OD	7:30:00	56
152	OD	7:33:00	51
153	OD	7:36:00	55

228	OD 11:21:00	50	*
229	OD 11:24:00	49	*
230	OD 11:27:00	49	*
231	OD 11:30:00	47	*
232	OD 11:33:00	47	*
233	OD 11:36:00	48	*
234	OD 11:39:00	57	*
235	OD 11:42:00	49	*
236	OD 11:45:00	48	*
237	OD 11:48:00	50	*
238	OD 11:51:00	50	*
239	OD 11:54:00	50	*
240	OD 11:57:00	50	*
241	OD 12:00:00	50	*
242	OD 12:03:00	49	*
243	OD 12:06:00	50	*
244	OD 12:09:00	50	*
245	OD 12:12:00	50	*
246	OD 12:15:00	50	*
247	OD 12:18:00	51	*
248	OD 12:21:00	51	*
249	OD 12:24:00	51	*
250	OD 12:27:00	51	*
251	OD 12:30:00	50	*
252	OD 12:33:00	51	*
253	OD 12:36:00	51	*
254	OD 12:39:00	51	*
255	OD 12:42:00	51	*
256	OD 12:45:00	51	*
257	OD 12:48:00	51	*
258	OD 12:51:00	52	*
259	OD 12:54:00	51	*
260	OD 12:57:00	51	*
261	OD 13:00:00	50	*
262	OD 13:03:00	50	*
263	OD 13:06:00	51	*
264	OD 13:09:00	50	*
265	OD 13:12:00	51	*
266	OD 13:15:00	50	*
267	OD 13:18:00	52	*
268	OD 13:21:00	50	*
269	OD 13:24:00	51	*
270	OD 13:27:00	50	*
271	OD 13:30:00	51	*
272	OD 13:33:00	50	*
273	OD 13:36:00	49	*
274	OD 13:39:00	50	*
275	OD 13:42:00	50	*
276	OD 13:45:00	49	*
277	OD 13:48:00	48	*
278	OD 13:51:00	46	*
279	OD 13:54:00	45	*
280	OD 13:57:00	47	*
281	OD 14:00:00	47	*
282	OD 14:03:00	48	*
283	OD 14:06:00	49	*
284	OD 14:09:00	49	*
285	OD 14:12:00	49	*
286	OD 14:15:00	47	*
287	OD 14:18:00	46	*
288	OD 14:21:00	44	*
289	OD 14:24:00	47	*
290	OD 14:27:00	48	*
291	OD 14:30:00	47	*
292	OD 14:33:00	50	*
293	OD 14:36:00	51	*
294	OD 14:39:00	48	*
295	OD 14:42:00	48	*
296	OD 14:45:00	49	*
297	OD 14:48:00	49	*
298	OD 14:51:00	50	*
299	OD 14:54:00	50	*
300	OD 14:57:00	49	*
301	OD 15:00:00	48	*

302	OD 15:03:00	49
303	OD 15:06:00	48
304	OD 15:09:00	48
305	OD 15:12:00	49
306	OD 15:15:00	51
307	OD 15:18:00	48
308	OD 15:21:00	49
309	OD 15:24:00	50
310	OD 15:27:00	49
311	OD 15:30:00	50
312	OD 15:33:00	48
313	OD 15:36:00	50
314	OD 15:39:00	49
315	OD 15:42:00	62
316	OD 15:45:00	49
317	OD 15:48:00	50
318	OD 15:51:00	50
319	OD 15:54:00	53
320	OD 15:57:00	49
321	OD 16:00:00	50
322	OD 16:03:00	51
323	OD 16:06:00	52
324	OD 16:09:00	50
325	OD 16:12:00	55
326	OD 16:15:00	49
327	OD 16:18:00	50
328	OD 16:21:00	53
329	OD 16:24:00	52
330	OD 16:27:00	55
331	OD 16:30:00	58
332	OD 16:33:00	56
333	OD 16:36:00	59
334	OD 16:39:00	54
335	OD 16:42:00	58
336	OD 16:45:00	59
337	OD 16:48:00	53
338	OD 16:51:00	52
339	OD 16:54:00	55
340	OD 16:57:00	58
341	OD 17:00:00	53
342	OD 17:03:00	55
343	OD 17:06:00	59
344	OD 17:09:00	60
345	OD 17:12:00	59
346	OD 17:15:00	56
347	OD 17:18:00	60
348	OD 17:21:00	54
349	OD 17:24:00	59
350	OD 17:27:00	59
351	OD 17:30:00	58
352	OD 17:33:00	59
353	OD 17:36:00	64
354	OD 17:39:00	63
355	OD 17:42:00	59
356	OD 17:45:00	59
357	OD 17:48:00	59
358	OD 17:51:00	59
359	OD 17:54:00	61
360	OD 17:57:00	59
361	OD 18:00:00	61
362	OD 18:03:00	62
363	OD 18:06:00	58
364	OD 18:09:00	57
365	OD 18:12:00	58
366	OD 18:15:00	61
367	OD 18:18:00	61
368	OD 18:21:00	62
369	OD 18:24:00	57
370	OD 18:27:00	61
371	OD 18:30:00	55
372	OD 18:33:00	63
373	OD 18:36:00	57
374	OD 18:39:00	57
375	OD 18:42:00	58



376	OD 18:45:00	58
377	OD 18:48:00	56
378	OD 18:51:00	57
379	OD 18:54:00	54
380	OD 18:57:00	61
381	OD 19:00:00	58
382	OD 19:03:00	58
383	OD 19:06:00	63
384	OD 19:09:00	57
385	OD 19:12:00	58
386	OD 19:15:00	59
387	OD 19:18:00	61
388	OD 19:21:00	59
389	OD 19:24:00	61
390	OD 19:27:00	59
391	OD 19:30:00	60
392	OD 19:33:00	58
393	OD 19:36:00	57
394	OD 19:39:00	66
395	OD 19:42:00	61
396	OD 19:45:00	62
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400	OD 19:57:00	57
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402	OD 20:03:00	55
403	OD 20:06:00	57
404	OD 20:09:00	55
405	OD 20:12:00	58
406	OD 20:15:00	58
407	OD 20:18:00	56
408	OD 20:21:00	55
409	OD 20:24:00	58
410	OD 20:27:00	55
411	OD 20:30:00	59
412	OD 20:33:00	52
413	OD 20:36:00	59
414	OD 20:39:00	61
415	OD 20:42:00	60
416	OD 20:45:00	54
417	OD 20:48:00	53
418	OD 20:51:00	60
419	OD 20:54:00	56
420	OD 20:57:00	61
421	OD 21:00:00	61
422	OD 21:03:00	57
423	OD 21:06:00	58
424	OD 21:09:00	57
425	OD 21:12:00	60
426	OD 21:15:00	58
427	OD 21:18:00	58
428	OD 21:21:00	54
429	OD 21:24:00	57
430	OD 21:27:00	57
431	OD 21:30:00	60
432	OD 21:33:00	57
433	OD 21:36:00	56
434	OD 21:39:00	56
435	OD 21:42:00	54
436	OD 21:45:00	57
437	OD 21:48:00	60
438	OD 21:51:00	59
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441	OD 22:00:00	56
442	OD 22:03:00	57
443	OD 22:06:00	63
444	OD 22:09:00	58
445	OD 22:12:00	55
446	OD 22:15:00	54
447	OD 22:18:00	58
448	OD 22:21:00	58
449	OD 22:24:00	56



450 OD 22:27:00 52
 451 OD 22:30:00 62
 452 OD 22:33:00 61
 453 OD 22:36:00 57
 454 OD 22:39:00 52
 455 OD 22:42:00 57
 456 OD 22:45:00 56
 457 OD 22:48:00 54
 458 OD 22:51:00 57
 459 OD 22:54:00 57
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 469 OD 23:24:00 61
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 471 OD 23:30:00 54
 472 OD 23:33:00 60
 473 OD 23:36:00 58
 474 OD 23:39:00 58
 475 OD 23:42:00 57
 476 OD 23:45:00 59
 477 OD 23:48:00 61
 478 OD 23:51:00 56
 479 OD 23:54:00 55
 480 OD 23:57:00 59

METROSONICS dt-390 SN 1056 V1.0 6/86

LOGGER TYPE: 301/14 S/N: 1537
 SAMPLE RATE: 4/sec.
 TEST LENGTH: 1 DAYS 1:31:00
 STANDBY TIME: 0 DAYS 0:03:41
 TEST INTERRUPTIONS: 0
 DYNAMIC RANGE: 40 TO 103dB
 CUTOFF: NONE

** TIME HISTORY REPORT **

PERIODS COMPLETED: 153
 PERIOD LENGTH: 0:10:00
 MAXIMUM AVERAGE: 64dB
 Leq : 55.4dB

** PERIODIC AND CUMULATIVE Lav **

HOUR	CURRENT Leq	CUMUL Leq
1	54.0	54.0
2	54.6	54.3
3	54.4	54.4
4	55.4	54.7
5	54.5	54.6
6	54.5	54.6
7	54.0	54.5
8	55.2	54.6
9	57.1	55.0
10	53.3	54.8
11	53.0	54.7
12	53.8	54.6
13	53.4	54.6
14	53.0	54.5
15	53.5	54.4
16	54.4	54.4
17	56.0	54.5
18	55.9	54.6
19	53.8	54.6
20	54.1	54.5

INT	TIME	La
1	0D 0:00:00	54
2	0D 0:10:00	54
3	0D 0:20:00	54
4	0D 0:30:00	55
5	0D 0:40:00	54
6	0D 0:50:00	53
7	0D 1:00:00	56
8	0D 1:10:00	54
9	0D 1:20:00	54
10	0D 1:30:00	53
11	0D 1:40:00	55
12	0D 1:50:00	55
13	0D 2:00:00	55
14	0D 2:10:00	54
15	0D 2:20:00	54
16	0D 2:30:00	54
17	0D 2:40:00	56
18	0D 2:50:00	53
19	0D 3:00:00	53
20	0D 3:10:00	53
21	0D 3:20:00	54
22	0D 3:30:00	54
23	0D 3:40:00	60
24	0D 3:50:00	53
25	0D 4:00:00	57
26	0D 4:10:00	53
27	0D 4:20:00	56
28	0D 4:30:00	53
29	0D 4:40:00	53
30	0D 4:50:00	53
31	0D 5:00:00	54
32	0D 5:10:00	54
33	0D 5:20:00	53
34	0D 5:30:00	54
35	0D 5:40:00	57
36	0D 5:50:00	54
37	0D 6:00:00	54
38	0D 6:10:00	54
39	0D 6:20:00	54
40	0D 6:30:00	54
41	0D 6:40:00	54
42	0D 6:50:00	54
43	0D 7:00:00	56
44	0D 7:10:00	58
45	0D 7:20:00	53
46	0D 7:30:00	53
47	0D 7:40:00	54
48	0D 7:50:00	55
49	0D 8:00:00	54
50	0D 8:10:00	63
51	0D 8:20:00	53
52	0D 8:30:00	53
53	0D 8:40:00	53
54	0D 8:50:00	54
55	0D 9:00:00	54
56	0D 9:10:00	54
57	0D 9:20:00	53
58	0D 9:30:00	53
59	0D 9:40:00	53
60	0D 9:50:00	53
61	0D 10:00:00	53
62	0D 10:10:00	53
63	0D 10:20:00	53
64	0D 10:30:00	53

[illegible]

A scatter plot showing the relationship between the number of hours per week spent on housework (Y-axis) and the number of children in the household (X-axis). The X-axis ranges from 0 to 10, and the Y-axis ranges from 0 to 10. The data points are represented by asterisks (*). There is a general upward trend, indicating that households with more children tend to spend more hours on housework. The data points are scattered, with a notable cluster at 0 children and 10 hours, and another at 10 children and 10 hours.

139 OD 23:00:00 56
 140 OD 23:10:00 61
 141 OD 23:20:00 64
 142 OD 23:30:00 58
 143 OD 23:40:00 56
 144 OD 23:50:00 57
 145 1D 0:00:00 56
 146 1D 0:10:00 56
 147 1D 0:20:00 60
 148 1D 0:30:00 56
 149 1D 0:40:00 58
 150 1D 0:50:00 55
 151 1D 1:00:00 58
 152 1D 1:10:00 55
 153 1D 1:20:00 56

METROSONICS dt-390 SN 1056 V1.0 6/86

LOGGER TYPE: 301/14 S/N: 1536
 SAMPLE RATE: 4/sec.
 TEST LENGTH: 1 DAYS 1:15:50
 STANDBY TIME: 0 DAYS 0:05:08
 TEST INTERRUPTIONS: 0
 DYNAMIC RANGE: 40 TO 103dB
 CUTOFF: NONE

** TIME HISTORY REPORT **

PERIODS COMPLETED: 151
 PERIOD LENGTH: 0:10:00
 MAXIMUM AVERAGE: 64dB
 Leq : 51.8dB

** PERIODIC AND CUMULATIVE Lav **

HOURL	CURRENT Leq	CUMUL Leq
1	54.7	54.7
2	49.6	52.9
3	51.1	52.4
4	51.1	52.1
5	49.1	51.6
6	50.3	51.4
7	52.5	51.6
8	49.1	51.4
9	56.8	52.4
10	48.2	52.1
11	49.2	52.0
12	49.8	51.8
13	47.8	51.6
14	48.6	51.4
15	49.2	51.3
16	52.4	51.4
17	54.7	51.7
18	53.6	51.8
19	50.7	51.8
20	51.3	51.7
21	49.7	51.7
22	50.1	51.6
23	51.4	51.6
24	56.1	51.9
25	49.4	51.8
26	49.0	51.8

INT	TIME	La
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1	OD 0:00:00	61
2	OD 0:10:00	49
3	OD 0:20:00	52
4	OD 0:30:00	48
5	OD 0:40:00	52
6	OD 0:50:00	48

7	OD	1:00:00	50
8	OD	1:10:00	49
9	OD	1:20:00	49
10	OD	1:30:00	51
11	OD	1:40:00	49
12	OD	1:50:00	49
13	OD	2:00:00	50
14	OD	2:10:00	50
15	OD	2:20:00	51
16	OD	2:30:00	54
17	OD	2:40:00	50
18	OD	2:50:00	50
19	OD	3:00:00	48
20	OD	3:10:00	48
21	OD	3:20:00	51
22	OD	3:30:00	48
23	OD	3:40:00	56
24	OD	3:50:00	48
25	OD	4:00:00	52
26	OD	4:10:00	48
27	OD	4:20:00	48
28	OD	4:30:00	48
29	OD	4:40:00	48
30	OD	4:50:00	49
31	OD	5:00:00	49
32	OD	5:10:00	49
33	OD	5:20:00	54
34	OD	5:30:00	49
35	OD	5:40:00	49
36	OD	5:50:00	49
37	OD	6:00:00	49
38	OD	6:10:00	49
39	OD	6:20:00	50
40	OD	6:30:00	50
41	OD	6:40:00	53
42	OD	6:50:00	57
43	OD	7:00:00	49
44	OD	7:10:00	50
45	OD	7:20:00	48
46	OD	7:30:00	48
47	OD	7:40:00	51
48	OD	7:50:00	48
49	OD	8:00:00	64
50	OD	8:10:00	48
51	OD	8:20:00	48
52	OD	8:30:00	49
53	OD	8:40:00	49
54	OD	8:50:00	48
55	OD	9:00:00	48
56	OD	9:10:00	48
57	OD	9:20:00	48
58	OD	9:30:00	48
59	OD	9:40:00	48
60	OD	9:50:00	49
61	OD	10:00:00	49
62	OD	10:10:00	49
63	OD	10:20:00	49
64	OD	10:30:00	49
65	OD	10:40:00	49
66	OD	10:50:00	50
67	OD	11:00:00	50
68	OD	11:10:00	49
69	OD	11:20:00	50
70	OD	11:30:00	50
71	OD	11:40:00	50
72	OD	11:50:00	50
73	OD	12:00:00	50
74	OD	12:10:00	49
75	OD	12:20:00	47
76	OD	12:30:00	47
77	OD	12:40:00	46
78	OD	12:50:00	46
79	OD	13:00:00	47
80	OD	13:10:00	48

81	OD 13:20:00	49	*
82	OD 13:30:00	49	*
83	OD 13:40:00	49	*
84	OD 13:50:00	49	*
85	OD 14:00:00	49	*
86	OD 14:10:00	49	*
87	OD 14:20:00	49	*
88	OD 14:30:00	49	*
89	OD 14:40:00	49	*
90	OD 14:50:00	50	*
91	OD 15:00:00	51	*
92	OD 15:10:00	51	*
93	OD 15:20:00	50	*
94	OD 15:30:00	56	*
95	OD 15:40:00	51	*
96	OD 15:50:00	52	*
97	OD 16:00:00	60	*
98	OD 16:10:00	51	*
99	OD 16:20:00	51	*
100	OD 16:30:00	53	*
101	OD 16:40:00	52	*
102	OD 16:50:00	52	*
103	OD 17:00:00	57	*
104	OD 17:10:00	52	*
105	OD 17:20:00	51	*
106	OD 17:30:00	56	*
107	OD 17:40:00	50	*
108	OD 17:50:00	50	*
109	OD 18:00:00	51	*
110	OD 18:10:00	51	*
111	OD 18:20:00	50	*
112	OD 18:30:00	50	*
113	OD 18:40:00	52	*
114	OD 18:50:00	50	*
115	OD 19:00:00	51	*
116	OD 19:10:00	51	*
117	OD 19:20:00	51	*
118	OD 19:30:00	51	*
119	OD 19:40:00	53	*
120	OD 19:50:00	50	*
121	OD 20:00:00	49	*
122	OD 20:10:00	49	*
123	OD 20:20:00	50	*
124	OD 20:30:00	50	*
125	OD 20:40:00	50	*
126	OD 20:50:00	50	*
127	OD 21:00:00	51	*
128	OD 21:10:00	50	*
129	OD 21:20:00	50	*
130	OD 21:30:00	51	*
131	OD 21:40:00	49	*
132	OD 21:50:00	49	*
133	OD 22:00:00	50	*
134	OD 22:10:00	51	*
135	OD 22:20:00	54	*
136	OD 22:30:00	49	*
137	OD 22:40:00	53	*
138	OD 22:50:00	49	*
139	OD 23:00:00	49	*
140	OD 23:10:00	49	*
141	OD 23:20:00	48	*
142	OD 23:30:00	51	*
143	OD 23:40:00	49	*
144	OD 23:50:00	63	*
145	1D 0:00:00	51	*
146	1D 0:10:00	49	*
147	1D 0:20:00	49	*
148	1D 0:30:00	50	*
149	1D 0:40:00	49	*
150	1D 0:50:00	48	*
151	1D 1:00:00	49	*

METROSONICS dt-390 SN 1056 V1.0 6/86

LOGGER TYPE: 301/14 S/N: 1535
 SAMPLE RATE: 4/sec.
 TEST LENGTH: 0 DAYS 17:19:44
 STANDBY TIME: 0 DAYS 0:22:37
 TEST INTERRUPTIONS: 0
 DYNAMIC RANGE: 40 TO 103dB
 CUTOFF: NONE

** TIME HISTORY REPORT **

PERIODS COMPLETED: 103
 PERIOD LENGTH: 0:10:00
 MAXIMUM AVERAGE: 63dB
 Leq : 53.1dB

** PERIODIC AND CUMULATIVE Lav **

HOUR	CURRENT Leq	CUMUL Leq
1	52.6	52.6
2	52.5	52.6
3	54.6	53.3
4	52.8	53.2
5	57.1	54.3
6	53.3	54.2
7	52.2	54.0
8	52.0	53.7
9	52.0	53.6
10	51.7	53.4
11	51.7	53.3
12	52.0	53.2
13	51.5	53.1
14	52.4	53.0
15	53.7	53.1
16	53.1	53.1
17	53.8	53.1
18	53.0	53.1

INT	TIME	La
-----	------	----

1	OD 0:00:00	54		*
2	OD 0:10:00	52	*	
3	OD 0:20:00	53		*
4	OD 0:30:00	51 *		
5	OD 0:40:00	52	*	
6	OD 0:50:00	53		*
7	OD 1:00:00	53		*
8	OD 1:10:00	52	*	
9	OD 1:20:00	52	*	
10	OD 1:30:00	52	*	
11	OD 1:40:00	53		*
12	OD 1:50:00	53		*
13	OD 2:00:00	53		*
14	OD 2:10:00	53		*
15	OD 2:20:00	59		*
16	OD 2:30:00	52	*	
17	OD 2:40:00	53		*
18	OD 2:50:00	52	*	
19	OD 3:00:00	53		*
20	OD 3:10:00	53		*
21	OD 3:20:00	52	*	
22	OD 3:30:00	53		*
23	OD 3:40:00	53		*
24	OD 3:50:00	53		*
25	OD 4:00:00	53		*
26	OD 4:10:00	54		*
27	OD 4:20:00	63		*
28	OD 4:30:00	54		*
29	OD 4:40:00	53	*	
30	OD 4:50:00	53	*	
31	OD 5:00:00	54		*
32	OD 5:10:00	53	*	

33	OD	5:20:00	54		*
34	OD	5:30:00	53		*
35	OD	5:40:00	53		*
36	OD	5:50:00	53		*
37	OD	6:00:00	52	*	
38	OD	6:10:00	53		*
39	OD	6:20:00	52	*	
40	OD	6:30:00	52	*	
41	OD	6:40:00	52	*	
42	OD	6:50:00	52	*	
43	OD	7:00:00	52	*	
44	OD	7:10:00	52	*	
45	OD	7:20:00	52	*	
46	OD	7:30:00	52	*	
47	OD	7:40:00	52	*	
48	OD	7:50:00	52	*	
49	OD	8:00:00	52	*	
50	OD	8:10:00	52	*	
51	OD	8:20:00	52	*	
52	OD	8:30:00	52	*	
53	OD	8:40:00	52	*	
54	OD	8:50:00	52	*	
55	OD	9:00:00	52	*	
56	OD	9:10:00	51 *		
57	OD	9:20:00	52	*	
58	OD	9:30:00	51 *		
59	OD	9:40:00	52	*	
60	OD	9:50:00	52	*	
61	OD	10:00:00	51 *		
62	OD	10:10:00	51 *		
63	OD	10:20:00	52	*	
64	OD	10:30:00	52	*	
65	OD	10:40:00	52	*	
66	OD	10:50:00	52	*	
67	OD	11:00:00	52	*	
68	OD	11:10:00	52	*	
69	OD	11:20:00	52	*	
70	OD	11:30:00	52	*	
71	OD	11:40:00	52	*	
72	OD	11:50:00	52	*	
73	OD	12:00:00	52	*	
74	OD	12:10:00	51 *		
75	OD	12:20:00	52	*	
76	OD	12:30:00	52	*	
77	OD	12:40:00	51 *		
78	OD	12:50:00	51 *		
79	OD	13:00:00	53	*	
80	OD	13:10:00	52	*	
81	OD	13:20:00	52	*	
82	OD	13:30:00	52	*	
83	OD	13:40:00	53	*	
84	OD	13:50:00	52	*	
85	OD	14:00:00	54	*	
86	OD	14:10:00	53	*	
87	OD	14:20:00	54	*	
88	OD	14:30:00	53	*	
89	OD	14:40:00	54	*	
90	OD	14:50:00	54	*	
91	OD	15:00:00	53	*	
92	OD	15:10:00	54	*	
93	OD	15:20:00	54	*	
94	OD	15:30:00	52	*	
95	OD	15:40:00	52	*	
96	OD	15:50:00	53	*	
97	OD	16:00:00	53	*	
98	OD	16:10:00	53	*	
99	OD	16:20:00	54	*	
100	OD	16:30:00	56	*	
101	OD	16:40:00	53	*	
102	OD	16:50:00	53	*	
103	OD	17:00:00	53	*	

APPENDIX B

db - 308 Field Data

METROSONICS db-308 SN 2248 V2.3 3/87

CURRENT DATE: 10/19/94
CURRENT TIME: 15:24:09

Location R3

CALIBRATED: 1/01/85 @ 0:11:53
DISPLAY RANGE: 43.3dB TO 139.3dB
DOUBLING RATE: 3 dB
FILTER: A WGHT
RESPONSE: SLOW
SCHEDULED RUN: OFF
START DATE: 1/01/85
START TIME: 0:00:00
LENGTH: 1:00:00
** OVERALL REPORT **

TEST STARTING DATE: 10/18/94
TEST STARTING TIME: 13:29:55
TEST LENGTH: 1DAYS 1:37:34

Lav = 62.7dB
Lav 80= 60.9dB
Lav 90= 60.5dB
SEL =112.2dB

Lmax =108.0dB ON 10/18/94 @ 16:07:33
Lpk > 146dB ON 10/18/94 @ 13:35:27
TIME OVER 115dB OD 0:00:00.00
DOSE CRITERION: 90dB
8 HR DOSE (80dB CUTOFF)= 0.38%
8 HR DOSE (90dB CUTOFF)= 0.35%

** TIME HISTORY REPORT **

MODE: CONTINUOUS
PERIOD LENGTH: 0:10:00
TIME HISTORY CUTOFF: NONE
Ln(1): 10.0% Ln(2): 90.0%

INT	TIME	Lav	Lmax	Lpk	L1	L2
1	13:29:55	59.8	77.7	146	57	43
2	13:39:55	62.1	82.8	118	57	43
3	13:49:55	53.4	76.8	118	52	43
4	13:59:55	58.1	78.3	139	53	43
5	14:09:55	61.4	79.1	118	59	43
6	14:19:55	50.8	73	118	49	43
7	14:29:55	63.4	81.1	118	62	43
8	14:39:55	59.5	78.7	118	55	43
9	14:49:55	62.8	82.5	118	57	43
10	14:59:55	63.5	84.3	118	59	43
11	15:09:55	54.6	75.8	118	51	43
12	15:19:55	60.8	80.9	136	60	43
13	15:29:55	60.5	79	146	55	43
14	15:39:55	59.2	75.9	146	59	43
15	15:49:55	59	81.5	118	52	43
16	15:59:55	80.6	108	140	59	43
17	16:09:55	62.8	79.6	118	63	43
18	16:19:55	77.9	105.2	146	61	43
19	16:29:55	61.4	79.1	118	59	43
20	16:39:55	57.5	75.6	118	56	43
21	16:49:55	60.3	82.7	118	50	43
22	16:59:55	63.8	81.9	118	66	43
23	17:09:55	60.2	79.1	118	56	43
24	17:19:55	60.2	80.2	118	57	43
25	17:29:55	62.1	81	118	59	43
26	17:39:55	61	79.7	118	57	43
27	17:49:55	61.3	81.6	118	62	43
28	17:59:55	59.5	79.9	118	51	43
29	18:09:55	61.7	84.5	146	57	43
30	18:19:55	58.9	74.2	118	57	43
31	18:29:55	58.3	78.4	146	51	43
32	18:39:55	60.3	79.4	118	61	43

33	18:49:55	59.5	78.7	118	52	43
34	18:59:55	59	79.6	118	50	43
35	19:09:55	55.1	75.9	118	45	43
36	19:19:55	57.9	78.3	118	50	43
37	19:29:55	43.3	45.3	118	43	43
38	19:39:55	55.2	78.2	118	43	43
39	19:49:55	57.4	81	118	45	43
40	19:59:55	56.3	72.8	118	59	43
41	20:09:55	52.2	73.8	118	43	43
42	20:19:55	50	73.5	118	43	43
43	20:29:55	54.3	78.6	118	44	43
44	20:39:55	52.7	74.9	118	46	43
45	20:49:55	57.3	78	118	50	43
46	20:59:55	43.3	43.7	118	43	43
47	21:09:55	44	50.8	118	45	43
48	21:19:55	60	80.1	118	61	43
49	21:29:55	60.1	75.3	118	61	43
50	21:39:55	52.5	74.4	118	45	43
51	21:49:55	47.2	59.7	118	46	43
52	21:59:55	54.2	78.9	118	43	43
53	22:09:55	54.9	76.1	118	56	43
54	22:19:55	53.2	77.6	118	43	43
55	22:29:55	62.8	78.8	118	60	43
56	22:39:55	50.8	74.5	118	43	43
57	22:49:55	43.3	45	118	43	43
58	22:59:55	43.3	44.8	118	43	43
59	23:09:55	59.1	83	118	45	43
60	23:19:55	43.4	46.4	118	43	43
61	23:29:55	52.8	76.4	118	43	43
62	23:39:55	53.1	77.5	124	44	43
63	23:49:55	43.7	52.5	126	44	43
64	23:59:55	43.4	46.3	127	43	43
65	0:09:55	43.4	46.2	130	43	43
66	0:19:55	46.8	58.9	132	48	43
67	0:29:55	44	48.8	130	45	43
68	0:39:55	51.6	74.2	131	48	43
69	0:49:55	55	79.1	134	48	43
70	0:59:55	45.5	52.8	135	47	43
71	1:09:55	45.5	52.6	136	47	43
72	1:19:55	44.5	49.9	136	45	43
73	1:29:55	51.3	73.6	136	49	43
74	1:39:55	56.8	80.7	136	51	43
75	1:49:55	47.5	57.5	136	49	43
76	1:59:55	46.9	54.1	140	49	43
77	2:09:55	48.9	57.5	141	51	43
78	2:19:55	47.2	57.6	141	49	43
79	2:29:55	52	74.9	139	50	43
80	2:39:55	44.4	50.3	139	45	43
81	2:49:55	46.6	56.8	140	49	43
82	2:59:55	54.5	77.4	141	49	43
83	3:09:55	47.2	55.7	141	49	44
84	3:19:55	49.3	69.9	140	48	43
85	3:29:55	45.5	52.3	139	47	43
86	3:39:55	45	50.2	141	46	43
87	3:49:55	44.6	55.4	141	45	43
88	3:59:55	52	75.4	142	47	43
89	4:09:55	49.5	69.7	142	49	44
90	4:19:55	48.5	56.2	140	50	44
91	4:29:55	47.4	57.3	140	49	43
92	4:39:55	47.9	53.8	142	50	44
93	4:49:55	56.4	78.1	142	50	44
94	4:59:55	46.9	53.1	143	48	43
95	5:09:55	48.9	55.1	143	51	44
96	5:19:55	58.6	80.9	143	51	45
97	5:29:55	58.2	78.4	142	51	45
98	5:39:55	64.7	84.1	142	60	44
99	5:49:55	49.7	58.3	141	52	44
100	5:59:55	60.7	82.5	140	54	43
101	6:09:55	60.6	79.8	141	59	43
102	6:19:55	60.2	78.7	142	55	44
103	6:29:55	59	78.9	142	51	45
104	6:39:55	63.5	82.1	142	65	44
105	6:49:55	60.9	80.9	142	56	45
106	6:59:55	60.2	76.3	143	60	45

107	7:09:55	58.6	79.1	143	56	45
108	7:19:55	62	82.9	143	57	45
109	7:29:55	64.5	82	143	67	45
110	7:39:55	61.5	79.3	143	61	46
111	7:49:55	61.3	80.9	143	60	45
112	7:59:55	62.5	79.3	143	59	45
113	8:09:55	60.6	77.2	143	62	44
114	8:19:55	61.5	80.9	144	58	44
115	8:29:55	62.2	81	144	57	45
116	8:39:55	57.7	75.9	144	57	46
117	8:49:55	57.3	78.9	144	53	46
118	8:59:55	58	77.5	144	52	45
119	9:09:55	57.3	74.9	144	53	45
120	9:19:55	59.9	80.7	144	54	45
121	9:29:55	59.2	80.7	144	54	44
122	9:39:55	57.8	78.9	144	57	46
123	9:49:55	61.1	83.2	144	55	46
124	9:59:55	57.5	77.6	144	51	46
125	10:09:55	56.5	76.3	144	56	46
126	10:19:55	55.7	76	144	55	46
127	10:29:55	59.8	79.3	143	53	47
128	10:39:55	61.6	81.8	144	56	47
129	10:49:55	59.6	83.2	144	52	47
130	10:59:55	58.9	79.9	144	53	46
131	11:09:55	54.9	77	143	53	47
132	11:19:55	56.8	75.3	144	54	48
133	11:29:55	55.6	76.8	144	51	47
134	11:39:55	60	78.6	144	58	47
135	11:49:55	58.4	76.8	144	55	47
136	11:59:55	56.6	75.6	144	52	47
137	12:09:55	59.9	78.9	144	58	46
138	12:19:55	57.5	80.1	144	56	45
139	12:29:55	53.6	72.8	143	51	45
140	12:39:55	59.1	82.9	143	53	45
141	12:49:55	58.2	78.6	143	55	45
142	12:59:55	60.7	81.7	143	60	47
143	13:09:55	62	82.4	143	60	46
144	13:19:55	62.1	80	143	60	46
145	13:29:55	54.9	71.9	143	57	46
146	13:39:55	59.6	81.1	142	53	46
147	13:49:55	52	69.7	142	52	46
148	13:59:55	62	81.5	143	61	46
149	14:09:55	62.4	82.2	143	57	47
150	14:19:55	62.1	83.3	143	56	48
151	14:29:55	59.8	81	143	55	47
152	14:39:55	60.1	78.7	142	55	47
153	14:49:55	63.2	83.2	142	60	47
154	14:59:55	60.8	78.9	142	54	46

Ln(1.0) = 73dB
 Ln(10.0) = 53dB
 Ln(50.0) = 46dB
 Ln(90.0) = 43dB

	NO CUTOFF	80.0dB CUTOFF	90.0dB CUTOFF
Ldod	55.8dB	47.5dB	45.9dB
Losha	52.9dB	45.2dB	44.4dB
Leq(6)	51.4dB	43.9dB	43.5dB

METROSONICS db-308 SN 3004 V3.0 4/88
 REPORT PRINTED 10/19/94 @ 15:45:54

DOUBLING RATE: 3dB FILTER: A WGH
 DOSE CRITERION: 90dB RESPONSE: SLOW
 PRE-CALIBRATION TIME: 9/26/94 @ 16:15:39
 PRE-CALIBRATION RANGE: 43.3dB TO 143.3dB
 NO POST-CALIBRATION

Location B4 moved @ ~16:05

TEST BEGAN 10/18/94 @ 13:13:17
 TEST LENGTH: 1DAYS 2:25:05
 TEST ENDED 10/19/94 @ 15:42:32
 TEST INTERRUPTIONS: 4

Lav = 57.1dB Lav (80) = 44.3dB
 SEL = 106.7dB Lav (90) = 43.3dB
 Lmax = 81.3dB ON 10/19/94 @ 9:06:25
 Lpk = UNDER
 TIME OVER 115dB 0D 0:00:00.00

8 HR DOSE (80dB CUTOFF) = 0.00%
 8 HR DOSE (90dB CUTOFF) = 0.00%
 "TIME HISTORY REPORT"

OF PERIODS: 162 MODE: CONTINUOUS
 PERIOD LENGTH: 0:10:00
 TIME HISTORY CUTOFF: NONE
 Ln(1): 10.0% Ln(2): 90.0%

DATE: 10/18/94 TAG #: 0

INT	TIME	Lav	Lmx	Lpk	L1	L2
	113:13:17	57.3	58.1	"UNR"	57	56

DATE: 10/18/94 TAG #: 0

INT	TIME	Lav	Lmx	Lpk	L1	L2
	213:13:26	59.5	62.5	"UNR"	61	56

DATE: 10/18/94 TAG #: 0

INT	TIME	Lav	Lmx	Lpk	L1	L2
	3"13:13:2	57.4	73.7	"UNR"	59	47
	4"13:23:2	57.5	73.7	"UNR"	60	46
	5"13:33:2	55.9	73.8	"UNR"	57	45
	6"13:43:2	58.7	77.9	"UNR"	59	46
	7"13:53:2	59.1	76	"UNR"	61	46
	8"14:03:2	58.6	75.8	"UNR"	61	47
	9"14:13:2	56.8	70.3	"UNR"	61	46
	10"14:23:2	60.2	79.5	"UNR"	60	46
	11"14:33:2	59.3	75.1	"UNR"	61	46
	12"14:43:2	57	71.9	"UNR"	60	46
	13"14:53:2	59.7	75.5	"UNR"	62	47
	14"15:03:2	61	79.1	"UNR"	63	47
	15"15:13:2	59.7	79.6	"UNR"	60	47
	16"15:23:2	56.7	66.3	"UNR"	60	47
	17"15:33:2	56.4	72.1	"UNR"	59	47
	18"15:43:2	62.5	80.5	"UNR"	64	46
	19"15:53:2	59	74.5	"UNR"	63	46
	20"16:03:2	57.7	66.3	"UNR"	61	49
	21"16:09:2	60	78.9	"UNR"	61	49
	22"16:19:2	58.8	72.3	"UNR"	62	49
	23"16:29:2	58	74	"UNR"	61	48
	24"16:39:2	57.8	71.9	"UNR"	60	48
	25"16:49:2	59.9	71.5	"UNR"	64	48
	26"16:59:2	57.6	70.1	"UNR"	61	47
	27"17:09:2	61.5	76.1	"UNR"	64	48
	28"17:19:2	56.9	68.7	"UNR"	61	48
	29"17:29:2	59.9	75.4	"UNR"	63	48
	30"17:39:2	58.3	71.2	"UNR"	62	48
	31"17:49:2	58.4	72.6	"UNR"	62	47
	32"17:59:2	56.3	69.6	"UNR"	60	48
	33"18:09:2	58.6	73.9	"UNR"	61	47
	34"18:19:2	59.3	75.5	"UNR"	63	47
	35"18:29:2	57.6	77.2	"UNR"	60	47
	36"18:39:2	55.9	68.7	"UNR"	60	47
	37"18:49:2	57	76.1	"UNR"	60	47
	38"18:59:2	54	67.1	"UNR"	57	48
	39"19:09:2	54.7	67.6	"UNR"	59	48
	40"19:19:2	53.7	69.9	"UNR"	56	49
	41"19:29:2	54.5	67.4	"UNR"	58	49
	42"19:39:2	55	66.3	"UNR"	59	50
	43"19:49:2	54.9	67.8	"UNR"	57	50

44"19:59:2	56.3	73"UNR"	60	50
45"20:09:2	53.6	67.9"UNR"	55	50
46"20:19:2	52.3	67.4"UNR"	51	51
47"20:29:2	56.2	69.9"UNR"	59	50
48"20:39:2	56.3	71.1"UNR"	59	50
49"20:49:2	53.2	65.8"UNR"	55	50
50"20:59:2	54.1	70.6"UNR"	54	51
51"21:09:2	54	68.1"UNR"	55	51
52"21:19:2	53.6	66.9"UNR"	55	51
53"21:29:2	54.8	66.9"UNR"	58	50
54"21:39:2	55	70.6"UNR"	57	50
55"21:49:2	55.1	68.4"UNR"	58	49
56"21:59:2	50.5	64.2"UNR"	50	49
57"22:09:2	52.7	67"UNR"	54	49
58"22:19:2	54.8	69.7"UNR"	57	50
59"22:29:2	61.1	75.9"UNR"	62	49
60"22:39:2	54.1	65.9"UNR"	56	50
61"22:49:2	52.2	63.7"UNR"	52	50
62"22:59:2	53.8	66.1"UNR"	57	48
63"23:09:2	53.1	70.7"UNR"	54	48
64"23:19:2	53.4	69.5"UNR"	54	49
65"23:29:2	49.4	62.5"UNR"	49	49
66"23:39:2	48.8	60.5"UNR"	49	48
67"23:49:2	50.7	67.7"UNR"	49	48
68"23:59:2	48.2	51.7"UNR"	49	48
69" 0:09:2	50.1	64.9"UNR"	49	48
70" 0:19:2	49.9	64.5"UNR"	49	48
71" 0:29:2	48.1	59.5"UNR"	48	47
72" 0:39:2	51.6	70.9"UNR"	49	48
73" 0:49:2	49.7	65.3"UNR"	49	48
74" 0:59:2	48	52.9"UNR"	48	48
75" 1:09:2	48.5	60.7"UNR"	48	48
76" 1:19:2	48.1	49.7"UNR"	48	48
77" 1:29:2	49.8	64.7"UNR"	49	48
78" 1:39:2	48.4	50.9"UNR"	49	48
79" 1:49:2	48.6	51.6"UNR"	49	49
80" 1:59:2	50.1	65.8"UNR"	49	49
81" 2:09:2	49.2	51.6"UNR"	49	49
82" 2:19:2	50.9	69"UNR"	49	48
83" 2:29:2	50.4	66.3"UNR"	49	49
84" 2:39:2	48.8	55.9"UNR"	49	48
85" 2:49:2	49.4	63.9"UNR"	49	48
86" 2:59:2	48.7	58.6"UNR"	49	48
87" 3:09:2	48.9	65.3"UNR"	48	48
88" 3:19:2	48.3	62.8"UNR"	48	48
89" 3:29:2	48.3	51.2"UNR"	49	48
90" 3:39:2	51.5	65.9"UNR"	51	48
91" 3:49:2	49.4	51.2"UNR"	50	49
92" 3:59:2	50.1	60.9"UNR"	50	49
93" 4:09:2	50.8	63.2"UNR"	50	50
94" 4:19:2	50.6	65.1"UNR"	50	49
95" 4:29:2	50.7	64.9"UNR"	50	49
96" 4:39:2	51.2	65.7"UNR"	50	50
97" 4:49:2	56.9	78.5"UNR"	51	50
98" 4:59:2	51.3	67.5"UNR"	51	50
99" 5:09:2	52.3	64.5"UNR"	52	50
100" 5:19:2	53.3	69.8"UNR"	52	50
101" 5:29:2	58.2	73.3"UNR"	60	50
102" 5:39:2	59.7	76.7"UNR"	61	51
103" 5:49:2	60.4	75.2"UNR"	62	51
104" 5:59:2	56.6	72.9"UNR"	59	51
105" 6:09:2	58.5	74.5"UNR"	61	51
106" 6:19:2	57.8	68.8"UNR"	61	52
107" 6:29:2	60	76.1"UNR"	63	51
108" 6:39:2	60.6	70.9"UNR"	65	52
109" 6:49:2	59.6	77.4"UNR"	62	51
110" 6:59:2	60.9	76.7"UNR"	64	51
111" 7:09:2	58.2	70"UNR"	62	52
112" 7:19:2	59.4	71.7"UNR"	63	51
113" 7:29:2	60.7	72.4"UNR"	64	51
114" 7:39:2	59.5	70.3"UNR"	63	51
115" 7:49:2	58.7	72.8"UNR"	62	51
116" 7:59:2	57.6	74"UNR"	60	51
117" 8:09:2	59.3	75"UNR"	62	50

118"	8:19:2	58.5	77.7"UNR"	57	50
119"	8:29:2	56.6	70.9"UNR"	60	50
120"	8:39:2	59.5	78.2"UNR"	62	50
121"	8:49:2	58.5	78.8"UNR"	60	49
122"	8:59:2	59.8	81.3"UNR"	60	49
123"	9:09:2	55.7	72.5"UNR"	56	49
124"	9:19:2	56.1	72.6"UNR"	58	47
125"	9:29:2	57.1	75.9"UNR"	58	48
126"	9:39:2	57.6	78.4"UNR"	57	47
127"	9:49:2	55.2	73.1"UNR"	57	48
128"	9:59:2	58.1	78.2"UNR"	59	48
129"	10:09:2	55.3	72.3"UNR"	58	48
130"	10:19:2	54.6	68.1"UNR"	57	48
131"	10:29:2	61.1	78"UNR"	63	49
132"	10:39:2	55.8	69.9"UNR"	59	49
133"	10:49:2	57.6	75.8"UNR"	59	50
134"	10:59:2	60.4	78.5"UNR"	59	49
135"	11:09:2	60.9	79.9"UNR"	62	48
136"	11:19:2	58.1	74.7"UNR"	59	49
137"	11:29:2	55.9	71.4"UNR"	58	48
138"	11:39:2	57.3	75.4"UNR"	57	48
139"	11:49:2	57.9	75"UNR"	59	49
140"	11:59:2	56.5	73.5"UNR"	59	47
141"	12:09:2	58	75.5"UNR"	60	47
142"	12:19:2	53.5	69.5"UNR"	54	47
143"	12:29:2	54	70.3"UNR"	56	48
144"	12:39:2	53.5	66.9"UNR"	56	46
145"	12:49:2	60.9	80.5"UNR"	61	46
146"	12:59:2	59.9	80.8"UNR"	61	47
147"	13:09:2	59	80.5"UNR"	58	46
148"	13:19:2	57.5	75.1"UNR"	59	47
149"	13:29:2	58.1	76.8"UNR"	60	46
150"	13:39:2	55.9	72"UNR"	59	45
151"	13:49:2	57.7	74.5"UNR"	60	46
152"	13:59:2	59	75.5"UNR"	61	45
153"	14:09:2	60.7	79.7"UNR"	60	48
154"	14:19:2	60.5	79.7"UNR"	61	48
155"	14:29:2	61	79.3"UNR"	62	45
156"	14:39:2	57.3	73.9"UNR"	59	46
157"	14:49:2	52.4	65.3"UNR"	54	47
158"	14:59:2	59	74.9"UNR"	62	48
159"	15:09:2	60.2	74.5"UNR"	63	48
160"	15:19:2	54	66.3"UNR"	58	47
161"	15:29:2	59.1	74.7"UNR"	61	47
162"	15:39:2	62	78.1"UNR"	62	48

Ln(1.0) = 68dB
 Ln(10.0) = 59dB
 Ln(50.0) = 50dB
 Ln(90.0) = 47dB

	NO CUTOFF	80.0dB CUTOFF	90.0dB CUTOFF
Ldod	54.9dB	43.2dB	43.0dB
Losha	53.9dB	43.0dB	43.0dB
Leq(6)	53.3dB	43.0dB	43.0dB

METROSONICS db-308 SN 1071 V3.0 4/88
 REPORT PRINTED 10/19/94 @ 15:46:18

DOUBLING RATE: 3dB FILTER: A WGT
 DOSE CRITERION: 90dB RESPONSE: SLOW
 PRE-CALIBRATION TIME: 1/01/88 @ 0:00:54
 PRE-CALIBRATION RANGE: 42.9dB TO 142.9dB
 NO POST-CALIBRATION

Location M3

TEST BEGAN 10/18/94 @ 15:13:14
 TEST LENGTH: 1DAYS 0:21:56
 TEST ENDED 10/19/94 @ 15:35:11

TEST INTERRUPTIONS: 1

Lav = 50.3dB Lav (80)= 42.9dB
 SEL = 99.5dB Lav (90)= 42.9dB
 Lmax = 78.6dB ON 10/18/94 @ 18:22:11
 Lpk =126.7dB ON 10/19/94 @ 10:24:06
 TIME OVER 115dB OD 0:00:00.00

8 HR DOSE (80dB CUTOFF)= 0.00%

8 HR DOSE (90dB CUTOFF)= 0.00%

"TIME HISTORY REPORT

OF PERIODS: 147 MODE: CONTINUOUS

PERIOD LENGTH: 0:10:00

TIME HISTORY CUTOFF: NONE

Ln(1): 10.0% Ln(2): 90.0%

DATE: 10/18/94 TAG #: 0

INT	TIME	Lav	Lmx Lpk	L1	L2
	1"15:13:1	48.7	63.5"UNR"	51	42
	2"15:23:1	51.8	68.2"UNR"	52	42
	3"15:33:1	50.9	64.2"UNR"	52	42
	4"15:43:1	48.5	58"UNR"	51	42
	5"15:53:1	49.8	58.4"UNR"	53	43
	6"16:03:1	49.3	65.3"UNR"	51	42
	7"16:13:1	50.1	62.5"UNR"	53	42
	8"16:23:1	48.7	59.5"UNR"	52	42
	9"16:33:1	48.2	56.4"UNR"	51	42
	10"16:43:1	51.2	62.6"UNR"	54	42
	11"16:53:1	51.4	66.6"UNR"	53	43
	12"17:03:1	54.8	68.2"UNR"	58	43
	13"17:13:1	51.7	68.8 115.6	54	42
	14"17:23:1	49.4	59.9"UNR"	52	43
	15"17:33:1	50.2	60.9"UNR"	52	43
	16"17:43:1	48.5	60.3"UNR"	50	42
	17"17:53:1	53	68.1"UNR"	55	43
	18"18:03:1	47.2	56.9"UNR"	49	42
	19"18:13:1	58.5	78.6"UNR"	55	43
	20"18:23:1	48.4	58.3"UNR"	51	42
	21"18:33:1	48.6	62.6"UNR"	50	42
	22"18:43:1	52.7	67.8"UNR"	54	43
	23"18:53:1	47	55.7"UNR"	49	42
	24"19:03:1	46.3	51.1"UNR"	48	42
	25"19:13:1	46.5	54.3"UNR"	48	42
	26"19:23:1	46.1	51.2"UNR"	48	42
	27"19:33:1	47	54.7"UNR"	48	43
	28"19:43:1	46.5	53.1"UNR"	48	44
	29"19:53:1	49	62.1"UNR"	49	43
	30"20:03:1	53.7	67.4"UNR"	56	44
	31"20:13:1	47.9	68.2"UNR"	48	43
	32"20:23:1	46.8	52.9"UNR"	48	43
	33"20:33:1	47.1	56.9"UNR"	49	43
	34"20:43:1	47.1	55.7"UNR"	48	43
	35"20:53:1	49.3	69.4"UNR"	48	43
	36"21:03:1	45.6	52.5"UNR"	47	43
	37"21:13:1	47.4	57.9"UNR"	49	43
	38"21:23:1	51.9	66.9"UNR"	54	43
	39"21:33:1	58.3	71.7"UNR"	60	42
	40"21:43:1	48.3	59.7"UNR"	50	42
	41"21:53:1	45	51.5"UNR"	47	42
	42"22:03:1	45.1	51.9"UNR"	46	42
	43"22:13:1	50.2	61.7"UNR"	53	42
	44"22:23:1	46.6	54.3"UNR"	49	42
	45"22:33:1	61.8	77.1"UNR"	55	42
	46"22:43:1	45.5	52.1"UNR"	47	42
	47"22:53:1	45.6	52.7"UNR"	47	42
	48"23:03:1	45.4	51.7"UNR"	47	42
	49"23:13:1	45.9	54.4"UNR"	48	42
	50"23:23:1	45.6	57.3"UNR"	47	42
	51"23:33:1	43.9	50.9"UNR"	44	42
	52"23:43:1	43.9	49.7"UNR"	44	42
	53"23:53:1	44.9	58.9"UNR"	45	42
	54" 0:03:1	43.9	48.9"UNR"	45	42

129"12:33:1	47.7	62.7"UNR"	49	42
130"12:43:1	49.9	60.7"UNR"	53	42
131"12:53:1	49.8	64.6"UNR"	50	42
132"13:03:1	56.5	74.8"UNR"	58	42
133"13:13:1	55.1	70.2"UNR"	59	42
134"13:23:1	47.2	56.7"UNR"	50	42
135"13:33:1	46.8	58.9"UNR"	48	42
136"13:43:1	46.4	57"UNR"	49	42
137"13:53:1	47.1	57.9"UNR"	49	42
138"14:03:1	51.1	65.8"UNR"	54	42
139"14:13:1	50.5	63.8"UNR"	53	42
140"14:23:1	55	70.5"UNR"	55	42
141"14:33:1	47.7	58.9"UNR"	50	42
142"14:43:1	48	58.9"UNR"	51	42
143"14:53:1	46.9	57.1"UNR"	49	42
144"15:03:1	46.5	56.4"UNR"	48	42
145"15:13:1	48.8	60.1 111.2	52	42
146"15:23:1	47.5	60.3"UNR"	50	42
147"15:33:1	47.6	56.9"UNR"	50	43

Ln(1.0) = 60dB
 Ln(10.0) = 50dB
 Ln(50.0) = 45dB
 Ln(90.0) = 42dB

	NO CUTOFF	80.0dB CUTOFF	90.0dB CUTOFF
Ldod	48.1dB	42.0dB	42.0dB
Losha	47.3dB	42.0dB	42.0dB
Leq(6)	47.0dB	42.0dB	42.0dB

METROSONICS db-308 SN 3006 V3.0 4/88
 REPORT PRINTED 10/20/94 @ 10:45:42

DOUBLING RATE: 3dB FILTER: A WGT
 DOSE CRITERION: 90dB RESPONSE: SLOW
 PRE-CALIBRATION TIME: 9/26/94 @ 16:19:19
 PRE-CALIBRATION RANGE: 41.6dB TO 141.6dB
 NO POST-CALIBRATION

TEST BEGAN 10/19/94 @ 10:56:50
 TEST LENGTH: 0DAYS 23:21:01
 TEST ENDED 10/20/94 @ 10:17:51
 TEST INTERRUPTIONS: 1

Lav = 52.8dB Lav (80)= 41.6dB
 SEL =100.8dB Lav (90)= 41.6dB
 Lmax = 76.6dB ON 10/19/94 @ 21:32:33
 Lpk = UNQER
 TIME OVER 115dB 0D 0:00:00.00

8 HR DOSE (80dB CUTOFF)= 0.00%
 8 HR DOSE (90dB CUTOFF)= 0.00%
 "TIME HISTORY REPORT

OF PERIODS: 110 MODE: CONTINUOUS
 PERIOD LENGTH: 0:10:00
 TIME HISTORY CUTOFF: NONE
 Ln(1): 10.0% Ln(2): 90.0%

DATE: 10/19/94 TAG #: 0

INT	TIME	Lav	Lmx Lpk	L1	L2
1	10:56:50	55.4	61.9"UNR"	58	49
2	11:06:50	52.2	66.2"UNR"	53	50
3	11:16:50	52.4	61.2"UNR"	53	49
4	11:26:50	52.2	62.8"UNR"	56	49
5	11:36:50	54.5	64.7"UNR"	57	49
6	11:46:50	53.1	63.6"UNR"	58	50
7	11:56:50	53.6	63.7"UNR"	57	50
8	12:06:50	56.5	69.6"UNR"	62	54

9	12:16:50	54.0	63.9"UNR"	62	53
10	12:26:50	51.8	59"UNR"	53	50
11	12:36:50	53.8	63"UNR"	55	50
12	12:46:50	53.0	64.7"UNR"	59	50
13	12:56:50	54.7	65.2"UNR"	58	49
14	13:06:50	55.9	67.8"UNR"	58	50
15	13:16:50	55.0	63.9"UNR"	60	50
16	13:26:50	50.8	64.2"UNR"	55	49
17	13:36:50	49.9	60.2"UNR"	52	49
18	13:46:50	50.5	62.8"UNR"	56	49
19	13:56:50	55.4	66.6"UNR"	60	51
20	14:06:50	54.9	59.9"UNR"	57	50
21	14:16:50	53.1	67.2"UNR"	56	51
22	14:26:50	53.2	62.5"UNR"	55	50
23	14:36:50	51.8	58.2"UNR"	53	49
24	14:46:50	52.4	60.4"UNR"	54	49
25	14:56:50	52.6	58.2"UNR"	55	50
26	15:06:50	53.5	61.2"UNR"	55	51
27	15:16:50	53.9	67.2"UNR"	54	50
28	15:26:50	53.7	68"UNR"	55	51
29	15:36:50	55.3	66.2"UNR"	57	52
30	15:46:50	53.9	63.4"UNR"	54	49
31	15:56:50	53.2	61.6"UNR"	56	50
32	16:06:50	54.9	66.5"UNR"	58	50
33	16:16:50	53.2	60.4"UNR"	55	50
34	16:26:50	53.8	62.2"UNR"	55	50
35	16:36:50	53.6	61.2"UNR"	56	50
36	16:46:50	54.4	64.2"UNR"	57	50
37	16:56:50	52.1	61"UNR"	53	50
38	17:06:50	51.6	58.4"UNR"	53	49
39	17:16:50	51.9	59.6"UNR"	53	49
40	17:26:50	52.6	66"UNR"	52	49
41	17:36:50	51.3	57.2"UNR"	52	49
42	17:46:50	51	55.2"UNR"	52	49
43	17:56:50	52.2	62"UNR"	54	49
44	18:06:50	50.7	54.8"UNR"	51	49
45	18:16:50	50.9	54.8"UNR"	52	49
46	18:26:50	50.3	54.4"UNR"	51	49
47	18:36:50	50.6	56.6"UNR"	51	49
48	18:46:50	50.4	53.2"UNR"	51	49
49	18:56:50	50	53"UNR"	51	49
50	19:06:50	50.8	54"UNR"	52	49
51	19:16:50	51.8	54"UNR"	52	51
52	19:26:50	52.1	61.2"UNR"	53	51
53	19:36:50	53.1	54.9"UNR"	53	52
54	19:46:50	54.4	64"UNR"	54	53
55	19:56:50	53.5	55.6"UNR"	54	52
56	20:06:50	54	59.6"UNR"	54	53
57	20:16:50	53.5	54.8"UNR"	54	53
58	20:26:50	53.1	55.6"UNR"	53	52
59	20:36:50	53.9	55.6"UNR"	54	53
60	20:46:50	53.5	55.6"UNR"	54	52
61	20:56:50	53.6	60.8"UNR"	54	52
62	21:06:50	52.7	55.6"UNR"	53	51
63	21:16:50	55.2	68.4"UNR"	54	50
64	21:26:50	62.3	76.6"UNR"	60	49
65	21:36:50	51.6	60.2"UNR"	51	49
66	21:46:50	50.3	52.8"UNR"	51	49
67	21:56:50	50.7	53.6"UNR"	51	49
68	22:06:50	50.6	54.2"UNR"	51	49
69	22:16:50	51.8	60.8"UNR"	54	49
70	22:26:50	50.1	52"UNR"	50	49
71	22:36:50	50.1	53.6"UNR"	50	49
72	22:46:50	50	51.7"UNR"	50	49
73	22:56:50	50	53.4"UNR"	50	49
74	23:06:50	49.8	51.6"UNR"	50	49
75	23:16:50	50.1	52.2"UNR"	50	49
76	23:26:50	50.2	52.4"UNR"	50	49
77	23:36:50	50.5	53"UNR"	51	49
78	23:46:50	50.6	53.2"UNR"	51	49
79	23:56:50	50.5	52.5"UNR"	51	49
80	0:06:50	50.9	54.4"UNR"	51	50
81	0:16:50	50.6	53.8"UNR"	51	49
82	0:26:50	50.7	53.6"UNR"	51	49

83	0:36:50	50.8	52.9"UNR"	51	50
84	0:46:50	51	54"UNR"	51	50
85	0:56:50	51.6	59.9"UNR"	52	50
86	1:06:50	51	54.4"UNR"	51	50
87	1:16:50	50.9	53.3"UNR"	51	50
88	1:26:50	50.9	53.6"UNR"	51	50
89	1:36:50	50.4	52.6"UNR"	51	49
90	1:46:50	50.8	53.2"UNR"	51	50
91	1:56:50	50.8	52.8"UNR"	51	50
92	2:06:50	50.5	52.9"UNR"	51	49
93	2:16:50	50.5	52.5"UNR"	51	49
94	2:26:50	50.5	55.1"UNR"	51	49
95	2:36:50	50.7	53.3"UNR"	51	49
96	2:46:50	50.8	54"UNR"	51	50
97	2:56:50	50.9	53"UNR"	51	50
98	3:06:50	51.1	53.6"UNR"	51	50
99	3:16:50	50.7	53.3"UNR"	51	50
100	3:26:50	50.4	53.2"UNR"	51	49
101	3:36:50	50.7	54.8"UNR"	51	49
102	3:46:50	50.9	54"UNR"	51	50
103	3:56:50	50.8	54.5"UNR"	51	50
104	4:06:50	50.6	53.6"UNR"	51	49
105	4:16:50	50.6	53.4"UNR"	51	49
106	4:26:50	50.7	53.6"UNR"	51	50
107	4:36:50	51	54.4"UNR"	51	50
108	4:46:50	51.3	53"UNR"	51	50
109	4:56:50	51.3	54.8"UNR"	52	50
110	5:06:50	51.6	60.8"UNR"	52	50
111	5:16:50	51.3	55.2"UNR"	52	50
112	5:26:50	51.6	58.4"UNR"	52	50
113	5:36:50	51.9	55"UNR"	52	51
114	5:46:50	51.2	53.2"UNR"	51	50
115	5:56:50	52.6	61.6"UNR"	52	51
116	6:06:50	54.1	62.9"UNR"	56	51
117	6:16:50	53.4	59.6"UNR"	54	51
118	6:26:50	54.3	63.2"UNR"	56	52
119	6:36:50	54	62.4"UNR"	55	51
120	6:46:50	52.7	54.9"UNR"	53	51
121	6:56:50	52.5	62.1"UNR"	53	51
122	7:06:50	54.3	61.2"UNR"	56	52
123	7:16:50	53.6	59.6"UNR"	54	51
124	7:26:50	52.8	58.8"UNR"	53	51
125	7:36:50	52.7	59.9"UNR"	53	51
126	7:46:50	54.9	61.4"UNR"	57	51
127	7:56:50	52.7	59.3"UNR"	53	51
128	8:06:50	53.5	59.6"UNR"	56	51
129	8:16:50	56.1	63.6"UNR"	57	52
130	8:26:50	52.5	62.2"UNR"	53	51
131	8:36:50	53.6	60.8"UNR"	54	52
132	8:46:50	54.9	67.3"UNR"	56	52
133	8:56:50	56.5	65.2"UNR"	58	54
134	9:06:50	56.8	63"UNR"	60	54
135	9:16:50	55.7	60.9"UNR"	56	54
136	9:26:50	55.5	67.2"UNR"	57	50
137	9:36:50	52.6	61.2"UNR"	54	50
138	9:46:50	55.1	61.8"UNR"	56	53
139	9:56:50	56.9	65.7"UNR"	59	54
140	10:06:50	55.1	62.6"UNR"	56	51
141	10:16:50	54.7	57.6"UNR"	57	52

Ln(1.0) = 59dB
 Ln(10.0) = 54dB
 Ln(50.0) = 51dB
 Ln(90.0) = 49dB

	NO CUTOFF	80.0dB CUTOFF	90.0dB CUTOFF
Ldod	52.0dB	41.0dB	41.0dB
Losha	51.8dB	41.0dB	41.0dB
Leq(6)	51.7dB	41.0dB	41.0dB

11.3 – Traffic Impact Study

Florida Transportation Engineering

TRAFFIC IMPACT STATEMENT

for

LEE COUNTY ENERGY

RECOVERY FACILITY

Prepared by:

**Florida Transportation Engineering
(FTE)**

June, 1990

CONTENTS

1. **EXECUTIVE SUMMARY**
2. **SCOPE OF PROJECT**
3. **TRIP GENERATION**
4. **TRIP DISTRIBUTION AND AREA OF INFLUENCE**
5. **EXISTING TRAFFIC CONDITIONS**
6. **FUTURE TRAFFIC CONDITIONS**
7. **CAPACITY AND LEVEL OF SERVICE CALCULATIONS**
8. **REQUIRED IMPROVEMENTS**
9. **APPENDIX**

1. EXECUTIVE SUMMARY

The Lee County Energy Recovery Facility is a proposed energy recovery operation to be located on the north side of Buckingham Road, east of S.R. 82. As determined by this report, this project will have no adverse impact on the surrounding roadway network.

2. SCOPE OF PROJECT

The Lee County Energy Recovery Facility is a proposed energy recovery operation. The proposed site is located on the north side of Buckingham Road, east of S.R. 82. The first phase of the facility is estimated to have an 1800 tons per day capacity in 1993. The second phase is scheduled for 2002 and is estimated to have a daily capacity of 2400 tons. This traffic study provides the trip generation for both phases, but analyzes the impacts of only the first phase. The second phase impacts are more accurately addressed at a future time closer to the second phase construction. Exhibit 1 provides a location map of this particular development.

Access to the project will be via a driveway connection to Buckingham Road on the western side of the property frontage. The site plan for this development is shown in Exhibit 2.

3. TRIP GENERATION

Vehicular trip ends generated by the project were calculated based on information provided by the developer. This information was obtained from a traffic impact study for a similar facility recently approved in Florida. The data is shown in Table 1 for a 1200 tons per day facility. From this data, a maximum peak hour trip generation was determined for each phase of the Lee County facility. This data is shown in Table 2. The Phase 1 figures were derived for the Lee County 1800 ton capacity by multiplying the

trip generation figures for the similar facility by 1.5 to reflect the greater processing capacity in Lee County. The Phase 2 trips were calculated for the 2400 ultimate capacity by multiplying the trip generation figures of the example site by a factor of 2.0.

This method and the assumptions were reviewed and agreed to by Lee County staff and FTE in the methodology meeting for this project.

4. TRIP DISTRIBUTION AND AREA OF INFLUENCE

The trips generated by the Lee County Energy Recovery Facility development were manually assigned based on the development patterns existing and planned for this area of Lee County. The area of influence for this project was determined based on the magnitude of trips generated by the project and on the characteristics of the surrounding roadway network. Both the trip distribution and the area of influence were discussed and agreed upon by FTE and Lee County staff during a methodology meeting in May, 1990. The project traffic distribution and area of influence are provided in Exhibit 3.

5. EXISTING TRAFFIC CONDITIONS

Buckingham Road is a two lane undivided rural collector. S.R. 82 is a two lane undivided fringe arterial.

The existing 1990 daily and peak hour traffic volumes are provided for average conditions in terms of raw field counts taken in the month of May, 1990. These raw field counts were converted to annual average conditions based on the monthly factor (99) for May 1988 provided in the information for Lee County Count Station No. 5.

The average conditions were then multiplied by the factor of 0.9524 to account for the effects of truck volumes. The resulting average existing condition volumes are provided in Exhibit 4. The existing 1990 daily peak season traffic volumes and existing levels of service on the links being analyzed inside the area of influence are provided in Exhibit 5. The following peak season factors and truck volume adjustments were applied to the raw field counts:

	<u>Peak Season Factor</u>	<u>Truck Volume Adjustment</u>
Buckingham Rd	1.12 (Station 5)	5% (per Lee Co.)

These figures were agreed to by Lee County staff and FTE in the methodology meeting for this project.

6. FUTURE TRAFFIC CONDITIONS

In order to project the future background traffic volumes for the project phase of 1993, a compound growth factor was determined for the major links in the project's impact area. A growth percentage of 5% was reviewed and approved by Lee County staff in the methodology meeting for this project.

The build-out traffic for the AM Peak Hour and the Site Peak Hour traffic from the proposed development for Phase 1 is shown in Exhibit 6. This project traffic is provided by direction by link based on the trip generation and the directions of approach provided earlier in this report.

The future traffic conditions for the PM peak hour were determined after combining the future background traffic and the project

traffic for each phase. The future 1993 AM Peak Hour traffic volumes and the Site Peak Hour traffic volumes without development traffic and the corresponding levels of service are shown in Exhibit 7 and 8 respectively. Total traffic (i.e. background + development traffic) is also shown by link in Exhibit 7 and 8, along with the corresponding future level of service with development traffic on the system.

7. CAPACITY AND LEVEL OF SERVICE CALCULATIONS

In order to determine which links and intersections were significantly impacted by the Lee County Energy Recovery Facility, the 1993 AM Peak Hour and Site Peak Hour total traffic was compared to the 5% LOS C peak hour capacity for each link and to the 5% total traffic for each intersection at buildout. It was determined that there was a significant impact on only one of the surrounding links within the area of influence - Buckingham Road between S.R. 82 and the site access drive.

The analyzes conducted for the project were on the following link and intersections:

Buckingham Rd. (from S.R. 82 to the site access)

1990 Peak Season	LOS A
1993 Peak Season w/o Development	LOS A
1993 Peak Season w/ Development	LOS A

Buckingham Rd./Project Entrance

1993 Peak Season w/ Development	LOS A
---------------------------------	-------

The data sheets for the intersection capacity analyses performed based on the 1985 Highway Capacity Manual Software (HCS) are provided in the appendix. The link capacity analyses performed for this project were based on the 1965 Highway Capacity Manual (HCM) level of service tables prepared by Florida Department of Transportation (FDOT). The level of service determination was based on the v/c ratio for the particular link as compared to Table 10.13 in the 1965 HCM.

8. REQUIRED IMPROVEMENTS

Based on the capacity analyses detailed in this report, there are no significant impacts on the surrounding roadway links and intersections due to the traffic associated with the proposed expansion. Therefore, the Lee County Energy Recovery Facility should not be required to provide or construct any roadway improvements in order to accommodate the development traffic and to obtain approval for development. Due to the fact that Buckingham Road is currently posted at 50 mph, a left-turn lane for eastbound traffic will need to be constructed to service the vehicles accessing the site, based on the current Lee County Turn Lane Policy. The site related geometrics and any potential constraints to this turn lane construction have not been investigated.

APPENDIX

Contained in the Appendix are the following:

1. Tables 1 and 2
2. Exhibits 1 thru 8
3. Highway Capacity Software (HCS) Analyses
4. FTE Raw Traffic Counts

APPENDIX

TABLES 1 AND 2

TABLE 1

HOURLY DISTRIBUTION OF INCREASED TRAFFIC VOLUME FOR YEAR 2010 VEHICLE TRIPS

Poor Original

Time Period	Administration and Support	Commuting Employees	Packer Trucks	Total
0001-0100	0	12	0	12
0100-0200	0	0	0	0
0200-0300	0	0	0	0
0300-0400	0	0	0	0
0400-0500	0	0	0	0
0500-0600	0	0	0	0
0600-0700	0	30	0	30
0700-0800 ^{a, b}	0	0	0	0
0800-0900	1	12	44	57
0900-1000	2	0	31	33
1000-1100 ^c	2	0	65	67
1100-1200	1	0	30	31
1200-1300	1	0	24	25
1300-1400	2	0	46	48
1400-1500 ^c	2	12	56	70
1500-1600	1	0	44	45
1600-1700	2	21	0	23
1700-1800 ^{a, b}	0	0	0	0
1800-1900	0	9	0	9
1900-2000	0	0	0	0
2000-2100	0	0	0	0
2100-2200	0	0	0	0
2200-2300	0	12	0	12
2300-2400	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	14	108	340	462

^a It is possible that some traffic volume would occur during these periods. During the early hour period some traffic could be generated by employees arriving late for the first shift or some private packers arriving before the normal scheduled opening of the facility.

^b Existing peak traffic volume hours.

^c Estimated facility peak traffic volume hours.

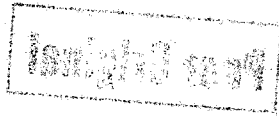
10-18-1987

TABLE 2

Lee County Energy Recovery Facility

Trip Generation

	1200 TPD (EXAMPLE SITE)	1800 TPD (PHASE 1)	2400 TPD (PHASE 2)
Daily	462	693	924
AM PEAK			
IN	35	52	70
OUT	22	33	44
TOTAL	57	85	114
SITE PEAK			
IN	28	42	56
OUT	42	63	84
TOTAL	70	105	140



EXHIBITS 1 THRU 8

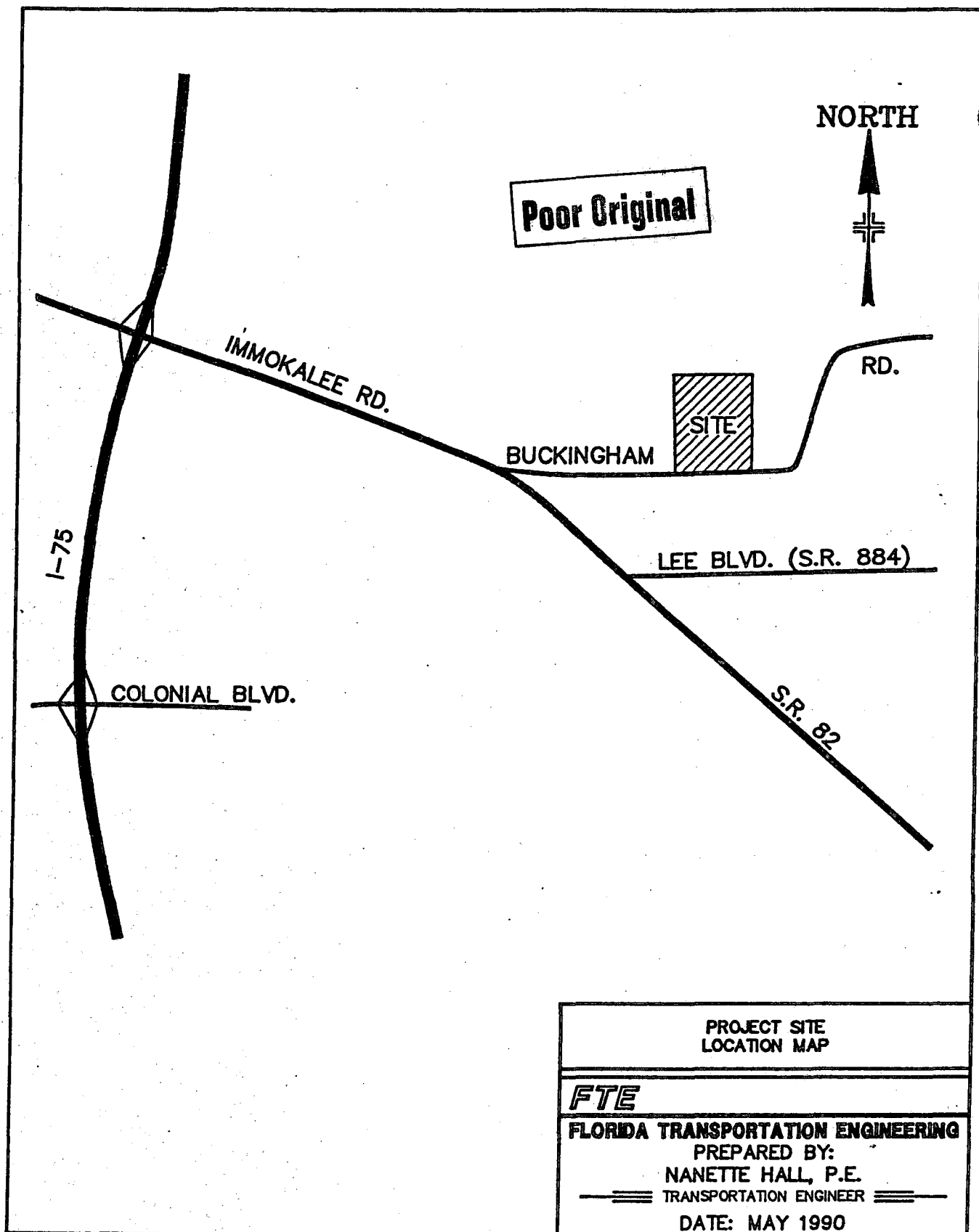
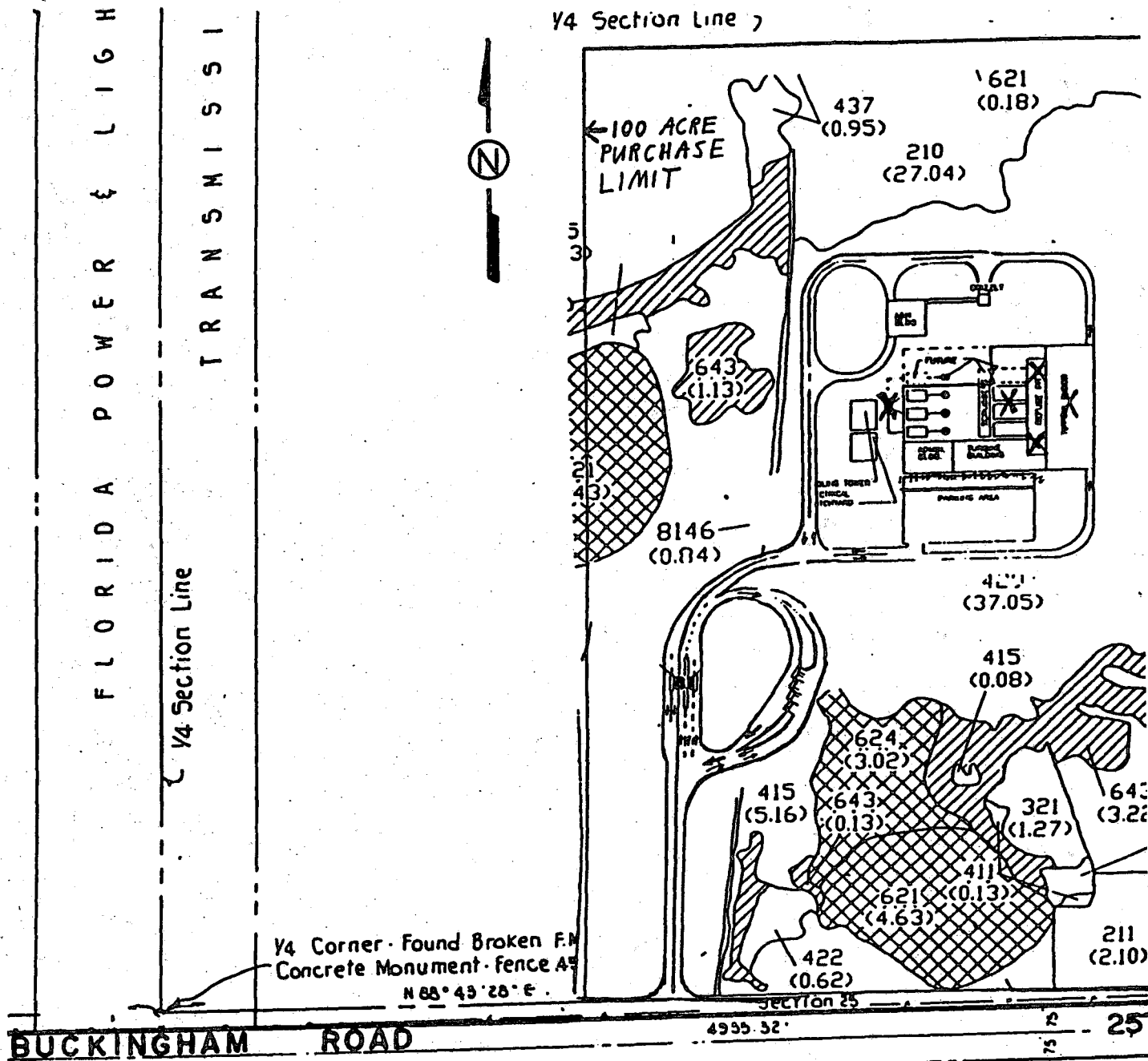


EXHIBIT 1

IMAGE QUALITY

**PLEASE NOTE
THE ORIGINAL DOCUMENTS
SCANNED FOR THIS RECORD
WERE OF POOR QUALITY.**



SITE PLAN

FTE

FLORIDA TRANSPORTATION ENGINEER

PREPARED BY:

NANETTE HALL, P.E.

TRANSPORTATION ENGINEER

DATE: MAY 1990

SCALE: 1" = 40'-0"

EXHIBIT 2

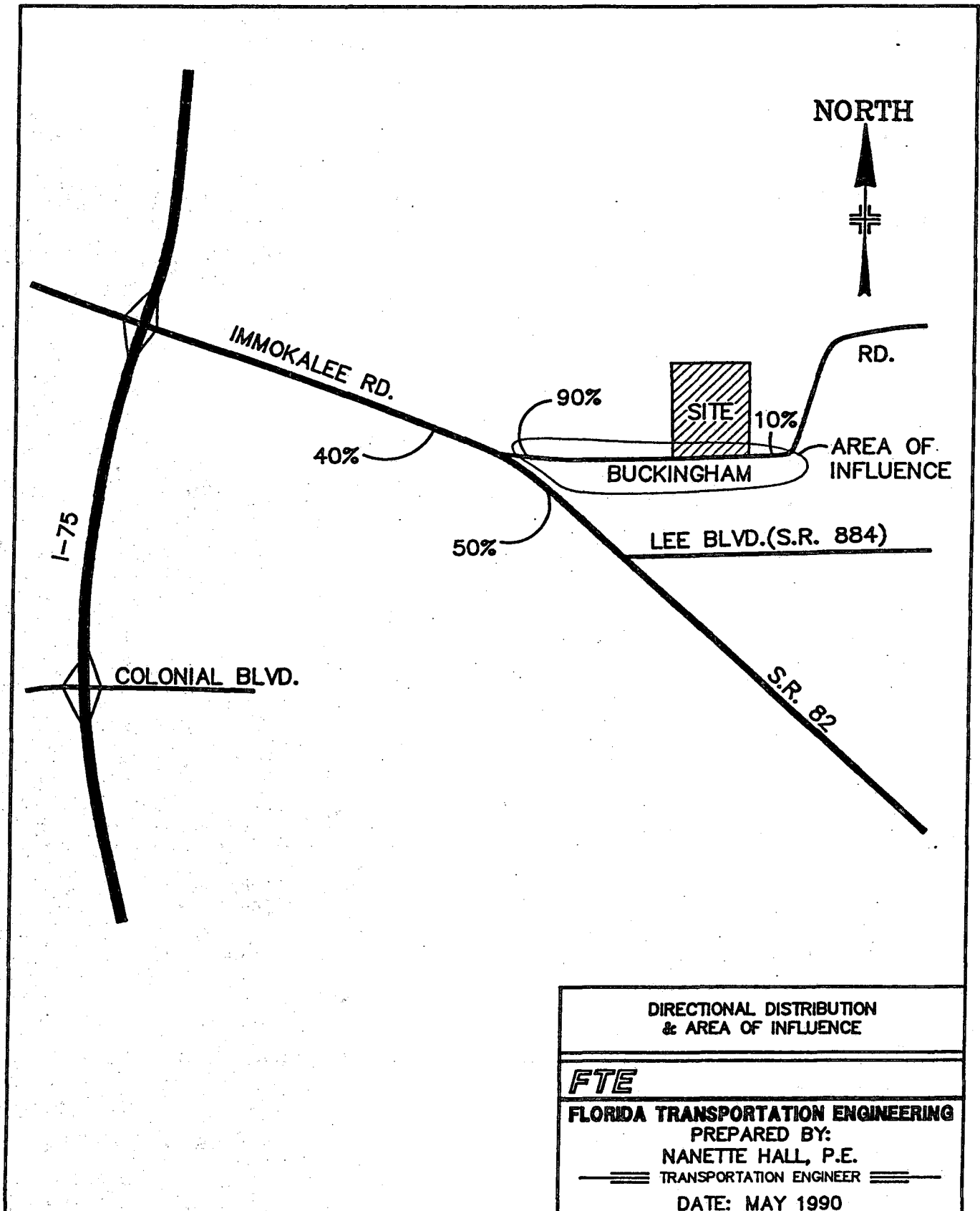
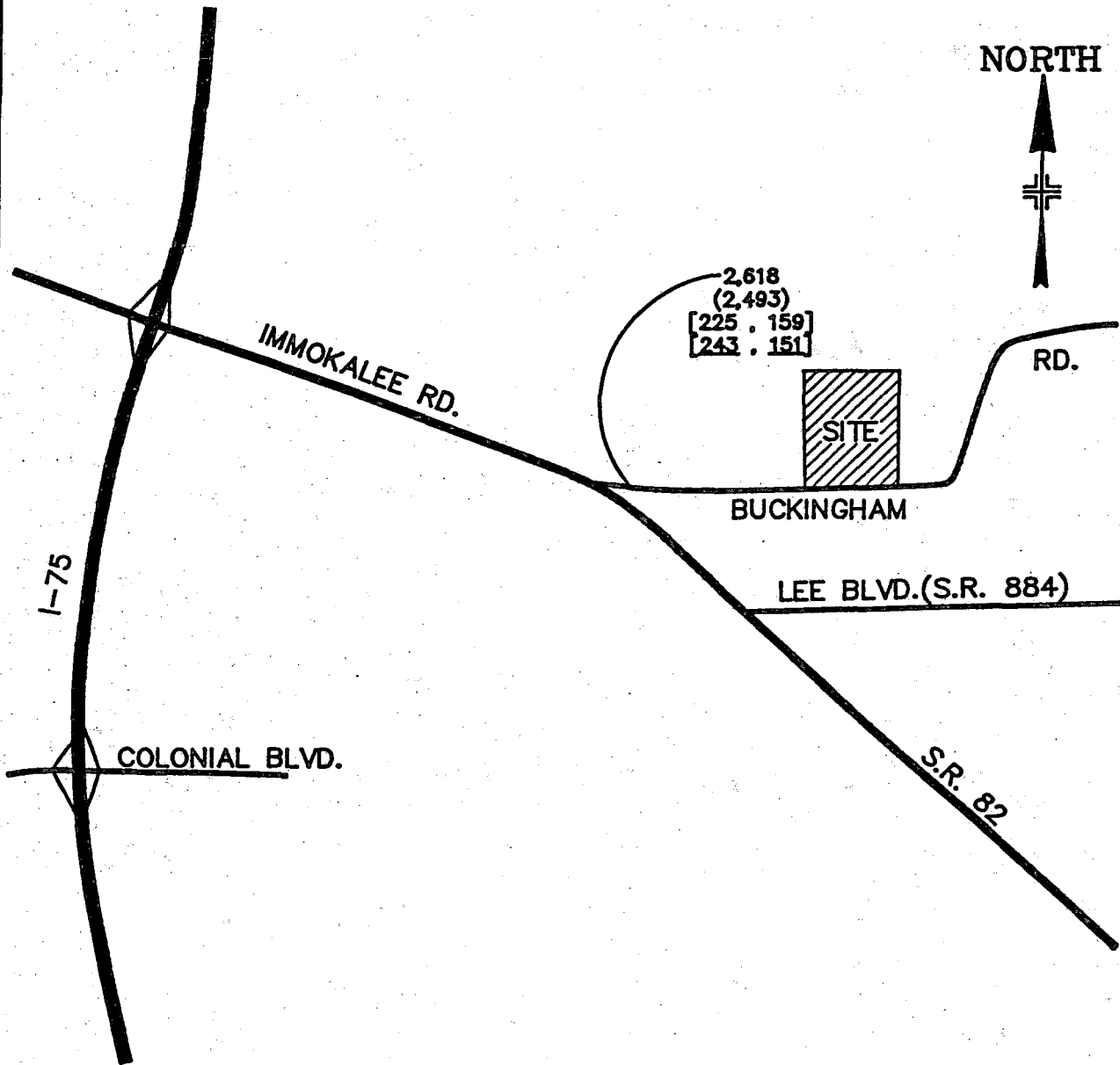


EXHIBIT 3



LEGEND:

000	DAILY - RAW
(000)	DAILY - ADJUSTED FOR TRUCKS
[000, 000]	AM, SITE PEAK HOUR - RAW
[000, 000]	AM, SITE PEAK HOUR - ADJUSTED FOR TRUCKS

EXISTING TRAFFIC
(AVERAGE CONDITIONS)

FTE

FLORIDA TRANSPORTATION ENGINEERING

PREPARED BY:

NANETTE HALL, P.E.

TRANSPORTATION ENGINEER

DATE: MAY 1990

EXHIBIT 4

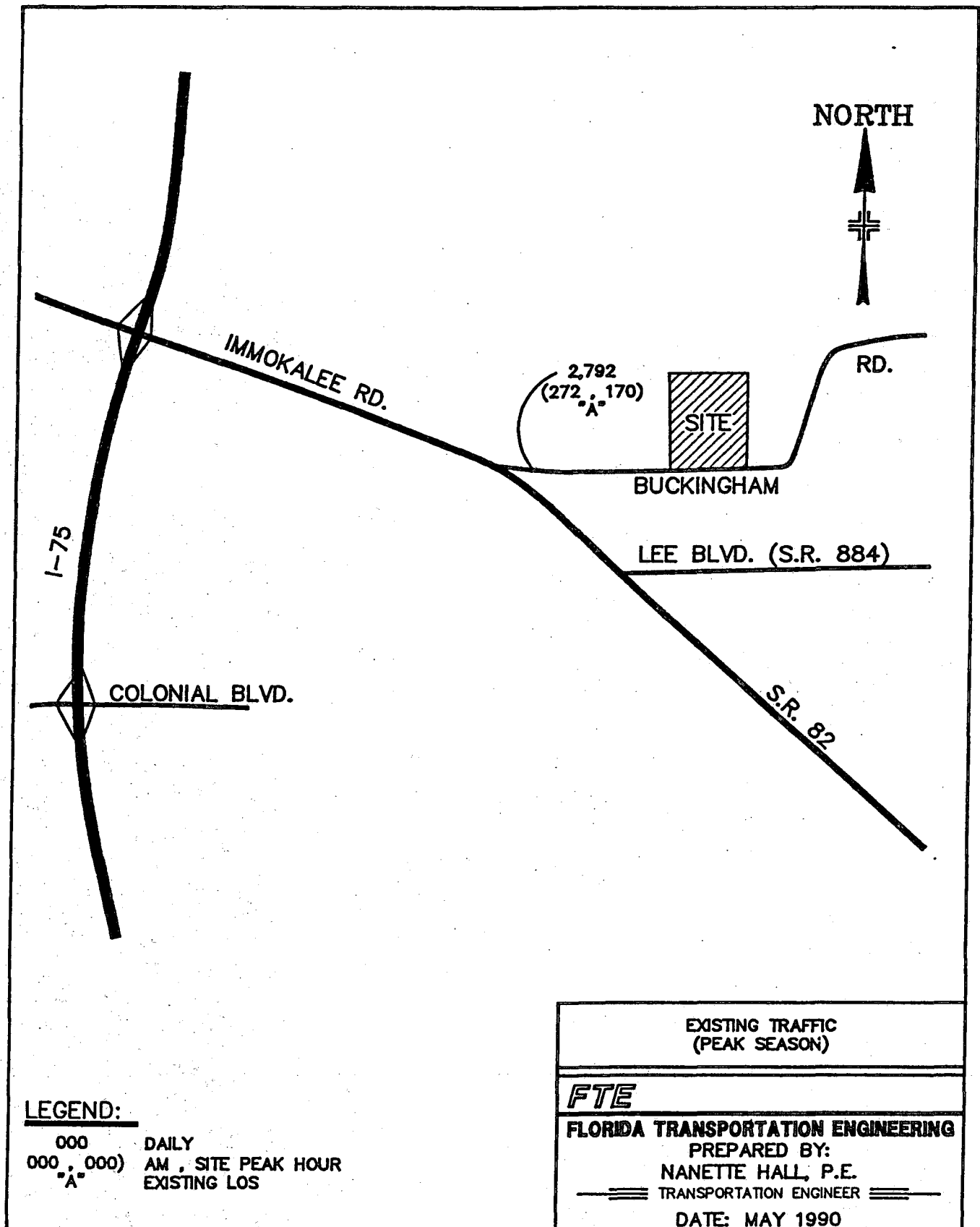


EXHIBIT 5

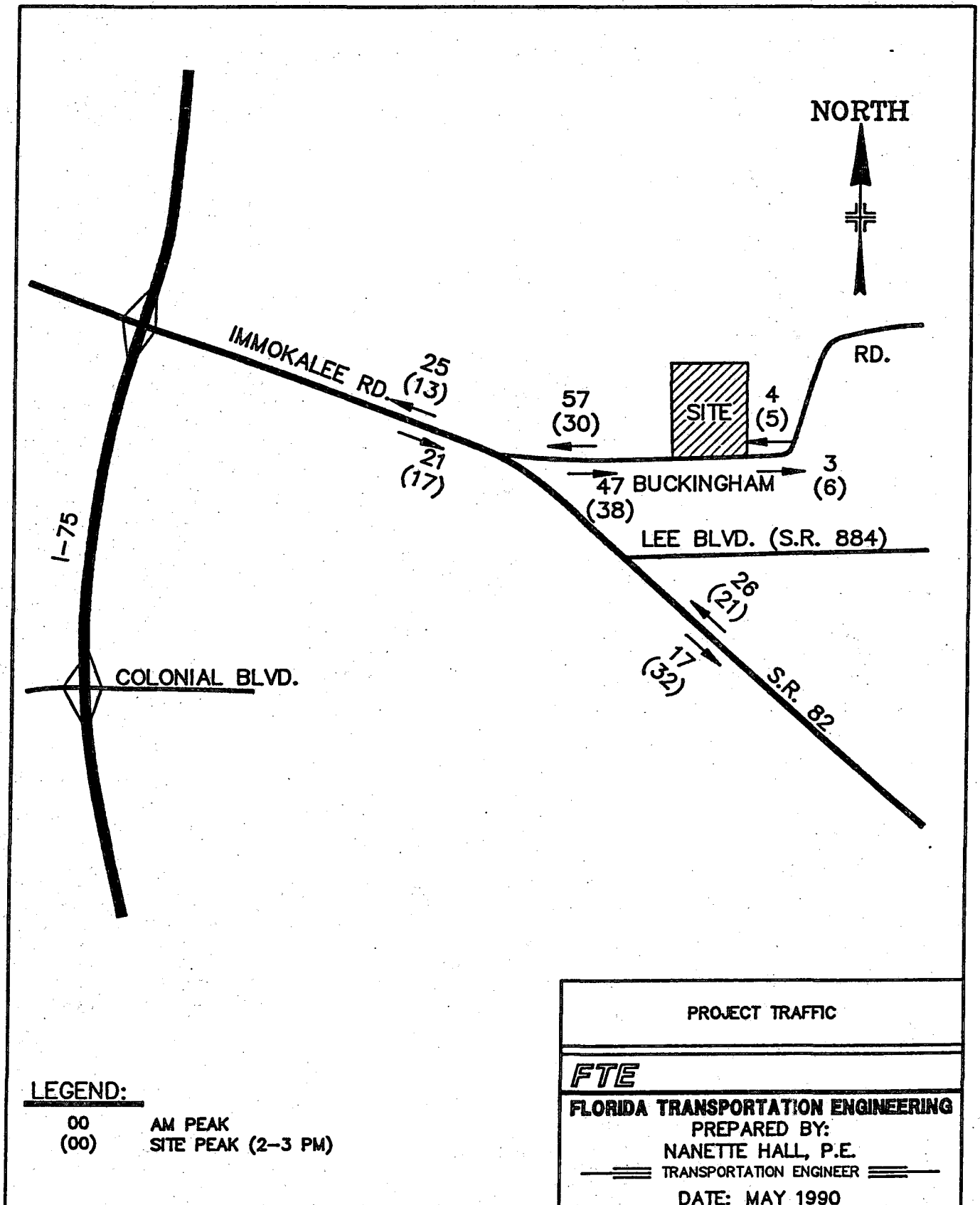


EXHIBIT 6

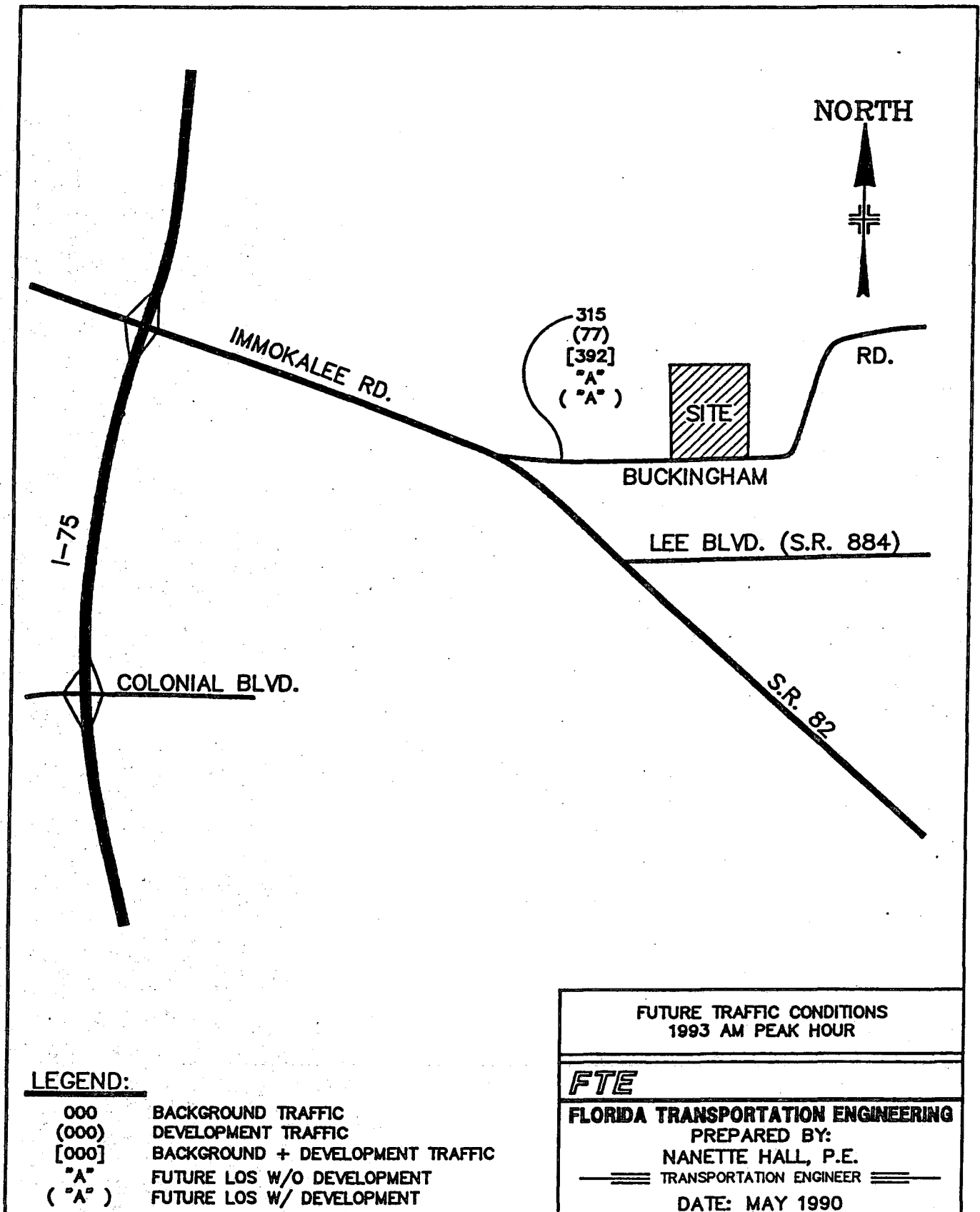


EXHIBIT 7

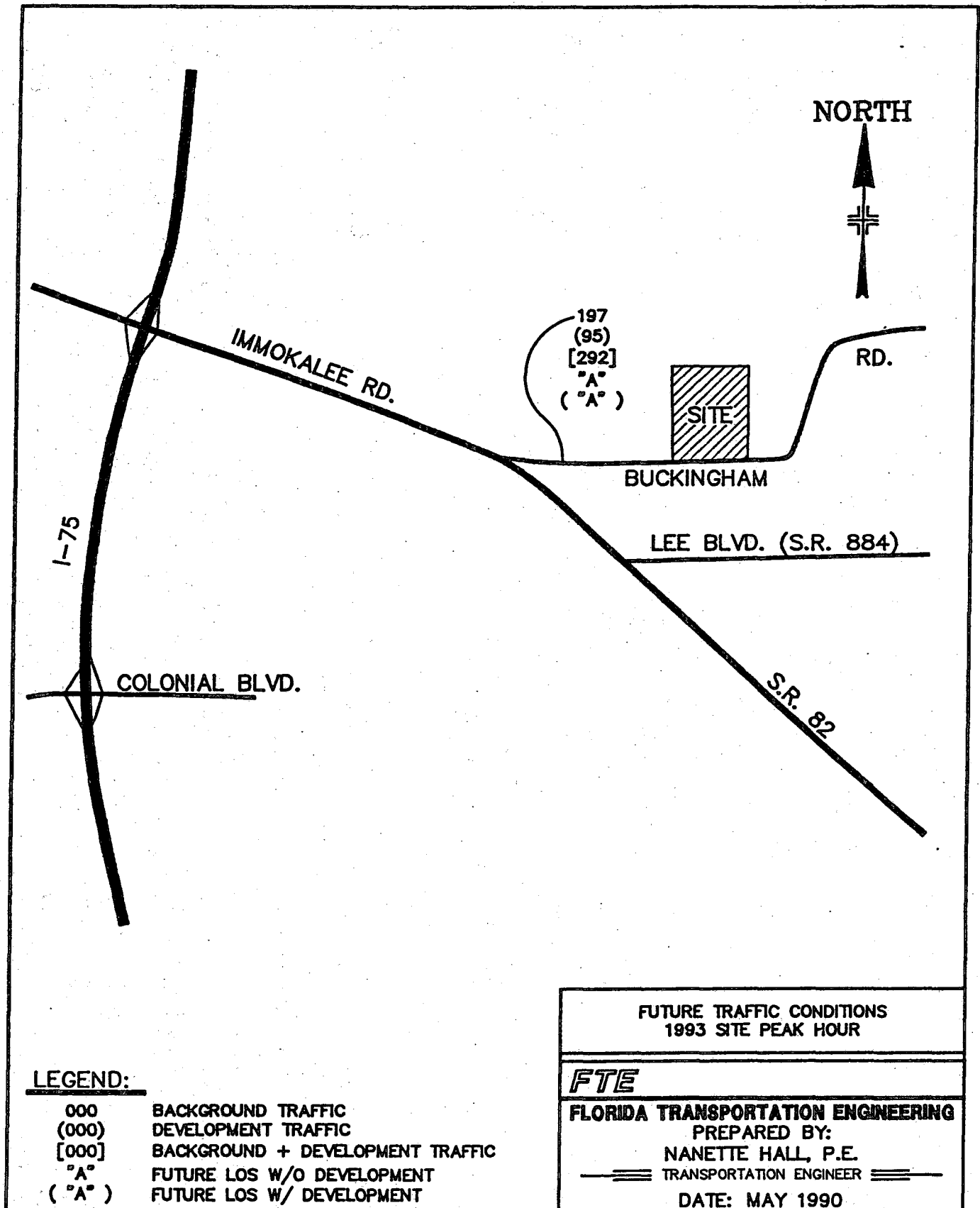


EXHIBIT 8

HIGHWAY CAPACITY SOFTWARE

(HCS)

ANALYSES

1985 HCM: UNSIGNALIZED INTERSECTIONS

Page-1

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 50

PEAK HOUR FACTOR..... 1

AREA POPULATION..... 350000

NAME OF THE EAST/WEST STREET..... Buckingham Road

NAME OF THE NORTH/SOUTH STREET..... Energy Recovery Access

NAME OF THE ANALYST..... FTE

DATE OF THE ANALYSIS (mm/dd/yy)..... 5/25/90

TIME PERIOD ANALYZED..... Site Peak (2-3 PM)

OTHER INFORMATION.... 1993 Total Traffic (Bkg + Dev)

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: EAST/WEST

CONTROL TYPE SOUTHBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
	----	----	----	----
LEFT	38	0	--	6
THRU	199	116	--	0
RIGHT	0	4	--	57

NUMBER OF LANES

	EB	WB	NB	SB
	----	----	----	----
LANES	1	1	--	2

ADJUSTMENT FACTORS

Page-2

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	-----	---	---	-
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	0	0	0
NORTHBOUND	---	---	---
SOUTHBOUND	0	0	0

CRITICAL GAPS

	TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS				
SB	6.30	5.80	0.00	5.80
MAJOR LEFTS				
EB	5.40	4.90	0.00	4.90
MINOR LEFTS				
SB	7.70	7.20	0.00	7.20

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... Buckingham Road
NAME OF THE NORTH/SOUTH STREET.... Energy Recovery Access
DATE AND TIME OF THE ANALYSIS..... 5/25/90 ; Site Peak (2-3 PM)
OTHER INFORMATION.... 1993 Total Traffic (Bkg + Dev)

CAPACITY AND LEVEL-OF-SERVICE

Page-3

MOVEMENT	FLOW- RATE v(pcph)	POTEN- TIAL CAPACITY c (pcph) p	ACTUAL MOVEMENT CAPACITY c (pcph) M	SHARED CAPACITY c (pcph) SH	RESERVE CAPACITY c = c - v R SH	LOS

MINOR STREET						
SB LEFT	7	517	504	504	498	A
RIGHT	63	917	917	917	854	A
MAJOR STREET						
EB LEFT	42	998	998	998	956	A

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... Buckingham Road
 NAME OF THE NORTH/SOUTH STREET.... Energy Recovery Access
 DATE AND TIME OF THE ANALYSIS..... 5/25/90 ; Site Peak (2-3 PM)
 OTHER INFORMATION.... 1993 Total Traffic (Bkg + Dev)

FTE RAW TRAFFIC COUNTS

VOLUME COUNT REPORT Mitron Systems Corporation MSC3000 -- (c) 1987, 1988.

Channel Number 1
 Location Code 123WB
 Date 5/15/90
 Start Time 08:52
 Sample Time 15 minutes
 Divide by 2
 Summation NO
 2-Way YES
 Operator Number 1
 Machine Number 2

Buchingham Rd - east of SR 82 - Westbound Volume
 street or highway name

Parameter checksum is OK.

5/15/90

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	Totals
								79	57	59	43	62	67	110	94	87	63	38	29	22	16	24	850	
								25	18	16	11	26	8	51	37	36	15	16	10	5	4	13		
								19	13	12	8	13	21	25	26	19	13	9	8	7	6	5		
								27	13	12	12	7	20	18	18	19	20	12	4	6	4	4		
								8	13	19	12	16	18	16	13	13	15	1	7	4	2	2		

09:00 - 10:00 AM peak hour (79 vehicles).

14:30 - 15:30 PM peak hour (114 vehicles).

5/17/90

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	Totals
3	3	1	1	8	42	119	162	104	68	67	55	79	59	59	101	91	87	45	33	31	15	15	25	1273
1	1	0	0	0	5	14	32	38	18	10	17	10	20	14	43	37	38	14	9	8	1	4	20	
1	0	0	0	8	7	29	44	27	16	27	13	22	15	17	28	20	18	10	10	10	9	6	1	
1	1	1	0	0	20	36	53	20	20	16	9	24	15	17	16	16	19	13	5	10	4	4	2	
0	1	0	1	0	10	40	33	19	14	14	16	23	9	11	14	18	12	8	9	3	1	1	2	

06:45 - 07:45 AM peak hour (169 vehicles).

15:00 - 16:00 PM peak hour (101 vehicles).

5/17/90

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	Totals
8	1	5	1	13	37	109	149	85	73	62	55	24												622
1	1	0	0	0	2	15	34	28	18	17	15	13												
3	0	2	0	7	4	29	39	18	18	13	14	11												
2	0	1	0	2	23	28	42	16	22	22	14													
2	0	2	1	4	8	37	34	23	15	10	12													

page 2 Location : 123WB -- started : 5/15/90 at 09:00.

06:45 - 07:45 AM peak hour (152 vehicles).

12:00 - 12:30 PM peak hour (24 vehicles).

MOVING 24 HOUR TOTAL SAMPLE

10:00-	1293	11:00-	1282	12:00-	1292	13:00-	1288	14:00-	1324	15:00-	1321	16:00-	1313	17:00-	1304
18:00-	1301	19:00-	1301	20:00-	1283	21:00-	1278	22:00-	1280	23:00-	1273	24:00-	1272	01:00-	1273
02:00-	1278	03:00-	1276	04:00-	1280	05:00-	1280	06:00-	1285	07:00-	1280	08:00-	1270	09:00-	1257

Traffic checksum is OK.

VOLUME COUNT REPORT Mitron Systems Corporation MSC3000 -- (c) 1987, 1988.

Channel Number 2
 Location Code 123EB
 Date 5/15/90
 El Time 08:52
 Start Time 09:00
 Sample Time 15 minutes
 Divide by 2
 Summation NO
 2-Way YES
 Operator Number 1
 Machine Number 2

Buckingham Rd - east of SR 82 - Eastbound Volume
 street or highway name

Parameter checksum is OK.

5/15/90																										
0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	Totals		
										44	50	76	63	88	85	116	132	138	84	46	39	60	32	17	1070	
										7	10	16	16	20	22	17	32	20	22	15	9	12	11	6		
										10	19	20	10	20	21	32	45	47	32	14	9	22	11	2		
										18	14	19	19	22	17	34	26	36	16	7	6	14	4	7		
										9	7	21	18	26	25	33	29	35	14	10	15	12	6	2		

11:00 - 12:00 AM peak hour (76 vehicles).
 15:30 - 16:30 PM peak hour (144 vehicles).

5/90

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	Totals
3	5	5	2	6	18	59	97	49	44	43	41	78	60	102	96	149	165	83	48	43	63	35	17	1311
3	3	4	0	0	5	11	26	14	13	10	8	24	11	33	19	30	46	24	16	13	25	9	3	
0	2	0	1	1	1	22	19	8	12	8	6	13	17	32	31	38	40	29	15	12	17	8	4	
0	0	0	1	2	3	13	24	18	5	17	12	15	16	18	19	41	57	20	12	6	10	14	8	
0	0	1	0	3	9	13	28	9	14	8	15	26	16	19	27	40	22	10	5	12	11	4	2	

07:00 - 08:00 AM peak hour (97 vehicles).
 16:45 - 17:45 PM peak hour (183 vehicles).

5/17/90

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	Totals
10	6	4	5	6	16	77	95	52	61	49	62	26												469
4	2	1	1	2	1	10	23	13	13	12	16	15												
2	0	1	1	1	3	22	22	15	25	14	13	11												
2	0	1	2	0	7	18	31	12	8	11	17													
2	4	1	1	3	5	27	19	12	15	12	16													

page 2 Location : 123EE -- started : 5/15/90 at 09:00.

06:45 - 07:45 AM peak hour (103 vehicles).

12:00 - 12:30 PM peak hour (26 vehicles).

MOVING 24 HOUR TOTAL SAMPLE

10:00-	1314	11:00-	1314	12:00-	1307	13:00-	1272	14:00-	1287	15:00-	1259	16:00-	1276	17:00-	1256
18:00-	1273	19:00-	1300	20:00-	1299	21:00-	1301	22:00-	1305	23:00-	1308	24:00-	1311	01:00-	1311
02:00-	1318	03:00-	1319	04:00-	1318	05:00-	1321	06:00-	1321	07:00-	1319	08:00-	1337	09:00-	1335

Traffic checksum is OK.



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

APPENDIX 12.0

RISK ASSESSMENT

**12.1 – Human Health and
Ecological Risk Assessment
2002**

**12.2 – Human Health and
Ecological Risk Assessment
1992**

12.1 – Human Health and Ecological Risk Assessment 2002

**HUMAN HEALTH AND ECOLOGICAL IMPACT ANALYSIS OF THE
LEE COUNTY RESOURCE RECOVERY FACILITY EXPANSION**

**Prepared by
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**Prepared for
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Lee County Solid Waste Division
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October 31, 2002



TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
EXECUTIVE SUMMARY	vi
1. INTRODUCTION	1
1.1 The Proposed Expansion.....	1
1.2 Objectives Of This Analysis	1
1.3 Methods Of This Analysis	2
2. DESCRIPTION OF THE FACILITY AND PREVIOUS STUDIES	3
2.1 Description and Operation of the Lee County ERF	3
2.2 Previous Impact Studies	6
2.3 Biological Monitoring for Mercury.....	7
3. INFORMATION FROM ANALOGOUS FACILITIES	9
3.1 Environmental Studies at Waste-to-Energy Plants	9
3.2 Epidemiologic Studies.....	10
3.3 Recent Environmental Monitoring Studies	11
3.4 Spokane, WA Risk Assessment.....	12
4. SELECTION OF CHEMICALS OF POTENTIAL CONCERN.....	14
4.1 WTE Regulations	14
4.2 Screening Of Chemicals For Potential Human Health Impact.....	14
4.2.1 Introduction	14
4.2.2 Emission Rates	15
4.2.3 Human Health Toxicological Criteria	16
4.2.4 Bioaccumulation Potential.....	17
4.2.5 Selection of Chemicals for Human Health Evaluation	17
4.3 Screening Of Chemicals For Potential Ecological Impact	18
5. ENVIRONMENTAL FATE AND TRANSPORT MODELING.....	19
5.1 Summary of Air Dispersion and Deposition Modeling Information	19
5.1.1 Modeling Results Used in the Inhalation Risk Assessment.....	20
5.1.2 Modeling Results Used in the Multiple Pathway and Ecological Risk Assessment	21
5.2 Modeled Concentrations of Chemicals in Ambient Air and Deposition Rates	23
5.3 Modeled Concentrations of Chemicals in Soil.....	23
5.4 Modeled Concentrations of Chemicals in Produce and Beef	24
5.5 Modeled Concentrations of Chemicals in Water and Fish	25
5.6 Comparison to Typical Environmental Concentrations	26
5.6.1 Comparison to PCDD/PCDF Environmental Concentrations	27
5.6.2 Comparison to Mercury Environmental Concentrations	28

6.	HUMAN HEALTH RISK ASSESSMENT	30
6.1	Inhalation Risk Assessment.....	30
6.1.1	Chronic Health Risks.....	30
6.1.2	Acute Health Risks.....	31
6.2	Multiple Pathway Risk Assessment	31
6.2.1	Exposure Assessment	31
6.2.2	Methods to Evaluate Chronic Health Risks.....	33
6.2.3	Chronic Health Risk Results.....	34
6.3	Uncertainties in the Human Health Risk Assessment.....	35
6.4	Conclusions	37
7.	ECOLOGICAL RISK ASSESSMENT	38
7.1	Study Area Habitats	38
7.2	Receptors and Endpoints for Evaluation.....	39
7.3	Toxicity Assessment	42
7.4	Exposure Assessment	42
7.4.1	Aquatic Life	42
7.4.2	Terrestrial Wildlife	43
7.5	Risk Characterization.....	45
7.6	Uncertainties in the Ecological Risk Assessment.....	45
7.7	Conclusions	47
8.	SUMMARY AND CONCLUSIONS.....	48
8.1	Introduction	48
8.2	Previous and Ongoing Studies.....	48
8.3	Environmental Impacts	48
8.4	Human Health Risk Assessment.....	49
8.5	Ecological Risk Assessment	52
8.6	Conclusions	52
9.	REFERENCES	54

APPENDICES

- Appendix A Biographies of CPF Associates, Inc. Authors
- Appendix B Input Modeling Information for the Lee County Facility
(PCDD/PCDF Congener Distribution, PCDD/PCDF and Mercury
Stack Test Results, Particle Size Distribution)
- Appendix C IEM-2M Modeling for the Lee County Study
- Appendix D Detailed Risk Results

LIST OF FIGURES

- Figure 1 Lee County Waste to Energy Facility: Site Location Map
- Figure 2 Lee County Waste to Energy Facility: Aerial Site Location Map

LIST OF TABLES

- Table 2-1 Summary of Lee County Biomonitoring Results for Mercury
- Table 4-1 Chemical Emission Rates Based on Permit Limits for the Proposed Expansion of the Lee County Facility (Existing Facility Plus a Proposed Third Unit)
- Table 4-2 Chronic and Acute Toxicity Criteria for the Lee County Facility Project
- Table 4-3 List of Chemicals to be Evaluated in the Human Health Risk Assessment for the Lee County Facility
- Table 4-4 Screening Analysis for Selection of Chemicals of Concern for Evaluation in the Ecological Risk Assessment
- Table 5-1 Modeled Long-Term Average Ambient Air Concentrations Used in the Inhalation Risk Assessment (Maximum Impact Point Results Using Permit Limit-Based Emission Rates)
- Table 5-2 Modeled 1-Hour Average Ambient Air Concentrations Used in the Inhalation Risk Assessment (Maximum Impact Point Results Using Permit Limit-Based Emission Rates)
- Table 5-3 Unitized Long-Term Average Air Concentrations and Deposition Rates Modeled for the Lee County Energy Recovery Facility Risk Assessment (Combined Impacts of Existing and Proposed Units)
- Table 5-4 Chemical Emission Rates Used in the Multiple Pathway Human Health and Ecological Risk Assessments (Emission Rates Based on Stack Test Measurements)
- Table 5-5 Modeled Long-Term Average Ambient Air Concentrations and Deposition Rates at the Maximum Impact Point (Emission Rates Based on Stack Test Measurements)

LIST OF TABLES (Continued)

Table 5-6	Summary of Chemical-Specific Input Parameters for the Risk Assessment
Table 5-7	Fate and Transport Parameters for the Lee County ERF Facility Multiple Pathway Risk Assessment
Table 5-8	Chemical Soil Concentrations at the Maximum Impact Point
Table 5-9	Chemical Concentrations in Produce, Feed Crops and Beef
Table 5-10	Data Used in IEM-2M Mercury Modeling of a Typical Pond (Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters)
Table 5-11	Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters)
Table 5-12	Data Used in IEM-2M Mercury Modeling of a Typical Pond (Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)
Table 5-13	Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)
Table 5-14	Chemical Concentrations in the Caloosahatchee River and Fish in the River
Table 5-15	Chemical Concentrations in a Typical Nearby Pond and Fish in the Pond
Table 6-1	Chronic Inhalation Risk Analysis - Three Units Combined
Table 6-2	Acute Inhalation Risk Analysis - Three Units Combined
Table 6-3	Exposure Pathways Evaluated in the Multiple Pathway Risk Assessment
Table 6-4	Exposure Parameters for the Lee County ERF Multiple Pathway Risk Assessment
Table 6-5	Summary of Excess Lifetime Cancer Risks: Lee County - Human Health Risk Assessment

LIST OF TABLES (Continued)

Table 6-6	Summary of Potential for Noncancer Health Risks: Lee County - Human Health Assessment
Table 6-7	Summary of Infant PCDD/PCDF Exposures: Lee County - Human Health Risk Assessment
Table 6-8	Key Assumptions Used in the Lee County ERF Human Health Risk Assessment
Table 7-1	Federally Endangered and Threatened Species in Lee County
Table 7-2	Toxicity Reference Values (TRVs) for Ecological Receptors
Table 7-3	Calculated Sediment Concentrations for PCDDs/PCDFs
Table 7-4	Exposure Parameters for Terrestrial Receptors Evaluated in the Risk Assessment
Table 7-5	Calculated Fish Tissue Concentrations of PCDDs/PCDFs: Bird Exposures
Table 7-6	Calculated Fish Tissue Concentrations of PCDDs/PCDFs: Otter Exposures
Table 7-7	Calculated Concentrations of Mercury and PCDDs/PCDFs in Snails
Table 7-8	Hazard Quotients for Aquatic Life in the Caloosahatchee River and Pond
Table 7-9	Hazard Quotients for Terrestrial Wildlife Feeding in the Caloosahatchee River and Pond

EXECUTIVE SUMMARY

Municipal solid waste from Lee County and Hendry County is processed at the Lee County Solid Waste Energy Recovery Facility (ERF), which began operation in 1994. Lee County is proposing to add a third combustion unit to the ERF to accommodate excess municipal solid waste that is being generated. Approval to construct the third unit will be made by the State of Florida's Siting Board.

This report presents a Human Health and Ecological Impact Analysis that was performed to address questions related to human and environmental health. This analysis is not a formal requirement of the permit process but was conducted to ensure that issues of potential concern related to the third unit were evaluated. The analysis showed that the proposed modification of the ERF will not have an adverse impact on human health or the environment. This study was performed by CPF Associates, Inc., a Washington, D.C.-based scientific and regulatory consulting firm.

Two studies conducted in 1992 evaluated the potential human health and ecological impacts of the currently operating Lee County ERF. These studies concluded that construction and operation of the facility would not adversely affect humans or threatened or endangered species. Health studies and risk assessments conducted for other similar waste combustion facilities show that a modern municipal solid waste (MSW) waste-to-energy plant will not cause adverse health effects if it is designed and operated in accordance with current state and federal regulations. Lee County also initiated a biomonitoring program in 1993 to determine if operation of the facility was correlated with mercury levels in aquatic life. The program results suggest that mercury concentrations in aquatic life in the area are generally similar to the levels typical of South Florida and not associated with operation of the ERF.

This Human Health and Ecological Impact Analysis for the expanded facility relies on air dispersion and particle deposition modeling conducted by RTP Environmental Associates, Inc. (RTP). RTP calculated air concentrations and deposition rates associated with the proposed ERF (i.e., operation of the two existing units plus the proposed third unit). CPF then used U.S. Environmental Protection Agency (USEPA) fate and transport models to calculate chemical concentrations in soil, produce, surface water, beef and fish. Air concentrations were calculated for the chemicals currently regulated under the facility's air permit. Mercury and polychlorinated dibenzodioxin and dibenzofuran (PCDD/PCDF) concentrations were calculated for the other environmental media. The model inputs included site-specific data provided by Malcolm Pirnie, Inc. Overall, the models and input assumptions are expected to provide conservative (i.e., health protective) calculations of potential environmental concentrations.

The calculated environmental concentrations associated with stack emissions from the proposed three-unit Lee County ERF were compared with typical environmental levels. These comparisons showed that the environmental concentrations associated with the proposed three-unit ERF are consistent with or below typical environmental concentrations, thus the proposed expansion will not measurably increase the typical concentrations of chemicals in the environment.

The human health risk assessment was conducted following current USEPA guidance and is summarized below:

- Potential human health risks were evaluated in two types of risk assessments. An inhalation risk assessment was performed for all chemicals currently regulated under the facility's air permit using permit limit-based emission rates. A more refined multiple pathway risk assessment was also performed for mercury and PCDDs/PCDFs using emission rates based on long-term stack gas measurements.
- In the inhalation risk assessment, inhalation exposures were calculated for two hypothetical groups of people, an adult resident and a child resident. In the multiple pathway risk assessment, exposures were calculated for 12 different hypothetical groups of people, including adults, children and infants. The exposure pathways considered in the multiple pathway assessment were inhalation, soil ingestion, ingestion of produce, beef and fish, and ingestion of breast-milk.
- A variety of evaluations were performed in the human health risk assessment. Chronic long-term excess lifetime cancer risks were found to be at least 10 times lower than USEPA's combustion risk assessment target risk level of 1×10^{-5} (one in 100,000) and did not exceed Florida's common target risk level of 1×10^{-6} (one in 1,000,000). Chronic long-term noncancer effects were predicted not to occur with a large margin of safety (i.e., calculated exposures were at least 10 times lower than the common regulatory noncancer target exposure levels). An analysis of short-term acute inhalation adverse effects showed that these effects will not occur with a large margin of safety (i.e., calculated short-term air concentrations were at least 100 times lower than health-based reference air concentrations).

An ecological risk assessment was also conducted in accordance with USEPA guidelines and is summarized below.

- The ecological assessment focused on mercury and PCDDs/PCDFs which, among the compounds present in MSW combustion facility emissions, are expected to be of greatest potential concern to aquatic and terrestrial wildlife of the area.
- The ecological risk assessment evaluated potential impacts to wildlife species that were considered to be at greatest risk based on habitat use, exposure potential and population status. The species selected for evaluation consisted of aquatic life, the wood stork, the snail kite, the white pelican, and the river otter.
- Adverse impacts to aquatic and terrestrial wildlife were predicted not to occur with a large margin of safety (i.e., exposures to ecological receptors were at least 10 times lower than comparison toxicity reference values).

In conclusion, the Human Health and Ecological Impact Analysis presented in this document shows that potential risks from stack emissions from the expansion of the Lee County ERF, in its proposed configuration with three combustion units, are below regulatory and other target risk levels for both human health and ecological receptors. These conclusions are consistent with previous studies performed both for this facility and other modern MSW waste-to-energy combustion facilities in the U.S. Additionally, the environmental concentrations in air, soil, surface water, beef and fish associated with emissions from the proposed three-unit ERF facility are calculated to be consistent with or below typical environmental levels and will not measurably increase the typical concentrations of chemicals in the environment. Based on this analysis, the proposed modification to the ERF is not anticipated to have an adverse impact on human health or the environment.

HUMAN HEALTH AND ECOLOGICAL IMPACT ANALYSIS OF THE LEE COUNTY RESOURCE RECOVERY FACILITY EXPANSION

1. INTRODUCTION

1.1 The Proposed Expansion

Municipal solid waste from Lee County and Hendry County is processed at the Lee County Solid Waste Energy Recovery Facility (ERF). The ERF is owned by Lee County and operated by Covanta Energy of Lee, Inc. The ERF operates under a prevention of significant deterioration (PSD) permit that was issued in 1992 and a Clean Air Act Title V final permit issued in 2000. As permitted, the ERF may process 1,320 tons per day (tpd) of municipal solid waste in two 660 tpd boiler units, based on a reference waste of 5,000 Btu per pound. The ERF is capable of generating approximately 40 megawatts (MW) of electricity.

Despite the County's comprehensive recycling program, the amount of solid waste the County delivers to the ERF has increased, primarily due to population growth. In 2000, the ERF processed over 392,000 tons of County waste while an additional 44,000 tons of waste that could have been processed was landfilled. Current population projections suggest that the amount of processable waste will continue to increase to approximately 550,000 tons annually in 2010.

The County is proposing to add a third 660 tpd unit to the ERF to accommodate the additional municipal solid waste that is being generated in the County. This will bring the ERF's capacity up to 1,980 tpd and the electrical generating capacity up to approximately 60 MW.

1.2 Objectives Of This Analysis

The permit process for a third unit at the ERF requires submittal of a number of documents. These include a Supplemental Site Certification Application to comply with the Florida Electrical Power Plant Siting Act, and a Prevention of Significant Deterioration (PSD) Permit Application to comply with the Clean Air Act. Approval to construct the third unit will be determined by the State of Florida's Siting Board.

The Human Health and Ecological Impact Analysis presented in this document was performed to address questions related to human and environmental health that may arise during the course of the permit process. This analysis is not a formal requirement of the permit process for the third unit but was conducted to ensure that issues of potential concern related to the proposed ERF expansion were evaluated.

This Human Health and Ecological Impact Analysis was performed by CPF Associates, Inc., a Washington, D.C.-based scientific and regulatory consulting firm. Appendix A provides biographies of the CPF scientists who participated in this effort.

1.3 Methods Of This Analysis

This analysis consists of several parts. First, information regarding the operation of Lee County's solid waste management plan, including the existing ERF and the proposed ERF expansion was obtained and reviewed. Following this, a scientific literature search and review was conducted to obtain information relevant to the analysis, including information about analogous facilities and specific information about the southwest Florida environment. Site visits were conducted, state and local officials were contacted, and Lee County's engineer, Malcolm Pirnie, Inc., was requested to perform survey work to obtain site-specific information that was pertinent to the analysis. Simultaneously, RTP conducted air dispersion and deposition modeling to address the behavior of the ERF's stack emissions in the environment. The information obtained from all of these activities was incorporated into the human health and ecological risk assessment.

Risk assessment is an important tool that can be used to evaluate the probability of adverse effects from various types of activities or situations. This well-recognized method of analysis can assist in identifying the probability of adverse health effects occurring as a result of exposure to chemicals. It is also often used in a regulatory context, in which risk assessment results are compared to regulatory target risk levels. The U.S. Environmental Protection Agency (USEPA), and numerous other regulatory and research organizations, including the National Academy of Sciences, have developed guidelines for the performance of risk assessments. These guidelines were followed in the assessment of the proposed expansion of the Lee County ERF.

2. DESCRIPTION OF THE FACILITY AND PREVIOUS STUDIES

2.1 Description and Operation of the Lee County ERF

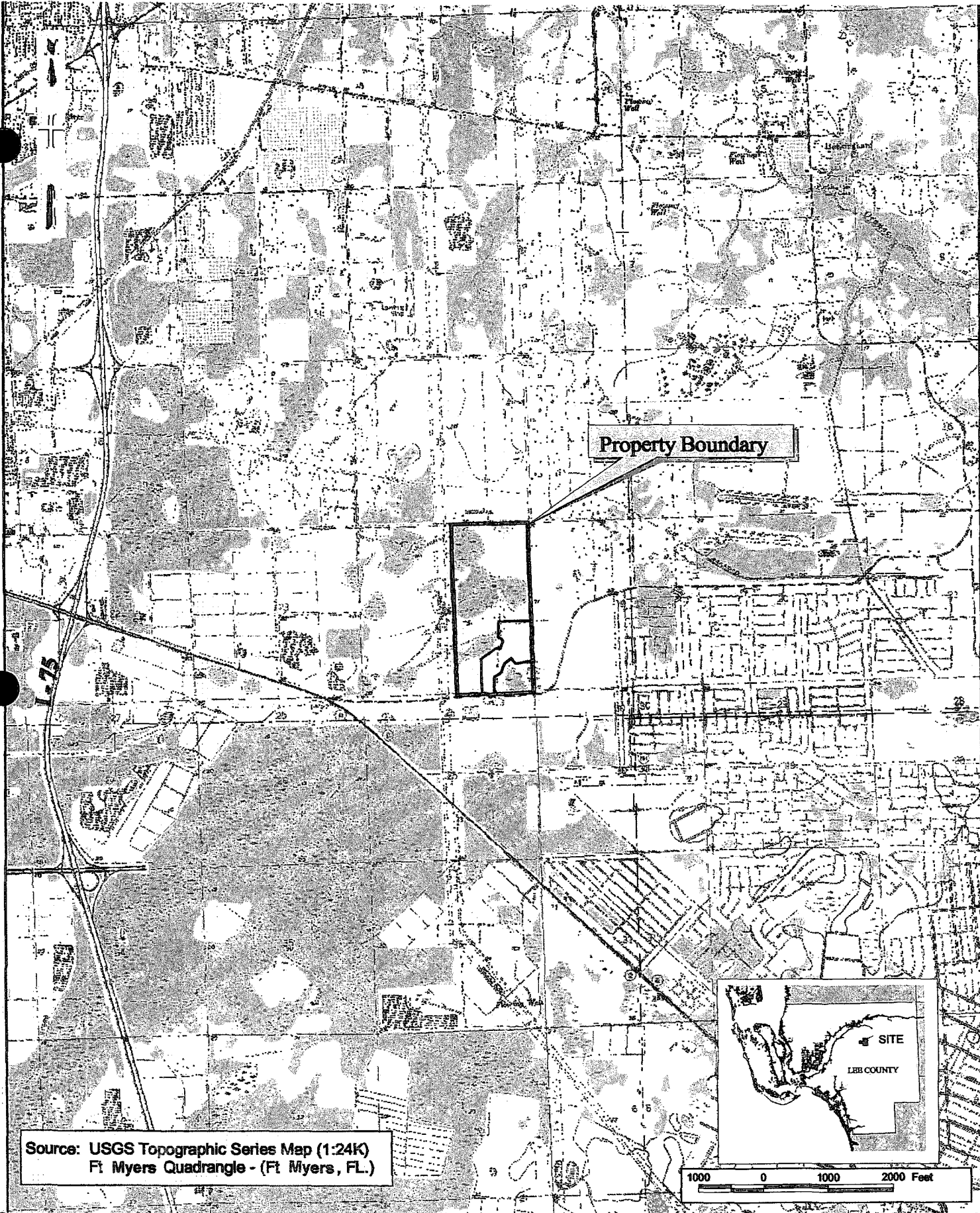
Lee County has operated under an integrated solid waste management plan since approximately 1989. The solid waste system components of this plan include:

- The Energy Recovery Facility (ERF)
- The Gulf Coast Landfill
- The Lee/Hendry County Regional Landfill
- Constructions & Demolition (C&D) debris processing and/or disposal facilities
- Recovered materials processing facility
- Tire processing facility
- Household hazardous waste processing facilities, and
- Horticultural waste processing facilities.

The County operates an aggressive recycling plan that includes residential recyclables, commercial recyclables, ferrous and non-ferrous metals, white goods, tires, and electronic wastes. Despite the operation of these programs, and consequent diversion of large amounts of municipal waste from the disposal stream, the amount of waste has been steadily increasing. In 2000, nearly 44,000 tons of processable waste were landfilled because the ERF lacked sufficient capacity. This figure is anticipated to reach close to 180,000 tons annually by 2010.

The location of the existing ERF is depicted in Figures 1 and 2. On each figure, the property boundary for the land owned by Lee County is shown. This property occupies roughly 300 acres and contains the County's 145-acre solid waste complex which includes the ERF facility. The solid waste complex is the irregular shaped area shown in the southeast portion of the County's property. The zoning for the entire County property prohibits residential, recreational or farmland development.

The existing 1,320 tpd ERF, which has operated since 1994, consists of two waterwall combustors. The emissions from the combustors are controlled by a slaked lime dry scrubber and a baghouse. Nitrogen oxides (NO_x) emissions are controlled by a selective non-catalytic reduction system and mercury emissions are controlled by injection of activated carbon. The ERF uses a combination of continuous and non-continuous monitoring to measure the concentrations of permitted materials in the flue gas. Continuous emission monitors (CEMs) are used to measure and record carbon monoxide, oxygen, nitrogen oxide, opacity and sulfur dioxide. Periodic monitoring is used for respirable particulate matter

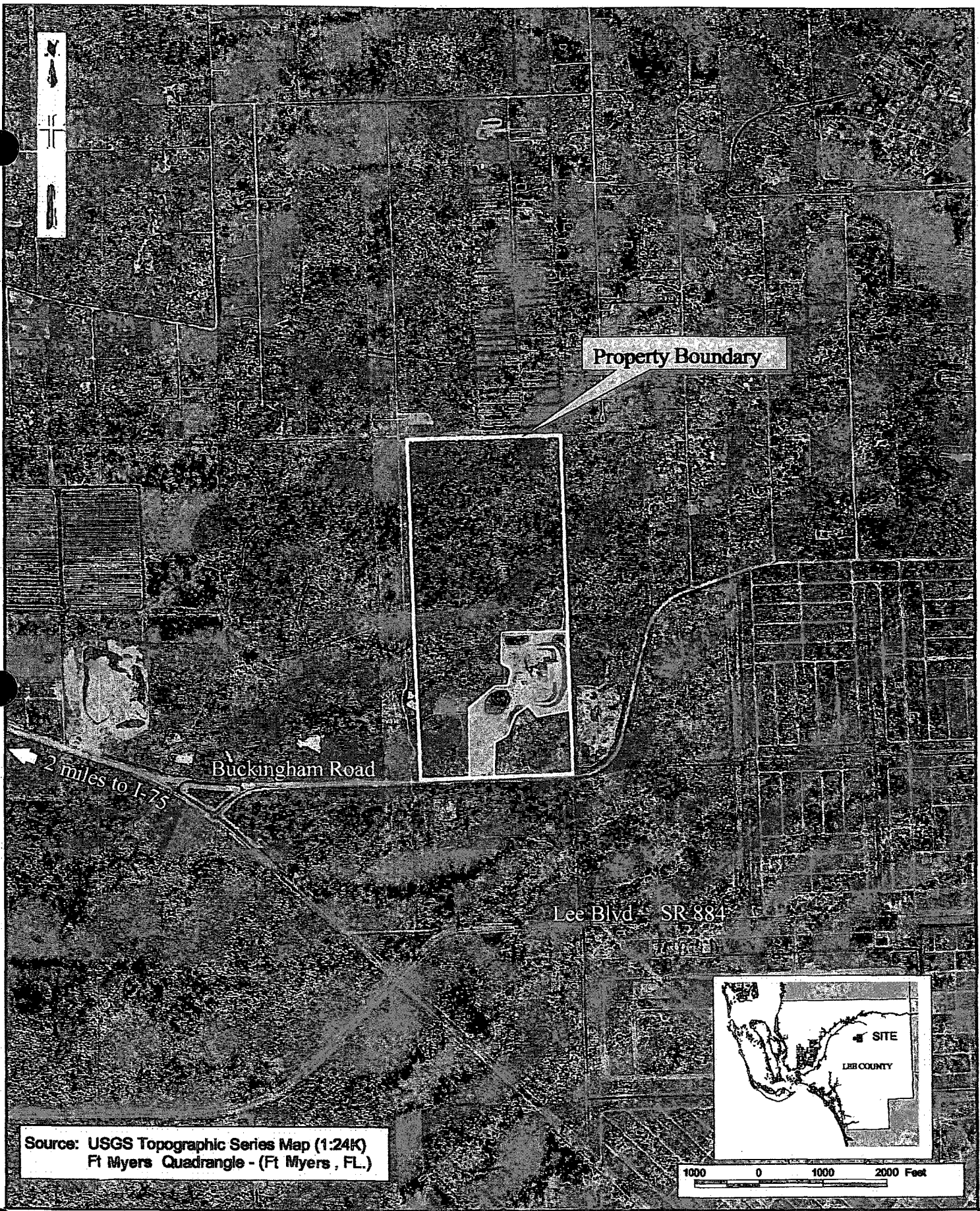


**MALCOLM
PIRNIE**

**Lee County Waste to Energy Facility
SITE LOCATION MAP**

August 2002

Figure 1



**MALCOLM
PIRNIE**

**Lee County Waste to Energy Facility
AERIAL SITE LOCATION MAP**

August 2002

Figure 2

(PM10), total hydrocarbons, hydrogen chloride, sulfuric acid mist, fluoride, lead, beryllium, mercury, arsenic, polychlorinated dioxins and furans (PCDDs/PCDFs)¹, and ammonia. Stack testing conducted at the facility continues to show that emissions from the ERF are well within permit limits.

2.2 Previous Impact Studies

In 1992, at the request of Lee County, Clement International Corporation² prepared a "Human Health and Ecological Risk Assessment for the proposed Lee County Waste-to-Energy Facility" (Clement 1992a). The assessment was conducted in response to community concerns that were raised about the potential for emissions from the ERF to result in a negative human health and/or environmental impacts. The assessment was conducted according to the regulatory guidance that was in effect at that time and using conservative (health protective) assumptions. The focus of the assessment was an evaluation of the potential for mercury and PCDD/PCDF impacts on human health, aquatic life, and on food chains ending in endangered top predators. The assessment found that the environmental concentrations of mercury and PCDDs/PCDFs associated with emissions from the ERF would be lower than those of concern to regulatory agencies when compared to human toxicological criteria, ambient water quality criteria, and toxicity reference values. It was concluded that construction and operation of the facility would not adversely affect humans or threatened or endangered species.

At the request of the U.S. Fish and Wildlife Service (FWS), a supplementary risk assessment was conducted to evaluate the impact of potential mercury emissions on the endangered Florida panther (Clement 1992b). This assessment evaluated panther exposure to mercury through a complex food web. It also included a sensitivity analysis that assessed the impact of varying assumptions in the risk assessment on the results. The supplementary assessment concluded that the risk assessment results regarding the Florida panther substantiated the results of the previous assessment on other endangered species in Southwest Florida – i.e., impacts to these species, including the panther, were unlikely to occur.

¹ Polychlorinated dioxins and furans are a class of chemicals known as polychlorinated dibenzodioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), sometimes referred to as dioxins and furans. There are 75 PCDDs and 135 PCDFs, with each individual compound referred to as a congener. Only 7 of the 75 PCDD congeners and 10 of the 135 PCDFs are considered to be toxic; these are compounds with chlorine molecule substitutions at the 2, 3, 7, and 8 positions on the compound. In this document, the mixture of polychlorinated dioxins and furans are referred to as "PCDDs/PCDFs".

² The scientists from Clement International who prepared the 1992 assessments are currently principals of CPF Associates, Inc.

2.3 Biological Monitoring for Mercury

Lee County initiated a biomonitoring program to determine if operation of the facility was correlated with increased mercury levels in the local environment. The program was designed in conjunction with the FWS to characterize background concentrations and concentration trends for mercury residues in key indicator species within the local aquatic environment (KLE 1992).

The indicator species selected were largemouth bass (*Micropterus salmoides*), mosquitofish (*Gambusia affinis*), and oyster (*Crassostrea virginica*). These species were selected because they occupy different trophic levels within the aquatic food web, and so could be used to support evaluations of mercury biomagnification.³ In addition, these species were hypothesized to be linked indirectly to the diet of the Florida panther through raccoon, which feed on oysters and were believed at that time to comprise an important part of the panther diet (Roelke et al. 1991).

Sampling stations were located in representative aquatic environments in the general area of the ERF. Largemouth bass and mosquitofish were collected in and near Six Mile Cypress Slough. Oysters were collected from Tarpon Bay on Sanibel Island. Sampling was conducted in 1993 (September), 1994 (June and September), 1995 (August), and most recently in 2001 (September). The facility began operation in August 1994.

Table 2-1 presents the results of the biomonitoring program. The listed values are arithmetic mean mercury concentrations and are presented as mg/kg (ppm) fresh weight (fw) or ppm dry weight (dw), as noted in the table. Data for mosquitofish are whole-body residues and those for oyster are for soft tissue residues. There is some uncertainty, however, regarding the tissues analyzed for the bass samples. Bass were to be analyzed for whole-body residues, but laboratory reports for the September 1993 and August 1995 analyses indicate that at least some of these samples were for fillets, rather than whole body. We do not have complete laboratory reports for any of the other sampling periods and so cannot verify the tissue type. In general, whole-body mercury concentrations are lower than fillet concentrations. Lange et al. (1998) found that whole-body mercury concentrations in Florida largemouth bass averaged 70% of fillet concentrations.

Overall, the reported concentrations are greatest in bass and lowest in oysters. This pattern is consistent with expectations, given the position of each of these species in the food web. In general, mercury concentrations in aquatic life increase with increasing trophic level. Organisms located near the bottom of the food web have lower concentrations and those located at the top have the

³ Biomagnification is a process that results in higher chemical concentrations in predators (located nearer the top of the food web) compared to prey (located nearer the bottom of the food web).

highest concentrations. Oysters are filter feeders located near the bottom of the food web, and can accumulate mercury from detritus and plant material used as food. Mosquitofish are higher on the food web, ingesting surface-dwelling aquatic insects and their larvae and small crustaceans, as well as some algae (Rhode et al. 1994). Bass are located at the top of the aquatic food web in southern Florida, feeding on fish, frogs, small ducklings, and a variety of other size-appropriate animal prey (Rhode et al. 1994).

Bass. Total mercury concentrations in the sampled Lee County bass have generally declined since the initial sampling in 1994. This is consistent with patterns observed in bass in Southern Florida since the mid-1990s. Atkeson and Parks (2002) report declines of mercury in Everglades' largemouth bass coinciding with national and regional trends of decreased atmospheric mercury emissions. Bass fillet concentrations in Everglades' fish in 1994 were in the range of 1.7 ppm (fw) and have declined to approximately 0.5 ppm (fw) in more recently collected samples (Atkeson and Parks 2002). There are, however, too few data to clearly determine temporal trends in the sampled Lee County largemouth bass. Uncertainties regarding tissue type further complicate data interpretation. However, it does appear that bass collected by the County have mercury residues that are generally below or similar to the levels detected in the Everglades and other South Florida bass.

Mosquitofish. Few data are available on regional levels of mercury in mosquitofish. USEPA collected mosquitofish from throughout southern Florida marshes and reported mean whole-body concentrations of 0.1 ppm (fw) to more than 0.25 ppm (fw) in the majority (68%) of the sampled fish (USEPA 2001a). Lee County mosquitofish mercury data are generally in this range.

Oysters. Data on mercury in Florida oysters have been collected for Tampa Bay as part of the National Oceanographic and Atmospheric Administration's (NOAA) Status and Trends Monitoring Program. NOAA (2002) reported mean concentrations in Tampa Bay oysters in the range of 0.11 to 0.5 ppm (dw). Dry-weight concentrations for the Lee County oysters are consistent with these levels, with a range of 0.12 to 0.24 ppm (dw).

3. INFORMATION FROM ANALOGOUS FACILITIES

A number of health studies and risk assessments have been conducted for waste combustion facilities. These studies indicate that stack emissions from a modern MSW waste-to-energy plant will not cause adverse health effects if it is designed and operated in accordance with current state and federal regulations. This section presents information from the scientific literature regarding potential environmental and health impacts associated with waste-to-energy plants and other waste combustion facilities.

3.1 Environmental Studies at Waste-to-Energy Plants

Monitoring studies have been conducted around numerous waste-to-energy plants and these have shown that emissions from a modern facility do not produce measurable changes in environmental chemical concentrations or the levels of chemicals in animal tissues. Samples have been collected from ambient air, soil, cow's milk, vegetation, and human blood and milk.

The USEPA conducted an intensive study of ambient air quality in the area of a 240 ton per day waste-to-energy plant in Rutland, Vermont (USEPA 1991). Ambient air monitoring locations for dioxins and particulate matter were selected based on wind patterns in the facility area and air dispersion modeling. The USEPA concluded from the monitoring results that the facility was not the primary source of dioxins in ambient air in the vicinity of the facility. The study also found no correlation between the amount of waste combusted and ambient air particle concentrations.

Soil sampling for dioxins was conducted by scientists from the Ontario Ministry of Environment in the vicinity of a municipal solid-waste combustor in Hamilton, Ontario (McLaughlin et al. 1989). The soil sampling, conducted after 10 years of facility operation, was initiated due to airborne dioxin emissions in excess of Provincial guidelines. The 14 soil samples included 3 control sites and the predicted point of maximum impact. The authors concluded that there was no measurable change in surface soils in the plant vicinity as a result of stack emissions.

Scientists from Cornell University and the Horticultural Research Institute of Ontario analyzed vegetation around a municipal solid-waste combustor for metals and PCBs (Bache et al. 1991). The incinerator had been in operation without pollution controls for approximately 7 years prior to sample collection. Statistical analyses of the sampling results indicated that PCBs and 5 of the 6 metals evaluated, including mercury, were not significantly higher than background concentrations.

The Connecticut Agricultural Experiment Station analyzed cow's milk samples for chlorinated dibenzodioxins and furans near a new waste-to-energy plant before

and 1 year after the facility went into operation (Eitzer 1995). The data showed no statistically significant differences between preoperational and postoperational concentrations.

The State of Massachusetts conducted a study of metal concentrations in soil around the SEAMASS waste-to-energy plant in Rochester after the facility had been operating for several years (MDEP 1996). The combustor's emissions had no detectable effect on mercury concentrations in either air or soil around the facility.

Scientists from the Institute of Toxicology in Germany collected samples of blood and human milk from persons living 8 or more years in the vicinity of a municipal solid waste combustor that had been in operation for 13 years (Deml et al. 1996). The authors concluded that living in the vicinity of the incinerator did not result in a higher body burden for dioxins and furans.

3.2 Epidemiologic Studies

Researchers at the University of North Carolina studied whether living near waste combustion plants increases the occurrence of respiratory health effects (Shy et al. 1995). The study focused on people living near a biomedical waste incinerator, a waste-to-energy plant, and an industrial furnace fueled by liquid waste. The authors concluded that there was no difference in acute or chronic respiratory symptoms or lung function between the communities living near the waste combustors and the comparison communities. The also concluded that particle and acid gas emissions from the three waste combustors contributed trivial amounts to air concentrations in adjacent neighborhoods. In a follow-up study (Hu et al. 2001), the authors again found no significant associations between exposures for any of the waste combustion facilities and lung function tests. One result for the waste-to-energy facility did show a statistically significant relationship for lung function but this result was only observed for one of the three years of the study and when using only one of the four different types of exposure estimation methods.

Scientists studied the prevalence of asthma in children living in two regions of Sydney, Australia where incinerators combusted sewage sludge and in a comparison community (Gray et al. 1994). The results showed no significant difference in the occurrence of asthma effects between the groups of children. The authors concluded that emissions from the high-temperature sewage sludge incinerators appeared to have no adverse effect on the prevalence or severity of childhood asthma.

The National Academy of Sciences (NAS 1999) evaluated available epidemiological data regarding waste incineration and health effects in surrounding communities and concluded that waste combustion facilities that are in compliance with USEPA's Maximum Achievable Control Technology (MACT) requirements pose minimal or negligible risks to surrounding communities. NAS

also noted that for modern, well-controlled waste combustors, risk assessments show that potential cancer effects even for the most highly exposed persons in the surrounding areas are generally small to negligible.

3.3 Recent Environmental Monitoring Studies

Detailed environmental monitoring studies have been undertaken at two other Covanta waste-to-energy facilities – the Montgomery County facility in Dickerson, Maryland, and the Union County facility in Rahway, New Jersey. The information gained from these studies can yield useful insights about Covanta's operations which may be applied to the Lee County facility.

The Montgomery County facility consists of three 600 tpd combustion units. The air pollution control equipment and electrical generating capacity of the Montgomery County facility are similar to those at the Lee County facility. The Montgomery County facility has been operating since 1995. Although the population of Montgomery County is approximately 800,000 people, the land use around this facility is semi-rural, and includes residential units, agricultural (including dairy) operations, and fishery resources. Roy F. Weston, Inc. was contracted by Montgomery County to conduct an ambient air monitoring study (Weston 1998) and a non-air monitoring study (Weston 2000).

Weston (1998) evaluated both air toxics and meteorologic data before the facility went into operation (pre-operation) and after the facility had been operating for approximately two years (post-operational). Air toxics monitoring included dioxins/furans, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, formaldehyde, arsenic, cadmium, chromium, lead, mercury, and nickel. Particulate matter was also monitored. Numerous long-term and short-term measurements were obtained. The number of post-operational measurements ranged from 20 for PCBs to 79 for dioxins and furans. The primary monitoring site was situated near the maximum point of annual ground-level air and dry deposition concentrations as predicted by air dispersion/deposition modeling. The report concluded that no major differences in air quality were observed at any operating sites when pre-operational and post-operational measurements were compared. Additionally, the report concluded that the facility did not have a significant impact on air quality in the surrounding region.

The non-air media report (Weston 2000) evaluated chemical concentrations in soil, earthworms, cow's milk, forage/hay, vegetables, surface water and sediment, and fish tissue. The monitoring locations were selected based on local meteorology, air modeling, and the results of a human health risk assessment. Pre-operational sampling was conducted in 1994 and post-operational sampling was conducted in 1996 and 1998. The samples were analyzed for dioxins/furans, PAHs, PCBs, arsenic, beryllium, cadmium, chromium, lead, mercury, and nickel. The results showed that there were no statistically significant or consistent patterns detected between the pre-operational and post-

operational phases of the study. Many of the environmental media sampled during the post-operational phase had concentrations approximately equivalent to or less than the pre-operational conditions. In some media, the concentrations increased, however, the investigators felt that this was a reflection of scientific uncertainty rather than an actual impact. The study concluded that the operation of the facility had not caused unacceptable increases in target compound concentrations.

The Union County, New Jersey facility is a 1,440 tpd resource recovery facility located in Rahway that has been operating since 1994. The land use around the facility is highly industrial, dominated by heavy industry and transportation uses. The Union County Utilities Authority contracted with Paulus, Sokolowski and Sartor, Inc. (PSS) and HDR Environmental Engineering, Inc. (HDR) to conduct on-going monitoring studies in the air and other media around this facility (PSS 1993, PSS 1997, HDR 1998). As with the Montgomery County facility, this study consists of both pre- and post-operational monitoring. The chemicals of potential concern include PCBs, dioxin (2,3,7,8-TCDD), arsenic, beryllium, cadmium, chromium, lead, mercury, and nickel. In addition to ambient air, soil, sediment, surface water, food crops (lettuce, radishes, tomatoes) and fish have been evaluated periodically, both pre- and post-operationally. The post-operational data show that the chemicals of potential concern are present at levels consistent with those anticipated for an urban industrial environment. Additionally, the reports suggest that the post-operational samples are consistent with the pre-operational samples. This program is continuing.

The results of these two recent studies regarding operating Covanta facilities similar to the Lee County ERF show that there is no discernable impact on the local environment with respect to the chemicals that are considered to be the most significant trace components of waste-to-energy emissions. These results are consistent with the results that are reported elsewhere in the literature and suggest that similar results would likely be obtained in Lee County.

3.4 Spokane, WA Risk Assessment

The results of a comprehensive risk assessment recently conducted for the City of Spokane waste-to-energy facility can also provide insight into the potential risks associated with the Lee County facility (Pioneer 2001). The Spokane risk assessment is pertinent because the Spokane facility is a state-of-the-art plant, as is the Lee County facility, and it is one of the first risk assessments to rely on USEPA's 1998 guidance for performing risk assessments for combustion sources. Although USEPA's guidance is intended for hazardous waste combustors, it is generally useful for other types of waste combustion facilities.

The Spokane facility is comprised of two units each capable of managing roughly 800 tpd municipal solid waste. The air pollution controls on each unit consist of lime slurry spray dryer absorbers followed by fabric filter baghouses. A carbon

injection system also is used. An anhydrous ammonia thermal DeNox selective non-catalytic system is also used for nitrogen oxides control.

The risk assessment utilized 10 years of measured emissions data to calculate potential risks through multiple exposure pathways at a maximum off-site impact point. Risks were evaluated at this point for a typical resident, a subsistence farmer, a subsistence fisher and infants. The results were determined to be below Washington state target risk levels (i.e., a non-cancer hazard index below 1 and an excess lifetime cancer risk below one in one hundred thousand or one in 100,000). The predominant chemicals contributing to the non-cancer risk results were hydrogen chloride via inhalation and methyl mercury via ingestion of fish. The predominant compounds contributing to the cancer risks were PCDDs/PCDFs due to ingestion of animal products.

4. SELECTION OF CHEMICALS OF POTENTIAL CONCERN

4.1 WTE Regulations

The primary federal regulatory mechanism for municipal waste combustors is Section 129 of the Clean Air Act. Under the authority of this Act, USEPA has promulgated emission guidelines and standards for municipal waste combustors (40 CFR 60 Subparts Cb and Eb). These guidelines and standards include processes to ensure that municipal waste combustors are operated safely (e.g., good combustion practices), standards for operator training and certification, and requirements for compliance and performance testing. When establishing the guidelines and standards, USEPA reviewed existing data on emissions from municipal waste combustors and selected a group of chemicals for regulation that include metals, acid gases, organics, and nitrogen oxides. USEPA feels that this list encompasses the majority of the potentially toxic emissions and that monitoring these chemicals can yield information about the overall safety of an incinerator. This list of chemicals was the basis of the permit limitations and monitoring requirements for the existing ERF.

4.2 Screening Of Chemicals For Potential Human Health Impact

A screening analysis was performed to identify compounds to be evaluated in a human health and ecological risk assessment. This section discusses the screening analyses performed for this study.

4.2.1 Introduction

A screening analysis was performed to identify compounds to be evaluated in a human health risk assessment. This screening was conducted for hazardous air pollutant (HAP) emissions and included those compounds that have been measured in stack emissions and are specifically addressed in the facility's air permit. These compounds consist of: beryllium, arsenic, PCDDs/PCDFs, mercury, lead, fluoride (as hydrogen fluoride, or HF), sulfuric acid mist (as sulfuric acid) and hydrogen chloride.

The screening analysis identified compounds to be evaluated either only for the direct inhalation pathway of exposure or to be evaluated in a full-scale refined multiple exposure pathway risk analysis. The screening relied on methods proposed by USEPA in the mid-1990's that rank potential chemicals of concern based on three factors: chemical emission rates, chemical toxicity and the chemical's potential for bioaccumulation. Information from the scientific literature was also considered in selecting chemicals for evaluation.

4.2.2 Emission Rates

Emission rates for each compound were compiled based on an analysis performed by RTP (2002a). RTP identified a range of chemical emission rates associated with a variety of stack gas conditions for the proposed three-unit facility and then modeled these scenarios using USEPA's Industrial Source Complex Short-Term (ISCST) dispersion model. Both short-term (1-hour to 24-hour) average and long-term (multiple year) average air concentrations were modeled. The emission rates addressed by RTP consisted of existing permit limits for the two combustion units currently operating in addition to proposed permit limits for the proposed third combustion unit.

The screening analysis performed for this report relied on the emission rates that corresponded to the stack gas conditions producing the highest 1-hour average and long-term annual average maximum air concentrations for the existing facility plus the proposed new unit. These emission rates are listed in Table 4-1. A more detailed discussion of RTP's modeling analysis may be found in the PSD Permit Application.

Table 4-1 also provides additional details regarding the emission rates used for PCDDs/PCDFs and for mercury. PCDD/PCDF emission rates were developed for each 2,3,7,8-congener from the total PCDD/PCDF emission rate reported by RTP (2002a) and the distribution of congeners based on historical stack test data. The distribution of congeners was based on the average of congener-specific emissions measurements from Units 1 and 2 in 1994, 1995, 1996, 2000 and 2001 (RTP 2002b). A summary of the PCDD/PCDF congener distribution data is provided in Appendix B.

Mercury emission rates were developed for three different mercury species (elemental vapor, divalent vapor and divalent particulate). In addition, consistent with USEPA's risk assessment methods in its 1998 Combustion Risk Assessment Guidance document (USEPA 1998a), the speciated mercury emission rates also took into account the portion of each expected to remain locally available (i.e., not enter the global mercury cycle). USEPA's *Mercury Report to Congress* (USEPA 1997) suggests that total mercury emissions would be comprised of 60% elemental mercury, 30% divalent vapor phase mercury and 10% divalent particle phase mercury. Additionally, the fraction of each species expected to not enter the global mercury cycle and thus be available for local deposition was identified, per USEPA 1998 Guidance (Section 2 and Figure 2-4), as 0.01 for elemental mercury, 0.68 for divalent vapor phase mercury, and 0.36 for divalent particle phase mercury. For example, using these data, the fraction of total mercury expected to remain locally available (0.25) can be calculated as follows: $[(0.68 \times 30\%) + (0.36 \times 10\%) + (0.01 \times 60\%)] / 100\% = 0.25$.

An examination of the magnitude of the emission rates in Table 4-1 shows that the highest emissions among the listed compounds are expected for the acid gases - hydrogen chloride, hydrogen fluoride and sulfuric acid.

4.2.3 Human Health Toxicological Criteria

Three types of human health toxicological criteria were compiled for each chemical regulated in the facility's air permit:

- Chronic long-term noncancer toxicity criteria
- Chronic long-term cancer slope factors
- Acute short-term inhalation toxicity criteria

These data were compiled from currently available USEPA sources, including the Integrated Risk Information System (IRIS) and other sources cited in USEPA's guidance for risk assessments of hazardous waste combustors (USEPA 1998a).

The chronic long-term toxicity criteria that are used to evaluate the potential for non-cancer health effects are oral reference doses and inhalation reference concentrations. These non-cancer criteria define levels of exposure below which adverse non-cancer health effects are not expected to occur, but above which there may be a possibility of adverse health effects. The chronic long-term toxicity criteria that are used to evaluate potential excess lifetime cancer risks are oral cancer slope factors and inhalation unit risk factors. The acute toxicity criteria that were compiled are short-term reference air concentrations below which adverse short-term health effects (e.g., reversible lung irritation) are not expected to occur.

The toxicity criteria are presented in Table 4-2. This table not only shows the value of each criterion, but also the safety factor incorporated into it and the health effects endpoint that the criterion is based on.

The compounds with the greatest potential for adverse chronic non-cancer health effects are those with the lowest chronic oral reference doses and inhalation reference concentrations. Among the compounds shown in Table 4-2, arsenic, beryllium and mercury have oral noncancer toxicity data, and among these three, the lowest oral reference dose is for methyl mercury. Three compounds on Table 4-2 have chronic inhalation noncancer toxicity criteria (beryllium, hydrogen chloride and mercury), and the lowest inhalation reference concentration among these compounds is for beryllium.

The compounds with the greatest potential for contributing to chronic excess lifetime cancer risks are those with the highest slope factors and unit risk values. Oral cancer slope factors are available for two compounds (arsenic and PCDDs/PCDFs), and inhalation unit risks are available for three compounds

(arsenic, beryllium and PCDDs/PCDFs). Among these compounds, the slope factor and unit risk are highest for PCDDs/PCDFs.

Finally, the lower the acute reference air concentration, the greater the chemical's ability to result in adverse short-term inhalation effects. Among the chemicals shown in Table 4-2, beryllium has the lowest acute reference air concentration.

4.2.4 Bioaccumulation Potential

The bioaccumulation potential of each compound was evaluated by examining chemical-specific beef biotransfer coefficients and fish bioconcentration or bioaccumulation data. Default values for these parameters are provided in USEPA (1998a).

The beef biotransfer coefficient describes the extent of uptake of a compound by cattle from ingested food. This biotransfer coefficient was used as an indicator of each chemical's ability to be taken up into edible animal products. The larger the biotransfer coefficient, the greater the potential for a compound to be taken up into the animal food product. Among the compounds evaluated, the beef biotransfer coefficients were up to an order of magnitude higher for PCDD/PCDFs compared to all the other compounds.

Fish bioconcentration data reported in USEPA (1998a) include bioconcentration factors (BCFs), bioaccumulation factors (BAFs) and fish:sediment bioaccumulation factors (BSAFs). In general, BAFs and BSAFs apply to compounds with a greater tendency to bioaccumulate in the food chain compared to compounds with BCFs. Among the compounds considered here, only methyl mercury and lead have BAFs and only PCDD/PCDFs have BSAFs. The methyl mercury BAF is almost six orders of magnitude greater than the BAF for lead.

4.2.5 Selection of Chemicals for Human Health Evaluation

The data presented and described above were examined collectively to identify compounds for inclusion in a risk assessment. Table 4-3 summarizes the list of chemicals selected based on consideration of emission rates, toxicity criteria and bioaccumulation potential. As shown in this table, two types of risk analyses are included in this report, an "inhalation risk assessment" and a "multiple pathway risk assessment".

Based on the magnitude of emission rates and the toxicity criteria provided above, all chemicals were retained for evaluation via the inhalation exposure pathway. Potential inhalation risks due to both chronic long-term and acute short-term exposures are evaluated below. This assessment is referred to hereafter as the "inhalation risk assessment".

The class of PCDDs/PCDFs and mercury, compared to the other compounds considered above, clearly have both the greatest bioaccumulation potential and the most restrictive toxicity criteria for the oral pathway of exposure (i.e., the lowest oral reference dose for methyl mercury and the highest cancer slope factor for PCDDs/PCDFs). Numerous risk assessments performed for other waste combustion facilities consistently show that these compounds almost always dominate the final risk results. As a result, mercury and PCDDs/PCDFs are most likely to be of concern via indirect exposure pathways relative to the other compounds considered and will be evaluated in a more comprehensive multiple pathway risk analysis. The assessment of mercury and PCDDs/PCDFs will hereafter be referred to as the "multiple pathway risk assessment."

The multiple pathway risk assessment for mercury and PCDDs/PCDFs will examine the following exposure pathways: inhalation, soil ingestion, produce ingestion, beef ingestion and fish ingestion. These pathways were selected based on consideration of both site-specific information and USEPA guidance for combustion source risk assessments. A more detailed discussion of the basis for selecting these pathways is provided later in this report.

4.3 Screening Of Chemicals For Potential Ecological Impact

The ecological risk assessment evaluates potential risks associated with mercury and PCDDs/PCDFs.

Acid gases (HCl, HF, and H₂SO₄) are not evaluated in the ecological risk assessment because these chemicals are unlikely to be associated with ecological effects at levels released from combustion facilities (USEPA 1999).

Arsenic, beryllium, and lead are not evaluated in the ecological risk assessment because these chemicals do not contribute significantly to risks relative to mercury and PCDDs/PCDFs. As can be seen from Table 4-4, these metals are substantially less toxic to aquatic life and terrestrial wildlife than mercury and PCDDs/PCDFs, and also do not bioaccumulate in ecological food webs to any significant degree. Further, none of these metals biomagnifies in the ecological food web, as do mercury and dioxins/furans. A screening-level risk evaluation based on maximum emission rates and default, conservative assumptions regarding bioaccumulation and toxicity (Table 4-4) demonstrates that these three metals collectively contribute 1% or less to aquatic or terrestrial wildlife risks. For these reasons, arsenic, beryllium, and lead will not be evaluated further in the ecological assessment.

5. ENVIRONMENTAL FATE AND TRANSPORT MODELING

Environmental concentrations of the selected chemicals were calculated in order to conduct the human health and ecological risk assessments. This section describes the methods used to calculate these concentrations. The environmental concentrations needed for the inhalation human health risk assessment were ambient air concentrations for all compounds regulated under the facility's current permit. The environmental concentrations needed for the multiple pathway risk assessment (i.e., for mercury and PCDDs/PCDFs) consist of concentrations in ambient air, soil, produce, beef and fish. The environmental concentrations needed for the ecological risk assessment included mercury and PCDD/PCDF levels in water, sediments and fish.

5.1 Summary of Air Dispersion and Deposition Modeling Information

Potential environmental concentrations were calculated by combining air dispersion and deposition modeling information with USEPA fate and transport algorithms. Air dispersion and deposition modeling was performed by RTP Environmental Associates (2002a) for the ERF facility. RTP's modeling analysis provided the information necessary to calculate ambient air concentrations and deposition rates for the selected chemicals of concern. This section presents RTP's modeling results.

RTP performed the modeling using the USEPA-approved Industrial Source Complex Short-Term (ISCST) model. The model was applied across a 20 km-by-20 km modeling domain with the facility stack at its center. This modeling domain was selected by RTP based on prior experience modeling similar sources and a screening analysis conducted for this facility. This modeling domain size is also supported by USEPA's modeling of emissions from numerous combustion sources that was conducted to support the Agency's proposed Maximum Achievable Control Technology (MACT) standard for hazardous waste combustors (RTI 1996). USEPA's model results showed that the maximum ambient air concentrations occurred within the first 3 km downwind of the stack. The maximum deposition impacts (i.e., wet plus dry deposition) occurred within 100 meters for 10 of the 11 combustors modeled and at 700 meters for the 11th facility. Moreover, the USEPA modeling results showed that deposition rates decreased by at least 100 times within the first 10 km for the evaluated combustion facilities.

This human health and ecological risk assessment relies on modeling results assuming operation of the existing two-unit facility along with the proposed third unit. The ISCST modeling was conducted using a unitized emission rate of 1 g/sec. Chemical-specific ambient air concentrations and deposition rates were then calculated by multiplying the unitized modeling results by the chemical-specific emission rates.

RTP's modeling results were applied in the risk assessment as follows:

- Risks for the inhalation risk assessment were based on ambient air concentrations for the full list of chemicals of concern (see Table 4-3). The ambient air concentrations were calculated using two types of input information provided by RTP: long-term average and 1-hour average maximum unitized ambient air concentrations (in units of $\mu\text{g}/\text{m}^3$ per 1 g/sec) and chemical-specific emission rates (in units of g/sec). The emission rates used in the inhalation risk assessment were based on existing permit limits for the two units that are currently operating and proposed permit limits for the proposed third unit.
- Risks for the multiple pathway human health risk assessment and the ecological risk assessment were based on ambient air concentrations and deposition rates for mercury and PCDDs/PCDFs. The ambient air concentrations and deposition rates were calculated using three types of input information provided by RTP: long-term average unitized ambient air concentrations (in units of $\mu\text{g}/\text{m}^3$ per 1 g/sec), long-term average unitized deposition rates (in units of $\text{g}/\text{m}^2\text{-yr}$ per 1 g/sec) and chemical-specific emission rates (in units of g/sec). The emission rates used in the multiple pathway risk assessment and the ecological risk assessment were based on long-term average stack gas concentrations measured from the two units that are currently operating in conjunction with the maximum stack gas flow rate expected for all three units operating simultaneously.

Each of the modeling outputs listed above will be briefly described in this section. For more information, the reader may refer to the PSD Permit Application that has been prepared for the Lee County facility.

5.1.1 Modeling Results Used in the Inhalation Risk Assessment

Ambient air concentrations for the inhalation risk assessment were calculated from the unitized air concentrations predicted by RTP (2002a) and the permit-based chemical emission rates. The maximum impact point modeling results (i.e., maximum impacts beyond the facility boundary) were relied upon in this analysis. Air concentrations at all other locations beyond the property boundary will be lower than those calculated at the maximum impact point.

Two types of unitized model output were used in the inhalation risk assessment, as described below.

- The long-term average unitized ambient air concentration (averaged over a 5-year period based on 1990-1994 meteorological data) was used to evaluate chronic long-term inhalation risks at the maximum impact point. The specific ISCST model outputs used were the maximum unitized vapor phase ambient air concentration and the maximum unitized particle phase

ambient air concentration. The calculation of chemical air concentrations from the unitized vapor and particulate modeling outputs was performed in accordance with USEPA (1998a) guidance. The maximum impact point (for both vapor and particle phase ISCST output) was found to occur roughly 2.5 km (1.5 miles) to the west-south-west of the facility stack. The maximum long-term average air impact was predicted to occur for a set of stack gas conditions referred to as "Case F" in RTP's (2002a) analysis. This condition assumed that all three units would be operating simultaneously.

- The short-term 1-hour average unitized ambient air concentration was used to evaluate short-term acute inhalation risks at the maximum impact point. The short-term unitized result was conservatively modeled assuming no reduction in concentrations due to deposition (thus there was no need to differentiate between vapor phase and particle phase results). The short-term maximum impact point occurred roughly 0.7 km (0.4 miles) to the south-south-west of the facility stack. The maximum 1-hour average impact was predicted to occur for a set of stack gas conditions referred to as "Case E" in RTP's (2002a) analysis. The highest short-term impact was predicted to occur when one existing unit and the proposed unit were operating simultaneously rather than when all three units were assumed to be operating together.

Table 5-1 presents the maximum long-term average unitized modeling result described above in addition to the maximum chemical-specific long-term average ambient air concentrations. Table 5-2 presents the maximum 1-hour average unitized modeling result as well as the chemical-specific concentrations. The chemical-specific concentrations shown in Tables 5-1 and 5-2 are used in the inhalation risk assessment (see Section 6 below).

5.1.2 Modeling Results Used in the Multiple Pathway and Ecological Risk Assessment

The multiple pathway human health risk assessment and the ecological risk assessment required calculation of long-term average ambient air concentrations and deposition rates for mercury and PCDDs/PCDFs. These were calculated from unitized air concentrations and unitized deposition rates predicted by RTP (2002a) and chemical emission rates based on average stack gas concentrations measured at the facility. RTP's unitized long-term average model results were predicted to occur for a set of stack gas conditions referred to as "Case F" which was based on all three units operating at the same time. Emission rates were based on average stack gas concentrations, instead of permit limits, to more accurately reflect long-term operating conditions and thus allow a more refined estimate of potential long-term risks.

RTP's unitized modeling results were compiled for four locations that were selected for evaluation in the human health and ecological risk assessment. These locations consisted of the following:

- The maximum impact point
- The maximally impacted nearby area that could be used for animal grazing
- A nearby typical pond and its watershed
- The Caloosahatchee River and its watershed

With the exception of the maximum impact point, the other locations are areas (i.e., the animal grazing area, the nearby pond and its watershed area, and the Caloosahatchee River and its watershed area). For these areas, RTP's unitized modeling results were averaged across all modeled receptor points located within each area for use in the multiple pathway risk assessment.

For each of these locations, several types of ISCST model output were compiled because they were needed to calculate either ambient air concentrations or deposition rates. These outputs consisted of the following:

- unitized vapor phase ambient air concentration ($\mu\text{g}/\text{m}^3$ per 1 g/sec)
- unitized particle phase ambient air concentration ($\mu\text{g}/\text{m}^3$ per 1 g/sec)
- unitized wet vapor phase deposition rate ($\text{g}/\text{m}^2\text{-yr}$ per 1 g/sec)
- unitized wet particle phase deposition rate ($\text{g}/\text{m}^2\text{-yr}$ per 1 g/sec)
- unitized dry particle phase deposition rate ($\text{g}/\text{m}^2\text{-yr}$ per 1 g/sec)

Wet and dry deposition modeling requires information on the size distribution of particles within the stack. For the ISCST modeling, RTP used a surface area weighted particle size distribution measured at the Wurzburg, Germany waste-to-energy facility (RTP 2002a). A surface area weighted particle size distribution is appropriate for both mercury and PCDDs/PCDFs (USEPA 1998a) (see Appendix B).

One of the most important sources of uncertainty in any combustion source risk assessment, including this one, is the modeled wet deposition rates. The level of scientific support and validation for predicting wet deposition in ISCST is notably different from that for predicting dry deposition of particles. The algorithms in ISCST used to predict dry deposition rates for particles are based on a well-understood process and have been evaluated in detail. In contrast, the wet deposition algorithms in ISCST have not received the verification necessary to support their use in a regulatory context. These algorithms were not developed within USEPA's Office of Air Quality Planning and Standards (OAQPS) as the dispersion and dry particle deposition portions of ISCST were. The wet deposition algorithms in ISCST have not undergone detailed scientific peer review, nor have they been validated or calibrated. Rather, the methods used to predict wet deposition in combustion source risk assessments are simple

approximations that contain large uncertainties which will tend to bias the results to an overprediction of exposure and risk. For example, the algorithm used to model wet deposition of particles in ISCST does not differentiate between the physical processes that are relevant to wet deposition in the near field (close to the stack) versus the far field (far from the stack). These wet deposition modeling uncertainties, and the potential for over-estimating risk, should be recognized when interpreting the results of this risk assessment.

Each of the necessary ISCST modeling results was compiled for each of the four locations, as shown in Table 5-3. These results are combined with chemical-specific emission rates in the sections below to calculate chemical-specific ambient air concentrations and deposition rates.

Table 5-3 also provides additional information about the modeling location or area for which the ISCST results were compiled. For example, the maximum impact point for air concentrations and dry deposition rates occurred roughly 1.5 miles to the west-south-west of the facility stack. The maximum impact point for wet and total deposition was found to occur roughly 0.12 miles to the east-north-east of the ERF facility. Although not located at the same place, these data were conservatively assumed to be collocated and used together in the risk assessment to describe maximum impact point results, even though this approach will overestimate potential risks.

5.2 Modeled Concentrations of Chemicals in Ambient Air and Deposition Rates

Long-term average chemical concentrations in ambient air and chemical deposition rates were calculated using the unitized ISCST modeling results and chemical emission rates based on stack measurements. The ISCST results in units of $\mu\text{g}/\text{m}^3$ per 1 g/sec for air concentrations and $\text{g}/\text{m}^2\text{-year}$ per 1 g/sec for deposition rates were multiplied by chemical-specific emission rates (in g/sec) to calculate chemical air concentrations and deposition rates.

Table 5-4 presents the mercury and PCDD/PCDF emission rates used to calculate environmental concentrations. The stack test data from which emission rates were calculated are shown in Appendix B. The resulting ambient air concentrations and deposition rates for the maximum impact point are shown in Table 5-5. Concentrations and deposition rates at any other location or for any other area beyond the property boundary are lower than the values shown in this table.

5.3 Modeled Concentrations of Chemicals in Soil

Chemical concentrations in soil were calculated for mercury and PCDDs/PCDFs using mathematical fate and transport algorithms provided in USEPA (1998a). Except where otherwise noted in this assessment, all equations and input

parameters used to calculate soil concentrations were obtained from default information provided in USEPA (1998a). Site-specific information was used in some cases in place of the default inputs. The input parameters used to calculate environmental concentrations are provided in several tables and discussed below.

Table 5-6 provides the chemical-specific input parameters used to calculate soil concentrations (as well as other environmental concentrations). These parameters are required in many of the USEPA (1998a) equations. The values were directly obtained from USEPA (1998a).

In addition to chemical-specific properties, numerous other input parameters were required for the USEPA (1998a) fate and transport modeling equations used to calculate soil concentrations (and other environmental concentrations). Table 5-7 lists each of these parameters, the parameter's name and the acronym that USEPA uses to describe this parameter in its fate and transport modeling equations. The value selected for each parameter and the source for the selected value are also shown in Table 5-7. As can be seen in this table, many of the input parameters were treated using the default assumptions defined by USEPA (1998a). These default assumptions are generally conservative and will, therefore, tend to overestimate potential risks. Some input assumptions reflect site-specific information that was compiled by Malcolm Pirnie, Inc., as noted in Table 5-7.

Table 5-8 lists the calculated chemical soil concentrations. These soil concentrations were calculated based on the maximum impact point wet and dry chemical deposition rates. The concentrations are overestimated because they conservatively assume that the maximum impact point for dry deposition occurs at the same location as the maximum impact point for wet deposition, though this does not occur (see above). As shown in this table, two types of soil concentrations were calculated based on USEPA (1998a) fate and transport models. One calculation produces the highest annual average concentration occurring during the operating lifetime of the proposed three-unit facility. The other calculation produces the long-term average soil concentration over the entire projected lifetime of the proposed three-unit facility. Since these soil concentrations were calculated based on maximum impact point deposition rates, soil concentrations at all other locations beyond the property boundary are lower than these values.

5.4 Modeled Concentrations of Chemicals in Produce and Beef

Chemical concentrations were also calculated in homegrown produce, animal feed crops (forage and grain) and beef. As with soil concentrations, chemical concentrations in produce, feed crops and beef were calculated using mathematical fate and transport algorithms presented by USEPA (1998a). The chemical-specific input parameters shown in Table 5-6 and fate and transport

input parameters shown in Table 5-7 were applied in these calculations, along with the chemical-specific air concentrations and deposition rates.

Concentrations in produce and feed crops were calculated based on impacts from direct dry and wet particle deposition onto the plant surface, root uptake from soil, and vapor phase air-to-plant uptake. Beef tissue concentrations were calculated based on the animal's intake of feed crops as well as incidental ingestion of soil. The produce and beef concentrations are used in the multiple pathway risk assessment to calculate potential human health risks associated with exposures to produce and beef in the risk assessment.

Concentrations in produce were calculated at the maximum impact point. Concentrations in feed crops and beef were calculated for the maximally impacted area that could plausibly be used for animal grazing (a utility corridor adjacent to the property boundary). Table 5-9 summarizes these environmental concentrations.

5.5 Modeled Concentrations of Chemicals in Water and Fish

Chemical concentrations were modeled in both the Caloosahatchee River and in a representative shallow pond typical of the area to the south-south-west of the facility in which numerous ponds are located. Concentrations were modeled in the water column (total and dissolved) and in benthic sediments taking into account direct deposition onto the waterbody as well as indirect input to the waterbody from runoff and soil erosion in the watershed. The river modeling focused on the roughly 21 km length of the Caloosahatchee River and the approximately 100 square mile river watershed area contained within the 20 km-by-20 km ISCST modeling domain. The pond modeling focused on a typical pond characteristic of a 26 square mile area south-south-west of the facility which contains a variety of water bodies. This 26 square mile area is bounded on the north by State Route 82, on the west by Interstate 75, and on the east and south by the edges of the 20 km-by-20 km modeling domain. The typical pond within this area was characterized based on GIS modeling performed by Malcolm Pirnie, Inc. to be roughly 0.04 square miles in size with a watershed area of approximately 0.07 square miles.

In addition, concentrations in fish assumed to reside in each waterbody were also calculated. Bioaccumulation data applicable to a higher trophic level fish (i.e., trophic level 4) were used to calculate fish tissue concentrations.

Concentrations of PCDDs/PCDFs were calculated using mathematical fate and transport algorithms provided in USEPA (1998a). The input data used in these algorithms include chemical-specific properties, which are shown in Table 5-6, and numerous other fate and transport modeling input parameters, which are shown in Table 5-7.

Concentrations of mercury were modeled using a model developed by USEPA that better addresses the complexities of the environmental fate and transport of combustion source mercury emissions in a watershed and lake environment (USEPA 1997, Lyon et al. 1998). This model, referred to as IEM-2M, has been applied by USEPA in the *Mercury Report to Congress (MRTC)* (USEPA 1997) as well as the *Utility Report to Congress* (USEPA 1998c). IEM-2M models individual chemical species of mercury and, unlike the default approaches in USEPA (1998a), includes specific transformation rates affecting mercury compounds in soil, water and sediments. At the core of the IEM-2M model are nine differential equations describing the mass balance of each mercury species in the watershed surficial soil layer, in the water column, and in the waterbody's surficial benthic sediments. Transformations associated with oxidation, reduction, methylation and demethylation are taken into account in the model. The model evaluates several mercury sources and sinks in the watershed and water body. Mercury sources include wet and dry deposition loadings to the watershed soils and waterbody in addition to diffusion of vapor phase mercury. Mercury sinks include vertical leaching from watershed soils, burial in lake sediments, volatilization of mercury from watershed soil and the water column, and advection of mercury out of the waterbody. A detailed presentation of the IEM-2M model algorithms is provided in Volume III of USEPA's *MRTC* (USEPA 1997). Appendix C provides a description of the application of the IEM-2M model in the Lee County ERF study.

Chemical-specific input parameters used in the IEM-2M model were obtained from the *MRTC* (USEPA 1997). Additionally, Malcolm Pirnie, Inc. compiled site-specific data where possible for use in the IEM-2M model. These inputs are provided in Table 5-10 for the nearby pond and Table 5-11 for the Caloosahatchee River. These tables list the chemical-specific input parameters for each mercury species, the mercury emission rates, modeling constants, and the site-specific parameters used in the model. Additional information on the mercury concentrations used in the IEM-2M model, mercury loading rates and information related to solving the IEM model's differential equations is provided in Table 5-12 for the nearby pond and Table 5-13 for the Caloosahatchee River.

The resulting concentrations of mercury and PCDDs/PCDFs in the Caloosahatchee River and in fish assumed to reside in the river are shown in Table 5-14. The concentrations of mercury and PCDDs/PCDFs calculated for the nearby pond and fish assumed to reside in the pond are shown in Table 5-15.

5.6 Comparison to Typical Environmental Concentrations

The calculated environmental concentrations may be put into context by comparison with typical environmental levels. This section compares the calculated environmental concentrations associated with stack emissions from the proposed three-unit Lee County ERF with available environmental data. These comparisons show that the environmental concentrations calculated

based on stack emissions from the proposed three-unit facility are consistent with or well below typical environmental levels. As a result, the proposed three-unit ERF will not measurably increase the typical concentrations of chemicals in the environment.

5.6.1 Comparison to PCDD/PCDF Environmental Concentrations

Typical levels of PCDDs/PCDFs in the environment have been compiled by USEPA (2000) as part of its Dioxin Reassessment project. In its presentation of data, USEPA expresses the concentrations of mixtures of PCDDs/PCDFs as 2,3,7,8-TCDD toxic equivalent (TEQ) concentrations. In this method, the concentration of each 2,3,7,8-PCDD/PCDF congener is multiplied by its 2,3,7,8-TCDD toxic equivalency factor (TEF), which produces a TEQ concentration for the congener. The TEQ concentrations for all congeners are then summed to produce a total PCDD/PCDF concentration expressed as TEQs.

TEFs relate the toxicity of a PCDD/PCDF congener to the toxicity of 2,3,7,8-TCDD, the most well-studied and most toxic congener among the PCDDs/PCDFs. The TEFs currently recommended for use by USEPA and specified by WHO (1998) and Van den Berg et al. (1998) are used in this risk assessment.⁴ In this system, the TEF for 2,3,7,8-TCDD is 1.0 and the other congeners have TEF values ranging from 1.0 to 0.0001. For example, the TEF for 2,3,7,8-TCDF is 0.1, which means that the potential toxicity of 2,3,7,8-TCDF is considered to be 10 times lower than that for 2,3,7,8-TCDD.

The TEQ concentrations provided by USEPA (2000) for soil, air, beef, sediment and fish were compared to the concentrations calculated in this assessment. The concentrations calculated in this assessment were converted to TEQ concentrations using the same method applied by USEPA (2000) to allow comparisons to be made. A summary of the resulting comparisons is provided below.

- USEPA (2000) presents mean TEQ soil concentrations ranging from 2.5E-6 mg/kg⁵ in rural areas to 9.4E-6 mg/kg in urban areas. The TEQ soil concentrations calculated at the single maximum impact point in this assessment (highest annual average and long-term average for the proposed three-unit facility) are less than 1E-6 mg/kg. The concentrations

⁴ USEPA TEFs for human health are as follows:

1,2,3,4,6,7,8-HpCDD = 0.01;	1,2,3,4,6,7,8-HpCDF = 0.01;	1,2,3,4,7,8,9-HpCDF = 0.01;
1,2,3,4,7,8-HxCDD = 0.1;	1,2,3,6,7,8-HxCDD = 0.1;	1,2,3,7,8,9-HxCDD = 0.1;
1,2,3,4,7,8-HxCDF = 0.1;	1,2,3,6,7,8-HxCDF = 0.1;	1,2,3,7,8,9-HxCDF = 0.1;
2,3,4,6,7,8-HxCDF = 0.1;	OCDD = 0.0001;	OCDF = 0.0001;
1,2,3,7,8-PeCDD = 1.0;	1,2,3,7,8-PeCDF = 0.05;	2,3,4,7,8-PeCDF = 0.5;
2,3,7,8-TCDD = 1.0;	2,3,7,8-TCDF = 0.1.	

⁵ 2.5E-6 is one way of presenting scientific notation. 2.5E-6 is equivalent to 2.5×10^{-6} and 0.0000025.

calculated for the ERF, however, are overestimated because they conservatively assume that the maximum impact point for air concentration and dry deposition occurs at the same location as the maximum impact point for wet deposition, though this will not occur (see Section 5.1.2 above). As a result, PCDD/PCDF soil concentrations associated with the proposed three-unit facility will not cause a measurable change in typical environmental levels.

- Mean TEQ air concentrations for urban and rural areas are listed at $1.2\text{E-}7 \mu\text{g}/\text{m}^3$ and $1.7\text{E-}9 \mu\text{g}/\text{m}^3$, respectively, by USEPA (2000). The calculated TEQ air concentration at the maximum impact point in this study is less than $5\text{E-}10 \mu\text{g}/\text{m}^3$. Thus TEQ air impacts for the proposed three-unit ERF will not cause a measurable change in typical air concentrations.
- The mean beef tissue TEQ concentration provided by USEPA (2000) is $2\text{E-}7 \text{ mg/kg}$, whereas the TEQ concentration calculated in this assessment is less than $1\text{E-}8 \text{ mg/kg}$. This concentration assumes that beef cattle exclusively reside in a maximally impacted area (utility corridor) immediately adjacent to the ERF property boundary and obtain all their food from this area. As a result, TEQ beef tissue concentrations calculated for the proposed three-unit facility will not cause a measurable change relative to typical beef tissue levels.
- USEPA (2000) presents a mean TEQ sediment concentration of $5.3\text{E-}6 \text{ mg/kg}$. In comparison, the TEQ concentrations calculated in this study for the Caloosahatchee River and a nearby pond are less than $1\text{E-}7 \text{ mg/kg}$. Thus the impacts for the proposed three-unit facility will not cause a measurable change in typical TEQ sediment concentrations.
- The mean TEQ fish tissue concentration presented by USEPA (2000) is $1\text{E-}6 \text{ mg/kg}$. The TEQ concentrations calculated for the river and a nearby pond are less than $1\text{E-}8 \text{ mg/kg}$. As a result, the impacts for the proposed three-unit facility will not cause a measurable change in typical fish TEQ concentrations.

5.6.2 Comparison to Mercury Environmental Concentrations

USEPA (1997) compiled a wide variety of environmental data on mercury in its *Mercury Report to Congress*. In addition, some information specific to the State of Florida is also available. A summary of information comparing the calculated mercury concentrations in this study with typical environmental data is provided below.

- USEPA (1997) indicates that typical mercury levels in U.S. soil range from roughly 0.008 mg/kg to 0.1 mg/kg . Boerngen and Shacklette (1981) found mercury levels in Lee County and surrounding Florida counties to range

from 0.01 to 0.11 mg/kg. The mercury concentrations calculated in this study for the proposed three-unit ERF (summed across the three mercury species) at the single maximum impact point are less than 0.1 mg/kg. As noted above for PCDDs/PCDFs, these concentrations are overestimated because they conservatively assume that the maximum impact point for air concentration and dry deposition occurs at the same location as the maximum impact point for wet deposition. As a result, the mercury soil concentrations associated with stack emissions from the proposed three-unit facility will not cause a measurable change in typical environmental levels.

- Ambient air concentrations of mercury reported by USEPA (1997) range from 1 ng/m³ - 4 ng/m³ for rural areas and from 10 ng/m³ - 170 ng/m³ for urban areas. The long-term average maximum impact point concentrations due to emissions from the proposed three-unit facility are less than 0.03 ng/m³. Thus, air impacts of the proposed three-unit ERF will not cause a measurable change in typical mercury air concentrations.
- An official with the South Florida Mercury Science Program notes that the background mercury concentration in surface water in the southern half of Florida ranges from roughly 1E-6 mg/L to 2E-6 mg/L (Atkeson 2002). The mercury concentrations due to emissions from the proposed three-unit ERF (summed across the three mercury species) for the river and nearby pond are less than 1E-7 mg/L. As a result, surface water impacts due to the proposed facility will not measurably affect typical background levels.
- Measured levels of mercury in bass, as noted in the Biological Monitoring section above, have been in the range of 0.5 mg/kg - 1.7 mg/kg (fw) (Atkeson and Parks 2002). The impact on mercury fish tissue levels calculated in this study, based on bioaccumulation data for trophic level 4 fish (applicable to bass) are well below the measured levels, ranging from 0.01 mg/kg for the Caloosahatchee River to 0.0004 for a nearby typical pond. Thus fish tissue mercury impacts due to emissions from the proposed three-unit facility will not cause a measurable change in typical environmental concentrations in fish.

6. HUMAN HEALTH RISK ASSESSMENT

This section presents a description of the methods used for the human health risk assessment and its results. As described above, two types of human health risk analyses were performed, an inhalation risk assessment for compounds regulated under the facility's current permit and a more refined multiple pathway risk assessment for mercury and PCDDs/PCDFs. Each of these analyses is described below.

6.1 Inhalation Risk Assessment

Potential risks from inhalation at the maximum impact point were calculated for each chemical based on the maximum impact point ambient air concentrations, default exposure assumptions specified in USEPA (1998a), and chemical toxicological criteria. The maximum impact point long-term ambient air concentrations based on facility permit limits were presented above in Table 5-1. The maximum impact point 1-hour average ambient air concentrations were presented in Table 5-2. These air concentrations are used to evaluate potential chronic long-term and acute short-term inhalation exposures and risks.

6.1.1 Chronic Health Risks

The information needed to calculate long-term inhalation exposures and potential risks includes the predicted air concentrations, inhalation rates, and data on body weight, exposure frequency (i.e., hours/day and days/year exposed) and exposure duration (i.e., total years exposed). This risk analysis relied on the following exposure parameters, all of which are default values obtained from USEPA (1998a):

- inhalation rate = 0.3 m³/hr (child) and 0.63 m³/hr (adult),
- exposure time = 24 hrs/day,
- exposure frequency = 350 days/yr,
- exposure duration = 6 yrs (child) and 40 yrs (adult - default for a farmer),
- body weight = 15 kg (child) and 70 kg (adult).

Chronic long-term risks were calculated by combining the exposure estimates with toxicity values for cancer and noncancer effects. Cancer risks reflect the upper bound probability that an individual may develop cancer over a 70-year lifetime under the assumed exposure conditions. Cancer risks were calculated separately for each chemical and also summed across chemicals. The cancer risks were evaluated relative to a target risk level of 1×10^{-5} identified in USEPA (1998a) and the State of Florida's common target risk level of 1×10^{-6} . A cancer risk of 1×10^{-5} means that an individual could have, at most, a one in 100,000 chance of developing cancer over a 70-year lifetime under the evaluated

exposure conditions. In comparison, each person in the U.S. has a background risk of developing cancer over a lifetime of about one in three.

The potential for noncancer effects was determined by comparing the inhalation exposures with noncancer toxicity criteria (inhalation reference air concentrations). A hazard quotient was calculated for each chemical by dividing its air concentration by its inhalation reference concentration. Each chemical was evaluated separately and then the individual hazard quotients were summed across chemicals that have the potential to affect similar target organs or health effect endpoints. The sum of a number of hazard quotients is referred to as a hazard index. The hazard index result reflects exposure to mixtures of chemicals with similar health effects. This result was evaluated against a target hazard index level of 1 which is customary in risk assessment practice.

The results of the chronic inhalation risk analysis are presented in Table 6-1. This table shows that long-term noncancer health effects would not be expected to occur even at the maximum impact point. This is because the calculated hazard index values (ranging from 0.01 to 0.0001) are all at least 100 times below the target level of 1. The excess lifetime cancer risks, ranging from $7E-8$ to $2E-7$, are at least 50 times below USEPA's regulatory target risk level of $1E-5$ (one in one hundred thousand) and at least five times below Florida's common target risk level of $1E-6$.

6.1.2 Acute Health Risks

Maximum 1-hour average air concentrations were also calculated for each compound and compared to acute reference air concentrations, as shown in Table 6-2. This comparison shows that the maximum 1-hour average ambient air concentrations are all at least 200 times lower than the concentrations at which short-term health effects (e.g., irritation) could occur.

6.2 Multiple Pathway Risk Assessment

This section presents the methods and results of the refined multiple pathway risk assessment conducted for mercury and PCDDs/PCDFs. This assessment was conducted according to guidance presented by USEPA (1998a). It relies on the environmental concentrations and toxicity criteria presented above, and evaluates potential human exposures via multiple exposure pathways. Potential long-term chronic risks, both excess lifetime cancer risks and the potential for noncancer effects, are evaluated.

6.2.1 Exposure Assessment

A list of hypothetical pathways was selected for evaluation based on both site-specific information and considering USEPA (1998a) recommendations. Site-specific information on local land use patterns and residential behaviors was

obtained from contacts with local officials, published information from local and state agencies, and a detailed drive-through survey of the area surrounding the facility.

Lee County, as with other counties in southwest Florida, has experienced significant growth in population over the past several decades. From 1990 to 2000, the population of the county increased from roughly 335,000 people to 440,000 people (SWFRPC 2002). As noted in SWFRPC (2002), "The majority of the population growth has resulted from migration of retirees who moved to the area to enjoy the warm weather and ideal climate. As a result, the retiree influx has produced a population that is primarily white and generally older than the state as a whole." This changing pattern of demographics in the county is relevant because it helps identify not only the types of exposure pathways that may occur in the ERF facility area, but also the extent to which each exposure pathway may be relevant to nearby populations.

The area surrounding the Lee County ERF facility contains both new residential developments, as well as larger residential plots comprised of a few acres of land, portions of which are used for gardens and farm animals. Isolated farm animals, such as cattle, goats, pigs, and chickens were observed on some of the larger residential plots during the drive-through survey. Some larger plots of open land were also observed to be used for cattle grazing. Information obtained from local officials indicates that very few cattle are raised in Florida, in general, up until slaughter; rather the cattle are raised for about 7-8 months and then shipped out of state for fattening and slaughter purposes (Handley 2002, Pate 2002). Information on the extent to which families rely on home-raised animals as a food source is generally difficult to obtain. While it is always possible that a family may rely on their own animals as a food source, contacted local officials suggested this scenario is unlikely in Lee County for a variety of reasons (e.g., cattle need to be fattened prior to slaughter, the climate is not conducive for fattening conditions, there is only one slaughterhouse facility in the state of Florida) (Pate 2002, Handley 2002, Chamblis 2002, Townsend 2002).

The predominant agricultural use of land in the area is for citrus groves and home gardens. Fishing is a very popular activity in Lee County. In the Lee County ERF facility area (up to roughly 6 miles away), fishing occurs in the Caloosahatchee River, canals, drainage ditches and ponds.

Based on this local information and regulatory guidance, a set of hypothetical exposure pathways was identified for evaluation in the risk assessment. This matrix of pathways is shown in Table 6-3. It addresses several general receptors (adults, children, and infants), different categories of behavior (typical resident, beef farmer, and fisher), and a number of routes of exposure (inhalation, soil ingestion, produce ingestion, fish ingestion, etc.). Each adult or child receptor was hypothesized to be simultaneously exposed through multiple pathways (e.g., the child resident was exposed via inhalation, soil ingestion, and ingestion of

locally-grown produce). Each adult receptor was also assumed to be the mother of a breast-fed infant.

The information needed to calculate exposures through each of these pathways includes the predicted environmental concentrations, rates of exposure for each pathway (e.g., vegetable ingestion rates, soil ingestion rates, beef ingestion rates), and data on body weight, exposure frequency (i.e., days/year exposed) and exposure duration (i.e., total years exposed). The exposure assumptions address each of the hypothetical receptor types evaluated in this assessment - adults, children and infants. Table 6-4 provides this information and, for each parameter, includes the value that was used in the risk assessment. All exposure parameter values were defaults obtained from USEPA (1998a). These parameter values have been intentionally derived to produce a conservative (i.e., health protective) estimate of exposure. For example, an important USEPA default value assumes that beef farmers obtain 100% of the beef they ingest from their own locally raised beef cattle, which have, in turn, obtained 100% of their food from locally-grown feed crops. This assumption is not supported by local official information, but was evaluated to ensure that the health risk assessment conservatively addressed potential risks.

6.2.2 Methods to Evaluate Chronic Health Risks

Excess Lifetime Cancer Risks and Potential for Noncancer Effects

Potential long-term risks associated with exposure to mercury and PCDDs/PCDFs through the multiple pathways were calculated by combining calculated exposures with toxicity values for cancer and noncancer effects.

As with the inhalation risk assessment, cancer risks were calculated separately for each chemical and summed across chemicals for each exposure pathway. Risks were added across pathways as relevant for specific hypothetical population groups (e.g., adult resident, child resident). As noted above, the cancer risks were evaluated relative to a USEPA regulatory target risk level of $1E-5$ (i.e., 1×10^{-5}) and a common Florida target risk level of $1E-6$ (i.e., 1×10^{-6}). A cancer risk of $1E-5$ means that an individual could have, at most, a one in 100,000 chance of developing cancer over a 70-year lifetime under the evaluated exposure conditions.

The potential for noncancer effects was determined by comparing the calculated exposures with noncancer reference doses (RfDs). A hazard quotient was calculated for each chemical by dividing its exposure by its reference dose. Each chemical and pathway was evaluated separately, with results added across chemicals that have the potential to affect similar target organs or similar health effect endpoints. The sum of a number of hazard quotients is referred to as a hazard index. The hazard index results were also added across pathways as relevant. Each final hazard index result, therefore, reflects exposure to mixtures

of chemicals with similar health effects through multiple exposure pathways. This result was evaluated against a target hazard index level of 1.

Dioxin Exposure Evaluation

The USEPA has not developed a noncancer reference dose for PCDDs/PCDFs. As an alternative, a margin of exposure approach developed by USEPA was applied to compare the calculated doses in the risk assessment to typical background U.S. exposure levels. Accordingly, the maximum PCDD/PCDF toxic equivalent (TEQ)⁶ average daily doses predicted for the child and adult receptors in this risk assessment were compared to typical background levels. The background exposure levels were based on published estimates prepared by USEPA (Schaum et al. 1999). Recognizing that there are important uncertainties inherent in USEPA's estimates, the current average background exposure levels were assumed to be 1 pg TEQs/kg-day.

Risk assessment methodologies have not been developed to quantitatively evaluate the potential risks to a breast-fed infant from exposure to PCDDs/PCDFs using traditional regulatory cancer and noncancer risk approaches. As an alternative, the average daily dose to PCDDs/PCDFs, expressed as 2,3,7,8-TCDD TEQs was calculated and then compared to a comparison background level per USEPA (1998b) guidance. The comparison level used in this analysis is currently specified by USEPA (1998b) as an average infant breast-milk intake level of 60 pg TEQs/kg-day. It is very important to recognize, however, that the method specified for use in this risk assessment is a default regulatory approach; it does not reflect actual knowledge of the potential health effects, if any, of short-term exposure via breast-milk ingestion on an infant.

6.2.3 Chronic Health Risk Results

Summaries of the risk assessment results are discussed in this section and presented in a series of associated tables.

Excess Lifetime Cancer Risks and Potential for Noncancer Effects

Table 6-5 presents the excess lifetime cancer risks calculated in the multiple pathway risk assessment. This table shows the cancer risk for oral and inhalation exposure pathways separately and combined for each receptor. The specific exposure pathways included for each hypothetical receptor are also presented. The detailed excess lifetime cancer risk results are provided in Appendix D for all hypothetical receptors.

All of the excess lifetime cancer risks calculated in this analysis were at least 10 times below USEPA's target cancer risk level of 1×10^{-5} and did not exceed

⁶ See Section 5.6 for a discussion of TEQs and toxic equivalency factors (TEFs).

Florida's target risk level of 1×10^{-6} . The total excess lifetime cancer risks ranged from 1×10^{-7} for the hypothetical child resident to 1×10^{-6} for the hypothetical adult fisher.

Table 6-6 presents the results of the chronic noncancer risk evaluation. The total hazard index is provided for oral and inhalation pathways separately and then combined for each evaluated receptor. The detailed noncancer results are provided in Appendix D for all hypothetical receptors.

All of the hazard index values calculated in this analysis were at least 10 times below the target hazard index of 1.0. The highest hazard index result was 0.1 for the adult Caloosahatchee River fisher scenario.

Dioxin Exposure Evaluation

Maximum PCDD/PCDF TEQ average daily doses predicted for hypothetical child and adult receptors in this risk assessment were compared to typical background levels. The maximum average daily doses predicted in this risk assessment were 0.01 pg TEQs/kg-day for an adult and 0.02 pg TEQs/kg-day for a child, both based on the hypothetical fisher scenario for the nearby typical pond. These doses are roughly 100 times below USEPA's current estimates of background PCDD/PCDF exposure (i.e., 1 pg TEQs/kg-day). As a result, TEQ exposures to people due to emissions from the proposed three-unit ERF will not cause a measurable change in typical background exposures.

Table 6-7 presents the calculated hypothetical infant exposures to PCDDs/PCDFs due to breast-milk ingestion. These exposures were found to range from 0.1 to 0.4 pg TEQs/kg-day, more than 100 times below the target exposure level of 60 pg TEQs/kg-day identified in USEPA (1998b). The detailed hypothetical infant results are provided in Appendix D. Thus, infant TEQ exposures due to emissions from the proposed three-unit facility will not cause a measurable change in typical breast-fed infant TEQ exposure levels.

6.3 Uncertainties in the Human Health Risk Assessment

All risk assessments involve the use of assumptions, judgment and incomplete data to varying degrees. This results in uncertainty in the final estimates of risk. In accordance with USEPA (1989, 1992) guidance, this section presents a discussion of key uncertainties affecting the risk assessment.

The results of any risk assessment inherently reflect uncertainty because of the many complexities involved in the analysis. This risk assessment, for example, involved the integration of many steps, each of which is characterized by some uncertainty. These steps include:

- the calculation of chemical emission rates,

- the modeling of potential air concentrations and deposition rates associated with chemical emissions,
- the calculation of chemical concentrations in the environment (e.g., soil, beef, fish and produce) using mathematical models in conjunction with many chemical/physical properties and assumed or site-specific information about the environment in the facility area,
- the calculation of potential exposures to humans through multiple pathways using a combination of default and site-specific exposure parameters, and
- the calculation of potential risks using toxicity information derived in some instances from human data but predominantly from experimental data produced from animal studies.

The human health risk assessment results presented earlier in this report reflect the combination of all of these potential sources of uncertainty.

There are two types of uncertainty generally associated with a risk assessment - one is referred to as variability and the other is a more technical definition of uncertainty.

- Variability results from differences in physical or biological processes, such as the natural differences in how much people weigh or how much they eat. Variability generally cannot be reduced by doing additional research but it can be addressed by incorporating information on the range of values that might be present in a population. In this risk assessment, many single point estimates were used for parameters that are known to vary across the population and, as a result, the risk results presented earlier do not reflect potentially important elements of variability.
- Uncertainty stems from imperfect knowledge of the true value of a variable or model, and is generally reducible through additional research or analysis work (i.e., better data and better models). Uncertain elements in this risk assessment include chemical-specific input parameters (e.g., emission rates, biotransfer factors, cancer slope factors), input parameters describing the physical environment (e.g., animal feed ingestion rates, the dry deposition velocity of gases, and soil and surface water characteristics), and mathematical models (e.g., ISCST, fate and transport equations embodied in the USEPA (1998a) Combustion Guidance). These types of uncertainty are typically very complex to evaluate in a quantitative manner.

Table 6-8 summarizes some of the key assumptions used in this risk assessment and their potential direction of impact on the risk assessment results.

Collectively, the assumptions used in this risk assessment are considered more likely to overestimate potential risks than underestimate them. For example, many conservative (i.e., health protective) assumptions, including reliance on

default values and mathematical models specified in USEPA guidance, were used in this risk assessment in an effort to ensure that potential risks would not be underestimated. As a result, the results in this report are expected to be far more likely to overestimate potential risks than underestimate potential risks.

6.4 Conclusions

The human health risk assessment results presented above show that potential human exposures to emissions from the proposed Lee County ERF (three operating units) are well below regulatory and other target risk levels (e.g., typical PCDD/PCDF exposure levels) for human health. This conclusion takes into account the calculated risk assessment results as well as the conservatism inherent in many of the inputs to the risk assessment, including chemical emission rates and toxicity criteria. As a result, the risks are considered much more likely to be overestimated than underestimated.

7. ECOLOGICAL RISK ASSESSMENT

An ecological risk assessment was conducted to evaluate the potential impacts of facility emissions on the natural systems of the area. The risk assessment followed USEPA guidelines for ecological risk assessment and combustion facility ecological assessment (USEPA 1998d, 1999) and incorporated regional-specific information on wildlife habitats and species use to identify species and habitats of concern.

The ecological assessment focused on mercury and dioxin/furans based on the chemical-screening analysis presented earlier in this report, which demonstrated that these regulated compounds would account for between 98 and 99.9% of potential risk for aquatic and terrestrial wildlife of the area.

7.1 Study Area Habitats

The Lee County ERF is located in southwestern Florida, in the Caloosahatchee River Watershed (USFWS 1999). The major physiographic provinces of the subregion are the Caloosahatchee Valley, Gulf Coast Lowlands, DeSoto Plain and the Immokalee Rise (SWFRPC 1995). The predominant ecological communities in this subregion are the Caloosahatchee River, pine flatwoods, scrub flatwoods, coastal strand, freshwater marshes, mangroves, and sea grasses (USFWS 1999). Cypress swamps, freshwater ponds, and hardwood forests also occur in the general region (Lee County 1986).

Urban, agricultural, and rangeland are the predominant land uses within the study area. Urban and residential development is concentrated to the north and northwest of the ERF along the Caloosahatchee River and to the east (SFWMD 2000). Tracts of agricultural land, and freshwater ponds and associated marshes, occur to the south and southwest, south of State Route (SR) 82 (SFWMD 2000). The headwaters of Six Mile Cypress Slough Preserve are also located in this general region. These ponds and marshes, along with the Caloosahatchee River, represent the principal wildlife habitats of the study area.

The largest tracts of regionally significant natural areas, as identified by the Southwest Florida Regional Planning Council (SWFRPC 2002b), are located outside the study area in extreme southern Lee County (i.e., the Corkscrew Regional Ecosystem Watershed lands) and in the barrier islands and coastal lands to the west (e.g., Ding Darling National Wildlife Refuge, Pine Island Preserve). Given their distance from the ERF, these areas are not included in the assessment.

The ecological risk assessment focuses on potential impacts on the natural communities of the Caloosahatchee River, to the north and northwest of the ERF, and the freshwater ponds and wetlands located to the southwest. The

Caloosahatchee River provides important open water habitat in the region and is home to a variety of fish and wildlife species. The freshwater ponds and emergent wetlands interspersed within the agricultural and range lands provide large tracts of undeveloped areas and are likely home to a variety of birds and other wildlife. In addition, the maximum long-term air concentrations and the maximum long-term dry particle deposition are predicted to occur in the general location of these ponds and wetlands (see Section 5.1).

7.2 Receptors and Endpoints for Evaluation

Lee County, like the rest of South Florida, is home to a diversity of wildlife species. Lee County has been designated a biodiversity hot-spot, with portions of the county supporting seven or more rare species (SWFRPC 2001). Six Mile Cypress Slough is home to more than 20 species of mammals, 79 species of birds, and 60 species of reptiles. Given this diversity, it is not possible to assess risks to all wildlife species. Consequently, this assessment focuses on those wildlife species predicted to be at greatest risk considering habitat use, exposure potential and population status. The following criteria were used to select receptor species for this assessment.

- **Habitat selectivity.** Species were considered for evaluation if they could inhabit or otherwise utilize the Caloosahatchee River and/or the ponds and wetlands located south of the facility, which were identified as the principal habitats of concern in the study area.
- **Foraging Guild.** Species were considered for evaluation if they were aquatic carnivores. Both mercury and dioxins/furans are known to bioaccumulate in aquatic food webs (USEPA 1997, USEPA 2000). Bioaccumulation generally does not occur to any significant degree in terrestrial systems compared to aquatic systems, likely because terrestrial organisms are not constantly exposed to bioavailable forms of chemicals as they are in aquatic systems. Species that feed on non-aquatic prey or on plants were considered to be at a substantially lower risk of exposure, and were not selected for evaluation.
- **Trophic position.** Both mercury and dioxins/furans are known to biomagnify in aquatic food webs (USEPA 1997, USEPA 2000) such that concentrations increase with increasing trophic position. As a result, species located at the top of the food web will have greater exposures than species located near the bottom and, therefore, are more vulnerable to increased exposures and effects. This has been well documented in the general literature for all habitat types, and for the south Florida ecosystem as well (e.g., Cleckner et al. 1998, Duvall and Barron 2000, USEPA 2001a).

- **Population Status.** Endangered and threatened species were considered to be at potentially greater risk of impact from chemical exposures because their populations are already imperiled due to a combination of stressors. In south Florida, habitat loss is one of the principal factors leading to the population decline in endangered and threatened species (Maehr and Meegan 2001, USFWS 1999). Chemical exposures at levels sufficient to cause toxic effects would be an additional stressor that could lead to additional population decline. Table 7-1 identifies the endangered and threatened species that occur in Lee County.
- **Toxicity and Data Availability.** No plant species were selected for evaluation because this receptor group is relatively insensitive to low-level environmental exposure to mercury or dioxins/furans. Reptiles were not selected for evaluation because too few data are available to assess toxicity in this receptor group (Duvall and Barron 2000, Meyers-Schone 2000).

Based on these criteria, the following receptors and endpoints were selected for quantitative evaluation in the ecological assessment.

- **Aquatic life.** Fish and invertebrates inhabiting the Caloosahatchee River and the ponds and wetlands of the area could be exposed to mercury and PCDDs/PCDFs that deposit in these waters. Both mercury and PCDDs/PCDFs tend to partition to sediments, so benthic dwelling organisms are likely to be at greatest risk of exposure to these compounds. Therefore, risks to benthic dwelling organisms exposed to chemicals in sediment are evaluated, and the benthic community as a whole is selected as the receptor group of interest. The assessment endpoint is maintenance of species abundance and diversity within the study area's aquatic community. The measures of effect (measurement endpoints) are alterations of growth, reproduction, or survival in individual species.
- **Wood stork.** Wood stork is a federally endangered species that has occurred historically in the study area (Lee County 1986). In Florida, this species commonly nests in medium to large cypress trees, and has been a documented breeder in Six Mile Cypress Slough Preserve (Lee County 1986). This species of wading bird is tied entirely to the aquatic food web, and feeds almost exclusively on small fish in shallow freshwater wetlands and ponds (USFWS 1999). As a result, wood stork could be exposed to chemicals that have accumulated in fish and thus be at risk of adverse effects. Hallam et al. (1996) predicted that wood stork in Florida are at risk of population declines due to mercury exposure in fish prey. For these reasons, wood storks are selected as a receptor species in this evaluation. Given their habitat preference for shallow water habitats, this

species is a receptor for the small pond and wetland habitats located southwest of the ERF. The assessment endpoint for this evaluation is maintenance of the long-term health and reproductive capacity of any wood stork potentially foraging in the study area. The measures of effect (measurement endpoints) are alteration of reproduction or survival of exposed birds.

- **Snail kite.** Snail kites are medium-sized hawks that inhabit freshwater marshes and the shallow vegetated edges of natural and man-made lakes (USFWS 1999). Historically, this species was found throughout peninsular Florida, but currently is limited to six freshwater systems located in central and southern Florida. The Lehigh Acres wetlands located in eastern Lee County and in the eastern portion of the study area are among the smaller, more isolated wetlands used by snail kites (USFWS 1999). Snail kites feed exclusively on freshwater apple snails. Apple snails are predominantly herbivorous (Howless 2001, Perera and Walls 1996, Snyder and Snyder 1971) and, thus, the principal prey of the snail kite is unlikely to accumulate chemicals to the same degree as fish located higher in the food web. Nevertheless, snail kite are selected as a species of concern for this evaluation because they are an aquatic carnivore, they occur in the study area, and their almost exclusive reliance on only a single prey species is believed to increase their overall vulnerability to extirpation. The assessment and measurement endpoints for this species are identical to those selected for wood stork.
- **White pelican.** The White pelican is a large piscivorous bird that likely forages extensively in the Caloosahatchee River. Though this species is not endangered or threatened, its exclusive piscivorous habits render it potentially susceptible to effects of mercury and PCDDs/PCDFs that have accumulated in its prey. This species is selected as a receptor for the Caloosahatchee River, and is representative of other exclusive piscivores that feed in this habitat (e.g., cormorant, tern). The assessment and measurement endpoints for this species are identical to those selected for wood stork.
- **River Otter.** River otters are aquatic mammals with a diet that consists primarily of fish, but also includes other aquatic prey such as frogs, insects and crustaceans (USEPA 1997, Nowak 1991). Otter populations have been declining in the southeastern US, and toxic effects from exposure to mercury and other environmental contaminants have been hypothesized as one possible cause (USEPA 1997). Otter and other mustelids have a demonstrated sensitivity to a wide-range of environmental toxicants, including mercury. In addition, a comprehensive risk evaluation conducted by USEPA (1997) to assess the potential effects of mercury exposures on wildlife populations, identified otter as one of the species at greatest risk of elevated exposure to mercury in the diet. This species has

historically occurred in the study area (Lee County 1986) and is selected as a receptor species for the wetlands and ponds of the area, as well as the Caloosahatchee River. The assessment endpoint for this evaluation is maintenance of the long-term health and reproductive capacity of otter populations of the study area. The measures of effect (measurement endpoints) are alteration of reproduction or survival of exposed otter.

7.3 Toxicity Assessment

Toxicity reference values (TRVs) were derived for aquatic life, birds, and mammals to support the risk evaluation. The TRVs used in this assessment were obtained from published reviews and criteria documents developed by or on behalf of (in order of preference) the State of Florida, the USEPA, and the National Oceanic and Atmospheric Administration (NOAA). The USEPA sources consulted were the comprehensive 1997 *Mercury Report to Congress* and the Agency's *Draft Combustion Source Ecological Risk Guidelines* (USEPA 1999). The summarized TRVs represent the maximum concentration or dose to which an organism could be exposed without adverse toxicological effects. They were generally derived based on the no-observable-adverse-effect levels (NOAELs) reported in laboratory studies, and in some instances incorporated additional safety factors to account for variability in species sensitivity or for less-than-lifetime exposures in the study species. The TRV for PCDDs/PCDFs is expressed in terms of 2,3,7,8-TCDD, because this is the congener for which the greatest amount of toxicity data is available, and it is the congener believed to be most toxic to fish and wildlife. Table 7-2 lists the TRVs used for aquatic and terrestrial wildlife in this assessment.

7.4 Exposure Assessment

Ecological exposures were assessed using modeled data of annual average exposure concentrations within the Caloosahatchee River and the ponds and wetlands located southwest of the ERF. Model results presented in earlier sections of this report are used to assess ecological exposures or are combined with other factors discussed below to quantify intake. The exposure pathways to be evaluated and the assumptions used to quantify exposure are described below for aquatic and terrestrial receptors.

7.4.1 Aquatic Life

Aquatic life inhabiting the Caloosahatchee River and the ponds and wetlands of the study area could be exposed to chemicals that are released during ERF operation and reach surface water either as a result of direct deposition or as a result of deposition onto surrounding soils and surface run-off. Aquatic life can be exposed to the chemicals via a number of pathways, with respiration (i.e., uptake over the gills) typically the most significant exposure pathway (USEPA 1993). For a few highly hydrophobic chemicals that are not readily metabolized,

such as PCDDs/PCDFs, dietary exposures also could contribute importantly to exposures (Carey et al. 1998). These pathways were collectively evaluated in this risk assessment by utilizing aquatic life toxicity criteria that were developed to be protective of aquatic species exposed to ambient concentrations via all pathways.

Chemical concentrations in the Caloosahatchee River and the ponds and wetlands predicted as part of the human health risk assessment were used to predict aquatic life exposures. Mercury concentrations in the sediment were based on total mercury (e.g., divalent, methyl, and elemental). Sediment concentrations of individual dioxin and furan congeners were converted to 2,3,7,8-TCDD equivalents (TEQs) using toxic equivalency factors for fish developed by the World Health Organization (Van den Berg et al. 1998). Table 7-3 lists the predicted sediment concentrations for each individual dioxin and furan congener, as well as the equivalent 2,3,7,8-TCDD TEQ concentration.

7.4.2 Terrestrial Wildlife

Terrestrial wildlife also could be exposed via a number of exposure routes. Potential exposure pathways in terrestrial wildlife include inhalation of airborne chemicals, dermal contact with chemicals deposited onto the soil, and ingestion of contaminated surface water, soil, sediment, or food. Of these, potential dietary exposures via the food web are typically associated with the greatest potential wildlife risks, especially with biomagnifying compounds such as mercury and PCDDs/PCDFs. The collective scientific literature also indicates that dietary exposures are the only important route of chemical accumulation in terrestrial (air-breathing) species (Carey et al. 1998). Consequently, the terrestrial species risk assessment focused on potential dietary exposures and risks.

Dietary exposures are quantified using the parameter values listed in Table 7-4 and the following equation:

$$\text{Intake} = [C_{\text{diet}} * \text{IR} * \text{FI}] / \text{BW}$$

where

Intake =	average daily chemical intake throughout the exposure period (mg/kg bw day)
C_{diet} =	chemical concentration in the total diet (mg chemical/kg fresh weight (fw) diet)
IR =	daily ingestion rate in kg (fw) food/day
FI =	fraction of diet obtained from the study area
BW =	body weight

This assessment conservatively assumes that all food is obtained from the study area (i.e., the FI is equal to one). This is an extreme overestimate for mobile

wildlife species, such as those selected in this assessment. All of the terrestrial wildlife species are known to forage over very large areas. For example, non-breeding adult storks are non-territorial and typically wander over large geographic areas of hundreds of miles in search of food (Virginia Polytechnic University 2000).

This assessment also conservatively assumes that wood stork, pelican, and otter ingest only fish from the very top of the aquatic food web (i.e., trophic level IV). This will overestimate exposure in these species because each typically consumes a combination of prey occupying a number of lower trophic levels (see Table 7-4), and because the concentrations of dioxins/furans and mercury will be much lower in lower trophic level prey. For example, the mercury bioaccumulation factor for trophic level III fish is approximately 40 times lower than that for trophic level IV fish. Nevertheless, this approach is adopted in this assessment to simplify exposure calculations. Were this screening-level approach to result in predicted risks, a more refined assessment would be conducted.

Chemical concentrations in fish are based on the predicted concentrations presented in the earlier sections of this report. Fish tissue mercury concentrations are conservatively assumed to be 100% methyl mercury, which is more toxic than inorganic mercury. There is some evidence, however, that inorganic mercury on average constitutes approximately 17% of the total mercury in fish collected from south Florida estuaries (Kannan et al. 1998). Fish tissue concentrations of individual dioxin and furan congeners were converted to 2,3,7,8-TCDD TEQs using toxic equivalency factors for birds and mammals developed by the World Health Organization (Van den Berg et al. 1998), as shown in Tables 7-5 and 7-6.

Chemical concentrations in apple snails were estimated using bioaccumulation factors and estimated sediment concentrations of mercury and dioxins/furans, as shown in Table 7-7.

Few data are available quantifying mercury bioaccumulation in benthic invertebrates, such as snails, and USEPA did not develop a benthic organism bioaccumulation factor (BAF) in its extensive review and risk assessment of mercury. Given the paucity of quantitative data on mercury accumulation in snails and other benthic organisms, we chose to use a sediment BAF reported for Everglades mosquitofish to predict concentrations in apple snails. USEPA (1997) reported a BAF of 0.6 mg/kg fw fish per mg/kg dw sediment for mercury in mosquitofish. Because mosquitofish are primarily insectivores (Wolfe and Drew 1990) and apple snails are primarily herbivores (Howless 2001, Perera and Walls 1996, Snyder and Snyder 1971), use of the mosquitofish BAF should overestimate likely mercury concentrations in apple snails.

Virtually no data are available on bioaccumulation of PCDDs/PCDFs in benthic organisms (USEPA 2000). There are some data to suggest that invertebrates might accumulate PCDDs/PCDFs to a greater degree than fish because they cannot metabolize these compounds to the same degree as fish. Based on these suggestive data, USEPA (2000) assumed a default sediment to invertebrate BAF of 1 mg /kg organism lipid per mg/kg sediment organic carbon. USFWS (2002) recommends a default lipid content of 1% for benthic invertebrates, which is used here.

7.5 Risk Characterization

Aquatic life and terrestrial wildlife risks are quantified using the hazard quotient approach. A hazard quotient (HQ) is the ratio of predicted exposure to predicted toxicity. In general, hazard quotients less than 1 indicate that adverse effects from chemical-specific exposures are unlikely, whereas hazard quotients greater than one indicate adverse effects are possible.

Tables 7-8 and 7-9 present the calculated hazard quotients for aquatic and terrestrial wildlife. As can be seen, the calculated HQs for both aquatic and terrestrial receptors are generally 10 to 1,000 times below the threshold level of 1. Thus, aquatic and terrestrial wildlife are not predicted to be at risk from adverse effects of exposures to chemicals released during the operation of an expanded three-unit ERF facility in Lee County.

7.6 Uncertainties in the Ecological Risk Assessment

As in any risk assessment, there are uncertainties associated with the risk estimates presented here that stem from the use of assumptions, judgment and incomplete data. Some of these key uncertainties were discussed above along with the presentation of the ecological risk results. Additional sources of uncertainty important to the ecological risk assessment are discussed below.

The risk assessment quantitatively evaluated risks from exposure to mercury and dioxin only, although additional chemicals are regulated as part of ERF's overall permit. Although this focused approach could underestimate potential risks, the magnitude of this effect is considered to be negligible. This is because the chemical selection screening process presented earlier indicated that the other chemicals would contribute minimally to potential risks.

The terrestrial risk assessment focused on three bird species and one mammal that are expected to have greater exposures than other species and species groups not selected for detailed evaluation. As a result, the selection of a subset of species for detailed evaluation is not expected to underestimate potential ecological risks. For example, of the endangered and threatened species potentially occurring in Lee County, five (three sea turtle species, piping plover, and American crocodile) will occur in more coastal habitats more distant from the

facility, one (manatee) would have only limited distribution in study area habitats and is herbivorous and therefore unlikely to experience any significant exposure, three (red cockaded woodpecker, scrub jay, and eastern indigo snake) are strictly terrestrial in their habits with no or only limited link to the aquatic food web, and therefore are unlikely to be significantly exposed, and two are plants which are not sensitive to the toxic effects of low levels of environmental mercury or dioxins/furans. Bald eagle, a threatened species potentially occurring in the study area, does consume fish, but it also preys on terrestrial animals and carrion and therefore, does not have an exclusive piscivorous diet as do pelican, and therefore, would likely experience lower exposures.

Florida panther is the other endangered species that was not selected for evaluation in this assessment. Historically, there have been concerns that panther population declines in southern Florida were due, at least in part, to mercury in the diet of panthers that consumed raccoon (USEPA 1997, Roekle et al. 1991). Currently, insufficient data exist to support or refute that hypothesis or to quantitatively evaluate panther risks as a result of the fish-raccoon-panther foodchain. USEPA (1997) did conduct an extensive review of the toxicological literature and determined that cats do not appear to be toxicologically more sensitive than other mammalian groups such as mustelids (e.g., otters). Because panthers do not exclusively consume raccoon, and because white-tailed deer and wild hog are their main food source (Maehr and Meegan 2001, USFWS 1999), it is considered unlikely that panther could experience an exposure greater than that predicted for the exclusive aquatic carnivorous otter. In addition, panthers are highly unlikely to occur in the study area. Only five radio-collared panthers have been located in all of Lee County since field studies began two decades ago, and all of these animals appeared to be dispersing (Maehr and Meegan 2001). Most of the panther habitat in Lee County is adjacent to Collier County in the extreme southeastern part of the county (Maehr and Meegan 2001), distant from the ERF. Overall, risks to panthers associated with operation of the ERF will be lower than those predicted for river otter. This is consistent with the conclusions of the initial risk assessment conducted for this facility in the early 1990s (Clement International Corporation 1992a, b).

Overall, the TRVs used in this risk assessment are expected to be protective of fish and wildlife species chronically exposed to chemicals. The wildlife TRVs were all based on longer-term studies, using sensitive relevant endpoints, and incorporated additional uncertainty factors as necessary to extrapolate to non-toxic dosages. In general, however, the ecological toxicity of PCDDs/PCDFs has not been well studied, and the use of TEFs to evaluate the mixture of PCDDs/PCDFs relative to a TRV for 2,3,7,8-TCDD adds uncertainty to this assessment. Additionally, there is relatively greater uncertainty associated with the sediment toxicity values used to evaluate aquatic life risks. Sediment toxicity is largely a site-specific phenomenon and is highly dependent upon sediment chemistry and physical characteristics, as well as the composition of the

biological community potentially affected. The approach used to select sediment TRVs for this assessment is in general expected to overestimate risks.

In this assessment, terrestrial wildlife was assumed to obtain all its food from surface waters within the study area. As mentioned previously, this will result in an overestimate of exposure, given that wildlife roam widely on a daily and seasonal basis. On the other hand, by focusing the terrestrial wildlife risk assessment on only dietary exposures, there is some potential for risks to be underestimated. Non-dietary exposure pathways, however, are not expected to contribute significantly to overall exposures or risks. For example, sediment ingestion, which could occur during foraging, typically represents only a very small percentage (e.g., less than 10%) of the total daily intake in birds (Beyer et al. 1994). Given this, the overall impact of sediment ingestion on total daily intake is negligible. This also is the case for surface water ingestion.

Pelican, stork, and otter were assumed to consume exclusively 100% trophic level IV fish, although the literature documents that each of these species relies on prey from lower trophic levels as part of its diet. The assumption used in this assessment will, consequently, result in an overestimate of exposures.

7.7 Conclusions

Aquatic and terrestrial wildlife living or feeding in the Caloosahatchee River or the ponds and wetlands of the area are unlikely to be at risk of adverse effects from exposure to chemical stack emissions released during operation of the proposed three-unit ERF.

8. SUMMARY AND CONCLUSIONS

8.1 Introduction

This document presents a Human Health and Ecological Impact Analysis that was performed to address questions related to human and environmental health that may arise during the course of the permit process for the proposed third municipal solid waste combustion unit at Lee County's ERF. This study is not a formal requirement of the permit process for the third unit, but was conducted to ensure that issues of potential concern related to the third unit were evaluated.

This study was performed by CPF Associates, Inc., a Washington, D.C.-based scientific and regulatory consulting firm with over 20 years experience in evaluating the potential impacts of municipal solid waste management technologies.

8.2 Previous and Ongoing Studies

Studies of the potential human health and ecological impacts of the Lee County ERF have been conducted in the past. A 1992 study found that environmental concentrations of mercury and polychlorinated dibenzodioxins and polychlorinated dibenzofurans (PCDDs/PCDFs) would not adversely affect humans or threatened or endangered species. A supplementary risk assessment was also conducted in 1992 at the request of the U.S. Fish and Wildlife Service to evaluate the impact of potential mercury emissions on the endangered Florida panther. This assessment concluded that adverse impacts to the panther were unlikely to occur.

Health studies and risk assessments have also been conducted for many other waste combustion facilities in the U.S. and other countries. These studies indicate that stack emissions from a modern municipal solid waste (MSW) waste-to-energy plant will not cause adverse health effects if it is designed and operated in accordance with current state and federal regulations.

Lee County initiated a biomonitoring program in 1993 to determine if operation of the facility was correlated with mercury levels in aquatic indicator species in the local environment. The available data suggest that mercury concentrations in the indicator species are generally similar to the levels typical of South Florida and not associated with operation of the ERF.

8.3 Environmental Impacts

Air dispersion and particle deposition modeling was conducted by RTP to calculate chemical concentrations in air and chemical deposition rates onto the earth's surface within a 400 square kilometer (154 square mile) study area

surrounding the ERF. The modeling assumed operation of three waste combustion units at the Lee County ERF, the two existing units and the proposed third unit. These modeling results were then used in mathematical models developed by the USEPA to calculate the fate and transport of each chemical in the environment. Ambient air concentrations were calculated for the eight chemicals or chemical classes that are currently regulated under the facility's air permit. Mercury and PCDD/PCDF concentrations were calculated in several other environmental media, including soil, produce, beef, surface water, and fish. The input assumptions used to calculate environmental concentrations were based on default values provided in USEPA's *Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities* supplemented by site-specific data where available. Mercury modeling in the Caloosahatchee River and a nearby pond was performed using USEPA's refined IEM-2M model which is presented in USEPA's *Mercury Report to Congress*. The IEM-2M model better addresses the complexities of the environmental fate and transport of combustion source mercury emissions in a watershed and lake environment. Overall, these models and input assumptions provide a very conservative (i.e., health protective) estimate of potential environmental concentrations.

The calculated environmental concentrations associated with stack emissions from the proposed three-unit Lee County ERF were compared with available typical environmental levels. The environmental concentrations calculated based on the proposed three-unit ERF stack emissions are consistent with or below typical environmental levels. The calculated concentrations of PCDDs/PCDFs in soil, air, beef, sediment and fish were compared to typical U.S. levels provided in USEPA's 2000 *Dioxin Reassessment*. All of the calculated PCDD/PCDF concentrations due to stack emissions from the proposed three-unit ERF were below the typical U.S. levels identified by USEPA. Mercury concentrations in soil and air due to emissions from the proposed three-unit ERF were below or consistent with typical U.S. levels identified in USEPA's 1997 *Mercury Report to Congress* and within typical background levels identified in the Lee County region. Calculated mercury concentrations in surface water were found to be lower than typical South Florida background levels. The calculated mercury concentrations in trophic level IV fish (bass) due to emissions from the proposed three-unit facility were found to be less than levels typically found in fish in South Florida.

8.4 Human Health Risk Assessment

The human health risk assessment presented in this report evaluated potential risks associated with operation of three waste combustion units at the Lee County ERF (two existing units and the proposed third unit). The risk assessment was performed following current USEPA guidance, including but not limited to USEPA's *Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities*. Where possible, the risk assessment also incorporated site-specific information.

Potential human health risks were evaluated in two types of risk assessments. An inhalation risk assessment was performed for the eight chemicals or chemical classes that are regulated under the facility's air permit. This risk assessment relied on permit limit-based emission rates. A more refined multiple pathway risk assessment was also performed for mercury and PCDDs/PCDFs, the compounds that are of most concern via indirect exposure pathways. The multiple pathway risk assessment relied on emission rates based on long-term stack gas measurements.

In the inhalation risk assessment, inhalation exposures to the chemicals were calculated for two hypothetical receptors, an adult resident and a child resident. Both receptors were assumed to reside at the single maximum impact point. In the multiple pathway risk assessment, exposures were calculated for 12 different hypothetical receptors: four adult receptors, four child receptors and four breast-fed infant receptors. For example, the four hypothetical child receptors were: child resident, child of an adult beef farmer, child of an adult who fishes in the Caloosahatchee River, and child of an adult who fishes in a nearby pond. Each adult or child receptor was hypothesized to be simultaneously exposed through multiple pathways (e.g., the child resident was exposed via inhalation, soil ingestion, and ingestion of locally-grown produce). Each adult receptor was also assumed to be the mother of a breast-fed infant.

A variety of risk evaluations were performed in the risk assessment. Chronic long-term risks were calculated by combining the exposure estimates for each receptor and each chemical with human health toxicity criteria. Toxicity criteria were obtained from USEPA databases. Both cancer risks and the potential for noncancer effects were calculated for each adult and child receptor. The cancer risks were evaluated relative to a target risk level of 1×10^{-5} which is a criterion used by USEPA for combustion risk assessments and the State of Florida common target risk level of 1×10^{-6} . A cancer risk of 1×10^{-5} means that an individual could have, at most, a one in 100,000 chance of developing cancer over a 70-year lifetime under the evaluated exposure conditions. The potential for noncancer effects was evaluated by comparing hazard index values calculated for specific health effects endpoints to the common regulatory target level of 1.0. A margin of exposure approach, which was developed by USEPA and involves comparing calculated doses of PCDDs/PCDFs to typical background U.S. exposure levels, was used to evaluate potential child and adult exposures to dioxins and furans. Exposures to infants were calculated for PCDDs/PCDFs and also compared to a background infant intake level. Finally, the potential for short-term acute inhalation risks was evaluated by comparing predicted maximum short-term air concentrations with acute reference concentrations. The acute reference concentrations were derived from various published sources according to USEPA's guidance.

The risk assessment results were all below the target risk levels, as described below:

- The total excess lifetime cancer risks in the inhalation risk assessment (using permit limit based emission rates) ranged from 7×10^{-8} for the hypothetical child resident to 2×10^{-7} for the hypothetical adult resident. The predominant chemicals driving the inhalation cancer risk assessment results were beryllium and arsenic.
- The total excess lifetime cancer risks in the multiple pathway risk assessment ranged from 1×10^{-7} for the hypothetical child resident to 1×10^{-6} for the hypothetical adult fisher (both Caloosahatchee River and nearby pond fishing scenarios). The fisher scenarios assumed exposures occurred via inhalation, soil ingestion, produce ingestion and fish ingestion. The cancer risk assessment results were based on PCDDs/PCDFs only and were dominated by exposures due to fish ingestion.
- The noncancer hazard index results for the inhalation risk assessment (using permit limit-based emission rates) ranged from 0.01 to 0.0001. The predominant chemical contributing to the hazard index values was hydrogen chloride.
- The noncancer hazard index results for the multiple pathway risk assessment ranged from 0.00006 to 0.1. The highest hazard index values occurred for the adult Caloosahatchee River fisher scenario which assumed exposures via inhalation, soil ingestion, produce ingestion and fish ingestion. The noncancer hazard index results were based on mercury only and were dominated by exposures due to fish ingestion.
- The maximum PCDD/PCDF average daily doses predicted for a child and an adult were on the order of 10^{-2} pg toxic equivalents (TEQs) per kg body weight per day (pg TEQs/kg-day). These doses are more than an order of magnitude below USEPA's current estimates of background PCDD/PCDF exposures of 1 pg TEQs/kg-day.
- Infant exposures to PCDDs/PCDFs ranged from 0.1 to 0.4 pg TEQs/kg-day, well below the current target exposure level of 60 pg TEQs/kg-day.
- The maximum short-term (1-hour average) air concentrations were compared with acute reference inhalation criteria and all found to be less than the corresponding criteria. The highest ratio of any short-term air concentration to its acute reference criterion was observed for hydrogen chloride at 0.009.

8.5 Ecological Risk Assessment

An ecological risk assessment was also conducted to evaluate potential effects of modeled emissions on ecological receptors within the ERF area. The ecological risk assessment followed USEPA guidelines for ecological risk assessment and combustion facility ecological assessment, including but not limited to USEPA's *Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities* and incorporated regional-specific information on wildlife habitats and species use to identify species and habitats of concern. The ecological assessment focused on mercury and PCDDs/PCDFs based on a chemical-screening analysis which demonstrated that these regulated compounds would be of greatest potential concern to aquatic and terrestrial wildlife of the area.

The ecological risk assessment focused on potential impacts on the natural communities of the Caloosahatchee River, to the north and northwest of the ERF, and the freshwater ponds and wetlands, located to the southwest. The assessment focused on those wildlife species that were considered to be at greatest risk based on habitat use, exposure potential and population status. The specific criteria used to select species for evaluation included habitat selectivity, foraging guild, trophic position, population status, and toxicity and data availability. The species selected for evaluation consisted of aquatic life, the wood stork, the snail kite, the white pelican, and the river otter.

Potential risks were evaluated by calculating hazard quotients. A hazard quotient is the ratio of the predicted exposure level to a toxicity reference value (TRV) derived for the protection of fish or wildlife species. No risk was presumed to exist when the calculated hazard quotients were less than or equal to the TRV. Calculated hazard quotients greater than the TRV were interpreted as indicating that some environmental impacts are possible.

The hazard quotients for aquatic life and the selected terrestrial species were all less than the target level of 1.0. The quotients ranged from 0.0004 (due to PCDD/PCDF exposure to the white pelican) to 0.09 (due to methyl mercury exposure to the river otter). These results indicate that aquatic and terrestrial wildlife are not predicted to be at risk from adverse effects of exposures to chemicals released during the operation of the Lee County ERF.

8.6 Conclusions

All risk assessments involve the use of assumptions, judgment and incomplete data to varying degrees. This results in uncertainty in the final estimates of risk. Overall, the assumptions and methods used in the human health and ecological risk assessments were conservative and are, therefore, considered more likely to overestimate than underestimate risks. Uncertainties in this analysis include chemical emission rates, toxicity criteria used to evaluate risks, USEPA's *Human*

Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities mathematical models that were used to calculate chemical concentrations in various environmental media (e.g., soil, plants, beef, etc.), modeling of wet and dry deposition of vapors, and use of many default input parameters from USEPA guidance. Because conservatism is inherent in many of the inputs to the risk assessment, its results are considered much more likely to be overestimated than underestimated.

In conclusion, the Human Health and Ecological Impact Analysis presented in this document showed that potential risks from emissions from the proposed expansion of the Lee County ERF, in its proposed configuration with three combustion units, were below regulatory and other target risk levels for both human health and ecological receptors. These conclusions are consistent with previous studies performed both for this facility as well as other waste-to-energy combustion facilities in the U.S. Additionally, the calculated environmental concentrations in air, soil, water, beef and fish associated with the ERF emissions were also predicted to be consistent with or below background levels. Based on this analysis, the proposed modification to the ERF is not anticipated to have an adverse impact on human health or the environment.

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TABLES

IMAGE QUALITY

**PLEASE NOTE
THE ORIGINAL DOCUMENTS
SCANNED FOR THIS RECORD
WERE OF POOR QUALITY.**

Table 2-1
Summary of Lee County Biomonitoring Results for Mercury
(Mercury Concentrations as ppm)

Sampling Date	Largemouth bass ppm fw (n)	Mosquitofish whole-body ppm fw (n)	Oyster soft tissue (n)	
			ppm fw	ppm dw
Sep-93	1.49 f (7)	0.076 (1)	0.041	0.22 (2)
Jun-94	1.09 * (10)	0.37 (1)	0.030	0.12 (3)
Sep-94	0.43 * (10)	0.24 (1)	0.052	0.24 (1)
Aug-95	0.23 f (6)	0.15 (1)	0.048	0.24 (3)
Sep-01	0.46 * (7)	-	-	-

fw = fresh weight
dw = dry weight
f = fillet
* = tissue unknown
- = not sampled
(n) = sample size

Poor Original

Table 4-1
Chemical Emission Rates Based on Permit Limits
for the Proposed Expansion of the Lee County Facility
(Existing Facility Plus a Proposed Third Unit)

Chemical	Permit Limit Emission Rates Used to Calculate Maximum Long-Term Average Air Concentrations (a)		Permit Limit Emission Rates Used to Calculate Maximum 1-Hour Average Air Concentrations (b)	
	Emission Rate (lb/hr)	Emission Rate (g/sec)	Emission Rate (lb/hr)	Emission Rate (g/sec)
Arsenic	7.63E-03	9.61E-04	5.13E-03	6.46E-04
Beryllium	1.13E-04	1.42E-05	7.61E-05	9.59E-06
Hydrogen chloride (HCl)	8.17E+01	1.03E+01	6.40E+01	8.07E+00
Hydrogen fluoride (HF)	2.63E+00	3.31E-01	1.67E+00	2.10E-01
Lead	2.55E-01	3.21E-02	1.52E-01	1.92E-02
Mercury				
Total mercury	1.18E-01	1.49E-02	8.01E-02	1.01E-02
Total mercury: locally available (c)	2.95E-02	3.72E-03	2.00E-02	2.52E-03
Divalent (vapor phase): locally available (d)	2.41E-02	3.04E-03	NA	NA
Divalent (particulate phase): locally available (d)	4.25E-03	5.36E-04	NA	NA
Elemental: locally available (d)	7.10E-04	8.94E-05	NA	NA
Sulfuric acid (H2SO4)	3.63E+01	4.58E+00	2.65E+01	3.34E+00
PCDDs/PCDFs (e)				
2,3,7,8-TCDD	1.79E-08	2.17E-09	NA	NA
1,2,3,7,8-PeCDD	6.27E-08	7.58E-09	NA	NA
1,2,3,4,7,8-HxCDD	6.45E-08	7.80E-09	NA	NA
1,2,3,6,7,8-HxCDD	1.50E-07	1.81E-08	NA	NA
1,2,3,7,8,9-HxCDD	1.68E-07	2.03E-08	NA	NA
1,2,3,4,6,7,8-HpCDD	9.67E-07	1.17E-07	NA	NA
OCDD	1.90E-06	2.30E-07	NA	NA
2,3,7,8-TCDF	1.07E-07	1.30E-08	NA	NA
1,2,3,7,8-PeCDF	1.97E-07	2.38E-08	NA	NA
2,3,4,7,8-PeCDF	2.51E-07	3.03E-08	NA	NA
1,2,3,4,7,8-HxCDF	4.66E-07	5.63E-08	NA	NA
1,2,3,6,7,8-HxCDF	2.51E-07	3.03E-08	NA	NA
2,3,4,6,7,8-HxCDF	2.83E-07	3.42E-08	NA	NA
1,2,3,7,8,9-HxCDF	4.30E-08	5.20E-09	NA	NA
1,2,3,4,6,7,8-HpCDF	1.09E-06	1.32E-07	NA	NA
1,2,3,4,7,8,9-HpCDF	1.21E-07	1.47E-08	NA	NA
OCDF	4.12E-07	4.98E-08	NA	NA
Total for 2,3,7,8-PCDDs/PCDFs	6.55E-06	7.93E-07	NA	NA
Total for all PCDDs/PCDFs (f)	1.72E-05	2.17E-06	NA	NA

NA = Not applicable because acute short-term reference air concentrations are not available for these compounds.

(a) The emission rates were obtained from RTP (2002a) for "Proposed Case 6" for the new unit + 2 units for the existing facility, also referred to as "Case F". This combination of conditions produced the highest maximum annual average modeling results.

(b) The emission rates were obtained from RTP (2002a) for "Proposed Case 6" + 1 unit for the existing facility, also referred to as "Case E". This combination of conditions produced the highest maximum 1-hour average modeling result.

(c) The portion of total mercury emitted that was assumed to remain locally available for the risk analysis was calculated based on the assumed speciation of mercury in the stack gas plus EPA guidance on the portion of each species expected to remain locally available. RTP assumed that total mercury emissions would be comprised of 60% elemental mercury, 30% divalent vapor phase mercury and 10% divalent particle phase mercury, based on data for large municipal waste combustors in USEPA's Mercury Report to Congress. Additionally, the fraction of each species not expected to enter the global Hg cycle and thus be available for local impacts was identified, per USEPA 1998 Combustion Risk Assessment Guidance (Section 2 and Figure 2-4), as 0.01 for elemental Hg, 0.68 for divalent vapor phase Hg, and 0.36 for divalent particle phase mercury. Accordingly, the fraction of total mercury expected to remain locally available was calculated as:

$$[(0.68 \times 30\%) + (0.36 \times 10\%) + (0.01 \times 60\%)] / 100\% = 0.25.$$

(d) The total mercury emission rate was divided by RTP between the mercury species as follows: 60% elemental mercury, 30% divalent vapor phase mercury and 10% divalent particle phase mercury. The emission rates were also adjusted to account for the fraction of each species expected to not enter the global Hg cycle and thus be available for local impacts (i.e., 0.01 for elemental Hg; 0.68 for divalent vapor phase Hg; and 0.36 for divalent particle phase mercury based on USEPA 1998 Guidance, Section 2 and Figure 2-4). For example, the divalent vapor phase emission rate = $1.49\text{E-}2 \text{ g/sec} \times 0.3 \times 0.68 = 3.04\text{E-}3 \text{ g/sec}$.

(e) The PCDD/PCDF emission rates were calculated from a total PCDD/PCDF emission rate of 1.72E-5 lb/hr and a fractional distribution of congeners based on several years of stack test measurements (see Appendix B).

(f) Includes all congeners (i.e., non-2,3,7,8-congeners as well as 2,3,7,8-congeners).

Table 4-2
Chronic and Acute Toxicity Criteria for the Lee County Facility Project

Chronic Oral and Inhalation Toxicity Criteria

Chemical	Non-Cancer Toxicity Criteria					Cancer Toxicity Criteria				
	Chronic Oral Reference Dose (mg/kg/day)	Chronic Inhalation Reference Concentration (mg/m ³)	Safety Factor (oral/inhalation) (a)	Toxicological Endpoint (oral/inhalation)	Reference Dose/Concentration Source	Oral Cancer Slope Factor (mg/kg/day) ⁻¹	Inhalation Cancer Unit Risk Factor (ug/m ³) ⁻¹	Tumor Type or Target Tissue (oral/inhalation)	USEPA Weight of Evidence (b)	Slope Factor and Unit Risk Source
Arsenic	3.0E-04	NA	3 / -	skin / -	IRIS	1.5E+00	4.3E-03	skin/lung	A	IRIS
Beryllium	2.0E-03	2.0E-05	300 / 10	intestinal / respiratory tract & sensitization	IRIS	NA	2.4E+00	lung	B1	IRIS
Hydrogen chloride (HCl)	NA	2.0E-02	- / 300	nasal / respiratory tract	IRIS	NA	NA	NA	-	-
Hydrogen fluoride (HF)	NA	NA	NA	-	-	NA	NA	NA	-	-
Lead	(c)	(c)	NA	blood, neurological	-	NA	NA	NA	B2	IRIS
Mercury										
Divalent (e)	3.0E-04	3.0E-04	1000 / 30	immunological / neurological	IRIS	NA	NA	NA	C	IRIS
Elemental	-	3.0E-04	- / 30	- / neurological	IRIS	NA	NA	NA	D	IRIS
Methyl	1.0E-04	-	10 / -	neurological & developmental / -	IRIS	NA	NA	NA	C	IRIS
PCDDs/PCDFs (as 2,3,7,8-TCDD)	NA	NA	-	-	-	1.5E+05	3.3E+01	liver	B2	EPA 1998/ EPA 1999
Sulfuric acid	NA	NA	-	-	-	NA	NA	NA	-	-

Acute Inhalation Toxicity Criteria

Chemical	Acute Reference Air Concentration (mg/m ³)	Acute Reference Air Concentration Source (d)
Arsenic	3.00E-02	TEEL-1 (EPA 1998)
Beryllium	9.95E-03	TEEL-1 (EPA 1998)
Hydrogen chloride (HCl)	2.68	1-hr AEGL-1 (EPA 2002)
Hydrogen fluoride (HF)	0.82	1-hr AEGL-1 (EPA 2002)
Lead	3.81E-02	TEEL-1 (EPA 1998)
Mercury	7.38E-02	TEEL-1 (EPA 1998)
PCDDs/PCDFs (as 2,3,7,8-TCDD)	NA	NA
Sulfuric acid	2	ERPG-1 (AIHA 2000)

Notes:

NA = Not applicable

- = No data available

IRIS = Integrated Risk Information System (10/2002)

EPA 1998 = U.S. Environmental Protection Agency. 1998. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Peer Review Draft. Solid Waste and Emergency Response. EPA 530-D-98-001A. July 1998.

EPA 1999 = U.S. Environmental Protection Agency. 1999. Errata to the 1998 Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Memorandum from B. Johnson, Economics, Methods and Risk Analysis Division. August 2, 1999.

EPA 2002 = U.S. Environmental Protection Agency. 2002. Acute Exposure Guideline Levels (AEGLs) Results. Data sent from P. Tobin, USEPA, January 18, 2002. Note that AEGLs for HCl and HF are interim values awaiting final peer review.

AIHA 2000 = American Industrial Hygiene Association. 2000. Emergency Response Planning Guidelines and Workplace Environmental Exposure Level Guides. AIHA Press. Fairfax, VA.

- (a) Safety factors are the products of uncertainty factors and modifying factors. Uncertainty factors used to develop reference doses generally consist of multiples of 10, with each factor representing a specific area of uncertainty in the data available. The standard uncertainty factors include the following:
A 10-fold factor to account for the variation in sensitivity among the members of the human population; a 10-fold factor to account for the uncertainty in extrapolating animal data to humans; a 10-fold factor to account for uncertainty in extrapolating from less than chronic NOAELs to chronic NOAELs; and a 10-fold factor to account for the uncertainty in extrapolating from LOAELs to NOAELs. Modifying factors are applied at the discretion of the reviewer to cover other uncertainties in the data.
- (b) USEPA Weight of evidence classification scheme for carcinogens:
A-Human Carcinogen, sufficient evidence from human epidemiological studies; B1-Probable Human Carcinogen, limited evidence from epidemiological studies;
B2-Probable Human Carcinogen, inadequate or no evidence from epidemiological studies and adequate evidence from animal studies;
C-Possible Human Carcinogen, limited evidence in animals in the absence of human data; D-Not Classified as to human carcinogenicity; and E-Evidence of Noncarcinogenicity.
- (c) EPA has not developed a reference dose for lead. EPA's 1998 risk assessment combustion guidance recommends screening lead impacts in soil and air against soil concentration and air concentration screening levels considered to be protective of human health. These screening levels are 100 mg/kg in soil and 0.2 ug/m³ in air.
- (d) Acute toxicity criteria were obtained according to the data source hierarchy outlined by USEPA (1998). TEEL-1 = Level 1 temporary emergency exposure limits; AEGL-1 = Level 1 acute exposure guideline levels for 1-hour exposure duration; ERPG-1 = level 1 emergency response planning guideline level.
- (e) The inhalation RfC for elemental mercury was used for divalent mercury per USEPA 1998 guidance (which recommends this practice due to lack of available toxicity data).

Table 4-3
List of Chemicals to be Evaluated in the
Human Health Risk Assessment for the Lee County Facility

Type of Assessment	Selected Chemicals (a)
Inhalation risk assessment	Arsenic, beryllium, hydrogen chloride, hydrogen fluoride, lead, mercury, sulfuric acid and PCDDs/PCDFs
Multiple pathway risk assessment	Mercury and PCDDs/PCDFs

- (a) Three species of mercury are addressed in the risk assessment: elemental, divalent vapor, and divalent particulate. The PCDDs/PCDFs that are addressed are the 16 congeners with chlorine atoms in the 2,3,7,8-positions. Evaluation of the three mercury species and the 2,3,7,8 congeners is consistent with USEPA (1998a) guidance.

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Table 4-4
Screening Analysis for Selection of Chemicals of Concern
For Evaluation in the Ecological Risk Assessment

A. Aquatic Life COC Screen

Chemical	Permit Limit-Based Emission Rate (ER) (g/sec) (a)	Aquatic Life Toxicity Screening Value (TSV) (ug/L) (b)	COC Screen Score (c)	Contribution to Total COC-Screen Score (d)
Arsenic	9.61E-04	50	1.9E-05	0.001%
Beryllium	1.42E-05	0.13	1.1E-04	0.01%
Lead	3.21E-02	3.2 (e)	1.0E-02	1%
Mercury	1.49E-02 (f)	0.012	1.2E+00	85%
2,3,7,8-TCDD (2,3,7,8- congeners of PCDFs/PCDDs)	7.93E-07 (g)	3.8E-06 (h)	2.1E-01	14%
Total			1.5E+00	100%

- (a) See Table 4-1.
(b) Florida Class III Surface Water Criteria. Florida Administrative Code: 62-302.530. Value listed is the lowest of freshwater and saltwater criteria.
(c) Calculated by: ER/TSV
(d) Percent of total hazard screen contributed by individual chemical.
(e) Hardness dependent criterion. 100 mg/L CaCO₃ assumed.
(f) Listed emission rate is for total mercury.
(g) Listed emission rate is for the sum of all 2,3,7,8-congeners, assuming all are as toxic as 2,3,7,8-TCDD.
(h) Aquatic life toxicity reference value developed by USEPA (1999) for freshwater.

B. Terrestrial Wildlife COC Screen

Chemical	Permit Limit-Based Emission Rate (ER) (g/sec) (a)	Fish BCF (b)	Wildlife Toxicity Screening Value (TSV) (mg/kg bw) (b)		COC Screen Score (c)	Contribution to Total COC-Screen Score (d)
			Avian	Mammal		
Arsenic	9.61E-04	114	2.46	1.25	8.8E-02	0.0003%
Beryllium	1.42E-05	62	—	0.66	1.3E-03	0.000005%
Lead	3.21E-02	0.09	0.025	0.0375	1.2E-01	0.0004%
Mercury	1.49E-02 (e)	11,168	0.0064	0.032	2.6E+04	89%
2,3,7,8-TCDD (2,3,7,8- congeners of PCDFs/PCDDs)	7.93E-07 (f)	4,235	0.00001	0.000001	3.4E+03	11%
Total					2.9E+04	100%

- (a) See Table 4-1.
(b) USEPA (1999).
(c) Calculated by: ER*BCF/TSV, where TSV is the lower of the mammal and bird TSVs listed.
(d) Percent of total hazard screen contributed by individual chemical.
(e) Listed emission rate is for total mercury.
(f) Listed emission rate is for the sum of all 2,3,7,8-congeners, assuming all are as toxic as 2,3,7,8-TCDD.

Table 5-1
Modeled Long-Term Average Ambient Air Concentrations
Used in the Inhalation Risk Assessment
(Maximum Impact Point Results Using Permit Limit-Based Emission Rates)

Chemical	Emission Rate (g/sec) (a)	Fraction Vapor Phase (b)	Maximum Annual Average Air Concentration (mg/m ³) (c)
RTP Maximum Impact Point Unitized Modeling Results for a 1 g/sec Emission Rate (a)			
Vapor phase unitized annual average air concentration (μ/m ³ per 1 g/sec)			0.013
Particle phase unitized annual average air concentration (μg/m ³ per 1 g/sec)			0.013
Chemical-Specific Modeling Results			
Arsenic	9.61E-04	0.00E+00	1.25E-08
Beryllium	1.42E-05	0.00E+00	1.85E-10
Hydrogen chloride (HCl)	1.03E+01	1.00E+00	1.34E-04
Hydrogen fluoride (HF)	3.31E-01	1.00E+00	4.31E-06
Lead	3.21E-02	0.00E+00	4.18E-07
Mercury (d)			
Divalent (vapor phase)	3.04E-03	1.00E+00	3.95E-08
Divalent (particulate phase)	5.36E-04	0.00E+00	6.97E-09
Elemental	8.94E-05	1.00E+00	1.16E-09
Sulfuric acid (H ₂ SO ₄)	4.58E+00	1.00E+00	5.95E-05
PCDDs/PCDFs			
2,3,7,8-TCDD	2.17E-09	4.90E-01	2.82E-14
1,2,3,7,8-PeCDD	7.58E-09	2.19E-01	9.86E-14
1,2,3,4,7,8-HxCDD	7.80E-09	5.96E-02	1.01E-13
1,2,3,6,7,8-HxCDD	1.81E-08	2.89E-02	2.36E-13
1,2,3,7,8,9-HxCDD	2.03E-08	1.53E-02	2.64E-13
1,2,3,4,6,7,8-HpCDD	1.17E-07	1.62E-02	1.52E-12
OCDD	2.30E-07	1.69E-03	2.99E-12
2,3,7,8-TCDF	1.30E-08	6.63E-01	1.69E-13
1,2,3,7,8-PeCDF	2.38E-08	3.64E-01	3.10E-13
2,3,4,7,8-PeCDF	3.03E-08	2.63E-01	3.94E-13
1,2,3,4,7,8-HxCDF	5.63E-08	4.86E-02	7.32E-13
1,2,3,6,7,8-HxCDF	3.03E-08	5.15E-02	3.94E-13
2,3,4,6,7,8-HxCDF	3.42E-08	5.47E-02	4.45E-13
1,2,3,7,8,9-HxCDF	5.20E-09	5.76E-02	6.76E-14
1,2,3,4,6,7,8-HpCDF	1.32E-07	3.47E-02	1.72E-12
1,2,3,4,7,8,9-HpCDF	1.47E-08	2.01E-02	1.91E-13
OCDF	4.98E-08	1.67E-03	6.48E-13

(a) The emission rates and unitized maximum modeling results were obtained from RTP (2002a) for "Case 6" for the new unit + the existing facility, also referred to as "Case F". This combination of conditions produced the highest maximum annual average modeling results for the combined (proposed and existing) units.

(b) Fraction vapor (Fv) values were obtained from EPA 1998 and EPA's subsequent Errata (USEPA 1999), except for HF and H₂SO₄ which are not addressed in EPA 1998 and were assumed to be present in the vapor phase.

(c) Air concentrations were calculated as follows: [(unit air concentration for vapors in μg/m³ per 1 g/sec * Fv) + ((1-Fv) * unit air concentration for particles in μg/m³ per 1 g/sec)] * chemical emission rate (g/sec) * conversion factor (mg/10⁻³ μg). Source: USEPA 1998, Table B-5-1.

(d) The total mercury emission rate of 1.18E-1 lb/hr (1.49E-2 g/sec) for "Case 6" + the existing facility (Case F in RTP 2002a) was divided between the mercury species based on USEPA's Mercury Report to Congress for large municipal waste combustors. RTP assumed that total mercury emissions would be comprised of 60% elemental mercury, 30% divalent vapor phase mercury and 10% divalent particle phase mercury. Additionally, the emission rates were adjusted to account for the fraction of each species expected to enter the global Hg cycle and thus not be available for local deposition. The fractions remaining locally available and not assumed to enter the global cycle, per USEPA 1998 Guidance (Section 2 and Figure 2-4), were: 0.01 for elemental Hg; 0.68 for divalent vapor phase Hg; and 0.36 for divalent particle phase mercury. For example, the divalent vapor phase emission rate = 1.49E-2 g/sec * 0.3 * 0.68 = 3.04E-3 g/sec.

Table 5-2

**Modeled 1-Hour Average Ambient Air Concentrations
Used in the Inhalation Risk Assessment
(Maximum Impact Point Results Using
Permit-Limit Based Emission Rates)**

Chemical	Emission Rate (g/sec) (a)	Maximum 1-Hour Average Air Concentration (mg/m³) (b)
<i>RTP Maximum Impact Point Unitized Modeling Result for a 1 g/sec Emission Rate (a)</i>		
Maximum unitized 1-hour average air concentration (µg/m ³ per 1 g/sec)		2.97
<i>Chemical-Specific Modeling Results</i>		
Arsenic	6.46E-04	1.92E-06
Beryllium	9.59E-06	2.85E-08
Hydrogen chloride (HCl)	8.07E+00	2.40E-02
Hydrogen fluoride (HF)	2.10E-01	6.25E-04
Lead	1.92E-02	5.69E-05
Total mercury (c)	2.52E-03	7.49E-06
Sulfuric acid (H ₂ SO ₄)	3.34E+00	9.91E-03
PCDDs/PCDFs	NA	NA

NA = Not applicable.

(a) The emission rates and maximum modeling result were obtained from RTP (2002a) for Case 6 + 1 Unit for Existing Facility, also referred to as "Case E". This combination of conditions produced the highest maximum 1-hour average modeling results for the combined (proposed and existing) units.

(b) Air concentrations were calculated as follows: unit air concentration in µg/m³ per 1 g/sec * chemical emission rate in g/sec * conversion factor of 1 mg/10⁺³ µg.

(c) The permit limit-based total mercury emission rate associated with the highest 1-hour average modeling results (for Case E) was 8.01E-2 lb/hr (1.01E-2 g/sec). The emission rate shown reflects adjustment, per USEPA 1998 guidance, for the portion that will enter the global mercury cycle (i.e., 1.01E-2 g/sec * 0.25; See Table 4-1, footnote c).

Table 5-3
Unitized Long-Term Average Air Concentrations and Deposition Rates Modeled
for the Lee County Energy Recovery Facility Risk Assessment
(Combined Impacts of Existing and Proposed Units)

Receptor and Location	Input Modeling Data for Multiple Pathway Risk Assessment (a)						Modeling Area or Location
	Vapor Phase Air Concentration [[$\mu\text{g}/\text{m}^3$]/ (1 g/sec)] (Cyv or Cywv)	Particle Phase Air Concentration [[$\mu\text{g}/\text{m}^3$]/ (1 g/sec)] (Cyp)	Wet Deposition from Vapor [[$\text{g}/\text{m}^2\text{-yr}$]/ (1 g/sec)] (Dyvw or Dywvw)	Dry Deposition from Particle - Surface Area weighted (e) [[$\text{g}/\text{m}^2\text{-yr}$]/ (1 g/sec)] (Dydp)	Wet Deposition from Particle - Surface Area weighted (e) [[$\text{g}/\text{m}^2\text{-yr}$]/ (1 g/sec)] (Dywp)	Combined Wet and Dry Deposition from Particle - Surface Area weighted (e) [[$\text{g}/\text{m}^2\text{-yr}$]/ (1 g/sec)] (Dytwp)	
Surface Water Locations							
Nearby Pond Watershed Area	0.0041	0.0041	0.00092	0.000086	0.00063	0.00072	Average across nearby typical pond area within the modeling domain and beyond the property boundary (b)
Caloosahatchie River Watershed Area	0.0038	0.0038	0.0011	0.000079	0.00074	0.00082	Average across Caloosahatchie River watershed area within the modeling domain and beyond the property boundary
Maximum Impact Point							
Maximum impact point - farm & residence	0.013	0.013	0.083	0.00027	0.038	0.038	Maximum model results within the modeling domain and beyond the property boundary (c)
Cattle Grazing Location							
Beef cattle grazing area	0.0028	0.0028	0.028	0.000048	0.014	0.014	Average across a maximally impacted nearby area assumed to be used for animal grazing, and also located within the modeling domain and beyond the property boundary (d)

(a) Long-term average modeling results are 5-year averages based on modeling with 1990-1994 meteorological data from Fort Myers Airport. Results reflect the combined impacts of the two existing municipal solid waste combustion units in addition to the third proposed combustion unit.

(b) The nearby pond area is bounded on the north by state route 82, on the west by Interstate 75, and on the east and south by the 20 km-by-20 km modeling domain.

(c) Maximum values for air concentrations and dry deposition occur at a different location than maximum values for wet and total deposition. Maximum air concentrations and dry deposition rates occur roughly 2.5 km (1.5 miles) west-south-west of the stack, whereas maximum wet and total deposition rates occur roughly 0.2 km (0.12 miles) to the east-north-east of the stack.

(d) The grazing area is a 69-acre north-south right-of-way located adjacent to the western property boundary.

(e) Surface area weighted means that the particle size distribution used in the ISCST modeling was weighted based on particle surface area. This treatment of particle size data in ISCST modeling is recommended for mercury and PCDDs/PCDFs by USEPA (1998).

Table 5-4
Chemical Emission Rates Used in the
Multiple Pathway Human Health and
Ecological Risk Assessments
(Emission Rates Based on Stack Test Measurements)

Compound Name	Chemical emission rate (a) (g/sec)
mercury (a) (divalent; vapor + particulate phases)	6.43E-04
mercury (elemental)	1.61E-05
PCDD/Fs (b)	
HpCDD, 1,2,3,4,6,7,8-	5.51E-08
HpCDF, 1,2,3,4,6,7,8-	6.22E-08
HpCDF, 1,2,3,4,7,8,9-	6.91E-09
HxCDD, 1,2,3,4,7,8-	3.68E-09
HxCDD, 1,2,3,6,7,8-	8.55E-09
HxCDD, 1,2,3,7,8,9-	9.58E-09
HxCDF, 1,2,3,4,7,8-	2.65E-08
HxCDF, 1,2,3,6,7,8-	1.43E-08
HxCDF, 1,2,3,7,8,9-	2.45E-09
HxCDF, 2,3,4,6,7,8-	1.61E-08
OCDD, 1,2,3,4,5,7,8,9-	1.08E-07
OCDF, 1,2,3,4,6,7,8,9-	2.35E-08
PeCDD, 1,2,3,7,8-	3.57E-09
PeCDF, 1,2,3,7,8-	1.12E-08
PeCDF, 2,3,4,7,8-	1.43E-08
TCDD, 2,3,7,8-	1.02E-09
TCDF, 2,3,7,8-	6.13E-09

Notes:

(a) The mercury emission rates were calculated from a total mercury emission rate of 2.13E-2 lb/hr, based on stack test measurements (see Appendix B), using the same information regarding speciation and portion of each species available for local impacts as described in Table 4-1.

(b) The PCDD/PCDF emission rates were calculated from a total PCDD/PCDF emission rate of 8.1E-6 lb/hr, based on stack test measurements, and a fractional distribution of congeners based on several years of stack test measurements (see Appendix B).

Table 5-5

**Modeled Long-Term Average Ambient Air Concentrations and Deposition Rates at the Maximum Impact Point
(Emission Rates Based on Stack Test Measurements)**

Chemical	Emission Rate (g/sec)	Fraction Vapor Phase (a)	Maximum Long- Term Average Air Concentration (ug/m ³) (b)	Maximum Long- Term Average Wet Vapor Phase Deposition Rate (g/m ² -yr) (c)	Maximum Long- Term Average Wet Particle Phase Deposition Rate (g/m ² -yr) (d)	Maximum Long- Term Average Dry Particle Phase Deposition Rate (g/m ² -yr) (d)
Mercury species						
mercury (divalent)	6.43E-04	0.75	8.36E-06	4.00E-05	6.11E-06	4.34E-08
mercury (elemental)	1.61E-05	1.00	2.09E-07	1.34E-06	0.00E+00	0.00E+00
mercury (methyl)	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PCDDs/PCDFs						
HpCDD, 1,2,3,4,6,7,8-	5.51E-08	0.016	7.16E-10	7.32E-11	2.06E-09	1.46E-11
HpCDF, 1,2,3,4,6,7,8-	6.22E-08	0.035	8.09E-10	1.79E-10	2.28E-09	1.62E-11
HpCDF, 1,2,3,4,7,8,9-	6.91E-09	0.020	8.98E-11	1.15E-11	2.57E-10	1.83E-12
HxCDD, 1,2,3,4,7,8-	3.68E-09	0.060	4.78E-11	1.82E-11	1.32E-10	9.34E-13
HxCDD, 1,2,3,6,7,8-	8.55E-09	0.029	1.11E-10	2.05E-11	3.16E-10	2.24E-12
HxCDD, 1,2,3,7,8,9-	9.58E-09	0.015	1.25E-10	1.19E-11	3.59E-10	2.55E-12
HxCDF, 1,2,3,4,7,8-	2.65E-08	0.049	3.45E-10	1.07E-10	9.58E-10	6.81E-12
HxCDF, 1,2,3,6,7,8-	1.43E-08	0.052	1.86E-10	6.11E-11	5.15E-10	3.66E-12
HxCDF, 1,2,3,7,8,9-	2.45E-09	0.058	3.19E-11	1.17E-11	8.77E-11	6.23E-13
HxCDF, 2,3,4,6,7,8-	1.61E-08	0.055	2.09E-10	7.31E-11	5.78E-10	4.11E-12
OCDD, 1,2,3,4,5,7,8,9-	1.08E-07	0.0017	1.40E-09	1.52E-11	4.10E-09	2.91E-11
OCDF, 1,2,3,4,6,7,8,9-	2.35E-08	0.0017	3.06E-10	3.26E-12	8.92E-10	6.33E-12
PeCDD, 1,2,3,7,8-	3.57E-09	0.22	4.64E-11	6.49E-11	1.06E-10	7.53E-13
PeCDF, 1,2,3,7,8-	1.12E-08	0.36	1.46E-10	3.35E-10	2.72E-10	1.94E-12
PeCDF, 2,3,4,7,8-	1.43E-08	0.26	1.86E-10	3.09E-10	4.02E-10	2.86E-12
TCDD, 2,3,7,8-	1.02E-09	0.49	1.33E-11	4.15E-11	1.98E-11	1.40E-13
TCDF, 2,3,7,8-	6.13E-09	0.66	7.97E-11	3.36E-10	7.92E-11	5.63E-13

(a) Fraction vapor phase values were obtained from USEPA (1998).

(b) Air concentrations were calculated as follows: $[(\text{unit air concentration for vapors in ug/m}^3 \text{ per 1 g/sec} \cdot F_v) + ((1-F_v) \cdot \text{unit air concentration for particles in ug/m}^3 \text{ per 1 g/sec})] \cdot \text{chemical emission rate (g/sec)}$. Source: USEPA (1998).

(c) Wet vapor phase deposition rates were calculated as follows: $\text{unit deposition rate in g/m}^2\text{-yr per 1 g/sec} \cdot \text{chemical emission rate in g/sec} \cdot \text{fraction of compound in vapor phase}$. Source: USEPA (1998).

(e) Wet and dry particle phase deposition rates were calculated as follows: $\text{unit deposition rate in g/m}^2\text{-yr per 1 g/sec} \cdot \text{chemical emission rate in g/sec} \cdot \text{fraction of compound in particle phase}$ (source: USEPA 1998). Particle deposition rates were based on a surface area weighted particle size distribution (RTP, February 28, 2002 Memorandum).

Table 5-6
Summary of Chemical-Specific Input Parameters for the Risk Assessment

CAS Number	Compound Name	Koc (mL/g)	Soil/Sediment-Water Partition Coefficient, Kds (a)	Kow (unitless)	Ambient Vapor Pressure (atm)	Fraction in Vapor Phase, Fv (unitless)	Solubility (mg/L)	Molecular Weight (g/mol)	Henry's Law Constant, H (atm·m ³ /mol)	Diffusion Coefficient in Water, Dw (cm ² /s)	Diffusion Coefficient in air, Da (cm ² /s)	Soil-Water Partition Coefficient, Kd _s ^(b) (mL/g)	Suspended Sediment-Water Partition Coefficient, Kd _{sw} ^(b) (mL/g)	Bottom Sediment-Water Partition Coefficient, Kd _{bs} ^(b) (mL/g)	Soil Degradation Rate Constant, ksg (year ⁻¹)	Source
Mercury Species																
7487-94-7	mercury (divalent) (d)	NA	varies	6.1E-01	1.2E-04	0.75	6.9E+04	271.52	7.1E-10	5.25E-06	4.53E-02	5.80E+04	1.00E+05	5.00E+04	0	EPA 1998 (App. A)
7439-97-6	mercury (elemental)	NA	varies	NA	2.6E-06	1.00	NA	200.59	7.1E-03	3.01E-05	1.09E-02	1.00E+03	1.00E+03	3.00E+03	0	EPA 1998 (App. A)
22967-92-6	mercury (methyl)	NA	varies	NA	NA	0.00	NA	216.00	4.7E-07	6.11E-06	5.28E-02	7.00E+03	1.00E+05	3.00E+03	0	EPA 1998 (App. A)
PCDDs/PCDFs																
35822469	HxCDD, 1,2,3,4,6,7,8-	9.77E+07	varies	1.58E+08	4.22E-14	0.016	2.40E-06	4.25E+02	7.50E-06	3.89E-06	1.11E-02	9.77E+05	7.33E+06	3.91E+06	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
67562394	HxCDF, 1,2,3,4,6,7,8-	5.13E+07	varies	8.32E+07	1.75E-13	0.035	1.35E-06	4.09E+02	5.30E-06	3.99E-06	1.55E-02	5.13E+05	3.85E+06	2.05E+06	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
55673897	HxCDF, 1,2,3,4,7,8-	5.13E+07	varies	8.32E+07	1.41E-13	0.020	1.40E-06	4.09E+02	5.30E-06	3.99E-06	1.55E-02	5.13E+05	3.85E+06	2.05E+06	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
39227286	HxCDD, 1,2,3,4,7,8-	3.80E+07	varies	6.17E+07	1.33E-13	0.060	4.40E-06	3.91E+02	1.20E-05	4.12E-06	1.15E-02	3.80E+05	2.85E+06	1.52E+06	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
57653857	HxCDD, 1,2,3,6,7,8-	1.10E+07	varies	1.78E+07	4.70E-14	0.029	4.40E-06	3.91E+02	1.20E-05	4.12E-06	1.15E-02	1.10E+05	8.22E+05	4.39E+05	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
19408743	HxCDD, 1,2,3,7,8,9-	1.10E+07	varies	1.78E+07	6.45E-14	0.015	4.40E-06	3.91E+02	1.20E-05	4.12E-06	1.15E-02	1.10E+05	8.22E+05	4.39E+05	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
70648269	HxCDF, 1,2,3,4,7,8-	1.10E+07	varies	1.78E+07	3.16E-13	0.049	8.25E-06	3.75E+02	1.40E-05	4.23E-06	1.62E-02	1.10E+05	8.22E+05	4.39E+05	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
57117449	HxCDF, 1,2,3,6,7,8-	1.10E+07	varies	1.78E+07	2.89E-13	0.052	1.77E-06	3.75E+02	6.10E-06	4.23E-06	1.62E-02	1.10E+05	8.22E+05	4.39E+05	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
72918219	HxCDF, 1,2,3,7,8,9-	1.10E+07	varies	1.78E+07	2.37E-13	0.068	1.30E-05	3.75E+02	1.00E-05	4.23E-06	1.62E-02	1.10E+05	8.22E+05	4.39E+05	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
60851345	HxCDF, 2,3,4,6,7,8-	1.10E+07	varies	1.78E+07	2.83E-13	0.055	1.30E-05	3.75E+02	1.00E-05	4.23E-06	1.62E-02	1.10E+05	8.22E+05	4.39E+05	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
3268879	OCDD, 1,2,3,4,5,7,8,9-	2.40E+07	varies	3.89E+07	1.09E-15	0.0017	7.40E-08	4.61E+02	7.00E-09	3.89E-07	1.06E-02	2.40E+05	1.80E+06	9.60E+05	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
39001020	OCDF, 1,2,3,4,6,7,8,9-	3.72E+08	varies	6.03E+08	4.93E-15	0.0017	1.20E-06	4.45E+02	1.90E-06	3.78E-06	1.48E-02	3.72E+06	2.79E+07	1.49E+07	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
40321764	PeCDD, 1,2,3,7,8-	2.69E+06	varies	4.37E+06	1.25E-12	0.22	1.20E-04	3.56E+02	2.60E-06	4.38E-06	1.21E-02	2.69E+04	2.02E+05	1.08E+05	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
57117416	PeCDF, 1,2,3,7,8-	3.80E+06	varies	6.17E+06	3.58E-12	0.36	2.40E-04	3.40E+02	6.20E-06	4.51E-06	1.70E-02	3.80E+04	2.85E+05	1.52E+05	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
57117314	PeCDF, 2,3,4,7,8-	5.13E+06	varies	8.32E+06	4.33E-12	0.26	2.36E-04	3.40E+02	6.20E-06	4.51E-06	1.70E-02	5.13E+04	3.85E+05	2.05E+05	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
1746016	TCDD, 2,3,7,8-	2.69E+06	varies	4.37E+06	9.74E-13	0.49	1.93E-05	3.22E+02	1.60E-05	6.81E-06	1.27E-02	2.69E+04	2.02E+05	1.08E+05	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)
51207319	TCDF, 2,3,7,8-	2.08E+06	varies	3.39E+06	1.17E-11	0.66	4.19E-04	3.06E+02	8.60E-06	4.85E-06	1.79E-02	2.08E+04	1.57E+05	8.36E+04	6.93E-02	EPA 1998 (App. A) & EPA 99 (Errata)

Notes:

NA = Not Applicable or Not Available

(a) For PCDDs/PCDFs, Kd_s, Kd_{sw}, and Kd_{bs} are calculated by multiplying the Koc by the fraction organic carbon (foc) values shown below.

Parameter Name	Acronym	Value	Units	Source
Fraction Organic Carbon in Soil	-foc	0.01	None	EPA 1998, App. A-3
Fraction Organic Carbon in Suspended Sediment	foc _{sw}	0.075	None	EPA 1998, App. A-3
Fraction Organic Carbon in Bottom Sediment	foc _{bs}	0.04	None	EPA 1998, App. A-3

Sources:
EPA 1998 = Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities, Peer Review Draft, July 1998, EPA 530-D-98-001A.
EPA 1999 = EPA's Errata to the 1998 document (August, 1999).

Table 5-6 (Cont.)
Summary of Chemical-Specific Input Parameters for the Risk Assessment

Biotransfer Factors for Plants

CAS Number	Compound Name	Br - abovegrnd. veg. (µg/g DW plant)/ (µg/g soil)	Br - forage/ silage / grain (µg/g DW plant)/ (µg/g soil)	Bv - abovegrnd. veg. (µg/g DW plant)/ (µg/g air)	Bv - aboveground forage/silage (µg/g DW plant)/ (µg/g air)	Br - rootveg µg/g DW plant/ (µg/g soil)	Source (b)
7487-94-7	mercury (divalent)	1.45E-02	0.00E+00	1.83E+03	1.83E+03	3.60E-02	EPA 1998 (App. A)
7439-97-6	mercury (elemental)	NA	NA	NA	NA	NA	EPA 1998 (App. A) & EPA 99 (Errata)
22967-92-6	mercury (methyl)	2.94E-02	0.00E+00	NA	NA	9.90E-02	EPA 1998 (App. A) & EPA 99 (Errata)
PCDD/Fs							
35822489	HpCDD, 1,2,3,4,6,7,8-	7.05E-04	7.05E-04	9.10E+05	9.10E+05	4.90E-01	EPA 1998 (App. A) & EPA 99 (Errata)
67562394	HpCDF, 1,2,3,4,6,7,8-	1.02E-03	1.02E-03	8.30E+05	8.30E+05	5.68E-01	EPA 1998 (App. A) & EPA 99 (Errata)
55873897	HpCDF, 1,2,3,4,7,8,9-	1.02E-03	1.02E-03	8.30E+05	8.30E+05	5.68E-01	EPA 1998 (App. A) & EPA 99 (Errata)
39227286	HxCDD, 1,2,3,4,7,8-	1.22E-03	1.22E-03	5.20E+05	5.20E+05	6.09E-01	EPA 1998 (App. A) & EPA 99 (Errata)
57853857	HxCDD, 1,2,3,6,7,8-	2.50E-03	2.50E-03	5.20E+05	5.20E+05	8.10E-01	EPA 1998 (App. A) & EPA 99 (Errata)
19408743	HxCDD, 1,2,3,7,8,9-	2.50E-03	2.50E-03	5.20E+05	5.20E+05	8.10E-01	EPA 1998 (App. A) & EPA 99 (Errata)
70648269	HxCDF, 1,2,3,4,7,8-	2.50E-03	2.50E-03	1.62E+05	1.62E+05	8.10E-01	EPA 1998 (App. A) & EPA 99 (Errata)
57117449	HxCDF, 1,2,3,6,7,8-	2.50E-03	2.50E-03	1.62E+05	1.62E+05	8.10E-01	EPA 1998 (App. A) & EPA 99 (Errata)
72918219	HxCDF, 1,2,3,7,8,9-	2.50E-03	2.50E-03	1.62E+05	1.62E+05	8.10E-01	EPA 1998 (App. A) & EPA 99 (Errata)
60851345	HxCDF, 2,3,4,6,7,8-	2.50E-03	2.50E-03	1.62E+05	1.62E+05	8.10E-01	EPA 1998 (App. A) & EPA 99 (Errata)
3268879	OCDD, 1,2,3,4,5,7,8,9-	1.59E-03	1.59E-03	2.36E+08	2.36E+08	6.77E-01	EPA 1998 (App. A) & EPA 99 (Errata)
39001020	OCDF, 1,2,3,4,6,7,8,9-	3.26E-04	3.26E-04	2.28E+08	2.28E+08	3.60E-01	EPA 1998 (App. A) & EPA 99 (Errata)
40321764	PeCDD, 1,2,3,7,8-	5.62E-03	5.62E-03	2.39E+05	2.39E+05	1.12E+00	EPA 1998 (App. A) & EPA 99 (Errata)
57117416	PeCDF, 1,2,3,7,8-	4.61E-03	4.61E-03	9.75E+04	9.75E+04	1.03E+00	EPA 1998 (App. A) & EPA 99 (Errata)
57117314	PeCDF, 2,3,4,7,8-	3.87E-03	3.87E-03	9.75E+04	9.75E+04	9.65E-01	EPA 1998 (App. A) & EPA 99 (Errata)
1746016	TCDD, 2,3,7,8-	5.62E-03	5.62E-03	6.55E+04	6.55E+04	1.12E+00	EPA 1998 (App. A) & EPA 99 (Errata)
51207319	TCDF, 2,3,7,8-	6.51E-03	6.51E-03	4.57E+04	4.57E+04	1.19E+00	EPA 1998 (App. A) & EPA 99 (Errata)

Notes:

NA = Not Applicable or Not Available

Table 5-6 (Cont.)
Summary of Chemical-Specific Input Parameters for the Risk Assessment

Biotransfer Factors for Animals

CAS Number	Compound Name	Ba - beef (day/kg)	BAF - fish: total water conc. (L/kg body weight)	BCF - fish: dissolved water conc. (L/kg)	BSAF - fish: sediment org. carbon (unitless)	Source
7487-94-7	mercury (divalent)	5.22E-03	NA	NA	NA	App. A EPA 1998
7439-97-6	mercury (elemental)	NA	NA	NA	NA	EPA 1998 (App. A) & EPA 99 (Errata)
22967-92-6	mercury (methyl) (a)	7.80E-04	6.80E+06	NA	NA	EPA 1998 (App. A) & EPA 99 (Errata)
PCDD/Fs						
35822469	HpCDD, 1,2,3,4,6,7,8-	5.40E-03	NA	NA	5.0E-03	EPA 1998 (App. A) & EPA 99 (Errata)
67562394	HpCDF, 1,2,3,4,6,7,8-	5.43E-03	NA	NA	5.0E-03	EPA 1998 (App. A) & EPA 99 (Errata)
55673897	HpCDF, 1,2,3,4,7,8,9-	1.63E-02	NA	NA	5.0E-03	EPA 1998 (App. A) & EPA 99 (Errata)
39227286	HxCDD, 1,2,3,4,7,8-	3.26E-02	NA	NA	4.0E-02	EPA 1998 (App. A) & EPA 99 (Errata)
57653857	HxCDD, 1,2,3,6,7,8-	2.71E-02	NA	NA	4.0E-02	EPA 1998 (App. A) & EPA 99 (Errata)
19408743	HxCDD, 1,2,3,7,8,9-	2.71E-02	NA	NA	4.0E-02	EPA 1998 (App. A) & EPA 99 (Errata)
70648269	HxCDF, 1,2,3,4,7,8-	3.80E-02	NA	NA	4.0E-02	EPA 1998 (App. A) & EPA 99 (Errata)
57117449	HxCDF, 1,2,3,6,7,8-	3.26E-02	NA	NA	4.0E-02	EPA 1998 (App. A) & EPA 99 (Errata)
72918219	HxCDF, 1,2,3,7,8,9-	3.26E-02	NA	NA	4.0E-02	EPA 1998 (App. A) & EPA 99 (Errata)
60851345	HxCDF, 2,3,4,6,7,8-	2.71E-02	NA	NA	4.0E-02	EPA 1998 (App. A) & EPA 99 (Errata)
3268879	OCDD, 1,2,3,4,5,7,8,9-	5.43E-03	NA	NA	1.0E-04	EPA 1998 (App. A) & EPA 99 (Errata)
39001020	OCDF, 1,2,3,4,6,7,8,9-	5.43E-03	NA	NA	1.0E-04	EPA 1998 (App. A) & EPA 99 (Errata)
40321764	PeCDD, 1,2,3,7,8-	5.43E-02	NA	NA	9.0E-02	EPA 1998 (App. A) & EPA 99 (Errata)
57117416	PeCDF, 1,2,3,7,8-	1.09E-02	NA	NA	9.0E-02	EPA 1998 (App. A) & EPA 99 (Errata)
57117314	PeCDF, 2,3,4,7,8-	4.89E-02	NA	NA	9.0E-02	EPA 1998 (App. A) & EPA 99 (Errata)
1746016	TCDD, 2,3,7,8-	5.43E-02	NA	NA	9.0E-02	EPA 1998 (App. A) & EPA 99 (Errata)
51207319	TCDF, 2,3,7,8-	1.63E-02	NA	NA	9.0E-02	EPA 1998 (App. A) & EPA 99 (Errata)

Notes:

NA = Not Applicable or Not Available

(a) The fish uptake value for methyl mercury is described by USEPA as a BAF for trophic level 4 fish based on dissolved water concentrations (not total water concentrations), as described in EPA's 1997 Mercury Report to Congress (Appendix D of Volume III).

Table 5-7
Fate and Transport Parameters for the Lee County ERF Facility Multiple Pathway Risk Assessment

Parameter Name	Parameter Acronym	Value	Units	Source (a)
SOIL CONCENTRATION DUE TO DEPOSITION - soil ingestion (Sc for carcinogens, ScTc for non-carcinogens)				
Time period over which deposition occurs	T _D	30	yr	Assumed facility lifetime
Time period at the beginning of combustion	T _i	0	yr	Assumed
Length of exposure duration - Adult resident	T _{2R}	30	yr	Table C-1-7
Length of exposure duration - Fisher	T _{2F}	30	yr	Table C-1-7
Length of exposure duration - Beef farmer	T _{2B}	40	yr	Table C-1-7
Length of exposure duration - child	T _{child}	6	yr	Table C-1-7
Soil mixing depth (untilled)	Z _s	1	cm	Table B-1-1 (default value)
Soil bulk density	BD	1.5	g/cm ³	Site-specific data (same as EPA (1998) default value)
Units conversion factor		0.31536	m ³ g/s/cm ³ g/yr	Table B-1-1
Dry deposition velocity	V _{dv}	3	cm/s	Table B-1-1
Units conversion factor		100	(mg/m ³)/(kg/cm ³)	Table B-1-1
Fraction wet deposition on plant - organics, selected inorganics	F _w	0.6	none	Table B-2-7
Fraction wet deposition on plant - selected inorganics	F _w	0.2	none	Table B-2-7
Soil Loss Constant, ks (input for calculating Sc)				
Soil loss due to soil erosion	k _{se}	0	yr ⁻¹	Table B-1-2
Loss Constant due to Leaching, ksl (input for calculating ks)				
Average annual recharge	q	0.11	cm/yr	Average value for the modeling and facility area calculated by Malcolm Pirnie based on recharge data in a South Florida Water Management District report (SFWMD 1999) (b)
Soil volumetric water content	θ _{sw}	0.2	mL/cm ³	Table B-1-5
Soil depth from which leaching removal occurs (untilled)	Z _s	1	cm	linked to above - Table B-1-5
Soil bulk density	BD	1.5	g/cm ³	linked to above - Table B-1-5
Loss Constant due to Runoff, kar (input for calculating ks)				
Average annual runoff from pervious areas	RO	15	cm/yr	Value calculated by Malcolm Pirnie based on stormwater modeling using site-specific precipitation data.
Soil volumetric water constant	θ _{sw}	0.2	mL/cm ³	Table B-1-4
Soil mixing depth (untilled)	Z _s	1	cm	linked to above - Table B-1-4
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
Loss Constant due to Volatilization, ksv (input for calculating ks)				
Conversion constant		3.1536E+07	s/yr	Errata, EPA 1999
Soil mixing depth (untilled)	Z _s	1	cm	linked to above - Errata, EPA 1999
Universal gas constant	R	8.205E-05	atm*m ³ /mol*K	Errata, EPA 1999
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
Ambient air temperature	T	297	K	NCDC. 5-year annual average based on 1990-1995 data from Page Field, Fort Myers (297 K = 75°F).
Soil volumetric water constant	θ _{sw}	0.2	mL/cm ³	linked to above - Errata, EPA 1999 and Table B-1-5
Solids particle density	ρ _s	2.7	g/cm ³	Errata, EPA 1999
SOIL CONCENTRATION DUE TO DEPOSITION - produce (Sc for carcinogens, ScTc for non-carcinogens)				
Time period over which deposition occurs	T _D	30	yr	linked to above - assumed facility lifetime
Time period at the beginning of combustion	T _i	0	yr	linked to above - Assumed
Length of exposure duration - Adult resident	T _{2R}	30	yr	linked to above - Table C-1-7
Length of exposure duration - Fisher	T _{2F}	30	yr	linked to above - Table C-1-7
Length of exposure duration - Beef farmer	T _{2B}	40	yr	linked to above - Table C-1-7
Soil mixing depth (tilled)	Z _s	20	cm	Table B-2-1

Table 5-7
Fate and Transport Parameters for the Lee County ERF Facility Multiple Pathway Risk Assessment

Parameter Name	Parameter Acronym	Value	Units	Source (a)
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
Units conversion factor		0.31536	m ³ g/s/cm ³ μg/yr	linked to above - Table B-2-1
Dry deposition velocity	V _{dv}	3	cm/s	linked to above - Table B-2-1
Units conversion factor		100	((mg/m ³)/[kg/cm ³])	Table B-2-1
Soil Loss Constant, k_s (input for calculating S_c)				
Soil loss due to soil erosion	k _{se}	0	yr ⁻¹	Table B-2-2
Loss Constant due to Leaching, k_{sl} (input for calculating k_s)				
Average annual recharge	q	0.11	cm/yr	linked to above - Average value for the modeling and facility area calculated by Malcolm Pirnie based on recharge data in a South Florida Water Management District report (SFWMD 1999) (b)
Soil volumetric water content	θ _{sw}	0.2	mL/cm ³	linked to above - Table B-1-5
Soil depth from which leaching removal occurs (tilled)	Z _s	20	cm	linked to above - Table B-1-5
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
Loss Constant due to Runoff, k_{sr} (input for calculating k_s)				
Average annual runoff	RO	15	cm/yr	Linked to above - Value calculated by Malcolm Pirnie based on stormwater modeling using site-specific precipitation data.
Soil volumetric water constant	θ _{sw}	0.2	mL/cm ³	linked to above - Table B-1-4
Soil mixing depth (tilled)	Z _s	20	cm	linked to above - Table B-1-4
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
Loss Constant due to Volatilization, k_{sv} (input for calculating k_s)				
Conversion constant		3.15E+07	s/yr	linked to above - Errata, EPA 1999 and Table B-1-5
Soil mixing depth (tilled)	Z _s	20	cm	linked to above - Errata, EPA 1999 and Table B-1-5
Universal gas constant	RO	8.205E-05	atm*m ³ /mol*K	Linked to above - Value calculated by Malcolm Pirnie based on stormwater modeling using site-specific precipitation data.
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
Soil volumetric water constant	θ _{sw}	0.2	mL/cm ³	linked to above - Errata, EPA 1999
Solids particle density	ρ _s	2.7	g/cm ³	linked to above - Errata, EPA 1999
ABOVEGROUND PRODUCE CONCENTRATION DUE TO DIRECT DEPOSITION, P_d				
Units conversion factor		1000	mg/g	Table B-2-7
Fraction wet deposition on plant - organics, selected inorganics	F _w	0.6	none	Table B-2-7
Fraction wet deposition on plant - selected inorganics	F _w	0.2	none	Table B-2-7
Interception fraction of edible portion of plant	R _p	0.39	none	Table B-2-7
Plant surface loss coefficient	k _p	18	yr ⁻¹	Table B-2-7
Length of plant's exposure to deposition per harvest of edible portion of plant	T _p	0.164	yr	Table B-2-7
Yield or standing crop biomass of the edible portion of the plant	Y _p	2.24	kg*DW/m ²	Table B-2-7
ABOVEGROUND PRODUCE CONCENTRATION DUE TO AIR-TO-PLANT TRANSFER, P_v				
Empirical correction factor for aboveground vegetation - organics with log K _{ow} >= 4	V _{dag-organics}	0.01	none	Table B-2-8
Empirical correction factor for aboveground vegetation - all other compounds	V _{dag-other}	1	none	Table B-2-8
Density of air	ρ _a	1.20E-03	g/cm ³	Table B-2-8 (Value in EPA 1998 is 1,200 g/m ³)
BELOWGROUND PRODUCE CONCENTRATION DUE TO ROOT UPTAKE, P_{rbg}				

Table 5-7
Fate and Transport Parameters for the Lee County ERF Facility Multiple Pathway Risk Assessment

Parameter Name	Parameter Acronym	Value	Units	Source (a)
Empirical correction factor for belowground produce - organics with log $K_{ow} \geq 4$	$V_{g,rootveg-low}$	0.01	none	Table B-2-10
Empirical correction factor for belowground produce - all other compounds	$V_{g,rootveg-nonlow}$	1	none	Table B-2-10
SOIL CONCENTRATION DUE TO DEPOSITION - animal products (Sc for carcinogens, ScTc for non-carcinogens)				
Time period over which deposition occurs	T_D	30	yr	linked to above - assumed facility lifetime
Length of exposure duration - Adult resident	T_{2R}	30	yr	linked to above - Table C-1-7
Length of exposure duration - Fisher	T_{2F}	30	yr	linked to above - Table C-1-7
Length of exposure duration - Beef farmer	T_{2B}	40	yr	linked to above - Table C-1-7
Soil mixing depth (tilled)	Z_s	20	cm	linked to above - Table B-2-1
Soil mixing depth (untilled)	Z_s	1	cm	linked to above - Table B-2-1
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
Units conversion factor		0.31536	m ³ g/s/cm ³ ug*yr	Table B-3-1
Dry deposition velocity	V _{dv}	3	cm/s	linked to above - Table B-3-1
Units conversion factor		100	(mg*m ²)/(kg*cm ²)	linked to above - Table B-3-1
Soil Loss Constant, ks (input for calculating Sc)				
Soil loss due to soil erosion	k _{se}	0	yr ⁻¹	linked to above - Table B-3-2
Loss Constant due to Leaching, ksl (input for calculating ks)				
Average annual recharge	q	0.11	cm/yr	linked to above - Average value for the modeling and facility area calculated by Malcolm Pirnie based on recharge data in a South Florida Water Management District report (SFWMD 1999) (b)
Soil volumetric water content	θ_{sw}	0.2	mL/cm ³	linked to above - Table B-3-5
Soil depth from which leaching removal occurs (tilled)	Z_e	20	cm	linked to above - Table B-3-5
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
Loss Constant due to Runoff, ksr (input for calculating ks)				
Average annual runoff	RO	15	cm/yr	Linked to above - Value calculated by Malcolm Pirnie based on stormwater modeling using site-specific precipitation data.
Soil volumetric water constant	θ_{sw}	0.2	mL/cm ³	linked to above - Table B-3-4
Soil mixing depth (tilled)	Z_e	20	cm	linked to above - Table B-3-4
Soil mixing depth (untilled)	Z_e	1	cm	linked to above - Table B-3-4
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
Loss Constant due to Volatilization, ksv (input for calculating ks)				
Conversion constant		3.1536E+07	s/yr	Errata, EPA 1999
Soil mixing depth (tilled)	Z_e	20	cm	linked to above - Errata, EPA 1999
Universal gas constant	R	8.205E-05	atm*m ³ /mol*K	linked to above - Errata, EPA 1999
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
Soil volumetric water constant	θ_{sw}	0.2	mL/cm ³	linked to above - Errata, EPA 1999
Solids particle density	ρ_s	2.7	g/cm ³	linked to above - Errata, EPA 1999
Ambient air temperature	T	297	K	Linked to above - NCDC. 5-year annual average based on 1990-1995 data from Page Field, Fort Myers (297 K = 75°F).
FORAGE AND SILAGE CONCENTRATION DUE TO DIRECT DEPOSITION, Pd				
Units conversion factor		1000	mg/g	Table B-3-7
Fraction wet deposition on plant - organics, selected inorganics	F_w	0.6	none	Linked to above - Table B-3-7
Fraction Wet Deposition on plant - selected inorganics	F_w	0.2	none	Linked to above - Table B-3-7
Interception fraction of the edible portion of the plant (forage)	$R_{p(forage)}$	0.5	none	Table B-3-7
Interception fraction of the edible portion of the plant (silage)	$R_{p(silage)}$	0.46	none	Table B-3-7

Table 5-7
Fate and Transport Parameters for the Lee County ERF Facility Multiple Pathway Risk Assessment

Parameter Name	Parameter Acronym	Value	Units	Source (a)
Plant surface loss coefficient	kp	18	yr ⁻¹	linked to above - Table B-3-7
Length of the plant's exposure to deposition per harvest of the edible portion of the plant - forage	TP _{forage}	0.12	yr	Table B-3-7
Length of the plant's exposure to deposition per harvest of the edible portion of the plant - silage	TP _{silage}	0.16	yr	Table B-3-7
Yield or standing crop biomass of the edible portion of the plant - forage	YP _{forage}	0.24	kg*DW/m ²	Table B-3-7
Yield or standing crop biomass of the edible portion of the plant - silage	YP _{silage}	0.8	kg*DW/m ²	Table B-3-7
FORAGE AND SILAGE CONCENTRATION DUE TO AIR-TO-PLANT TRANSFER, P_v				
Empirical correction factor for above ground vegetation - forage	Vg _{ag - forage}	1.0	none	Table B-3-8
Empirical correction factor for above ground vegetation - silage	Vg _{ag - silage}	0.5	none	Table B-3-8
Density of air	ρ _a	1.20E-03	g/cm ³	linked to above - Table B-3-8
BEEF CONCENTRATION DUE TO PLANT AND SOIL INGESTION, A_{beef}				
Fraction of forage grown on affected soil and eaten by the animal	F _i	1	none	Table B-3-10
Fraction of silage grown on affected soil and eaten by the animal	F _i	1	none	Table B-3-10
Fraction of grain grown on affected soil and eaten by the animal	F _i	1	none	Table B-3-10
Quantity of plant eaten by the animal each day - forage	Q _{p1 - forage}	8.64	kg plant tissue DW/day	Site-specific information based on input from interviews with local and state officials by Malcolm Pirnie
Quantity of plant eaten by the animal each day - silage	Q _{p1 - silage}	0	kg plant tissue DW/day	Site-specific information based on input from interviews with local and state officials by Malcolm Pirnie
Quantity of plant eaten by the animal each day - grain	Q _{p1 - grain}	0.45	kg plant tissue DW/day	Site-specific information based on input from interviews with local and state officials by Malcolm Pirnie
Quantity of soil eaten by the animal	Q _s	0.5	kg soil/day	Table B-3-10
WATERSHED SOIL CONCENTRATION DUE TO DEPOSITION (used for fish pathway) (C_s)				
Time period over which deposition occurs	TD	30	yr	linked to above - site specific
Length of exposure duration - Fisher	T _{2,F1}	30	yr	linked to above - Table B-4-1
Soil mixing depth (depth1)	Z _s	1	cm	linked to above - Table B-4-1
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
Units conversion factor		0.31536	m ³ *g ⁻¹ *s/cm ³ *ug ⁻¹ *yr	Table B-4-1
Dry deposition velocity	V _{dv}	3	cm/s	linked to above - Table B-4-1
Units conversion factor		100	((mg*m ³)/(kg*cm ²))	Table B-4-1
Loss Constant due to Leaching, k_{sl} (input for calculating total loss constant, ks)				
Average annual recharge	q	0.11	cm/yr	and facility area calculated by Malcolm Pirnie based on recharge data in a South Florida Water Management District report (SFWMD 1999) (b)
Soil volumetric water content	θ _{sw}	0.2	mL/cm ³	linked to above - Table B-4-5
Soil depth from which leaching removal occurs	Z _s	1	cm	linked to above - Table B-4-5
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
Loss Constant due to Erosion, k_{se} (input for calculating total loss constant, ks: All k_{se} = 0)				
Loss Constant due to Runoff, k_{sr} (input for calculating total loss constant, ks)				
Average annual runoff	RO	15	cm/yr	Linked to above - Value calculated by Malcolm Pirnie based on stormwater modeling using site-specific precipitation data.

Table 5-7
Fate and Transport Parameters for the Lee County ERF Facility Multiple Pathway Risk Assessment

Parameter Name	Parameter Acronym	Value	Units	Source (a)
Soil volumetric water constant	θ_{sw}	0.2	mL/cm ³	linked to above - Table B-4-4
Soil mixing depth	Z_s	1	cm	linked to above - Table B-4-4
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
Loss Constant due to Volatilization, ksv (input for calculating total loss constant, ks)				
Conversion constant		3.1536E+07	s/yr	Errata 1999
Soil mixing depth	Z_s	1	cm	linked to above - Errata 1999
Universal gas constant	R	8.205E-05	atm*m ³ /mol*K	Errata 1999
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
Ambient air temperature	T_a	297	K	Linked to above - NCDC. 5-year annual average based on 1990-1995 data from Page Field, Fort Myers (297 K = 75°F).
Solids particle density	ρ_s	2.7	g/cm ³	Errata 1999
Soil volumetric water constant	θ_{sw}	0.2	m ³	linked to above - Errata 1999
TOTAL WATERBODY LOAD, LT				
Impervious Runoff Load to Waterbody, L_R (input for calculating L_T)				
River: Impervious watershed area receiving deposition	A_i	4.4E+07	m ²	Calculated by Malcolm Pirnie based on an analysis of land use categories (e.g., residential, rural) and the percentage impervious area within each category for the watershed area.
Pond: Impervious watershed area receiving deposition	A_i	3.6E+03	m ²	Calculated by Malcolm Pirnie based on an analysis of land use in the watershed area of a typical pond and the percentage impervious area within each land use category for the watershed area.
Pervious Runoff Load to Waterbody, L_R (input for calculating L_T)				
Average annual runoff	RO	15	cm/yr	Linked to above - Value calculated by Malcolm Pirnie based on stormwater modeling using site-specific precipitation data.
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
River: Total watershed area receiving deposition	A_t	2.69E+08	m ²	GIS analysis performed by Malcolm Pirnie was used to determine the Caloosahatchee River watershed area within the modeling domain and beyond the facility boundary (area ~100 square miles).
River: Impervious watershed area receiving deposition	A_i	4.4E+07	m ²	linked to above - Calculated by Malcolm Pirnie based on an analysis of land use categories (e.g., residential, rural) and the percentage impervious area within each category for the watershed area.
Pond: Total watershed area receiving deposition	A_t	1.80E+05	m ²	Watershed area for a typical pond was calculated by Malcolm Pirnie using data from USGS topographic maps, County GIS data, and aerial photography (area ~ 0.07 square miles).
Pond: Impervious watershed area receiving deposition	A_i	3.6E+03	m ²	linked to above - Calculated by Malcolm Pirnie based on an analysis of land use in the watershed area of a typical pond and the percentage impervious area within each category for the watershed area.
Units conversion factor		0.01	kg*cm ³ /mg*m ³	Table B-4-10
Soil volumetric water constant	θ_{sw}	0.2	mL/cm ³	linked to above - Table B-4-10
Erosion Load to Waterbody, L_E (input for calculating L_T)				
Soil bulk density	BD	1.5	g/cm ³	linked to above - Site-specific data (same as EPA (1998) default value)
Soil volumetric water constant	θ_{sw}	0.2	mL/cm ³	linked to above - Table B-4-11
River: Total watershed area receiving deposition	A_t	2.69E+08	m ²	linked to above - GIS analysis performed by Malcolm Pirnie was used to determine the Caloosahatchee River watershed area within the modeling domain and beyond the facility boundary (area ~100 square miles).

Table 5-7
Fate and Transport Parameters for the Lee County ERF Facility Multiple Pathway Risk Assessment

Parameter Name	Parameter Acronym	Value	Units	Source (a)
River: Impervious watershed area receiving deposition	A_i	4.4E+07	m ²	linked to above - Calculated by Malcolm Pirnie based on an analysis of land use categories (e.g., residential, rural) and the percentage impervious area within each category for the watershed area.
Pond: Total watershed area receiving deposition	A_L	1.80E+05	m ²	linked to above - Watershed area was calculated by Malcolm Pirnie using data from USGS topographic maps, County GIS data, and aerial photography (area ~ 0.07 square miles).
Pond: Impervious watershed area receiving deposition	A_i	3.6E+03	m ²	linked to above - Calculated by Malcolm Pirnie based on an analysis of land use in the watershed area of a typical pond and the percentage impervious area within each category for the watershed area.
Soil enrichment ratio (organics)	ER	3	none	linked to above - Table B-4-11
Soil enrichment ratio (inorganics)	ER	1	none	linked to above - Table B-4-11
Units conversion factor		0.001	(kg-cm ³)/(mg-m ³)	Table B-4-11
Diffusion Load to Waterbody, L_{DF} (input for calculating L_T)				
River: Waterbody surface area	A_W	1.7E+07	m ²	Calculated by Malcolm Pirnie using GIS analysis of Caloosahatchee River area within the 20 km-by-20 km modeling domain.
Pond: Waterbody surface area	A_W	3.6E+04	m ²	Average value calculated by Malcolm Pirnie to be representative of ponds in area S and SSE of the facility (and within modeling domain), based on analysis of ponds shown on USGS topographical maps and GIS analysis.
Universal gas constant	R	8.205E-05	atm*m ³ /mol*K	linked to above - Table B-4-12
River: Waterbody temperature	T_{wk}	298	K	Calculated by Malcolm Pirnie based on 5 years of Caloosahatchee River monitoring data at station S79.
Pond: Waterbody temperature	T_{wk}	298	K	Value based on measurement collected at a sample pond in area by Malcolm Pirnie.
Units conversion factor		1.00E-06	g/lug	Table B-4-12
Deposition Load (Wet Plus Dry Particles and Wet Vapors) to Waterbody, L_{DP} (input for calculating L_T)				
River: Waterbody surface area	A_W	1.7E+07	m ²	linked to above - Calculated by Malcolm Pirnie using GIS analysis of river area within the 20 km-by-20 km modeling domain.
Pond: Waterbody surface area	A_W	3.6E+04	m ²	linked to above - Average value calculated by Malcolm Pirnie to be representative of ponds in area S and SSE of the facility (and within modeling domain), based on analysis of ponds shown on USGS topographical maps and GIS analysis
Unit Soil Loss/Universal Soil Loss Equation, X_e (input for calculating LE and kse)				
USLE rainfall (or erosivity) factor (pond and river)	RF	450	yr ⁻¹	Data provided by Malcolm Pirnie and based on Maidment (1993) Handbook of Hydrology. Corresponding EPA table is Table B-4-13.
USLE erodibility factor (pond and river)	K	0.14	ton/acre	Site-specific value calculated by Malcolm Pirnie based on data in local soil survey
USLE length-slope factor (pond and river)	LS	0.17	none	Site-specific value calculated by Malcolm Pirnie based on data in local soil survey
USLE cover management factor (pond and river)	C	0.07	none	Site-specific value calculated by Malcolm Pirnie based on data in local soil survey
USLE supporting practice factor (pond and river)	P	1	none	Table B-4-13
Conversion factor		907.18	kg/ton	Table B-4-13
Conversion factor		4047	mg ² /acre	Table B-4-13
Sediment Delivery Ratio, SD (to use in calculating soil erosion load, LE, and kse)				
River: Total watershed area receiving deposition	A_L	2.69E+08	m ²	linked to above - GIS analysis performed by Malcolm Pirnie was used to determine the Caloosahatchee River watershed area within the modeling domain and beyond the facility boundary (area ~100 square miles).
Pond: Total watershed area receiving deposition	A_L	1.80E+05	m ²	linked to above - Watershed area was calculated by Malcolm Pirnie using data from USGS topographic maps, County GIS data, and aerial photography (area ~ 0.07 square miles).
Empirical slope coefficient	b	0.125	none	Table B-4-14

Table 5-7
Fate and Transport Parameters for the Lee County ERF Facility Multiple Pathway Risk Assessment

Parameter Name	Parameter Acronym	Value	Units	Source (a)
River: Empirical intercept coefficient	a	1.2	none	Table B-4-14. Value based on area of 100 square miles.
Pond: Empirical intercept coefficient	a	2.1	none	Table B-4-14. Value based on area of 0.1 square miles.
TOTAL WATERBODY CONCENTRATION, C_{wtot}				
River: Average volumetric flow rate through water body	V _r	2.1E+09	m ³ /yr	Annual average flow rate calculated by Malcolm Pirnie based on the average of: 1) 5 years of Caloosahatchee River monitoring data at station S79 (1.72E+9 m ³ /yr) (upstream edge of river in modeling domain) and 2) a calculated flow rate at the Fort Myers Bridge (downstream edge of modeling domain) based on watershed areas for station S79 and the area between S79 and the bridge and an urban runoff adjustment of 1.1 for the area between S79 and the bridge (2.5E+9 m ³ /yr).
River: Waterbody surface area	A _w	1.7E+07	m ²	linked to above - Calculated by Malcolm Pirnie using GIS analysis of river area within the 20 km by-20 km modeling domain.
River: Depth of water column	d _{wc}	2.4	m	Water column depth calculated by Malcolm Pirnie based on measurements at Caloosahatchee River monitoring station S79 and NOAA river charts.
River: Depth of upper benthic layer	d _{be}	0.03	m	Default value from EPA, Table B-4-16.
Pond: Average volumetric flow rate through water body	V _r	1.8E+04	m ³ /yr	Flow rate was estimated by Malcolm Pirnie based on the annual volume of water in the pond removed by either surface water flow or ground water flow.
Pond: Waterbody surface area	A _w	3.6E+04	m ²	linked to above - Average value calculated by Malcolm Pirnie to be representative of ponds in area S and SSE of the facility (and within modeling domain), based on analysis of ponds shown on USGS topographical maps and GIS analysis
Pond: Depth of water column	d _{wc}	0.6	m	Value based on analysis of typical pond water depth and rainfall data by Malcolm Pirnie
Pond: Depth of upper benthic layer	d _{be}	0.05	m	Value based on measurements collected at sample ponds in area by Malcolm Pirnie.
Fraction of Water Column and Benthic Sediment, f_{wc} or f_w and f_{bs} or f_{benth} (used to calculate C_{wtot} and K_{wt})				
River: Total suspended solids	TSS	2.9	mg/L	Provided by Malcolm Pirnie based on 5 years of Caloosahatchee River monitoring data at station S79.
Conversion factor		1E-06	kg/mg	Table B-4-16
River: Depth of water column	d _{wc}	2.4	m	linked to above - Water column depth calculated by Malcolm Pirnie based on measurements at Caloosahatchee River monitoring station S79 and NOAA river charts.
River: Depth of upper benthic layer	d _{be}	0.03	m	linked to above - Default value from EPA, Table B-4-16.
Bed sediment porosity	θ _{bs}	0.6	L _{water} /L _{sed}	Table B-4-16
Bed sediment concentration	C _{bs}	1	g/cm ³	Table B-4-16
Pond: Total suspended solids	TSS	39	mg/L	Value based on measurements collected at a sample pond in area by Malcolm Pirnie.
Pond: Depth of water column	d _{wc}	0.6	m	linked to above - Value based on measurements collected at sample ponds in area by Malcolm Pirnie.
Pond: Depth of upper benthic layer	d _{be}	0.05	m	linked to above - Value based on measurements collected at sample ponds in area by Malcolm Pirnie.
OVERALL TOTAL WATERBODY DISSIPATION RATE CONSTANT, k_{wt}				
Water Column Volatilization Loss Rate Constant, k_w				
River: Total suspended solids	TSS	2.9	mg/L	linked to above - Calculated by Malcolm Pirnie based on 5 years of Caloosahatchee River monitoring data at station S79.
Pond: Total suspended solids	TSS	39	mg/L	linked to above - Value based on measurements collected at a sample pond in area by Malcolm Pirnie.
Conversion factor		1E-06	kg/mg	Table B-4-18

Table 5-7
Fate and Transport Parameters for the Lee County ERF Facility Multiple Pathway Risk Assessment

Parameter Name	Parameter Acronym	Value	Units	Source (a)
Overall Transfer Rate, Kv				
Universal gas constant	R	8.205E-05	atm ³ /mol ³ K	linked to above - Table B-4-19
River: Waterbody temperature	T _{wk}	298	K	linked to above - Calculated by Malcolm Pirnie based on 5 years of Caloosahatchee River monitoring data at station S79.
Pond: Waterbody temperature	T _{wk}	298	K	linked to above - Value based on measurement collected at a sample pond in area by Malcolm Pirnie.
Temperature correction factor	q	1.026	none	Table B-4-19
Liquid Phase Transfer Coefficient, KL (for streams or rivers)				
River: Current velocity	u	0.11	m/s	An average value calculated based on data provided by Malcolm Pirnie on: 1) the velocity at the Caloosahatchee River monitoring data station S79 (0.12 m/sec based on 5 years of data) and 2) the estimated velocity at the Fort Myers Bridge (0.096 m/sec) based on the calculated river flow rate (2.5E+9 m ³ /yr) and cross-sectional area (828 m ²) at the bridge.
Conversion constant		3.1536E+07	s/yr	
River: Depth of water column	d _{wc}	2.4	m	linked to above - Water column depth calculated by Malcolm Pirnie based on measurements at Caloosahatchee River monitoring station S79 and NOAA river charts.
River: Depth of upper benthic layer	d _{be}	0.03	m	linked to above - Default value from EPA, Table B-4-16.
Pond: Current velocity	u	1E-08	m/s	Velocity was calculated based on data provided by Malcolm Pirnie on the typical pond water flow rate (1.8E+4 m ³ /yr) and the cross-sectional area of a typical pond bottom (3.6E+4 m ²). This velocity (0.5 m/yr) is consistent with average groundwater flows in the County of 1-2 ft/yr (0.3-0.6 m/yr).
Pond: Depth of water column	d _{wc}	0.6	m	linked to above - Value based on measurements collected at sample ponds in area by Malcolm Pirnie.
Pond: Depth of upper benthic layer	d _{be}	0.05	m	linked to above - Value based on measurements collected at sample ponds in area by Malcolm Pirnie.
Liquid Phase Transfer Coefficient, KL (for quiescent lakes or ponds)				
Drag coefficient	C _d	0.0011	unitless	Table B-4-20
Density of water	ρ _w	1	g/cm ³	Table B-4-20
Viscous sublayer thickness	λ _z	4	unitless	Table B-4-20
von Karman's constant	k	0.4	unitless	Table B-4-20
Viscosity of water	u _w	1.69E-02	g/cm-s	Table B-4-20
Average annual wind speed	W	3.2	m/s	Linked to above - NCDC. 5-year annual average based on 1990-1995 data from Page Field, Fort Myers.
Density of air	ρ _a	1.20E-03	g/cm ³	Table B-4-20
Gas Phase Transfer Coefficient, KG (for streams and rivers)				
Gas Phase Transfer Coefficient, KG (for streams and rivers)	K _G	36500	m/yr	Table B-4-21
Gas Phase Transfer Coefficient, KG (for quiescent lakes or ponds)				
Drag coefficient	C _d	0.0011	unitless	linked to above - Table B-4-21
Viscosity of air	u _a	1.81E-04	g/cm-s	linked to above - Table B-4-21
Viscous sublayer thickness	λ _z	4	unitless	Table B-4-21
Density of air	ρ _a	1.20E-03	g/cm ³	linked to above - Table B.1.5., NC Protocol, Jan 1997
von Karman's constant	k	0.4	unitless	Table B-4-21
Average annual wind speed	W	3.2	m/s	Linked to above - NCDC. 5-year annual average based on 1990-1995 data from Page Field, Fort Myers (297 K = 75°F).
Benthic Burial Rate Constant, Kb (used to calculate k_{wb})				

Table 5-7
Fate and Transport Parameters for the Lee County ERF Facility Multiple Pathway Risk Assessment

Parameter Name	Parameter Acronym	Value	Units	Source (a)
River: Watershed area	A_L	2.69E+08	m ²	linked to above - GIS analysis performed by Malcolm Pirnie was used to determine the Caloosahatchee River watershed area within the modeling domain (area ~100 square miles).
River: Average volumetric flow rate through water body	V_{fx}	2.10E+09	m ³ /yr	Linked to above - Annual average flow rate calculated by Malcolm Pirnie based on the average of: 1) 5 years of Caloosahatchee River monitoring data at station S79 (1.72E+9 m ³ /yr) (upstream edge of river in modeling domain) and 2) a calculated flow rate at the Fort Myers Bridge (downstream edge of modeling domain) based on watershed areas for station S79 and the area between S79 and the bridge and an urban runoff adjustment of 1.1 for the area between S79 and the bridge (2.5E+9 m ³ /yr).
River: Total suspended solids	TSS	2.9	mg/L	linked to above - Calculated by Malcolm Pirnie based on 5 years of Caloosahatchee River monitoring data at station S79.
River: Waterbody surface area	A_W	1.7E+07	m ²	linked to above - Calculated by Malcolm Pirnie using GIS analysis of river area within the 20 km by-20 km modeling domain.
River: Depth of upper benthic layer	d_{ba}	0.03	m	linked to above - Default value from EPA, Table B-4-16.
Pond: Average volumetric flow rate through water body	V_{fx}	1.8E+04	m ³ /yr	linked to above - Flow rate was estimated by Malcolm Pirnie based on the annual volume of water in the pond removed by either surface water flow or ground water flow.
Pond: Total suspended solids	TSS	39	mg/L	linked to above - Value based on measurements collected at sample ponds in area by Malcolm Pirnie.
Pond: Waterbody surface area	A_W	3.6E+04	m ²	linked to above - Average value calculated by Malcolm Pirnie to be representative of ponds in area S and SSE of the facility (and within modeling domain), based on analysis of ponds shown on USGS topographical maps and GIS analysis
Pond: Depth of upper benthic layer	d_{ba}	0.05	m	linked to above - Value based on measurements collected at sample ponds in area by Malcolm Pirnie.
Benthic solids concentration	C_{bs}	1	g/cm ³	Table B-4-22
Conversion factor		1.00E+03	g/kg	Table B-4-22
Conversion factor		1E-06	kg/mg	Table B-4-22
TOTAL WATER COLUMN CONCENTRATION, C_{wtot}				
River: Depth of upper benthic layer	d_{ba}	0.03	m	linked to above - Default value from EPA, Table B-4-16.
River: Depth of water column	d_{wc}	2.4	m	linked to above - Water column depth calculated by Malcolm Pirnie based on measurements at Caloosahatchee River monitoring station S79 and NOAA river charts.
Pond: Depth of upper benthic layer	d_{ba}	0.05	m	linked to above - Value based on measurements collected at sample ponds in area by Malcolm Pirnie.
Pond: Depth of water column	d_{wc}	0.6	m	linked to above - Value based on measurements collected at sample ponds in area by Malcolm Pirnie.
DISSOLVED WATER CONCENTRATION, C_{dw}				
River: Total suspended solids	TSS	2.9	mg/L	linked to above - Calculated by Malcolm Pirnie based on 5 years of Caloosahatchee River monitoring data at station S79.
Pond: Total suspended solids	TSS	39	mg/L	linked to above - Value based on measurements collected at sample ponds in area by Malcolm Pirnie.
CONCENTRATION SORBED TO BED SEDIMENT, C_{sb}				
River: Depth of water column	d_{wc}	2.4	m	linked to above - Water column depth calculated by Malcolm Pirnie based on measurements at Caloosahatchee River monitoring station S79 and NOAA river charts.
River: Depth of upper benthic layer	d_{ba}	0.03	m	linked to above - Default value from EPA, Table B-4-16.

Table 5-7
Fate and Transport Parameters for the Lee County ERF Facility Multiple Pathway Risk Assessment

Parameter Name	Parameter Acronym	Value	Units	Source (a)
Pond: Depth of water column	d_{wc}	0.6	m	linked to above - Value based on measurements collected at sample ponds in area by Malcolm Pirnie.
Pond: Depth of upper benthic layer	d_{be}	0.05	m	linked to above - Value based on measurements collected at sample ponds in area by Malcolm Pirnie.
Bed sediment porosity	θ_{be}	0.6	L_{water}/L_{sed}	linked to above - Table B-4-25
Bed sediment concentration	C_{BS}	1	g/cm ³	linked to above - Table B-4-25
FISH CONCENTRATION FROM BED SEDIMENTS, C_{fish} - sediment				
Fish lipid content	f_{lipid}	0.07	unitless	Table B-4-28
River: Fraction organic carbon in bottom sediment	OC_{sed}	0.04	unitless	EPA default per Table B-4-28
Pond: Fraction organic carbon in bottom sediment	OC_{sed}	0.026	unitless	Value calculated by Malcolm Pirnie based on a total organic carbon (TOC) measurement collected at a sample pond

(a) Source for all values is USEPA 1998 combustion risk assessment guidance, unless otherwise noted. "Linked to above", which is noted in many entries of this table, means that the number shown in the "value" column is automatically linked to a cell shown earlier in the table.
(b) South Florida Water Management District. 1999. Caloosahatchee Basin Integrated Surface Water - Ground Water Model. June 1999.

Table 5-8
Chemical Soil Concentrations at the Maximum Impact Point

Chemical	Soil Concentration (highest annual average over facility lifetime) (a) (mg/kg)	Soil Concentration (long-term average over facility lifetime) (a) (mg/kg)
mercury (divalent)	9.00E-02	2.25E-02
mercury (elemental)	NA	NA
mercury (methyl)	1.78E-03	1.11E-03
PCDD/Fs		
HpCDD, 1,2,3,4,6,7,8-	1.82E-06	1.23E-06
HpCDF, 1,2,3,4,6,7,8-	2.10E-06	1.42E-06
HpCDF, 1,2,3,4,7,8,9-	2.28E-07	1.55E-07
HxCDD, 1,2,3,4,7,8-	1.29E-07	8.73E-08
HxCDD, 1,2,3,6,7,8-	2.86E-07	1.94E-07
HxCDD, 1,2,3,7,8,9-	3.14E-07	2.13E-07
HxCDF, 1,2,3,4,7,8-	9.11E-07	6.17E-07
HxCDF, 1,2,3,6,7,8-	4.95E-07	3.35E-07
HxCDF, 1,2,3,7,8,9-	8.53E-08	5.78E-08
HxCDF, 2,3,4,6,7,8-	5.59E-07	3.78E-07
OCDD, 1,2,3,4,5,7,8,9-	3.49E-06	2.36E-06
OCDF, 1,2,3,4,6,7,8,9-	7.59E-07	5.14E-07
PeCDD, 1,2,3,7,8-	1.52E-07	1.03E-07
PeCDF, 1,2,3,7,8-	5.50E-07	3.72E-07
PeCDF, 2,3,4,7,8-	6.35E-07	4.30E-07
TCDD, 2,3,7,8-	5.57E-08	3.78E-08
TCDF, 2,3,7,8-	3.84E-07	2.60E-07

(a) USEPA (1998a) guidance provides algorithms for calculating two types of soil concentrations: the highest annual average concentration in soil and the soil concentration averaged over a longer time frame, in this case the assumed 30-year facility lifetime (see Table B-1-1 in USEPA 1998a).

Table 5-9
Chemical Concentrations in Produce, Feed Crops and Beef

Chemical	Concentration in belowground root produce (from soil uptake) (mg/kg DW) (a)	Concentration in aboveground produce (from soil uptake, vapor phase uptake from air, and particle deposition) (mg/kg DW) (a)	Concentration in aboveground protected produce (from soil uptake) (mg/kg DW) (a)	Concentration in forage (from soil uptake, vapor phase uptake from air, and particle deposition) (mg/kg DW) (b)	Concentration in grain (from soil uptake) (mg/kg DW) (b)	Concentration in beef (from forage and grain ingestion) (mg/kg FW) (b)
mercury (divalent)	4.59E-05	3.50E-05	1.85E-05	3.82E-05	0.00E+00	1.72E-06
mercury (elemental)	NA	NA	NA	NA	NA	NA
mercury (methyl)	6.43E-06	6.57E-06	1.91E-06	1.08E-05	0.00E+00	7.26E-08
PCDD/Fs						
HpCDD, 1,2,3,4,6,7,8-	3.01E-10	1.16E-08	4.34E-11	4.88E-08	1.58E-11	2.34E-09
HpCDF, 1,2,3,4,6,7,8-	4.05E-10	1.30E-08	7.27E-11	5.61E-08	2.64E-11	2.70E-09
HpCDF, 1,2,3,4,7,8,9-	4.41E-11	1.45E-09	7.91E-12	6.13E-09	2.89E-12	8.86E-10
HxCDD, 1,2,3,4,7,8-	2.66E-11	7.50E-10	5.33E-12	3.26E-09	1.92E-12	9.44E-10
HxCDD, 1,2,3,6,7,8-	7.87E-11	1.79E-09	2.43E-11	7.49E-09	8.84E-12	1.80E-09
HxCDD, 1,2,3,7,8,9-	8.65E-11	2.03E-09	2.67E-11	8.35E-09	9.76E-12	2.01E-09
HxCDF, 1,2,3,4,7,8-	2.51E-10	5.43E-09	7.74E-11	2.23E-08	2.80E-11	7.54E-09
HxCDF, 1,2,3,6,7,8-	1.36E-10	2.92E-09	4.20E-11	1.20E-08	1.52E-11	3.49E-09
HxCDF, 1,2,3,7,8,9-	2.35E-11	4.98E-10	7.25E-12	2.05E-09	2.62E-12	5.95E-10
HxCDF, 2,3,4,6,7,8-	1.54E-10	3.28E-09	4.74E-11	1.35E-08	1.71E-11	3.26E-09
OCDD, 1,2,3,4,5,7,8,9-	7.99E-10	2.30E-08	1.88E-10	9.43E-08	6.88E-11	4.54E-09
OCDF, 1,2,3,4,6,7,8,9-	9.24E-11	4.98E-09	8.37E-12	2.05E-08	3.07E-12	9.88E-10
PeCDD, 1,2,3,7,8-	5.78E-11	6.39E-10	2.90E-11	2.86E-09	1.01E-11	1.39E-09
PeCDF, 1,2,3,7,8-	1.94E-10	1.64E-09	8.68E-11	7.12E-09	2.95E-11	7.05E-10
PeCDF, 2,3,4,7,8-	2.09E-10	2.35E-09	8.40E-11	1.00E-08	2.90E-11	4.41E-09
TCDD, 2,3,7,8-	2.15E-11	1.24E-10	1.08E-11	5.30E-10	3.62E-12	2.66E-10
TCDF, 2,3,7,8-	1.58E-10	5.43E-10	8.65E-11	2.25E-09	2.85E-11	3.52E-10

NA = Not applicable.

(a) Concentrations in produce were calculated at the maximum impact point, assuming maximum air concentrations and dry deposition rates occur at the same location as maximum wet deposition rates.

(b) Concentrations in feed crops and beef were calculated across a maximally impacted nearby area where feed crop farming and/or animal grazing could plausibly occur.

Table 5-10
Data Used In IEM-2M Mercury Modeling of a Typical Pond (a)

(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
CHEMICAL PHYSICAL PROPERTIES FOR MERCURY USED IN IEM-2M MODEL				
1. Molecular weight				
MW - elemental and divalent	Elemental and divalent mercury molecular weight	201	g/mol	MRTC, Section B.1.2.1.1, Appendix B, p. B-15
MW - methyl mercury	Methyl mercury molecular weight	216	g/mol	MRTC, Section B.1.2.1.1, Appendix B, p. B-15
2. Air diffusivity				
D_{air} - elemental and divalent	Elemental and divalent mercury atmospheric diffusion coefficient (MRTC Equ. 15, p. 4-31)	0.0554	cm ² /sec	Calculated based on MRTC, Section B.1.2.1.7 in Appendix B, p. B-18 ($D_i = D_{air} = 1.9 / (MW)^{0.25}$)
D_{air} - methyl	Methyl mercury atmospheric diffusion coefficient (MRTC Equ. 15, p. 4-31)	0.0528	cm ² /sec	Calculated based on MRTC, Section B.1.2.1.7 in Appendix B, p. B-18 ($D_i = D_{air} = 1.9 / (MW)^{0.25}$)
3. Henry's Law Constant				
H - elemental	Henry's law constant (MRTC, Equ. 20, p. 4-32)	7.10E-03	atm-m ³ /mol	MRTC, Section B.1.2.1.2, Appendix B, p. B-15
H - divalent and mercuric chloride (HgCl ₂)	Henry's law constant (MRTC, Equ. 20, p. 4-32)	7.10E-10	atm-m ³ /mol	MRTC, Section B.1.2.1.2, Appendix B, p. B-15
H - methyl mercury	Henry's law constant (MRTC, Equ. 20, p. 4-32)	4.70E-07	atm-m ³ /mol	MRTC, Section B.1.2.1.2, Appendix B, p. B-15
4. Soil-water (solids) partition coefficient (K_d)				
K_d - elemental	Solids (soil-water) partition coefficient (MRTC, Equ. 20, p. 4-32)	1,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.3, Appendix B, p. B-16
K_d - divalent	Solids (soil-water) partition coefficient (MRTC, Equ. 20, p. 4-32)	58,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.3, Appendix B, p. B-16
K_d - methyl mercury	Solids (soil-water) partition coefficient (MRTC, Equ. 20, p. 4-32)	7,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.3, Appendix B, p. B-16
5. Water diffusivity (D_w)				
D_w - elemental	Water diffusivity - elemental (MRTC, p. 4-47 - 4-48)	6.41E-06	cm ² /sec	Calculated according to MRTC, p. 4-48: $D_w = 22E-5 / (MW)^{0.25}$
D_w - divalent	Water diffusivity - divalent (MRTC, p. 4-47 - 4-48)	6.41E-06	cm ² /sec	Calculated according to MRTC, p. 4-48: $D_w = 22E-5 / (MW)^{0.25}$
D_w - methyl mercury	Water diffusivity - methyl mercury (MRTC, p. 4-47 - 4-48)	6.11E-06	cm ² /sec	Calculated according to MRTC, p. 4-48: $D_w = 22E-5 / (MW)^{0.25}$
6. Air Schmidt Number (Sc_a)				
Sc_a - elemental and divalent	Air Schmidt number (MRTC, p. 4- 48)	2.77	unitless	Calculated according to MRTC, p. 4-47. $Sc_a =$ dynamic viscosity of air ν_a cm ² /sec / D_{air} cm ² /sec
Sc_a - methyl mercury	Air Schmidt number (MRTC, p. 4- 48)	2.91	unitless	Calculated according to MRTC, p. 4-47. $Sc_a =$ dynamic viscosity of air ν_a cm ² /sec / D_{air} cm ² /sec
6. Water Schmidt Number (Sc_w)				
Sc_w - elemental and divalent	Water Schmidt number (MRTC, p. 4- 48)	2.64E+03	unitless	Calculated according to MRTC, p. 4-48. $Sc_w = \mu_w$ water viscosity at water temp g/cm-sec / (ρ_w water density at water temp g/cm ³ * D_w water diffusion coefficient cm ² /sec)
Sc_w - methyl mercury	Water Schmidt number (MRTC, p. 4- 48)	2.77E+03	unitless	Calculated according to MRTC, p. 4-48. $Sc_w = \mu_w$ water viscosity at water temp g/cm-sec / (ρ_w water density at water temp g/cm ³ * D_w water diffusion coefficient cm ² /sec)
7. Liquid phase transfer coefficient (K_L)				
K_L - elemental and divalent	Liquid phase transfer coefficient (MRTC, p. 4-47)	1.09E+02	m/year	Calculated according to MRTC, p. 4-47. $K_L =$ shear velocity m/sec * (air density/water density) ^{0.5} * ((von Karman) ^{0.33} / viscous sublayer thickness) * (water Schmidt number) ^{0.67} * 3.15E+7
K_L - methyl mercury	Liquid phase transfer coefficient (MRTC, p. 4-47)	1.05E+02	m/year	Calculated according to MRTC, p. 4-47. $K_L =$ shear velocity m/sec * (air density/water density) ^{0.5} * ((von Karman) ^{0.33} / viscous sublayer thickness) * (water Schmidt number) ^{0.67} * 3.15E+7
8. Gas phase transfer coefficient (K_G)				
K_G - elemental and divalent	Gas phase transfer coefficient (MRTC, p. 4-47)	3.12E+05	m/year	Calculated according to MRTC, p. 4-47. $K_G =$ shear velocity m/sec * ((von Karman) ^{0.33} / viscous sublayer thickness) * (air Schmidt number) ^{0.67} * 3.15E+7

Table 5-10
Data Used in IEM-2M Mercury Modeling of a Typical Pond (a)

(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
K_G - methyl mercury	Gas phase transfer coefficient (MRTC, p. 4-47)	3.02E+05	m/year	Calculated according to MRTC, p. 4-47. $K_G =$ shear velocity m/sec * ((von Karman) ^{0.33} / viscous sublayer thickness) * (air Schmidt number) ^{0.67} * 3.15E+7
9. Overall transfer rate or conductivity for waterbody (at 20 °C) (K_w)				
K_w - elemental	Overall transfer rate, conductivity, volatilization rate constant (MRTC, p. 4-46)	1.08E+02	m/year	Calculated according to MRTC, p. 4-46. $K_w = \{ K_L^{-1} + (K_G * Henry / (R * T_{kw} \text{ in K}))^{-1} \}^{-1}$
K_w - divalent	Overall transfer rate, conductivity, volatilization rate constant (MRTC, p. 4-46)	9.06E-03	m/year	Calculated according to MRTC, p. 4-46. $K_w = \{ K_L^{-1} + (K_G * Henry / (R * T_{kw} \text{ in K}))^{-1} \}^{-1}$
K_w - methyl	Overall transfer rate, conductivity, volatilization rate constant (MRTC, p. 4-46)	5.50E+00	m/year	Calculated according to MRTC, p. 4-46. $K_w = \{ K_L^{-1} + (K_G * Henry / (R * T_{kw} \text{ in K}))^{-1} \}^{-1}$
10. Overall transfer rate or conductivity for waterbody (at waterbody temperature) (K_{wT})				
K_{wT} - elemental	Overall transfer rate, conductivity, Volatilization rate constant at water temperature (MRTC, p. 4-47)	1.23E+02	m/year	Calculated according to MRTC, p. 4-47. $K_{wT} = K_w$ at 20°C m/yr * (temp correction factor 1.026) ^{(T_w - 20) / 10}
K_{wT} - divalent	Overall transfer rate, conductivity, Volatilization rate constant at water temperature (MRTC, p. 4-47)	1.03E-02	m/year	Calculated according to MRTC, p. 4-47. $K_{wT} = K_w$ at 20°C m/yr * (temp correction factor 1.026) ^{(T_w - 20) / 10}
K_{wT} - methyl	Overall transfer rate, conductivity, Volatilization rate constant at water temperature (MRTC, p. 4-47)	6.25E+00	m/year	Calculated according to MRTC, p. 4-47. $K_{wT} = K_w$ at 20°C m/yr * (temp correction factor 1.026) ^{(T_w - 20) / 10}
11. Suspended sediment-water partition coefficient for abiotic solids (K_{sw})				
K_{sw} - elemental	Suspended sediment-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	1,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.5, Appendix B, p. B-17
K_{sw} - divalent (and mercuric chloride HgCl ₂)	Suspended sediment-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	100,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.5, Appendix B, p. B-17
K_{sw} - methyl mercury	Suspended sediment-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	100,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.5, Appendix B, p. B-17
12. Suspended biotic solids-water partition coefficient (K_{sb})				
K_{sb} - elemental	Suspended biotic solids-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	1,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.6, Appendix B, p. B-17
K_{sb} - divalent (and mercuric chloride HgCl ₂)	Suspended biotic solids-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	200,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.6, Appendix B, p. B-17
K_{sb} - methyl mercury	Suspended biotic solids-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	500,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.6, Appendix B, p. B-17
13. Benthic sediment-water partition coefficient (K_{sb})				
K_{sb} - elemental	Benthic sediment-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	3,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.4, Appendix B, p. B-16
K_{sb} - divalent (and mercuric chloride HgCl ₂)	Benthic sediment-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	50,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.4, Appendix B, p. B-16
K_{sb} - methyl mercury	Benthic sediment-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	3,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.4, Appendix B, p. B-16
14. Oxidation chemical transformation rate constants (k_o)				
k_{so} - watershed soil	Oxidation rate constant in watershed soil (MRTC, differential equations, p. 4-30, p. 4-38)	0	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{wo} - water column	Oxidation rate constant in the water column (MRTC, differential equations, p. 4-30, p. 4-38)	0	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{bo} - benthic sediments	Oxidation rate constant in benthic sediments (MRTC, differential equations, p. 4-30, p. 4-38)	0	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
15. Reduction chemical transformation rate constants (k_r)				
k_{sr} - watershed soil	Reduction rate constant in watershed soil (MRTC, differential equations, p. 4-30, p. 4-38)	0.000025	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{wr} - water column	Reduction rate constant in the water column (MRTC, differential equations, p. 4-30, p. 4-38)	0.0075	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{br} - benthic sediments	Reduction rate constant in benthic sediments (MRTC, differential equations, p. 4-30, p. 4-38)	0.000001	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
16. Methylation chemical transformation rate constants (k_m)				

Table 5-10
Data Used in IEM-2M Mercury Modeling of a Typical Pond (a)

(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)

Parameter	Description (Example: MRTC (b) equation that parameter is used in)		Units	Source
k_{s_m} - watershed soil	Methylation rate constant in watershed soil (MRTC, differential equations, p. 4-30, p. 4-38)	0.000050	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{w_m} - water column	Methylation rate constant in the water column (MRTC, differential equations, p. 4-30, p. 4-38)	0.001	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{b_m} - benthic sediments	Methylation rate constant in benthic sediments (MRTC, differential equations, p. 4-30, p. 4-38)	0.0001	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
17. Demethylation to Hg⁰ (divalent) transformation rate constants (k_{dm})				
$k_{s_{dm}}$ - watershed soil	Demethylation rate constant in watershed soil (MRTC, differential equations, p. 4-30, p. 4-38)	0.0025	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
$k_{w_{dm}}$ - water column	Demethylation rate constant in the water column (MRTC, differential equations, p. 4-30, p. 4-38)	0.015	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
$k_{b_{dm}}$ - benthic sediments	Demethylation rate constant in benthic sediments (MRTC, differential equations, p. 4-30, p. 4-38)	0.002	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
18. mer Demethylation to Hg⁰ (elemental) transformation rate constants (k_{md})				
$k_{s_{md}}$ - watershed soil	mer Demethylation rate constant in watershed soil (MRTC, differential equations, p. 4-30, p. 4-38)	0	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
$k_{w_{md}}$ - water column	mer Demethylation rate constant in the water column (MRTC, differential equations, p. 4-30, p. 4-38)	0	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
$k_{b_{md}}$ - benthic sediments	mer Demethylation rate constant in benthic sediments (MRTC, differential equations, p. 4-30, p. 4-38)	0	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
19. Bioaccumulation factor for methyl mercury in fish (BAF)				
BAF_{TL3}	Trophic level 3 bioaccumulation factor, defined as ratio of fish tissue concentration to dissolved methyl mercury concentration in water column	1.6E+06	L/kg	MRTC, Volume 6, p. 5-9
BAF_{TL4}	Trophic level 4 bioaccumulation factor, defined as ratio of fish tissue concentration to dissolved methyl mercury concentration in water column	6.8E+06	L/kg	MRTC, Volume 6, p. 5-9
EMISSION RATES				
Fraction elemental mercury in emissions and locally available		0.006	unitless	Fraction of species in emissions provided by RTP based on MRTC (Volume III, Table 4-2) (0.6) and fraction locally available based on USEPA 1998 combustion guidance (USEPA 1998, Figure 2-4) (0.01). Calculated as $0.6 * 0.01$.
Fraction divalent mercury - vapor phase - in emissions and locally available		0.2	unitless	Fraction of species in emissions provided by RTP based on MRTC (Volume III, Table 4-2) (0.3) and fraction locally available based on USEPA 1998 combustion guidance (USEPA 1998, Figure 2-4) (0.68). Calculated as $0.3 * 0.68$.
Fraction divalent mercury - particulate phase - in emissions and locally available		0.036	unitless	Fraction of species in emissions provided by RTP based on MRTC (Volume III, Table 4-2) (0.1) and fraction locally available based on USEPA 1998 combustion guidance (USEPA 1998, Figure 2-4) (0.36). Calculated as $0.1 * 0.36$.
Total Mercury emission rate		2.68E-03	g/sec	Provided by RTP. Based on average of measured emission rates from Units 1 and 2 and including additional emissions from the third proposed unit (assuming the average stack gas concentration for Units 1 and 2 applies to the third unit). $(2.13E-2 \text{ lb/hr} * 453.39 \text{ g/lb} * \text{hr}/3600 \text{ sec} = 2.68E-3 \text{ g/sec})$.
Elemental mercury emission rate		1.61E-05	g/sec	Calculated
Divalent mercury emission rate - vapor phase		5.47E-04	g/sec	Calculated
Divalent mercury emission rate - particulate phase		9.65E-05	g/sec	Calculated

Table 5-10
Data Used in IEM-2M Mercury Modeling of a Typical Pond (a)

(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
 Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
CHEMICAL INDEPENDENT CONSTANTS				
EF	Particle enrichment ratio (MRTC, Equ. 24, p. 4-33)	2	unitless	MRTC, Section B.2.18, p. B-46. Note that default in North Carolina Protocol (Jan 1997) is 1 for inorganics (Table B.4.4)
R	Ideal universal gas constant (MRTC, Equ. 20, p. 4-32)	8.21E-05	m ³ -atm/mol-K	MRTC, Section B.1.1.1, Appendix B, p. B-1
Z _r	Characteristic diffusion reference depth in watershed soil (MRTC, Equ. 15, p. 4-31; Equ. 27, p. 4-34)	0.01	m	MRTC, Section B.2.10, Appendix B, p. B-40. Value assumed to be equal to MRTC default z _d for depth that chemical is incorporated into soil (no tillage).
Z _u (also z _d)	Soil thickness, upper soil layer depth (MRTC, Equ. 22, p. 4-32; Equ. 27, p. 4-34)	0.01	m	MRTC, Section B.2.10, Appendix B, p. B-40. Value assumed to be equal to MRTC default z _d for depth that chemical is incorporated into soil (no tillage).
μ _a	Air viscosity (MRTC, p. 4-48)	1.84E-04	g/cm-sec	MRTC, Section B.1.1.1, Appendix B, p. B-1
k	von Karman's constant	0.4		MRTC, Section B.1.1.1, Appendix B, p. B-1
λ ₂	Boundary thickness = dimensionless viscous sublayer thickness (MRTC, p. 4-48)	4		MRTC, Section B.1.1.1, Appendix B, p. B-1
ρ _a	Air density (MRTC, p. 4-48)	1.19E-03	g/cm ³	MRTC, Section B.1.1.1, Appendix B, p. B-1
C _d	Drag coefficient (MRTC, p. 4-48)	1.1E-03		MRTC, Section B.1.1.1, Appendix B, p. B-1
C _{sa}	Solids concentrations (dry density) in the benthic sediments (MRTC, fractions in waterbody, p. 4-42 - 4- 43)	75,000	g/m ³ (mg/L)	MRTC, Section B.2.26, Appendix B, p. B-49
V _s	Settling velocity for abiotic solids (MRTC, Equ. 41 & 43, p. 4-40)	730	m/year	MRTC, Section B.2.22, Appendix B, p. B-48
V _{sb}	Settling velocity for biotic solids (MRTC, Equ. 42, p. 4-40)	73	m/year	MRTC, Section B.2.25, Appendix B, p. B-49
V _{re}	Resuspension velocity (MRTC, Equ. 41 & 43, p. 4-40)	3.7E-03	m/year	MRTC, Section B.2.28, Appendix B, p. B-50
V _{min}	Mineralization rate for upper benthic solids (MRTC, Equ. 43, p. 4-40)	0.001	m/year	IEM-2M model file sent by M. Duzetsina, USEPA (October 2000) (filename 50IEMHG11-22-97)
k _{mort}	Phytoplankton mortality rate (MRTC, Equ. 42, p. 4-40)	11	yr ⁻¹	MRTC, Section B.2.24, Appendix B, p. B-48
SITE-SPECIFIC PARAMETERS				
A _s	Surface area of watershed soil element (MRTC Equ. 14, p. 4-30)	1.80E+05	m ²	Watershed area for a typical pond was calculated by Malcolm Pirnie using data from USGS topographic maps, County GIS data, and aerial photography (area = ~0.07 square miles = 0.89 acres)
A _w	Surface area of waterbody (MRTC, p. 4-41)	3.60E+04	m ²	Average value calculated by Malcolm Pirnie to be representative of ponds in area S and SSE of the facility (and within modeling domain), based on analysis of ponds shown on USGS topographical maps and GIS analysis
waterbody depth	Waterbody depth (used to calculate water column volume, V _w , MRTC, Equ. 42, p. 4-40)	0.6	m	Value based on analysis of typical pond water depth and rainfall data by Malcolm Pirnie.
V _w	Water column volume (MRTC, Equ. 42, p. 4-40)	2.2E+04	m ³	Calculated based on water depth and pond surface area (depth m * surface area m ² = volume m ³)
Fraction A _i / A _s	Fraction of total watershed that is impervious	2.00E-02	unitless	Calculated based on impervious area m ² / total watershed area m ² .
A _i	Impervious watershed soil area receiving chemical deposition (MRTC, p. 4-41)	3.60E+03	m ²	Calculated by Malcolm Pirnie based on an analysis of land use in the watershed area of a typical pond and the percentage impervious area within each land use category for the watershed area.
A _p (erroneously called A _s on MRTC, Equ. 46, p. 4-41)	Pervious watershed soil area receiving chemical deposition (MRTC, p. 4-41)	1.76E+05	m ²	Calculated: total watershed area - impervious watershed area
V _s	Soil layer volume in entire watershed (MRTC, Equ. 11, p. 4-30 and 4-33)	1.80E+03	m ³	Calculated based on watershed soil area A _s * upper soil layer depth z _u
V _p (erroneously called V _s on MRTC, p. 4-41)	Pervious soil layer volume (MRTC, p. 4-41)	1.76E+03	m ³	Calculated based on pervious watershed soil area A _p * upper soil layer depth z _u
V _b	Benthic volume (MRTC, Equ. 29, p. 4-35)	1.80E+03	m ³	Calculated from upper benthic layer depth and waterbody surface area. V _b = A _w m ² * benthic layer depth z _b m

Table 5-10
Data Used in IEM-2M Mercury Modeling of a Typical Pond (a)

**(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)**

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
Z_b	Upper benthic sediment depth, surficial benthic layer depth (MRTC, Equ. 30, p. 4-36)	0.05	m	Value based on measurements collected at sample ponds in area by Malcolm Pirnie.
θ_v (Ov)	Soil void fraction (MRTC Equ. 15, p. 4-31)	0.26	unitless	ASTM default
θ_w (Ow)	Soil water fraction (MRTC, Equ. 20, p. 4-32)	0.12	unitless	ASTM default
θ_s (Os)	Total soil porosity (MRTC, Equ. 23, p. 4-33)	0.38	unitless	ASTM default
θ_{bs}	Porosity of upper sediment bed (Lw/L) (MRTC, fractions in waterbody, p. 4-42 - 4-43)	0.60	unitless	USEPA 1998 Combustion Guidance, default value from Table B-4-16
T_K - air	Air temperature (MRTC, Equ. 20, p. 4-32)	297	K	NCDC. 5-year annual average based on 1990- 1995 data from Page Field, Fort Myers (297 K = 75°F). Value provided by RTP.
BD	Soil bulk density (MRTC, Equ. 20, p. 4-32)	1.5	kg/L (dry weight)	Site-specific data (same as USEPA 1998 Combustion Guidance default value)
R_o	Average annual runoff (MRTC, Equ. 22, p. 4-32)	0.15	m/yr	Value calculated by Malcolm Pirnie based on stormwater modeling using site-specific precipitation data.
P	Average annual precipitation (MRTC, Equ. 23, p. 4-33)	1.3	m/yr	Based on 30-year record from Fort Myers, Page Field (53 inches/year). Value provided by RTP.
I	Average annual irrigation (MRTC, Equ. 23, p. 4-33)	0	m/yr	Assumed
EV	Average annual evapotranspiration (MRTC, Equ. 23, p. 4-33)	0.63	m/yr	Calculated from default value for Eastern location in MRTC ($E_v = 65$ cm/yr, Appendix B, Section B.2.7, p. B-39), scaled by the difference between site-specific precipitation and the MRTC default precipitation for an Eastern location. $E_v = 0.65$ m/yr MRTC $E_v \cdot 130$ cm/yr site-specific P / 102 cm/yr MRTC default P.
X_e	Unit soil loss (MRTC, Equ. 24, p. 4- 33)	0.17	kg/m ² -yr	Calculated using USLE method, site-specific data and MRTC defaults: $X_e = RF \cdot K \cdot LS \cdot C \cdot P$ (907.18/4047) where P is default from MRTC, Appendix B (P = 1); and RF, K, C and LS are based on site-specific data from Malcolm Pirnie (RF=450; K = 0.14; C = 0.07; and LS = 0.17).
SD	Sediment delivery ratio (MRTC, Equ. 24, p. 4-33)	0.46	unitless	Calculated: $SD = a \cdot (WAL)^{-b}$, where a = empirical intercept coefficient (2.1); b = empirical slope coefficient (0.125), and WAL = watershed area A_w .
T_w	Waterbody temperature in °C (MRTC, p. 4-48)	25	°C	Value based on measurements collected at a sample pond in area by Malcolm Pirnie.
$T_{ice-water}$	Waterbody temperature in K (MRTC, p. 4-48)	298	K	Linked to above - Calculated using °C temperature (°C + 273 = K).
T_a	Air temperature (MRTC, p. 4-48)	24	°C	Linked to above and calculated from temperature in K (K - 273 = °C). NCDC data provided by RTP. 5-year annual average based on 1990-1995 data from Page Field, Fort Myers (297 K = 75°F).
ν_a	Dynamic viscosity of air (MRTC, p. 4-48)	1.54E-01	cm ² /sec	Calculated according to MRTC, p. 4-48. $\nu_a = (1.32$ $+ 0.009 \cdot T_a) \cdot 1E-1$
ρ_w	Water density (MRTC, p. 4-48)	0.998	g/cm ³	Calculated according to MRTC, p. 4-48. $\rho_w = 1 -$ $8.8E-5 \cdot T_w \cdot ^\circ C$
Intermediate calculation for water viscosity	Intermediate calculation for water viscosity	-1.772	log (g/cm-sec)	Calculated according to MRTC, p. 4-48. $\log (\mu_w) =$ $((1301) / (998.333 + 8.1855(T_w - 20) + 0.00585(T_w -$ $20)^2)) - 3.0233$
μ_w	Water viscosity (MRTC, p. 4-48)	1.69E-02	g/cm-sec	MRTC, p. 4-48. $\mu_w = 10^{\Delta \log (\mu_w)}$
W	Wind velocity 10 m above water surface (MRTC, p. 4-47)	3.2	m/sec	NCDC data provided by RTP. 5-year annual average based on 1990-1995 data from Page Field, Fort Myers.
μ^*	Shear velocity (MRTC, p. 4-47)	0.106	m/sec	Calculated according to MRTC, p. 4-47. $\mu^* = (C_d$ drag coefficient) ^{0.5} * W wind velocity m/sec
V_{fz}	Dilution flow (MRTC, Equ. 41 & 42, p. 4-40)	1.80E+04	m ³ /yr	Flow rate was calculated by Malcolm Pirnie based on the annual volume of water in the pond removed by either surface water flow or groundwater flow.
TSS	Total suspended solids in waterbody	39	g/m ³ (mg/L)	Value based on measurements collected at a sample pond in area by Malcolm Pirnie.
Calculation of abiotic and biotic solids in water column (S_w and S_{bw}) and burial velocity (v_b) (Based on TSS measurements from waterbody)				
Fraction biotic	Fraction of total suspended solids in waterbody that are biotic solids	0.37	unitless	Calculated based on general properties of Eastern Lake in MRTC, Table 8-8, p. 6-10 (fraction = 0.7/(0.7+1.2) all in mg/L).

Table 5-10
Data Used in IEM-2M Mercury Modeling of a Typical Pond (a)

**(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)**

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
Fraction abiotic	Fraction of total suspended solids in waterbody that are abiotic solids	0.63	unitless	Calculated based on general properties of Eastern Lake in MRTC, Table 6-8, p. 6-10 (fraction = $1.2/(0.7+1.2)$ all in mg/L)
S_{bio}	Biotic solids concentration in the water column (MRTC, fractions in waterbody, p. 4-42 - 4-43)	14.43	g/m ³	Calculated based on total suspended concentration TSS and fraction TSS that is biotic solids (TSS * fraction biotic). (Did not use MRTC equations on p. 4-40 because site-specific TSS measurements were available.)
S_{ab}	Abiotic solids concentration in the water column (MRTC, fractions in waterbody, p. 4-42 - 4-43)	24.57	g/m ³	Calculated based on total suspended concentration TSS and fraction TSS that is abiotic solids (TSS * fraction abiotic). (Did not use MRTC equations on p. 4-40 because site-specific TSS measurements were available.)
v_b	Burial velocity (MRTC, Equ. 35-37, 40, p. 4-39)	0.248	m/year	Calculated based on MRTC, Equ. 43, p. 4-40. $v_b = \{ (v_a * S_w) + (v_{ab} * S_{ab}) - ((v_a + v_{ab}) * S_b) \} / S_b$
CALCULATED INTERMEDIATE PARAMETERS				
K_{dH} - elemental and divalent Hg	Diffusive exchange volume in soil for elemental and divalent Hg (MRTC, Equ. 14, p. 4-30)	8.17E+08	m ³ /yr	Calculated according to MRTC, Equ. 15, p. 4-31. $K_{dH} = (D_w \text{ cm}^2/\text{sec}) * (A_w \text{ watershed area m}^2) * (\theta_v \text{ soil void fraction unitless}) * (3.15E+7 \text{ sec/yr}) * (1E-4 \text{ m}^2/\text{cm}^2) / (z_d \text{ diffusion reference depth m})$. Used to calculate vapor phase diffusion flux over watershed.
K_{dH} - mercuric chloride (HgCl ₂)	Diffusive exchange volume in soil for mercuric chloride HgCl ₂ (MRTC, Equ. 14, p. 4-30)	6.68E+08	m ³ /yr	Calculated according to MRTC, Equ. 15, p. 4-31. $K_{dH} = (D_w \text{ cm}^2/\text{sec}) * (A_w \text{ watershed area m}^2) * (\theta_v \text{ soil void fraction unitless}) * (3.15E+7 \text{ sec/yr}) * (1E-4 \text{ m}^2/\text{cm}^2) / (z_d \text{ diffusion reference depth m})$. Used to calculate vapor phase diffusion flux over watershed.
R_{pw} - elemental	Pore water diffusion volume (MRTC, Equ. 28 and 29, p. 4-35)	8.73E+03	m ³ /year	Calculated according to MRTC, Equ. 29, p. 4-35, with adjustment of water diffusion coefficient from cm ² /sec to m ² /year. $R_{pw} = (E_{pw} \text{ pore water diffusion coefficient m}^2/\text{year}) * A_w \text{ waterbody surface area m}^2 * \theta_{bs} \text{ benthic porosity} / z_b \text{ surficial benthic layer depth m} = (D_w \text{ cm}^2/\text{sec} * 3.1536E+7 \text{ sec/yr} * \text{m}^2/1E+4 \text{ cm}^2 * A_w \text{ m}^2 * \theta_{bs}) / z_b \text{ m}$. Used to calculate intermediate solutions to differential equations.
R_{pw} - divalent	Pore water diffusion volume (MRTC, Equ. 28 and 29, p. 4-35)	8.73E+03	m ³ /year	Calculated according to MRTC, Equ. 29, p. 4-35, with adjustment of water diffusion coefficient from cm ² /sec to m ² /year. $R_{pw} = (E_{pw} \text{ pore water diffusion coefficient m}^2/\text{year}) * A_w \text{ waterbody surface area m}^2 * \theta_{bs} \text{ benthic porosity} / z_b \text{ surficial benthic layer depth m} = (D_w \text{ cm}^2/\text{sec} * 3.1536E+7 \text{ sec/yr} * \text{m}^2/1E+4 \text{ cm}^2 * A_w \text{ m}^2 * \theta_{bs}) / z_b \text{ m}$. Used to calculate intermediate solutions to differential equations.
R_{pw} - methyl mercury	Pore water diffusion volume (MRTC, Equ. 28 and 29, p. 4-35)	8.33E+03	m ³ /year	Calculated according to MRTC, Equ. 30, p. 4-36, with adjustment of water diffusion coefficient from cm ² /sec to m ² /year. $R_{pw} = (E_{pw} \text{ pore water diffusion coefficient m}^2/\text{year}) * A_w \text{ waterbody surface area m}^2 * \theta_{bs} \text{ benthic porosity} / z_b \text{ surficial benthic layer depth m} = (D_w \text{ cm}^2/\text{sec} * 3.1536E+7 \text{ sec/yr} * \text{m}^2/1E+4 \text{ cm}^2 * A_w \text{ m}^2 * \theta_{bs}) / z_b \text{ m}$. Used to calculate intermediate solutions to differential equations.
FRACTION OF COMPOUND IN EACH WATERSHED SOIL PHASE (USED IN INTERMEDIATE SOLUTIONS OF DIFFERENTIAL EQUATIONS)				
1. Fraction of compound in each soil phase - elemental mercury				
f_g - elemental	Fraction elemental Hg in gas phase of watershed soil (MRTC, Equ. 27, p. 4-34)	5.048E-05	unitless	Calculated according to MRTC, Equ. 19, p. 4-32. $f_g = A/B$ where $A = (H/RT_{K_{ad}}) * \theta_v$ and $B = \{ (H/RT_{K_{ad}}) * \theta_v \} + \theta_w + (K_d * BD)$
f_w - elemental	Fraction elemental Hg in water phase of watershed soil (MRTC, Equ. 22, p. 4-32)	7.999E-05	unitless	Calculated according to MRTC, Equ. 20, p. 4-32. $f_w = A/B$ where $A = \theta_w$ and $B = \{ (H/RT_{K_{ad}}) * \theta_v \} + \theta_w + (K_d * BD)$
f_s - elemental	Fraction of elemental Hg in solid phase of watershed soil (MRTC, Equ. 24, p. 4-33)	9.999E-01	unitless	Calculated according to MRTC, Equ. 21, p. 4-32. $f_s = A/B$ where $A = K_d * BD$ and $B = \{ (H/RT_{K_{ad}}) * \theta_v \} + \theta_w + (K_d * BD)$
2. Fraction of compound in each soil phase - divalent mercury				
f_g - divalent	Fraction divalent Hg in gas phase of watershed soil (MRTC, Equ. 27, p. 4-34)	8.702E-14	unitless	Calculated according to MRTC, Equ. 19, p. 4-32. $f_g = A/B$ where $A = (H/RT_{K_{ad}}) * \theta_v$ and $B = \{ (H/RT_{K_{ad}}) * \theta_v \} + \theta_w + (K_d * BD)$
f_w - divalent	Fraction divalent Hg in water phase of watershed soil (MRTC, Equ. 22, p. 4-32)	1.379E-06	unitless	Calculated according to MRTC, Equ. 20, p. 4-32. $f_w = A/B$ where $A = \theta_w$ and $B = \{ (H/RT_{K_{ad}}) * \theta_v \} + \theta_w + (K_d * BD)$

Table 5-10
Data Used in IEM-2M Mercury Modeling of a Typical Pond (a)

(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
f_d - divalent	Fraction of divalent Hg in solid phase of watershed soil (MRTC, Equ. 24, p. 4-33)	1.000E+00	unitless	Calculated according to MRTC, Equ. 21, p. 4-32. $f_d = A/B$ where $A = K_d \cdot BD$ and $B =$ $\{ (HVRTK) \cdot \theta v \} + \theta w + (K_d \cdot BD) \}$
3. Fraction of compound in each soil phase - methyl mercury				
f_g - methyl mercury	Fraction methyl Hg in gas phase of watershed soil (MRTC, Equ. 27, p. 4-34)	4.773E-10	unitless	Calculated according to MRTC, Equ. 19, p. 4-32. $f_g = A/B$ where $A = (HRT_{d,g}) \cdot \theta v$ and $B = \{ (HVRT_{K_{d,g}})$ $\cdot \theta v \} + \theta w + (K_d \cdot BD) \}$
f_w - methyl mercury	Fraction methyl Hg in water phase of watershed soil (MRTC, Equ. 22, p. 4-32)	1.143E-05	unitless	Calculated according to MRTC, Equ. 20, p. 4-32. $f_w = A/B$ where $A = \theta w$ and $B = \{ (HVRT_{K_{d,w}})$ $\cdot \theta v \} + \theta w + (K_d \cdot BD) \}$
f_s - methyl mercury	Fraction of methyl Hg in solid phase of watershed soil (MRTC, Equ. 24, p. 4-33)	1.000E+00	unitless	Calculated according to MRTC, Equ. 21, p. 4-32. $f_s = A/B$ where $A = K_d \cdot BD$ and $B =$ $\{ (HVRTK) \cdot \theta v \} + \theta w + (K_d \cdot BD) \}$
FRACTION OF COMPOUND IN EACH WATERBODY PHASE				
1. Fraction of compound in each waterbody phase - elemental mercury				
f_{dw} - elemental	Fraction elemental Hg in aqueous phase in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	9.625E-01	unitless	Calculated according to MRTC, p. 4-42. $f_{dw} = 1 / \{$ $1 + (K_{dw} L/kg \cdot S_w g/m^3 \cdot 1E-6) + (K_{db} L/kg \cdot S_{db}$ $g/m^3 \cdot 1E-6) \}$
f_{pw} - elemental	Fraction elemental Hg in abiotic particulate fraction in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4- 39)	2.365E-02	unitless	Calculated according to MRTC, p. 4-42. $f_{pw} = A/B$, where $A = K_{dw} L/kg \cdot S_w g/m^3 \cdot 1E-6$ and $B = \{ 1 +$ $(K_{dw} L/kg \cdot S_w g/m^3 \cdot 1E-6) + (K_{db} L/kg \cdot S_{db} g/m^3$ $\cdot 1E-6) \}$
f_{bw} - elemental	Fraction elemental Hg in biotic particulate fraction in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4- 39)	1.389E-02	unitless	Calculated according to MRTC, p. 4-42. $f_{bw} = A/B$, where $A = K_{bw} L/kg \cdot S_w g/m^3 \cdot 1E-6$ and $B = \{ 1 +$ $(K_{dw} L/kg \cdot S_w g/m^3 \cdot 1E-6) + (K_{db} L/kg \cdot S_{db} g/m^3$ $\cdot 1E-6) \}$
f_{db} - elemental	Fraction elemental Hg in aqueous phase in benthic sediments (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	2.660E-03	unitless	Calculated according to MRTC, p. 4-43. $f_{db} = \theta_{db} /$ $\theta_{db} + (K_{db} L/kg \cdot S_b g/m^3 \cdot 1E-6) \}$
f_{pb} - elemental	Fraction elemental Hg in particulate fraction in benthic sediments (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	9.973E-01	unitless	Calculated according to MRTC, p. 4-43. $f_{pb} = \{ K_{db}$ $L/kg \cdot S_b g/m^3 \cdot 1E-6 \} / \{ \theta_{db} + (K_{db} L/kg \cdot S_b g/m^3$ $\cdot 1E-6) \}$
2. Fraction of compound in each waterbody phase - divalent mercury				
f_{dw} - divalent	Fraction divalent Hg in aqueous phase in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	1.577E-01	unitless	Calculated according to MRTC, p. 4-42. $f_{dw} = 1 / \{$ $1 + (K_{dw} L/kg \cdot S_w g/m^3 \cdot 1E-6) + (K_{db} L/kg \cdot S_{db}$ $g/m^3 \cdot 1E-6) \}$
f_{pw} - divalent	Fraction divalent Hg in abiotic particulate fraction in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4- 39)	3.874E-01	unitless	Calculated according to MRTC, p. 4-42. $f_{pw} = A/B$, where $A = K_{dw} L/kg \cdot S_w g/m^3 \cdot 1E-6$ and $B = \{ 1 +$ $(K_{dw} L/kg \cdot S_w g/m^3 \cdot 1E-6) + (K_{db} L/kg \cdot S_{db} g/m^3$ $\cdot 1E-6) \}$
f_{bw} - divalent	Fraction divalent Hg in biotic particulate fraction in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4- 39)	4.550E-01	unitless	Calculated according to MRTC, p. 4-42. $f_{bw} = A/B$, where $A = K_{bw} L/kg \cdot S_w g/m^3 \cdot 1E-6$ and $B = \{ 1 +$ $(K_{dw} L/kg \cdot S_w g/m^3 \cdot 1E-6) + (K_{db} L/kg \cdot S_{db} g/m^3$ $\cdot 1E-6) \}$
f_{db} - divalent	Fraction divalent Hg in aqueous phase in benthic sediments (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	1.600E-04	unitless	Calculated according to MRTC, p. 4-43. $f_{db} = \theta_{db} /$ $\theta_{db} + (K_{db} L/kg \cdot S_b g/m^3 \cdot 1E-6) \}$
f_{pb} - divalent	Fraction divalent Hg in particulate fraction in benthic sediments (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	9.998E-01	unitless	Calculated according to MRTC, p. 4-43. $f_{pb} = \{ K_{db}$ $L/kg \cdot S_b g/m^3 \cdot 1E-6 \} / \{ \theta_{db} + (K_{db} L/kg \cdot S_b g/m^3$ $\cdot 1E-6) \}$
3. Fraction of compound in each waterbody phase - methyl mercury				
f_{dw} - methyl mercury	Fraction methyl mercury Hg in aqueous phase in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4- 39)	9.370E-02	unitless	Calculated according to MRTC, p. 4-42. $f_{dw} = 1 / \{$ $1 + (K_{dw} L/kg \cdot S_w g/m^3 \cdot 1E-6) + (K_{db} L/kg \cdot S_{db}$ $g/m^3 \cdot 1E-6) \}$
f_{pw} - methyl mercury	Fraction methyl mercury Hg in abiotic particulate fraction in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4- 39)	2.302E-01	unitless	Calculated according to MRTC, p. 4-42. $f_{pw} = A/B$, where $A = K_{dw} L/kg \cdot S_w g/m^3 \cdot 1E-6$ and $B = \{ 1 +$ $(K_{dw} L/kg \cdot S_w g/m^3 \cdot 1E-6) + (K_{db} L/kg \cdot S_{db} g/m^3$ $\cdot 1E-6) \}$

Table 5-10
Data Used in IEM-2M Mercury Modeling of a Typical Pond (a)

(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
f_{bw} - methyl mercury	Fraction methyl mercury Hg in biotic particulate fraction in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	6.761E-01	unitless	Calculated according to MRTC, p. 4-42. $f_{bw} = A/B$, where $A = K_{bw} \text{ L/kg} \cdot S_{bw} \text{ g/m}^3 \cdot 1\text{E-6}$ and $B = \{ 1 + (K_{bw} \text{ L/kg} \cdot S_{bw} \text{ g/m}^3 \cdot 1\text{E-6}) + (K_{bs} \text{ L/kg} \cdot S_{bs} \text{ g/m}^3 \cdot 1\text{E-6}) \}$
f_{bs} - methyl mercury	Fraction methyl mercury Hg in aqueous phase in benthic sediments (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	2.660E-03	unitless	Calculated according to MRTC, p. 4-43. $f_{bs} = \theta_{bs} / \{ \theta_{bs} + (K_{bs} \text{ L/kg} \cdot S_{bs} \text{ g/m}^3 \cdot 1\text{E-6}) \}$
f_{bs} - methyl mercury	Fraction methyl mercury Hg in particulate fraction in benthic sediments (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	9.973E-01	unitless	Calculated according to MRTC, p. 4-43. $f_{bs} = \{ K_{db} \text{ L/kg} \cdot S_{bs} \text{ g/m}^3 \cdot 1\text{E-6} \} / \{ \theta_{bs} + (K_{bs} \text{ L/kg} \cdot S_{bs} \text{ g/m}^3 \cdot 1\text{E-6}) \}$
CALCULATED INTERMEDIATE PARAMETERS - RATE CONSTANTS				
1. Rate Constants - Elemental Mercury				
ks_v - elemental	Volatilization rate constant (used in MRTC differential equations, Equ. 10 & 12, p. 4-30)	8.81E+01	yr ⁻¹	Calculated according to MRTC, Equ. 27, p. 4-34. $ks_v = (3.15\text{E}+3 \text{ sec/yr} \cdot \text{m}^2/\text{cm}^2) \cdot D_{av} \text{ diffusivity cm}^2/\text{sec} \cdot \theta_v \text{ soil void fraction unitless} \cdot f_g \text{ fraction in gas phase unitless} / (z_s \text{ soil thickness m} \cdot z_r \text{ diffusive mixing depth m} \cdot \theta_v \text{ unitless})$
ks_{ro} - elemental	Runoff loss constant (used in MRTC differential equations, Equ. 10-12, p. 4-30)	1.00E-02	yr ⁻¹	Calculated according to MRTC, Equ. 22, p. 4-32. $ks_{ro} = R_o \text{ runoff m/yr} \cdot f_w \text{ fraction in water phase unitless} / (z_s \text{ upper soil layer depth m} \cdot \theta_w \text{ unitless})$
ks_l - elemental	Leaching loss constant (used in MRTC differential equations, Equ. 10-12, p. 4-30)	6.74E-03	yr ⁻¹	Calculated according to MRTC, Equ. 23, p. 4-33. $ks_l = (P + I - R_o - EV \text{ all in m/yr}) / z_s \text{ upper soil layer depth m} \cdot f_w \text{ unitless} / \theta_s \text{ total porosity unitless}$
ks_e - elemental	Erosion loss constant (used in MRTC, Equ. 10, p. 4-30)	1.04E-02	yr ⁻¹	Calculated according to MRTC, Equ. 24, p. 4-33. $ks_e = \{ (X_s \text{ unit soil loss kg/m}^2\text{-yr} \cdot SD \text{ sediment delivery ratio unitless} \cdot ER \text{ enrichment ratio unitless} / z_s \text{ upper soil layer depth m}) \cdot f_s \text{ fraction in soil phase unitless} / (1,000 \cdot BD \text{ soil dry density g/cm}^3) \}$
kw_v - elemental	Water column volatilization loss rate constant (used in MRTC differential equations, Equ. 32 and 34, p. 4-38)	1.98E+02	yr ⁻¹	Calculated according to MRTC, equation on p. 4-46. $kw_v = K_{vt} \text{ overall transfer rate or conductivity at waterbody temperature m/year} \cdot f_{bw} \text{ fraction in water column that is dissolved unitless} / z_w \text{ water body depth m}$
2. Rate Constants - Divalent Mercury				
ks_v - divalent	Volatilization rate constant (used in MRTC differential equations, Equ. 10 & 12, p. 4-30)	1.52E-07	yr ⁻¹	Calculated according to MRTC, Equ. 27, p. 4-34. $ks_v = (3.15\text{E}+3 \text{ sec/yr} \cdot \text{m}^2/\text{cm}^2) \cdot D_{av} \text{ diffusivity cm}^2/\text{sec} \cdot \theta_v \text{ soil void fraction unitless} \cdot f_g \text{ fraction in gas phase unitless} / (z_s \text{ soil thickness m} \cdot z_r \text{ diffusive mixing depth m} \cdot \theta_v \text{ unitless})$
ks_{ro} - divalent	Runoff loss constant (used in MRTC differential equations, Equ. 10-12, p. 4-30)	1.72E-04	yr ⁻¹	Calculated according to MRTC, Equ. 22, p. 4-32. $ks_{ro} = R_o \text{ runoff m/yr} \cdot f_w \text{ fraction in water phase unitless} / (z_s \text{ upper soil layer depth m} \cdot \theta_w \text{ unitless})$
ks_l - divalent	Leaching loss constant (used in MRTC differential equations, Equ. 10-12, p. 4-30)	1.16E-04	yr ⁻¹	Calculated according to MRTC, Equ. 23, p. 4-33. $ks_l = (P + I - R_o - EV \text{ all in m/yr}) / z_s \text{ upper soil layer depth m} \cdot f_w \text{ unitless} / \theta_s \text{ total porosity unitless}$
ks_e - divalent	Erosion loss constant (used in MRTC, Equ. 10, p. 4-30)	1.04E-02	yr ⁻¹	Calculated according to MRTC, Equ. 24, p. 4-33. $ks_e = \{ (X_s \text{ unit soil loss kg/m}^2\text{-yr} \cdot SD \text{ sediment delivery ratio unitless} \cdot ER \text{ enrichment ratio unitless} / z_s \text{ upper soil layer depth m}) \cdot f_s \text{ fraction in soil phase unitless} / (1,000 \cdot BD \text{ soil dry density g/cm}^3) \}$
kw_v - divalent	Water column volatilization loss rate constant (used in MRTC differential equations, Equ. 32 and 34, p. 4-38)	2.71E-03	yr ⁻¹	Calculated according to MRTC, equation on p. 4-46. $kw_v = K_{vt} \text{ overall transfer rate or conductivity at waterbody temperature m/year} \cdot f_{bw} \text{ fraction in water column that is dissolved unitless} / z_w \text{ water body depth m}$
3. Rate Constants - Methyl Mercury				

Table 5-10
Data Used in IEM-2M Mercury Modeling of a Typical Pond (a)

**(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)**

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
ks_v - methyl mercury	Volatilization rate constant (used in MRTC differential equations, Equ. 10 & 12, p. 4-30)	7.94E-04	yr ⁻¹	Calculated according to MRTC, Equ. 27, p. 4-34. $ks_v = (3.15E+3 \text{ sec/yr} \cdot \text{m}^2/\text{cm}^2) \cdot D_{av} \text{ diffusivity cm}^2/\text{sec} \cdot \theta_v \text{ soil void fraction unitless} \cdot f_g \text{ fraction in gas phase unitless} / (z_s \text{ soil thickness m} \cdot z_r \text{ diffusive mixing depth m} \cdot \theta_v \text{ unitless})$
ks_{RO} - methyl mercury	Runoff loss constant (used in MRTC differential equations, Equ. 10-12, p. 4-30)	1.43E-03	yr ⁻¹	Calculated according to MRTC, Equ. 22, p. 4-32. $ks_{RO} = Ro \text{ runoff m/yr} \cdot f_w \text{ fraction in water phase unitless} / (z_u \text{ upper soil layer depth m} \cdot \theta_w \text{ unitless})$
ks_l - methyl mercury	Leaching loss constant (used in MRTC differential equations, Equ. 10-12, p. 4-30)	9.62E-04	yr ⁻¹	Calculated according to MRTC, Equ. 23, p. 4-33. $ks_l = (P + I - Ro - EV \text{ all in m/yr}) / z_u \text{ upper soil layer depth m} \cdot f_w \text{ unitless} / \theta_s \text{ total porosity unitless}$
ks_e - methyl mercury	Erosion loss constant (used in MRTC, Equ. 10, p. 4-30)	1.04E-02	yr ⁻¹	Calculated according to MRTC, Equ. 24, p. 4-33. $ks_e = \{ (X_s \text{ unit soil loss kg/m}^2\text{-yr} \cdot SD \text{ sediment delivery ratio unitless} \cdot ER \text{ enrichment ratio unitless} / z_u \text{ upper soil layer depth m}) \} \cdot \{ f_s \text{ fraction in soil phase unitless} / (1,000 \cdot BD \text{ soil dry density g/cm}^3) \}$
kw_v - methyl mercury	Water column volatilization loss rate constant (used in MRTC differential equations, Equ. 32 and 34, p. 4-38)	9.76E-01	yr ⁻¹	Calculated according to MRTC, equation on p. 4-46. $kw_v = K_{tr} \text{ overall transfer rate or conductivity at waterbody temperature m/year} \cdot f_{dw} \text{ fraction in water column that is dissolved unitless} / z_w \text{ water body depth m}$

(a) EPA's IEM-2M model for mercury is described in EPA's 1997 Mercury Report to Congress (MRTC). Chemical specific properties used for mercury species in the IEM-2M model are provided in Table 9H. The MRTC does not provide equation numbers; to facilitate correspondence with Volume III of the MRTC, equations were assigned numbers, beginning with equation 1 for the first equation on page 4-28 (Section 4.4.2.1) and continuing through equation 54 for the last equation on page 4-43 (Section 4.4.3.5).

(b) MRTC = EPA's Mercury Report to Congress. 1997. Volume III: Fate and Transport of Mercury in the Environment. EPA-452/R-97-005.

Table 5-11
Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (a)

(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
 Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
CHEMICAL-PHYSICAL PROPERTIES FOR MERCURY USED IN IEM-2M MODEL				
1. Molecular weight				
MW - elemental and divalent	Elemental and divalent mercury molecular weight	201	g/mol	MRTC, Section B.1.2.1.1, Appendix B, p. B-15
MW - methyl mercury	Methyl mercury molecular weight	216	g/mol	MRTC, Section B.1.2.1.1, Appendix B, p. B-15
2. Air diffusivity				
$D_{a,e}$ - elemental and divalent	Elemental and divalent mercury atmospheric diffusion coefficient (MRTC Equ. 15, p. 4-31)	0.0554	cm ² /sec	Calculated based on MRTC, Section B.1.2.1.7 in Appendix B, p. B-18 ($D_a = D_{a,e} = 1.9 / (MW)^{2/3}$)
$D_{a,m}$ - methyl	Methyl mercury atmospheric diffusion coefficient (MRTC Equ. 15, p. 4-31)	0.0528	cm ² /sec	Calculated based on MRTC, Section B.1.2.1.7 in Appendix B, p. B-18 ($D_a = D_{a,m} = 1.9 / (MW)^{2/3}$)
3. Henry's Law Constant				
H - elemental	Henry's law constant (MRTC, Equ. 20, p. 4-32)	7.10E-03	atm-m ³ /mol	MRTC, Section B.1.2.1.2, Appendix B, p. B-15
H - divalent and mercuric chloride (HgCl ₂)	Henry's law constant (MRTC, Equ. 20, p. 4-32)	7.10E-10	atm-m ³ /mol	MRTC, Section B.1.2.1.2, Appendix B, p. B-15
H - methyl mercury	Henry's law constant (MRTC, Equ. 20, p. 4-32)	4.70E-07	atm-m ³ /mol	MRTC, Section B.1.2.1.2, Appendix B, p. B-15
4. Soil-water (solids) partition coefficient (K_d)				
K_d - elemental	Solids (soil-water) partition coefficient (MRTC, Equ. 20, p. 4-32)	1,000	L/kg (also m ³ /g)	MRTC, Section B.1.2.1.3, Appendix B, p. B-16
K_d - divalent	Solids (soil-water) partition coefficient (MRTC, Equ. 20, p. 4-32)	58,000	L/kg (also m ³ /g)	MRTC, Section B.1.2.1.3, Appendix B, p. B-16
K_d - methyl mercury	Solids (soil-water) partition coefficient (MRTC, Equ. 20, p. 4-32)	7,000	L/kg (also m ³ /g)	MRTC, Section B.1.2.1.3, Appendix B, p. B-16
5. Water diffusivity (D_w)				
D_w - elemental	Water diffusivity - elemental (MRTC, p. 4-47 - 4-48)	6.41E-06	cm ² /sec	Calculated according to MRTC, p. 4-48: $D_w = 22E-5 / (MW)^{2/3}$
D_w - divalent	Water diffusivity - divalent (MRTC, p. 4-47 - 4-48)	6.41E-06	cm ² /sec	Calculated according to MRTC, p. 4-48: $D_w = 22E-5 / (MW)^{2/3}$
D_w - methyl mercury	Water diffusivity - methyl mercury (MRTC, p. 4-47 - 4-48)	6.11E-06	cm ² /sec	Calculated according to MRTC, p. 4-48: $D_w = 22E-5 / (MW)^{2/3}$
6. Air Schmidt Number (Sc_a)				
Sc_a - elemental and divalent	Air Schmidt number (MRTC, p. 4-48)	2.77	unitless	Calculated according to MRTC, p. 4-47: $Sc_a = \text{dynamic viscosity of air } \nu_a \text{ cm}^2/\text{sec} / D_{a,e} \text{ cm}^2/\text{sec}$
Sc_a - methyl mercury	Air Schmidt number (MRTC, p. 4-48)	2.91	unitless	Calculated according to MRTC, p. 4-47: $Sc_a = \text{dynamic viscosity of air } \nu_a \text{ cm}^2/\text{sec} / D_{a,m} \text{ cm}^2/\text{sec}$
6. Water Schmidt Number (Sc_w)				
Sc_w - elemental and divalent	Water Schmidt number (MRTC, p. 4-48)	2.64E+03	unitless	Calculated according to MRTC, p. 4-48: $Sc_w = \mu_w \text{ water viscosity at water temp g/cm-sec} / (\rho_w \text{ water density at water temp g/cm}^3 \cdot D_{a,e} \text{ water diffusion coefficient cm}^2/\text{sec})$
Sc_w - methyl mercury	Water Schmidt number (MRTC, p. 4-48)	2.77E+03	unitless	Calculated according to MRTC, p. 4-48: $Sc_w = \mu_w \text{ water viscosity at water temp g/cm-sec} / (\rho_w \text{ water density at water temp g/cm}^3 \cdot D_{a,m} \text{ water diffusion coefficient cm}^2/\text{sec})$
7. Liquid phase transfer coefficient (K_L)				
K_L - elemental and divalent	Liquid phase transfer coefficient (MRTC, p. 4-47)	1.09E+02	m/year	Calculated according to MRTC, p. 4-47: $K_L = \text{shear velocity m/sec} \cdot (\text{air density/water density})^{0.5} \cdot ((\text{von Karman})^{0.33} / \text{viscous sublayer thickness}) \cdot (\text{water Schmidt number})^{0.67} \cdot 3.15E+7$
K_L - methyl mercury	Liquid phase transfer coefficient (MRTC, p. 4-47)	1.05E+02	m/year	Calculated according to MRTC, p. 4-47: $K_L = \text{shear velocity m/sec} \cdot (\text{air density/water density})^{0.5} \cdot ((\text{von Karman})^{0.33} / \text{viscous sublayer thickness}) \cdot (\text{water Schmidt number})^{0.67} \cdot 3.15E+7$
8. Gas phase transfer coefficient (K_G)				
K_G - elemental and divalent	Gas phase transfer coefficient (MRTC, p. 4-47)	3.12E+05	m/year	Calculated according to MRTC, p. 4-47: $K_G = \text{shear velocity m/sec} \cdot ((\text{von Karman})^{0.33} / \text{viscous sublayer thickness}) \cdot (\text{air Schmidt number})^{0.67} \cdot 3.15E+7$

Table 5-11
Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (a)
(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
K_0 - methyl mercury	Gas phase transfer coefficient (MRTC, p. 4-47)	3.02E+05	m/year	Calculated according to MRTC, p. 4-47. $K_0 = \text{shear velocity m/sec} * ((\text{von Karman})^{0.33} / \text{viscous sublayer thickness}) * (\text{air Schmidt number})^{0.67} * 3.15E+7$
9. Overall transfer rate or conductivity for waterbody (at 20°C) (K_r)				
K_r - elemental	Overall transfer rate, conductivity, volatilization rate constant (MRTC, p. 4-46)	1.09E+02	m/year	Calculated according to MRTC, p. 4-46. $K_r = \{ K_0^{-1} + (K_0 * \text{Henry}/(R * T_{kw} \text{ in K}))^{-1} \}^{-1}$
K_r - divalent	Overall transfer rate, conductivity, volatilization rate constant (MRTC, p. 4-46)	9.08E-03	m/year	Calculated according to MRTC, p. 4-46. $K_r = \{ K_0^{-1} + (K_0 * \text{Henry}/(R * T_{kw} \text{ in K}))^{-1} \}^{-1}$
K_r - methyl	Overall transfer rate, conductivity, volatilization rate constant (MRTC, p. 4-46)	5.50E+00	m/year	Calculated according to MRTC, p. 4-46. $K_r = \{ K_0^{-1} + (K_0 * \text{Henry}/(R * T_{kw} \text{ in K}))^{-1} \}^{-1}$
10. Overall transfer rate or conductivity for waterbody (at waterbody temperature) (K_{rt})				
K_{rt} - elemental	Overall transfer rate, conductivity, Volatilization rate constant at water temperature (MRTC, p. 4-47)	1.23E+02	m/year	Calculated according to MRTC, p. 4-47. $K_{rt} = K_r \text{ at } 20^\circ\text{C m/yr} * (\text{temp correction factor } 1.026)^{((T_w - 20) / 10)}$
K_{rt} - divalent	Overall transfer rate, conductivity, Volatilization rate constant at water temperature (MRTC, p. 4-47)	1.03E-02	m/year	Calculated according to MRTC, p. 4-47. $K_{rt} = K_r \text{ at } 20^\circ\text{C m/yr} * (\text{temp correction factor } 1.026)^{((T_w - 20) / 10)}$
K_{rt} - methyl	Overall transfer rate, conductivity, Volatilization rate constant at water temperature (MRTC, p. 4-47)	6.25E+00	m/year	Calculated according to MRTC, p. 4-47. $K_{rt} = K_r \text{ at } 20^\circ\text{C m/yr} * (\text{temp correction factor } 1.026)^{((T_w - 20) / 10)}$
11. Suspended sediment-water partition coefficient for abiotic solids (K_{sw})				
K_{sw} - elemental	Suspended sediment-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	1,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.5, Appendix B, p. B-17
K_{sw} - divalent (and mercuric chloride HgCl ₂)	Suspended sediment-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	100,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.5, Appendix B, p. B-17
K_{sw} - methyl mercury	Suspended sediment-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	100,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.5, Appendix B, p. B-17
12. Suspended biotic solids-water partition coefficient (K_{sb})				
K_{sb} - elemental	Suspended biotic solids-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	1,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.6, Appendix B, p. B-17
K_{sb} - divalent (and mercuric chloride HgCl ₂)	Suspended biotic solids-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	200,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.6, Appendix B, p. B-17
K_{sb} - methyl mercury	Suspended biotic solids-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	500,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.6, Appendix B, p. B-17
13. Benthic sediment-water partition coefficient (K_{bs})				
K_{bs} - elemental	Benthic sediment-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	3,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.4, Appendix B, p. B-16
K_{bs} - divalent (and mercuric chloride HgCl ₂)	Benthic sediment-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	50,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.4, Appendix B, p. B-16
K_{bs} - methyl mercury	Benthic sediment-water partition coefficient (MRTC, fractions in waterbody, p. 4-42)	3,000	L/kg (also ml/g)	MRTC, Section B.1.2.1.4, Appendix B, p. B-16
14. Oxidation chemical transformation rate constants (k_o)				
k_{so} - watershed soil	Oxidation rate constant in watershed soil (MRTC, differential equations, p. 4-30, p. 4-38)	0	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{wo} - water column	Oxidation rate constant in the water column (MRTC, differential equations, p. 4-30, p. 4-38)	0	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{bo} - benthic sediments	Oxidation rate constant in benthic sediments (MRTC, differential equations, p. 4-30, p. 4-38)	0	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
15. Reduction chemical transformation rate constants (k_r)				
k_{sr} - watershed soil	Reduction rate constant in watershed soil (MRTC, differential equations, p. 4-30, p. 4-38)	0.000025	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{wr} - water column	Reduction rate constant in the water column (MRTC, differential equations, p. 4-30, p. 4-38)	0.0075	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{br} - benthic sediments	Reduction rate constant in benthic sediments (MRTC, differential equations, p. 4-30, p. 4-38)	0.000001	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
16. Methylation chemical transformation rate constants (k_m)				

Table 5-11
Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (a)
(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
k_{sm} - watershed soil	Methylation rate constant in watershed soil (MRTC, differential equations, p. 4-30, p. 4-38)	0.000050	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{wm} - water column	Methylation rate constant in the water column (MRTC, differential equations, p. 4-30, p. 4-38)	0.001	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{bm} - benthic sediments	Methylation rate constant in benthic sediments (MRTC, differential equations, p. 4-30, p. 4-38)	0.0001	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
17. Demethylation to Hg⁰ (divalent) transformation rate constants (k_{dm})				
k_{sdm} - watershed soil	Demethylation rate constant in watershed soil (MRTC, differential equations, p. 4-30, p. 4-38)	0.0025	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{wdm} - water column	Demethylation rate constant in the water column (MRTC, differential equations, p. 4-30, p. 4-38)	0.015	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{bdm} - benthic sediments	Demethylation rate constant in benthic sediments (MRTC, differential equations, p. 4-30, p. 4-38)	0.002	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
18. mer Demethylation to Hg⁰ (elemental) transformation rate constants (k_{md})				
k_{smd} - watershed soil	mer Demethylation rate constant in watershed soil (MRTC, differential equations, p. 4-30, p. 4-38)	0	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{wmd} - water column	mer Demethylation rate constant in the water column (MRTC, differential equations, p. 4-30, p. 4-38)	0	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
k_{bmd} - benthic sediments	mer Demethylation rate constant in benthic sediments (MRTC, differential equations, p. 4-30, p. 4-38)	0	day ⁻¹	MRTC, Section B.1.2.1.8, Appendix B, p. B-18
19. Bioaccumulation factor for methyl mercury in fish (BAF)				
BAF _{T3}	Trophic level 3 bioaccumulation factor, defined as ratio of fish tissue concentration to dissolved methyl mercury concentration in water column	1.6E+06	L/kg	MRTC, Volume 6, p. 5-9
BAF _{T4}	Trophic level 4 bioaccumulation factor, defined as ratio of fish tissue concentration to dissolved methyl mercury concentration in water column	6.8E+06	L/kg	MRTC, Volume 6, p. 5-9
EMISSION RATES				
Fraction elemental mercury in emissions and locally available		0.008	unitless	Fraction of species in emissions provided by RTP based on MRTC (Volume III, Table 4-2) (0.6) and fraction locally available based on USEPA 1998 combustion guidance (USEPA 1998, Figure 2-4) (0.01). Calculated as 0.6 * 0.01.
Fraction divalent mercury - vapor phase - in emissions and locally available		0.2	unitless	Fraction of species in emissions provided by RTP based on MRTC (Volume III, Table 4-2) (0.3) and fraction locally available based on USEPA 1998 combustion guidance (USEPA 1998, Figure 2-4) (0.68). Calculated as 0.3 * 0.68.
Fraction divalent mercury - particulate phase - in emissions and locally available		0.036	unitless	Fraction of species in emissions provided by RTP based on MRTC (Volume III, Table 4-2) (0.1) and fraction locally available based on USEPA 1998 combustion guidance (USEPA 1998, Figure 2-4) (0.36). Calculated as 0.1 * 0.36.
Total Mercury emission rate		2.68E-03	g/sec	Provided by RTP. Based on average of measured emission rates from Units 1 and 2 and including additional emissions from the third proposed unit (assuming the average stack gas concentration for Units 1 and 2 applies to the third unit). (2.13E-2 lb/hr * 453.39 g/lb * hr/3600 sec = 2.68E-3 g/sec).
Elemental mercury emission rate		1.61E-05	g/sec	Calculated
Divalent mercury emission rate - vapor phase		5.47E-04	g/sec	Calculated
Divalent mercury emission rate - particulate phase		9.65E-05	g/sec	Calculated

Table 5-11
Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (a)

(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
 Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
CHEMICAL INDEPENDENT CONSTANTS				
EF	Particle enrichment ratio (MRTC, Equ. 24, p. 4-33)	2	unitless	MRTC, Section B.2.18, p. B-46. Note that default in North Carolina Protocol (Jan 1997) is 1 for inorganics (Table B.4.4)
R	Ideal universal gas constant (MRTC, Equ. 20, p. 4-32)	8.21E-05	m ³ -atm/mol-K	MRTC, Section B.1.1.1, Appendix B, p. B-1
Z _r	Characteristic diffusion reference depth in watershed soil (MRTC, Equ. 15, p. 4-31; Equ. 27, p. 4-34)	0.01	m	MRTC, Section B.2.10, Appendix B, p. B-40. Value assumed to be equal to MRTC default z _r for depth that chemical is incorporated into soil (no tillage).
Z _u (also Z _o)	Soil thickness, upper soil layer depth (MRTC, Equ. 22, p. 4-32; Equ. 27, p. 4-34)	0.01	m	MRTC, Section B.2.10, Appendix B, p. B-40. Value assumed to be equal to MRTC default z _u for depth that chemical is incorporated into soil (no tillage).
μ _a	Air viscosity (MRTC, p. 4-48)	1.84E-04	g/cm-sec	MRTC, Section B.1.1.1, Appendix B, p. B-1
k	von Karman's constant	0.4		MRTC, Section B.1.1.1, Appendix B, p. B-1
Δ _z	Boundary thickness = dimensionless viscous sublayer thickness (MRTC, p. 4-48)	4		MRTC, Section B.1.1.1, Appendix B, p. B-1
ρ _a	Air density (MRTC, p. 4-48)	1.19E-03	g/cm ³	MRTC, Section B.1.1.1, Appendix B, p. B-1
C _d	Drag coefficient (MRTC, p. 4-48)	1.1E-03		MRTC, Section B.1.1.1, Appendix B, p. B-1
S _b	Solids concentrations (dry density) in the benthic sediments (MRTC, fractions in waterbody, p. 4-42 - 4-43)	75,000	g/m ³ (mg/L)	MRTC, Section B.2.28, Appendix B, p. B-49
V _s	Settling velocity for abiotic solids (MRTC, Equ. 41 & 43, p. 4-40)	730	m/year	MRTC, Section B.2.22, Appendix B, p. B-48
V _{sb}	Settling velocity for biotic solids (MRTC, Equ. 42, p. 4-40)	73	m/year	MRTC, Section B.2.25, Appendix B, p. B-49
V _{rs}	Resuspension velocity (MRTC, Equ. 41 & 43, p. 4-40)	3.7E-03	m/year	MRTC, Section B.2.28, Appendix B, p. B-50
V _{min}	Mineralization rate for upper benthic solids (MRTC, Equ. 43, p. 4-40)	0.001	m/year	IEM-2M model file sent by M. Duzetsina, USEPA (October 2000) (filename 50IEMHG11-22-97)
K _{mort}	Phytoplankton mortality rate (MRTC, Equ. 42, p. 4-40)	11	yr ⁻¹	MRTC, Section B.2.24, Appendix B, p. B-48
SITE SPECIFIC PARAMETERS				
A _s	Surface area of watershed soil element (MRTC Equ. 14, p. 4-30)	2.69E+08	m ²	GIS analysis performed by Malcolm Pirnie was used to determine the Caloosahatchee River watershed area within the modeling domain and beyond the facility boundary (area ~100 square miles).
A _w	Surface area of waterbody (MRTC, p. 4-41)	1.70E+07	m ²	Calculated by Malcolm Pirnie using GIS analysis of river area within the 20 km-by-20 km modeling domain.
waterbody depth	Waterbody depth (used to calculate water column volume, V _w , MRTC, Equ. 42, p. 4-40)	2.4	m	Water column depth calculated by Malcolm Pirnie based on measurements at Caloosahatchee River monitoring station S79 and NOAA river charts.
V _w	Water column volume (MRTC, Equ. 42, p. 4-40)	4.1E+07	m ³	Calculated based on water depth and waterbody surface area (depth m * surface area m ² = volume m ³)
Fraction AI / As	Fraction of total watershed that is impervious	1.64E-01	unitless	Calculated based on impervious area m ² / total watershed area m ² .
A _i	Impervious watershed soil area receiving chemical deposition (MRTC, p. 4-41)	4.40E+07	m ²	Calculated by Malcolm Pirnie based on an analysis of land use categories (e.g., residential, rural) and the percentage impervious area within each category for the watershed area.
A _p (erroneously called A _s on MRTC, Equ. 46, p. 4-41)	Pervious watershed soil area receiving chemical deposition (MRTC, p. 4-41)	2.25E+08	m ²	Calculated: total watershed area - impervious watershed area
V _s	Soil layer volume in entire watershed (MRTC, Equ. 11, p. 4-30 and 4-33)	2.69E+06	m ³	Calculated based on watershed soil area A _s * upper soil layer depth z _u
V _p (erroneously called V _s on MRTC, p. 4-41)	Pervious soil layer volume (MRTC, p. 4-41)	2.25E+06	m ³	Calculated based on pervious watershed soil area V _p * upper soil layer depth z _u
V _b	Benthic volume (MRTC, Equ. 29, p. 4-35)	5.10E+05	m ³	Calculated from upper benthic layer depth and waterbody surface area. V _b = A _w * m ² * benthic layer depth z _b m
Z _b	Upper benthic sediment depth, surficial benthic layer depth (MRTC, Equ. 30, p. 4-36)	0.03	m	Default value from USEPA 1998 Combustion Guidance, Table B-4.16.

Table 5-11
Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (a)

(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
 Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
θ_v (Ov)	Soil void fraction (MRTC Equ. 15, p. 4-31)	0.26	unitless	ASTM default
θ_w (Ow)	Soil water fraction (MRTC, Equ. 20, p. 4-32)	0.12	unitless	ASTM default
θ_s (Os)	Total soil porosity (MRTC, Equ. 23, p. 4-33)	0.38	unitless	ASTM default
θ_{se}	Porosity of upper sediment bed (Lw/L) (MRTC, fractions in waterbody, p. 4-42 - 4-43)	0.6	unitless	USEPA 1998 Combustion Guidance, default value from Table B-4-16
T_{K-air}	Air temperature (MRTC, Equ. 20, p. 4-32)	297	K	NCDC. 5-year annual average based on 1990-1995 data from Page Field, Fort Myers (297 K = 75°F). Value provided by RTP.
BD	Soil bulk density (MRTC, Equ. 20, p. 4-32)	1.5	kg/L (dry weight)	Site-specific data (same as USEPA 1998 Combustion Guidance default value)
Ro	Average annual runoff (MRTC, Equ. 22, p. 4-32)	0.15	m/yr	Value calculated by Malcolm Pirnie based on stormwater modeling using site-specific precipitation data.
P	Average annual precipitation (MRTC, Equ. 23, p. 4-33)	1.3	m/yr	Based on 30-year record from Fort Myers, Page Field (53 inches/year). Value provided by RTP.
I	Average annual irrigation (MRTC, Equ. 23, p. 4-33)	0	m/yr	Assumed
EV	Average annual evapotranspiration (MRTC, Equ. 23, p. 4-33)	0.83	m/yr	Calculated from default value for Eastern location in MRTC ($E_v = 65$ cm/yr, Appendix B, Section B.2.7, p. B-39), scaled by the difference between site-specific precipitation and the MRTC default precipitation for an Eastern location. $EV = 0.65$ m/yr MRTC $E_v \cdot 130$ cm/yr site-specific P / 102 cm/yr MRTC default P.
X_e	Unit soil loss (MRTC, Equ. 24, p. 4-33)	0.17	kg/m ² -yr	Calculated using USLE method, site-specific data and MRTC defaults: $X_e = RF \cdot K \cdot LS \cdot C \cdot P$ (907.18/4047) where P is default from MRTC, Appendix B (P = 1); and RF, K, C and LS are based on site-specific data from Malcolm Pirnie (RF=450; K = 0.14; C = 0.07; and LS = 0.17).
SD	Sediment delivery ratio (MRTC, Equ. 24, p. 4-33)	0.11	unitless	Calculated: $SD = a \cdot (WAL)^b$, where a = empirical intercept coefficient (1.2); b = empirical slope coefficient (0.125), and WAL = watershed area A_w .
T_w	Waterbody temperature in °C (MRTC, p. 4-48)	25	°C	Calculated by Malcolm Pirnie based on 5 years of Caloosahatchee River monitoring data at station S79.
$T_{K-water}$	Waterbody temperature in K (MRTC, p. 4-48)	298	K	Linked to above - Calculated using °C temperature ($^{\circ}C + 273 = K$).
T_a	Air temperature (MRTC, p. 4-48)	24	°C	Linked to above and calculated from temperature in K ($K - 273 = ^{\circ}C$). NCDC data provided by RTP. 5-year annual average based on 1990-1995 data from Page Field, Fort Myers (297 K = 75°F).
ν_a	Dynamic viscosity of air (MRTC, p. 4-48)	1.54E-01	cm ² /sec	Calculated according to MRTC, p. 4-48. $\nu_a = (1.32 + 0.009 \cdot T_a) \cdot 1E-1$
ρ_w	Water density (MRTC, p. 4-48)	0.998	g/cm ³	Calculated according to MRTC, p. 4-48. $\rho_w = 1 - 8.8E-5 \cdot T_w \cdot ^{\circ}C$
Intermediate calculation for water viscosity	Intermediate calculation for water viscosity	-1.772	log (g/cm-sec)	Calculated according to MRTC, p. 4-48. $\log(\mu_w) = ((1301) / (998.333 + 8.1855(T_w - 20) + 0.00585(T_w - 20)^2)) - 3.0233$
μ_w	Water viscosity (MRTC, p. 4-48)	1.69E-02	g/cm-sec	MRTC, p. 4-48: $\mu_w = 10^{\mu}$ Log (μ_w)
W	Wind velocity 10 m above water surface (MRTC, p. 4-47)	3.2	m/sec	NCDC data provided by RTP. 5-year annual average based on 1990-1995 data from Page Field, Fort Myers.
μ^*	Shear velocity (MRTC, p. 4-47)	0.106	m/sec	Calculated according to MRTC, p. 4-47. $\mu^* = (C_d \text{ drag coefficient})^{0.5} \cdot W$ wind velocity m/sec
V_{fk}	Dilution flow (MRTC, Equ. 41 & 42, p. 4-40)	2.10E+09	m ³ /yr	Annual average flow rate calculated by Malcolm Pirnie based on the average of: 1) 5 years of Caloosahatchee River monitoring data at station S79 (1.72E+9 m ³ /yr) (upstream edge of river in modeling domain), and 2) a calculated flow rate at the Fort Myers Bridge (downstream edge of modeling domain) based on watershed areas for station S79 and the area between S79 and the bridge and an urban runoff adjustment of 1.1 for the area between S79 and the bridge (2.5E+9 m ³ /yr).
TSS	Total suspended solids in waterbody	2.9	g/m ³ (mg/L)	Provided by Malcolm Pirnie based on 5 years of Caloosahatchee River monitoring data at station S79.

Table 5-11
Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (a)
 (Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
 Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
Calculation of abiotic and biotic solids in water column (S_w and S_{bi}) and burial velocity (v_b) (Based on TSS measurements from waterbody)				
Fraction biotic	Fraction of total suspended solids in waterbody that are biotic solids	0.37	unitless	Calculated based on general properties of Eastern Lake in MRTC, Table 6-8, p. 6-10 (fraction = $0.7/(0.7+1.2)$ all in mg/L).
Fraction abiotic	Fraction of total suspended solids in waterbody that are abiotic solids	0.63	unitless	Calculated based on general properties of Eastern Lake in MRTC, Table 6-8, p. 6-10 (fraction = $1.2/(0.7+1.2)$ all in mg/L).
S_{bi}	Biotic solids concentration in the water column (MRTC, fractions in waterbody, p. 4-42 - 4-43)	1.07	gm ³	Calculated based on total suspended concentration TSS and fraction TSS that is biotic solids (TSS * fraction biotic). (Did not use MRTC equations on p. 4-40 because site-specific TSS measurements were available.)
S_w	Abiotic solids concentration in the water column (MRTC, fractions in waterbody, p. 4-42 - 4-43)	1.83	gm ³	Calculated based on total suspended concentration TSS and fraction TSS that is abiotic solids (TSS * fraction abiotic). (Did not use MRTC equations on p. 4-40 because site-specific TSS measurements were available.)
v_b	Burial velocity (MRTC, Equ. 35-37, 40, p. 4-39)	0.014	m/year	Calculated based on MRTC, Equ. 43, p. 4-40. $v_b = [(v_s * S_w) + (v_{sb} * S_{bi}) - ((v_s + v_{ms}) * S_b)] / S_b$
CALCULATED INTERMEDIATE PARAMETERS				
$K_{s_{eff}}$ - elemental and divalent Hg	Diffusive exchange volume in soil for elemental and divalent Hg (MRTC, Equ. 14, p. 4-30)	1.22E+12	m ³ /yr	Calculated according to MRTC, Equ. 15, p. 4-31. $K_{s_{eff}} = (D_{s_{eff}} \text{ cm}^2/\text{sec}) * (A_s \text{ watershed area m}^2) * (\theta_v \text{ soil void fraction unitless}) * (3.15E+7 \text{ sec/yr}) * (1E-4 \text{ m}^2/\text{cm}^2) / (z_s \text{ diffusion reference depth m})$. Used to calculate vapor phase diffusion flux over watershed.
$K_{s_{eff}}$ - mercuric chloride (HgCl ₂)	Diffusive exchange volume in soil for mercuric chloride HgCl ₂ (MRTC, Equ. 14, p. 4-30)	9.98E+11	m ³ /yr	Calculated according to MRTC, Equ. 15, p. 4-31. $K_{s_{eff}} = (D_{s_{eff}} \text{ cm}^2/\text{sec}) * (A_s \text{ watershed area m}^2) * (\theta_v \text{ soil void fraction unitless}) * (3.15E+7 \text{ sec/yr}) * (1E-4 \text{ m}^2/\text{cm}^2) / (z_s \text{ diffusion reference depth m})$. Used to calculate vapor phase diffusion flux over watershed.
R_{sw} - elemental	Pore water diffusion volume (MRTC, Equ. 28 and 29, p. 4-35)	6.87E+06	m ³ /year	Calculated according to MRTC, Equ. 30, p. 4-36, with adjustment of water diffusion coefficient from cm ² /sec to m ² /year. $R_{sw} = (E_{sw} \text{ pore water diffusion coefficient m}^2/\text{year} * A_w \text{ waterbody surface area m}^2 * \theta_{bs} \text{ benthic porosity}) / z_b \text{ surficial benthic layer depth m} = (D_w \text{ cm}^2/\text{sec} * 3.1536E+7 \text{ sec/yr} * \text{m}^2/1E+4 \text{ cm}^2 * A_w \text{ m}^2 * \theta_{bs}) / z_b \text{ m}$. Used to calculate intermediate solutions to differential equations.
R_{sw} - divalent	Pore water diffusion volume (MRTC, Equ. 28 and 29, p. 4-35)	6.87E+06	m ³ /year	Calculated according to MRTC, Equ. 30, p. 4-36, with adjustment of water diffusion coefficient from cm ² /sec to m ² /year. $R_{sw} = (E_{sw} \text{ pore water diffusion coefficient m}^2/\text{year} * A_w \text{ waterbody surface area m}^2 * \theta_{bs} \text{ benthic porosity}) / z_b \text{ surficial benthic layer depth m} = (D_w \text{ cm}^2/\text{sec} * 3.1536E+7 \text{ sec/yr} * \text{m}^2/1E+4 \text{ cm}^2 * A_w \text{ m}^2 * \theta_{bs}) / z_b \text{ m}$. Used to calculate intermediate solutions to differential equations.
R_{sw} - methyl mercury	Pore water diffusion volume (MRTC, Equ. 28 and 29, p. 4-35)	6.55E+06	m ³ /year	Calculated according to MRTC, Equ. 30, p. 4-36, with adjustment of water diffusion coefficient from cm ² /sec to m ² /year. $R_{sw} = (E_{sw} \text{ pore water diffusion coefficient m}^2/\text{year} * A_w \text{ waterbody surface area m}^2 * \theta_{bs} \text{ benthic porosity}) / z_b \text{ surficial benthic layer depth m} = (D_w \text{ cm}^2/\text{sec} * 3.1536E+7 \text{ sec/yr} * \text{m}^2/1E+4 \text{ cm}^2 * A_w \text{ m}^2 * \theta_{bs}) / z_b \text{ m}$. Used to calculate intermediate solutions to differential equations.
FRACTION OF COMPOUND IN EACH WATERSHED SOIL PHASE (USED IN INTERMEDIATE SOLUTIONS OF DIFFERENTIAL EQUATIONS)				
1. Fraction of compound in each soil phase - elemental mercury				
f_g - elemental	Fraction elemental Hg in gas phase of watershed soil (MRTC, Equ. 27, p. 4-34)	5.046E-05	unitless	Calculated according to MRTC, Equ. 19, p. 4-32. $f_g = A/B$ where $A = (H/RT_{K_{ad}}) * \theta_v$ and $B = \{ (H/RT_{K_{ad}}) * \theta_v \} + \theta_w + (K_d * BD)$
f_w - elemental	Fraction elemental Hg in water phase of watershed soil (MRTC, Equ. 22, p. 4-32)	7.999E-05	unitless	Calculated according to MRTC, Equ. 20, p. 4-32. $f_w = A/B$ where $A = \theta_w$ and $B = \{ (H/RT_{K_{ad}}) * \theta_v \} + \theta_w + (K_d * BD)$
f_s - elemental	Fraction of elemental Hg in solid phase of watershed soil (MRTC, Equ. 24, p. 4-33)	9.999E-01	unitless	Calculated according to MRTC, Equ. 21, p. 4-32. $f_s = A/B$ where $A = K_d * BD$ and $B = \{ (H/RT_{K_{ad}}) * \theta_v \} + \theta_w + (K_d * BD)$
2. Fraction of compound in each soil phase - divalent mercury				

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(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
f_g - divalent	Fraction divalent Hg in gas phase of watershed soil (MRTC, Equ. 27, p. 4-34)	8.702E-14	unitless	Calculated according to MRTC, Equ. 19, p. 4-32. $f_g = A/B$ where $A = (H/RT_{K_d}) * \theta v$ and $B = \{ (H/RT_{K_{ad}}) * \theta v \} + \theta w + (K_d * BD)$
f_w - divalent	Fraction divalent Hg in water phase of watershed soil (MRTC, Equ. 22, p. 4-32)	1.379E-06	unitless	Calculated according to MRTC, Equ. 20, p. 4-32. $f_w = A/B$ where $A = \theta w$ and $B = \{ (H/RT_{K_{ad}}) * \theta v \} + \theta w + (K_d * BD)$
f_s - divalent	Fraction of divalent Hg in solid phase of watershed soil (MRTC, Equ. 24, p. 4-33)	1.000E+00	unitless	Calculated according to MRTC, Equ. 21, p. 4-32. $f_s = A/B$ where $A = K_d * BD$ and $B = \{ (H/RT_{K_d}) * \theta v \} + \theta w + (K_d * BD)$
3. Fraction of compound in each soil phase - methyl mercury				
f_g - methyl mercury	Fraction methyl Hg in gas phase of watershed soil (MRTC, Equ. 27, p. 4-34)	4.773E-10	unitless	Calculated according to MRTC, Equ. 19, p. 4-32. $f_g = A/B$ where $A = (H/RT_{K_d}) * \theta v$ and $B = \{ (H/RT_{K_{ad}}) * \theta v \} + \theta w + (K_d * BD)$
f_w - methyl mercury	Fraction methyl Hg in water phase of watershed soil (MRTC, Equ. 22, p. 4-32)	1.143E-05	unitless	Calculated according to MRTC, Equ. 20, p. 4-32. $f_w = A/B$ where $A = \theta w$ and $B = \{ (H/RT_{K_{ad}}) * \theta v \} + \theta w + (K_d * BD)$
f_s - methyl mercury	Fraction of methyl Hg in solid phase of watershed soil (MRTC, Equ. 24, p. 4-33)	1.000E+00	unitless	Calculated according to MRTC, Equ. 21, p. 4-32. $f_s = A/B$ where $A = K_d * BD$ and $B = \{ (H/RT_{K_d}) * \theta v \} + \theta w + (K_d * BD)$
FRACTION OF COMPOUND IN EACH WATERBODY PHASE				
1. Fraction of compound in each waterbody phase - elemental mercury				
f_{aw} - elemental	Fraction elemental Hg in aqueous phase in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	9.971E-01	unitless	Calculated according to MRTC, p. 4-42. $f_{aw} = 1 / \{ 1 + (K_{aw} L/kg * S_w g/m^3 * 1E-6) + (K_{sw} L/kg * S_{sw} g/m^3 * 1E-6) \}$
f_{pw} - elemental	Fraction elemental Hg in abiotic particulate fraction in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	1.822E-03	unitless	Calculated according to MRTC, p. 4-42. $f_{pw} = A/B$, where $A = K_{aw} L/kg * S_w g/m^3 * 1E-6$ and $B = \{ 1 + (K_{aw} L/kg * S_w g/m^3 * 1E-6) + (K_{sw} L/kg * S_{sw} g/m^3 * 1E-6) \}$
f_{bw} - elemental	Fraction elemental Hg in biotic particulate fraction in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	1.070E-03	unitless	Calculated according to MRTC, p. 4-42. $f_{bw} = A/B$, where $A = K_{bw} L/kg * S_{bw} g/m^3 * 1E-6$ and $B = \{ 1 + (K_{aw} L/kg * S_w g/m^3 * 1E-6) + (K_{sw} L/kg * S_{sw} g/m^3 * 1E-6) \}$
f_{as} - elemental	Fraction elemental Hg in aqueous phase in benthic sediments (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	2.660E-03	unitless	Calculated according to MRTC, p. 4-43. $f_{as} = \theta_{as} / \{ \theta_{as} + (K_{as} L/kg * S_s g/m^3 * 1E-6) \}$
f_{ps} - elemental	Fraction elemental Hg in particulate fraction in benthic sediments (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	9.973E-01	unitless	Calculated according to MRTC, p. 4-43. $f_{ps} = \{ K_{ps} L/kg * S_s g/m^3 * 1E-6 \} / \{ \theta_{as} + (K_{as} L/kg * S_s g/m^3 * 1E-6) \}$
2. Fraction of compound in each waterbody phase - divalent mercury				
f_{aw} - divalent	Fraction divalent Hg in aqueous phase in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	7.157E-01	unitless	Calculated according to MRTC, p. 4-42. $f_{aw} = 1 / \{ 1 + (K_{aw} L/kg * S_w g/m^3 * 1E-6) + (K_{sw} L/kg * S_{sw} g/m^3 * 1E-6) \}$
f_{pw} - divalent	Fraction divalent Hg in abiotic particulate fraction in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	1.308E-01	unitless	Calculated according to MRTC, p. 4-42. $f_{pw} = A/B$, where $A = K_{aw} L/kg * S_w g/m^3 * 1E-6$ and $B = \{ 1 + (K_{aw} L/kg * S_w g/m^3 * 1E-6) + (K_{sw} L/kg * S_{sw} g/m^3 * 1E-6) \}$
f_{bw} - divalent	Fraction divalent Hg in biotic particulate fraction in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	1.536E-01	unitless	Calculated according to MRTC, p. 4-42. $f_{bw} = A/B$, where $A = K_{bw} L/kg * S_{bw} g/m^3 * 1E-6$ and $B = \{ 1 + (K_{aw} L/kg * S_w g/m^3 * 1E-6) + (K_{sw} L/kg * S_{sw} g/m^3 * 1E-6) \}$
f_{as} - divalent	Fraction divalent Hg in aqueous phase in benthic sediments (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	1.600E-04	unitless	Calculated according to MRTC, p. 4-43. $f_{as} = \theta_{as} / \{ \theta_{as} + (K_{as} L/kg * S_s g/m^3 * 1E-6) \}$
f_{ps} - divalent	Fraction divalent Hg in particulate fraction in benthic sediments (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	9.998E-01	unitless	Calculated according to MRTC, p. 4-43. $f_{ps} = \{ K_{ps} L/kg * S_s g/m^3 * 1E-6 \} / \{ \theta_{as} + (K_{as} L/kg * S_s g/m^3 * 1E-6) \}$
3. Fraction of compound in each waterbody phase - methyl mercury				
f_{aw} - methyl mercury	Fraction methyl mercury Hg in aqueous phase in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4-39)	5.817E-01	unitless	Calculated according to MRTC, p. 4-42. $f_{aw} = 1 / \{ 1 + (K_{aw} L/kg * S_w g/m^3 * 1E-6) + (K_{sw} L/kg * S_{sw} g/m^3 * 1E-6) \}$

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(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
 Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
f_{aw} - methyl mercury	Fraction methyl mercury Hg in abiotic particulate fraction in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4- 39)	1.063E-01	unitless	Calculated according to MRTC, p. 4-42. $f_{aw} = AB$, where $A = K_{aw} \text{ L/kg} \cdot S_w \text{ g/m}^3 \cdot 1\text{E-6}$ and $B = \{ 1 +$ $(K_{aw} \text{ L/kg} \cdot S_w \text{ g/m}^3 \cdot 1\text{E-6}) + (K_{ab} \text{ L/kg} \cdot S_{ab} \text{ g/m}^3$ $\cdot 1\text{E-6}) \}$
f_{bw} - methyl mercury	Fraction methyl mercury Hg in biotic particulate fraction in the water column (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4- 39)	3.121E-01	unitless	Calculated according to MRTC, p. 4-42. $f_{bw} = AB$, where $A = K_{bw} \text{ L/kg} \cdot S_{bw} \text{ g/m}^3 \cdot 1\text{E-6}$ and $B = \{ 1 +$ $(K_{bw} \text{ L/kg} \cdot S_{bw} \text{ g/m}^3 \cdot 1\text{E-6}) + (K_{ab} \text{ L/kg} \cdot S_{ab} \text{ g/m}^3$ $\cdot 1\text{E-6}) \}$
f_{ab} - methyl mercury	Fraction methyl mercury Hg in aqueous phase in benthic sediments (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4- 39)	2.660E-03	unitless	Calculated according to MRTC, p. 4-43. $f_{ab} = \theta_{ab} / \{$ $\theta_{aw} + (K_{ab} \text{ L/kg} \cdot S_w \text{ g/m}^3 \cdot 1\text{E-6}) \}$
f_{bb} - methyl mercury	Fraction methyl mercury Hg in particulate fraction in benthic sediments (MRTC, differential equations, Equ. 32-37, p. 4-38 to 4- 39)	9.973E-01	unitless	Calculated according to MRTC, p. 4-43. $f_{bb} = \{ K_{bb}$ $\text{ L/kg} \cdot S_{bb} \text{ g/m}^3 \cdot 1\text{E-6} \} / \{ \theta_{bb} + (K_{bb} \text{ L/kg} \cdot S_{bb} \text{ g/m}^3$ $\cdot 1\text{E-6}) \}$
CALCULATED INTERMEDIATE PARAMETERS - RATE CONSTANTS				
1: Rate Constants - Elemental Mercury				
ks_v - elemental	Volatilization rate constant (used in MRTC differential equations, Equ. 10 & 12, p. 4-30)	8.81E+01	yr ⁻¹	Calculated according to MRTC, Equ. 27, p. 4-34. $ks_v = (3.15\text{E}+3 \text{ sec/yr} \cdot \text{m}^2/\text{cm}^2) \cdot D_{av} \text{ diffusivity}$ $\text{cm}^2/\text{sec} \cdot \theta_v \text{ soil void fraction unitless} \cdot f_g \text{ fraction}$ in gas phase unitless / (z_s soil thickness m $\cdot z_s$ diffusive mixing depth m $\cdot \theta_v$ unitless)
ks_{ro} - elemental	Runoff loss constant (used in MRTC differential equations, Equ. 10-12, p. 4-30)	1.00E-02	yr ⁻¹	Calculated according to MRTC, Equ. 22, p. 4-32. $ks_{ro} = R_o \text{ runoff m/yr} \cdot f_w \text{ fraction in water phase}$ unitless / (z_s upper soil layer depth m $\cdot \theta_w$ unitless)
ks_l - elemental	Leaching loss constant (used in MRTC differential equations, Equ. 10-12, p. 4-30)	6.74E-03	yr ⁻¹	Calculated according to MRTC, Equ. 23, p. 4-33. $ks_l = (P + 1 - R_o - EV \text{ all in m/yr}) / z_s \text{ upper soil layer}$ depth m $\cdot f_w$ unitless / θ_s total porosity unitless)
ks_e - elemental	Erosion loss constant (used in MRTC, Equ. 10, p. 4-30)	2.49E-03	yr ⁻¹	Calculated according to MRTC, Equ. 24, p. 4-33. $ks_e = \{ (X_s \text{ unit soil loss kg/m}^2\text{-yr} \cdot SD$ sediment delivery ratio unitless $\cdot ER \text{ enrichment}$ ratio unitless / z_s upper soil layer depth m) $\} \cdot \{ f_s$ fraction in soil phase unitless / ($1,000 \cdot BD \text{ soil dry}$ density g/cm ³) $\}$
kw_v - elemental	Water column volatilization loss rate constant (used in MRTC differential equations, Equ. 32 and 34, p. 4-38)	5.13E+01	yr ⁻¹	Calculated according to MRTC, equation on p. 4- 46. $kw_v = K_{vt}$ overall transfer rate or conductivity at waterbody temperature m/year $\cdot f_{aw}$ fraction in water column that is dissolved unitless / z_w water body depth m
2: Rate Constants - Divalent Mercury				
ks_v - divalent	Volatilization rate constant (used in MRTC differential equations, Equ. 10 & 12, p. 4-30)	1.52E-07	yr ⁻¹	Calculated according to MRTC, Equ. 27, p. 4-34. $ks_v = (3.15\text{E}+3 \text{ sec/yr} \cdot \text{m}^2/\text{cm}^2) \cdot D_{av} \text{ diffusivity}$ $\text{cm}^2/\text{sec} \cdot \theta_v \text{ soil void fraction unitless} \cdot f_g \text{ fraction}$ in gas phase unitless / (z_s soil thickness m $\cdot z_s$ diffusive mixing depth m $\cdot \theta_v$ unitless)
ks_{ro} - divalent	Runoff loss constant (used in MRTC differential equations, Equ. 10-12, p. 4-30)	1.72E-04	yr ⁻¹	Calculated according to MRTC, Equ. 22, p. 4-32. $ks_{ro} = R_o \text{ runoff m/yr} \cdot f_w \text{ fraction in water phase}$ unitless / (z_s upper soil layer depth m $\cdot \theta_w$ unitless)
ks_l - divalent	Leaching loss constant (used in MRTC differential equations, Equ. 10-12, p. 4-30)	1.16E-04	yr ⁻¹	Calculated according to MRTC, Equ. 23, p. 4-33. $ks_l = (P + 1 - R_o - EV \text{ all in m/yr}) / z_s \text{ upper soil layer}$ depth m $\cdot f_w$ unitless / θ_s total porosity unitless)
ks_e - divalent	Erosion loss constant (used in MRTC, Equ. 10, p. 4-30)	2.49E-03	yr ⁻¹	Calculated according to MRTC, Equ. 24, p. 4-33. $ks_e = \{ (X_s \text{ unit soil loss kg/m}^2\text{-yr} \cdot SD$ sediment delivery ratio unitless $\cdot ER \text{ enrichment}$ ratio unitless / z_s upper soil layer depth m) $\} \cdot \{ f_s$ fraction in soil phase unitless / ($1,000 \cdot BD \text{ soil dry}$ density g/cm ³) $\}$
kw_v - divalent	Water column volatilization loss rate constant (used in MRTC differential equations, Equ. 32 and 34, p. 4-38)	3.07E-03	yr ⁻¹	Calculated according to MRTC, equation on p. 4- 46. $kw_v = K_{vt}$ overall transfer rate or conductivity at waterbody temperature m/year $\cdot f_{bw}$ fraction in water column that is dissolved unitless / z_w water body depth m

Table 5-11
Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (a)
(Chemical-Specific Input Values, Mercury Emission Rates, Constants, Site-Specific Parameters,
Fraction Partitioning Between Watershed Soil Phases and Waterbody Phases, and Rate Constants)

Parameter	Description (Example MRTC (b) equation that parameter is used in)		Units	Source
3. Rate Constants - Methyl Mercury				
k_{sv} - methyl mercury	Volatilization rate constant (used in MRTC differential equations, Equ. 10 & 12, p. 4-30)	7.94E-04	yr ⁻¹	Calculated according to MRTC, Equ. 27, p. 4-34. $k_{sv} = (3.15E+3 \text{ sec/yr} \cdot \text{m}^2/\text{cm}^2) \cdot D_{air} \text{ diffusivity cm}^2/\text{sec} \cdot \theta_v \text{ soil void fraction unitless} \cdot f_g \text{ fraction in gas phase unitless} / (z_s \text{ soil thickness m} \cdot z_r \text{ diffusive mixing depth m} \cdot \theta_v \text{ unitless})$
k_{RO} - methyl mercury	Runoff loss constant (used in MRTC differential equations, Equ. 10-12, p. 4-30)	1.43E-03	yr ⁻¹	Calculated according to MRTC, Equ. 22, p. 4-32. $k_{RO} = R_o \text{ runoff m/yr} \cdot f_w \text{ fraction in water phase unitless} / (z_u \text{ upper soil layer depth m} \cdot \theta_w \text{ unitless})$
k_{sl} - methyl mercury	Leaching loss constant (used in MRTC differential equations, Equ. 10-12, p. 4-30)	9.62E-04	yr ⁻¹	Calculated according to MRTC, Equ. 23, p. 4-33. $k_{sl} = (P + I - R_o - EV \text{ all in m/yr}) / z_u \text{ upper soil layer depth m} \cdot f_w \text{ unitless} / \theta_s \text{ total porosity unitless})$
k_{se} - methyl mercury	Erosion loss constant (used in MRTC, Equ. 10, p. 4-30)	2.49E-03	yr ⁻¹	Calculated according to MRTC, Equ. 24, p. 4-33. $k_{se} = \{ (X_s \text{ unit soil loss kg/m}^2\text{-yr} \cdot SD \text{ sediment delivery ratio unitless} \cdot ER \text{ enrichment ratio unitless} / z_u \text{ upper soil layer depth m}) \} \cdot \{ f_s \text{ fraction in soil phase unitless} / (1,000 \cdot BD \text{ soil dry density g/cm}^3) \}$
k_{wv} - methyl mercury	Water column volatilization loss rate constant (used in MRTC differential equations, Equ. 32 and 34, p. 4-38)	1.51E+00	yr ⁻¹	Calculated according to MRTC, equation on p. 4-46. $k_{wv} = K_T \text{ overall transfer rate or conductivity at waterbody temperature m/year} \cdot f_{aw} \text{ fraction in water column that is dissolved unitless} / z_w \text{ water body depth m}$

(a) EPA's IEM-2M model for mercury is described in EPA's 1997 Mercury Report to Congress (MRTC). Chemical specific properties used for mercury species in the IEM-2M model are provided in Table 9H. The MRTC does not provide equation numbers; to facilitate correspondence with Volume III of the MRTC, equations were assigned numbers, beginning with equation 1 for the first equation on page 4-28 (Section 4.4.2.1) and continuing through equation 54 for the last equation on page 4-43 (Section 4.4.3.5).

(b) MRTC = EPA's Mercury Report to Congress, 1997. Volume III: Fate and Transport of Mercury in the Environment. EPA-452/R-97-005.

Table 5-12
Data Used in IEM-2M Mercury Modeling of a Typical Pond (a)
(Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)

Parameter	Value	Units	Basis
EMISSION RATES			
Fraction elemental mercury in emissions and locally available	0.006	unitless	Fraction of species in emissions provided by RTP based on MRTC (Volume III, Table 4-2) (0.6) and fraction locally available based on USEPA 1998 combustion guidance (USEPA 1998, Figure 2-4) (0.01). Calculated as 0.6×0.01 .
Fraction divalent mercury - vapor phase - in emissions and locally available	0.204	unitless	Fraction of species in emissions provided by RTP based on MRTC (Volume III, Table 4-2) (0.3) and fraction locally available based on USEPA 1998 combustion guidance (USEPA 1998, Figure 2-4) (0.68). Calculated as 0.3×0.68 .
Fraction divalent mercury - particulate phase - in emissions and locally available	0.036	unitless	Fraction of species in emissions provided by RTP based on MRTC (Volume III, Table 4-2) (0.1) and fraction locally available based on USEPA 1998 combustion guidance (USEPA 1998, Figure 2-4) (0.36). Calculated as 0.1×0.36 .
Total Mercury emission rate	2.68E-03	g/sec	Provided by RTP. Based on average of measured emission rates from Units 1 and 2 and including additional emissions from the third proposed unit (assuming the average stack gas concentration for Units 1 and 2 applies to the third unit). $(2.13E-2 \text{ lb/hr} \times 453.99 \text{ g/lb} \times \text{hr}/3600 \text{ sec} = 2.68E-3 \text{ g/sec})$.
Elemental mercury emission rate	1.61E-05	g/sec	Calculated
Divalent mercury emission rate - vapor phase	5.47E-04	g/sec	Calculated
Divalent mercury emission rate - particulate phase	9.85E-05	g/sec	Calculated
CONCENTRATIONS AND DEPOSITION RATES OVER WATERSHED			
Air Concentrations Over Watershed			
$UC_{a, \text{ watershed}}$ - Unit air concentration (annual average) over watershed	4.00E-03	$\mu\text{g}/\text{m}^3$ per 1 g/sec	ISCST model results for a pond located in the general area S and SSW of the facility, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
$C_{a, \text{ elemental}}$ - Elemental mercury air concentration over watershed	6.44E-08	$\mu\text{g}/\text{m}^3$	Calculated: $C_{a, \text{ elemental}} = ER_{\text{g/sec}} \times \text{unit air conc } \mu\text{g}/\text{m}^3 \text{ per 1 g/sec}$. Used in MRTC, L_{DF} Equ. 14, p. 4-30
$C_{a, \text{ vaporHg}}$ - Divalent vapor phase air concentration over watershed	2.19E-06	$\mu\text{g}/\text{m}^3$	Calculated: $C_{a, \text{ vaporHg}} = ER_{\text{g/sec}} \times \text{unit air conc } \mu\text{g}/\text{m}^3 \text{ per 1 g/sec}$. Used in MRTC, L_{DF} Equ. 14, p. 4-30
$C_{a, \text{ particHg}}$ - Divalent particulate phase air concentration over watershed	3.86E-07	$\mu\text{g}/\text{m}^3$	Calculated: $C_{a, \text{ particHg}} = ER_{\text{g/sec}} \times \text{unit air conc } \mu\text{g}/\text{m}^3 \text{ per 1 g/sec}$. Used in MRTC, L_{DF} Equ. 14, p. 4-30
$C_{a, \text{ total Hg}}$ - Total mercury air concentration over watershed	2.64E-06	$\mu\text{g}/\text{m}^3$	Calculated: $C_{a, \text{ total Hg}} = \text{sum of air concentrations for three Hg species (elemental, divalent vapor phase, divalent particulate)}$
Deposition Rates Over Watershed			
1. Particulate Phase Divalent Mercury Dry and Wet Deposition Rates over Watershed			
$UD_{\text{dry, partic}}$ - Unit dry particle deposition rate (surface area weighted) over watershed	8.6E-05	$\text{g}/\text{m}^2\text{-year per 1 g/sec}$	ISCST model results for a pond located in the general area S and SSW of the facility, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
$UD_{\text{wet, partic}}$ - Unit wet particle deposition rate (surface area weighted) over watershed	6.3E-04	$\text{g}/\text{m}^2\text{-year per 1 g/sec}$	ISCST model results for a pond located in the general area S and SSW of the facility, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
$D_{\text{dry, particHg}}$ - Divalent particulate phase mercury - dry deposition rate over watershed	8.30E-09	$\text{g}/\text{m}^2\text{-year}$	Calculated: $D_{\text{dry, particHg}} = ER_{\text{g/sec}} \times \text{unit deposition rate } \text{g}/\text{m}^2\text{-year per 1 g/sec}$. Used in MRTC, L_{SD} Equ. 13, p. 4-30
$D_{\text{wet, particHg}}$ - Divalent particulate phase mercury - wet deposition rate over watershed	6.08E-08	$\text{g}/\text{m}^2\text{-year}$	Calculated: $D_{\text{wet, particHg}} = ER_{\text{g/sec}} \times \text{unit deposition rate } \text{g}/\text{m}^2\text{-year per 1 g/sec}$. Used in MRTC, L_{SD} Equ. 13, p. 4-30
D_{total} - Total deposition rate for divalent particulate phase mercury over watershed	6.91E-08	$\text{g}/\text{m}^2\text{-year}$	Calculated: $D_{\text{total}} = \text{sum of wet and dry deposition rates for divalent particulate phase mercury over watershed}$
2. Vapor Phase Elemental and Divalent Mercury Wet Deposition Rates over Watershed			
$UD_{\text{wet, vapor}}$ - Unit wet vapor phase deposition rate over watershed	9.20E-04	$\text{g}/\text{m}^2\text{-year per 1 g/sec}$	ISCST model results for a pond located in the general area S and SSW of the facility, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
$D_{\text{wet, vaporHg}}$ - Divalent vapor phase mercury - wet deposition rate over watershed	5.03E-07	$\text{g}/\text{m}^2\text{-year}$	Calculated: $D_{\text{wet, vaporHg}} = ER_{\text{g/sec}} \times \text{unit deposition rate } \text{g}/\text{m}^2\text{-year per 1 g/sec}$. Used in MRTC, L_{SD} Equ. 13, p. 4-30
$D_{\text{wet, vaporHg}}$ - Elemental vapor phase mercury - wet deposition rate over watershed	1.48E-08	$\text{g}/\text{m}^2\text{-year}$	Calculated: $D_{\text{wet, vaporHg}} = ER_{\text{g/sec}} \times \text{unit deposition rate } \text{g}/\text{m}^2\text{-year per 1 g/sec}$. Used in MRTC, L_{SD} Equ. 13, p. 4-30. Note that the scavenging coefficient for divalent mercury was also conservatively applied to elemental mercury in this approach. This will overestimate elemental mercury wet deposition by about two orders of magnitude (MRTC; USEPA 1997).
3. Vapor Phase Elemental and Divalent Mercury Dry Deposition Rates over Watershed			
$D_{\text{dry, vaporHg}}$ - Dry vapor deposition velocity for elemental mercury - vapor phase	0.06	cm/sec	MRTC (p. 4-18). Default value based on average of winter and summer deposition velocities for forests
$D_{\text{dry, vaporHg}}$ - Dry vapor deposition velocity for divalent mercury - vapor phase	2.9	cm/sec	MRTC (p. 4-18), average default value. USEPA 1998 Combustion Guidance default value is 3 cm/sec.
$D_{\text{dry, vaporHg}}$ - Divalent vapor phase mercury - dry deposition rate over watershed	2.00E-06	$\text{g}/\text{m}^2\text{-year}$	Calculated: $D_{\text{dry, vaporHg}} = \text{divalent vapor air concentration } \mu\text{g}/\text{m}^3 \times D_{\text{dry, vaporHg}} \text{ divalent vapor dep. velocity cm/sec} \times \text{m}/100 \text{ cm} \times \text{g}/1E6 \times 3.1536E+7 \text{ sec/yr}$. Used in MRTC, L_{SD} Equ. 13, p. 4-30

Table 5-12
Data Used in IEM-2M Mercury Modeling of a Typical Pond (a)
(Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)

Parameter	Value	Units	Basis
$D_{\text{vapor-vapor}} \text{Hg}$ - Elemental vapor phase mercury - dry deposition rate over watershed	1.22E-09	g/m ² -year	Calculated: $D_{\text{vapor-vapor}} \text{Hg}$ = elemental air concentration ug/m ³ * $D_{\text{vapor-vapor}} \text{Hg}$ elemental dep. velocity cm/sec * m/100 cm * g/1E8 ug * 3.1536E+7 sec/yr. Used in MRTC, L_{SD} Equ. 13, p. 4-30
4. Vapor Phase Diffusion Flux Over Watershed			
L_{DF} - Divalent vapor phase mercury - diffusion flux over watershed	9.92E-09	g/m ² -year	Calculated: MRTC, Equ. 14, p. 4-30. $L_{\text{DF}} = (k_{\text{a,DF}} \text{ m}^2/\text{yr}) * (\text{vapor air conc ug/m}^3) * (1\text{E-6 g/ug}) / (A_{\text{w}} \text{ watershed soil surface area m}^2)$. Used in MRTC, L_{SD} Equ. 13, p. 4-30
L_{DF} - Elemental vapor phase mercury - diffusion flux over watershed	2.92E-10	g/m ² -year	Calculated: MRTC, Equ. 14, p. 4-30. $L_{\text{DF}} = (k_{\text{a,DF}} \text{ m}^2/\text{yr}) * (\text{vapor air conc ug/m}^3) * (1\text{E-6 g/ug}) / (A_{\text{w}} \text{ watershed soil surface area m}^2)$. Used in MRTC, L_{SD} Equ. 13, p. 4-30
5. Total Atmospheric Loading for Each Mercury Species Over Watershed (L_{SD})			
L_{SD} - Elemental mercury total loading over watershed ($L_{\text{SD,1}}$)	2.94E-03	g/year	Calculated: MRTC, Equation 13, p. 4-30. Sum of wet vapor deposition ($D_{\text{vapor-vapor}} \text{Hg}$), dry vapor deposition ($D_{\text{vapor-vapor}} \text{Hg}$), and diffusion flux ($L_{\text{DF}} + L_{\text{DF}}$) * surface area of watershed soil m ²
L_{SD} - Divalent mercury total loading over watershed ($L_{\text{SD,2}}$)	4.65E-01	g/year	Calculated: MRTC, Equation 13, p. 4-30. Sum of wet divalent vapor phase deposition ($D_{\text{vapor-vapor}} \text{Hg}$), wet divalent particulate phase deposition ($D_{\text{vapor-vapor}} \text{Hg}$), dry divalent vapor deposition ($D_{\text{vapor-vapor}} \text{Hg}$), dry divalent particulate phase deposition ($D_{\text{vapor-vapor}} \text{Hg}$), and diffusion flux ($L_{\text{DF}} + L_{\text{DF}}$) * surface area of watershed soil m ²
INTERMEDIATE SOLUTION OF WATERSHED DIFFERENTIAL EQUATIONS			
1. Differential equation for C_{H} (elemental Hg)			
1a. $L_{\text{SD,1}}/V_{\text{S}}$ - total atmospheric loading elemental mercury	1.63E-06	g/m ² -year	Calculated: Portion of MRTC, Equation 10, p. 4-30. Value = $L_{\text{SD,1}}/V_{\text{S}}$. See above for $L_{\text{SD,1}}$. V_{S} = soil layer volume m ³ . All terms in differential equation were divided by V_{S} . Resulting value used in solving differential equation, MRTC, p. 4-30
1b. Term with $C_{\text{H,1}}$	8.81E+01	yr ⁻¹	Calculated: Portion of MRTC, Equation 10, p. 4-30. Value = $(k_{\text{a,H,1}} + k_{\text{a,H,2}} + k_{\text{a,H,3}} + k_{\text{a,H,4}}) * V_{\text{S}} \text{ soil layer volume m}^3 / V_{\text{S}} \text{ soil layer volume m}^3$. Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_{S} . Resulting value used in solving differential equation, MRTC, p. 4-30.
1c. Term with $C_{\text{H,2}}$	9.13E-03	yr ⁻¹	Calculated: Portion of MRTC, Equation 10, p. 4-30. Value = $k_{\text{a,H,2}} \text{ reduction rate constant yr}^{-1}$ from MRTC, p. B-18 * $V_{\text{S}} \text{ soil layer volume m}^3 / V_{\text{S}} \text{ soil layer volume m}^3$. Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_{S} . Resulting value used in solving differential equation, MRTC, p. 4-30
1d. Term with $C_{\text{H,3}}$	0.00E+00	yr ⁻¹	Calculated: Portion of MRTC, Equation 10, p. 4-30. Value = $k_{\text{a,H,3}} \text{ demethylation rate constant yr}^{-1}$ from MRTC, p. B-18 * $V_{\text{S}} \text{ soil layer volume m}^3 / V_{\text{S}} \text{ soil layer volume m}^3$. Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_{S} . Resulting value used in solving differential equation, MRTC, p. 4-30
Final equation = $L_{\text{SD,1}}/V_{\text{S}} + (\text{term with } C_{\text{H,2}}) * C_{\text{H,2}} + (\text{term with } C_{\text{H,3}}) * C_{\text{H,3}} - (\text{term with } C_{\text{H,1}}) * C_{\text{H,1}}$			
2. Differential equation for C_{D} (divalent Hg)			
1a. $L_{\text{SD,2}}$ - total atmospheric loading divalent mercury	2.58E-04	g/year	Calculated: Portion of MRTC, Equation 11, p. 4-30. Value = $L_{\text{SD,2}}/V_{\text{S}} \text{ soil layer volume m}^3$. Resulting value used in solving differential equation, MRTC, p. 4-30
1b. Term with $C_{\text{D,1}}$	0.00E+00	yr ⁻¹	Calculated: Portion of MRTC, Equation 11, p. 4-30. Value = $k_{\text{a,D,1}} * V_{\text{S}} \text{ soil layer volume m}^3 / V_{\text{S}} \text{ soil layer volume m}^3$. Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_{S} . Resulting value used in solving differential equation, MRTC, p. 4-30
1c. Term with $C_{\text{D,2}}$	3.81E-02	yr ⁻¹	Calculated: Portion of MRTC, Equation 11, p. 4-30. Value = $(k_{\text{a,D,2}} + k_{\text{a,D,3}} + k_{\text{a,D,4}} + k_{\text{a,D,5}}) * V_{\text{S}} \text{ soil layer volume m}^3 / V_{\text{S}} \text{ soil layer volume m}^3$. Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_{S} . Resulting value used in solving differential equation, MRTC, p. 4-30
1d. Term with $C_{\text{D,3}}$	9.13E-01	yr ⁻¹	Calculated: Portion of MRTC, Equation 11, p. 4-30. Value = $k_{\text{a,D,3}} \text{ demethylation to HgII rate constant yr}^{-1}$ from MRTC, p. B-18 * $V_{\text{S}} \text{ soil layer volume m}^3 / V_{\text{S}} \text{ soil layer volume m}^3$. Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_{S} . Resulting value used in solving differential equation, MRTC, p. 4-30
Final equation = $L_{\text{SD,2}}/V_{\text{S}} + (\text{term with } C_{\text{D,1}}) * C_{\text{D,1}} + (\text{term with } C_{\text{D,2}}) * C_{\text{D,2}} - (\text{term with } C_{\text{D,3}}) * C_{\text{D,3}}$			
3. Differential equation for C_{M} (methyl Hg)			

Table 5-12
Data Used in IEM-2M Mercury Modeling of a Typical Pond (a)
(Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)

Parameter	Value	Units	Basis
1a. L_{SO_2} - total atmospheric loading methyl mercury	0.00E+00	g/year	No loading of methyl mercury from atmosphere
1b. Term with C_{SO_2}	1.83E-02	yr ⁻¹	Calculated: Portion of MRTC, Equation 12, p. 4-30. Value = k_{SO_2} methylation rate constant yr ⁻¹ from MRTC, p. B-18 * V_s soil layer volume m ³ / V_s soil layer volume m ³ . Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_s . Resulting value used in solving differential equation, MRTC, p. 4-30
1c. Term with C_{SO_2}	9.26E-01	yr ⁻¹	Calculated: Portion of MRTC, Equation 12, p. 4-30. Value = $(k_{SO_2} + k_{SO_2} + k_{SO_2} + k_{SO_2} + k_{SO_2}) * V_s$ soil layer volume m ³ / V_s soil layer volume m ³ . Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_s . Resulting value used in solving differential equation, MRTC, p. 4-30
Final equation =	$L_{SO_2}/V_s + (\text{term with } C_{SO_2}) * C_{SO_2} - (\text{term with } C_{SO_2}) * C_{SO_2}$		
CONCENTRATIONS AND DEPOSITION RATES OVER WATERBODY			
Air Concentrations Over Waterbody			
UC_{air} - waterbody - Unit air concentration (annual average) over waterbody	4.00E-03	ugm ³ per 1 g/sec	ISCST model results for a pond located in the general area S and SSW of the facility, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
C_{air} - elemental - Elemental mercury air concentration over waterbody	6.44E-08	ugm ³	Calculated: $C_{air} - \text{elemental} = ER \text{ g/sec} * \text{unit air conc ugm}^3 \text{ per 1 g/sec}$
$C_{air} - \text{vaporHg}$ - Divalent vapor phase air concentration over waterbody	2.19E-06	ugm ³	Calculated: $C_{air} - \text{vaporHg} = ER \text{ g/sec} * \text{unit air conc ugm}^3 \text{ per 1 g/sec}$
$C_{air} - \text{particulateHg}$ - Divalent particulate phase air concentration over waterbody	3.86E-07	ugm ³	Calculated: $C_{air} - \text{particulateHg} = ER \text{ g/sec} * \text{unit air conc ugm}^3 \text{ per 1 g/sec}$
$C_{air} - \text{total Hg}$ - Total mercury air concentration over waterbody	2.64E-06	ugm ³	Calculated: $C_{air} - \text{total Hg} = \text{sum of air concentrations for three Hg species (elemental, divalent vapor phase, divalent particulate)}$
Deposition Rates Over Waterbody			
1. Particulate Phase Divalent Mercury Dry and Wet Deposition Rates over Waterbody			
$UD_{dry} - \text{particulate}$ - Unit dry particle deposition rate (surface area weighted) over waterbody area	8.6E-05	g/m ² -year per 1 g/sec	ISCST model results for a pond located in the general area S and SSW of the facility, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
$UD_{wet} - \text{particulate}$ - Unit wet particle deposition rate (surface area weighted) over waterbody area	6.3E-04	g/m ² -year per 1 g/sec	ISCST model results for a pond located in the general area S and SSW of the facility, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
$D_{dry} - \text{particulateHg}$ - Divalent particulate phase mercury - dry deposition rate over waterbody	8.30E-09	g/m ² -year	Calculated: $D_{dry} - \text{particulateHg} = ER \text{ g/sec} * \text{unit deposition rate g/m}^2\text{-year per 1 g/sec}$. Used in MRTC, L_{Dep} equation 45, p. 4-41.
$D_{wet} - \text{particulateHg}$ - Divalent particulate phase mercury - wet deposition rate over waterbody	6.08E-08	g/m ² -year	Calculated: $D_{wet} - \text{particulateHg} = ER \text{ g/sec} * \text{unit deposition rate g/m}^2\text{-year per 1 g/sec}$. Used in MRTC, L_{Dep} equation 45, p. 4-41.
$D_{total} - \text{particulateHg}$ - Total deposition rate for divalent particulate phase mercury over waterbody	6.91E-08	g/m ² -year	Calculated: $D_{total} - \text{particulateHg} = \text{sum of wet and dry deposition rates for divalent particulate phase mercury over waterbody}$
2. Vapor Phase Elemental and Divalent Mercury Wet Deposition Rates over Waterbody			
$UD_{wet} - \text{vapor}$ - Unit wet vapor phase deposition rate over waterbody	9.2E-04	g/m ² -year per 1 g/sec	ISCST model results for a pond located in the general area S and SSW of the facility, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
$D_{wet} - \text{vaporHg}$ - Divalent vapor phase mercury - wet deposition rate over waterbody	5.03E-07	g/m ² -year	Calculated: $ER \text{ g/sec} * \text{unit deposition rate g/m}^2\text{-year per 1 g/sec}$. Used in MRTC, L_{Dep} equation 45, p. 4-41.
$D_{wet} - \text{vaporHg}$ - Elemental vapor phase mercury - wet deposition rate over waterbody	1.48E-08	g/m ² -year	Calculated: $ER \text{ g/sec} * \text{unit deposition rate g/m}^2\text{-year per 1 g/sec}$. Used in MRTC, L_{Dep} equation 45, p. 4-41. Note that the scavenging coefficient for divalent mercury was also conservatively applied to elemental mercury in this approach. This will overestimate elemental mercury wet deposition by about two orders of magnitude (MRTC; USEPA 1997).
3. Vapor Phase Elemental and Divalent Mercury Dry Deposition Rates over Waterbody			
$D_{dry} - \text{vaporHg}$ - Dry vapor deposition velocity for elemental mercury - vapor phase	0.06	cm/sec	MRTC (p. 4-18). Default value based on average of winter and summer deposition velocities for forests
$D_{dry} - \text{vaporHg}$ - Dry vapor deposition velocity for divalent mercury - vapor phase	2.9	cm/sec	MRTC (p. 4-18), average default value. USEPA 1998 Combustion Guidance default value is 3 cm/sec.
$D_{dry} - \text{vaporHg}$ - Divalent vapor phase mercury - dry deposition rate over waterbody	2.00E-06	g/m ² -year	Calculated: divalent vapor air concentration ugm ³ * divalent vapor dep. velocity cm/sec * m ² /100 cm * g/1E6 ug * 3.1536E+7 sec/yr. Used in MRTC, L_{Dep} equation 45, p. 4-41.
$D_{dry} - \text{vaporHg}$ - Elemental vapor phase mercury - dry deposition rate over waterbody	1.22E-09	g/m ² -year	Calculated: elemental air concentration ugm ³ * elemental dep. velocity cm/sec * m ² /100 cm * g/1E6 ug * 3.1536E+7 sec/yr. Used in MRTC, L_{Dep} equation 45, p. 4-41.
Total Loading for Each Mercury Species to Waterbody			
1. Deposition of compound onto surface of waterbody (MRTC, p. 4-41) (L_{Dep})			

Table 5-12
Data Used in IEM-2M Mercury Modeling of a Typical Pond (a)
(Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)

Parameter	Value	Units	Basis
$D_{\text{ydr-vaporHg}}$ - elemental. Yearly dry deposition rate of elemental mercury onto surface water body	1.22E-09	$\text{g/m}^2\text{-year}$	Equal to deposition rate for dry deposition of vapor phase elemental Hg from above. Used in MRTC, L_{Dwp} equation 45, p. 4-41
$D_{\text{ywr-vaporHg}}$ - elemental. Yearly wet deposition rate of elemental mercury onto surface water body	1.48E-08	$\text{g/m}^2\text{-year}$	Equal to deposition rate for wet deposition of vapor phase elemental Hg from above. Used in MRTC, L_{Dwp} equation 45, p. 4-41
L_{Dwp} - elemental. Direct deposition of elemental mercury onto surface water body	5.77E-04	g/year	Calculated: MRTC, equation 45, p. 4-41. L_{Dwp} = sum of direct deposition rates for elemental Hg (dry and wet) $\text{g/m}^2\text{-yr} \times A_w$ waterbody area m^2 . Used in MRTC, L_T equation 44, p. 4-40
D_{ydr} - divalent. Yearly dry deposition rate of divalent mercury onto surface water body	2.01E-08	$\text{g/m}^2\text{-year}$	Calculated: sum of dry divalent vapor deposition, dry divalent particle phase deposition. Used in MRTC, L_{Dwp} equation 45, p. 4-41
D_{ywr} - divalent. Yearly wet deposition rate of divalent mercury onto surface water body	5.84E-07	$\text{g/m}^2\text{-year}$	Calculated: sum of wet divalent vapor phase deposition, wet divalent particulate phase deposition. Used in MRTC, L_{Dwp} equation 45, p. 4-41
L_{Dwp} - divalent. Direct deposition of divalent mercury onto surface water body	9.26E-02	g/year	Calculated: MRTC, equation 45, p. 4-41. L_{Dwp} = sum of direct deposition rates for particulate and vapor phase divalent Hg (dry and wet) $\text{g/m}^2\text{-yr} \times \text{waterbody area } \text{m}^2$. Used in MRTC, L_T equation 44, p. 4-40
2. Runoff load from impervious surface (MRTC, p. 4-41) (L_{Ri})			
$D_{\text{ywr-vaporHg}}$ - elemental. Yearly wet deposition flux onto watershed	1.48E-08	$\text{g/m}^2\text{-year}$	Obtained from values shown above: wet elemental vapor phase deposition over watershed. Used in MRTC, L_{Ri} equation 46, p. 4-41
$D_{\text{ywr-Hg}}$ - divalent. Yearly wet deposition flux onto watershed	5.84E-07	$\text{g/m}^2\text{-year}$	Calculated from values shown above: sum of wet divalent vapor phase deposition and wet divalent particulate phase deposition onto watershed. Used in MRTC, L_{Ri} equation 46, p. 4-41
$D_{\text{ydr-vaporHg}}$ - elemental. Yearly dry deposition flux onto watershed	1.22E-09	$\text{g/m}^2\text{-year}$	Calculated from values shown above: dry elemental deposition over watershed. Used in MRTC, L_{Ri} equation 46, p. 4-41
$D_{\text{ydr-Hg}}$ - divalent. Yearly dry deposition flux onto watershed	2.01E-06	$\text{g/m}^2\text{-year}$	Calculated from values shown above: sum of dry divalent vapor phase deposition and dry divalent particulate phase deposition onto watershed. Used in MRTC, L_{Ri} equation 46, p. 4-41
L_{Ri} - elemental. Impervious surface runoff load	5.77E-05	g/year	Calculated: MRTC, equation 46, p. 4-41. L_{Ri} = sum of yearly (dry and wet) deposition rates onto watershed $\text{g/m}^2\text{-yr} \times \text{impervious watershed area } \text{m}^2$. Used in MRTC, L_T equation 44, p. 4-40
L_{Ri} - divalent. Impervious surface runoff load	9.26E-03	g/year	Calculated: MRTC, equation 46, p. 4-41. L_{Ri} = sum of yearly (dry and wet) deposition rates onto watershed $\text{g/m}^2\text{-yr} \times \text{impervious watershed area } \text{m}^2$. Used in MRTC, L_T equation 44, p. 4-40
3. Runoff load from pervious surfaces (MRTC, p. 4-41) (L_{Rp})			
C_{soil} - elemental. Concentration in watershed soil	6.13E-07	g/m^3	Calculated from IEM modeling (solution of MRTC differential equation 10, p. 4-30). C_s = elemental Hg soil conc $6.41\text{E-}7 \text{ mg/kg} \times \text{g/1e+3 mg} \times \text{soil BD } 1.4 \text{ kg/L} \times 1\text{e+3 L/m}^3$. Used in MRTC, L_{Rp} and L_{E} equations, p. 4-41.
C_{soil} - divalent. Concentration in watershed soil	5.74E-03	g/m^3	Calculated from IEM modeling (solution of MRTC differential equation 11, p. 4-30). C_s = divalent Hg soil conc $5.1\text{E-}3 \text{ mg/kg} \times \text{g/1e+3 mg} \times \text{soil BD } 1.4 \text{ kg/L} \times 1\text{e+3 L/m}^3$. Used in MRTC, L_{Rp} and L_{E} equations, p. 4-41.
C_{soil} - methyl. Concentration in watershed soil	1.10E-04	g/m^3	Calculated from IEM modeling (solution of MRTC differential equation 12, p. 4-30). C_s = methyl Hg soil conc $3.5\text{E-}6 \text{ mg/kg} \times \text{g/1e+3 mg} \times \text{soil BD } 1.4 \text{ kg/L} \times 1\text{e+3 L/m}^3$. Used in MRTC, L_{Rp} and L_{E} equations, p. 4-41.
L_{Rp} - elemental. Pervious surface runoff load	1.08E-05	g/year	Calculated: MRTC, equation 46, p. 4-41. $k_{\text{Rd}} \text{ yr}^{-1} \times V_p$ volume pervious soil layer $\text{m}^3 \times \text{soil concentration in watershed soil } \text{g/m}^3$. Used in MRTC, L_T equation 44, p. 4-40
L_{Rp} - divalent. Pervious surface runoff load	1.75E-03	g/year	Calculated: MRTC, equation 46, p. 4-41. $k_{\text{Rd}} \text{ yr}^{-1} \times V_p$ volume pervious soil layer $\text{m}^3 \times \text{soil concentration in watershed soil } \text{g/m}^3$. Used in MRTC, L_T equation 44, p. 4-40
L_{Rp} - methyl mercury. Pervious surface runoff load	2.77E-04	g/year	Calculated: MRTC, equation 46, p. 4-41. $k_{\text{Rd}} \text{ yr}^{-1} \times V_p$ volume pervious soil layer $\text{m}^3 \times \text{soil concentration in watershed soil } \text{g/m}^3$. Used in MRTC, L_T equation 44, p. 4-40
4. Soil erosion load (MRTC, p. 4-41 - 4-42) (L_{E})			
L_{E} - elemental	1.15E-05	g/year	Calculated: MRTC, L_{E} equation 48, p. 4-41. $k_{\text{er}} \text{ yr}^{-1} \times V_s$ soil layer volume in watershed $\text{m}^3 \times \text{soil concentration in watershed soil } \text{g/m}^3$. Used in MRTC, L_T equation 44, p. 4-40
L_{E} - divalent	1.08E-01	g/year	Calculated: MRTC, L_{E} equation 48, p. 4-41. $k_{\text{er}} \text{ yr}^{-1} \times V_s$ soil layer volume in watershed $\text{m}^3 \times \text{soil concentration in watershed soil } \text{g/m}^3$. Used in MRTC, L_T equation 44, p. 4-40
L_{E} - methyl mercury	2.06E-03	g/year	Calculated: MRTC, L_{E} equation 48, p. 4-41. $k_{\text{er}} \text{ yr}^{-1} \times V_s$ soil layer volume in watershed $\text{m}^3 \times \text{soil concentration in watershed soil } \text{g/m}^3$. Used in MRTC, L_T equation 44, p. 4-40

Table 5-12
Data Used in IEM-2M Mercury Modeling of a Typical Pond (a)
(Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)

Parameter	Value	Units	Basis
5. Load due to gaseous diffusion over waterbody (MRTC, p. 4-42) (L_{DG})			
L_{DG} - elemental	9.86E-07	g/year	Calculated: MRTC, equation 49, p. 4-42. L_{DG} g/yr = overall transfer rate at water temp K_{tr} m/yr * A_w water body surface area m^2 * (vapor phase air concentration over water body ug/m^3 * $1E-6$ / (Henry's/R*water body temperature T_{Dj})). Used in MRTC, L_T equation 44, p. 4-40
L_{DG} - divalent	2.79E-02	g/year	Calculated: MRTC, equation 49, p. 4-42. L_{DG} g/yr = overall transfer rate at water temp K_{tr} m/yr * A_w water body surface area m^2 * (vapor phase air concentration over water body ug/m^3 * $1E-6$ / (Henry's/R*water body temperature T_{Dj})). Used in MRTC, L_T equation 44, p. 4-40
6. Total load to waterbody (MRTC, p. 4-40)			
L_T - elemental	6.58E-04	g/yr	Calculated: MRTC, Equ. 44, p. 4-40. $L_T = L_{DG} + L_{R1} + L_R + L_E + L_{dif}$. Used in differential equations.
L_T - divalent	2.39E-01	g/yr	Calculated: MRTC, Equ. 44, p. 4-40. $L_T = L_{DG} + L_{R1} + L_R + L_E + L_{dif}$. Used in differential equations.
L_T - methyl	2.34E-03	g/yr	Calculated: MRTC, Equ. 44, p. 4-40. $L_T = L_R + L_E$. Used in differential equations.
INTERMEDIATE SOLUTION OF WATERBODY DIFFERENTIAL EQUATIONS			
1. Differential equation for C_{w1} - total water column concentration (elemental Hg)			
1a. L_T/V_w - total load to waterbody elemental mercury	3.05E-08	g/m ² -year	Calculated: Portion of MRTC, Equation 32, p. 4-38. Value = L_T/V_w volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1b. Term with C_{s1} - concentration in watershed soil - elemental mercury	1.70E-03	yr ⁻¹	Calculated: Portion of MRTC, Equation 32, p. 4-38. Value = V_s soil layer volume m^3 * ($k_{s10} + k_{s1}$) / V_w volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1c. Term with C_{w2} - total water column concentration - divalent mercury	2.74E+00	yr ⁻¹	Calculated: Portion of MRTC, Equation 32, p. 4-38. Value = k_{w2} reduction rate constant yr^{-1} from MRTC, p. B-18 * V_w volume of water column m^3 / V_w volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1d. Term with $C_{wt,3}$ - total water column concentration - methyl mercury	0.00E+00	yr ⁻¹	Calculated: Portion of MRTC, Equation 32, p. 4-38. Value = $k_{w,3}$ mer demethylation rate constant yr^{-1} from MRTC, p. B-18 * V_w volume of water column m^3 / V_w volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1e. Term with $C_{wt,1}$ - total water column concentration - elemental mercury	2.30E+02	yr ⁻¹	Calculated: Portion of MRTC, Equation 32, p. 4-38. Value = (V_f diffusion flow m^3/yr + (R_{wp} pore water diffusion volume m^3/yr * $f_{w,1}$) + (($k_{w,1} + k_{w2}$) * V_w) + (V_{s1} * k_{s1} + V_{s2} * k_{s2}) * A_w) / V_w volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1f. Term with $C_{bt,1}$ - total benthic concentration - elemental mercury	7.94E-03	yr ⁻¹	Calculated: Portion of MRTC, Equation 32, p. 4-38. Value = ((R_{wb} * ($f_{b,1}$ / θ_{wb}) + V_{b1} * $k_{b,1}$ * A_w) / V_w volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
Final equation =	$L_T/V_w + (\text{term with } C_{s1}) * C_{s1} + (\text{term with } C_{w2}) * C_{w2} + (\text{term with } C_{wt,3}) * C_{wt,3} - (\text{term with } C_{wt,1}) * C_{wt,1} + (\text{term with } C_{bt,1}) * C_{bt,1}$		
2. Differential equation for C_{w2} - total water column concentration (divalent mercury)			
1a. L_T/V_w - total load to waterbody divalent mercury	1.11E-05	g/m ² -year	Calculated: Portion of MRTC, Equation 33, p. 4-38. Value = L_T/V_w volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1b. Term with C_{s2} - concentration in watershed soil - divalent mercury	8.83E-04	yr ⁻¹	Calculated: Portion of MRTC, Equation 33, p. 4-38. Value = V_s soil layer volume m^3 * ($k_{s20} + k_{s2}$) / V_w volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1c. Term with C_{w1} - total water column concentration - elemental mercury	0.00E+00	yr ⁻¹	Calculated: Portion of MRTC, Equation 33, p. 4-38. Value = k_{w1} oxidation rate constant yr^{-1} from MRTC, p. B-18 * V_w volume of water column m^3 / V_w volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1d. Term with C_{w3} - total water column concentration - methyl mercury	5.48E+00	yr ⁻¹	Calculated: Portion of MRTC, Equation 33, p. 4-38. Value = $k_{w,3}$ demethylation rate constant yr^{-1} from MRTC, p. B-18 * V_w volume of water column m^3 / V_w volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38

Table 5-12
Data Used in IEM-2M Mercury Modeling of a Typical Pond (a)
(Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)

Parameter	Value	Units	Basis
1e. Term with $C_{w,2}$ - total water column concentration - divalent mercury	5.31E+02	yr ⁻¹	Calculated: Portion of MRTC, Equation 33, p. 4-38. Value = $\{V_f \text{ dilution flow } m^3/yr + (R_{wp} \text{ pore water diffusion volume } m^3/yr * f_{dw,2}) + [(k_w + k_{wm})V_w] + [(V_s * f_{sw,2} + V_{sb} * f_{sb,2}) * A_w]\} / V_w$ volume of water column m ³ All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1f. Term with $C_{b,2}$ - total benthic concentration - divalent mercury	6.27E-03	yr ⁻¹	Calculated: Portion of MRTC, Equation 33, p. 4-38. Value = $\{(R_{wb} * (f_{bw,2} / \theta_{bw}) + V_{bs} * f_{bs,2} * A_w) / V_b\} / V_w$ volume of water column m ³ All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
Final equation =	$L_{12}/V_w + (\text{term with } C_{w,2}) * C_{w,2} + (\text{term with } C_{w,1}) * C_{w,1} + (\text{term with } C_{w,3}) * C_{w,3} - (\text{term with } C_{b,2}) * C_{b,2} + (\text{term with } C_{b,1}) * C_{b,1}$		
3. Differential equation for $C_{w,3}$ - total water column concentration (methyl mercury)			
1a. L_{13}/V_w - total load to waterbody methyl mercury	1.08E-07	g/m ² -year	Calculated: Portion of MRTC, Equation 34, p. 4-38. Value = L_{13} / V_w volume of water column m ³ . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1b. Term with $C_{s,3}$ - concentration in watershed soil - methyl mercury	9.88E-04	yr ⁻¹	Calculated: Portion of MRTC, Equation 34, p. 4-38. Value = $V_s \text{ soil layer volume } m^3 * (k_{s,3} / V_w)$ volume of water column m ³ . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1c. Term with $C_{w,2}$ - total water column concentration - divalent mercury	3.65E-01	yr ⁻¹	Calculated: Portion of MRTC, Equation 34, p. 4-38. Value = $k_{w,2}$ methylation rate constant yr ⁻¹ from MRTC, p. B-18 * V_w volume of water column m ³ / V_w volume of water column m ³ . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1d. Term with $C_{w,3}$ - total water column concentration - methyl mercury	3.70E+02	yr ⁻¹	Calculated: Portion of MRTC, Equation 34, p. 4-38. Value = $\{V_f \text{ dilution flow } m^3/yr + (R_{wp} \text{ pore water diffusion volume } m^3/yr * f_{dw,3}) + [(k_{w,3} + k_{wm})V_w] + [(V_s * f_{sw,3} + V_{sb} * f_{sb,3}) * A_w]\} / V_w$ volume of water column m ³ All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1e. Term with $C_{b,3}$ - total benthic concentration - methyl mercury	7.86E-03	yr ⁻¹	Calculated: Portion of MRTC, Equation 34, p. 4-38. Value = $\{(R_{wb} * (f_{bw,3} / \theta_{bw}) + V_{bs} * f_{bs,3} * A_w) / V_b\} / V_w$ volume of water column m ³ All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
Final equation =	$L_{13}/V_w + (\text{term with } C_{s,3}) * C_{s,3} + (\text{term with } C_{w,2}) * C_{w,2} - (\text{term with } C_{w,3}) * C_{w,3} + (\text{term with } C_{b,3}) * C_{b,3}$		
4. Differential equation for $C_{b,1}$ - total benthic concentration (elemental Hg)			
1a. Term with $C_{w,1}$ - total water column concentration - elemental mercury	3.70E+02	yr ⁻¹	Calculated: Portion of MRTC, Equation 35, p. 4-39. Value = $\{R_{w,1} * f_{dw,1} + [(V_s * f_{sw,1} + V_{sb} * f_{sb,1}) * A_w]\} / V_b$ benthic volume m ³ All terms in differential equation were divided by V_b . Resulting value used in differential equation, MRTC, p. 4-39.
1b. Term with $C_{b,2}$ - total benthic concentration - divalent mercury	3.65E-04	yr ⁻¹	Calculated: Portion of MRTC, Equation 35, p. 4-39. Value = k_b reduction rate constant in benthic sediment yr ⁻¹ * V_b benthic volume m ³ / V_b benthic volume m ³ All terms in differential equation were divided by V_b . Resulting value used in differential equation, MRTC, p. 4-39.
1c. Term with $C_{b,3}$ - total benthic concentration - methyl mercury	0.00E+00	yr ⁻¹	Calculated: Portion of MRTC, Equation 35, p. 4-39. Value = $k_{b,3}$ demethylation rate constant yr ⁻¹ from MRTC, p. B-18 * V_b benthic volume m ³ / V_b benthic volume m ³ . All terms in differential equation were divided by V_b . Resulting value used in differential equation, MRTC, p. 4-39.
1d. Term with $C_{w,1}$ - total benthic concentration - elemental mercury	5.05E+00	yr ⁻¹	Calculated: Portion of MRTC, Equation 35, p. 4-39. Value = $\{(R_{w,1} * (f_{bw,1} / \theta_{bw}) + ((V_{bs} * V_b) * f_{bs,1} * A_w) + (k_b * V_b)) / V_b\} / V_b$ benthic volume m ³ All terms in differential equation were divided by V_b . Resulting value used in differential equation, MRTC, p. 4-39.
Final equation =	$(\text{term with } C_{w,1}) * C_{w,1} + (\text{term with } C_{b,2}) * C_{b,2} + (\text{term with } C_{b,3}) * C_{b,3} - (\text{term with } C_{b,1}) * C_{b,1}$		
5. Differential equation for $C_{b,3}$ - total benthic concentration (divalent Hg)			
1a. Term with $C_{w,2}$ - total water column concentration - divalent mercury	6.32E+03	yr ⁻¹	Calculated: Portion of MRTC, Equation 36, p. 4-39. Value = $\{R_{w,2} * f_{dw,2} + [(V_s * f_{sw,2} + V_{sb} * f_{sb,2}) * A_w]\} / V_b$ benthic volume m ³ All terms in differential equation were divided by V_b . Resulting value used in solving differential equation, MRTC, p. 4-39
1b. Term with $C_{w,1}$ - total benthic concentration - elemental mercury	0.00E+00	yr ⁻¹	Calculated: Portion of MRTC, Equation 35, p. 4-39. Value = $k_{b,1}$ oxidation rate constant in benthic sediment yr ⁻¹ (MRTC, p. B-18) * V_b benthic volume m ³ / V_b benthic volume m ³ All terms in differential equation were divided by V_b . Resulting value used in solving differential equation, MRTC, p. 4-39
1c. Term with $C_{b,3}$ - total benthic concentration - methyl mercury	7.30E-01	yr ⁻¹	Calculated: Portion of MRTC, Equation 35, p. 4-39. Value = $k_{b,3}$ demethylation rate constant yr ⁻¹ (MRTC, p. B-18) * V_b benthic volume m ³ / V_b benthic volume m ³ . All terms in differential equation were divided by V_b . Resulting value used in solving differential equation, MRTC, p. 4-39

Table 5-12
Data Used in IEM-2M Mercury Modeling of a Typical Pond (a)
(Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)

Parameter	Value	Units	Basis
1d. Term with $C_{M,2}$ - total benthic concentration - divalent mercury	5.08E+00	yr ⁻¹	Calculated: Portion of MRTC, Equation 35, p. 4-39. Value = $\{ (R_{sed} * (f_{d,2} / \theta_{d,2}) + ((V_{sed} * v_b) * f_{d,2} * A_w) + ((k_{br} + k_{b,2}) * V_b) \} / V_b$ benthic volume m ³ All terms in differential equation were divided by Vb. Resulting value used in solving differential equation, MRTC, p. 4-39
Final equation =	(term with $C_{M,2}$)* $C_{M,2}$ + (term with $C_{M,1}$)* $C_{M,1}$ + (term with $C_{M,3}$)* $C_{M,3}$ - (term with $C_{M,2}$)* $C_{M,2}$		
6. Differential equation for $C_{M,3}$ - total benthic concentration (methyl Hg)			
1a. Term with $C_{M,3}$ - total water column concentration - methyl mercury	4.35E+03	yr ⁻¹	Calculated: Portion of MRTC, Equation 37, p. 4-39. Value = $\{ R_{sed} * f_{d,3} + \{ (V_{sed} * f_{d,3} + V_{sed} * f_{d,3} * A_w) \} / V_b$ benthic volume m ³ All terms in differential equation were divided by Vb. Resulting value used in solving differential equation, MRTC, p. 4-39
1b. Term with $C_{M,2}$ - total benthic concentration - divalent mercury	3.65E-02	yr ⁻¹	Calculated: Portion of MRTC, Equation 37, p. 4-39. Value = $k_{b,3}$ methylation rate constant in benthic sediment yr ⁻¹ (MRTC, p. B-18) * V_b benthic volume m ³ / V_b benthic volume m ³ All terms in differential equation were divided by Vb. Resulting value used in solving differential equation, MRTC, p. 4-39
1c. Term with $C_{M,3}$ - total benthic concentration - methyl mercury	5.78E+00	yr ⁻¹	Calculated: Portion of MRTC, Equation 37, p. 4-39. Value = $\{ (R_{sed} * (f_{d,3} / \theta_{d,3}) + ((V_{sed} * v_b) * f_{d,3} * A_w) + ((k_{b,3} + k_{b,3}) * V_b) \} / V_b$ benthic volume m ³ All terms in differential equation were divided by Vb. Resulting value used in solving differential equation, MRTC, p. 4-39
Final equation =	(term with $C_{M,3}$)* $C_{M,3}$ + (term with $C_{M,2}$)* $C_{M,2}$ - (term with $C_{M,3}$)* $C_{M,3}$		

(a) MRTC = EPA's Mercury Report to Congress, 1997. Volume III: Fate and Transport of Mercury in the Environment. EPA-452/R-97-005. The MRTC does not provide equation numbers; to facilitate correspondence with Volume III of the MRTC, equations were assigned numbers, beginning with equation 1 for the first equation on page 4-28 (Section 4.4.2.1) and continuing through equation 54 for the last equation on page 4-43 (Section 4.4.3.5).

Table 5-13
Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (a)
(Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)

Parameter	Value	Units	Basis
EMISSION RATES			
Fraction elemental mercury in emissions and locally available	0.006	unitless	Fraction of species in emissions provided by RTP based on MRTC (Volume III, Table 4-2) (0.6) and fraction locally available based on USEPA 1998 combustion guidance (USEPA 1998, Figure 2-4) (0.01). Calculated as $0.6 * 0.01$.
Fraction divalent mercury - vapor phase - in emissions and locally available	0.204	unitless	Fraction of species in emissions provided by RTP based on MRTC (Volume III, Table 4-2) (0.3) and fraction locally available based on USEPA 1998 combustion guidance (USEPA 1998, Figure 2-4) (0.68). Calculated as $0.3 * 0.68$.
Fraction divalent mercury - particulate phase - in emissions and locally available	0.036	unitless	Fraction of species in emissions provided by RTP based on MRTC (Volume III, Table 4-2) (0.1) and fraction locally available based on USEPA 1998 combustion guidance (USEPA 1998, Figure 2-4) (0.36). Calculated as $0.1 * 0.36$.
Total Mercury emission rate	2.68E-03	g/sec	Provided by RTP. Based on average of measured emission rates from Units 1 and 2 and including additional emissions from the third proposed unit (assuming the average stack gas concentration for Units 1 and 2 applies to the third unit). ($2.13E-2 \text{ lb/hr} * 453.39 \text{ g/lb} * \text{hr}/3600 \text{ sec} = 2.68E-3 \text{ g/sec}$).
Elemental mercury emission rate	1.61E-05	g/sec	Calculated
Divalent mercury emission rate - vapor phase	5.47E-04	g/sec	Calculated
Divalent mercury emission rate - particulate phase	9.65E-05	g/sec	Calculated
CONCENTRATIONS AND DEPOSITION RATES OVER WATERSHED			
Air Concentrations Over Watershed			
$UC_{a-watershed}$ - Unit air concentration (annual average) over watershed	4.00E-03	ug/m ³ per 1 g/sec	ISCST model results for the Caloosahatchee River watershed for the portion of river within the modeling domain and beyond the facility boundary, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
$C_{a-elemental}$ - Elemental mercury air concentration over watershed	6.44E-08	ug/m ³	Calculated: $C_{a-elemental} = ER \text{ g/sec} * \text{unit air conc ug/m}^3 \text{ per 1 g/sec}$. Used in MRTC, L_{DP} Equ. 14, p. 4-30
$C_{a-vaporHg}$ - Divalent vapor phase air concentration over watershed	2.19E-06	ug/m ³	Calculated: $C_{a-vaporHg} = ER \text{ g/sec} * \text{unit air conc ug/m}^3 \text{ per 1 g/sec}$. Used in MRTC, L_{DP} Equ. 14, p. 4-30
$C_{a-particulateHg}$ - Divalent particulate phase air concentration over watershed	3.86E-07	ug/m ³	Calculated: $C_{a-particulateHg} = ER \text{ g/sec} * \text{unit air conc ug/m}^3 \text{ per 1 g/sec}$. Used in MRTC, L_{DP} Equ. 14, p. 4-30
$C_{a-total Hg}$ - Total mercury air concentration over watershed	2.64E-06	ug/m ³	Calculated: $C_{a-total Hg} = \text{sum of air concentrations for three Hg species (elemental, divalent vapor phase, divalent particulate)}$
Deposition Rates Over Watershed			
1. Particulate Phase Divalent Mercury Dry and Wet Deposition Rates over Watershed			
$UD_{year-particulate}$ - Unit dry particle deposition rate (surface area weighted) over watershed	7.9E-05	g/m ² -year per 1 g/sec	ISCST model results for the Caloosahatchee River watershed for the portion of river within the modeling domain and beyond the facility boundary, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
$UD_{year-wet}$ - Unit wet particle deposition rate (surface area weighted) over watershed	7.4E-04	g/m ² -year per 1 g/sec	ISCST model results for the Caloosahatchee River watershed for the portion of river within the modeling domain and beyond the facility boundary, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
$D_{year-particulateHg}$ - Divalent particulate phase mercury - dry deposition rate over watershed	7.62E-09	g/m ² -year	Calculated: $D_{year-particulateHg} = ER \text{ g/sec} * \text{unit deposition rate g/m}^2\text{-year per 1 g/sec}$. Used in MRTC, L_{SD} Equ. 13, p. 4-30
$D_{year-wet-particulateHg}$ - Divalent particulate phase mercury - wet deposition rate over watershed	7.14E-08	g/m ² -year	Calculated: $D_{year-wet-particulateHg} = ER \text{ g/sec} * \text{unit deposition rate g/m}^2\text{-year per 1 g/sec}$. Used in MRTC, L_{SD} Equ. 13, p. 4-30
D_{total} - Total deposition rate for divalent particulate phase mercury over watershed	7.90E-08	g/m ² -year	Calculated: $D_{total} = \text{sum of wet and dry deposition rates for divalent particulate phase mercury over watershed}$
2. Vapor Phase Elemental and Divalent Mercury Wet Deposition Rates over Watershed			
$UD_{year-vapor}$ - Unit wet vapor phase deposition rate over watershed	1.10E-03	g/m ² -year per 1 g/sec	ISCST model results for the Caloosahatchee River watershed for the portion of river within the modeling domain and beyond the facility boundary, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
$D_{year-vaporHg}$ - Divalent vapor phase mercury - wet deposition rate over watershed	6.01E-07	g/m ² -year	Calculated: $D_{year-vaporHg} = ER \text{ g/sec} * \text{unit deposition rate g/m}^2\text{-year per 1 g/sec}$. Used in MRTC, L_{SD} Equ. 13, p. 4-30
$D_{year-vaporHg}$ - Elemental vapor phase mercury - wet deposition rate over watershed	1.77E-08	g/m ² -year	Calculated: $D_{year-vaporHg} = ER \text{ g/sec} * \text{unit deposition rate g/m}^2\text{-year per 1 g/sec}$. Used in MRTC, L_{SD} Equ. 13, p. 4-30. Note that the scavenging coefficient for divalent mercury was also conservatively applied to elemental mercury in this approach. This will overestimate elemental mercury wet deposition by about two orders of magnitude (MRTC; USEPA 1997).
3. Vapor Phase Elemental and Divalent Mercury Dry Deposition Rates over Watershed			
$D_{wet-vaporHg}$ - Dry vapor deposition velocity for elemental mercury - vapor phase	0.06	cm/sec	MRTC (p. 4-18). Default value based on average of winter and summer deposition velocities for forests
$D_{wet-vaporHg}$ - Dry vapor deposition velocity for divalent mercury - vapor phase	2.9	cm/sec	MRTC (p. 4-18), average default value. USEPA 1998 Combustion Guidance default value is 3 cm/sec.

Table 5-13
Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (a)
(Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)

Parameter	Value	Units	Basis
$D_{ydw-vaporHg(1)}$ - Divalent vapor phase mercury - dry deposition rate over watershed	2.00E-06	$g/m^2 \cdot year$	Calculated: $D_{ydw-vaporHg(1)}$ = divalent vapor air concentration ug/m^3 * $D_{val-vaporHg(1)}$ divalent vapor dep. velocity cm/sec * $m/100$ cm * $g/1E6$ ug * $3.1536E+7$ sec/yr . Used in MRTC, L_{SD} Equ. 13, p. 4-30
$D_{ydw-vaporHg(2)}$ - Elemental vapor phase mercury - dry deposition rate over watershed	1.22E-09	$g/m^2 \cdot year$	Calculated: $D_{ydw-vaporHg(2)}$ = elemental air concentration ug/m^3 * $D_{val-vaporHg(2)}$ elemental dep. velocity cm/sec * $m/100$ cm * $g/1E6$ ug * $3.1536E+7$ sec/yr . Used in MRTC, L_{SD} Equ. 13, p. 4-30
4. Vapor Phase Diffusion Flux Over Watershed			
L_{DIF} - Divalent vapor phase mercury - diffusion flux over watershed	9.92E-09	$g/m^2 \cdot year$	Calculated: MRTC, Equ. 14, p. 4-30. $L_{DIF} = (ks_{air} m^2/yr) * (vapor\ air\ conc\ ug/m^3) * (1E-6\ g/ug) / (A_s\ watershed\ soil\ surface\ area\ m^2)$. Used in MRTC, L_{SD} Equ. 13, p. 4-30
L_{DIF} - Elemental vapor phase mercury - diffusion flux over watershed	2.92E-10	$g/m^2 \cdot year$	Calculated: MRTC, Equ. 14, p. 4-30. $L_{DIF} = (ks_{air} m^2/yr) * (vapor\ air\ conc\ ug/m^3) * (1E-6\ g/ug) / (A_s\ watershed\ soil\ surface\ area\ m^2)$. Used in MRTC, L_{SD} Equ. 13, p. 4-30
5. Total Atmospheric Loading for Each Mercury Species Over Watershed (L_{SD})			
L_{SD} - Elemental mercury total loading over watershed ($L_{SD,1}$)	5.17E+00	$g/year$	Calculated: MRTC, Equation 13, p. 4-30. Sum of wet vapor deposition ($D_{ydw-vaporHg(2)}$), dry vapor deposition ($D_{ydw-vaporHg(1)}$), and diffusion flux ($L_{DIF-Hg(2)}$) * surface area of watershed soil m^2
L_{SD} - Divalent mercury total loading over watershed ($L_{SD,2}$)	7.24E+02	$g/year$	Calculated: MRTC, Equation 13, p. 4-30. Sum of wet divalent vapor phase deposition ($D_{ydw-vaporHg(1)}$), wet divalent particulate phase deposition ($D_{ydw-particHg(1)}$), dry divalent vapor deposition ($D_{ydw-vaporHg(1)}$), dry divalent particulate phase deposition ($D_{ydw-particHg(1)}$), and diffusion flux ($L_{DIF-Hg(1)}$) * surface area of watershed soil m^2 .
INTERMEDIATE SOLUTION OF WATERSHED DIFFERENTIAL EQUATIONS			
1. Differential equation for C_{e1} (elemental Hg)			
1a. $L_{SD,1}/V_s$ - total atmospheric loading elemental mercury	1.92E-06	$g/m^3 \cdot year$	Calculated: Portion of MRTC, Equation 10, p. 4-30. Value = $L_{SD,1}/V_s$. See above for $L_{SD,1}$. V_s = soil layer volume m^3 . All terms in differential equation were divided by V_s . Resulting value used in solving differential equation, MRTC, p. 4-30
1b. Term with C_{s1}	8.81E+01	yr^{-1}	Calculated: Portion of MRTC, Equation 10, p. 4-30. Value = $(ks_{s1} + ks_s + ks_{s0} + ks_t + ks_{s3}) * V_s$ soil layer volume m^3 / V_s soil layer volume m^3 . Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_s . Resulting value used in solving differential equation, MRTC, p. 4-30.
1c. Term with C_{s2}	9.13E-03	yr^{-1}	Calculated: Portion of MRTC, Equation 10, p. 4-30. Value = k_{re} reduction rate constant yr^{-1} from MRTC, p. B-18 * V_s soil layer volume m^3 / V_s soil layer volume m^3 . Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_s . Resulting value used in solving differential equation, MRTC, p. 4-30
1d. Term with C_{s3}	0.00E+00	yr^{-1}	Calculated: Portion of MRTC, Equation 10, p. 4-30. Value = ks_{dem} mer demethylation rate constant yr^{-1} from MRTC, p. B-18 * V_s soil layer volume m^3 / V_s soil layer volume m^3 . Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_s . Resulting value used in solving differential equation, MRTC, p. 4-30
Final equation =	$L_{SD,1}/V_s + (\text{term with } C_{s2})C_{s2} + (\text{term with } C_{s3})C_{s3} - (\text{term with } C_{e1})C_{e1}$		
2. Differential equation for C_{e2} (divalent Hg)			
1a. $L_{SD,2}/V_s$ - total atmospheric loading divalent mercury	2.69E-04	$g/year$	Calculated: Portion of MRTC, Equation 11, p. 4-30. Value = $L_{SD,2}/V_s$ soil layer volume m^3 . Resulting value used in solving differential equation, MRTC, p. 4-30
1b. Term with C_{s1}	0.00E+00	yr^{-1}	Calculated: Portion of MRTC, Equation 11, p. 4-30. Value = $ks_s * V_s$ soil layer volume m^3 / V_s soil layer volume m^3 . Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_s . Resulting value used in solving differential equation, MRTC, p. 4-30
1c. Term with C_{s2}	3.02E-02	yr^{-1}	Calculated: Portion of MRTC, Equation 11, p. 4-30. Value = $(ks_s + ks_{sm} + ks_{s0} + ks_t + ks_{s3}) * V_s$ soil layer volume m^3 / V_s soil layer volume m^3 . Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_s . Resulting value used in solving differential equation, MRTC, p. 4-30
1d. Term with C_{s3}	9.13E-01	yr^{-1}	Calculated: Portion of MRTC, Equation 11, p. 4-30. Value = ks_{dm} demethylation to HgII rate constant yr^{-1} from MRTC, p. B-18 * V_s soil layer volume m^3 / V_s soil layer volume m^3 . Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_s . Resulting value used in solving differential equation, MRTC, p. 4-30
Final equation =	$L_{SD,2}/V_s + (\text{term with } C_{s1})C_{s1} + (\text{term with } C_{s2})C_{s2} - (\text{term with } C_{e2})C_{e2}$		

Table 5-13
Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (a)
(Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)

Parameter	Value	Units	Basis
3. Differential equation for C_{d3} (methyl Hg)			
1a. $L_{d0,3}$ - total atmospheric loading methyl mercury	0.00E+00	g/year	No loading of methyl mercury from atmosphere
1b. Term with C_{s2}	1.83E-02	yr ⁻¹	Calculated: Portion of MRTC, Equation 12, p. 4-30. Value = k_{sm} methylation rate constant yr ⁻¹ from MRTC, p. B-18 * V_s soil layer volume m ³ / V_a soil layer volume m ³ . Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_a . Resulting value used in solving differential equation, MRTC, p. 4-30
1c. Term with C_{s3}	9.18E-01	yr ⁻¹	Calculated: Portion of MRTC, Equation 12, p. 4-30. Value = $(k_{smd} + k_{sno} + k_{sa} + k_{sy}) * V_s$ soil layer volume m ³ / V_a soil layer volume m ³ . Chemical specific properties used for mercury species in the IEM-2M model are provided in companion IEM data table. All terms in differential equation were divided by V_a . Resulting value used in solving differential equation, MRTC, p. 4-30
Final equation =	$L_{d0,3}/V_a + (\text{term with } C_{s2}) * C_{s2} - (\text{term with } C_{d3}) * C_{d3}$		
CONCENTRATIONS AND DEPOSITION RATES OVER WATERBODY			
Air Concentrations Over Waterbody			
$UC_{a-waterbody}$ - Unit air concentration (annual average) over waterbody	3.00E-03	ug/m ³ per 1 g/sec	ISCST model results for the Caloosahatchee River waterbody for the portion of river within the modeling domain and beyond the facility boundary, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
$C_{a-elemental}$ - Elemental mercury air concentration over waterbody	4.83E-08	ug/m ³	Calculated: $C_{a-elemental}$ = ER g/sec * unit air conc ug/m ³ per 1 g/sec
$C_{a-vaporHgt}$ - Divalent vapor phase air concentration over waterbody	1.64E-06	ug/m ³	Calculated: $C_{a-vaporHgt}$ = ER g/sec * unit air conc ug/m ³ per 1 g/sec
$C_{a-particleHgt}$ - Divalent particulate phase air concentration over waterbody	2.90E-07	ug/m ³	Calculated: $C_{a-particleHgt}$ = ER g/sec * unit air conc ug/m ³ per 1 g/sec
$C_{a-total Hg}$ - Total mercury air concentration over waterbody	1.98E-06	ug/m ³	Calculated: $C_{a-total Hg}$ = sum of air concentrations for three Hg species (elemental, divalent vapor phase, divalent particulate)
Deposition Rates Over Waterbody			
1. Particulate Phase Divalent Mercury Dry and Wet Deposition Rates over Waterbody			
$UD_{dry-particle}$ - Unit dry particle deposition rate (surface area weighted) over waterbody area	5.8E-05	g/m ² -year per 1 g/sec	ISCST model results for the Caloosahatchee River waterbody for the portion of river within the modeling domain and beyond the facility boundary, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
$UD_{wet-particle}$ - Unit wet particle deposition rate (surface area weighted) over waterbody area	3.3E-04	g/m ² -year per 1 g/sec	ISCST model results for the Caloosahatchee River waterbody for the portion of river within the modeling domain and beyond the facility boundary, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
$D_{dry-particleHgt}$ - Divalent particulate phase mercury - dry deposition rate over waterbody	5.60E-09	g/m ² -year	Calculated: $D_{dry-particleHgt}$ = ER g/sec * unit deposition rate g/m ² -year per 1 g/sec. Used in MRTC, L_{dep} equation 45, p. 4-41.
$D_{wet-particleHgt}$ - Divalent particulate phase mercury - wet deposition rate over waterbody	3.18E-08	g/m ² -year	Calculated: $D_{wet-particleHgt}$ = ER g/sec * unit deposition rate g/m ² -year per 1 g/sec. Used in MRTC, L_{dep} equation 45, p. 4-41.
$D_{total-particleHgt}$ - Total deposition rate for divalent particulate phase mercury over waterbody	3.74E-08	g/m ² -year	Calculated: $D_{total-particleHgt}$ = sum of wet and dry deposition rates for divalent particulate phase mercury over waterbody
2. Vapor Phase Elemental and Divalent Mercury Wet Deposition Rates over Waterbody			
$UD_{wet-vapor}$ - Unit wet vapor phase deposition rate over waterbody	3.8E-04	g/m ² -year per 1 g/sec	ISCST model results for the Caloosahatchee River waterbody for the portion of river within the modeling domain and beyond the facility boundary, obtained from RTP (5-year average based on 1990-1994 Fort Myers Airport meteorological data)
$D_{wet-vaporHgt}$ - Divalent vapor phase mercury - wet deposition rate over waterbody	2.08E-07	g/m ² -year	Calculated: ER g/sec * unit deposition rate g/m ² -year per 1 g/sec. Used in MRTC, L_{dep} equation 45, p. 4-41.
$D_{wet-vaporHgt0}$ - Elemental vapor phase mercury - wet deposition rate over waterbody	6.12E-09	g/m ² -year	Calculated: ER g/sec * unit deposition rate g/m ² -year per 1 g/sec. Used in MRTC, L_{dep} equation 45, p. 4-41. Note that the scavenging coefficient for divalent mercury was also conservatively applied to elemental mercury in this approach. This will overestimate elemental mercury wet deposition by about two orders of magnitude (MRTC; USEPA 1997).
3. Vapor Phase Elemental and Divalent Mercury Dry Deposition Rates over Waterbody			
$D_{dry-vaporHgt0}$ - Dry vapor deposition velocity for elemental mercury - vapor phase	0.06	cm/sec	MRTC (p. 4-18). Default value based on average of winter and summer deposition velocities for forests
$D_{dry-vaporHgt}$ - Dry vapor deposition velocity for divalent mercury - vapor phase	2.9	cm/sec	MRTC (p. 4-18), average default value. USEPA 1998 Combustion Guidance default value is 3 cm/sec.
$D_{dry-vaporHgt}$ - Divalent vapor phase mercury - dry deposition rate over waterbody	1.50E-06	g/m ² -year	Calculated: divalent vapor air concentration ug/m ³ * divalent vapor dep. velocity cm/sec * m/100 cm * g/1E8 ug * 3.1536E+7 sec/yr. Used in MRTC, L_{dep} equation 45, p. 4-41.

Table 5-13
Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (a)
(Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)

Parameter	Value	Units	Basis
$D_{yds-vaporHg}$ - Elemental vapor phase mercury - dry deposition rate over waterbody	9.14E-10	$g/m^2\text{-year}$	Calculated: elemental air concentration ug/m^3 * elemental dep. velocity cm/sec * $m/100\text{ cm}$ * $g/1E6\text{ ug}$ * $3.1536E+7\text{ sec/yr}$. Used in MRTC, L_{Dep} equation 45, p. 4-41.
Total Loading for Each Mercury Species to Waterbody			
1. Deposition of compound onto surface of waterbody (MRTC, p. 4-41) (L_{Dep})			
$D_{yds-vaporHg}$ - elemental. Yearly dry deposition rate of elemental mercury onto surface water body	9.14E-10	$g/m^2\text{-year}$	Equal to deposition rate for dry deposition of vapor phase elemental Hg from above. Used in MRTC, L_{Dep} equation 45, p. 4-41
$D_{yws-vaporHg}$ - elemental. Yearly wet deposition rate of elemental mercury onto surface water body	6.12E-09	$g/m^2\text{-year}$	Equal to deposition rate for wet deposition of vapor phase elemental Hg from above. Used in MRTC, L_{Dep} equation 45, p. 4-41
L_{Dep} - elemental. Direct deposition of elemental mercury onto surface water body	1.20E-01	$g/year$	Calculated: MRTC, equation 45, p. 4-41. L_{Dep} = sum of direct deposition rates for elemental Hg (dry and wet) $g/m^2\text{-yr}$ * A_w waterbody area m^2 . Used in MRTC, L_T equation 44, p. 4-40
$D_{yds-divalent}$ - divalent. Yearly dry deposition rate of divalent mercury onto surface water body	1.51E-06	$g/m^2\text{-year}$	Calculated: sum of dry divalent vapor deposition, dry divalent particle phase deposition. Used in MRTC, L_{Dep} equation 45, p. 4-41
$D_{yws-divalent}$ - divalent. Yearly wet deposition rate of divalent mercury onto surface water body	2.40E-07	$g/m^2\text{-year}$	Calculated: sum of wet divalent vapor phase deposition, wet divalent particulate phase deposition. Used in MRTC, L_{Dep} equation 45, p. 4-41
L_{Dep} - divalent. Direct deposition of divalent mercury onto surface water body	2.97E+01	$g/year$	Calculated: MRTC, equation 45, p. 4-41. L_{Dep} = sum of direct deposition rates for particulate and vapor phase divalent Hg (dry and wet) $g/m^2\text{-yr}$ * waterbody area m^2 . Used in MRTC, L_T equation 44, p. 4-40
2. Runoff load from impervious surface (MRTC, p. 4-41) (L_{RI})			
$D_{yws-vaporHg}$ - elemental. Yearly wet deposition flux onto watershed	1.77E-08	$g/m^2\text{-year}$	Obtained from values shown above: wet elemental vapor phase deposition over watershed. Used in MRTC, L_{RI} equation 46, p. 4-41
$D_{yws-HgII}$ - divalent. Yearly wet deposition flux onto watershed	6.73E-07	$g/m^2\text{-year}$	Calculated from values shown above: sum of wet divalent vapor phase deposition and wet divalent particulate phase deposition onto watershed. Used in MRTC, L_{RI} equation 46, p. 4-41
$D_{yds-vaporHg}$ - elemental. Yearly dry deposition flux onto watershed	1.22E-09	$g/m^2\text{-year}$	Calculated from values shown above: dry elemental deposition over watershed. Used in MRTC, L_{RI} equation 46, p. 4-41
$D_{yds-HgII}$ - divalent. Yearly dry deposition flux onto watershed	2.01E-06	$g/m^2\text{-year}$	Calculated from values shown above: sum of dry divalent vapor phase deposition and dry divalent particulate phase deposition onto watershed. Used in MRTC, L_{RI} equation 46, p. 4-41
L_{RI} - elemental. Impervious surface runoff load	8.33E-01	$g/year$	Calculated: MRTC, equation 46, p. 4-41. L_{RI} = sum of yearly (dry and wet) deposition rates onto watershed $g/m^2\text{-yr}$ * impervious watershed area m^2 . Used in MRTC, L_T equation 44, p. 4-40
L_{RI} - divalent. Impervious surface runoff load	1.18E+02	$g/year$	Calculated: MRTC, equation 46, p. 4-41. L_{RI} = sum of yearly (dry and wet) deposition rates onto watershed $g/m^2\text{-yr}$ * impervious watershed area m^2 . Used in MRTC, L_T equation 44, p. 4-40
3. Runoff load from pervious surfaces (MRTC, p. 4-41) (L_R)			
C_{soil} - elemental. Concentration in watershed soil	7.10E-07	g/m^3	Calculated from IEM modeling (solution of MRTC differential equation 10, p. 4-30). C_s = elemental Hg soil conc $6.41E-7\text{ mg/kg}$ * $g/1e+3\text{ mg}$ * soil BD 1.4 kg/L * $1e+3\text{ L/m}^3$. Used in MRTC, L_R and L_E equations, p. 4-41.
C_{soil} - divalent. Concentration in watershed soil	6.66E-03	g/m^3	Calculated from IEM modeling (solution of MRTC differential equation 11, p. 4-30). C_s = divalent Hg soil conc $5.1E-3\text{ mg/kg}$ * $g/1e+3\text{ mg}$ * soil BD 1.4 kg/L * $1e+3\text{ L/m}^3$. Used in MRTC, L_R and L_E equations, p. 4-41.
C_{soil} - methyl. Concentration in watershed soil	1.26E-04	g/m^3	Calculated from IEM modeling (solution of MRTC differential equation 12, p. 4-30). C_s = methyl Hg soil conc $3.5E-6\text{ mg/kg}$ * $g/1e+3\text{ mg}$ * soil BD 1.4 kg/L * $1e+3\text{ L/m}^3$. Used in MRTC, L_R and L_E equations, p. 4-41.
L_R - elemental. Pervious surface runoff load	1.60E-02	$g/year$	Calculated: MRTC, equation 46, p. 4-41. $ks_{RO}\text{ yr}^{-1}$ * V_p volume pervious soil layer m^3 * soil concentration in watershed soil g/m^3 . Used in MRTC, L_T equation 44, p. 4-40
L_R - divalent. Pervious surface runoff load	2.58E+00	$g/year$	Calculated: MRTC, equation 46, p. 4-41. $ks_{RO}\text{ yr}^{-1}$ * V_p volume pervious soil layer m^3 * soil concentration in watershed soil g/m^3 . Used in MRTC, L_T equation 44, p. 4-40
L_R - methyl mercury. Pervious surface runoff load	4.05E-01	$g/year$	Calculated: MRTC, equation 46, p. 4-41. $ks_{RO}\text{ yr}^{-1}$ * V_p volume pervious soil layer m^3 * soil concentration in watershed soil g/m^3 . Used in MRTC, L_T equation 44, p. 4-40
4. Soil erosion load (MRTC, p. 4-41 - 4-42) (L_E)			
L_E - elemental	4.76E-03	$g/year$	Calculated: MRTC, L_E equation 48, p. 4-41. $ks_{er}\text{ yr}^{-1}$ * V_s soil layer volume in watershed m^3 * soil concentration in watershed soil g/m^3 . Used in MRTC, L_T equation 44, p. 4-40

Table 5-13
Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (a)
(Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)

Parameter	Value	Units	Basis
L_E - divalent	4.47E+01	g/year	Calculated: MRTC, L_E equation 48, p. 4-41. $k_{sw} \text{ yr}^{-1} \cdot V_s$ soil layer volume in watershed $\text{m}^3 \cdot \text{soil concentration in watershed soil g/m}^3$. Used in MRTC, L_T equation 44, p. 4-40
L_E - methyl mercury	8.45E-01	g/year	Calculated: MRTC, L_E equation 48, p. 4-41. $k_{sw} \text{ yr}^{-1} \cdot V_s$ soil layer volume in watershed $\text{m}^3 \cdot \text{soil concentration in watershed soil g/m}^3$. Used in MRTC, L_T equation 44, p. 4-40
5. Load due to gaseous diffusion over waterbody (MRTC, p. 4-42) (L_{DW})			
L_{DW} - elemental	3.49E-04	g/year	Calculated: MRTC, equation 49, p. 4-42. $L_{DW} \text{ g/yr}$ = overall transfer rate at water temp $K_T \text{ m/yr} \cdot A_w$ water body surface area $\text{m}^2 \cdot (\text{vapor phase air concentration over water body ug/m}^3 \cdot 1\text{E-6} / (\text{Henry's/R} \cdot \text{water body temperature } T_D))$. Used in MRTC, L_T equation 44, p. 4-40
L_{DW} - divalent	9.89E+00	g/year	Calculated: MRTC, equation 49, p. 4-42. $L_{DW} \text{ g/yr}$ = overall transfer rate at water temp $K_T \text{ m/yr} \cdot A_w$ water body surface area $\text{m}^2 \cdot (\text{vapor phase air concentration over water body ug/m}^3 \cdot 1\text{E-6} / (\text{Henry's/R} \cdot \text{water body temperature } T_D))$. Used in MRTC, L_T equation 44, p. 4-40
6. Total load to waterbody (MRTC, p. 4-40)			
L_T - elemental	9.73E-01	g/yr	Calculated: MRTC, Equ. 44, p. 4-40. $L_T = L_{DW} + L_{RI} + L_R + L_E + L_{dif}$. Used in differential equations.
L_T - divalent	2.05E+02	g/yr	Calculated: MRTC, Equ. 44, p. 4-40. $L_T = L_{DW} + L_{RI} + L_R + L_E + L_{dif}$. Used in differential equations.
L_T - methyl	1.25E+00	g/yr	Calculated: MRTC, Equ. 44, p. 4-40. $L_T = L_R + L_E$. Used in differential equations.
INTERMEDIATE SOLUTION OF WATERBODY DIFFERENTIAL EQUATIONS			
1. Differential equation for $C_{wt,1}$ - total water column concentration (elemental Hg)			
1a. L_T/V_w - total load to waterbody elemental mercury	2.39E-08	$\text{g/m}^3 \cdot \text{year}$	Calculated: Portion of MRTC, Equation 32, p. 4-38. Value = $L_{T,1} / V_w$ volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1b. Term with $C_{s,1}$ - concentration in watershed soil - elemental mercury	8.24E-04	yr^{-1}	Calculated: Portion of MRTC, Equation 32, p. 4-38. Value = V_s soil layer volume $\text{m}^3 \cdot (k_{s,0} + k_{s,1}) / V_w$ volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1c. Term with $C_{wt,2}$ - total water column concentration - divalent mercury	2.74E+00	yr^{-1}	Calculated: Portion of MRTC, Equation 32, p. 4-38. Value = k_w , reduction rate constant yr^{-1} from MRTC, p. B-18 $\cdot V_w$ volume of water column m^3 / V_w volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1d. Term with $C_{wt,3}$ - total water column concentration - methyl mercury	0.00E+00	yr^{-1}	Calculated: Portion of MRTC, Equation 32, p. 4-38. Value = $k_{w,mer}$ demethylation rate constant yr^{-1} from MRTC, p. B-18 $\cdot V_w$ volume of water column m^3 / V_w volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1e. Term with $C_{wt,1}$ - total water column concentration - elemental mercury	1.04E+02	yr^{-1}	Calculated: Portion of MRTC, Equation 32, p. 4-38. Value = $(V_f \text{ dilution flow } \text{m}^3/\text{yr} + (R_{pore} \text{ pore water diffusion volume } \text{m}^3/\text{yr} \cdot f_{d,1}) + [(k_{w,1} + k_{w,2}) \cdot V_w] + [(V_{s,1} \cdot f_{sw,1} + V_{sB} \cdot f_{Bw,1}) \cdot A_w]) / V_w$ volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1f. Term with $C_{bt,1}$ - total benthic concentration - elemental mercury	2.28E-03	yr^{-1}	Calculated: Portion of MRTC, Equation 32, p. 4-38. Value = $(R_{sw} \cdot (f_{d,1} / \theta_{ds}) + v_{sB} \cdot f_{Bw,1} \cdot A_w) / V_w$ volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
Final equation =	$L_T/V_w + (\text{term with } C_{s,1}) \cdot C_{s,1} + (\text{term with } C_{wt,2}) \cdot C_{wt,2} + (\text{term with } C_{wt,3}) \cdot C_{wt,3} - (\text{term with } C_{wt,1}) \cdot C_{wt,1} + (\text{term with } C_{bt,1}) \cdot C_{bt,1}$		
2. Differential equation for $C_{wt,2}$ - total water column concentration (divalent mercury)			
1a. L_T/V_w - total load to waterbody divalent mercury	5.02E-06	$\text{g/m}^3 \cdot \text{year}$	Calculated: Portion of MRTC, Equation 33, p. 4-38. Value = $L_{T,2} / V_w$ volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1b. Term with $C_{s,2}$ - concentration in watershed soil - divalent mercury	1.78E-04	yr^{-1}	Calculated: Portion of MRTC, Equation 33, p. 4-38. Value = V_s soil layer volume $\text{m}^3 \cdot (k_{s,0} + k_{s,2}) / V_w$ volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1c. Term with $C_{wt,1}$ - total water column concentration - elemental mercury	0.00E+00	yr^{-1}	Calculated: Portion of MRTC, Equation 33, p. 4-38. Value = $k_{w,2}$ oxidation rate constant yr^{-1} from MRTC, p. B-18 $\cdot V_w$ volume of water column m^3 / V_w volume of water column m^3 . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38

Table 5-13
Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (a)
(Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)

Parameter	Value	Units	Basis
1d. Term with $C_{w,3}$ - total water column concentration - methyl mercury	5.48E+00	yr ⁻¹	Calculated: Portion of MRTC, Equation 33, p. 4-38. Value = $k_{w,3}$ demethylation rate constant yr ⁻¹ from MRTC, p. B-18 * V_w volume of water column m ³ / V_w volume of water column m ³ . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1e. Term with $C_{w,2}$ - total water column concentration - divalent mercury	9.91E+01	yr ⁻¹	Calculated: Portion of MRTC, Equation 33, p. 4-38. Value = $\{V_f$ dilution flow m ³ /yr + $(R_{sw}$ pore water diffusion volume m ³ /yr * $f_{dw,2}$) + $\{ (k_{w,2} + k_{w,3}) * V_w \} + \{ (V_s * f_{sw,2} + V_{sb} * f_{bw,2}) * A_w \} \} / V_w$ volume of water column m ³ . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1f. Term with $C_{b,2}$ - total benthic concentration - divalent mercury	1.59E-03	yr ⁻¹	Calculated: Portion of MRTC, Equation 33, p. 4-38. Value = $\{ (R_{sw} * (f_{dw,2} / \theta_{bw}) + V_s * f_{sb,2} * A_w) / V_w$ volume of water column m ³ . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
Final equation =	$L_{T,3}/V_w + (\text{term with } C_{w,2}) * C_{w,2} + (\text{term with } C_{w,1}) * C_{w,1} + (\text{term with } C_{w,3}) * C_{w,3} - (\text{term with } C_{w,2}) * C_{w,2} + (\text{term with } C_{b,2}) * C_{b,2}$		
3. Differential equation for $C_{w,3}$ - total water column concentration (methyl mercury)			
1a. $L_{T,3}/V_w$ - total load to waterbody methyl mercury	3.06E-08	g/m ³ -year	Calculated: Portion of MRTC, Equation 34, p. 4-38. Value = $L_{T,3} / V_w$ volume of water column m ³ . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1b. Term with $C_{s,3}$ - concentration in watershed soil - methyl mercury	2.59E-04	yr ⁻¹	Calculated: Portion of MRTC, Equation 34, p. 4-38. Value = V_s soil layer volume m ³ * $(k_{s,3} + k_{s,2}) / V_w$ volume of water column m ³ . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1c. Term with $C_{w,2}$ - total water column concentration - divalent mercury	3.65E-01	yr ⁻¹	Calculated: Portion of MRTC, Equation 34, p. 4-38. Value = $k_{w,2}$ methylation rate constant yr ⁻¹ from MRTC, p. B-18 * V_w volume of water column m ³ / V_w volume of water column m ³ . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1d. Term with $C_{w,3}$ - total water column concentration - methyl mercury	1.00E+02	yr ⁻¹	Calculated: Portion of MRTC, Equation 34, p. 4-38. Value = $\{V_f$ dilution flow m ³ /yr + $(R_{sw}$ pore water diffusion volume m ³ /yr * $f_{dw,3}$) + $\{ (k_{w,3} + k_{w,2} + k_{w,1}) * V_w \} + \{ (V_s * f_{sw,3} + V_{sb} * f_{bw,3}) * A_w \} \} / V_w$ volume of water column m ³ . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
1e. Term with $C_{b,3}$ - total benthic concentration - methyl mercury	2.25E-03	yr ⁻¹	Calculated: Portion of MRTC, Equation 34, p. 4-38. Value = $\{ (R_{sw} * (f_{dw,3} / \theta_{bw}) + V_s * f_{sb,3} * A_w) / V_w$ volume of water column m ³ . All terms in differential equation were divided by V_w . Resulting value used in solving differential equation, MRTC, p. 4-38
Final equation =	$L_{T,3}/V_w + (\text{term with } C_{s,3}) * C_{s,3} + (\text{term with } C_{w,2}) * C_{w,2} - (\text{term with } C_{w,3}) * C_{w,3} + (\text{term with } C_{b,3}) * C_{b,3}$		
4. Differential equation for $C_{b,1}$ - total benthic concentration (elemental Hg)			
1a. Term with $C_{w,1}$ - total water column concentration - elemental mercury	6.04E+01	yr ⁻¹	Calculated: Portion of MRTC, Equation 35, p. 4-39. Value = $\{ R_{sw} * f_{dw,1} + \{ (V_s * f_{sw,1} + V_{sb} * f_{bw,1}) * A_w \} / V_b$ benthic volume m ³ . All terms in differential equation were divided by V_b . Resulting value used in differential equation, MRTC, p. 4-39.
1b. Term with $C_{b,2}$ - total benthic concentration - divalent mercury	3.85E-04	yr ⁻¹	Calculated: Portion of MRTC, Equation 35, p. 4-39. Value = k_b reduction rate constant in benthic sediment yr ⁻¹ * V_b benthic volume m ³ / V_b benthic volume m ³ . All terms in differential equation were divided by V_b . Resulting value used in differential equation, MRTC, p. 4-39.
1c. Term with $C_{b,3}$ - total benthic concentration - methyl mercury	0.00E+00	yr ⁻¹	Calculated: Portion of MRTC, Equation 35, p. 4-39. Value = $k_{b,mer}$ demethylation rate constant yr ⁻¹ from MRTC, p. B-18 * V_b benthic volume m ³ / V_b benthic volume m ³ . All terms in differential equation were divided by V_b . Resulting value used in differential equation, MRTC, p. 4-39.
1d. Term with $C_{b,1}$ - total benthic concentration - elemental mercury	6.52E-01	yr ⁻¹	Calculated: Portion of MRTC, Equation 35, p. 4-39. Value = $\{ (R_{sw} * (f_{dw,1} / \theta_{bw}) + (V_s * V_b) * f_{sb,1} * A_w) + (k_b * V_b) \} / V_b$ benthic volume m ³ . All terms in differential equation were divided by V_b . Resulting value used in differential equation, MRTC, p. 4-39.
Final equation =	$(\text{term with } C_{w,1}) * C_{w,1} + (\text{term with } C_{b,2}) * C_{b,2} + (\text{term with } C_{b,3}) * C_{b,3} - (\text{term with } C_{b,1}) * C_{b,1}$		
5. Differential equation for $C_{b,2}$ - total benthic concentration (divalent Hg)			
1a. Term with $C_{w,2}$ - total water column concentration - divalent mercury	3.57E+03	yr ⁻¹	Calculated: Portion of MRTC, Equation 36, p. 4-39. Value = $\{ R_{sw} * f_{dw,2} + \{ (V_s * f_{sw,2} + V_{sb} * f_{bw,2}) * A_w \} / V_b$ benthic volume m ³ . All terms in differential equation were divided by V_b . Resulting value used in solving differential equation, MRTC, p. 4-39
1b. Term with $C_{b,1}$ - total benthic concentration - elemental mercury	0.00E+00	yr ⁻¹	Calculated: Portion of MRTC, Equation 35, p. 4-39. Value = k_b oxidation rate constant in benthic sediment yr ⁻¹ (MRTC, p. B-18) * V_b benthic volume m ³ / V_b benthic volume m ³ . All terms in differential equation were divided by V_b . Resulting value used in solving differential equation, MRTC, p. 4-39

Table 5-13
Data Used in IEM-2M Mercury Modeling for the Caloosahatchee River (a)
(Mercury Concentrations, Loading Rates and Intermediate Solutions of Differential Equations)

Parameter	Value	Units	Basis
1c. Term with $C_{b,3}$ - total benthic concentration - methyl mercury	7.30E-01	yr ⁻¹	Calculated: Portion of MRTC, Equation 35, p. 4-39. Value = kb_{dm} demethylation rate constant yr ⁻¹ (MRTC, p. B-18) * V_b benthic volume m ³ / V_b benthic volume m ³ . All terms in differential equation were divided by V_b . Resulting value used in solving differential equation, MRTC, p. 4-39
1d. Term with $C_{b,2}$ - total benthic concentration - divalent mercury	6.35E-01	yr ⁻¹	Calculated: Portion of MRTC, Equation 35, p. 4-39. Value = $\{ (R_{sw} * (f_{b,2} / \theta_{b,2}) + ((V_m * vb) * f_{b,2} * A_w) + ((kbr + kb_m) * V_b) \} / V_b$ benthic volume m ³ . All terms in differential equation were divided by V_b . Resulting value used in solving differential equation, MRTC, p. 4-39
Final equation =	(term with $C_{w,2}$)* $C_{w,2}$ + (term with $C_{b,1}$)* $C_{b,1}$ + (term with $C_{b,3}$)* $C_{b,3}$ - (term with $C_{b,2}$)* $C_{b,2}$		
6. Differential equation for $C_{w,3}$ - total benthic concentration (methyl Hg)			
1a. Term with $C_{w,3}$ - total water column concentration - methyl mercury	3.35E+03	yr ⁻¹	Calculated: Portion of MRTC, Equation 37, p. 4-39. Value = $\{ R_{sw} * f_{w,3} + [(v_s * f_{w,3} + v_{b,3} * f_{w,3}) * A_w] \} / V_b$ benthic volume m ³ . All terms in differential equation were divided by V_b . Resulting value used in solving differential equation, MRTC, p. 4-39
1b. Term with $C_{b,2}$ - total benthic concentration - divalent mercury	3.65E-02	yr ⁻¹	Calculated: Portion of MRTC, Equation 37, p. 4-39. Value = kb_m methylation rate constant in benthic sediment yr ⁻¹ (MRTC, p. B-18) * V_b benthic volume m ³ / V_b benthic volume m ³ . All terms in differential equation were divided by V_b . Resulting value used in solving differential equation, MRTC, p. 4-39
1c. Term with $C_{b,3}$ - total benthic concentration - methyl mercury	1.38E+00	yr ⁻¹	Calculated: Portion of MRTC, Equation 37, p. 4-39. Value = $\{ (R_{sw} * (f_{b,3} / \theta_{b,3}) + ((V_m * vb) * f_{b,3} * A_w) + ((kb_{m,3} + kb_{dm}) * V_b) \} / V_b$ benthic volume m ³ . All terms in differential equation were divided by V_b . Resulting value used in solving differential equation, MRTC, p. 4-39
Final equation =	(term with $C_{w,3}$)* $C_{w,3}$ + (term with $C_{b,2}$)* $C_{b,2}$ - (term with $C_{b,3}$)* $C_{b,3}$		

(a) MRTC = EPA's Mercury Report to Congress. 1997. Volume III: Fate and Transport of Mercury in the Environment. EPA-452/R-97-005. The MRTC does not provide equation numbers; to facilitate correspondence with Volume III of the MRTC, equations were assigned numbers, beginning with equation 1 for the first equation on page 4-28 (Section 4.4.2.1) and continuing through equation 54 for the last equation on page 4-43 (Section 4.4.3.5).

Table 5-14
Chemical Concentrations in the Caloosahatchee River and Fish in the River

Chemical	Total Water Column Concentration (mg/L)	Dissolved Phase Water Concentration (mg/L)	Concentration Sorbed to Bed Sediment (mg/kg)	Fish Concentration (mg/kg FW)
mercury (divalent)	7.03E-08	5.03E-08	6.43E-03	NC
mercury (elemental)	2.29E-09	2.28E-09	1.17E-04	NC
mercury (methyl)	2.59E-09	1.51E-09	1.01E-03	1.03E-02
PCDD/Fs				
HpCDD, 1,2,3,4,6,7,8-	1.64E-12	7.38E-14	2.89E-07	2.52E-09
HpCDF, 1,2,3,4,6,7,8-	1.81E-12	1.49E-13	3.05E-07	2.67E-09
HpCDF, 1,2,3,4,7,8,9-	1.99E-13	1.63E-14	3.35E-08	2.93E-10
HxCDD, 1,2,3,4,7,8-	1.12E-13	1.20E-14	1.83E-08	1.28E-09
HxCDD, 1,2,3,6,7,8-	2.42E-13	7.14E-14	3.14E-08	2.20E-09
HxCDD, 1,2,3,7,8,9-	2.68E-13	7.91E-14	3.47E-08	2.43E-09
HxCDF, 1,2,3,4,7,8-	7.56E-13	2.24E-13	9.81E-08	6.87E-09
HxCDF, 1,2,3,6,7,8-	4.20E-13	1.24E-13	5.45E-08	3.82E-09
HxCDF, 1,2,3,7,8,9-	7.14E-14	2.11E-14	9.26E-09	6.48E-10
HxCDF, 2,3,4,6,7,8-	4.68E-13	1.38E-13	6.07E-08	4.25E-09
OCDD, 1,2,3,4,5,7,8,9-	3.16E-12	5.08E-13	4.88E-07	8.54E-11
OCDF, 1,2,3,4,6,7,8,9-	6.98E-13	8.52E-15	1.27E-07	2.22E-11
PeCDD, 1,2,3,7,8-	1.17E-13	7.39E-14	7.95E-09	1.25E-09
PeCDF, 1,2,3,7,8-	3.97E-13	2.17E-13	3.31E-08	5.21E-09
PeCDF, 2,3,4,7,8-	4.78E-13	2.26E-13	4.64E-08	7.31E-09
TCDD, 2,3,7,8-	3.63E-14	2.29E-14	2.47E-09	3.90E-10
TCDF, 2,3,7,8-	2.53E-13	1.74E-13	1.45E-08	2.29E-09

NC = Not calculated.

Table 5-15
Chemical Concentrations in a Typical Nearby Pond and Fish in the Pond

Chemical	Total Water Column Concentration (mg/L)	Dissolved Phase Water Concentration (mg/L)	Concentration Sorbed to Bed Sediment (mg/kg)	Fish Concentration (mg/kg FW)
mercury (divalent)	3.10E-08	4.89E-09	5.15E-04	NC
mercury (elemental)	7.56E-10	7.28E-10	9.64E-05	NC
mercury (methyl)	6.29E-10	5.89E-11	9.57E-06	4.01E-04
PCDD/Fs				
HpCDD, 1,2,3,4,6,7,8-	1.28E-11	4.47E-14	1.75E-07	1.53E-09
HpCDF, 1,2,3,4,6,7,8-	1.42E-11	9.39E-14	1.93E-07	1.69E-09
HpCDF, 1,2,3,4,7,8,9-	1.53E-12	1.01E-14	2.07E-08	1.81E-10
HxCDD, 1,2,3,4,7,8-	9.14E-13	8.15E-15	1.24E-08	8.67E-10
HxCDD, 1,2,3,6,7,8-	1.79E-12	5.42E-14	2.38E-08	1.66E-09
HxCDD, 1,2,3,7,8,9-	1.94E-12	5.87E-14	2.58E-08	1.81E-09
HxCDF, 1,2,3,4,7,8-	5.58E-12	1.69E-13	7.42E-08	5.19E-09
HxCDF, 1,2,3,6,7,8-	3.30E-12	9.99E-14	4.39E-08	3.07E-09
HxCDF, 1,2,3,7,8,9-	5.46E-13	1.65E-14	7.25E-09	5.07E-10
HxCDF, 2,3,4,6,7,8-	3.56E-12	1.08E-13	4.73E-08	3.31E-09
OCDD, 1,2,3,4,5,7,8,9-	2.49E-11	3.49E-13	3.35E-07	5.87E-11
OCDF, 1,2,3,4,6,7,8,9-	5.33E-12	4.90E-15	7.29E-08	1.28E-11
PeCDD, 1,2,3,7,8-	1.14E-12	1.29E-13	1.39E-08	2.19E-09
PeCDF, 1,2,3,7,8-	3.77E-12	3.11E-13	4.73E-08	7.45E-09
PeCDF, 2,3,4,7,8-	4.42E-12	2.76E-13	5.66E-08	8.92E-09
TCDD, 2,3,7,8-	2.76E-13	3.11E-14	3.36E-09	5.29E-10
TCDF, 2,3,7,8-	2.18E-12	3.07E-13	2.57E-08	4.04E-09

NC = Not calculated.

Table 6-1
Chronic Inhalation Risk Analysis - Three Units Combined

Chemical	Maximum Annual Average Air Concentration (mg/m ³) (a)	Toxicity Information			Potential for Noncancer Effects (Hazard Index) (c,e)		Excess Lifetime Cancer Risk (d,e)	
		Chronic Inhalation Reference Concentration (mg/m ³)	Inhalation Cancer Unit Risk Factor (ug/m ³) ⁻¹	Toxic Equivalency Factors (TEFs) for PCDD/PCDFs (b)	Child	Adult	Child	Adult
Arsenic	1.25E-08	NA	4.30E-03	NA	NA	NA	7E-09	2E-08
Beryllium	1.85E-10	2E-05	2.40E+00	NA	1.5E-05	6.7E-06	6E-08	2E-07
Hydrogen chloride (HCl)	1.34E-04	2E-02	NA	NA	1.1E-02	4.9E-03	NA	NA
Hydrogen fluoride (HF)	4.31E-06	NA	NA	NA	NA	NA	NA	NA
Lead	4.18E-07	NA	NA	NA	NA	NA	NA	NA
Mercury (c)								
Divalent (vapor phase)	3.95E-08	3E-04	NA	NA	2.1E-04	9.5E-05	NA	NA
Divalent (particulate phase)	6.97E-09	3E-04	NA	NA	3.7E-05	1.7E-05	NA	NA
Elemental	1.16E-09	3E-04	NA	NA	6.2E-06	2.8E-06	NA	NA
Sulfuric acid (H2SO4)	5.95E-05	NA	NA	NA	NA	NA	NA	NA
PCDDs/PCDFs								
2,3,7,8-TCDD	2.82E-14	NA	3.3E+01	1	NA	NA	1E-10	4E-10
1,2,3,7,8-PeCDD	9.86E-14	NA	NA	1	NA	NA	4E-10	1E-09
1,2,3,4,7,8-HxCDD	1.01E-13	NA	NA	0.1	NA	NA	5E-11	1E-10
1,2,3,6,7,8-HxCDD	2.36E-13	NA	NA	0.1	NA	NA	1E-10	3E-10
1,2,3,7,8,9-HxCDD	2.64E-13	NA	NA	0.1	NA	NA	1E-10	4E-10
1,2,3,4,6,7,8-HpCDD	1.52E-12	NA	NA	0.01	NA	NA	7E-11	2E-10
OCDD	2.99E-12	NA	NA	0.0001	NA	NA	1E-12	4E-12
2,3,7,8-TCDF	1.69E-13	NA	NA	0.1	NA	NA	8E-11	2E-10
1,2,3,7,8-PeCDF	3.10E-13	NA	NA	0.05	NA	NA	7E-11	2E-10
2,3,4,7,8-PeCDF	3.94E-13	NA	NA	0.5	NA	NA	9E-10	3E-09
1,2,3,4,7,8-HxCDF	7.32E-13	NA	NA	0.1	NA	NA	3E-10	1E-09
1,2,3,6,7,8-HxCDF	3.94E-13	NA	NA	0.1	NA	NA	2E-10	5E-10
2,3,4,6,7,8-HxCDF	4.45E-13	NA	NA	0.1	NA	NA	2E-10	6E-10
1,2,3,7,8,9-HpCDF	6.76E-14	NA	NA	0.1	NA	NA	3E-11	9E-11
1,2,3,4,6,7,8-HpCDF	1.72E-12	NA	NA	0.01	NA	NA	8E-11	2E-10
1,2,3,4,7,8,9-HpCDF	1.91E-13	NA	NA	0.01	NA	NA	9E-12	3E-11
OCDF	6.48E-13	NA	NA	0.0001	NA	NA	3E-13	9E-13
Total TEQ PCDD/PCDFs							3E-09	8E-09
Total hazard index (respiratory noncancer endpoint; beryllium and hydrogen chloride)					1.E-02	5.E-03	NA	NA
Total hazard index (neurological noncancer endpoint; mercury compounds)					3.E-04	1.E-04	NA	NA
Total excess lifetime cancer risk					NA	NA	7E-08	2E-07

NA = Not applicable or not available.

(a) Air concentrations were calculated from the maximum impact point unitized long-term average air concentrations, chemical emission rates, and the fraction vapor and particulate values for each compound (USEPA 1998, RTP 2002a).

(b) TEFs were obtained from USEPA's 2000 Dioxin Reassessment - Chapter 9. Toxicity Equivalence Factors (TEF) for Dioxin and Related Compounds.

(c) The hazard index = $(Ca \text{ mg/m}^3 \times \text{inhal rate m}^3/\text{hr} \times \text{exp time hrs/day} \times \text{expo frequency days/yr} \times \text{expo duration yrs}) / [(\text{reference air concentration mg/m}^3 \times 20 \text{ m}^3/\text{day} / 70 \text{ kg}) \times (\text{body weight kg} \times \text{avg time yrs} \times 365 \text{ days/yr})]$. Source: EPA 1998, Table C-2-2.

(d) The excess lifetime cancer risk = $[(\text{unit risk factor (ug/m}^3)^{-1} \times 70 \text{ kg} \times 1,000 \text{ ug/mg} / 20 \text{ m}^3/\text{day}) \times (Ca \text{ mg/m}^3 \times \text{inhal rate m}^3/\text{hr} \times \text{exp time hrs/day} \times \text{expo frequency days/yr} \times \text{expo duration yrs})] / (\text{body weight kg} \times \text{avg time 70 yrs} \times 365 \text{ days/yr})$, and also multiplied by the congener-specific TEF for PCDD/PCDFs. Source: EPA 1998, Table C-2-1.

(e) Exposure parameters are: inhalation rate = 0.3 m³/hr (child) and 0.63 m³/hr (adult); exp time = 24 hrs/day; exp frequency = 350 days/yr; exp duration = 6 yrs (child) and 40 yrs (adult - used farmer exposure duration); body weight = 15 kg (child) and 70 kg (adult). All parameters were obtained from USEPA 1998.

Table 6-2
Acute Inhalation Risk Analysis - Three Units Combined

Chemical	Maximum 1-Hour Average Air Concentration (mg/m³) (a)	Acute Reference Air Concentration (mg/m³)	Ratio - Air Concentration to Reference Air Concentration
Arsenic	1.92E-06	3.00E-02	6E-05
Beryllium	2.85E-08	9.95E-03	3E-06
Hydrogen chloride (HCl)	2.40E-02	2.68E+00	9E-03
Hydrogen fluoride (HF)	6.25E-04	8.20E-01	8E-04
Lead	5.69E-05	3.81E-02	1E-03
Mercury (total)	7.50E-06	7.38E-02	1E-04
PCDDs/PCDFs (as 2,3,7,8-TCDD)	NA	NA	NA
Sulfuric acid (H ₂ SO ₄)	9.91E-03	2.00E+00	5E-03

NA = Not applicable because no acute inhalation toxicity criteria are available.

(a) Air concentrations were calculated from the maximum unitized 1-hour average air concentration (2.97 ug/m³ per 1 g/sec) and chemical emission rates (g/sec) (RTP 2002a).

Table 6-3
Exposure Pathways Evaluated in the Multiple Pathway Risk Assessment

Receptor	Exposure Pathway					
	Inhalation	Soil ingestion	Produce ingestion	Beef ingestion	Fish ingestion	Breast milk ingestion
Adult resident	X	X	X			
Child of adult resident	X	X	X			
Adult beef farmer	X	X	X	X		
Child of adult beef farmer	X	X	X	X		
Adult fisher - Caloosahatchee River	X	X	X		X	
Child of adult fisher - Caloosahatchee River	X	X	X		X	
Adult fisher - Typical Nearby Pond	X	X	X		X	
Child of adult fisher - Typical Nearby Pond	X	X	X		X	
Infant of adult resident						X
Infant of adult farmer						X
Infant of adult fisher - Caloosahatchee River						X
Infant of adult fisher - Typical Nearby Pond						X

Table 6-4
Exposure Parameters for the Lee County ERF Multiple Pathway Risk Assessment

Parameter Name	EPA 1998 Protocol Acronym	Value	Units	Source (a)
Receptor-Adult Resident				
Intake rate of air (Inhalation rate)	IR	15	m ³ /d	Table C-2-1. Daily inhalation rate = 0.63 m ³ /hr * 24 hrs/day per Table C-2-1.
Consumption rate of soil	CR _{soil}	0.0001	kg/d	Table C-1-1 and EPA 1999 Errata
Consumption rate of aboveground produce (g/day DW)	CR _{ag}	21	g/day DW	Table C-1-2. Calculated as consumption rate kg/kg-day DW * body weight kg * 1000 g/kg.
Consumption rate of aboveground produce (kg/kg-day DW)	CR _{ag}	0.0003	kg/kg-day DW	Table C-1-2
Consumption rate of aboveground protected produce (g/day DW)	CR _{pp}	40	g/day DW	Table C-1-2. Calculated as consumption rate kg/kg-day DW * body weight kg * 1000 g/kg.
Consumption rate of aboveground protected produce (kg/kg-day DW)	CR _{pp}	0.00057	kg/kg-day DW	Table C-1-2
Consumption rate of belowground produce (g/day DW)	CR _{bg}	9.8	g/day DW	Table C-1-2. Calculated as consumption rate kg/kg-day DW * body weight kg * 1000 g/kg.
Consumption rate of belowground produce (kg/kg-day DW)	CR _{bg}	0.00014	kg/kg-day DW	Table C-1-2
Average body weight	BW	70	kg	Table C-1-1
Lifetime/averaging time for carcinogens	AT	70	yr	Table C-1-7
Exposure frequency	EF	350	d/yr	Table C-1-7
Exposure duration	ED	30	yr	Table C-1-7
Fraction of consumed soil affected	F _{soil}	1	none	Table C-1-1. Value also applied to child resident.
Fraction of consumed produce affected	F _{ag}	0.25	none	Table C-1-2
Receptor-Child of Adult Resident				
Intake rate of air (Inhalation rate)	IR	7.2	m ³ /d	Table C-2-1. Daily inhalation rate = 0.3 m ³ /hr * 24 hrs/day per Table C-2-1.
Consumption rate of soil (b)	CR _{soil}	0.0002	kg/d	Table C-1-1 and EPA 1999 Errata
Consumption rate of aboveground produce (g/day DW) (b)	CR _{ag}	6.3	g/day DW	Table C-1-2. Calculated as consumption rate kg/kg-day DW * body weight kg * 1000 g/kg.
Consumption rate of aboveground produce (kg/kg-day DW)	CR _{ag}	0.00042	kg/kg-day DW	Table C-1-2
Consumption rate of aboveground protected produce (g/day DW)	CR _{pp}	12	g/day DW	Table C-1-2. Calculated as consumption rate kg/kg-day DW * body weight kg * 1000 g/kg.
Consumption rate of aboveground protected produce (kg/kg-day DW)	CR _{pp}	0.00077	kg/kg-day DW	Table C-1-2
Consumption rate of belowground produce (g/day DW)	CR _{bg}	3.3	g/day DW	Table C-1-2. Calculated as consumption rate kg/kg-day DW * body weight kg * 1000 g/kg.
Consumption rate of belowground produce (kg/kg-day DW)	CR _{bg}	0.00022	kg/kg-day DW	Table C-1-2
Average body weight	BW	15	kg	Table C-1-1
Lifetime/averaging time for carcinogens	AT	70	yr	Table C-1-7

Table 6-4
Exposure Parameters for the Lee County ERF Multiple Pathway Risk Assessment

Parameter Name	EPA 1998 Protocol Acronym	Value	Units	Source (a)
Exposure frequency	EF	350	d/yr	Table C-1-7
Exposure duration	ED	6	yr	Table C-1-7
Receptor-Adult Fisher				
Intake rate of air (Inhalation rate)	IR	15	m ³ /d	Table C-2-1; linked to adult resident value
Consumption rate of soil (b)	CR _{soil}	0.0001	kg/d	Table C-1-1; linked to adult resident value
Consumption rate of aboveground produce (b)	CR _{ag}	21	g DW/d	Table C-1-2; linked to adult resident value
Consumption rate of aboveground protected produce (b)	CR _{pp}	40	g DW/d	Table C-1-2; linked to adult resident value
Consumption rate of belowground produce (b)	CR _{bg}	9.8	g DW/d	Table C-1-2; linked to adult resident value
Consumption rate of fish (kg/day FW)	CR _{fish}	0.082	kg FW/d	Table C-1-4: consumption rate calculated from consumption rate in kg/kg-day FW and body weight
Consumption rate of fish (kg/kg-day FW)	CR _{fish}	0.00117	kg/kg-day FW	Table C-1-4
Average body weight	BW	70	kg	Table C-1-1
Lifetime/averaging time for carcinogens	AT	70	yr	Table C-1-7
Exposure frequency	EF	350	d/yr	Table C-1-7
Exposure duration	ED	30	yr	Table C-1-7
Fraction of consumed fish affected	f _{fish}	1.0	unitless	Table C-1-4
Receptor-Child of Fisher				
Intake rate of air (Inhalation rate)	IR	7.2	m ³ /d	Table C-2-1; linked to child resident value
Consumption rate of soil (b)	CR _{soil}	0.0002	kg/d	Table C-1-1; linked to child resident value
Consumption rate of aboveground produce (b)	CR _{ag}	6.3	g DW/d	Table C-1-2; linked to child resident value
Consumption rate of aboveground protected produce	CR _{pp}	12	g DW/d	Table C-1-2; linked to child resident value
Consumption rate of belowground produce	CR _{bg}	3.3	g DW/d	Table C-1-2; linked to child resident value
Consumption rate of fish (kg/day FW)	CR _{fish}	0.011	kg FW/day	Table C-1-4: consumption rate calculated from consumption rate in kg/kg-day FW and body weight
Consumption rate of fish (kg/kg-day FW)	CR _{fish}	0.000759	kg/kg-day FW	Table C-1-4
Average body weight	BW	15	kg	Table C-1-1
Lifetime/averaging time for carcinogens	AT	70	yr	Table C-1-7
Exposure frequency	EF	350	d/yr	Table C-1-7
Exposure duration	ED	6	yr	Table C-1-7
Receptor-Adult Beef Farmer				
Intake rate of air (Inhalation rate)	IR	15	m ³ /d	Table C-2-1; linked to adult resident value
Consumption rate of soil (b)	CR _{soil}	0.0001	kg/d	Table C-1-1; linked to adult resident value
Consumption rate of aboveground produce (b)	CR _{ag}	21	g DW/d	Table C-1-2; linked to adult resident value

Table 6-4
Exposure Parameters for the Lee County ERF Multiple Pathway Risk Assessment

Parameter Name	EPA 1998 Protocol Acronym	Value	Units	Source (a)
Consumption rate of aboveground protected produce (b)	CR _{pp}	40	g DW/d	Table C-1-2; linked to adult resident value
Consumption rate of belowground produce (b)	CR _{bg}	9.8	g DW/d	Table C-1-2; linked to adult resident value
Consumption rate of beef (kg/kg-day FW)	CR _{beef}	0.00114	kg/kg-day FW	Table C-1-3
Consumption rate of beef - all compounds except Hg, Se, and Cd (g/day FW)	CR _{beef}	79.8	g FW/d	Table C-1-3. Calculated as consumption rate kg/kg-day FW * body weight kg * 1000 g/kg.
Consumption rate of beef - Hg, Se and Cd (g/day FW) (a)	CR _{beef-m}	22.3	g DW/d	Converted to dry weight, per Table C-1-3 (0.28 * FW consumption rate)
Average body weight	BW	70	kg	Table C-1-1
Lifetime/averaging time for carcinogens	AT	70	yr	Table C-1-7
Exposure frequency	EF	350	d/yr	Table C-1-7
Exposure duration	ED	40	yr	Table C-1-7
Fraction of consumed beef affected	f _{beef}	1.0	unitless	Table C-1-3
Fraction of consumed produce affected	f _{ag}	1.0	unitless	Table C-1-2
Receptor-Child of Adult Beef Farmer				
Intake rate of air (Inhalation rate)	IR	7.2	m ³ /d	Table C-2-1; linked to child resident value
Consumption rate of soil (b)	CR _{soil}	0.0002	kg/d	Table C-1-1; linked to child resident value
Consumption rate of aboveground produce (e)	CR _{ag}	6.3	g DW/d	Table C-1-2; linked to child resident value
Consumption rate of aboveground protected produce (e)	CR _{pp}	12	g DW/d	Table C-1-2; linked to child resident value
Consumption rate of belowground produce (e)	CR _{bg}	3.3	g DW/d	Table C-1-2; linked to child resident value
Consumption rate of beef (kg/kg-day FW)	CR _{beef}	0.00051	kg/kg-day FW	Table C-1-3
Consumption rate of beef - all compounds except Hg, Se, and Cd (g/day FW)	CR _{beef}	7.7	g FW/d	Table C-1-3. Calculated as consumption rate kg/kg-day FW * body weight kg * 1000 g/kg.
Consumption rate of beef - Hg, Se and Cd (g/day FW) (a)	CR _{beef-m}	2.1	g DW/d	Converted to dry weight, per Table C-1-3 (0.28 * FW consumption rate)
Average body weight	BW	15	kg	Table C-1-1
Lifetime/averaging time for carcinogens	AT	70	yr	Table C-1-7
Exposure frequency	EF	350	d/yr	Table C-1-7
Exposure duration	ED	6	yr	Table C-1-7
Receptor-Breast-Fed Infant				
Ingestion rate of breastmilk	IR _{milk}	0.8	kg/d	Table C-3-2
Average infant body weight	BW	10	kg	Table C-3-2
Averaging time for pathway	AT	1	yr	Table C-3-2
Exposure frequency	EF	365	d/yr	Assumed
Exposure duration	ED	1	yr	Table C-3-2
Conversion constant		1.00E+09	pg/mg	Table C-3-1
Half life of dioxin in adults	h	2555	d	Table C-3-1

Table 6-4
Exposure Parameters for the Lee County ERF Multiple Pathway Risk Assessment

Parameter Name	EPA 1998 Protocol Acronym	Value	Units	Source (a)
Proportion of ingested dioxin that is stored in fat	f_1	0.9	none	Table C-3-1
Proportion of mother's weight that is fat	f_2	0.3	none	Table C-3-1
Body weight of mother	BW	70	kg	Table C-1-1
Fraction of fat in breastmilk	f_3	0.04	none	Table C-3-2
Fraction ingested compound which is absorbed	f_4	0.9	none	Table C-3-2

Notes:

- (a) Source for all references to tables is USEPA's 1998 Guidance: Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities
 - (b) Fraction of contaminated soil and produce ingested is assumed to be the same as that used for the resident, per Table C-1-2 in USEPA 1998.
 - (c) For mercury, the fresh weight consumption rates are multiplied by dry weight conversion factors before being used to calculate exposures. The conversion factor is 0.28 for beef.
- (Source: Table C-1-3 in USEPA 1998 (Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities) and Table 11-28 in USEPA 1997 (Exposure Factors Handbook))

Table 6-5
Summary of Excess Lifetime Cancer Risks
Lee County - Human Health Risk Assessment

Receptor	Total Excess Lifetime Cancer Risk (a)			Exposure Pathways Included	Evaluated Chemicals
	Oral	Inhalation	Total		
Adult Receptors					
Resident	2E-07	5E-09	2E-07	Soil ingestion, produce ingestion, inhalation	PCDDs/PCDFs
Beef Farmer	7E-07	5E-09	7E-07	Soil ingestion, produce ingestion, beef ingestion, inhalation	PCDDs/PCDFs
Fisher - Caloosahatchee River	9E-07	5E-09	1E-06	Soil ingestion, produce ingestion, fish ingestion, inhalation	PCDDs/PCDFs
Fisher - Nearby Pond	1E-06	5E-09	1E-06	Soil ingestion, produce ingestion, fish ingestion, inhalation	PCDDs/PCDFs
Child Receptors					
Resident	1E-07	2E-09	1E-07	Soil ingestion, produce ingestion, inhalation	PCDDs/PCDFs
Beef Farmer	2E-07	2E-09	2E-07	Soil ingestion, produce ingestion, beef ingestion, inhalation	PCDDs/PCDFs
Fisher - Caloosahatchee River (c)	2E-07	2E-09	2E-07	Soil ingestion, produce ingestion, fish ingestion, inhalation	PCDDs/PCDFs
Fisher - Nearby Pond	2E-07	2E-09	2E-07	Soil ingestion, produce ingestion, fish ingestion, inhalation	PCDDs/PCDFs

(a) A risk of 1E-6, for example, is equivalent to 1×10^{-6} and equals a 1 in 1,000,000 excess lifetime cancer risk. See Appendix D for the detailed excess lifetime cancer risk results.

Table 6-6
Summary of Potential for Noncancer Health Risks
Lee County - Human Health Risk Assessment

Receptor/ Health Endpoint B64	Total Hazard Index (a)			Exposure Pathways Included	Evaluated Chemicals
	Oral	Inhalation	Total		
Adult Receptors					
Resident	Soil ingestion, produce ingestion, inhalation				
Developmental	6.2E-05	0.0E+00	6.E-05		methyl Hg
Neurological	6.2E-05	2.0E-05	8.E-05		methyl Hg, Hg0
Kidney	5.0E-04	2.0E-05	5.E-04		divalent Hg
Immune System	5.0E-04	2.0E-05	5.E-04		divalent Hg
Beef Farmer	Soil ingestion, produce ingestion, beef ingestion, inhalation				
Developmental	6.3E-05	0.0E+00	6.E-05		methyl Hg
Neurological	6.3E-05	2.0E-05	8.E-05		methyl Hg, Hg0
Kidney	5.0E-04	2.0E-05	5.E-04		divalent Hg
Immune System	5.0E-04	2.0E-05	5.E-04		divalent Hg
Fisher - Caloosahatchee River	Soil ingestion, produce ingestion, fish ingestion, inhalation				
Developmental	1.2E-01	0.0E+00	1.E-01		methyl Hg
Neurological	1.2E-01	2.0E-05	1.E-01		methyl Hg, Hg0
Kidney	5.0E-04	2.0E-05	5.E-04		divalent Hg
Immune System	5.0E-04	2.0E-05	5.E-04		divalent Hg
Fisher - Nearby Pond	Soil ingestion, produce ingestion, fish ingestion, inhalation				
Developmental	4.6E-03	0.0E+00	5.E-03		methyl Hg
Neurological	4.6E-03	2.0E-05	5.E-03		methyl Hg, Hg0
Kidney	5.0E-04	2.0E-05	5.E-04		divalent Hg
Immune System	5.0E-04	2.0E-05	5.E-04		divalent Hg
Child Receptors					
Resident	Soil ingestion, produce ingestion, inhalation				
Developmental	5.9E-05	0.0E+00	6.E-05		methyl Hg
Neurological	5.9E-05	4.6E-05	1.E-04		methyl Hg, Hg0
Kidney	8.7E-04	4.5E-05	9.E-04		divalent Hg
Immune system	8.7E-04	4.5E-05	9.E-04		divalent Hg
Beef Farmer	Soil ingestion, produce ingestion, beef ingestion, inhalation				
Developmental	5.9E-05	0.0E+00	6.E-05		methyl Hg
Neurological	5.9E-05	4.6E-05	1.E-04		methyl Hg, Hg0
Kidney	8.7E-04	4.5E-05	9.E-04		divalent Hg
Immune system	8.7E-04	4.5E-05	9.E-04		divalent Hg
Fisher - Caloosahatchee River	Soil ingestion, produce ingestion, fish ingestion, inhalation				
Developmental	7.2E-02	0.0E+00	7.E-02		methyl Hg
Neurological	7.2E-02	4.6E-05	7.E-02		methyl Hg, Hg0
Kidney	4.1E-03	4.5E-05	4.E-03		divalent Hg
Immune system	4.1E-03	4.5E-05	4.E-03		divalent Hg
Fisher - Nearby Pond	Soil ingestion, produce ingestion, fish ingestion, inhalation				
Developmental	3.1E-03	0.0E+00	3.E-03		methyl Hg
Neurological	3.1E-03	4.6E-05	3.E-03		methyl Hg, Hg0
Kidney	4.1E-03	4.5E-05	4.E-03		divalent Hg
Immune system	4.1E-03	4.5E-05	4.E-03		divalent Hg

– = Not applicable.

(a) See Appendix D for the detailed noncancer health risk results. In this table, for a given chemical, the oral and inhalation hazard quotients were conservatively added even if the target organ/endpoint was different for the two routes of exposure.

Table 6-7
Summary of Infant PCDD/PCDF Exposures
Lee County - Human Health Risk Assessment

Receptor	Average Daily Dose (pg TEQs/kg/day) (a)
Infant of Adult Resident	0.1
Infant of Adult Beef Farmer	0.3
Infant of Adult Fisher (Caloosahatchee River)	0.4
Infant of Adult Fisher (Nearby Typical Pond)	0.4

(a) Target level in USEPA (1998) is 60 pg TEQs/kg/day. See Appendix D for the detailed infant dioxin exposure results.

Table 6-8

**Key Assumptions Used in the Lee County ERF
Human Health Risk Assessment**

Assumption	Effect of Assumption on Potential Risk
<i>Selection of Chemicals</i>	
The selected list of chemicals for the inhalation risk assessment included all compounds currently regulated in the facility's permit	Over- or under-estimation
The selected list of chemicals for the multiple pathway risk assessment included PCDDs/PCDFs and mercury	Over- or under-estimation
<i>Toxicity Characterization</i>	
Conservatively derived cancer slope factors and reference doses were used to assess risks	Over-estimation
The 2,3,7,8-TCDD cancer slope factor is currently under study; the value used is within the range identified in USEPA's draft Dioxin Reassessment	Over-estimation
Excess lifetime cancer risks for PCDDs/PCDFs other than 2,3,7,8-TCDD were evaluated using toxicity equivalency factors	Over- or under-estimation
Acute inhalation toxicity criteria were derived from a variety of sources, and incorporated safety factors to account for even sensitive members of the population	Over- or under-estimation
Acute inhalation toxicity criteria were not available for all selected compounds	Under-estimation
<i>Quantification of Stack Emission Rates</i>	
Emission rates for the inhalation risk assessment were set at permit levels that are higher than actually occur at the facility	Over-estimation
Upset operating conditions were not evaluated in the risk assessment	Under-estimation
<i>Calculation of Environmental Concentrations</i>	
The ISCST model was used to calculate ambient air concentrations	Over- or under-estimation
The ISCST model was used to calculate dry deposition rates of particle phase emissions	Over- or under-estimation
The ISCST model was used to calculate wet deposition of particle and vapor phase emissions	Over-estimation
Numerous default assumptions included in USEPA guidance were used to model environmental concentrations	Over-estimation
Vapor phase compounds were assumed to deposit onto the ground at a default rate of 3 cm/sec (chemical-specific properties were not taken into account)	Over-estimation
Vapor phase compounds were assumed to partition into and be deposited in rainfall at the same rate as a small particle (chemical-specific properties were not taken into account)	Over- or under-estimation
Fate and transport models provided in USEPA guidance were used to calculate environmental concentrations	Over-estimation

Table 6-8

**Key Assumptions Used in the Lee County ERF
Human Health Risk Assessment**

Assumption	Effect of Assumption on Potential Risk
Input parameters used to calculate chemical concentrations in water bodies were estimated from site-specific information as well as default assumptions	Over- or under-estimation
<i>Calculation of Human Exposures</i>	
Residential exposures were evaluated at a single maximum impact point assuming maximum air concentrations and dry deposition rates occurred at the same location at maximum wet deposition rates	Over-estimation
Beef ingestion exposures were evaluated assuming beef cattle reside, and all feed eaten by the cattle are grown, exclusively in a maximally impacted area adjacent to the property	Over-estimation
USEPA default assumptions for exposure duration, exposure frequency, and ingestion and inhalation rates were used to calculate exposures	Over-estimation
The beef ingestion and fish ingestion exposure scenarios assume 100% of all beef and fish ingested come from locally raised beef or locally caught fish	Over-estimation
USEPA default values on the fraction of local food affected by emissions and ingested locally (produce, beef and fish) were used in the exposure calculations	Over-estimation
<i>Risk Characterization</i>	
Potential exposure to PCDD/PCDFs were evaluated for infants, children and adults by comparison with estimates of current background exposure levels	Over- or under-estimation
Acute inhalation risks were evaluated for specific chemicals although the short-term effects of some chemicals may be additive, synergistic or antagonistic	Over- or under-estimation

**Table 7-1
Federally Endangered and Threatened Species
in Lee County**

Species		Federal Status
Common Name	Scientific Name	
West Indian manatee	<i>Trichechus manatus</i>	E
Florida panther	<i>Puma concolor coryi</i>	T
Wood stork	<i>Mycteria americana</i>	E
Red-cockaded woodpecker	<i>Picoides borealis</i>	E
Piping plover	<i>Charadrius melodus</i>	E
Florida scrub jay	<i>Aphelocoma coerulescens</i>	T
Everglade snail kite	<i>Rostrhamus sociabilis plumbeus</i>	E
Bald eagle	<i>Haliaeetus leucocephalus</i>	T
Loggerhead sea turtle	<i>Caretta caretta</i>	T
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	E
Green sea turtle	<i>Chelonia mydas</i>	E
Eastern indigo snake	<i>Drymarchon corais couperi</i>	T
American crocodile		E
Florida bonamia	<i>Bonamia grandiflora</i>	T
Beautiful papaw	<i>Deeringothamnus pulchellus</i>	E

Source: http://verobeach.fws.gov/species_lists/spl-le.html

Excludes species listed due only to similarity of appearance to a listed species.

E = Endangered

T = Threatened

Table 7-2
Toxicity Reference Values (TRVs) for Ecological Receptors

Receptor	Mercury (a)				2,3,7,8-TCDD			
	Value	Units	Basis	Source	Value	Units	Basis	Source
Aquatic life								
Sediment	0.13	mg/kg dw	toxic effect level	MacDonald 1994	0.000023	mg/kg dw	Pond, upper effects threshold based on bioassays with <i>Hyalosilla azteca</i> ; value calculated for pond assuming an foc of 0.026 (see Table 5-7, p. 10 of 10)	NOAA 1999
					0.000035	mg/kg dw	River, upper effects threshold based on bioassays with <i>Hyalosilla azteca</i> ; value calculated for river, assuming an foc of 0.04 (see Table 5-7, p. 10 of 10)	NOAA 1999
Terrestrial Wildlife								
Birds	0.028	mg/kg bw	alteration of reproduction and behavior in mallard duck exposed for 3-generations; uncertainty factor of 3 applied to low-effect level	USEPA 1997	0.00001	mg/kg bw	no-effect level in ring-necked pheasants subchronically exposed	USEPA 1999
Mammal	0.018	mg/kg bw	histopathological lesions in nerve tissue of mink following subchronic exposure; uncertainty factor of 3 applied to no-effect level	USEPA 1997	0.000001	mg/kg bw	reproduction no-effect level for chronic exposure in rat	USEPA 1999

(a) Aquatic TRVs based on total mercury; terrestrial TRVs for methyl mercury.

Sources:

MacDonald, D.D. 1994. Approach to the Assessment of Sediment Quality in Florida Coastal Waters. November 1994. Prepared for FDEP -- Office of Water Policy by MacDonald Environmental Services Ltd., Ladysmith, British Columbia.

NOAA. 1999. Screening Quick Reference Tables (SQUIRTs). NOAA-reported value 0.0088 ug/kg was the lowest reliable value reported among Upper Effects Thresholds (UET) tests, and was calculated on a 1% TOC basis. Site-specific values calculated here using foc for pond and river.

USEPA. 1997. Mercury Report to Congress. Volume VI: An Ecological Assessment for Anthropogenic Mercury Emissions in the United States. EPA 452/R-97-008.

USEPA. 1999. Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities. EPA 530-D-99-001C.

Table 7-3
Calculated Sediment Concentrations for PCDDs/PCDFs

Congener	Fish TEF	Sediment Concentration (mg/kg)			
		Caloosahatchee River		Pond	
		Individual Congener	2,3,7,8-TCDD equivalent	Individual Congener	2,3,7,8-TCDD equivalent
HpCDD, 1,2,3,4,6,7,8-	0.001	2.9E-07	2.9E-10	1.7E-07	1.7E-10
HpCDF, 1,2,3,4,6,7,8-	0.01	3.1E-07	3.1E-09	1.9E-07	1.9E-09
HpCDF, 1,2,3,4,7,8,9-	0.01	3.4E-08	3.4E-10	2.1E-08	2.1E-10
HxCDD, 1,2,3,4,7,8-	0.5	1.8E-08	9.2E-09	1.2E-08	6.2E-09
HxCDD, 1,2,3,6,7,8-	0.01	3.1E-08	3.1E-10	2.4E-08	2.4E-10
HxCDD, 1,2,3,7,8,9-	0.01	3.5E-08	3.5E-10	2.6E-08	2.6E-10
HxCDF, 1,2,3,4,7,8-	0.1	9.8E-08	9.8E-09	7.4E-08	7.4E-09
HxCDF, 1,2,3,6,7,8-	0.1	5.5E-08	5.5E-09	4.4E-08	4.4E-09
HxCDF, 1,2,3,7,8,9-	0.1	9.3E-09	9.3E-10	7.2E-09	7.2E-10
HxCDF, 2,3,4,6,7,8-	0.1	6.1E-08	6.1E-09	4.7E-08	4.7E-09
OCDD, 1,2,3,4,5,7,8,9-	0.0001 *	4.9E-07	4.9E-11	3.4E-07	3.4E-11
OCDF, 1,2,3,4,6,7,8,9-	0.0001	1.3E-07	1.3E-11	7.3E-08	7.3E-12
PeCDD, 1,2,3,7,8-	1	8.0E-09	8.0E-09	1.4E-08	1.4E-08
PeCDF, 1,2,3,7,8-	0.05	3.3E-08	1.7E-09	4.7E-08	2.4E-09
PeCDF, 2,3,4,7,8-	0.5	4.6E-08	2.3E-08	5.6E-08	2.8E-08
TCDD, 2,3,7,8-	1	2.5E-09	2.5E-09	3.4E-09	3.4E-09
TCDF, 2,3,7,8-	0.05	1.5E-08	7.3E-10	2.6E-08	1.3E-09
Total 2,3,7,8-TCDD equivalents			7.2E-08		7.5E-08

TEF = 2,3,7,8-TCDD toxic equivalency factor developed by WHO (Van den Berg 1998; USEPA 2001b)

* fish TEF not available; value listed is for OCDF

Table 7-4
Exposure Parameters for Terrestrial Receptors Evaluated in the Risk Assessment (a)

Receptor	Food Ingestion Rate (kg fw/d)	Body Weight (kg)	Dietary Composition (%)					Screening-level Assumption for this Assessment
			Benthic invertebrates	Zooplankton	Forage Fish	Trophic III fish	Trophic IV Fish	
Snail Kite	0.15	0.378	100	0	0	0	0	100% benthic invertebrates
Wood Stork	0.41	2.38	20	10	60	10	0	100% Trophic IV fish
White Pelican	1.0	7	0	0	60	20	20	100% Trophic IV fish
River Otter	1.2	7.4	0	0	0	80	20	100% Trophic IV fish

Avian exposure parameters supplied by US Fish and Wildlife Service (2002), South Florida Ecological Services Office, Vero Beach, FL. Dry-weight ingestion rates converted to freshweight (fw) ingestion rates assuming a moisture content of 75% for fish and 80% for invertebrates, as recommended by USFWS (2002). Otter exposure parameters from USEPA 1997.

Table 7-5
Calculated Fish Tissue Concentrations of PCDDs/PCDFs
Bird Exposures

Congener	BirdTEF	Concentration (mg/kg fw)			
		Caloosahatchee River		Pond	
		Individual Congener	2,3,7,8-TCDD equivalent	Individual Congener	2,3,7,8-TCDD equivalent
HpCDD, 1,2,3,4,6,7,8-	0.001	2.5E-09	2.5E-12	1.5E-09	1.5E-12
HpCDF, 1,2,3,4,6,7,8-	0.001	2.7E-09	2.7E-12	1.7E-09	1.7E-12
HpCDF, 1,2,3,4,7,8,9-	0.001	2.9E-10	2.9E-13	1.8E-10	1.8E-13
HxCDD, 1,2,3,4,7,8-	0.05	1.3E-09	6.4E-11	8.7E-10	4.3E-11
HxCDD, 1,2,3,6,7,8-	0.01	2.2E-09	2.2E-11	1.7E-09	1.7E-11
HxCDD, 1,2,3,7,8,9-	0.1	2.4E-09	2.4E-10	1.8E-09	1.8E-10
HxCDF, 1,2,3,4,7,8-	0.1	6.9E-09	6.9E-10	5.2E-09	5.2E-10
HxCDF, 1,2,3,6,7,8-	0.1	3.8E-09	3.8E-10	3.1E-09	3.1E-10
HxCDF, 1,2,3,7,8,9-	0.1	6.5E-10	6.5E-11	5.1E-10	5.1E-11
HxCDF, 2,3,4,6,7,8-	0.1	4.2E-09	4.2E-10	3.3E-09	3.3E-10
OCDD, 1,2,3,4,5,7,8,9-	0.0001 *	8.5E-11	8.5E-15	5.9E-11	5.9E-15
OCDF, 1,2,3,4,6,7,8,9-	0.0001	2.2E-11	2.2E-15	1.3E-11	1.3E-15
PeCDD, 1,2,3,7,8-	1	1.3E-09	1.3E-09	2.2E-09	2.2E-09
PeCDF, 1,2,3,7,8-	0.1	5.2E-09	5.2E-10	7.4E-09	7.4E-10
PeCDF, 2,3,4,7,8-	1	7.3E-09	7.3E-09	8.9E-09	8.9E-09
TCDD, 2,3,7,8-	1	3.9E-10	3.9E-10	5.3E-10	5.3E-10
TCDF, 2,3,7,8-	1	2.3E-09	2.3E-09	4.0E-09	4.0E-09
Total 2,3,7,8-TCDD equivalents			1.4E-08		1.8E-08

TEF = 2,3,7,8-TCDD toxic equivalency factor developed by WHO (Van den Berg 1998, USEPA 2001b).

* Bird TEF not available; value for OCDF used.

Table 7-6
Calculated Fish Tissue Concentrations of PCDDs/PCDFs
Otter Exposures

Congener	Mammal TEF	Concentration (mg/kg fw)			
		Caloosahatchee River		Pond	
		Individual Congener	2,3,7,8-TCDD equivalent	Individual Congener	2,3,7,8-TCDD equivalent
HpCDD, 1,2,3,4,6,7,8-	0.01	2.5E-09	2.5E-11	1.5E-09	1.5E-11
HpCDF, 1,2,3,4,6,7,8-	0.01	2.7E-09	2.7E-11	1.7E-09	1.7E-11
HpCDF, 1,2,3,4,7,8,9-	0.01	2.9E-10	2.9E-12	1.8E-10	1.8E-12
HxCDD, 1,2,3,4,7,8-	0.1	1.3E-09	1.3E-10	8.7E-10	8.7E-11
HxCDD, 1,2,3,6,7,8-	0.1	2.2E-09	2.2E-10	1.7E-09	1.7E-10
HxCDD, 1,2,3,7,8,9-	0.1	2.4E-09	2.4E-10	1.8E-09	1.8E-10
HxCDF, 1,2,3,4,7,8-	0.1	6.9E-09	6.9E-10	5.2E-09	5.2E-10
HxCDF, 1,2,3,6,7,8-	0.1	3.8E-09	3.8E-10	3.1E-09	3.1E-10
HxCDF, 1,2,3,7,8,9-	0.1	6.5E-10	6.5E-11	5.1E-10	5.1E-11
HxCDF, 2,3,4,6,7,8-	0.1	4.2E-09	4.2E-10	3.3E-09	3.3E-10
OCDD, 1,2,3,4,5,7,8,9-	0.0001	8.5E-11	8.5E-15	5.9E-11	5.9E-15
OCDF, 1,2,3,4,6,7,8,9-	0.0001	2.2E-11	2.2E-15	1.3E-11	1.3E-15
PeCDD, 1,2,3,7,8-	1	1.3E-09	1.3E-09	2.2E-09	2.2E-09
PeCDF, 1,2,3,7,8-	0.05	5.2E-09	2.6E-10	7.4E-09	3.7E-10
PeCDF, 2,3,4,7,8-	0.5	7.3E-09	3.7E-09	8.9E-09	4.4E-09
TCDD, 2,3,7,8-	1	3.9E-10	3.9E-10	5.3E-10	5.3E-10
TCDF, 2,3,7,8-	0.1	2.3E-09	2.3E-10	4.0E-09	4.0E-10
Total 2,3,7,8-TCDD equivalents			8.0E-09		9.6E-09

TEF = 2,3,7,8-TCDD toxic equivalency factor developed by WHO (Van den Berg 1998, USEPA 2001b).
 NA = Not applicable

Table 7-7
Calculated Concentrations of Mercury and PCDDs/PCDFs in Snails

Congener	Bird TEF	Pond Sediment (mg/kg) (a)		BAF (b)	Snail Concentration (mg/kg fw)
		Individual Compound	2,3,7,8-TCDD equivalent		
Mercury	NA	6.20E-04	NA	0.6	3.7E-04
HpCDD, 1,2,3,4,6,7,8-	0.001	6.7E-06	6.7E-09	—	—
HpCDF, 1,2,3,4,6,7,8-	0.001	7.4E-06	7.4E-09	—	—
HpCDF, 1,2,3,4,7,8,9-	0.001	8.0E-07	8.0E-10	—	—
HxCDD, 1,2,3,4,7,8-	0.05	4.8E-07	2.4E-08	—	—
HxCDD, 1,2,3,6,7,8-	0.01	9.1E-07	9.1E-09	—	—
HxCDD, 1,2,3,7,8,9-	0.1	9.9E-07	9.9E-08	—	—
HxCDF, 1,2,3,4,7,8-	0.1	2.9E-06	2.9E-07	—	—
HxCDF, 1,2,3,6,7,8-	0.1	1.7E-06	1.7E-07	—	—
HxCDF, 1,2,3,7,8,9-	0.1	2.8E-07	2.8E-08	—	—
HxCDF, 2,3,4,6,7,8-	0.1	1.8E-06	1.8E-07	—	—
OCDD, 1,2,3,4,5,7,8,9-	0.0001 *	1.3E-05	1.3E-09	—	—
OCDF, 1,2,3,4,6,7,8,9-	0.0001	2.8E-06	2.8E-10	—	—
PeCDD, 1,2,3,7,8-	1	5.3E-07	5.3E-07	—	—
PeCDF, 1,2,3,7,8-	0.1	1.8E-06	1.8E-07	—	—
PeCDF, 2,3,4,7,8-	1	2.2E-06	2.2E-06	—	—
TCDD, 2,3,7,8-	1	1.3E-07	1.3E-07	—	—
TCDF, 2,3,7,8-	1	9.8E-07	9.8E-07	—	—
Total 2,3,7,8-TCDD equivalents			4.8E-06	1	4.8E-08

TEF = 2,3,7,8-TCDD toxic equivalency factor developed by WHO (Van den Berg 1998).

NA = Not applicable.

*Bird TEF not available; value listed is for OCDF

(a) Mercury concentrations in mg/kg dw (summed across all three mercury species, see Appendix C); PCDDs/PCDFs in mg/kg OC, assuming pond foc = 0.026.

(b) Mercury BAF in units of mg/kg fw snail per mg/kg dw sediment;
TCDD BAF in units of mg /kg organism lipid per mg/kg OC. See text for basis of these values.

(c) Snails assumed to contain 1% lipid (USFWS 2002).

Table 7-8
Hazard Quotients for Aquatic Life in the Caloosahatchee River and Pond

Chemical	TRV (mg/kg)		Predicted Concentration (mg/kg)		Hazard Quotient	
	River	Pond	Caloosahatchee River	Pond	Caloosahatchee River	Pond
mercury	0.13	0.13	7.6E-03	6.2E-04	6.E-02	5.E-03
PCDDs/PCDFs (as TEQs)	3.5E-05	2.3E-05	7.2E-08	7.5E-08	2.E-03	3.E-03

Table 7-9
Hazard Quotients for Terrestrial Wildlife Feeding in the Caloosahatchee River and Pond

A. Wood stork

Chemical	Fish Concentration (mg/kg fw)		Intake (mg/kg bw d)		TRV (mg/kg bw)	Hazard Quotient	
	Caloosahatchee River	Pond	Caloosahatchee River	Pond		Caloosahatchee River	Pond
2,3,7,8-TCDD	NA	1.8E-08	NA	3.1E-09	0.00001	NA	3.E-04
Mercury (methyl)	NA	4.0E-04	NA	6.9E-05	0.026	NA	3.E-03

B. White pelican

Chemical	Fish Concentration (mg/kg fw)		Intake (mg/kg bw d)		TRV (mg/kg bw)	Hazard Quotient	
	Caloosahatchee River	Pond	Caloosahatchee River	Pond		Caloosahatchee River	Pond
2,3,7,8-TCDD	1.4E-08	NA	2.0E-09	NA	0.00001	2.E-04	NA
Mercury (methyl)	1.0E-02	NA	1.5E-03	NA	0.026	6.E-02	NA

C. Snail Kite

Chemical	Snail Concentration (mg/kg fw)		Intake (mg/kg bw d)		TRV (mg/kg bw)	Hazard Quotient	
	Caloosahatchee River	Pond	Caloosahatchee River	Pond		Caloosahatchee River	Pond
2,3,7,8-TCDD	NA	4.8E-08	NA	2.0E-08	0.00001	NA	2.E-03
Mercury (methyl)	NA	3.7E-04	NA	1.5E-04	0.026	NA	6.E-03

D. River Otter

Chemical	Fish Concentration (mg/kg fw)		Intake (mg/kg bw d)		TRV (mg/kg bw)	Hazard Quotient	
	Caloosahatchee River	Pond	Caloosahatchee River	Pond		Caloosahatchee River	Pond
2,3,7,8-TCDD	8.0E-09	9.6E-09	1.3E-09	1.6E-09	0.000001	1.E-03	2.E-03
Mercury (methyl)	1.0E-02	4.0E-04	1.7E-03	6.5E-05	0.018	9.E-02	4.E-03

APPENDIX A

**BIOGRAPHIES OF CPF ASSOCIATES, INC. SCIENTISTS
PARTICIPATING IN THE LEE COUNTY FACILITY
ENVIRONMENTAL IMPACT STUDY**

PAUL C. CHROSTOWSKI, Ph.D., QEP

EDUCATION

Ph.D. Environmental Engineering and Science, Drexel University, Philadelphia, PA (1981).

M.S. Environmental Science, Drexel University, Philadelphia, PA (Environmental Chemistry and Health Specializations, USPHS Traineeship) (1979).

B.S. Chemistry, University of California, Berkeley, California (American Chemical Society Certified, Honors) (1976).

PROFESSIONAL CERTIFICATION

Dr. Chrostowski is a Qualified Environmental Professional (QEP) (#02970014) and a Fellow of the Royal Society of Health (FRSH).

EXPERIENCE

Dr. Chrostowski is a founding member of Chrostowski, Pearsall, Foster, Durda & Preziosi (CPF Associates, Inc.). He is an environmental engineer, applied toxicologist, and chemist with 25 years experience in environmental science and engineering work on behalf of both government and private clients. Previously, he was Director of Environment, Health & Safety programs at The Weinberg Group, Vice President and Senior Science Advisor at ICF/Clement, Senior Scientist at EA Engineering, Science & Technology, Assistant Professor at Vassar College, a consultant in private practice and a pollution control/industrial hygiene technician in industry. He has specialized experience in the scientific and technical aspects of federal, state, and international regulatory programs including the CAA, CERCLA/SARA, RCRA, TSCA, FIFRA, OSHA, waste management technologies and ecological assessment. In addition, he has directed projects involving environmental chemistry, remedial investigation, pollution control, regulatory affairs, and quality assurance. A substantial portion of this effort is directed to Superfund, RCRA, and private party cost and liability issues including divisibility, allocation, modeling remedial costs at complex sites, auditing environmental contractor performance, and analyzing consistency with the NCP and state programs. In addition to EPA and OSHA programs, Dr. Chrostowski has developed substantial expertise in indoor air quality, the risk analysis of hazardous material transportation, and the risk analysis of FDA-regulated products. Dr. Chrostowski has conducted research into environmentally-friendly new product development and has directed registration and approval petition processes for the environmental and occupational aspects of new products, pesticides, and pharmaceuticals. Dr. Chrostowski's research interests include the behavior of complex mixtures, pharmacokinetics, application of quantitative management tools to environmental strategy development and evaluation, biomonitoring, use of epidemiology in risk assessment, mass transfer phenomena, applied statistics, and mathematical modeling for risk management decision making. Dr. Chrostowski is active in numerous professional societies and expert panels and has authored or co-authored about 100 publications or presentations in the environmental field. In addition to his technical work, Dr. Chrostowski has taught university-level environmental sciences and has presented expert testimony in litigation cases, regulatory, and permitting hearings and public meetings and has conducted technical negotiations on behalf of private and governmental clients.

SARAH A. FOSTER

EDUCATION

M.S., Environmental Health Sciences, Air Pollution Control Program Harvard University School of Public Health, Cambridge, MA (1985).

B.A., Political Science (Environmental Law/Energy Policy), Williams College, Williamstown, MA (1981).

EXPERIENCE

Ms. Foster is a founding member of Chrostowski, Pearsall, Foster, Durda & Preziosi (CPF Associates, Inc.). She has over 15 years of consulting experience in environmental health sciences, with expertise in developing strategies for and conducting exposure and risk analyses related to environmental issues and commercial and consumer products. Previously, Ms. Foster was a Senior Consultant with The Weinberg Group, a Project Manager at the Clement Division of ICF/Kaiser, an Environmental Analyst with the U.S. Environmental Protection Agency's Office of Policy Analysis, and a researcher for the Harvard Public Health School's Six City Study. Her areas of specialty include the application of quantitative methods for evaluating potential risks, including multiple chemical, multiple exposure pathway risk assessments for waste management technologies, air toxics sources and waste sites, Monte Carlo simulation, environmental epidemiology, and good risk assessment practice principles. She has managed and performed over 100 comprehensive risk assessment projects for combustion sources, waste sites and consumer and commercial products, with specialized knowledge in the conduct of risk assessments for municipal solid waste combustors, hazardous waste incinerators, and emissions reported under SARA Title III. She has developed and applied a wide variety of environmental fate and transport models, and critically analyzed and compiled a broad array of human activity pattern data, in exposure assessment projects involving multiple inhalation, ingestion and dermal pathways as well as the use of household tap water. She has also developed and applied innovative risk assessment methods to assess risks from combustion sources, indoor water use, waste sites, and pesticides and anti-microbial materials that include geostatistical kriging and stochastic simulation. Ms. Foster has analyzed issues regarding contaminated site remedy selection, cleanup goals, cost and liability allocation evaluations under CERCLA, RCRA and state regulatory programs, and the historical state-of-knowledge of toxicological and environmental health sciences. Ms. Foster has also evaluated global environmental issues associated with pharmaceuticals and medical devices. In conjunction with many of her risk assessment and regulatory toxicology projects, Ms. Foster has provided risk communication and technical support for public, regulatory and permit hearings, and for litigation. Ms. Foster has numerous publications focusing on risk assessment, air toxics and emissions from industrial sources and is a member of several professional societies. She also has considerable experience in developing and conducting risk assessment training courses.

JUDI L. DURDA

EDUCATION

M.S. Zoology and Toxicology, North Carolina State University, Raleigh, NC (*Phi Kappa Phi*) (1986).

B.S. Biology and Environmental Science, George Washington University, Washington, DC (with highest distinction, *Phi Beta Kappa*) (1982).

EXPERIENCE

Ms. Durda joined CPF Associates, Inc. as a principal in 1999. She is a toxicologist and ecologist with more than 15 years experience in the health and environmental science fields, working on behalf of both government and private clients. Prior to joining CPF, Ms. Durda was a Managing Consultant at The Weinberg Group Inc., a Project Manager with the Clement Division of ICF/Kaiser Engineers, a wildlife biologist at the U.S. Fish and Wildlife Service, and a research assistant at ICF Incorporated. Ms. Durda specializes in using science and science-based strategies to address complex technical issues related to the manufacture, use, or disposal of chemicals, consumer products, pharmaceuticals, and hazardous and non-hazardous wastes. In this vein, she assist clients in designing and implementing effective strategies to address regulatory compliance, gain product approval, assess product safety, or defend products, services, or actions in court. Her specific experience includes risk assessment and cost allocation evaluation under CERCLA/SARA, RCRA and State regulatory programs and related litigation, compliance strategy development under CWA and RCRA, source apportionment and risk assessment in technically oriented environmental litigation, and produce evaluations under California's Proposition 65. She also has conducted health and safety evaluations of chemicals present in food, beverages, and medical devices, conducted technical evaluations to support product registration of crop protection chemicals, and assessed the potential human health risks from the use of veterinary antibiotics. In addition, Ms. Durda is expert in the evaluation of ecological risks and natural resource damages potentially associated with chemical release or disposal. She has conducted risk and damage assessments and designed monitoring programs at hundreds of waste sites and in the US and abroad, primarily on behalf of private parties facing potentially significant remediation, restoration, compliance, and litigation costs. The types of facilities evaluated include: pesticide and organic chemicals manufacturing facilities, PCB and dioxin waste sites, hydrocarbon waste sites, wood treatment facilities with copper, chromium, and arsenic contamination, Department of Defense facilities, rail yards, metal finishing and processing sites, mining sites, municipal and hazardous waste landfills, mixed industrial waste sites, hazardous and solid waste incinerators, and contaminated rivers and estuaries. Ms. Durda is active in several professional societies and has published and presented in the field. Ms. Durda has served as a guest lecturer at Johns Hopkins University and has developed and conducted numerous risk assessment training courses.

DAMIAN V. PREZIOSI

EDUCATION

M.S., Biology, *magna cum laude*, Department of Biology, Bucknell University, Lewisburg, Pennsylvania (1994)

B.S., Biology and Geology, *cum laude*, Juniata College, Huntingdon, Pennsylvania (1991)

EXPERIENCE

Mr. Damian V. Preziosi joined Chrostowski, Pearsall & Foster (CPF Associates, Inc.) as a principal in 1999. He is an environmental scientist with over 7 years experience in evaluating potential ecological and human health risks associated with exposures to physical, chemical, and biological hazards. Previously, Mr. Preziosi was a senior scientist and project manager at The Weinberg Group, a junior fellow at the Congressional Research Service of the Library of Congress and a biologist with the National Marine Fisheries Service, National Oceanic and Atmospheric Administration (NOAA). His areas of expertise include environmental fate, exposure, toxicology, ecology, and statistics as well as the assessment and management of risk. Throughout his career, Mr. Preziosi has performed and participated in nearly 100 comprehensive risk assessment projects, including waste sites, hazardous waste incinerators, landfills, consumer and commercial products, pesticides, bio-engineered products, and biological hazards. He has experience in the scientific and technical aspects of federal and state regulatory programs including CERCLA/SARA, RCRA, FIFRA, CWA and Proposition 65. He has applied and developed innovative quantitative methods, including probabilistic and other varieties of uncertainty analysis, Geographic Information Systems (GIS) analysis, and a wide variety of environmental fate, transport and foodchain models to assist in effective ecological and human health risk assessment and management. Mr. Preziosi has also conducted, developed, and supervised environmental sampling, bioassessment and biosurvey programs, including the collection of environmental media, biological samples, and habitat, community, and assemblage data in both terrestrial and aquatic ecosystems. Mr. Preziosi's academic background covers ecology, geology, toxicology, and environmental policy analysis. His research interests include uncertainty analysis, ecological and population modeling, and remediation technology and alternatives. Mr. Preziosi is active in several professional societies, including the Society of Environmental Toxicology and Chemistry, the Ecological Society of America, the American Society of Testing and Materials, and the Society of Toxicology. He also has published and presented extensively in the field.

APPENDIX B

INPUT MODELING INFORMATION FOR THE LEE COUNTY FACILITY

- 1. PCDD/PCDF CONGENER DISTRIBUTION
FOR THE LEE COUNTY FACILITY**
- 2. PCDD/PCDF AND MERCURY STACK TEST RESULTS
FOR THE LEE COUNTY FACILITY**
- 3. PARTICLE SIZE DISTRIBUTION DATA**

Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

Dioxin and Mercury Stack Test Results for Lee County ERF

Pollutant	Year	Unit 1				Unit 2				Overall Average for Both Units
		Rep. 1	Rep. 2	Rep. 3	Average	Rep. 1	Rep. 2	Rep. 3	Average	
Total PCDD/F		ng/dscm@7%O ₂				ng/dscm@7%O ₂				ng/dscm@7%O ₂
Retest Original	2001	7.8	5.7	6.0	6.5	7.8	7.4	8.0	7.6 ^a	
	2000	7.9	7.1	13.0	9.3	14.3	5.5	3.2	7.6	
	1999	25.0	30.0	29.0	28.0	--	--	--	--	
	1999	30.0	31.0	28.0	29.0	17.5	18.9	18.0	18.1	
	1998	4.3	4.0	3.7	4.0	3.54	3.16	2.63	3.11	
	1997	2.6	1.3	2.3	2.1	2.5	3.1	2.5	2.7	
	1996	21.4	17.7	13.5	17.5	10.9	11.0	44.2	22.1	
	1995	28.4	18.6	11.8	19.6	14.0	6.4	2.9	7.8	
	1994	6.1	5.0	3.7	4.9	8.2	5.1	4.7	6.0	
Average		13.4				9.4				11.4
Hg		µg/dscm@7%O ₂				µg/dscm@7%O ₂				µg/dscm@7%O ₂
	2001	22	25	21	23	29	31	24	28	
	2000	<1.35	<1.36	<1.44	<1.39	30	15	<1.5	<15	
	1999	31	43	<33	<36	<25	32	27	<28	
	1998	27	32	26	28	34	32	58	41	
	1997	21	21	21	21	17	16	23	18	
	1996	42	38	44	42	53	54	49	52	
	1995	53	44	75	57	26	38	52	39	
	1994	14	14	17	15	27	26	30	28	
Average		28				31				30

^a Average includes Run 1 and Run 2 only. Thermal degradation of Run 3 sample is believed to have occurred during lab analysis.

Source: RTP

Dioxin/Furan Congener Distribution of Available Stack Test Data for Lee County Energy Recovery Facility

Percentage of Total PCDD/PCDF Concentration (based on ng/DSCM @ 7% O₂)

Congener	Average	1994	1995	1996	2000	2001	1994	1995	1996	2000	2001
		Unit 1 Stack Test Averages					Unit 2 Stack Test Averages				
2,3,7,8-TCDD	0.102%	0.044%	0.060%	0.073%	0.143%	0.142%	0.043%	0.121%	0.107%	0.158%	0.125%
Other TCDD	2.674%	2.206%	1.173%	3.643%	1.294%	4.485%	1.453%	3.308%	3.006%	1.806%	4.364%
1,2,3,7,8-PeCDD	0.350%	0.239%	0.463%	0.286%	0.439%	0.332%	0.210%	0.413%	0.320%	0.461%	0.340%
Other PeCDD	5.648%	5.931%	4.786%	7.768%	2.600%	6.006%	5.400%	7.851%	6.039%	3.220%	6.883%
1,2,3,4,7,8-HxCDD	0.363%	0.385%	0.643%	0.345%	0.339%	0.226%	0.405%	0.363%	0.287%	0.343%	0.291%
1,2,3,6,7,8-HxCDD	0.838%	0.883%	1.230%	0.943%	0.584%	0.522%	1.093%	1.015%	0.772%	0.615%	0.722%
1,2,3,7,8,9-HxCDD	0.939%	1.342%	1.577%	0.970%	0.604%	0.310%	1.528%	1.109%	0.915%	0.609%	0.426%
Other HxCDD	8.395%	9.514%	9.694%	11.103%	4.013%	8.387%	9.550%	9.202%	8.342%	4.202%	9.948%
1,2,3,4,6,7,8-HpCDD	5.354%	5.385%	8.163%	5.962%	4.304%	3.026%	7.917%	5.676%	5.032%	3.547%	4.532%
Other HpCDD	4.981%	5.628%	6.173%	6.513%	3.139%	2.965%	7.917%	4.723%	5.359%	2.670%	4.727%
OCDD	10.629%	11.377%	13.418%	12.148%	10.431%	4.608%	11.817%	15.830%	10.840%	7.134%	8.688%
Total PCDD	40.263%	42.915%	47.398%	49.734%	27.940%	31.029%	47.333%	49.550%	40.953%	24.738%	41.039%
2,3,7,8-TCDF	0.604%	0.350%	0.280%	0.481%	0.706%	1.031%	0.272%	0.597%	0.723%	0.832%	0.771%
Other TCDF	17.144%	12.510%	7.755%	17.871%	14.563%	28.264%	9.100%	15.187%	23.828%	19.764%	22.597%
1,2,3,7,8-PeCDF	1.138%	0.682%	0.872%	0.709%	1.899%	1.598%	0.575%	0.911%	1.035%	1.950%	1.153%
2,3,4,7,8-PeCDF	1.420%	1.381%	1.286%	1.125%	1.802%	1.476%	1.312%	1.326%	1.359%	1.924%	1.206%
Other PeCDF	15.298%	14.352%	11.224%	12.776%	17.260%	19.969%	11.867%	12.741%	16.399%	19.895%	16.494%
1,2,3,4,7,8-HxCDF	2.601%	3.785%	4.270%	2.184%	2.157%	1.329%	4.050%	2.741%	2.284%	2.107%	1.100%
1,2,3,6,7,8-HxCDF	1.441%	1.010%	1.816%	0.797%	2.643%	1.407%	1.125%	1.021%	0.928%	2.487%	1.181%
2,3,4,6,7,8-HxCDF	1.589%	1.964%	2.000%	1.466%	1.586%	1.052%	2.717%	1.171%	1.374%	1.479%	1.081%
1,2,3,7,8,9-HxCDF	0.235%	0.046%	0.138%	0.049%	0.758%	0.280%	0.090%	0.031%	0.051%	0.685%	0.227%
Other HxCDF	7.197%	6.437%	7.704%	5.460%	9.676%	7.757%	6.567%	5.483%	5.825%	9.843%	7.221%
1,2,3,4,6,7,8-HpCDF	6.093%	9.899%	8.316%	4.226%	8.220%	2.888%	9.717%	4.479%	2.719%	6.924%	3.545%
1,2,3,4,7,8,9-HpCDF	0.678%	0.312%	0.918%	0.291%	1.866%	0.303%	0.627%	0.537%	0.312%	1.348%	0.262%
Other HpCDF	2.003%	1.808%	2.352%	1.555%	4.250%	1.097%	2.067%	1.416%	1.194%	3.115%	1.179%
OCDF	2.343%	2.692%	3.566%	1.278%	4.757%	0.561%	2.767%	2.870%	1.061%	2.880%	0.996%
Total PCDF	59.725%	57.085%	52.551%	50.171%	72.168%	68.971%	52.667%	50.450%	59.092%	75.131%	58.961%
Total PCDD/PCDF	100.000%	100.000%	100.000%	100.000%	100.000%	100.000%	100.000%	100.000%	100.000%	100.000%	100.000%

Source: RTP.

**Particle Size Distribution used in RTP ISCST3 Modeling
(based on data from the Wurzburg, Germany facility) (a, b)**

Particle Class	Mean Diameter	% By Mass	% By Surface Area
< 0.6 μm	0.38 μm	53%	90.00%
0.6 - 1.0 μm	0.82 μm	4%	3.10%
1.0 - 1.6 μm	1.32 μm	3%	1.50%
1.6 - 3.2 μm	2.49 μm	10%	2.60%
3.2 - 5.0 μm	4.16 μm	8%	1.20%
5.0 - 7.3 μm	6.22 μm	8%	0.80%
7.3 - 10.8 μm	9.16 μm	6%	0.40%
10.8 - 17.4 μm	14.35 μm	8%	0.40%

(a) Hahn, J. L. and D. B. Sussman, 1986. Dioxin Emissions from Modern, Mass-Fired, Stoker/Boilers with Advanced Air Pollution Control Equipment. Ogden Projects, Inc. Paramus, NJ. Poster Presentation at Dioxin 86, Fukuoka, Japan. September 1986.

(b) A mean particle density of 1.0 g/cm^3 was assumed in the ISCST3 modeling.

APPENDIX C

IEM-2M MERCURY MODELING FOR THE LEE COUNTY FACILITY RISK ASSESSMENT

APPENDIX C

IEM-2M MERCURY MODELING FOR THE LEE COUNTY ERF FACILITY RISK ASSESSMENT

Introduction

This attachment describes the methodology used to calculate environmental concentrations in the Caloosahatchee River and a typical shallow pond near the Lee County ERF facility. The calculated environmental concentrations in these waterbodies were subsequently used to calculate potential fish ingestion risks for the human health risk assessment and aquatic life and terrestrial wildlife risks in the ecological risk analysis.

A more refined model than the default approach provided in USEPA's Combustion Risk Assessment Guidance (USEPA 1998a) was used to model mercury to better address the complexities of the environmental fate and transport of mercury in a watershed and waterbody environment. USEPA developed this more refined model, referred to as IEM-2M, for combustion source emissions in order to address important mercury processes in a more detailed manner (USEPA 1997a, Lyon et al. 1998). The IEM-2M model has been used by USEPA in the *Mercury Report to Congress (MRTC)* (USEPA 1997a) as well as the *Utility Report to Congress* (USEPA 1998b).

Description of IEM-2M Model

The IEM-2M model simulates mercury fate and transport using mass balance equations that describe watershed soils and a lake. It models three chemical species of mercury - elemental mercury, divalent mercury and methyl mercury and, unlike USEPA's Combustion Guidance methods, includes specific transformation rates affecting mercury compounds in soil, water and sediments. At the core of the IEM-2M model are nine differential equations describing the mass balance of each mercury species in the watershed surficial soil layer, in the water column, and in the lake's surficial benthic sediments. Transformations associated with oxidation, reduction, methylation and demethylation are taken into account in the model. The model evaluates several mercury sources and sinks in the watershed and water body. Mercury sources include wet and dry deposition loadings to the watershed soils and water body in addition to diffusion of vapor phase mercury. Mercury sinks include vertical downward leaching from watershed soils, burial in lake sediments, volatilization of mercury from watershed soil and the water column, and advection of mercury out of the waterbody.

The inputs to the IEM-2M model, and the modeling algorithms, are described in detail in Volume III of USEPA's *MRTC* (USEPA 1997a). The inputs used in this analysis were obtained either from site-specific data or directly from default values provided in the *MRTC* (USEPA 1997a). Site-specific data were based on information collected by Malcolm Pirnie, Inc. and include waterbody and watershed dimensions, water flow rate and current velocity, and total suspended solids. Inputs obtained from the *MRTC* included chemical-specific parameters and default values for variables that cannot readily be measured. Several tables in the main body of this report present the input parameters used in the IEM-2M model.

The IEM-2M model calculates the environmental fate of mercury based on the total loading of each component to the watershed and the water body. Tables in the main body of this report presents the data used to calculate total loadings to the watershed and water body, the resulting loading rates for the watershed and water body, and intermediate solutions to the differential equations noted above. The loadings considered for the watershed include wet and dry deposition in addition to vapor phase diffusion to watershed soils. The loadings considered for the water body include direct wet and dry deposition onto the water body, runoff from the watershed into the water body, soil erosion from the watershed into the water body, and vapor phase diffusion into the water body.

The IEM-2M differential model equations, as described in the *MRTC* (USEPA 1997a), were programmed into Scientific Workplace®, a software program designed to perform computerized algebra and calculus functions (Hardy and Walker 2000). The differential equations were solved numerically using a fourth order Runge-Kutta technique and verified using an analytical solution. In previous analyses, the operation of the differential equations has been verified by comparison with input and output data reported in a sample calculation presented in USEPA (1999).

The differential equations in IEM-2M were solved in several steps. First, the watershed differential modeling equations were applied to calculate soil concentrations of each mercury component in watershed soil. The output from this modeling for the nearby pond and river is provided in Tables 1 and 2, respectively, to this attachment. Second, the resulting watershed soil concentrations were used to calculate runoff and soil erosion loadings to the water body. The water body differential modeling equations were solved next to calculate concentrations of each mercury component in the water column and surficial benthic sediments. The output from the water body modeling is shown in Table 3 for the pond and Table 4 for the river. The remaining calculations required for the IEM-2M modeling were performed using an Excel® spreadsheet (see Tables 5-10 through 5-13 in the main body of this report).

IEM-2M Model Results

The IEM-2M model results for the Caloosahatchee River and a nearby pond are shown in Tables 5 and 6, respectively, to this attachment. Total concentrations of each mercury component calculated by the IEM-2M model are shown for the water column and benthic sediments.

From these results, several additional calculations were performed, as needed, for the human health and ecological risk assessments. First, the dissolved methyl mercury concentrations in the water column were calculated for use in evaluating potential fish ingestion risks for the human health risk assessment as well as for the ecological risk assessment. This is consistent with the *MRTC* (USEPA 1997b,c) which provides and relies on mercury bioaccumulation factors based on dissolved methyl mercury concentrations in the water column. Second, the total water column mercury concentration was calculated for use in the ecological risk assessment. These results are also shown in Tables 5 and 6.

References

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Table 1
Solution of IEM-2M Watershed Modeling Differential Equations
For a Typical Pond (a)

Parameters C_{s1} = Elemental mercury concentration in watershed soil (g/m^3) C_{s2} = Divalent mercury concentration in watershed soil (g/m^3) C_{s3} = Methyl mercury concentration in watershed soil (g/m^3)
Differential equations $dC_{s1}/dt = 1.63 \times 10^{-6} + 9.13 \times 10^{-3} (C_{s2}) - 88 (C_{s1})$ $dC_{s2}/dt = 2.58 \times 10^{-4} + 0.913 (C_{s3}) - 0.038 (C_{s2})$ $dC_{s3}/dt = 0.018 C_{s2} - 0.93 (C_{s3})$ $C_{s1}(0) = 0$ $C_{s2}(0) = 0$ $C_{s3}(0) = 0$
Solutions $C_{s1}(30) = 6.13 \times 10^{-7} \text{ g/m}^3$ $C_{s2}(30) = 5.74 \times 10^{-3} \text{ g/m}^3$ $C_{s3}(30) = 1.10 \times 10^{-4} \text{ g/m}^3$

(a) See Mercury Report to Congress (1997), Volume III, page 4-30.

Table 2
Solution of IEM-2M Watershed Modeling Differential Equations
For the Caloosahatchee River (a)

Parameters C_{s1} = Elemental mercury concentration in watershed soil (g/m³) C_{s2} = Divalent mercury concentration in watershed soil (g/m³) C_{s3} = Methyl mercury concentration in watershed soil (g/m³)
Differential equations $dC_{s1}/dt = 1.92 \times 10^{-6} + 9.13 \times 10^{-3} (C_{s2}) - 88 (C_{s1})$ $dC_{s2}/dt = 2.69 \times 10^{-4} + 0.913 (C_{s3}) - 0.030 (C_{s2})$ $dC_{s3}/dt = 0.018 C_{s2} - 0.92 (C_{s3})$ $C_{s1}(0) = 0$ $C_{s2}(0) = 0$ $C_{s3}(0) = 0$
Solutions $C_{s1}(30) = 7.10 \times 10^{-7} \text{ g/m}^3$ $C_{s2}(30) = 6.66 \times 10^{-3} \text{ g/m}^3$ $C_{s3}(30) = 1.26 \times 10^{-4} \text{ g/m}^3$

(a) See Mercury Report to Congress (1997), Volume III, page 4-30.

Table 3
Solution of IEM-2M Waterbody Modeling Differential Equations
For a Typical Pond (a)

Parameters
C_{wt1} = Total elemental mercury concentration in water column (mg/L or g/m ³) C_{wt2} = Total divalent mercury concentration in water column (mg/L or g/m ³) C_{wt3} = Total methyl mercury concentration in water column (mg/L or g/m ³) C_{bt1} = Total elemental mercury benthic layer sediment concentration (g/m ³) C_{bt2} = Total divalent mercury benthic layer sediment concentration (g/m ³) C_{bt3} = Total methyl mercury benthic layer sediment concentration (g/m ³)
Differential equations
$\frac{dC_{wt1}}{dt} = 3.05 \times 10^{-8} + 1.70 \times 10^{-3} (C_{s1}) + 2.74 (C_{wt2}) - 230 (C_{wt1}) + 7.94 \times 10^{-3} (C_{bt1})$ $\frac{dC_{wt2}}{dt} = 1.11 \times 10^{-5} + 8.83 \times 10^{-4} (C_{s2}) + 5.48 (C_{wt3}) - 531 (C_{wt2}) + 6.27 \times 10^{-3} (C_{bt2})$ $\frac{dC_{wt3}}{dt} = 1.08 \times 10^{-7} + 9.88 \times 10^{-4} (C_{s3}) + 0.365 (C_{wt2}) - 370 (C_{wt3}) + 7.86 \times 10^{-3} (C_{bt3})$ $\frac{dC_{bt1}}{dt} = 370 (C_{wt1}) + 3.65 \times 10^{-4} (C_{bt2}) - 5.05 (C_{bt1})$ $\frac{dC_{bt2}}{dt} = 6.32 \times 10^{-3} (C_{wt2}) + 0.73 (C_{bt3}) - 5.08 (C_{bt2})$ $\frac{dC_{bt3}}{dt} = 4.35 \times 10^{-3} (C_{wt3}) + 0.0365 (C_{bt2}) - 5.78 (C_{bt3})$ $C_{wt1}(0) = 0$ $C_{wt2}(0) = 0$ $C_{wt3}(0) = 0$ $C_{bt1}(0) = 0$ $C_{bt2}(0) = 0$ $C_{bt3}(0) = 0$
Solutions
$C_{wt1}(30) = 7.56 \times 10^{-10} \text{ g/m}^3$ $C_{wt2}(30) = 3.10 \times 10^{-8} \text{ g/m}^3$ $C_{wt3}(30) = 6.29 \times 10^{-10} \text{ g/m}^3$ $C_{bt1}(30) = 7.23 \times 10^{-8} \text{ g/m}^3$ $C_{bt2}(30) = 3.86 \times 10^{-5} \text{ g/m}^3$ $C_{bt3}(30) = 7.18 \times 10^{-7} \text{ g/m}^3$

(a) See Mercury Report to Congress (1997), Volume III, pages 4-38 - 4-39.

Table 4
Solution of IEM-2M Waterbody Modeling Differential Equations
For the Caloosahatchee River (a)

Parameters
C_{wt1} = Total elemental mercury concentration in water column (mg/L or g/m ³) C_{wt2} = Total divalent mercury concentration in water column (mg/L or g/m ³) C_{wt3} = Total methyl mercury concentration in water column (mg/L or g/m ³) C_{bt1} = Total elemental mercury benthic layer sediment concentration (g/m ³) C_{bt2} = Total divalent mercury benthic layer sediment concentration (g/m ³) C_{bt3} = Total methyl mercury benthic layer sediment concentration (g/m ³)
Differential equations
$\frac{dC_{wt1}}{dt} = 2.39 \times 10^{-8} + 8.24 \times 10^{-4} (C_{s1}) + 2.74 (C_{wt2}) - 104 (C_{wt1}) + 2.28 \times 10^{-3} (C_{bt1})$ $\frac{dC_{wt2}}{dt} = 5.02 \times 10^{-6} + 1.76 \times 10^{-4} (C_{s2}) + 5.48 (C_{wt3}) - 99.1 (C_{wt2}) + 1.59 \times 10^{-3} (C_{bt2})$ $\frac{dC_{wt3}}{dt} = 3.07 \times 10^{-8} + 2.59 \times 10^{-4} (C_{s3}) + 0.365 (C_{wt2}) - 100 (C_{wt3}) + 2.25 \times 10^{-3} (C_{bt3})$ $\frac{dC_{bt1}}{dt} = 60.4 (C_{wt1}) + 3.65 \times 10^{-4} (C_{bt2}) - 0.652 (C_{bt1})$ $\frac{dC_{bt2}}{dt} = 3.57 \times 10^{-3} (C_{wt2}) + 0.73 (C_{bt3}) - 0.635 (C_{bt2})$ $\frac{dC_{bt3}}{dt} = 3.35 \times 10^{-3} (C_{wt3}) + 0.0365 (C_{bt2}) - 1.38 (C_{bt3})$ $C_{wt1}(0) = 0$ $C_{wt2}(0) = 0$ $C_{wt3}(0) = 0$ $C_{bt1}(0) = 0$ $C_{bt2}(0) = 0$ $C_{bt3}(0) = 0$
Solutions
$C_{wt1}(30) = 2.29 \times 10^{-9} \text{ g/m}^3$ $C_{wt2}(30) = 7.03 \times 10^{-8} \text{ g/m}^3$ $C_{wt3}(30) = 2.59 \times 10^{-9} \text{ g/m}^3$ $C_{bt1}(30) = 8.76 \times 10^{-6} \text{ g/m}^3$ $C_{bt2}(30) = 4.82 \times 10^{-4} \text{ g/m}^3$ $C_{bt3}(30) = 7.57 \times 10^{-5} \text{ g/m}^3$

(a) See Mercury Report to Congress (1997), Volume III, pages 4-38 - 4-39.

Table 5
Results Based on IEM-2M Modeling for the Caloosahatchee River

Parameter	Value	Units	Basis
1. IEM-2M Model Output for the Caloosahatchee River (a)			
<i>Concentrations in watershed soil</i>			
$C_{s,1}$ (30) - elemental	7.10E-07	g/m ³	IEM-2M Model output
$C_{s,2}$ (30) - divalent	6.66E-03	g/m ³	IEM-2M Model output
$C_{s,3}$ (30) - methyl	1.26E-04	g/m ³	IEM-2M Model output
<i>Total concentrations in water column</i>			
C_1 (30) = $C_{wt,1}$ - elemental	2.29E-09	mg/L (g/m ³)	IEM-2M Model output
C_2 (30) = $C_{wt,2}$ - divalent	7.03E-08	mg/L (g/m ³)	IEM-2M Model output
C_3 (30) = $C_{wt,3}$ - methyl	2.59E-09	mg/L (g/m ³)	IEM-2M Model output
<i>Total benthic concentrations</i>			
C_4 (30) = $C_{bt,1}$ - elemental	8.76E-06	g/m ³	IEM-2M Model output
	1.17E-04	mg/kg dw	Calculated (b)
C_5 (30) = $C_{bt,2}$ - divalent	4.82E-04	g/m ³	IEM-2M Model output
	6.43E-03	mg/kg dw	Calculated (b)
C_6 (30) = $C_{bt,3}$ - methyl	7.57E-05	g/m ³	IEM-2M Model output
	1.01E-03	mg/kg dw	Calculated (b)
2. Calculated Concentrations Based on IEM Model Output			
Total Hg in water column	7.52E-08	mg/L (g/m ³)	Sum of all species
Dissolved elemental mercury in water column	2.28E-09	mg/L (g/m ³)	($C_{wt,3}$ Total methyl mercury water column concentration) / { 1 + (K_{dw} elemental Hg * S_w g/m ³ * 1E-6) + (K_{Bio} elemental Hg * S_{Bio} g/m ³ * 1E-6) } (Mills et al. 1985, Part I. p. 53. EPA/600/6-85/002a)
Dissolved divalent mercury in water column	5.03E-08	mg/L (g/m ³)	($C_{wt,3}$ Total methyl mercury water column concentration) / { 1 + (K_{dw} divalent Hg * S_w g/m ³ * 1E-6) + (K_{Bio} divalent Hg * S_{Bio} g/m ³ * 1E-6) } (Mills et al. 1985, Part I. p. 53. EPA/600/6-85/002a)
Dissolved methyl mercury in water column	1.51E-09	mg/L (g/m ³)	($C_{wt,3}$ Total methyl mercury water column concentration) / { 1 + (K_{dw} methyl Hg * S_w g/m ³ * 1E-6) + (K_{Bio} methyl Hg * S_{Bio} g/m ³ * 1E-6) } (Mills et al. 1985, Part I. p. 53. EPA/600/6-85/002a)

(a) Concentrations were calculated for a 30-year time period of emissions.

(b) Dry weight sediment concentrations were calculated as follows: (total benthic concentration g/m³ / sediment density dry weight 75,000 g/m³) * 1,000 g/kg * 1,000 mg/g (sediment density is from the MRTC, Appendix B).

Table 6
Results Based on IEM-2M Modeling for a Typical Pond

Parameter	Value	Units	Basis
1. IEM-2M Model Output for a Typical Pond (a)			
<i>Concentrations in watershed soil</i>			
$C_{s,1}$ (30) - elemental	6.13E-07	g/m ³	IEM-2M Model output
$C_{s,2}$ (30) - divalent	5.74E-03	g/m ³	IEM-2M Model output
$C_{s,3}$ (30) - methyl	1.10E-04	g/m ³	IEM-2M Model output
<i>Total concentrations in water column</i>			
$C_1(30) = C_{wt,1}$ - elemental	7.56E-10	mg/L (g/m ³)	IEM-2M Model output
$C_2(30) = C_{wt,2}$ - divalent	3.10E-08	mg/L (g/m ³)	IEM-2M Model output
$C_3(30) = C_{wt,3}$ - methyl	6.29E-10	mg/L (g/m ³)	IEM-2M Model output
<i>Total benthic concentrations</i>			
$C_4(30) = C_{bt,1}$ - elemental	7.23E-06	g/m ³	IEM-2M Model output
	9.64E-05	mg/kg dw	Calculated (b)
$C_5(30) = C_{bt,2}$ - divalent	3.86E-05	g/m ³	IEM-2M Model output
	5.15E-04	mg/kg dw	Calculated (b)
$C_6(30) = C_{bt,3}$ - methyl	7.18E-07	g/m ³	IEM-2M Model output
	9.57E-06	mg/kg dw	Calculated (b)
2. Calculated Water Column Concentrations Based on IEM Model Output			
Total Hg in water column	3.24E-08	mg/L (g/m ³)	Sum of all species
Dissolved elemental mercury in water column	7.28E-10	mg/L (g/m ³)	$(C_{wt,3} \text{ Total methyl mercury water column concentration}) / \{ 1 + (K_{dw \text{ elemental Hg}} * S_w \text{ g/m}^3 * 1E-6) + (K_{Bio \text{ elemental Hg}} * S_{Bio} \text{ g/m}^3 * 1E-6) \}$ (Mills et al. 1985, Part I. p. 53. EPA/600/6-85/002a)
Dissolved divalent mercury in water column	4.89E-09	mg/L (g/m ³)	$(C_{wt,3} \text{ Total methyl mercury water column concentration}) / \{ 1 + (K_{dw \text{ divalent Hg}} * S_w \text{ g/m}^3 * 1E-6) + (K_{Bio \text{ divalent Hg}} * S_{Bio} \text{ g/m}^3 * 1E-6) \}$ (Mills et al. 1985, Part I. p. 53. EPA/600/6-85/002a)
Dissolved methyl mercury in water column	5.89E-11	mg/L (g/m ³)	$(C_{wt,3} \text{ Total methyl mercury water column concentration}) / \{ 1 + (K_{dw \text{ methyl Hg}} * S_w \text{ g/m}^3 * 1E-6) + (K_{Bio \text{ methyl Hg}} * S_{Bio} \text{ g/m}^3 * 1E-6) \}$ (Mills et al. 1985, Part I. p. 53. EPA/600/6-85/002a)

(a) Concentrations were calculated for a 30-year time period of emissions.

(b) Dry weight sediment concentrations were calculated as follows: (total benthic concentration g/m³ / sediment density dry weight 75,000 g/m³) * 1,000 g/kg * 1,000 mg/g (sediment density is from the MRTC, Appendix B).

APPENDIX D
DETAILED RISK RESULTS

Potential Excess Lifetime Cancer Risks

Receptor: Adult Resident

	Oral Intakes					Oral Toxicity Data			Inhalation Intakes			Inhalation Toxicity Data			Inhalation Cancer Risk ^(f)	Total Cancer Risk ^(f)	
	Contaminant Intake from Soil Carcinog. I _{soil} (mg/d)	Contaminant Intake from Produce I _p (mg/d)	Total Intake (mg/d)	Toxic Equivalency Factors ^(d)	TCDD Equivalent Intake ^(e) (mg/d)	Oral Cancer Slope Factor (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(b)	Oral Cancer Risk ^(a)	Av. Daily Inhalation Intake ADI (mg/kg/d)	Toxic Equivalency Factors ^(d)	TCDD Equivalent Intake ^(e) (mg/kg/d)	Inhalation Cancer Slope Factor ^(a) (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(b)				
Chemical																	
mercury (divalent)	2.25E-06	1.92E-06	4.17E-06	NA	NA	--	C	NC	9.81E-10	NA	NA	--	C	NC	NC		
mercury (elemental)	NA	NA	NC	NA	NA	--	D	NC	2.46E-11	NA	NA	--	D	NC	NC		
mercury (methyl)	1.11E-07	2.77E-07	3.89E-07	NA	NA	--	C	NC	0.00E+00	NA	NA	--	C	NC	NC		
PCDD/Fs																	
HpCDD, 1,2,3,4,6,7,8-	1.23E-10	2.48E-10	3.71E-10	0.01	3.71E-12				8.41E-14	0.01	8.41E-16						
HpCDF, 1,2,3,4,6,7,8-	1.42E-10	2.79E-10	4.21E-10	0.01	4.21E-12				9.49E-14	0.01	9.49E-16						
HpCDF, 1,2,3,4,7,8,9-	1.55E-11	3.13E-11	4.67E-11	0.01	4.67E-13				1.05E-14	0.01	1.05E-16						
HxCDD, 1,2,3,4,7,8-	8.73E-12	1.62E-11	2.49E-11	0.10	2.49E-12				5.62E-15	0.10	5.62E-16						
HxCDD, 1,2,3,6,7,8-	1.94E-11	3.94E-11	5.88E-11	0.10	5.88E-12				1.31E-14	0.10	1.31E-15						
HxCDD, 1,2,3,7,8,9-	2.13E-11	4.46E-11	6.58E-11	0.10	6.58E-12				1.48E-14	0.10	1.48E-15						
HxCDF, 1,2,3,4,7,8-	6.17E-11	1.20E-10	1.81E-10	0.10	1.81E-11				4.05E-14	0.10	4.05E-15						
HxCDF, 1,2,3,6,7,8-	3.35E-11	6.44E-11	9.79E-11	0.10	9.79E-12				2.18E-14	0.10	2.18E-15						
HxCDF, 1,2,3,7,8,9-	5.78E-12	1.10E-11	1.68E-11	0.10	1.68E-12				3.74E-15	0.10	3.74E-16						
HxCDF, 2,3,4,6,7,8-	3.78E-11	7.23E-11	1.10E-10	0.10	1.10E-11				2.46E-14	0.10	2.46E-15						
OCDD, 1,2,3,4,5,7,8,9-	2.36E-10	4.99E-10	7.35E-10	0.0001	7.35E-14				1.65E-13	0.0001	1.65E-17						
OCDF, 1,2,3,4,6,7,8,9-	5.14E-11	1.08E-10	1.57E-10	0.0001	1.57E-14				3.59E-14	0.0001	3.59E-18						
PeCDD, 1,2,3,7,8-	1.03E-11	1.51E-11	2.54E-11	1.0	2.54E-11				5.45E-15	1.0	5.45E-15						
PeCDF, 1,2,3,7,8-	3.72E-11	3.99E-11	7.71E-11	0.05	3.86E-12				1.71E-14	0.05	8.55E-16						
PeCDF, 2,3,4,7,8-	4.30E-11	5.50E-11	9.80E-11	0.50	4.90E-11				2.18E-14	0.50	1.09E-14						
TCDD, 2,3,7,8-	3.78E-12	3.25E-12	7.03E-12	1.00	7.03E-12				1.56E-15	1.00	1.56E-15						
TCDF, 2,3,7,8-	2.60E-11	1.65E-11	4.25E-11	0.10	4.25E-12				9.36E-15	0.10	9.36E-16						
Total PCDD/Fs ^(g)					1.54E-10	1.5E+05	B2	1.8E-07			3.40E-14	1.50E+05	B2	5.1E-09	1.9E-07		
Total Risk	2.E-07															5.E-09	2.E-07

Notes:

NA and -- = Not Applicable

NC = Not Calculated since data not applicable or not available for particular chemical

(a) Risk = (Total Intake * Exposure Duration * Exposure Frequency * Cancer Slope Factor) / (Body Weight * Averaging Time * 365)

(b) USEPA Weight of evidence classification scheme for carcinogens:

A--Human Carcinogen, sufficient evidence from human epidemiological studies;

B1--Probable Human Carcinogen, limited evidence from epidemiological studies;

B2--Probable Human Carcinogen, inadequate or no evidence from epidemiological studies and adequate evidence from animal studies;

C--Possible Human Carcinogen, limited evidence in animals in the absence of human data;

D--Not Classified as to human carcinogenicity; and

E--Evidence of Noncarcinogenicity.

(d) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake. This total intake is then used to calculate the cancer risk for PCDD/Fs.

Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs

(f) Risk = Inhalation average daily intake * cancer slope factor

(g) Total risk = Σ cancer risks

Potential Excess Lifetime Cancer Risks

Receptor: Adult Beef Farmer

	Oral Intakes						Oral Toxicity Data		Oral Cancer Risk ^(a)	Inhalation Intakes			Inhalation Toxicity Data		Inhalation Cancer Risk ^(a)	Total Cancer Risk ^(d)
	Contaminant Intake from Soil Carcinog. I_{soil} (mg/d)	Contaminant Intake from Produce I_{pg} (mg/d)	Contaminant Intake from Beef I_{beef} (mg/d)	Total Intake (mg/d)	Toxic Equivalency Factors ^(b)	TCDD Equivalent Intake ^(c) (mg/d)	Oral Cancer Slope Factor (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(b)		Av. Daily Inhalation Intake ADI (mg/kg/d)	Toxic Equivalency Factors ^(b)	TCDD Equivalent Intake ^(c) (mg/kg/d)	Inhalation Cancer Slope Factor ^(e) (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(b)		
Chemical																
mercury (divalent)	2.25E-06	1.92E-06	3.85E-08	4.21E-06	NA	NA	--	C	NC	9.81E-10	NA	NA	--	C	NC	NC
mercury (elemental)	NA	NA	NA	NC	NA	NA	--	D	NC	2.46E-11	NA	NA	--	D	NC	NC
mercury (methyl)	1.11E-07	2.77E-07	1.62E-09	3.90E-07	NA	NA	--	C	NC	0.00E+00	NA	NA	--	C	NC	NC
PCDD/Fs																
HpCDD, 1,2,3,4,6,7,8-	1.23E-10	2.48E-10	1.86E-10	5.58E-10	0.01	5.58E-12				6.41E-14	0.01	8.41E-16				
HpCDF, 1,2,3,4,6,7,8-	1.42E-10	2.79E-10	2.16E-10	6.37E-10	0.01	6.37E-12				9.49E-14	0.01	9.49E-16				
HpCDF, 1,2,3,4,7,8,9-	1.55E-11	3.13E-11	7.07E-11	1.17E-10	0.01	1.17E-12				1.05E-14	0.01	1.05E-16				
HxCDD, 1,2,3,4,7,8-	8.73E-12	1.62E-11	7.54E-11	1.00E-10	0.10	1.00E-11				5.62E-15	0.10	5.62E-16				
HxCDD, 1,2,3,6,7,8-	1.94E-11	3.94E-11	1.44E-10	2.03E-10	0.10	2.03E-11				1.31E-14	0.10	1.31E-15				
HxCDD, 1,2,3,7,8,9-	2.13E-11	4.48E-11	1.80E-10	2.26E-10	0.10	2.26E-11				1.46E-14	0.10	1.46E-15				
HxCDF, 1,2,3,4,7,8-	8.17E-11	1.20E-10	6.02E-10	7.83E-10	0.10	7.83E-11				4.05E-14	0.10	4.05E-15				
HxCDF, 1,2,3,6,7,8-	3.35E-11	6.44E-11	2.78E-10	3.76E-10	0.10	3.76E-11				2.18E-14	0.10	2.18E-15				
HxCDF, 1,2,3,7,8,9-	5.78E-12	1.10E-11	4.75E-11	6.43E-11	0.10	6.43E-12				3.74E-15	0.10	3.74E-16				
HxCDF, 2,3,4,6,7,8-	3.78E-11	7.23E-11	2.60E-10	3.70E-10	0.10	3.70E-11				2.46E-14	0.10	2.46E-15				
OCDD, 1,2,3,4,6,7,8,9-	2.36E-10	4.99E-10	3.63E-10	1.10E-09	0.0001	1.10E-13				1.65E-13	0.0001	1.65E-17				
OCDF, 1,2,3,4,6,7,8,9-	5.14E-11	1.06E-10	7.88E-11	2.38E-10	0.0001	2.36E-14				3.69E-14	0.0001	3.59E-18				
PeCDD, 1,2,3,7,8-	1.03E-11	1.51E-11	1.11E-10	1.36E-10	1.0	1.36E-10				5.45E-15	1.0	5.45E-15				
PeCDF, 1,2,3,7,8-	3.72E-11	3.99E-11	5.65E-11	1.34E-10	0.05	6.65E-12				1.71E-14	0.05	8.55E-16				
PeCDF, 2,3,4,7,8-	4.30E-11	5.50E-11	3.53E-10	4.51E-10	0.50	2.25E-10				2.18E-14	0.50	1.09E-14				
TCDD, 2,3,7,8-	3.78E-12	3.25E-12	2.12E-11	2.83E-11	1.00	2.83E-11				1.56E-15	1.00	1.56E-15				
TCDF, 2,3,7,8-	2.60E-11	1.65E-11	2.83E-11	7.08E-11	0.10	7.08E-12				9.36E-15	0.10	9.36E-16				
Total PCDD/Fs ^(c)						6.29E-10	1.5E+05	B2	7.4E-07			3.40E-14	1.50E+05	B2	5.1E-09	7.4E-07
Total Risk									7.5E-07						5.5E-09	7.5E-07

Notes:

NA and -- = Not Applicable

NC = Not Calculated since data not applicable or not available for particular chemical

(a) Risk = (Total Intake * Exposure Duration * Exposure Frequency * Cancer Slope Factor) / (Body Weight * Averaging Time * 365)

(b) USEPA Weight of evidence classification scheme for carcinogens:

A--Human Carcinogen, sufficient evidence from human epidemiological studies;

B1--Probable Human Carcinogen, limited evidence from epidemiological studies;

B2--Probable Human Carcinogen, inadequate or no evidence from epidemiological studies and adequate evidence from animal studies;

C--Possible Human Carcinogen, limited evidence in animals in the absence of human data;

D--Not Classified as to human carcinogenicity; and

E--Evidence of Noncarcinogenicity.

(d) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake.

This total intake is then used to calculate the cancer risk for PCDD/Fs.

Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs

(f) Risk = Inhalation average daily intake * cancer slope factor

(g) Total risk = Σ cancer risks

Potential Excess Lifetime Cancer Risks

Receptor: Adult Fisherman - Caloosahatchee River

	Oral Intakes						Oral Toxicity Data				Inhalation Intakes			Inhalation Toxicity Data				
	Contaminant Intake from Soil Carcinog. I _{soil} (mg/d)	Contaminant Intake from Produce I _{pg} (mg/d)	Contaminant Intake from Fish I _{fish} (mg/d)	Total Intake (mg/d)	Toxic Equivalency Factors ^(a)	TCDD Equivalent Intake ^(a) (mg/d)	Oral Cancer Slope Factor (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(b)	Oral Cancer Risk ^(c)		Av. Daily Inhalation Intake ADI (mg/kg/d)	Toxic Equivalency Factors ^(a)	TCDD Equivalent Intake ^(a) (mg/kg/d)	Inhalation Cancer Slope Factor ^(a) (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(b)	Inhalation Cancer Risk ^(c)		
Chemical																		
mercury (divalent)	2.25E-06	1.92E-06	NC	NC	NA	NA	--	C	NC	9.81E-10	NA	NA	--	C	NC	NC		
mercury (elemental)	NA	NA	NA	NC	NA	NA	--	D	NC	2.46E-11	NA	NA	--	D	NC	NC		
mercury (methyl)	1.11E-07	2.77E-07	8.42E-04	8.42E-04	NA	NA	--	C	NC	0.00E+00	NA	NA	--	C	NC	NC		
PCDD/Fs																		
HpCDD, 1,2,3,4,6,7,8-	1.23E-10	2.48E-10	2.07E-10	5.78E-10	0.01	5.78E-12				8.41E-14	0.01	8.41E-16						
HpCDF, 1,2,3,4,6,7,8-	1.42E-10	2.79E-10	2.19E-10	6.40E-10	0.01	6.40E-12				9.49E-14	0.01	9.49E-16						
HpCDF, 1,2,3,4,7,8,9-	1.55E-11	3.13E-11	2.41E-11	7.08E-11	0.01	7.08E-13				1.05E-14	0.01	1.05E-16						
HxCDD, 1,2,3,4,7,8-	8.73E-12	1.62E-11	1.05E-10	1.30E-10	0.10	1.30E-11				5.62E-15	0.10	5.62E-16						
HxCDD, 1,2,3,6,7,8-	1.94E-11	3.94E-11	1.80E-10	2.39E-10	0.10	2.39E-11				1.31E-14	0.10	1.31E-15						
HxCDD, 1,2,3,7,8,9-	2.13E-11	4.46E-11	1.99E-10	2.65E-10	0.10	2.65E-11				1.48E-14	0.10	1.48E-15						
HxCDD, 1,2,3,4,7,8-	6.17E-11	1.20E-10	5.63E-10	7.45E-10	0.10	7.45E-11				4.05E-14	0.10	4.05E-15						
HxCDF, 1,2,3,6,7,8-	3.35E-11	6.44E-11	3.13E-10	4.11E-10	0.10	4.11E-11				2.18E-14	0.10	2.18E-15						
HxCDF, 1,2,3,7,8,9-	5.78E-12	1.10E-11	5.32E-11	6.99E-11	0.10	6.99E-12				3.74E-15	0.10	3.74E-16						
HxCDF, 2,3,4,6,7,8-	3.78E-11	7.23E-11	3.48E-10	4.59E-10	0.10	4.59E-11				2.46E-14	0.10	2.46E-15						
OCDD, 1,2,3,4,5,7,8,9-	2.36E-10	4.99E-10	7.00E-12	7.42E-10	0.0001	7.42E-14				1.65E-13	0.0001	1.65E-17						
OCDF, 1,2,3,4,6,7,8,9-	5.14E-11	1.06E-10	1.82E-12	1.59E-10	0.0001	1.59E-14				3.59E-14	0.0001	3.59E-18						
PeCDD, 1,2,3,7,8-	1.03E-11	1.51E-11	1.03E-10	1.28E-10	1.0	1.28E-10				5.45E-15	1.0	5.45E-15						
PeCDF, 1,2,3,7,8-	3.72E-11	3.98E-11	4.27E-10	5.04E-10	0.05	2.52E-11				1.71E-14	0.05	8.55E-16						
PeCDF, 2,3,4,7,8-	4.30E-11	5.50E-11	5.99E-10	6.97E-10	0.50	3.49E-10				2.18E-14	0.50	1.09E-14						
TCDD, 2,3,7,8-	3.78E-12	3.25E-12	3.19E-11	3.90E-11	1.00	3.90E-11				1.56E-15	1.00	1.56E-15						
TCDF, 2,3,7,8-	2.60E-11	1.65E-11	1.87E-10	2.30E-10	0.10	2.30E-11				9.36E-15	0.10	9.36E-16						
Total PCDD/Fs ^(e)						8.09E-10	1.5E+05	B2	9.5E-07			3.40E-14	1.50E+05	B2	5.1E-09	9.5E-07		
Total Risk																		
										9.5E-07								
NA and -- = Not Applicable																		
NC = Not Calculated since data not applicable or not available for particular chemical																		
(a) Risk = (Total Intake * Exposure Duration * Exposure Frequency * Cancer Slope Factor) / (Body Weight * Averaging Time * 365)																		
(b) USEPA Weight of evidence classification scheme for carcinogens:																		
A--Human Carcinogen, sufficient evidence from human epidemiological studies;																		
B1--Probable Human Carcinogen, limited evidence from epidemiological studies;																		
B2--Probable Human Carcinogen, inadequate or no evidence from epidemiological studies and adequate evidence from animal studies;																		
C--Possible Human Carcinogen, limited evidence in animals in the absence of human data;																		
D--Not Classified as to human carcinogenicity; and																		
E--Evidence of Noncarcinogenicity.																		
(d) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake. This total intake is then used to calculate the cancer risk for PCDD/Fs.																		
Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs																		
(f) Risk = Inhalation average daily intake * cancer slope factor																		
(g) Total risk = Σ cancer risks																		

Potential Excess Lifetime Cancer Risks

Receptor: Adult Fisherman - Typical Pond

	Oral Intakes						Oral Toxicity Data				Inhalation Intakes			Inhalation Toxicity Data				
	Contaminant Intake from Soil Carcinog. I_{soil} (mg/d)	Contaminant Intake from Produce I_{pg} (mg/d)	Contaminant Intake from Fish I_{fish} (mg/d)	Total Intake (mg/d)	Toxic Equivalency Factors ^(a)	TCDD Equivalent Intake ^(a) (mg/d)	Oral Cancer Slope Factor (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(a)	Oral Cancer Risk ^(a)		Av. Daily Inhalation Intake ADI (mg/kg/d)	Toxic Equivalency Factors ^(a)	TCDD Equivalent Intake ^(a) (mg/kg/d)	Inhalation Cancer Slope Factor ^(a) (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(a)	Inhalation Cancer Risk ^(a)		
Chemical																		
mercury (divalent)	2.25E-06	1.92E-06	NC	NC	NA	NA	--	C	NC	9.81E-10	NA	NA	--	C	NC	NC		
mercury (elemental)	NA	NA	NA	NC	NA	NA	--	D	NC	2.46E-11	NA	NA	--	D	NC	NC		
mercury (methyl)	1.11E-07	2.77E-07	3.28E-05	3.32E-05	NA	NA	--	C	NC	0.00E+00	NA	NA	--	C	NC	NC		
PCDD/Fs																		
HpCDD, 1,2,3,4,6,7,8-	1.23E-10	2.49E-10	1.25E-10	4.98E-10	0.01	4.96E-12				8.41E-14	0.01	8.41E-16						
HpCDF, 1,2,3,4,6,7,8-	1.42E-10	2.79E-10	1.38E-10	5.60E-10	0.01	5.60E-12		9.49E-14	0.01	9.49E-16								
HpCDF, 1,2,3,4,7,8,9-	1.55E-11	3.13E-11	1.49E-11	6.16E-11	0.01	6.16E-13		1.05E-14	0.01	1.05E-16								
HxCDD, 1,2,3,4,7,8-	8.73E-12	1.62E-11	7.11E-11	9.61E-11	0.10	9.61E-12		5.62E-15	0.10	5.62E-16								
HxCDD, 1,2,3,6,7,8-	1.94E-11	3.94E-11	1.36E-10	1.95E-10	0.10	1.95E-11		1.31E-14	0.10	1.31E-15								
HxCDD, 1,2,3,7,8,9-	2.13E-11	4.46E-11	1.48E-10	2.14E-10	0.10	2.14E-11		1.46E-14	0.10	1.46E-15								
HxCDF, 1,2,3,4,7,8-	6.17E-11	1.20E-10	4.26E-10	6.07E-10	0.10	6.07E-11		4.05E-14	0.10	4.05E-15								
HxCDF, 1,2,3,6,7,8-	3.35E-11	6.44E-11	2.52E-10	3.50E-10	0.10	3.50E-11		2.18E-14	0.10	2.18E-15								
HxCDF, 1,2,3,7,8,9-	5.78E-12	1.10E-11	4.16E-11	5.84E-11	0.10	5.84E-12		3.74E-15	0.10	3.74E-16								
HxCDF, 2,3,4,6,7,8-	3.78E-11	7.23E-11	2.72E-10	3.82E-10	0.10	3.82E-11		2.46E-14	0.10	2.46E-15								
OCDD, 1,2,3,4,5,7,8,9-	2.36E-10	4.99E-10	4.81E-12	7.40E-10	0.0001	7.40E-14		1.65E-13	0.0001	1.65E-17								
OCDF, 1,2,3,4,6,7,8,9-	5.14E-11	1.06E-10	1.05E-12	1.58E-10	0.0001	1.58E-14		3.59E-14	0.0001	3.59E-18								
PeCDD, 1,2,3,7,8-	1.03E-11	1.51E-11	1.79E-10	2.05E-10	1.0	2.05E-10		5.45E-15	1.0	5.45E-15								
PeCDF, 1,2,3,7,8-	3.72E-11	3.99E-11	6.08E-10	6.85E-10	0.05	3.42E-11		1.71E-14	0.05	8.55E-16								
PeCDF, 2,3,4,7,8-	4.30E-11	5.50E-11	7.28E-10	8.26E-10	0.50	4.13E-10		2.18E-14	0.50	1.09E-14								
TCDD, 2,3,7,8-	3.78E-12	3.25E-12	4.34E-11	5.04E-11	1.00	5.04E-11		1.56E-15	1.00	1.56E-15								
TCDF, 2,3,7,8-	2.60E-11	1.65E-11	3.30E-10	3.73E-10	0.10	3.73E-11		9.36E-15	0.10	9.36E-16								
Total PCDD/Fs ^(a)						9.41E-10	1.5E+05	B2	1.1E-06			3.40E-14	1.50E+05	B2	5.1E-09	1.1E-06		
Total Risk									1.E-06						5.E-09		1.E-06	

Notes:

NA and -- = Not Applicable

NC = Not Calculated since data not applicable or not available for particular chemical

(a) Risk = (Total Intake * Exposure Duration * Exposure Frequency * Cancer Slope Factor) / (Body Weight * Averaging Time * 365)

(b) USEPA Weight of evidence classification scheme for carcinogens:

A--Human Carcinogen, sufficient evidence from human epidemiological studies;

B1--Probable Human Carcinogen, limited evidence from epidemiological studies;

B2--Probable Human Carcinogen, inadequate or no evidence from epidemiological studies and adequate evidence from animal studies;

C--Possible Human Carcinogen, limited evidence in animals in the absence of human data;

D--Not Classified as to human carcinogenicity; and

E--Evidence of Noncarcinogenicity.

(d) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake. This total intake is then used to calculate the cancer risk for PCDD/Fs.

Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs

(i) Risk = Inhalation average daily intake * cancer slope factor

(j) Total risk = Σ cancer risks

Potential Excess Lifetime Cancer Risks

Receptor: Child of Adult Resident

	Oral Intakes					Oral Toxicity Data				Inhalation Intakes			Inhalation Toxicity Data					
	Contaminant Intake from Soil Carcinog. I_{soil} (mg/d)	Contaminant Intake from Produce I_{ag} (mg/d)	Total Intake (mg/d)	Toxic Equivalency Factors ^(d)	TCDD Equivalent Intake ^(d) (mg/d)	Oral Cancer Slope Factor (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(b)	Oral Cancer Risk ^(e)		Av. Daily Inhalation Intake ADI (mg/kg/d)	Toxic Equivalency Factors ^(d)	TCDD Equivalent Intake ^(d) (mg/kg/d)	Inhalation Cancer Slope Factor ^(e) (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(b)			Inhalation Cancer Risk ^(e)	Total Cancer Risk ^(f)
Chemical																		
mercury (divalent)	8.98E-06	1.07E-06	1.01E-05	NA	NA	--	C	NC	3.30E-10	NA	NA	--	C	NC	NC			
mercury (elemental)	NA	NA	NC	NA	NA	--	D	NC	8.26E-12	NA	NA	--	D	NC	NC			
mercury (methyl)	1.80E-07	7.36E-08	2.53E-07	NA	NA	--	C	NC	0.00E+00	NA	NA	--	C	NC	NC			
PCDD/Fs																		
HpCDD, 1,2,3,4,6,7,8-	2.41E-10	7.45E-11	3.15E-10	0.01	3.15E-12					2.83E-14	0.01	2.83E-16						
HpCDF, 1,2,3,4,6,7,8-	2.78E-10	8.38E-11	3.62E-10	0.01	3.62E-12					3.19E-14	0.01	3.19E-16						
HpCDF, 1,2,3,4,7,8,9-	3.03E-11	9.38E-12	3.96E-11	0.01	3.96E-13					3.54E-15	0.01	3.54E-17						
HxCDD, 1,2,3,4,7,8-	1.71E-11	4.87E-12	2.19E-11	0.10	2.19E-12					1.89E-15	0.10	1.89E-16						
HxCDD, 1,2,3,6,7,8-	3.79E-11	1.18E-11	4.98E-11	0.10	4.98E-12					4.39E-15	0.10	4.39E-16						
HxCDD, 1,2,3,7,8,9-	4.17E-11	1.34E-11	5.50E-11	0.10	5.50E-12					4.91E-15	0.10	4.91E-16						
HxCDF, 1,2,3,4,7,8-	1.21E-10	3.59E-11	1.57E-10	0.10	1.57E-11					1.36E-14	0.10	1.36E-16						
HxCDF, 1,2,3,6,7,8-	8.55E-11	1.93E-11	8.49E-11	0.10	8.49E-12					7.33E-15	0.10	7.33E-16						
HxCDF, 1,2,3,7,8,9-	1.13E-11	3.29E-12	1.46E-11	0.10	1.46E-12					1.26E-15	0.10	1.26E-16						
HxCDF, 2,3,4,6,7,8-	7.40E-11	2.17E-11	9.57E-11	0.10	9.57E-12					8.26E-15	0.10	8.26E-16						
OCDD, 1,2,3,4,5,7,8,9-	4.62E-10	1.50E-10	6.11E-10	0.0001	6.11E-14					5.54E-14	0.0001	5.54E-18						
OCDF, 1,2,3,4,6,7,8,9-	1.00E-10	3.18E-11	1.32E-10	0.0001	1.32E-14					1.21E-14	0.0001	1.21E-18						
PeCDD, 1,2,3,7,8-	2.01E-11	4.64E-12	2.46E-11	1.0	2.46E-11					1.83E-15	1.0	1.83E-15						
PeCDF, 1,2,3,7,8-	7.29E-11	1.20E-11	8.49E-11	0.05	4.24E-12					5.74E-15	0.05	2.87E-16						
PeCDF, 2,3,4,7,8-	8.42E-11	1.65E-11	1.01E-10	0.50	5.04E-11					7.33E-15	0.50	3.67E-15						
TCDD, 2,3,7,8-	7.42E-12	9.74E-13	8.40E-12	1.00	8.40E-12					5.23E-16	1.00	5.23E-16						
TCDF, 2,3,7,8-	5.11E-11	4.92E-12	5.60E-11	0.10	5.60E-12					3.14E-15	0.10	3.14E-16						
Total PCDD/Fs ^(d)					1.48E-10	1.5E+05	B2	1.2E-07			1.14E-14	1.50E+05	B2	1.7E-09	1.2E-07			
Total Risk	1.E-07																2.E-09	1.E-07

Notes:

NA and -- = Not Applicable

NC = Not Calculated since data not applicable or not available for particular chemical

(a) Risk = (Total Intake * Exposure Duration * Exposure Frequency * Cancer Slope Factor) / (Body Weight * Averaging Time * 365)

(b) USEPA Weight of evidence classification scheme for carcinogens:

A--Human Carcinogen, sufficient evidence from human epidemiological studies;

B1--Probable Human Carcinogen, limited evidence from epidemiological studies;

B2--Probable Human Carcinogen, inadequate or no evidence from epidemiological studies and adequate evidence from animal studies;

C--Possible Human Carcinogen, limited evidence in animals in the absence of human data;

D--Not Classified as to human carcinogenicity; and

E--Evidence of Noncarcinogenicity.

(d) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake. This total intake is then used to calculate the cancer risk for PCDD/Fs.

Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs

(f) Risk = Inhalation average daily intake * cancer slope factor

(g) Total risk = Σ cancer risks

Potential Excess Lifetime Cancer Risks

Receptor: Child of Adult Beef Farmer

	Oral Intakes						Oral Toxicity Data				Inhalation Intakes			Inhalation Toxicity Data				
	Contaminant Intake from Soil Carcinog. I_{soil} (mg/d)	Contaminant Intake from Produce I_{pg} (mg/d)	Contaminant Intake from Beef I_{beef} (mg/d)	Total Intake (mg/d)	Toxic Equivalency Factors ^(a)	TCDD Equivalent Intake ^(b) (mg/d)	Oral Cancer Slope Factor (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(c)	Oral Cancer Risk ^(d)		Av. Daily Inhalation Intake ADI (mg/kg/d)	Toxic Equivalency Factors ^(a)	TCDD Equivalent Intake ^(b) (mg/kg/d)	Inhalation Cancer Slope Factor ^(e) (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(c)	Inhalation Cancer Risk ^(d)		
Chemical																		
mercury (divalent)	8.98E-06	1.07E-06	3.68E-09	1.01E-05	NA	NA	--	C	NC	3.30E-10	NA	NA	--	C	NC	NC		
mercury (elemental)	NA	NA	NA	NC	NA	NA	--	D	NC	8.26E-12	NA	NA	--	D	NC	NC		
mercury (methyl)	1.80E-07	7.36E-08	1.55E-10	2.53E-07	NA	NA	--	C	NC	0.00E+00	NA	NA	--	C	NC	NC		
PCDD/Fs																		
HpCDD, 1,2,3,4,6,7,8-	2.41E-10	7.45E-11	1.82E-11	3.33E-10	0.01	3.33E-12				2.83E-14	0.01	2.83E-16						
HpCDF, 1,2,3,4,6,7,8-	2.78E-10	8.38E-11	2.11E-11	3.83E-10	0.01	3.83E-12		3.19E-14	0.01	3.19E-16								
HpCDF, 1,2,3,4,7,8,9-	3.03E-11	9.38E-12	6.91E-12	4.66E-11	0.01	4.66E-13		3.54E-15	0.01	3.54E-17								
HxCDD, 1,2,3,4,7,8-	1.71E-11	4.87E-12	7.37E-12	2.93E-11	0.10	2.93E-12		1.89E-16	0.10	1.89E-18								
HxCDD, 1,2,3,6,7,8-	3.79E-11	1.18E-11	1.41E-11	6.38E-11	0.10	6.38E-12		4.39E-16	0.10	4.39E-18								
HxCDD, 1,2,3,7,8,9-	4.17E-11	1.34E-11	1.57E-11	7.07E-11	0.10	7.07E-12		4.91E-16	0.10	4.91E-18								
HxCDF, 1,2,3,4,7,8-	1.21E-10	3.59E-11	5.90E-11	2.16E-10	0.10	2.16E-11		1.36E-14	0.10	1.36E-15								
HxCDF, 1,2,3,6,7,8-	6.55E-11	1.93E-11	2.73E-11	1.12E-10	0.10	1.12E-11		7.33E-15	0.10	7.33E-16								
HxCDF, 1,2,3,7,8,9-	1.13E-11	3.29E-12	4.68E-12	1.93E-11	0.10	1.93E-12		1.26E-15	0.10	1.26E-16								
HxCDF, 2,3,4,6,7,8-	7.40E-11	2.17E-11	2.55E-11	1.21E-10	0.10	1.21E-11		8.26E-15	0.10	8.26E-16								
OCDD, 1,2,3,4,5,7,8,9-	4.62E-10	1.50E-10	3.54E-11	6.47E-10	0.0001	6.47E-14		5.54E-14	0.0001	5.54E-18								
OCDF, 1,2,3,4,5,7,8,9-	1.00E-10	3.18E-11	7.70E-12	1.40E-10	0.0001	1.40E-14		1.21E-14	0.0001	1.21E-18								
PeCDD, 1,2,3,7,8-	2.01E-11	4.54E-12	1.09E-11	3.59E-11	1.0	3.59E-11		1.83E-15	1.0	1.83E-15								
PeCDF, 1,2,3,7,8-	7.29E-11	1.20E-11	5.63E-12	9.05E-11	0.05	4.53E-12		5.74E-15	0.05	2.87E-16								
PeCDF, 2,3,4,7,8-	8.42E-11	1.65E-11	3.49E-11	1.36E-10	0.50	6.78E-11		7.33E-15	0.50	3.67E-15								
TCDD, 2,3,7,8-	7.42E-12	9.74E-13	2.14E-12	1.05E-11	1.00	1.05E-11		5.23E-16	1.00	5.23E-16								
TCDF, 2,3,7,8-	5.11E-11	4.92E-12	2.93E-12	5.90E-11	0.10	5.90E-12		3.14E-15	0.10	3.14E-16								
Total PCDD/Fs ^(g)						1.95E-10	1.5E+05	B2	1.6E-07			1.14E-14	1.50E+05	B2	1.7E-09	1.6E-07		
Total Risk	2.E-07									2.E-09							2.E-07	

Notes:

NA and -- = Not Applicable

NC = Not Calculated since data not applicable or not available for particular chemical

(a) Risk = (Total Intake * Exposure Duration * Exposure Frequency * Cancer Slope Factor) / (Body Weight * Averaging Time * 365)

(b) USEPA Weight of evidence classification scheme for carcinogens:

A--Human Carcinogen, sufficient evidence from human epidemiological studies;

B1--Probable Human Carcinogen, limited evidence from epidemiological studies;

B2--Probable Human Carcinogen, inadequate or no evidence from epidemiological studies and adequate evidence from animal studies;

C--Possible Human Carcinogen, limited evidence in animals in the absence of human data;

D--Not Classified as to human carcinogenicity; and

E--Evidence of Noncarcinogenicity.

(d) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the

Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake.

This total intake is then used to calculate the cancer risk for PCDD/Fs.

Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs

(f) Risk = Inhalation average daily intake * cancer slope factor

(g) Total risk = Σ cancer risks

Potential Excess Lifetime Cancer Risks

Receptor: Child of Adult Fisherman (River)

	Oral Intakes						Oral Toxicity Data			Inhalation Intakes				Inhalation Toxicity Data		
	Contaminant Intake from Soil Carcinog. I_{soil} (mg/d)	Contaminant Intake from Produce I_{sp} (mg/d)	Contaminant Intake from Fish I_{fish} (mg/d)	Total Intake (mg/d)	Toxic Equivalency Factors ^(a)	TCDD Equivalent Intake ^(b) (mg/d)	Oral Cancer Slope Factor (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(b)	Oral Cancer Risk ^(c)	Av. Daily Inhalation Intake ADI (mg/kg/d)	Toxic Equivalency Factors ^(a)	TCDD Equivalent Intake ^(b) (mg/kg/d)	Inhalation Cancer Slope Factor ^(d) (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(b)	Inhalation Cancer Risk ^(c)	Total Cancer Risk ^(e)
Chemical																
mercury (divalent)	8.98E-06	1.07E-06	NC	NC	NA	NA	--	C	NC	3.30E-10	NA	NA	--	C	NC	NC
mercury (elemental)	NA	NA	NA	NC	NA	NA	--	D	NC	8.28E-12	NA	NA	--	D	NC	NC
mercury (methyl)	1.80E-07	7.38E-08	1.13E-04	1.13E-04	NA	NA	--	C	NC	0.00E+00	NA	NA	--	C	NC	NC
PCDD/Fs																
HpCDD, 1,2,3,4,6,7,8-	2.41E-10	7.45E-11	2.78E-11	3.43E-10	0.01	3.43E-12				2.83E-14	0.01	2.83E-16				
HpCDF, 1,2,3,4,6,7,8-	2.78E-10	8.38E-11	2.94E-11	3.91E-10	0.01	3.91E-12				3.19E-14	0.01	3.19E-16				
HpCDF, 1,2,3,4,7,8,9-	3.03E-11	9.38E-12	3.23E-12	4.29E-11	0.01	4.29E-13				3.54E-15	0.01	3.54E-17				
HxCDD, 1,2,3,4,7,8-	1.71E-11	4.87E-12	1.41E-11	3.60E-11	0.10	3.60E-12				1.89E-15	0.10	1.89E-16				
HxCDD, 1,2,3,6,7,8-	3.79E-11	1.18E-11	2.41E-11	7.39E-11	0.10	7.39E-12				4.39E-15	0.10	4.39E-16				
HxCDD, 1,2,3,7,8,9-	4.17E-11	1.34E-11	2.87E-11	8.18E-11	0.10	8.18E-12				4.91E-15	0.10	4.91E-16				
HxCDF, 1,2,3,4,7,8-	1.21E-10	3.59E-11	7.56E-11	2.32E-10	0.10	2.32E-11				1.36E-14	0.10	1.36E-15				
HxCDF, 1,2,3,6,7,8-	6.55E-11	1.93E-11	4.20E-11	1.27E-10	0.10	1.27E-11				7.33E-15	0.10	7.33E-16				
HxCDF, 1,2,3,7,8,9-	1.13E-11	3.29E-12	7.13E-12	2.17E-11	0.10	2.17E-12				1.26E-15	0.10	1.26E-16				
HxCDF, 2,3,4,6,7,8-	7.40E-11	2.17E-11	4.87E-11	1.42E-10	0.10	1.42E-11				8.26E-15	0.10	8.26E-16				
OCDD, 1,2,3,4,5,7,8,9-	4.62E-10	1.50E-10	9.39E-13	6.12E-10	0.0001	6.12E-14				5.54E-14	0.0001	5.54E-18				
OCDF, 1,2,3,4,6,7,8,9-	1.00E-10	3.18E-11	2.44E-13	1.32E-10	0.0001	1.32E-14				1.21E-14	0.0001	1.21E-18				
PeCDD, 1,2,3,7,8-	2.01E-11	4.54E-12	1.38E-11	3.84E-11	1.0	3.84E-11				1.83E-15	1.0	1.83E-15				
PeCDF, 1,2,3,7,8-	7.29E-11	1.20E-11	5.73E-11	1.42E-10	0.05	7.11E-12				5.74E-15	0.05	2.87E-16				
PeCDF, 2,3,4,7,8-	8.42E-11	1.65E-11	8.04E-11	1.81E-10	0.50	9.08E-11				7.33E-15	0.50	3.67E-15				
TCDD, 2,3,7,8-	7.42E-12	9.74E-13	4.28E-12	1.27E-11	1.00	1.27E-11				5.23E-16	1.00	5.23E-16				
TCDF, 2,3,7,8-	5.11E-11	4.92E-12	2.51E-11	8.12E-11	0.10	8.12E-12				3.14E-15	0.10	3.14E-16				
Total PCDD/Fs ^(f)						2.36E-10	1.5E+05	B2	1.9E-07			1.14E-14	1.50E+05	B2	1.7E-09	2.0E-07
Total Risk									2.E-07						2.E-09	2.E-07

Notes:

NA and -- = Not Applicable

NC = Not Calculated since data not applicable or not available for particular chemical

(a) Risk = (Total Intake * Exposure Duration * Exposure Frequency * Cancer Slope Factor) / (Body Weight * Averaging Time * 365)

(b) USEPA Weight of evidence classification scheme for carcinogens:

A--Human Carcinogen, sufficient evidence from human epidemiological studies;

B1--Probable Human Carcinogen, limited evidence from epidemiological studies;

B2--Probable Human Carcinogen, inadequate or no evidence from epidemiological studies and adequate evidence from animal studies;

C--Possible Human Carcinogen, limited evidence in animals in the absence of human data;

D--Not Classified as to human carcinogenicity; and

E--Evidence of Noncarcinogenicity.

(d) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake. This total intake is then used to calculate the cancer risk for PCDD/Fs.

Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs

(f) Risk = Inhalation average daily intake * cancer slope factor

(g) Total risk = Σ cancer risks

Potential Excess Lifetime Cancer Risks

Receptor: Child of Adult Fisherman (Pond)

	Oral Intakes						Oral Toxicity Data			Oral Cancer Risk ^(a)	Inhalation Intakes			Inhalation Toxicity Data			Inhalation Cancer Risk ^(a)	Total Cancer Risk ^(a)	
	Contaminant Intake from Soil Carcinog. I _{soil} (mg/d)	Contaminant Intake from Produce I _p (mg/d)	Contaminant Intake from Fish I _{fish} (mg/d)	Total Intake (mg/d)	Toxic Equivalency Factors ^(a)	TCDD Equivalent Intake ^(a) (mg/d)	Oral Cancer Slope Factor (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(a)	Av. Daily Inhalation Intake ADI (mg/kg/d)		Toxic Equivalency Factors ^(a)	TCDD Equivalent Intake ^(a) (mg/kg/d)	Inhalation Cancer Slope Factor ^(a) (mg/kg/d) ⁻¹	USEPA Weight of Evidence ^(a)					
Chemical																			
mercury (divalent)	8.98E-06	1.07E-06	NC	NC	NA	NA	--	C	NC	3.30E-10	NA	NA	--	C	NC	NC			
mercury (elemental)	NA	NA	NA	NC	NA	NA	--	D	NC	8.26E-12	NA	NA	--	D	NC	NC			
mercury (methyl)	1.80E-07	7.36E-08	4.41E-06	4.66E-06	NA	NA	--	C	NC	0.00E+00	NA	NA	--	C	NC	NC			
PCDD/Fs																			
HpCDD, 1,2,3,4,6,7,8-	2.41E-10	7.45E-11	1.68E-11	3.32E-10	0.01	3.32E-12				2.83E-14	0.01	2.83E-16							
HpCDF, 1,2,3,4,6,7,8-	2.78E-10	8.38E-11	1.85E-11	3.81E-10	0.01	3.81E-12				3.19E-14	0.01	3.19E-16							
HpCDF, 1,2,3,4,7,8,9-	3.03E-11	9.38E-12	1.99E-12	4.16E-11	0.01	4.16E-13				3.54E-15	0.01	3.54E-17							
HxCDD, 1,2,3,4,7,8-	1.71E-11	4.87E-12	9.54E-12	3.15E-11	0.10	3.15E-12				1.89E-15	0.10	1.89E-16							
HxCDD, 1,2,3,6,7,8-	3.79E-11	1.18E-11	1.83E-11	6.81E-11	0.10	6.81E-12				4.39E-15	0.10	4.39E-16							
HxCDD, 1,2,3,7,8,9-	4.17E-11	1.34E-11	1.98E-11	7.49E-11	0.10	7.49E-12				4.91E-15	0.10	4.91E-16							
HxCDF, 1,2,3,4,7,8-	1.21E-10	3.59E-11	5.71E-11	2.14E-10	0.10	2.14E-11				1.36E-14	0.10	1.36E-15							
HxCDF, 1,2,3,6,7,8-	6.55E-11	1.93E-11	3.38E-11	1.19E-10	0.10	1.19E-11				7.33E-15	0.10	7.33E-16							
HxCDF, 1,2,3,7,8,9-	1.13E-11	3.29E-12	5.58E-12	2.02E-11	0.10	2.02E-12				1.26E-15	0.10	1.26E-16							
HxCDF, 2,3,4,6,7,8-	7.40E-11	2.17E-11	3.64E-11	1.32E-10	0.10	1.32E-11				8.26E-15	0.10	8.26E-16							
OCDD, 1,2,3,4,5,7,8,9-	4.62E-10	1.50E-10	6.45E-13	6.12E-10	0.0001	6.12E-14				5.54E-14	0.0001	5.54E-18							
OCDF, 1,2,3,4,6,7,8,9-	1.00E-10	3.18E-11	1.40E-13	1.32E-10	0.0001	1.32E-14				1.21E-14	0.0001	1.21E-18							
PeCDD, 1,2,3,7,8-	2.01E-11	4.54E-12	2.41E-11	4.87E-11	1.0	4.87E-11				1.83E-15	1.0	1.83E-15							
PeCDF, 1,2,3,7,8-	7.29E-11	1.20E-11	8.15E-11	1.66E-10	0.05	8.32E-12				5.74E-15	0.05	2.87E-16							
PeCDF, 2,3,4,7,8-	8.42E-11	1.65E-11	9.76E-11	1.98E-10	0.50	9.92E-11				7.33E-15	0.50	3.67E-15							
TCDD, 2,3,7,8-	7.42E-12	9.74E-13	5.82E-12	1.42E-11	1.00	1.42E-11				5.23E-16	1.00	5.23E-16							
TCDF, 2,3,7,8-	5.11E-11	4.92E-12	4.43E-11	1.00E-10	0.10	1.00E-11				3.14E-15	0.10	3.14E-16							
Total PCDD/Fs ^(a)						2.54E-10	1.5E+05	B2	2.1E-07			1.14E-14	1.50E+05	B2	1.7E-09	2.1E-07			
Total Risk																			
										2.E-07									
																		2.E-09	2.E-07

Notes:

NA and -- = Not Applicable

NC = Not Calculated since data not applicable or not available for particular chemical

(a) Risk = (Total Intake * Exposure Duration * Exposure Frequency * Cancer Slope Factor) / (Body Weight * Averaging Time * 365)

(b) USEPA Weight of evidence classification scheme for carcinogens:

A--Human Carcinogen, sufficient evidence from human epidemiological studies;

B1--Probable Human Carcinogen, limited evidence from epidemiological studies;

B2--Probable Human Carcinogen, inadequate or no evidence from epidemiological studies and adequate evidence from animal studies;

C--Possible Human Carcinogen, limited evidence in animals in the absence of human data;

D--Not Classified as to human carcinogenicity; and

E--Evidence of Noncarcinogenicity.

(d) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the

Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake.

This total intake is then used to calculate the cancer risk for PCDD/Fs.

Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs

(i) Risk = Inhalation average daily intake * cancer slope factor

(j) Total risk = Σ cancer risks

Potential for Noncancer Effects

Receptor: Adult Resident

	Oral Intakes					Oral Toxicity Data		Oral Hazard Quotient ^(e)	Inhalation Intakes			Inhalation Toxicity Data			Inhalation Hazard Quotient ^(e)
	Contaminant Intake from Soil Noncarc. I _{soil} (mg/d)	Contaminant Intake from Produce I _{ag} (mg/d)	Total Oral Intake ^(f) (mg/d)	Toxic Equivalency Factors ^(c)	TCDD Equivalent Intake ^(c) (mg/d)	Oral Chronic Reference Dose (mg/kg/d) ⁻¹	Toxicological Endpoint/ Basis		Av. Daily Inhalation Intake ADI (mg/kg/d)	Toxic Equivalency Factors ^(c)	TCDD Equivalent Intake ^(c) (mg/kg/d)	Inhalation Chronic Reference Dose (mg/kg/d) ⁻¹	Toxicological Endpoint/ Basis		
Chemical															
mercury (divalent)	9.00E-06	1.92E-06	1.09E-05	NA	NA	3.0E-04	kidney, immune system	4.99E-04	1.72E-09	NA	NA	8.60E-05	neurotoxicity	2.0E-05	
mercury (elemental)	NA	NA	0.00E+00	NA	NA	—	—	NC	4.30E-11	NA	NA	8.60E-05	neurotoxicity	5.0E-07	
mercury (methyl)	1.78E-07	2.77E-07	4.55E-07	NA	NA	1.0E-04	neurolog., developmental	6.23E-05	0.00E+00	NA	NA	—	—	NC	
PCDD/Fs															
HpCDD, 1,2,3,4,6,7,8-	1.82E-10	2.48E-10	4.30E-10	0.01	4.30E-12	—	—	NC	1.47E-13	0.01	1.47E-15	—	—	NC	
HpCDF, 1,2,3,4,6,7,8-	2.10E-10	2.79E-10	4.89E-10	0.01	4.89E-12				1.66E-13	0.01	1.66E-15				
HpCDF, 1,2,3,4,7,8,9-	2.28E-11	3.13E-11	5.41E-11	0.01	5.41E-13				1.85E-14	0.01	1.85E-16				
HxCDD, 1,2,3,4,7,8-	1.29E-11	1.62E-11	2.91E-11	0.10	2.91E-12				9.83E-15	0.10	9.83E-16				
HxCDD, 1,2,3,6,7,8-	2.86E-11	3.94E-11	6.80E-11	0.10	6.80E-12				2.28E-14	0.10	2.28E-15				
HxCDD, 1,2,3,7,8,9-	3.14E-11	4.46E-11	7.60E-11	0.10	7.60E-12				2.56E-14	0.10	2.56E-15				
HxCDF, 1,2,3,4,7,8-	9.11E-11	1.20E-10	2.11E-10	0.10	2.11E-11				7.08E-14	0.10	7.08E-15				
HxCDF, 1,2,3,6,7,8-	4.95E-11	6.44E-11	1.14E-10	0.10	1.14E-11				3.82E-14	0.10	3.82E-15				
HxCDF, 1,2,3,7,8,9-	8.53E-12	1.10E-11	1.95E-11	0.10	1.95E-12				6.54E-15	0.10	6.54E-16				
HxCDF, 2,6,4,6,7,8-	5.59E-11	7.23E-11	1.28E-10	0.10	1.28E-11				4.30E-14	0.10	4.30E-15				
OCDD, 1,2,3,4,5,7,8,9-	3.49E-10	4.99E-10	8.48E-10	0.0001	8.48E-14				2.88E-13	0.0001	2.88E-17				
OCDF, 1,2,3,4,6,7,8,9-	7.59E-11	1.08E-10	1.82E-10	0.0001	1.82E-14				6.28E-14	0.0001	6.28E-18				
PeCDD, 1,2,3,7,8-	1.52E-11	1.51E-11	3.03E-11	1.0	3.03E-11				9.54E-15	1.0	9.54E-15				
PeCDF, 1,2,3,7,8-	5.50E-11	3.99E-11	9.48E-11	0.05	4.74E-12				2.99E-14	0.05	1.50E-15				
PeCDF, 2,3,4,7,8-	6.35E-11	5.50E-11	1.18E-10	0.50	5.92E-11				3.82E-14	0.50	1.91E-14				
TCDD, 2,3,7,8-	5.57E-12	3.25E-12	8.83E-12	1.00	8.83E-12				2.72E-15	1.00	2.72E-15				
TCDF, 2,3,7,8-	3.84E-11	1.65E-11	5.48E-11	0.10	5.48E-12				1.64E-14	0.10	1.64E-15				
Total PCDD/Fs ^(e) -					1.83E-10	—	—	NC			5.95E-14	—	—	NC	

Notes:

NA and — = Not Applicable

NC = Not Calculated since data not applicable or not available for particular chemical

(a) Inhalation Hazard Quotient = Concentration in air / Reference dose

(c) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake.

This total intake is then used to calculate the cancer risk for PCDD/Fs.

Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs

(e) Oral Hazard Quotient = (Intake mg/day * EF days/yr) / (Body weight kg * 365 days/yr * Reference dose mg/kg-day)

(f) Total Intake = Soil Intake + Produce Intake + Beef Intake

Calculation of Hazard Index Values by Target Organ and Health Endpoint

Chemicals Included in Hazard Index (HI)	Endpoint	HI	Endpoint	HI
methyl Hg	developmental	6.2E-05	developmental	
methyl Hg, elemental Hg (inhal only)	neurological	6.2E-05	neurological	2.0E-05
Hg	Kidney	5.0E-04	Kidney	2.0E-05
Hg	Immune System	5.0E-04	Immune System	2.0E-05

Potential for Noncancer Effects

Receptor: Adult Beef Farmer

	Oral Intakes						Oral Toxicity Data		Oral Hazard Quotient ^(a)	Inhalation Intakes			Inhalation Toxicity Data		Inhalation Hazard Quotient ^(a)	
	Contaminant Intake from Soil Noncarc. I _{soil} (mg/d)	Contaminant Intake from Produce I _{sp} (mg/d)	Contaminant Intake from Beef I _{beef} (mg/d)	Total Oral Intake ^(b) (mg/d)	Toxic Equivalency Factors ^(c)	TCDD Equivalent Intake ^(d) (mg/d)	Oral Chronic Reference Dose (mg/kg/d) ⁻¹	Toxicological Endpoint/ Basis		Av. Daily Inhalation Intake ADI (mg/kg/d)	Toxic Equivalency Factors ^(c)	TCDD Equivalent Intake ^(d) (mg/kg/d)	Inhalation Chronic Reference Dose (mg/kg/d) ⁻¹	Toxicological Endpoint/ Basis		
Chemical																
mercury (divalent)	9.00E-06	1.92E-06	3.85E-08	1.10E-05	NA	NA	3.0E-04	kidney, immune system	5.00E-04	1.72E-09	NA	NA	8.60E-05	neurotoxicity	2.0E-05	
mercury (elemental)	NA	NA	NA	NC	NA	NA	—	—	NC	4.30E-11	NA	NA	8.60E-05	neurotoxicity	5.0E-07	
mercury (methyl)	1.78E-07	2.77E-07	1.62E-09	4.57E-07	NA	NA	1.0E-04	neurolog., developmental	6.25E-05	0.00E+00	NA	NA	—	—	NC	
PCDD/Fs																
HpCDD, 1,2,3,4,6,7,8-	1.82E-10	2.48E-10	1.88E-10	6.16E-10	0.01	6.16E-12	—	—	NC	—	1.47E-13	0.01	1.47E-15	—	—	NC
HpCDF, 1,2,3,4,6,7,8-	2.10E-10	2.79E-10	2.16E-10	7.05E-10	0.01	7.05E-12					1.66E-13	0.01	1.66E-15			
HpCDF, 1,2,3,4,7,8,9-	2.28E-11	3.13E-11	7.07E-11	1.25E-10	0.01	1.25E-12					1.85E-14	0.01	1.85E-16			
HxCDD, 1,2,3,4,7,8-	1.29E-11	1.62E-11	7.54E-11	1.04E-10	0.10	1.04E-11					9.83E-15	0.10	9.83E-16			
HxCDD, 1,2,3,6,7,8-	2.86E-11	3.94E-11	1.44E-10	2.12E-10	0.10	2.12E-11					2.28E-14	0.10	2.28E-15			
HxCDD, 1,2,3,7,8,9-	3.14E-11	4.46E-11	1.80E-10	2.36E-10	0.10	2.36E-11					2.56E-14	0.10	2.56E-15			
HxCDF, 1,2,3,4,7,8-	9.11E-11	1.20E-10	6.02E-10	8.13E-10	0.10	8.13E-11					7.08E-14	0.10	7.08E-15			
HxCDF, 1,2,3,6,7,8-	4.95E-11	6.44E-11	2.78E-10	3.92E-10	0.10	3.92E-11					3.82E-14	0.10	3.82E-15			
HxCDF, 1,2,3,7,8,9-	8.53E-12	1.10E-11	4.75E-11	6.70E-11	0.10	6.70E-12					6.54E-15	0.10	6.54E-16			
HxCDF, 2,6,4,6,7,8-	5.59E-11	7.23E-11	2.60E-10	3.88E-10	0.10	3.88E-11					4.30E-14	0.10	4.30E-15			
OCDD, 1,2,3,4,5,7,8,9-	3.49E-10	4.99E-10	3.83E-10	1.21E-09	0.0001	1.21E-13					2.88E-13	0.0001	2.88E-17			
OCDF, 1,2,3,4,6,7,8,9-	7.59E-11	1.06E-10	7.88E-11	2.81E-10	0.0001	2.81E-14					6.28E-14	0.0001	6.28E-18			
PeCDD, 1,2,3,7,8-	1.52E-11	1.51E-11	1.11E-10	1.41E-10	1.0	1.41E-10					9.54E-15	1.0	9.54E-15			
PeCDF, 1,2,3,7,8-	5.50E-11	3.99E-11	5.65E-11	1.51E-10	0.05	7.57E-12					2.99E-14	0.05	1.50E-15			
PeCDF, 2,3,4,7,8-	6.35E-11	5.50E-11	3.53E-10	4.71E-10	0.50	2.36E-10					3.82E-14	0.50	1.91E-14			
TCDD, 2,3,7,8-	5.57E-12	3.25E-12	2.12E-11	3.01E-11	1.00	3.01E-11					2.72E-15	1.00	2.72E-15			
TCDF, 2,3,7,8-	3.84E-11	1.65E-11	2.83E-11	8.31E-11	0.10	8.31E-12					1.64E-14	0.10	1.64E-15			
Total PCDD/Fs ^(e)						6.59E-10	—	—	NC			5.95E-14	—	—	NC	

Notes:

NA and — = Not Applicable

NC = Not Calculated since data not applicable or not available for particular chemical

(a) Inhalation Hazard Quotient = Concentration in air / Reference dose

(c) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake.

This total intake is then used to calculate the cancer risk for PCDD/Fs.

Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs

(e) Oral Hazard Quotient = (Intake mg/day * EF days/yr) / (Body weight kg * 365 days/yr * Reference dose mg/kg-day)

(f) Total Intake = Soil Intake + Produce Intake + Beef Intake

Calculation of Hazard Index Values by Target Organ and Health Endpoint

Chemicals Included in Hazard Index (HI)	Endpoint	HI	Endpoint	HI
methyl Hg	developmental	6.3E-05	NA	
methyl Hg, elemental Hg (inhal only)	neurological	6.3E-05	neurological	2.0E-05
Hg	Kidney	5.0E-04	Kidney	2.0E-05
Hg	Immune System	5.0E-04	Immune System	2.0E-05

Potential for Noncancer Effects

Receptor: Adult Fisher - Caloosahatchee River

	Oral Intakes						Oral Toxicity Data			Oral Hazard Quotient ^(e)	Inhalation Intakes			Inhalation Toxicity Data			Inhalation Hazard Quotient ^(e)
	Contaminant Intake from Soil Noncanc. <i>I</i> _{soil} (mg/d)	Contaminant Intake from Produce <i>I</i> _{ag} (mg/d)	Contaminant Intake from Fish <i>I</i> _{fish} (mg/d)	Total Oral Intake ^(b) (mg/d)	Toxic Equivalency Factors ^(c)	TCDD Equivalent Intake ^(e) (mg/d)	Oral Chronic Reference Dose (mg/kg/d) ⁻¹	Toxicological Endpoint/ Basis	Av. Daily Inhalation Intake ADI (mg/kg/d)		Toxic Equivalency Factors ^(c)	TCDD Equivalent Intake ^(e) (mg/kg/d)	Inhalation Chronic Reference Dose (mg/kg/d) ⁻¹	Toxicological Endpoint/ Basis			
Chemical																	
mercury (divalent)	9.00E-06	1.92E-06	NC	1.09E-05	NA	NA	3.0E-04	kidney, immune system	4.99E-04	1.72E-09	NA	NA	8.60E-05	neurotoxicity	2.0E-05		
mercury (elemental)	NA	NA	NA	NC	NA	NA	—	—	NC	4.30E-11	NA	NA	8.60E-05	neurotoxicity	5.0E-07		
mercury (methyl)	1.78E-07	2.77E-07	8.42E-04	8.42E-04	NA	NA	1.0E-04	neurolog., developmental	1.15E-01	0.00E+00	NA	NA	—	—	NC		
PCDD/Fs																	
HpCDD, 1,2,3,4,6,7,8-	1.82E-10	2.48E-10	2.07E-10	6.37E-10	0.01	6.37E-12	NC		NC	1.47E-13	0.01	1.47E-15	NC				
HpCDF, 1,2,3,4,6,7,8-	2.10E-10	2.79E-10	2.19E-10	7.08E-10	0.01	7.08E-12				1.66E-13	0.01	1.66E-15					
HpCDF, 1,2,3,4,7,8,9-	2.28E-11	3.13E-11	2.41E-11	7.81E-11	0.01	7.81E-13				1.85E-14	0.01	1.85E-16					
HxCDD, 1,2,3,4,7,8-	1.29E-11	1.62E-11	1.05E-10	1.34E-10	0.10	1.34E-11				9.83E-15	0.10	9.83E-16					
HxCDD, 1,2,3,6,7,8-	2.86E-11	3.94E-11	1.80E-10	2.48E-10	0.10	2.48E-11				2.28E-14	0.10	2.28E-15					
HxCDD, 1,2,3,7,8,9-	3.14E-11	4.46E-11	1.99E-10	2.75E-10	0.10	2.75E-11				2.56E-14	0.10	2.56E-15					
HxCDF, 1,2,3,4,7,8-	9.11E-11	1.20E-10	5.63E-10	7.74E-10	0.10	7.74E-11				7.08E-14	0.10	7.08E-15					
HxCDF, 1,2,3,6,7,8-	4.95E-11	6.44E-11	3.13E-10	4.27E-10	0.10	4.27E-11				3.82E-14	0.10	3.82E-15					
HxCDF, 1,2,3,7,8,9-	8.53E-12	1.10E-11	5.32E-11	7.27E-11	0.10	7.27E-12				6.54E-15	0.10	6.54E-16					
HxCDF, 2,6,4,6,7,8-	5.59E-11	7.23E-11	3.48E-10	4.77E-10	0.10	4.77E-11				4.30E-14	0.10	4.30E-15					
OCDD, 1,2,3,4,5,7,8,9-	3.49E-10	4.99E-10	7.00E-12	8.55E-10	0.0001	8.55E-14				2.88E-13	0.0001	2.88E-17					
OCDF, 1,2,3,4,6,7,8,9-	7.59E-11	1.06E-10	1.82E-12	1.84E-10	0.0001	1.84E-14				6.28E-14	0.0001	6.28E-18					
PeCDD, 1,2,3,7,8-	1.52E-11	1.51E-11	1.03E-10	1.33E-10	1.0	1.33E-10				9.54E-15	1.0	9.54E-15					
PeCDF, 1,2,3,7,8-	5.50E-11	3.99E-11	4.27E-10	5.22E-10	0.05	2.61E-11				2.99E-14	0.05	1.50E-15					
PeCDF, 2,3,4,7,8-	6.35E-11	5.50E-11	5.99E-10	7.18E-10	0.50	3.59E-10				3.82E-14	0.50	1.91E-14					
TCDD, 2,3,7,8-	5.67E-12	3.25E-12	3.19E-11	4.08E-11	1.00	4.08E-11				2.72E-15	1.00	2.72E-15					
TCDF, 2,3,7,8-	3.84E-11	1.65E-11	1.87E-10	2.42E-10	0.10	2.42E-11				1.64E-14	0.10	1.64E-15					
Total PCDD/Fs ^(f)						8.38E-10	—	—	NC			5.95E-14	—	—	—	NC	

Notes:

NA and — = Not Applicable

NC = Not Calculated since data not applicable or not available for particular chemical

(a) Inhalation Hazard Quotient = Concentration in air / Reference dose

(c) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake.

This total intake is then used to calculate the cancer risk for PCDD/Fs.

Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs

(e) Oral Hazard Quotient = (Intake mg/day * EF days/yr) / (Body weight kg * 365 days/yr * Reference dose mg/kg-day)

(f) Total Intake = Soil Intake + Produce Intake + Beef Intake

Calculation of Hazard Index Values by Target Organ and Health Endpoint

Chemicals Included in Hazard Index (HI)	Endpoint	HI	Endpoint	HI
methyl Hg	developmental	1.2E-01	NA	
methyl Hg, elemental Hg (Inhal only)	neurological	1.2E-01	neurological	2.0E-05
Hg	Kidney	5.0E-04	Kidney	2.0E-05
Hg	Immune System	5.0E-04	Immune System	2.0E-05

Potential for Noncancer Effects

Receptor: Adult Fisher - Typical Pond

	Oral Intakes						Oral Toxicity Data		Oral Hazard Quotient ^(e)	Inhalation Intakes			Inhalation Toxicity Data		
	Contaminant Intake from Soil Noncanc. I _{soil} (mg/d)	Contaminant Intake from Produce I _{ng} (mg/d)	Contaminant Intake from Fish I _{fish} (mg/d)	Total Oral Intake ^(f) (mg/d)	Toxic Equivalency Factors ^(e)	TCDD Equivalent Intake ^(e) (mg/d)	Oral Chronic Reference Dose (mg/kg/d) ⁻¹	Toxicological Endpoint/ Basis		Av. Daily Inhalation Intake ADI (mg/kg/d)	Toxic Equivalency Factors ^(e)	TCDD Equivalent Intake ^(e) (mg/kg/d)	Inhalation Chronic Reference Dose (mg/kg/d) ⁻¹	Toxicological Endpoint/ Basis	Inhalation Hazard Quotient ^(e)
Chemical															
mercury (divalent)	9.00E-06	1.92E-06	NC	1.09E-05	NA	NA	3.0E-04	kidney, immune system	4.99E-04	1.72E-09	NA	NA	8.60E-05	neurotoxicity	2.0E-05
mercury (elemental)	NA	NA	NA	NC	NA	NA	--	--	NC	4.30E-11	NA	NA	8.60E-05	neurotoxicity	5.0E-07
mercury (methyl)	1.78E-07	2.77E-07	3.28E-05	3.33E-05	NA	NA	1.0E-04	neurolog., developmental	4.56E-03	0.00E+00	NA	NA	--	--	NC
PCDD/Fs															
HpCDD, 1,2,3,4,6,7,8-	1.82E-10	2.48E-10	1.25E-10	5.55E-10	0.01	5.55E-12	--	--	NC	1.47E-13	0.01	1.47E-15	--	--	NC
HpCDF, 1,2,3,4,6,7,8-	2.10E-10	2.79E-10	1.38E-10	6.27E-10	0.01	6.27E-12				1.66E-13	0.01	1.66E-15			
HpCDF, 1,2,3,4,7,8,9-	2.28E-11	3.13E-11	1.49E-11	6.90E-11	0.01	6.90E-13				1.85E-14	0.01	1.85E-16			
HxCDD, 1,2,3,4,7,8-	1.29E-11	1.62E-11	7.11E-11	1.00E-10	0.10	1.00E-11				9.83E-15	0.10	9.83E-18			
HxCDD, 1,2,3,6,7,8-	2.86E-11	3.94E-11	1.36E-10	2.05E-10	0.10	2.05E-11				2.28E-14	0.10	2.28E-15			
HxCDD, 1,2,3,7,8,9-	3.14E-11	4.46E-11	1.48E-10	2.24E-10	0.10	2.24E-11				2.56E-14	0.10	2.56E-15			
HxCDF, 1,2,3,4,7,8-	9.11E-11	1.20E-10	4.26E-10	6.36E-10	0.10	6.36E-11				7.08E-14	0.10	7.08E-15			
HxCDF, 1,2,3,6,7,8-	4.95E-11	6.44E-11	2.52E-10	3.66E-10	0.10	3.66E-11				3.82E-14	0.10	3.82E-15			
HxCDF, 1,2,3,7,8,9-	8.53E-12	1.10E-11	4.16E-11	6.11E-11	0.10	6.11E-12				6.54E-15	0.10	6.54E-16			
HxCDF, 2,6,4,6,7,8-	5.59E-11	7.23E-11	2.72E-10	4.00E-10	0.10	4.00E-11				4.30E-14	0.10	4.30E-15			
OCDD, 1,2,3,4,5,7,8,9-	3.49E-10	4.99E-10	4.81E-12	8.53E-10	0.0001	8.53E-14				2.88E-13	0.0001	2.88E-17			
OCDF, 1,2,3,4,6,7,8,9-	7.59E-11	1.06E-10	1.05E-12	1.83E-10	0.0001	1.83E-14				6.28E-14	0.0001	6.28E-18			
PeCDD, 1,2,3,7,8-	1.52E-11	1.51E-11	1.79E-10	2.10E-10	1.0	2.10E-10				9.54E-15	1.0	9.54E-15			
PeCDF, 1,2,3,7,8-	5.50E-11	3.99E-11	6.08E-10	7.03E-10	0.05	3.51E-11				2.99E-14	0.05	1.50E-15			
PeCDF, 2,3,4,7,8-	6.35E-11	5.50E-11	7.28E-10	8.46E-10	0.50	4.23E-10				3.82E-14	0.50	1.91E-14			
TCDD, 2,3,7,8-	5.57E-12	3.25E-12	4.34E-11	5.22E-11	1.00	5.22E-11				2.72E-15	1.00	2.72E-15			
TCDF, 2,3,7,8-	3.84E-11	1.65E-11	3.30E-10	3.85E-10	0.10	3.85E-11				1.64E-14	0.10	1.64E-15			
Total PCDD/Fs ^(e) -						9.70E-10	--	--	NC			5.95E-14	--	--	NC

Notes:

NA and — = Not Applicable

NC = Not Calculated since data not applicable or not available for particular chemical

(a) Inhalation Hazard Quotient = Concentration in air / Reference dose

(c) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake.

This total intake is then used to calculate the cancer risk for PCDD/Fs.

Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs

(e) Oral Hazard Quotient = (Intake mg/day * EF days/yr) / (Body weight kg * 365 days/yr * Reference dose mg/kg-day)

(f) Total Intake = Soil Intake + Produce Intake + Beef Intake

Calculation of Hazard Index Values by Target Organ and Health Endpoint

Chemicals Included in Hazard Index (HI)	Endpoint	HI	Endpoint	HI
methyl Hg	developmental	4.6E-03	NA	
methyl Hg, elemental Hg (inhal only)	neurological	4.6E-03	neurological	2.0E-05
Hg	Kidney	5.0E-04	Kidney	2.0E-05
Hg	Immune System	5.0E-04	Immune System	2.0E-05

Potential for Noncancer Effects

Receptor: Child of Adult Resident

	Oral Intakes					Oral Toxicity Data				Inhalation Intakes			Inhalation Toxicity Data		
	Contaminant Intake from Soil Noncanc. (mg/d)	Contaminant Intake from Produce (mg/d)	Total Oral Intake ^(b) (mg/d)	Toxic Equivalency Factors ^(c)	TCDD Equivalent Intake ^(d) (mg/d)	Oral Chronic Reference Dose (mg/kg/d) ⁻¹	Toxicological Endpoint/ Basis	Oral Hazard Quotient ^(e)		Av. Daily Inhalation Intake: ADI (mg/kg/d)	Toxic Equivalency Factors ^(c)	TCDD Equivalent Intake ^(d) (mg/kg/d)	Inhalation Chronic Reference Dose (mg/kg/d) ⁻¹	Toxicological Endpoint/ Basis	
Chemical															
mercury (divalent)	1.80E-05	1.07E-06	1.91E-05	NA	NA	3.0E-04	kidney, immune system	8.71E-04	3.85E-09	NA	NA	8.60E-05	neurotoxicity	4.5E-05	
mercury (elemental)	NA	NA	0.00E+00	NA	NA	—	—	NC	9.63E-11	NA	NA	8.60E-05	neurotoxicity	1.1E-06	
mercury (methyl)	3.56E-07	7.36E-08	4.29E-07	NA	NA	1.0E-04	neurolog., developmental	5.88E-05	0.00E+00	NA	NA	—	—	NC	
PCDD/Fs															
HpCDD, 1,2,3,4,6,7,8-	3.63E-10	7.45E-11	4.38E-10	0.01	4.38E-12			NC	3.30E-13	0.01	3.30E-15				
HpCDF, 1,2,3,4,6,7,8-	4.20E-10	8.38E-11	5.04E-10	0.01	5.04E-12				3.72E-13	0.01	3.72E-15				
HpCDF, 1,2,3,4,7,8,9-	4.57E-11	9.38E-12	5.51E-11	0.01	5.51E-13				4.13E-14	0.01	4.13E-16				
HxCDD, 1,2,3,4,7,8-	2.58E-11	4.87E-12	3.07E-11	0.10	3.07E-12				2.20E-14	0.10	2.20E-15				
HxCDD, 1,2,3,6,7,8-	5.72E-11	1.18E-11	6.91E-11	0.10	6.91E-12				5.12E-14	0.10	5.12E-15				
HxCDD, 1,2,3,7,8,9-	6.29E-11	1.34E-11	7.62E-11	0.10	7.62E-12				5.73E-14	0.10	5.73E-15				
HxCDF, 1,2,3,4,7,8-	1.82E-10	3.59E-11	2.18E-10	0.10	2.18E-11				1.59E-13	0.10	1.59E-14				
HxCDF, 1,2,3,6,7,8-	9.89E-11	1.93E-11	1.18E-10	0.10	1.18E-11				8.56E-14	0.10	8.56E-15				
HxCDF, 1,2,3,7,8,9-	1.71E-11	3.29E-12	2.04E-11	0.10	2.04E-12				1.47E-14	0.10	1.47E-15				
HxCDF, 2,6,4,6,7,8-	1.12E-10	2.17E-11	1.33E-10	0.10	1.33E-11				8.63E-14	0.10	8.63E-15				
OCDD, 1,2,3,4,5,7,8,9-	6.97E-10	1.50E-10	8.47E-10	0.0001	8.47E-14				6.46E-13	0.0001	6.46E-17				
OCDF, 1,2,3,4,6,7,8,9-	1.52E-10	3.18E-11	1.84E-10	0.0001	1.84E-14				1.41E-13	0.0001	1.41E-17				
PeCDD, 1,2,3,7,8-	3.03E-11	4.54E-12	3.48E-11	1.0	3.48E-11				2.14E-14	1.0	2.14E-14				
PeCDF, 1,2,3,7,8-	1.10E-10	1.20E-11	1.22E-10	0.05	6.09E-12				6.70E-14	0.05	3.35E-15				
PeCDF, 2,3,4,7,8-	1.27E-10	1.65E-11	1.43E-10	0.50	7.17E-11				8.56E-14	0.50	4.28E-14				
TCDD, 2,3,7,8-	1.11E-11	9.74E-13	1.21E-11	1.00	1.21E-11				6.10E-15	1.00	6.10E-15				
TCDF, 2,3,7,8-	7.67E-11	4.92E-12	8.17E-11	0.10	8.17E-12				3.67E-14	0.10	3.67E-15				
Total PCDD/Fs ^(f)					2.10E-10	—	—	NC			1.33E-13	—	—	NC	

Notes:

NA and -- = Not Applicable

NC = Not Calculated since data not applicable or not available for particular chemical

(a) Inhalation Hazard Quotient = Concentration in air / Reference dose

(c) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake. This total intake is then used to calculate the cancer risk for PCDD/Fs.

Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs

(e) Oral Hazard Quotient = (Intake mg/day * EF days/yr) / (Body weight kg * 365 days/yr * Reference dose mg/kg-day)

(f) Total Intake = Soil Intake + Produce Intake + Beef Intake

Calculation of Hazard Index Values by Target Organ and Health Endpoint

Chemicals included in Hazard Index (HI)		Endpoint	HI	Endpoint	HI
methyl Hg		developmental	5.9E-05	NA	
methyl Hg, elemental Hg (inhal only)		neurological	5.9E-05	neurological	4.6E-05
Hg		Kidney	8.7E-04	Kidney	4.5E-05
Hg		Immune System	8.7E-04	Immune System	4.5E-05

Potential for Noncancer Effects

Receptor: Child of Adult Beef Farmer

	Oral Intakes						Oral Toxicity Data		Oral Hazard Quotient ^(e)	Inhalation Intakes			Inhalation Toxicity Data		Inhalation Hazard Quotient ^(e)
	Contaminant Intake from Soil Noncanc. <i>I</i> _{soil} (mg/d)	Contaminant Intake from Produce <i>I</i> _{pg} (mg/d)	Contaminant Intake from Beef <i>I</i> _{beef} (mg/d)	Total Oral Intake ^(b) (mg/d)	Toxic Equivalency Factors ^(c)	TCDD Equivalent Intake ^(c) (mg/d)	Oral Chronic Reference Dose (mg/kg/d) ^(f)	Toxicological Endpoint/ Basis		Av. Daily Inhalation Intake ADI (mg/kg/d)	Toxic Equivalency Factors ^(c)	TCDD Equivalent Intake ^(c) (mg/kg/d)	Inhalation Chronic Reference Dose (mg/kg/d) ^(f)	Toxicological Endpoint/ Basis	
Chemical															
mercury (divalent)	1.80E-05	1.07E-06	3.68E-09	1.91E-05	NA	NA	3.0E-04	kidney, immune system	8.71E-04	3.85E-09	NA	NA	8.60E-05	neurotoxicity	4.5E-05
mercury (elemental)	NA	NA	NA	NC	NA	NA	—	—	NC	9.63E-11	NA	NA	8.60E-05	neurotoxicity	1.1E-06
mercury (methyl)	3.56E-07	7.36E-08	1.55E-10	4.29E-07	NA	NA	1.0E-04	neurolog., developmental	5.88E-05	0.00E+00	NA	NA	—	—	NC
PCDD/Fs															
HpCDD, 1,2,3,4,6,7,8-	3.63E-10	7.45E-11	1.82E-11	4.56E-10	0.01	4.56E-12	—	—	NC	3.30E-13	0.01	3.30E-15	—	—	NC
HpCDF, 1,2,3,4,6,7,8-	4.20E-10	8.38E-11	2.11E-11	5.25E-10	0.01	5.25E-12				3.72E-13	0.01	3.72E-15			
HpCDF, 1,2,3,4,7,8,9-	4.57E-11	9.38E-12	6.91E-12	6.20E-11	0.01	6.20E-13				4.13E-14	0.01	4.13E-16			
HxCDD, 1,2,3,4,7,8-	2.58E-11	4.87E-12	7.37E-12	3.80E-11	0.10	3.80E-12				2.20E-14	0.10	2.20E-15			
HxCDD, 1,2,3,6,7,8-	5.72E-11	1.18E-11	1.41E-11	8.31E-11	0.10	8.31E-12				5.12E-14	0.10	5.12E-15			
HxCDD, 1,2,3,7,8,9-	6.29E-11	1.34E-11	1.57E-11	9.19E-11	0.10	9.19E-12				5.73E-14	0.10	5.73E-15			
HxCDF, 1,2,3,4,7,8-	1.82E-10	3.59E-11	5.90E-11	2.77E-10	0.10	2.77E-11				1.59E-13	0.10	1.59E-14			
HxCDF, 1,2,3,6,7,8-	9.89E-11	1.93E-11	2.73E-11	1.45E-10	0.10	1.45E-11				8.56E-14	0.10	8.56E-15			
HxCDF, 1,2,3,7,8,9-	1.71E-11	3.29E-12	4.66E-12	2.50E-11	0.10	2.50E-12				1.47E-14	0.10	1.47E-15			
HxCDF, 2,6,4,6,7,8-	1.12E-10	2.17E-11	2.55E-11	1.59E-10	0.10	1.59E-11				9.63E-14	0.10	9.63E-15			
OCDD, 1,2,3,4,5,7,8,9-	6.97E-10	1.50E-10	3.54E-11	8.82E-10	0.0001	8.82E-14				6.46E-13	0.0001	6.46E-17			
OCDF, 1,2,3,4,6,7,8,9-	1.52E-10	3.18E-11	7.70E-12	1.91E-10	0.0001	1.91E-14				1.41E-13	0.0001	1.41E-17			
PeCDD, 1,2,3,7,8-	3.03E-11	4.54E-12	1.09E-11	4.58E-11	1.0	4.58E-11				2.14E-14	1.0	2.14E-14			
PeCDF, 1,2,3,7,8-	1.10E-10	1.20E-11	5.63E-12	1.27E-10	0.05	6.37E-12				6.70E-14	0.05	3.35E-15			
PeCDF, 2,3,4,7,8-	1.27E-10	1.65E-11	3.49E-11	1.78E-10	0.50	8.92E-11				8.56E-14	0.50	4.28E-14			
TCDD, 2,3,7,8-	1.11E-11	9.74E-13	2.14E-12	1.43E-11	1.00	1.43E-11				6.10E-15	1.00	6.10E-15			
TCDF, 2,3,7,8-	7.67E-11	4.92E-12	2.93E-12	8.46E-11	0.10	8.46E-12				3.67E-14	0.10	3.67E-15			
Total PCDD/Fs ^(d)						2.57E-10	—	—	NC			1.33E-13	—	—	NC

Notes:

NA and — = Not Applicable

NC = Not Calculated since data not applicable or not available for particular chemical

(a) Inhalation Hazard Quotient = Concentration in air / Reference dose

(c) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake.

This total intake is then used to calculate the cancer risk for PCDD/Fs.

Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs

(e) Oral Hazard Quotient = (Intake mg/day * EF days/yr) / (Body weight kg * 365 days/yr * Reference dose mg/kg-day)

(f) Total intake = Soil intake + Produce intake + Beef intake

Calculation of Hazard Index Values by Target Organ and Health Endpoint

Chemicals Included In Hazard Index (HI)	Endpoint	HI	Endpoint	HI
methyl Hg	developmental	5.9E-05	NA	
methyl Hg, elemental Hg (inhal only)	neurological	5.9E-05	neurological	4.6E-05
Hg	Kidney	8.7E-04	Kidney	4.5E-05
Hg	immune System	8.7E-04	Immune System	4.5E-05

Potential for Noncancer Effects

Receptor: Child of Adult Fisher (River)

	Oral Intakes						Oral Toxicity Data		Oral Hazard Quotient ^(e)	Inhalation Intakes			Inhalation Toxicity Data		Inhalation Hazard Quotient ^(e)
	Contaminant Intake from Soil Noncanc. <i>I</i> _{soil} (mg/d)	Contaminant Intake from Produce <i>I</i> _{ag} (mg/d)	Contaminant Intake from Fish <i>I</i> _{fish} (mg/d)	Total Oral Intake ^(b) (mg/d)	Toxic Equivalency Factors ^(c)	TCDD Equivalent Intake ^(d) (mg/d)	Oral Chronic Reference Dose (mg/kg/d) ⁻¹	Toxicological Endpoint/ Basis		Av. Daily Inhalation Intake ADI (mg/kg/d)	Toxic Equivalency Factors ^(c)	TCDD Equivalent Intake ^(d) (mg/kg/d)	Inhalation Chronic Reference Dose (mg/kg/d) ⁻¹	Toxicological Endpoint/ Basis	
Chemical															
mercury (divalent)	1.80E-05	1.07E-06	NC	1.91E-05	NA	NA	3.0E-04	kidney, immune system	4.06E-03	3.85E-09	NA	NA	8.60E-05	neurotoxicity	4.5E-05
mercury (elemental)	NA	NA	NA	NC	NA	NA	—	—	NC	9.83E-11	NA	NA	8.60E-05	neurotoxicity	1.1E-06
mercury (methyl)	3.56E-07	7.36E-08	1.13E-04	1.13E-04	NA	NA	1.0E-04	neurolog., developmental	7.25E-02	0.00E+00	NA	NA	—	—	NC
PCDD/Fs															
HpCDD, 1,2,3,4,6,7,8-	3.63E-10	7.45E-11	2.78E-11	4.66E-10	0.01	4.66E-12			NC	3.30E-13	0.01	3.30E-15			NC
HpCDF, 1,2,3,4,6,7,8-	4.20E-10	8.38E-11	2.94E-11	5.33E-10	0.01	5.33E-12				3.72E-13	0.01	3.72E-15			
HpCDF, 1,2,3,4,7,8,9-	4.57E-11	9.38E-12	3.23E-12	5.83E-11	0.01	5.83E-13				4.13E-14	0.01	4.13E-16			
HxCDD, 1,2,3,4,7,8-	2.58E-11	4.87E-12	1.41E-11	4.48E-11	0.10	4.48E-12				2.20E-14	0.10	2.20E-15			
HxCDD, 1,2,3,6,7,8-	5.72E-11	1.18E-11	2.41E-11	9.32E-11	0.10	9.32E-12				5.12E-14	0.10	5.12E-15			
HxCDD, 1,2,3,7,8,9-	6.29E-11	1.34E-11	2.67E-11	1.03E-10	0.10	1.03E-11				5.73E-14	0.10	5.73E-15			
HxCDF, 1,2,3,4,7,8-	1.82E-10	3.59E-11	7.56E-11	2.94E-10	0.10	2.94E-11				1.59E-13	0.10	1.59E-14			
HxCDF, 1,2,3,6,7,8-	9.89E-11	1.93E-11	4.20E-11	1.60E-10	0.10	1.60E-11				8.56E-14	0.10	8.56E-15			
HxCDF, 1,2,3,7,8,9-	1.71E-11	3.29E-12	7.13E-12	2.75E-11	0.10	2.75E-12				1.47E-14	0.10	1.47E-15			
HxCDF, 2,6,4,6,7,8-	1.12E-10	2.17E-11	4.67E-11	1.80E-10	0.10	1.80E-11				9.63E-14	0.10	9.63E-15			
OCDD, 1,2,3,4,5,7,8,9-	6.97E-10	1.50E-10	9.39E-13	8.48E-10	0.0001	8.48E-14				6.46E-13	0.0001	6.46E-17			
OCDF, 1,2,3,4,6,7,8,9-	1.52E-10	3.18E-11	2.44E-13	1.84E-10	0.0001	1.84E-14				1.41E-13	0.0001	1.41E-17			
PeCDD, 1,2,3,7,8-	3.03E-11	4.54E-12	1.38E-11	4.86E-11	1.0	4.86E-11				2.14E-14	1.0	2.14E-14			
PeCDF, 1,2,3,7,8-	1.10E-10	1.20E-11	5.73E-11	1.79E-10	0.05	8.96E-12				6.70E-14	0.05	3.35E-15			
PeCDF, 2,3,4,7,8-	1.27E-10	1.65E-11	8.04E-11	2.24E-10	0.50	1.12E-10				8.56E-14	0.50	4.28E-14			
TCDD, 2,3,7,8-	1.11E-11	9.74E-13	4.28E-12	1.64E-11	1.00	1.64E-11				6.10E-15	1.00	6.10E-15			
TCDF, 2,3,7,8-	7.67E-11	4.92E-12	2.51E-11	1.07E-10	0.10	1.07E-11				3.67E-14	0.10	3.67E-15			
Total PCDD/Fs ^(e)						2.98E-10	—	—	NC			1.33E-13	—	—	NC

Notes:

NA and — = Not Applicable

NC = Not Calculated since data not applicable or not available for particular chemical

(a) Inhalation Hazard Quotient = Concentration in air / Reference dose

(c) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake. This total intake is then used to calculate the cancer risk for PCDD/Fs.

Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs

(e) Oral Hazard Quotient = (Intake mg/day * EF days/yr) / (Body weight kg * 365 days/yr * Reference dose mg/kg-day)

(f) Total Intake = Soil Intake + Produce Intake + Beef Intake

Calculation of Hazard Index Values by Target Organ and Health Endpoint

Chemicals Included in Hazard Index (HI)	Endpoint	HI	Endpoint	HI
methyl Hg	developmental	7.2E-02	NA	
methyl Hg, elemental Hg (inhal only)	neurological	7.2E-02	neurological	4.6E-05
Hg	Kidney	4.1E-03	Kidney	4.5E-05
Hg	Immune System	4.1E-03	Immune System	4.5E-05

Potential for Noncancer Effects

Receptor: Child of Adult Fisher (Pond)

	Oral Intakes						Oral Toxicity Data		Oral Hazard Quotient ^(e)	Inhalation Intakes			Inhalation Toxicity Data			Inhalation Hazard Quotient ^(e)
	Contaminant Intake from Soil Noncanc. <i>I</i> _{soil} (mg/d)	Contaminant Intake from Produce <i>I</i> _{pg} (mg/d)	Contaminant Intake from Fish <i>I</i> _{fish} (mg/d)	Total Oral Intake ^(b) (mg/d)	Toxic Equivalency Factors ^(c)	TCDD Equivalent Intake ^(c) (mg/d)	Oral Chronic Reference Dose (mg/kg/d) ⁻¹	Toxicological Endpoint/ Basis		Av. Daily Inhalation Intake ADI (mg/kg/d)	Toxic Equivalency Factors ^(c)	TCDD Equivalent Intake ^(c) (mg/kg/d)	Inhalation Chronic Reference Dose (mg/kg/d) ⁻¹	Toxicological Endpoint/ Basis		
Chemical																
mercury (divalent)	1.80E-05	1.07E-06	NC	1.91E-05	NA	NA	3.0E-04	kidney, immune system	4.06E-03	3.85E-09	NA	NA	8.60E-05	neurotoxicity	4.5E-05	
mercury (elemental)	NA	NA	NA	NC	NA	NA	--	--	NC	9.63E-11	NA	NA	8.60E-05	neurotoxicity	1.1E-06	
mercury (methyl)	3.56E-07	7.36E-08	4.41E-06	4.83E-06	NA	NA	1.0E-04	neurolog., developmental	3.09E-03	0.00E+00	NA	NA	--	--	NC	
PCDD/Fs																
HpCDD, 1,2,3,4,6,7,8-	3.63E-10	7.45E-11	1.68E-11	4.55E-10	0.01	4.55E-12				3.30E-13	0.01	3.30E-15				
HpCDF, 1,2,3,4,6,7,8-	4.20E-10	8.38E-11	1.85E-11	5.22E-10	0.01	5.22E-12				3.72E-13	0.01	3.72E-15				
HpCDF, 1,2,3,4,7,8,9-	4.57E-11	9.38E-12	1.99E-12	5.71E-11	0.01	5.71E-13				4.13E-14	0.01	4.13E-16				
HxCDD, 1,2,3,4,7,8-	2.58E-11	4.87E-12	9.54E-12	4.02E-11	0.10	4.02E-12				2.20E-14	0.10	2.20E-15				
HxCDD, 1,2,3,6,7,8-	5.72E-11	1.18E-11	1.83E-11	8.74E-11	0.10	8.74E-12				5.12E-14	0.10	5.12E-15				
HxCDD, 1,2,3,7,8,9-	6.29E-11	1.34E-11	1.98E-11	9.61E-11	0.10	9.61E-12				5.73E-14	0.10	5.73E-15				
HxCDF, 1,2,3,4,7,8-	1.82E-10	3.59E-11	5.71E-11	2.75E-10	0.10	2.75E-11				1.59E-13	0.10	1.59E-14				
HxCDF, 1,2,3,6,7,8-	9.89E-11	1.93E-11	3.38E-11	1.52E-10	0.10	1.52E-11				8.56E-14	0.10	8.56E-15				
HxCDF, 1,2,3,7,8,9-	1.71E-11	3.29E-12	5.58E-12	2.59E-11	0.10	2.59E-12				1.47E-14	0.10	1.47E-15				
HxCDF, 2,6,4,6,7,8-	1.12E-10	2.17E-11	3.64E-11	1.70E-10	0.10	1.70E-11				9.63E-14	0.10	9.63E-15				
OCDD, 1,2,3,4,5,7,8,9-	6.97E-10	1.50E-10	6.45E-13	8.48E-10	0.0001	8.48E-14				6.46E-13	0.0001	6.46E-17				
OCDF, 1,2,3,4,6,7,8,9-	1.52E-10	3.18E-11	1.40E-13	1.84E-10	0.0001	1.84E-14				1.41E-13	0.0001	1.41E-17				
PeCDD, 1,2,3,7,8-	3.03E-11	4.54E-12	2.41E-11	5.89E-11	1.0	5.89E-11				2.14E-14	1.0	2.14E-14				
PeCDF, 1,2,3,7,8-	1.10E-10	1.20E-11	8.15E-11	2.03E-10	0.05	1.02E-11				6.70E-14	0.05	3.35E-15				
PeCDF, 2,3,4,7,8-	1.27E-10	1.65E-11	9.76E-11	2.41E-10	0.50	1.21E-10				8.56E-14	0.50	4.28E-14				
TCDD, 2,3,7,8-	1.11E-11	9.74E-13	5.82E-12	1.79E-11	1.00	1.79E-11				6.10E-15	1.00	6.10E-15				
TCDF, 2,3,7,8-	7.67E-11	4.92E-12	4.43E-11	1.26E-10	0.10	1.26E-11				3.67E-14	0.10	3.67E-15				
Total PCDD/Fs ^(d) -						3.15E-10	--	--	NC			1.33E-13	--	--	NC	

Notes:

NA and — = Not Applicable

NC = Not Calculated since data not applicable or not available for particular chemical

(a) Inhalation Hazard Quotient = Concentration in air / Reference dose

(c) For Dioxins and Furans (PCDD/Fs), the total intake is calculated by multiplying the intake of each PCDD/F by the Toxic Equivalency Factor (TEF) for each chemical and then summing to produce the total TCDD equivalent intake.

This total intake is then used to calculate the cancer risk for PCDD/Fs.

Source: USEPA 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of CDDs and CDFs

(e) Oral Hazard Quotient = (Intake mg/day * EF days/yr) / (Body weight kg * 365 days/yr * Reference dose mg/kg-day)

(f) Total Intake = Soil Intake + Produce Intake + Beef Intake

Calculation of Hazard Index Values by Target Organ and Health Endpoint

Chemicals included in Hazard Index (HI)	Endpoint	HI	Endpoint	HI
methyl Hg	developmental	3.1E-03	NA	
methyl Hg, elemental Hg (inhal only)	neurological	3.1E-03	neurological	4.6E-05
Hg	Kidney	4.1E-03	Kidney	4.5E-05
Hg	Immune System	4.1E-03	Immune System	4.5E-05

Infant Exposure Through Breastmilk

Receptor: Infant

Adult Receptor	Average maternal intake of dioxin $I^{(a)}$ (mg TEQs/d)	Half-life of dioxin in adults h (days)	Proportion of ingested dioxin stored in fat f_1 (unitless)	Proportion of mother's weight that is fat f_2 (unitless)	Adult body wt. BW_{adult} (kg)	Conc. in maternal milk $C_{(milkfat)}^{(b)}$ (pg TEQs/kg of milkfat)
	—	2555	0.9	0.3	70	—
Resident	1.87E-10	—	—	—	—	2.96E+01
Beef farmer	6.63E-10	—	—	—	—	1.05E+02
Fisher (Caloosahatchee River)	8.42E-10	—	—	—	—	1.33E+02
Fisher (Nearby Typical Pond)	9.74E-10	—	—	—	—	1.54E+02

Notes:

(a) Based on adult: $I = (\text{oral intake mg TEQs/day}) + (\text{inhalation intake mg TEQs/kg/day} \cdot \text{body weight kg})$.

(b) $C_{(milkfat)} = (I \cdot 10^9 \text{ (pg/mg)} \cdot h \cdot f_1) / (0.693 \cdot f_2 \cdot BW_{adult})$

Adult Receptor	Fraction of fat in breastmilk f_3 (unitless)	Fraction ingested contaminant absorbed f_4 (unitless)	Ingestion rate of breastmilk IR_{milk} (kg/d)	Exposure duration ED (year)	Infant body wt. BW_{infant} (kg)	Averaging time AT (year)	Average daily dose for infant $ADD_{(infant)}^{(a)}$ (pg TEQs/kg/d)
	0.04	0.9	0.8	1	10	1	—
Resident	—	—	—	—	—	—	0.1
Beef farmer	—	—	—	—	—	—	0.3
Fisher (Caloosahatchee River)	—	—	—	—	—	—	0.4
Fisher (Nearby Typical Pond)	—	—	—	—	—	—	0.4

Notes:

(a) $ADD = (C_{(milkfat)} \cdot f_3 \cdot f_4 \cdot IR_{milk} \cdot ED) / (BW_{infant} \cdot AT)$

12.2 – Human Health and Ecological Risk Assessment 1992

Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT FOR
THE PROPOSED LEE COUNTY WASTE-TO-ENERGY FACILITY

Clement International Corporation

Environmental and Health Science

EXHIBIT
LEE COUNTY
94

HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT FOR
THE PROPOSED LEE COUNTY WASTE-TO-ENERGY FACILITY

Prepared for:

Lee County Board of County Commissioners
Fort Myers, FL

Prepared by:

Clement International Corporation
9300 Lee Highway
Fairfax, VA

April 9, 1992

EXECUTIVE SUMMARY

Lee County has proposed to construct a 1,200 ton per day waste-to-energy (WTE) facility on a site approximately one mile to the west of Fort Myers, Florida. Although the facility is designed to be in conformance with federal and state emission requirements, concerns have been raised about the potential for emissions to result in a negative human health and/or environmental impact. In order to address these concerns, a focused human health and ecological risk assessment was performed in accordance with regulatory guidance and using conservative assumptions. The assessment evaluated the potential for mercury and dioxin impacts on human health, on aquatic life, and on food chains ending in endangered top predators. The assessment found that environmental concentrations of mercury and dioxin associated with emissions from the WTE facility will be lower than those of concern to regulatory agencies when compared to human toxicological criteria, ambient water quality criteria and toxicity reference values. The construction of the proposed facility would not adversely affect humans or threatened or endangered species.

INTRODUCTION

Lee County has proposed to construct a 1,200 ton-per-day waste-to-energy (WTE) facility on a site located approximately one mile west of Fort Myers, Florida. The facility has been designed to minimize emissions to the greatest extent practicable by using state-of-the-art controls. The facility will include a scrubber, baghouse, deNO_x, and mercury control systems. The emissions from the facility are expected to be far below any level that might result in adverse impacts on human health. The project is described in detail in the Application for Power Plant Certification (CDM 1990). Recently, the facility vendor agreed to reduce mercury emissions to 140 ug/dscm (corrected to 7% O₂) compared to the value of approximately 700 ug/dscm (@ 7%O₂) or 560 ug/dscm (actual) sought in the original permit application. An evaluation of emission rates (Elias 1992) demonstrates that, in reality, the actual 52% mercury emissions could be as low as 52 ug/dscm (70 ug/dscm @ 7% O₂). The new proposed limit of 140 ug/dscm corresponds to an emission rate of 0.0048 g/sec per unit or a total emission rate of 0.0096 g/sec. This emission rate is used in the following risk assessment to give an accurate, although conservative, indication of the potential for a threat to human health or the environment from operation of the facility.

The objective of this risk assessment was to investigate the fate of emissions from the proposed facility and effects on the human and natural environment. The focus of the assessment was on environmental concerns which had been raised by citizens and the U.S. Fish and Wildlife Service (USFWS) during the permitting process. These concerns are primarily due to the role of the south Florida area as habitat for threatened or endangered species. In addition, a section on human health has been included as a point of reference. This document presents the results of the ecological assessment first, followed by the human health risk assessment.

The ecological risk assessment was performed in accordance with U.S. Environmental Protection Agency (USEPA) guidance on ecological risk assessments (USEPA 1989). It was based on data concerning the ecotoxicity of dioxin and mercury published by the USFWS (Eisler 1986, 1987), publications

from the Florida DER (1990a,b) regarding the Florida mercury problem, information available in the Application for Certification, and site specific data, including a visit to the site and to environmentally sensitive areas in south Florida. The major components of the ecological risk assessment are a selection of chemicals of concern, selection of indicator species, exposure assessment, development of toxicity reference values, and assessment of risk.

The human health risk assessment was based on guidelines which have been developed by USEPA. In particular, USEPA's guidance on cancer risk assessment, exposure assessment, risk assessment of chemical mixtures (USEPA 1986a,b,c), Methodology for Assessing Health Risks Associated with Indirect Exposure to Combustor Emissions (USEPA 1990), and the Risk Assessment Guidance for Superfund (USEPA 1989) were relied on heavily in the production of this risk assessment. In addition, the Health Risk Assessment Guidelines for Nonhazardous Waste Incinerators produced by California's Air Resources Board (CARB 1990) was used to supplement the USEPA guidelines.

Selection of Chemicals of Potential Concern

The first step in this assessment was the selection of chemicals of potential concern. These are mercury and 2,3,7,8-tetrachlorodibenzo-p-dioxin (dioxin). Mercury is of particular concern due to the high concentrations in environmental media throughout Florida, and due to the potential for acute and chronic ecotoxicity, transformation and bioaccumulation. Mercury is also of concern to human health due to its association with potential central nervous system damage. Dioxin is of concern because it is considered to be highly bioaccumulative and chronically toxic. Dioxin is, in fact, the chemical with the highest potential human health toxicity of all chemicals which are commonly measured in emissions from waste-to-energy facilities. These chemicals would be the dominating factors affecting any ecological risks associated with emissions from the proposed WTE facility.

ECOLOGICAL RISK ASSESSMENT

Selection of Indicator Species

The next step in the risk assessment process was the selection of indicator species for evaluation. Because of the diversity of flora and fauna near the proposed facility, it is not feasible to assess impacts to every species that could be potentially affected. A common approach to this problem, and one that was used here, is the selection of "indicator" species for detailed evaluation. Selection of indicator species in this assessment considered the potential for exposure, availability of toxicity and exposure information, and the composition and stability of the potentially affected populations.

Endangered species are species that are in danger of extinction. Many species have become endangered primarily because of loss of specific habitats due to human activities such as construction and logging, or due to increased competition with other animals that are more adaptable to environmental changes. Some species are endangered because of their highly specialized feeding or nesting requirements. Regardless of the reason, endangered species populations are more sensitive to environmental changes and are more likely to be impacted than are non-endangered species. Because of their low numbers, the loss of even one individual of an endangered species could impact the survival of that species. Therefore, endangered species were the focus of this assessment. Potential impacts to these sensitive species are representative of potential maximum ecological risks associated with the WTE facility.

Endangered species were identified based on data provided to CDM by the Florida Game and Freshwater Fish Commission (FGFWFC 1989, CDM 1990) and U.S. Fish and Wildlife Service (CDM 1990). These endangered species are listed in Table 1. The species in this table were examined with regard to likelihood and magnitude of exposure.

Predatory species are considered the most likely to be impacted because of the potential bioaccumulation of chemicals in their prey, particularly in aquatic

TABLE 1

ENDANGERED AND THREATENED SPECIES OBSERVED OR REPORTED WITHIN A
5 MILE RADIUS OF THE PROPOSED SITE

Endangered

wood stork	<i>Mycteria americana</i> (S,F) ^a
snail kite	<i>Rostrhamus sociabilis</i> (S,F)
Florida panther	<i>Felis concolor coryi</i> (S,F)
bald eagle	<i>Haliaeetus leucocephalus</i> (S,F)

Threatened

Audubon's crested cara-cara	<i>Polyborus plancus audubonii</i> (S,F)
Florida sandhill crane	<i>Grus canadensis pratensis</i> (S)
big cypress fox squirrel	<i>Sciurus niger avicennia</i> (S)
eastern indigo snake	<i>Drymarchon corais couperi</i> (S,F)

Florida Species of Special Concern^b

gopher frog	<i>Rana aerolata aesopus</i>
gopher tortoise	<i>Gopherus polyphemus</i>
tri-colored heron	<i>Egretta tricolor</i>
little blue heron	<i>Egretta caerulea</i>
snowy egret	<i>Egretta thula</i>

Endangered or Threatened Within Lee County Outside of a 5-Mile Radius

West Indian manatee	<i>Trichechus manatus</i>
loggerhead turtle	<i>Caretta caretta</i>
Florida scrub jay	<i>Aphelocoma coerulescens</i>
beautiful pawpaw	<i>Deeringothamnus pulchellus</i>
arctic peregrine falcon (possible overwintering)	<i>Falco peregrineus tundrius</i>
Bachman's warbler	<i>Vermivora bachmanii</i>

- (a) S = State listed
F = Federal listed

- (b) The species is not in immediate danger of extinction, but could eventually become threatened or endangered.

species. The bald eagle *Haliaeetus leucocephalus* is a well-known example of a bird of prey that has been impacted by bioaccumulation of chemicals (i.e., DDT) in the fish it eats. However, eagles have a very large foraging range, and are not likely to receive significant exposures from the fish they ingest from a particular area. The only eagle nest which potentially can be affected by emissions from the proposed facility is located near the operating County landfill where prey consists mostly of gulls and cattle egrets associated with the disposal of municipal solid waste. When the waste-to-energy facility becomes operational, it is anticipated that this landfill will close and both predator and prey are expected to move to more favorable locations. Therefore the bald eagle was not selected as an indicator species. It should be kept in mind, however, that due to the indicator concept, the results associated with other top predators may also be applied to bald eagles without any loss of accuracy.

Potential exposures of predatory birds with a smaller home range, such as the wood stork *Mycteria americana*, are likely to be higher. Therefore the wood stork was selected as an indicator species. Another endangered species which could be affected is the snail kite *Rostrhamus sociabilis*. This predatory bird feeds exclusively on a freshwater snail *Pomacea* (Robbins et al. 1983). Given its highly specialized diet, the snail kite is considered to be a particularly susceptible species and was also selected as an indicator species.

Neither the FGFWCC nor the USFWS noted the presence of significant predators within a 5-mile radius of the site, with the exception of a single Florida panther (*Felis concolor coryi*). The panther (male no. 28), which may occasionally pass near the proposed WTE site, ranges mostly south and east (and therefore upwind) of the facility. Similarly, potential Florida panther habitat as defined by the USFWS is generally to the east-southeast. Figures 1 and 2 illustrate the relationship of the facility, prevailing winds, and panther habitat. Prevailing winds would carry facility emissions in the

Figure 1

Florida Panther Geographic Regions

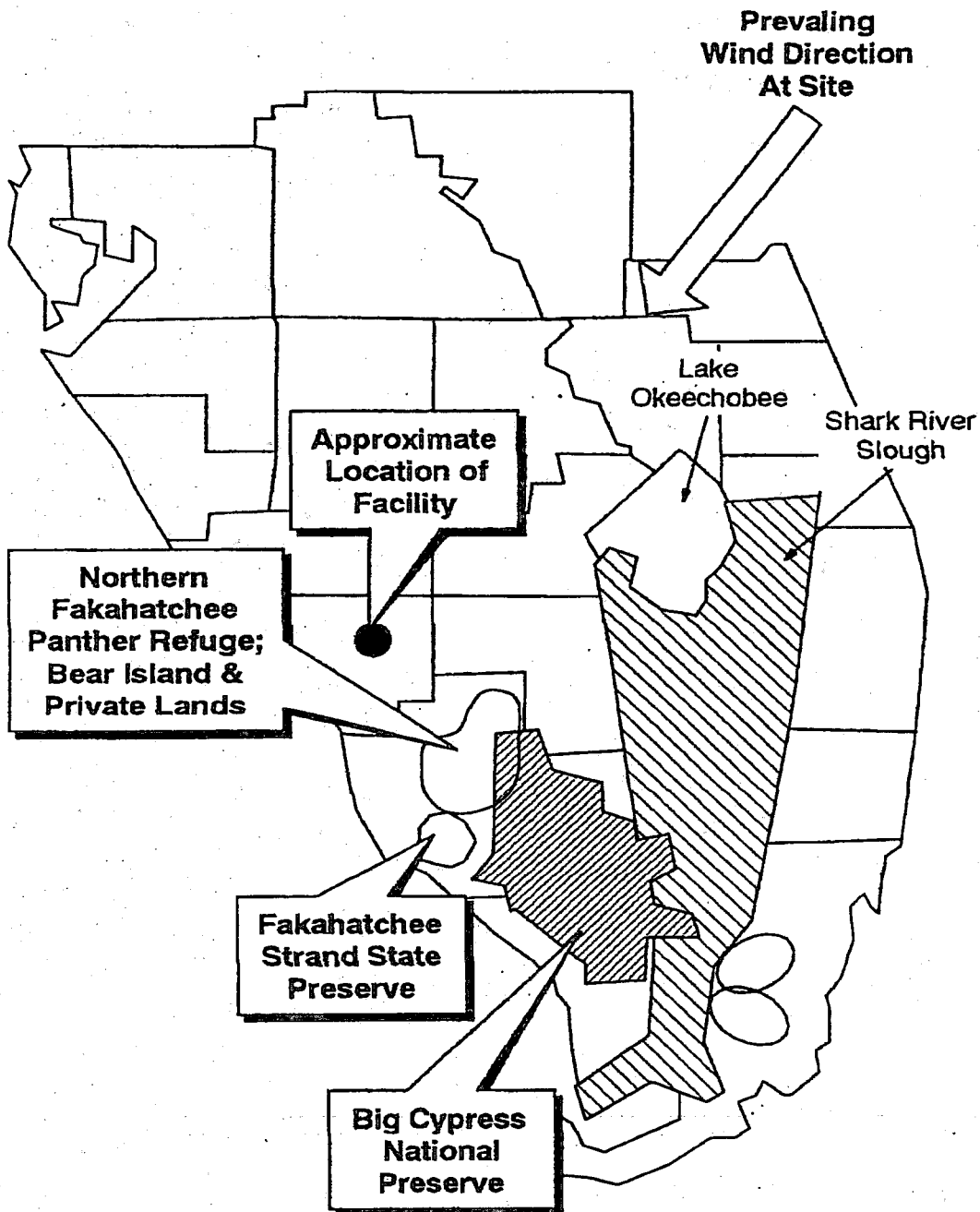
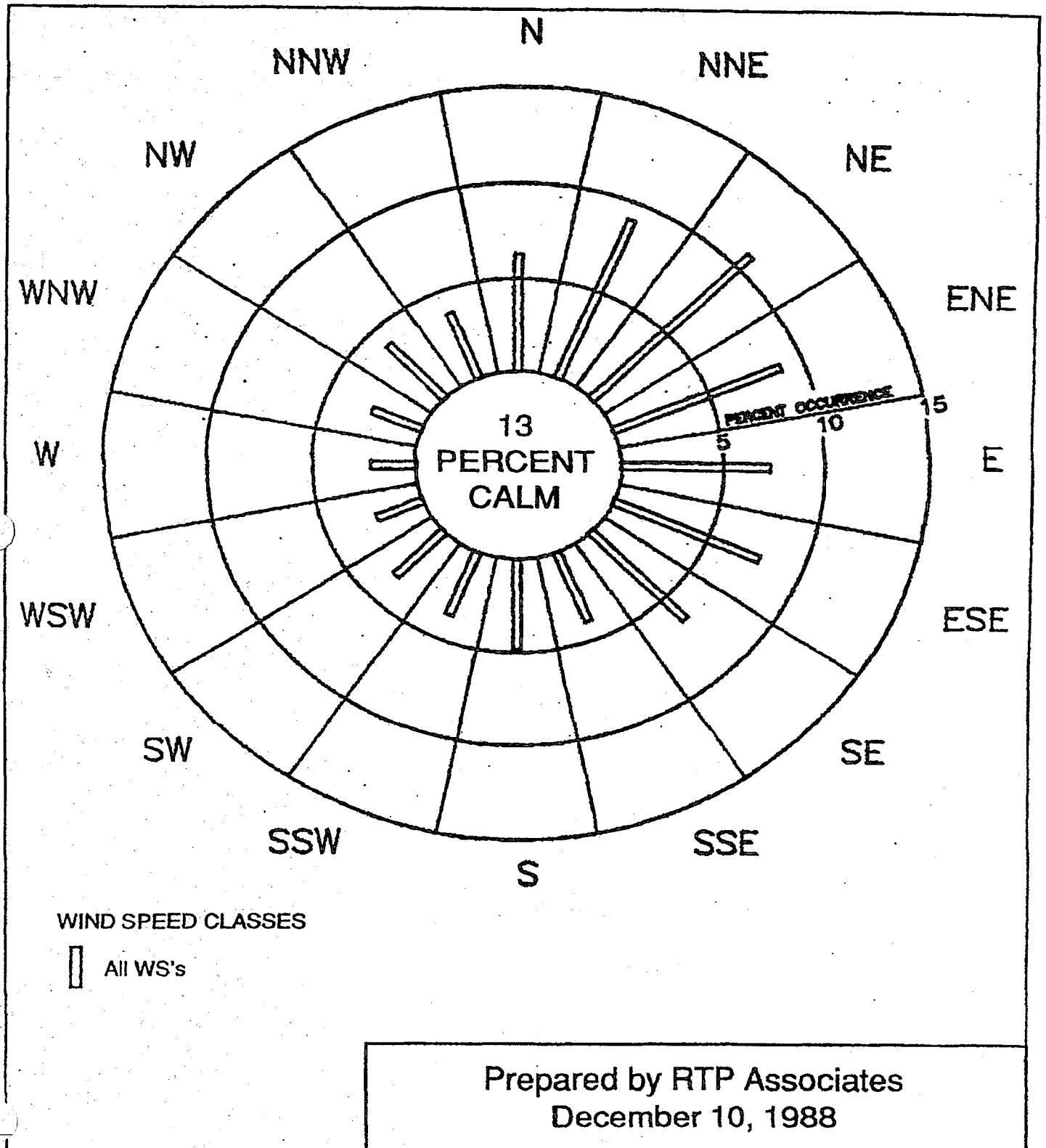


Figure 2
1982-1986 Fort Myers Windrose



opposite direction resulting in little deposition in the areas most likely to be used by the Florida panther¹.

Aquatic life was selected as an indicator species group because aquatic invertebrates and fish are important components of the food web in Florida's coastal ecosystems, and impacts to them also may affect a large number of other organisms dependent upon them for food. Additionally, inorganic mercury is transformed to methyl mercury to a much greater extent in the aquatic environment than in the terrestrial environment. Since organic (methyl) mercury is bioaccumulated to a greater extent and is more toxic than inorganic mercury, there is a much greater chance for an impact in the aquatic environment.

The indicator species (or groups) chosen for this assessment are aquatic life, the wood stork, and the snail kite. Exposures of these indicator species were quantified as discussed below. In addition, despite evidence indicating an incomplete exposure, the impact of mercury on the Florida panther is also discussed.

Selection of Exposure Pathways and Quantification of Exposure

Aquatic Life. Aquatic life may be exposed via direct contact with water or sediment and ingestion of other, previously exposed organisms. To evaluate these exposure pathways for aquatic life, we selected areas for study that were environmentally sensitive and likely to receive significant exposure to the WTE facility's emissions. Several sensitive natural areas were identified which might be of concern. These are the Big Cypress Swamp, the Ding Darling Refuge, and the Everglades. The Big Cypress Swamp, located approximately 61 km to the southeast, and the Everglades, located approximately 88 km to the

¹It should be noted that there is no concrete evidence which links panther mortality to environmental mercury. Of four blood mercury levels obtained from panthers in 1990, only one with a value of 2.8 ppm approached the toxic value of 14-17 ppm, which was derived by applying a safety factor threshold obtained from a study on alkyl mercury in domestic cats (Schulz 1990).

south-southeast, are not expected to be impacted by emissions from the WTE facility because the prevailing winds are to the southwest (i.e., away from the Big Cypress Swamp and the Everglades), and because these areas are located far from the proposed facility. The Ding Darling Refuge, located on Sanibel Island which is roughly 20 miles (33 km) to the southwest off the coast of Florida, could receive some effects from the WTE facility because the prevailing winds are in this general direction.

Therefore Tarpon Bay, located in the Ding Darling Refuge, was selected for the exposure assessment as the most environmentally sensitive area that was likely to be impacted. Additionally, the Caloosahatchee River located approximately 5 miles (8 km) NW of the facility was also selected. Neither of these areas are located in the maximum impact area, a small zone located about 1.5 miles (2.5 km) SSW of the facility (see Figure 6-3, CDM 1990). At the maximum impact area, maximum predicted annual concentrations for mercury and dioxin were calculated (see discussion below). Any emissions which reach the Caloosahatchee River will be diluted to levels at least 4 times lower than the levels at the maximum impact point. Sanibel is sufficiently distant from the site (20 miles) that no detectable emissions will actually be transported there. However for purposes of this analysis, we assumed that the ambient concentrations of mercury and dioxin over Sanibel and over the Caloosahatchee River would be the same as the concentrations at the maximum impact point.

Surface water concentrations in these water bodies were calculated to evaluate potential impacts to aquatic life. The emission rates and particle size distributions (presented in the permit application), and measured or assumed physical characteristics of the water bodies of interest, were combined to calculate surface water concentrations. Chemical concentrations in the Caloosahatchee River were obtained by estimating the amount of runoff into the river and by estimating the amount of atmospheric deposition directly onto the surface of the Caloosahatchee River. Chemical concentrations in the Tarpon Bay were obtained by estimating atmospheric deposition onto the surface of the bay. These chemical concentrations are then used to predict chemical concentrations in fish that could live in these water bodies. In order to predict the transport of soil to the Caloosahatchee River due to a rainfall

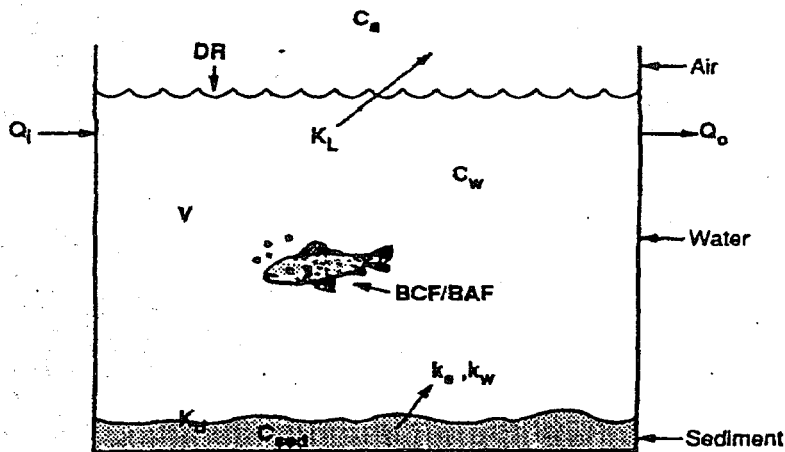
event, two methods of event modeling were used: the Soil Conservation Survey (SCS) TR-55 Method (SCS 1986), which predicts the volume of water that may occur in a rainfall event, and the Modified Universal Soil Loss Equation (MUSLE) (USEPA 1988a), which predicts the amount of soil eroded from the land surface and the fraction of this soil that is actually deposited into the river. The total concentration of chemicals in the water body due to runoff and atmospheric deposition was calculated using steady state mass balance approach derived from USEPA (1984a, 1985a) and Thomann and Mueller (1987). A schematic diagram of variables used in the model is shown in Figure 3. A total of 1% of mercury was assumed to be converted to methyl mercury. This is a typical value for this process based on a review of the scientific literature (Stary et al. 1980, Jackson 1986, EPRI 1987). Values for the variables were chosen such that the amounts of mercury and dioxin available to the food chain would be maximized (Table 2).

Wood stork. The primary exposure pathway for wood storks is the food chain. Impacts from inhalation and ingestion of water by the wood stork are likely to be insignificant when compared to the food chain pathway. Food chain exposures of the wood stork were evaluated by estimating the concentrations of dioxin and mercury in fish, a primary component of the wood stork's diet (USDA 1973). The primary source of dioxin that might accumulate in fish tissues is likely to be sediment. Therefore, sediment concentrations were calculated for dioxin. For mercury, the primary source is probably water. Bioconcentration factors (BCFs) were used to calculate the fish tissue concentrations. For dioxin, a sediment:fish BCF of 0.028 (derived from Kuehl et al. 1987) was used. For mercury, water:fish BCFs of 5,000 and 33,000 were used for inorganic and organic forms, respectively (USEPA 1985b). By multiplying the estimated water or sediment concentration (in mg/L or mg/kg, respectively) by the BCF, a fish tissue concentration was estimated. The calculated fish concentrations are presented in Table 3.

Snail kite. As in the case of the wood stork, the primary exposure pathway for snail kites is the food chain. Food chain exposures of the snail kite were evaluated by using the estimated concentrations of dioxin and mercury in

FIGURE 3

SCHEMATIC DIAGRAM OF VARIABLES IN THE AQUATIC FATE AND TRANSPORT MODEL FOR THE LEE COUNTY FACILITY



DR = chemical specific deposition rate ($\text{g/m}^2/\text{yr}$)

C_a = chemical airborne concentration ($\mu\text{g/m}^3$)

Q_i = inflow into water body (m^3/day)

Q_o = outflow from water body (m^3/day)

K_L = air : water mass transfer coefficient (cm/hr)

K_d = sediment : water partition coefficient ($\text{mg/kg sediment per mg/L water}$)

V = volume of water body (m^3)

V/Q_o = θ (days) = hydraulic detention time (days)

C_w = chemical concentration in water body (mg/L)

BCF = bioconcentration factor for chemical in fish, due to contact with water

BAF = bioaccumulation factor for chemical in fish, due to exposure to lake sediment

C_{sed} = chemical concentration in lake sediment (mg/kg)

k_s = sediment - film mass transfer coefficient (cm/hr)

k_w = water - film mass transfer coefficient (cm/hr)

TABLE 2

CONSERVATIVE ASSUMPTIONS USED IN ECOLOGICAL RISK ASSESSMENT

- Facility operates at 100% capacity at 1,200 TPD, for 365 days per year, 70 years, rather than 85-90% capacity for 20-30 years.
- Mercury emissions based on maximum permit limits (140 µg/dscm) rather than lower actual expected values.
- No credit taken for Lee County recycling, EPA regulatory initiatives^a, or manufacturers phase-out of mercury in batteries.
- Highest calculated concentrations for mercury and dioxin at maximum impact area (1.5 miles from the site) input to analysis of water bodies 20 miles and 5 miles from the site.
- Default deposition velocity of 2 cm/s compared to typical values <1 cm/s. This value is sufficient to account for all mechanisms of mercury deposition including vapor, particle, wet and dry deposition.
- Frequency of rainfall forces all deposited materials to wash off into surface water.
- Highest measured BCF for dioxin in whole fish.

^a EPA recently proposed a "universal hazardous waste" category which would regulate household hazardous wastes under 40 CFR Part 273. Batteries, light bulbs, refrigerants, and antifreeze are materials which could be included in this category (Bergson 1991).

TABLE 3
CALCULATION OF FISH CONCENTRATIONS

	Water Body			Fish Concentration (mg/kg)	
	-----			-----	
	Caloosahatchee River	Tarpon Bay	Fish BCF	Caloosahatchee River	Tarpon Bay
Dioxin (mg/kg sediment)	1.7E-04	1.71E-04	0.028 (a)	4.76E-06	4.79E-06
Mercury (ug/L water)					
-organic	6.7E-06	2.4E-08	33000 (b)	2.2E-04	7.9E-07
-inorganic	6.6E-04	5.0E-04	5000 (b)	3.3E-03	2.5E-03
	-----	-----		-----	-----
Total	6.7E-04	5.0E-04		3.5E-03	2.5E-03

(a) Sediment:fish BCF derived from Kuehl et al. (1987).
(b) Water:fish BCF from EPA (1985a).

the Caloosahatchee River to calculate concentrations in fish or snails. Snail concentrations in Tarpon Bay, an estuarine water body, were not calculated because snail kites feed exclusively on freshwater snails which are unlikely to occur in Tarpon Bay. A sediment:snail BCF was not available for dioxin. A water:snail BCF of 3,731 was used to calculate the snail concentration (Eisler 1986). For mercury, a BCF for snails was not available. Thus, according to standard risk assessment practice, the BCFs and concentrations calculated for fish are used as surrogate values for snails. The calculated snail concentrations are presented in Table 4.

Selection of Toxicity Reference Values

USEPA (1986d) has promulgated acute and chronic ambient water quality criteria (AWQC) for protection of aquatic life. An acute AWQC is the highest 1-hour average concentration that should not result in unacceptable effects in aquatic organisms (and uses of those organisms). A chronic AWQC is the highest 4-day average that should not result in unacceptable effects in aquatic organisms (and uses of those organisms). Separate AWQCs were derived for freshwater and saltwater aquatic life. The AWQC's for mercury in freshwater and in saltwater are presented in Table 5. For dioxin, data are insufficient to derive AWQCs. In the absence of adequate data, USEPA (1986d) present acute and chronic lowest- observed-effect concentrations (LOEC) in freshwater species for dioxin. These LOEC values may be used in lieu of an AWQC if one has not been derived. No data are available regarding the toxicity of dioxin to saltwater species.

Criteria for protection of avian or terrestrial species have not been established, and toxicity data for these particular bird species are not available. Therefore, toxicity data from studies of other bird species were used to estimate potential impacts to the wood stork and snail kite. Hudson et al. (1984) present an LD₅₀ for dioxin of >> 0.108 mg/kg body weight in mallard ducklings. A dietary conversion factor of 1 mg/kg diet/0.125 mg/kg body weight (Lehman 1954) was applied to calculate a corresponding dietary concentration of 0.86 mg/kg diet. NAS (1980) conducted studies using chickens, turkeys, pheasants, and ducks, and reported no adverse effects at

TABLE 4

CALCULATION OF SNAIL CONCENTRATIONS

	Water Concentration (ug/L)		Snail Concentration (mg/kg) (a)
	-----		-----
	Caloosahatchee River	Snail BCF	Caloosahatchee River
Dioxin	3.35E-08	3731 (b)	1.25E-07
Mercury			
- Organic	6.6E-06	NA (c)	NC
- Inorganic	6.5E-04		

Total	6.6E-04		

(a) Snail concentrations are not calculated for Tarpon Bay because the snail kite feeds exclusively upon freshwater species.

(b) From Eisler (1986).

(c) A snail BCF for mercury was not available.

NC = Not calculated.

TABLE 5

LEE COUNTY PROPOSED WTE FACILITY

	Estimated Water Concentration (ug/L)		FEDERAL AWQC (ug/L) (a)			
	-----		-----			
	Caloosahatchee River	Tarpon Bay	Freshwater acute chronic		Saltwater acute chronic	
Dioxin	3.35E-08	3.35E-08	1 L	0.001 L	NA	NA
Mercury						
-Organic	6.6E-04	2.3E-08	2.4	0.012	2.1	0.025
-Inorganic	6.6E-04	5.0E-04				
	-----	-----				
Total	6.7E-04	5.0E-04				

(a) EPA (1986d).

L = Lowest Observed Effect Concentration (LOEC).

NA = Not Available.

the mercury concentration of 3.3 mg/kg in the diet. These values were compared with the estimated fish tissue concentrations to evaluate potential for adverse impacts in piscivorous (fish-eating) birds such as the wood stork. Additionally, Eisler's (1987) values of total mercury in fish of 0.1 mg/kg for avian protection and 1.1 ppm for small mammals was used as toxicity reference values because no data are available for snails.

Risk Characterization

Aquatic Life. As mentioned above, EPA has established Ambient Water Quality Criteria (AWQC) for the protection of aquatic life and its uses. In Table 5 the AWQC are compared directly with water concentrations. This comparison shows that, even using conservative assumptions, the maximum predicted impacts from the WTE facility will be over 20,000 times less than the lowest observed effect concentrations (LOEC) for dioxin and 18 to 50 times less than the AWQC for chronic exposure to mercury. The margins of safety for acute exposure are 200 times larger for freshwater fish and 80 times larger for saltwater fish. Thus, adverse impacts to aquatic life are unlikely to occur as a result of emissions from the proposed facility.

An important issue to address is potential impacts associated with adding mercury to an environment already containing elevated levels of mercury. An average background surface water concentration of mercury of 0.5 ug/L was reported for the Caloosahatchee River from 1977 to 1979 (USGS 1983). This value already exceeds the AWQC for mercury. The estimated maximum mercury concentration that might result from emissions from the proposed facility is 0.00066 ug/L. This additional mercury represents a concentration too small for quantification and would result in no meaningful additional impact.

Wood Stork and Snail Kite. Tables 6 and 7 present comparisons of the estimated dietary concentrations in fish and snails with toxicity reference values (TRVs) for birds. As can be seen in this table, the estimated concentrations in fish and snails are far below those that might cause adverse effects if the fish and snails were eaten by wood storks and snail kites. As

TABLE 6
COMPARISON OF ESTIMATED FISH CONCENTRATIONS
WITH TRV FOR WOOD STORK

	Fish Concentration (mg/kg)		TRV (mg/kg diet)
	Caloosahatchee River	Tarpon Bay	
Dioxin	4.76E-06	4.79E-06	0.86 (a)
Mercury			
-organic	2.2E-04	7.9E-07	
-inorganic	3.3E-03	2.5E-03	
Total	3.5E-03	2.5E-03	3.3 (b) 0.1 (c)

(a) Derived from Hudson et al. (1984).

(b) NAS (1980).

(c) Eisler (1987).

TRV = Toxicity Reference Value.

TABLE 7

COMPARISON OF ESTIMATED SNAIL CONCENTRATIONS
WITH TRVS FOR SNAIL KITE

	Snail Concentration (mg/kg)	TRV (mg/kg diet)
Dioxin	1.25E-07	0.86 (a)
Mercury (b)		
-organic	2.2E-04	
-inorganic	3.3E-03	

Total	3.5E-03	3.3 (c) 0.1 (d)

(a) Derived from Hudson et al. (1984).

(b) The snail concentration is the same as that for fish
presented in Table 3. See text for discussion.

(b) NAS (1980).

(c) Eisler (1987).

TRV = Toxicity Reference Value

was noted above, these conclusions are also applicable to other birds such as the bald eagle.

Potential additive impacts associated with emissions of mercury to the environment were assessed by collecting data on the background concentrations in fish. Mercury concentrations in largemouth bass in the Caloosahatchee River averaged 0.45 mg/kg (DER 1990a). A mean mercury concentration for fish in Lee County for 1989 is 0.44 mg/kg (DER 1990b). The estimated maximum concentration of mercury in fresh water fish that might result from emissions from the proposed facility is 0.0035 mg/kg. This additional mercury is inconsequential when compared to the existing background and is unlikely to adversely affect wildlife feeding on such fish.

Mammals

The concentrations of mercury in fish are also below those proposed by Eisler (1987) for the protection of both avian species and mammals. Mammals, including raccoons, deer, and armadillos, are the primary food supply for panthers (Schultz 1990). Although bioconcentration factors for mercury in a fish to mammal to panther food chain are unknown, the maximum mercury concentrations in fish potentially associated with emissions from the proposed facility are approximately 300 times lower than Eisler's (1987) level of protection for mammals, thus an impact on the panther is unlikely even if the exposure pathway was considered to be complete. Last, regarding the panther, as Schultz (1990) has noted, panthers have their greatest reproductive success where they have access to larger prey such as deer. Eisler (1987) states that herbivores such as deer accumulate mercury to much lower levels than carnivores. Thus the preferred panther prey is another factor which could mitigate the potential impact of mercury in the food chain.

HUMAN HEALTH RISK ASSESSMENT

Exposure Assessment

The human health risk assessment addresses potential risks associated with exposure to mercury and dioxin in emissions from the proposed facility. Two exposure pathways have been selected for detailed evaluation on the basis of the results of numerous other risk assessments for waste-to-energy plants. These are the direct inhalation pathway and the indirect fish consumption pathway. Inhalation is of greatest importance since the receptor may be located directly in line with the emissions. The indirect fish consumption pathway has been chosen due to its importance in the south Florida area and also since it reflects the potential for chemicals to bioaccumulate in the aquatic foodchain. Standard conservative USEPA assumptions were used in the exposure assessment including the assumption that an individual spends 70 years of his/her lifetime, 24 hours per day, 365 days per year being exposed to emissions from the facility.

Toxicity Assessment

POLYCHLORINATED DIBENZO-P-DIOXINS (2,3,7,8-TCDD)

The polychlorinated dibenzo-p-dioxins (PCDDs) comprise a family of 75 congeners, each of which is an isomer of one of eight homologues with varying degrees of chlorination. The most widely studied and toxic of the numerous polychlorinated dibenzo-p-dioxin compounds is 2,3,7,8-tetrachloro-dibenzo-p-dioxin (2,3,7,8-TCDD). The effects of TCDD in either laboratory animals or humans have not been shown to occur at TCDD levels associated with emissions from modern waste-to-energy plants.

2,3,7,8-TCDD is categorized as a Group B2 Agent (Probable Human Carcinogen) (EPA 1991). This category applies to agents for which there is sufficient evidence of carcinogenicity in animals and inadequate evidence of carcinogenicity in humans. EPA (1991) calculated an oral cancer slope factor

for 2,3,7,8-TCDD of 1.56×10^5 (mg/kg/day)⁻¹ based on a feeding study by Kociba et al. (1978). EPA (1991) also calculated an inhalation unit risk of 3.3×10^{-1} (ug/cu.m)⁻¹. An oral reference dose (RfD) also has been established by EPA (1987) for 2,3,7,8-TCDD using a 3-generation reproduction study by Murray et al. (1979). Using a LOAEL of 0.001 μ g/kg and applying a safety factor of 1,000, an oral RfD for 2,3,7,8-TCDD of 1×10^{-6} μ g/kg/day (1×10^{-9} mg/kg/day) was derived (EPA 1987).

MERCURY

In humans, inorganic mercury is absorbed following inhalation and oral exposure, however only 7% to 15% of administered inorganic mercury is absorbed following oral exposure (EPA 1984b, Rahola et al. 1971, Task Group on Metal Accumulation 1973). In humans, organic mercury is almost completely absorbed from the gastrointestinal tract and is assumed to be well absorbed via inhalation (EPA 1984b). Chronic occupational exposure of workers to high levels of elemental mercury vapors (0.1 to 0.2 mg/m³) has been associated with mental disturbances, tremors, and gingivitis (EPA 1984b). The effects of exposure to mercury have not been demonstrated to occur at levels associated with emissions from modern waste-to-energy plants.

EPA (1991) has reported an oral reference dose for both chronic and subchronic exposures of 3×10^{-4} mg/kg/day for inorganic mercury based on several oral and parenteral studies conducted in the Brown Norway rat studies which observed kidney effects (Druet et al. 1978, Bernaudin et al. 1981). An uncertainty factor of 1,000 was used to derive the RfDs. EPA (1991) has also derived an inhalation reference concentration (RfC) for inorganic mercury of 3×10^{-4} mg/m³ for both chronic and subchronic exposures based on several human occupational studies in which neurotoxicity was observed (Fawer et al. 1987, Piikivi and Tolonen 1989, Piikivi and Hanninen 1989, Piikivi 1989). This is equivalent to a dose of 8.5×10^{-5} mg/kg/day assuming a 70 kilogram individual inhales 20 m³/day. An uncertainty factor of 30 was used to derive both inhalation RfCs.

Risk Characterization

The highest annual average total ambient dioxin (PCDD/PCDF) concentration for Lee County's 1200 TPD facility, based on Volume III of the Power Plant Certification Application, is $1.4 \times 10^{-8} \mu\text{g}/\text{m}^3$. (This number is based on the permit limitation of 30 ng/dscm which is USEPA's New Source Performance Standard.) In reality, it is anticipated that the plant will perform much better than this. The average for facilities with emission controls similar to those proposed here is about 5.5 ng/dscm². This value is for total dioxins and must be converted into 2,3,7,8-TCDD equivalents for use in a risk assessment. Based on USEPA's conversion factor of 30:1 cited in the New Source Performance Standards, $1.4 \times 10^{-8} \mu\text{g}/\text{m}^3$ total dioxin translates to $4.7 \times 10^{-10} \mu\text{g}/\text{m}^3$ toxic equivalents. In order to calculate the dose of dioxin which a maximally exposed person could receive, it is necessary to assume that a person breathes 20 m³ of air per day for 365 days per year, never travels more than 6 miles from the facility for 70 years and that the facility operates for 70 years. This results in a dose of dioxin of $1.3 \times 10^{-13} \text{ mg}/\text{kg-d}$. The dose is then taken in conjunction with USEPA's cancer slope factor for dioxin (see above) to yield the lifetime upperbound excess cancer risk. The dose associated with maximum exposure to facility emissions is equivalent to a lifetime cancer risk of 2×10^{-8} or 2 in 100,000,000. (If we use the cancer slope factor developed by Florida's Department of Health and Rehabilitative Services, the risk would be about 200 times lower).

In general, the risk from exposure by all other pathways (including inadvertent ingestion of soil, homegrown produce, dairy milk, fish, and mother's milk) is about 10 times the risk for inhalation. Therefore the total upperbound risk from the plant is predicted to be 2 in 10,000,000.

These risks can be put into context by comparison to risks usually used as the basis of regulatory decisions. Most regulatory agencies have regulated

²Lee county has proposed to use activated carbon for mercury control. Activated carbon is also effective at removing additional dioxin from the flue gas, however, this was not taken into account in this risk assessment.

chemicals on the basis of risks between 1 in 10,000 and 1 in 1,000,000. A risk of 1 in 1,000,000 is preferred by environmental activist groups as it is the most stringent. The risks of everyday life lie in a range which centers around 1 in 100,000. Thus the risks associated with exposure to dioxin from the proposed Lee County facility, using extremely conservative assumptions, are significantly lower than the risks considered important to regulatory agencies or the risks associated with everyday life.

The risk assessment for mercury is considerably simpler since it behaves as a non-carcinogen. As noted above, USEPA has developed a reference air concentration for mercury of $3 \times 10^{-1} \mu\text{g}/\text{m}^3$. If the ambient air concentrations of mercury are above this concentration, there is a high potential that adverse health effects will occur. If the ambient air levels are below this concentration, there is little potential for an adverse effect. Based on Elias (1992), the annual maximum mercury concentration is $1.49 \times 10^{-4} \mu\text{g}/\text{m}^3$. This value is over 1,000 times lower than the reference concentration for mercury, therefore, adverse effects to human health from chronic long-term inhalation exposure to mercury are extremely unlikely. In addition to USEPA's criterion for chronic exposure, the Agency for Toxic Substances Disease Registry has developed a minimal risk level for short-term acute exposure (ATSDR 1989). This level can be compared to short-term maximum concentrations associated with emissions from the proposed facility. The minimal risk level is $28 \mu\text{g}/\text{m}^3$ compared to the 8-hour maximum mercury concentration of $6.04 \times 10^{-3} \mu\text{g}/\text{m}^3$. Thus, no acute effects would be expected due to exposure to mercury at these levels.

In addition to inhalation of mercury, we can also evaluate the potential for human exposure from eating fish which are caught from the Caloosahatchee River. The Federal Food and Drug Administration has promulgated a fish consumption advisory level of 1 ppm; Florida's Department of Health and Rehabilitative Services issues consumption restrictions for those fish with mercury levels greater than 0.5 ppm and recommends no consumption at all of fish with greater than 1.5 ppm mercury. As previously discussed, the conservatively calculated level of mercury in freshwater fish from this facility is 0.0035 mg/kg. This is substantially below the levels associated

with either state or federal advisories, either by itself or when taken in conjunction with the already existing background of mercury in Lee County fish.

CONCLUSIONS

An ecological risk assessment was conducted using standard procedures to evaluate the potential impact of maximum emissions of dioxin and mercury from the proposed Lee County Resource Recovery Facility. The risk assessment results show that the WTE facility is unlikely to have any meaningful impacts on the environment even considering factors such as bioaccumulation and methylation of mercury.

In addition, a human health risk assessment was conducted with respect to exposures to mercury and dioxin associated with the proposed facility. The resultant risks are well below levels considered significant by regulatory agencies and, in fact, are below the levels of risks associated with everyday life.

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**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

APPENDIX 13.0

MISCELLANEOUS REPORTS AND STUDIES

13.1 – Household Trend Report

**13.2 – Environmental Justice
Overview and Audit**

**13.3 – Wetland Mitigation
Monitoring Report**

13.1 – Household Trend Report

Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

Household Trend Report

PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
LEE COUNTY, FL

2/27/01

Tract: 0003.01, Lee County, FL

State: 12, County: 071
Weight: 100.00



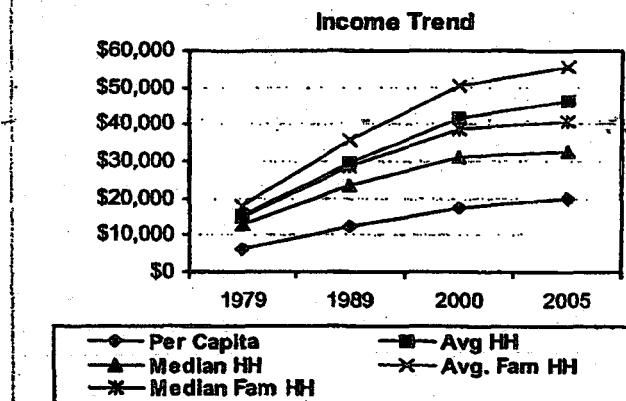
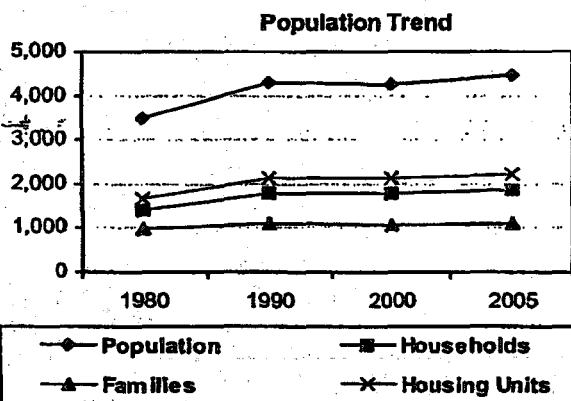
Population and Household Trend

	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Universe							
Population	3,489	4,270	22.4%	4,257	-0.3%	4,460	4.8%
Households	1,416	1,782	25.8%	1,782	0.0%	1,880	5.5%
Families	990	1,120	13.1%	1,069	-4.6%	1,106	3.5%
Housing Units	1,641	2,119	29.1%	2,102	-0.8%	2,212	5.2%
Grp. Qrt. Pop	11	26	136.4%	25	-3.8%	25	0.0%
Household Size	2.46	2.38	-3.0%	2.37	-0.3%	2.36	-0.7%



Income Trend

	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Income							
Aggregate (\$Mil.)	\$22	\$53	140.9%	\$75	41.5%	\$88	17.3%
Per Capita	\$6,274	\$12,350	96.8%	\$17,529	41.9%	\$19,771	12.8%
Avg. Household	\$15,500	\$29,485	90.2%	\$41,631	41.2%	\$46,501	11.7%
Median HH	\$12,528	\$23,167	84.9%	\$30,801	33.0%	\$32,704	6.2%
Avg. Family HH	\$17,997	\$35,571	97.6%	\$50,480	41.9%	\$55,280	9.5%
Med. Family HH	\$14,569	\$28,664	96.7%	\$38,469	34.2%	\$40,560	5.4%
Avg. HH Wealth				\$128,441		\$136,350	6.2%
Med. HH Wealth				\$47,403		\$49,842	5.1%



NOTE: When the median household wealth for an area is less than \$25,000 it will be listed on this report as \$24,999. Data on income are expressed in "current" dollars for each year. Decennial Census data reflects prior year income.

1990-00 change of 20% greater (>) or less (<) than national average

2000-2005 change of 20% greater (>) or less (<) than national average



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Household Trend Report

PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
LEE COUNTY, FL

2/27/01

Tract: 0003.02, Lee County, FL

State: 12, County: 071
Weight: 100.00

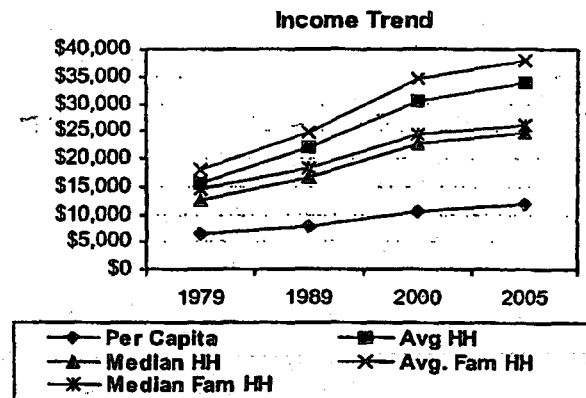
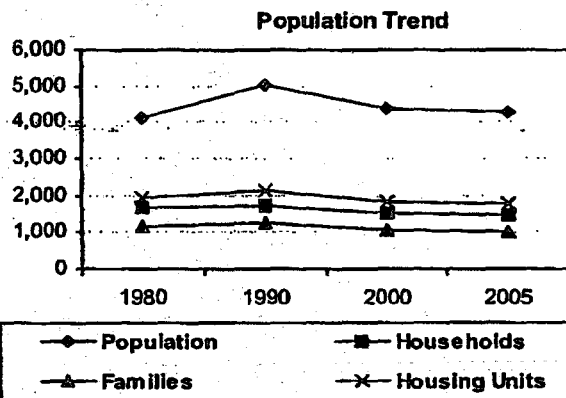
Population and Household Trend

Universe	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Population	4,120	5,042	22.4%	4,358	-13.6%	4,284	-1.7%
Households	1,672	1,754	4.9%	1,516	-13.6%	1,500	-1.1%
Families	1,170	1,264	8.0%	1,047	-17.2%	1,017	-2.9%
Housing Units	1,937	2,113	9.1%	1,811	-14.3%	1,788	-1.3%
Grp. Qrt. Pop	12	16	33.3%	16	0.0%	16	0.0%
Household Size	2.46	2.87	16.6%	2.86	0.0%	2.85	-0.7%



Income Trend

Income	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Aggregate (\$Mil.)	\$26	\$39	50.0%	\$46	17.9%	\$51	10.9%
Per Capita	\$6,274	\$7,694	22.6%	\$10,656	38.5%	\$11,926	11.9%
Avg. Household	\$15,500	\$22,091	42.5%	\$30,662	38.8%	\$33,733	10.0%
Median HH	\$12,536	\$16,775	33.8%	\$22,632	34.9%	\$24,583	8.6%
Avg. Family HH	\$17,997	\$24,872	38.2%	\$34,680	39.4%	\$37,807	9.0%
Med. Family HH	\$14,578	\$18,316	25.6%	\$24,390	33.2%	\$26,250	7.6%
Avg. HH Wealth				\$90,009		\$93,414	3.8%
Med. HH Wealth				\$24,999		\$24,999	0.0%



NOTE: When the median household wealth for an area is less than \$25,000 it will be listed on this report as \$24,999. Data on income are expressed in "current" dollars for each year. Decennial Census data reflects prior year income.

1990-00 change of 20% greater (>) or less (<) than national average

2000-2005 change of 20% greater (>) or less (<) than national average



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Household Trend Report

PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
LEE COUNTY, FL

2/27/01

Tract: 0004.00, Lee County, FL

State: 12, County: 071
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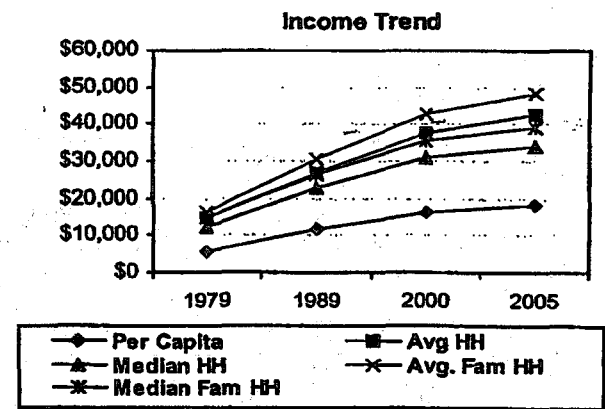
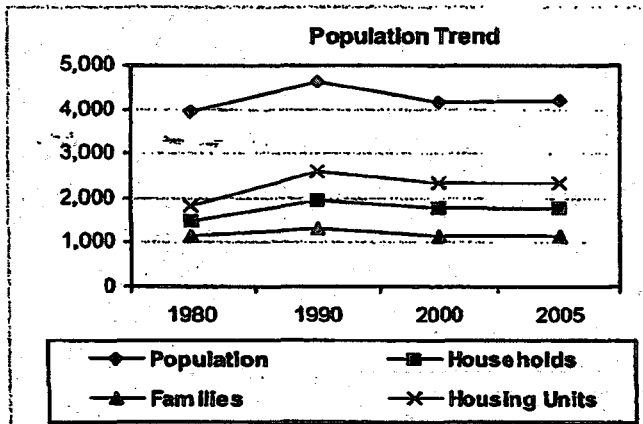
Population and Household Trend

	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Universe							
Population	3,938	4,621	17.3%	4,170	-9.8%	4,175	0.1%
Households	1,504	1,963	30.5%	1,774	-9.6%	1,786	0.7%
Families	1,134	1,332	17.5%	1,152	-13.5%	1,139	-1.1%
Housing Units	1,840	2,604	41.5%	2,325	-10.7%	2,333	0.3%
Grp. Qrt. Pop	0	0	0.0%	0	0.0%	0	0.0%
Household Size	2.62	2.35	-10.1%	2.35	-0.1%	2.34	-0.6%



Income Trend

	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Income							
Aggregate (\$M)	\$22	\$53	140.9%	\$67	26.4%	\$77	14.9%
Per Capita	\$5,578	\$11,482	105.8%	\$16,069	39.9%	\$18,365	14.3%
Avg. Household	\$14,846	\$27,029	82.1%	\$37,773	39.7%	\$42,930	13.7%
Median HH	\$12,423	\$22,750	83.1%	\$30,804	35.4%	\$33,984	10.3%
Avg. Family HH	\$16,400	\$30,691	87.1%	\$42,793	39.4%	\$48,432	13.2%
Med. Family HH	\$14,707	\$26,287	78.7%	\$35,753	36.0%	\$39,299	9.9%
Avg. HH Wealth				\$149,759		\$165,469	10.5%
Med. HH Wealth				\$76,133		\$83,281	9.4%



NOTE: When the median household wealth for an area is less than \$25,000 it will be listed on this report as \$24,999. Data on income are expressed in "current" dollars for each year. Decennial Census data reflects prior year income.

1990-00 change of 20% greater (▲) or less (◄) than national average

2000-2005 change of 20% greater (▲) or less (◄) than national average



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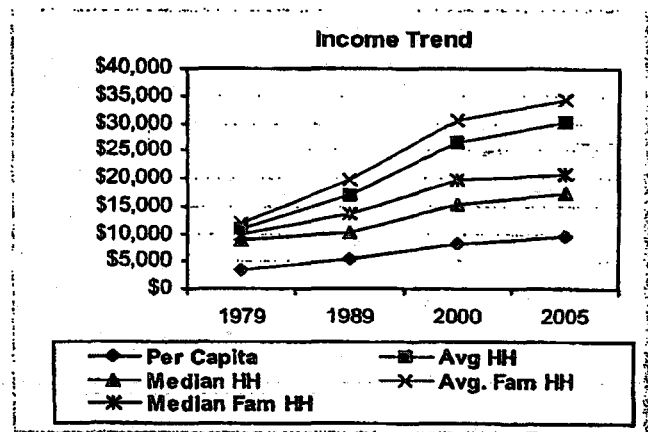
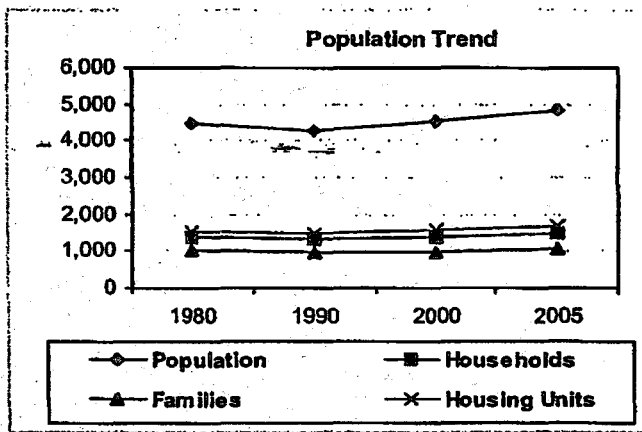
Population and Household Trend

	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Universe							
Population	4,489	4,293	-4.4%	4,533	5.6%	4,843	6.8%
Households	1,368	1,311	-4.2%	1,385	5.6%	1,489	7.5%
Families	1,029	976	-5.2%	989	1.3%	1,045	5.7%
Housing Units	1,515	1,483	-2.1%	1,558	5.1%	1,673	7.4%
Grp. Qrt. Pop	18	50	177.8%	49	-2.0%	48	-2.0%
Household Size	3.27	3.24	-1.0%	3.24	0.0%	3.22	-0.5%



Income Trend

	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Income							
Aggregate (\$M.)	\$15	\$23	53.3%	\$37	60.9%	\$46	24.3%
Per Capita	\$3,361	\$5,272	56.9%	\$8,179	55.1%	\$9,505	16.2%
Avg. Household	\$10,781	\$17,104	58.6%	\$26,570	55.3%	\$30,261	13.9%
Median HH	\$8,831	\$10,084	14.2%	\$15,335	52.1%	\$17,395	13.4%
Avg. Family HH	\$11,896	\$19,637	65.1%	\$30,501	55.3%	\$34,291	12.4%
Med. Family HH	\$9,767	\$13,654	39.8%	\$19,556	43.2%	\$20,799	6.4%
Avg. HH Wealth				\$79,753		\$83,701	6.3%
Med. HH Wealth				\$24,999		\$24,999	0.0%



NOTE: When the median household wealth for an area is less than \$25,000 it will be listed on this report as \$24,999. Data on income are expressed in "current" dollars for each year. Decennial Census data reflects prior year income.

1990-00 change of 20% greater (>) or less (<) than national average

2000-2005 change of 20% greater (>) or less (<) than national average



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Household Trend Report

PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
LEE COUNTY, FL

2/27/01

Tract: 0006.00, Lee County, FL

State: 12, County: 071
Weight: 100.00

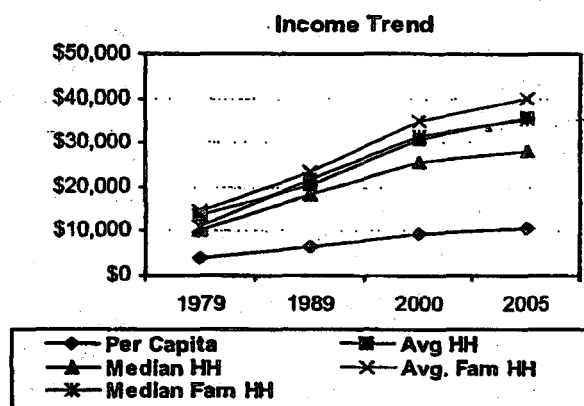
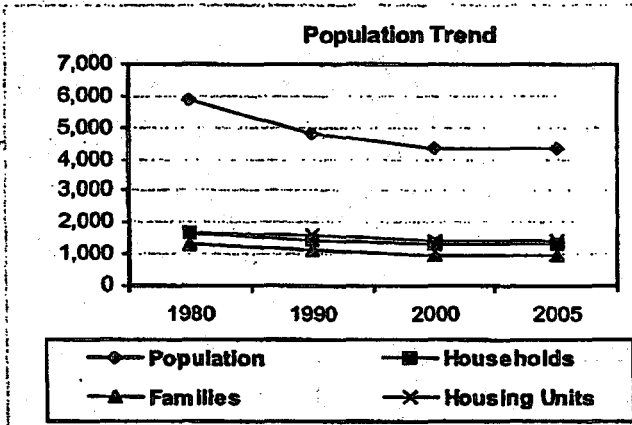
Population and Household Trend

	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Universe							
Population	5,849	4,820	-17.6%	4,335	-10.1%	4,336	0.0%
Households	1,637	1,442	-11.9%	1,295	-10.2%	1,302	0.5%
Families	1,305	1,112	-14.8%	959	-13.8%	947	-1.3%
Housing Units	1,688	1,602	-5.1%	1,432	-10.6%	1,438	0.4%
Grp. Qrt. Pop	5	0	-100.0%	0	0.0%	0	0.0%
Household Size	3.57	3.34	-6.4%	3.35	0.1%	3.33	-0.5%



Income Trend

	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Income							
Aggregate (\$Mil.)	\$24	\$30	25.0%	\$40	33.3%	\$46	15.0%
Per Capita	\$4,018	\$6,148	53.0%	\$9,164	49.1%	\$10,638	16.1%
Avg. Household	\$13,660	\$20,550	50.4%	\$30,676	49.3%	\$35,426	15.5%
Median HH	\$9,963	\$18,158	82.3%	\$25,408	39.9%	\$27,986	10.1%
Avg. Family HH	\$14,345	\$23,358	62.8%	\$34,939	49.6%	\$39,944	14.3%
Med. Family HH	\$11,002	\$21,587	96.2%	\$31,279	44.9%	\$35,283	12.8%
Avg. HH Wealth				\$95,933		\$107,183	11.7%
Med. HH Wealth				\$29,343		\$32,692	11.4%



NOTE: When the median household wealth for an area is less than \$25,000 it will be listed on this report as \$24,999. Data on income are expressed in "current" dollars for each year. Decennial Census data reflects prior year income.

1990-00 change of 20% greater (>) or less (<) than national average

2000-2005 change of 20% greater (>) or less (<) than national average



Household Trend Report (HTR)
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Sales: 800-234-5973
Support: 800-780-4237

Household Trend Report

PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
UNINCORPORATED LEE COUNTY, FL

2/27/01

Tract: 0012.00, Lee County, FL

State: 12, County: 071

Weight: 100.00



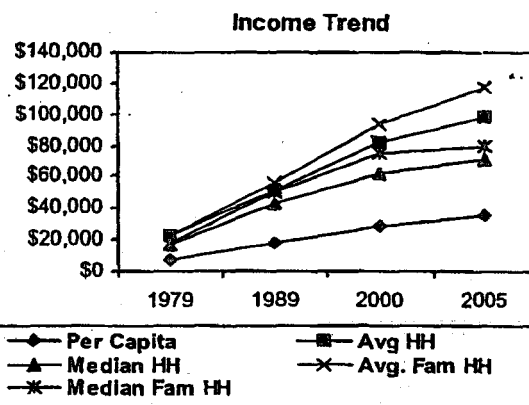
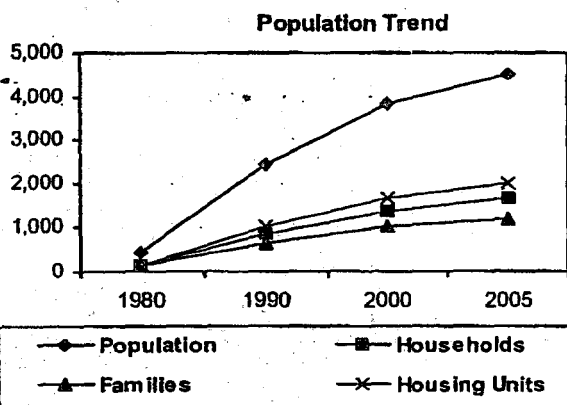
Population and Household Trend

Universe	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Population	442	2,423	448.2%	3,820	57.7%	4,499	17.8%
Households	123	833	577.2%	1,372	64.7%	1,642	19.7%
Families	106	635	499.1%	1,004	58.1%	1,180	17.5%
Housing Units	133	1,021	667.7%	1,667	63.3%	1,991	19.4%
Grp. Qrt. Pop	10	256	2,460.0%	249	-2.7%	250	0.4%
Household Size	3.51	2.60	-25.9%	2.60	0.1%	2.59	-0.6%



Income Trend

Income	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Aggregate (\$Mil.)	\$3	\$43	1,333.3%	\$110	155.8%	\$158	43.6%
Per Capita	\$6,846	\$17,864	160.9%	\$28,833	61.4%	\$35,109	21.8%
Avg. Household	\$22,222	\$50,957	129.3%	\$81,689	60.3%	\$98,229	20.2%
Median HH	\$17,153	\$42,232	146.2%	\$61,216	45.0%	\$71,316	16.5%
Avg. Family HH	\$22,991	\$56,086	143.9%	\$94,256	68.1%	\$117,806	25.0%
Med. Family HH	\$17,361	\$50,417	190.4%	\$74,800	48.4%	\$79,401	6.2%
Avg. HH Wealth				\$238,109		\$274,913	15.5%
Med. HH Wealth				\$104,206		\$134,109	28.7%



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1990-00 change of 20% greater (>) or less (<) than national average

2000-2005 change of 20% greater (>) or less (<) than national average



Household Trend Report (HTR)
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Household Trend Report

PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
LEE COUNTY, FL

2/27/01

Tract: 0301.00, Lee County, FL

State: 12, County: 071
Weight: 100.00



Population and Household Trend

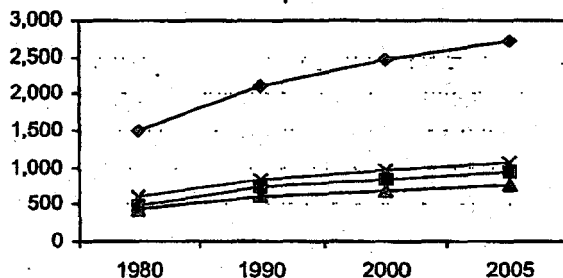
	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Universe							
Population	1,510	2,119	40.3%	2,465	16.3%	2,710	9.9%
Households	494	727	47.2%	847	16.5%	938	10.7%
Families	432	619	43.3%	695	12.3%	757	8.9%
Housing Units	611	834	36.5%	966	15.8%	1,069	10.7%
Grp. Qrt. Pop	10	74	640.0%	72	-2.7%	73	1.4%
Household Size	3.04	2.81	-7.4%	2.83	0.4%	2.81	-0.5%



Income Trend

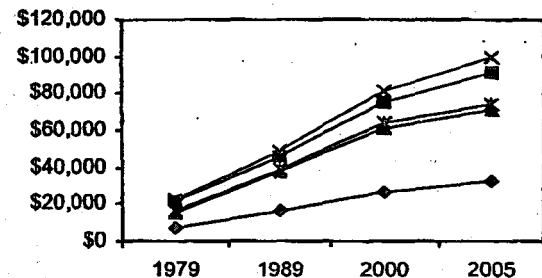
	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Income							
Aggregate (\$Mil.)	\$10	\$34	240.0%	\$65	91.2%	\$88	35.4%
Per Capita	\$6,613	\$16,076	143.1%	\$26,518	65.0%	\$32,386	22.1%
Avg. Household	\$20,962	\$45,308	116.1%	\$75,299	66.2%	\$91,225	21.2%
Median HH	\$15,119	\$37,837	150.3%	\$61,150	61.6%	\$71,104	16.3%
Avg. Family HH	\$22,750	\$48,430	112.9%	\$81,717	68.7%	\$99,949	22.3%
Med. Family HH	\$16,585	\$38,877	134.4%	\$64,167	65.1%	\$74,550	16.2%
Avg. HH Wealth				\$254,043		\$287,524	13.2%
Med. HH Wealth				\$135,699		\$159,761	17.7%

Population Trend



Population (diamonds), Households (squares), Families (triangles), Housing Units (crosses)

Income Trend



Per Capita (diamonds), Median HH (triangles), Median Fam HH (crosses), Avg HH (squares), Avg Fam HH (asterisks)

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1990-00 change of 20% greater (>) or less (<) than national average

2000-2005 change of 20% greater (>) or less (<) than national average



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Support: 800-780-4237

Household Trend Report

PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
NORTH EAST LEE COUNTY, FL

2/27/01

Tract: 0302.00, Lee County, FL

State: 12, County: 071
Weight: 100.00

Population and Household Trend

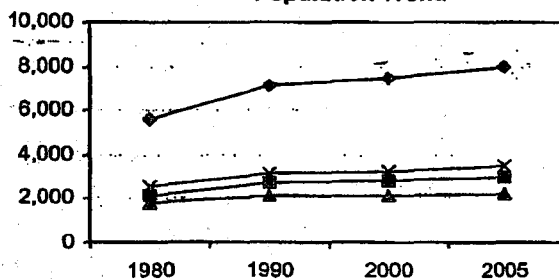
Universe	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Population	5,571	7,145	28.3%	7,448	4.2%	7,932	6.5%
Households	2,106	2,679	27.2%	2,787	4.0%	2,985	7.1%
Families	1,748	2,115	21.0%	2,116	0.0%	2,227	5.2%
Housing Units	2,557	3,135	22.6%	3,241	3.4%	3,464	6.9%
Grp. Qrt. Pop	0	12	0.0%	12	0.0%	12	0.0%
Household Size	2.65	2.66	0.7%	2.67	0.2%	2.65	-0.6%



Income Trend

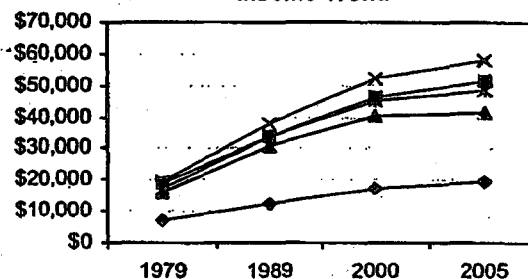
Income	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Aggregate (\$Mil.)	\$40	\$90	125.0%	\$129	43.3%	\$155	20.2%
Per Capita	\$7,124	\$12,649	77.6%	\$17,290	36.7%	\$19,549	13.1%
Avg. Household	\$18,695	\$33,667	80.1%	\$46,136	37.0%	\$51,839	12.4%
Median HH	\$16,075	\$30,850	91.9%	\$40,256	30.5%	\$41,636	3.4%
Avg. Family HH	\$19,738	\$37,780	91.4%	\$51,916	37.4%	\$58,244	12.2%
Med. Family HH	\$16,949	\$34,082	101.1%	\$44,929	31.8%	\$48,387	7.7%
Avg. HH Wealth				\$160,917		\$172,666	7.3%
Med. HH Wealth				\$82,395		\$87,592	6.3%

Population Trend



Population (diamonds), Households (squares), Families (triangles), Housing Units (crosses)

Income Trend



Per Capita (diamonds), Median HH (triangles), Median Fam HH (asterisks), Avg HH (squares), Avg Fam HH (crosses)

NOTE: When the median household wealth for an area is less than \$25,000 it will be listed on this report as \$24,999. Data on income are expressed in "current" dollars for each year. Decennial Census data reflects prior year income.

1990-00 change of 20% greater (▸) or less (◀) than national average

2000-2005 change of 20% greater (▸) or less (◀) than national average



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Sales: 800-234-5973
Support: 800-780-4237

Household Trend Report

PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
UNINCORPORATED LEE COUNTY, FL

2/27/01

Tract: 0401.01, Lee County, FL

State: 12, County: 071

Weight: 100.00



Population and Household Trend

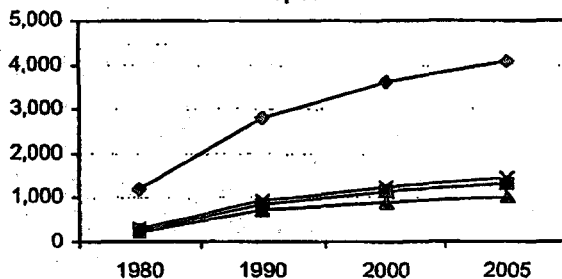
	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Universe							
Population	1,171	2,786	137.9%	3,601	29.3%	4,060	12.7%
Households	275	859	212.4%	1,152	34.1%	1,323	14.8%
Families	230	700	204.3%	904	29.1%	1,020	12.8%
Housing Units	295	932	215.9%	1,246	33.7%	1,429	14.7%
Grp. Qrt. Pop	318	390	22.6%	380	-2.6%	381	0.3%
Household Size	3.10	2.79	-10.1%	2.80	0.2%	2.78	-0.5%



Income Trend

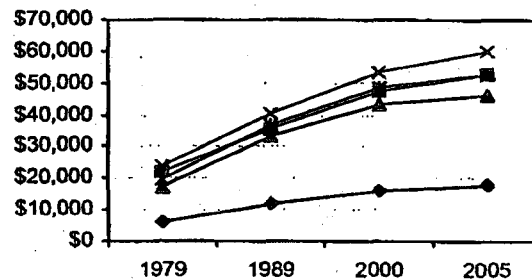
	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Income							
Aggregate (\$Mil.)	\$7	\$33	371.4%	\$57	72.7%	\$73	28.1%
Per Capita	\$6,025	\$11,757	95.1%	\$15,896	35.2%	\$17,886	12.5%
Avg. Household	\$21,801	\$35,731	63.9%	\$47,407	32.7%	\$52,668	11.1%
Median HH	\$17,132	\$33,325	94.5%	\$43,404	30.2%	\$46,038	6.1%
Avg. Family HH	\$23,546	\$40,514	72.1%	\$53,675	32.5%	\$59,652	11.1%
Med. Family HH	\$19,643	\$36,786	87.3%	\$48,547	32.0%	\$52,546	8.2%
Avg. HH Wealth				\$172,019		\$189,924	10.4%
Med. HH Wealth				\$94,105		\$103,303	9.8%

Population Trend



Population (diamond)
Households (square)
Families (triangle)
Housing Units (x)

Income Trend



Per Capita (diamond)
Median HH (triangle)
Median Fam HH (x)
Avg. Fam HH (square)

NOTE: When the median household wealth for an area is less than \$25,000 it will be listed on this report as \$24,999. Data on income are expressed in "current" dollars for each year. Decennial Census data reflects prior year income.

1990-00 change of 20% greater (>) or less (<) than national average

2000-2005 change of 20% greater (>) or less (<) than national average



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Sales: 800-234-5973
Support: 800-780-4237

Household Trend Report

PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
LEE COUNTY, FL

2/27/01

Tract: 0401.02, Lee County, FL

State: 12, County: 071
Weight: 100.00

Population and Household Trend

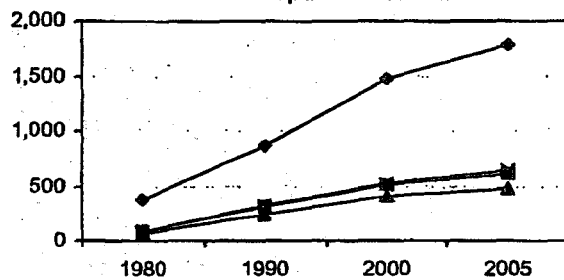
Universe	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Population	366	871	138.0%	1,480	69.9%	1,772	19.7%
Households	86	297	245.3%	502	69.0%	606	20.7%
Families	72	245	240.3%	399	62.9%	473	18.5%
Housing Units	92	316	243.5%	533	68.7%	643	20.6%
Grp. Qrt. Pop	99	0	-100.0%	0	0.0%	0	0.0%
Household Size	3.10	2.93	-5.5%	2.95	0.5%	2.92	-0.8%



Income Trend

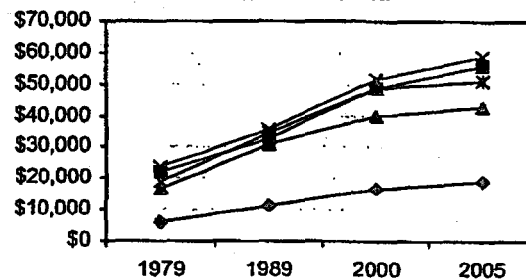
Income	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Aggregate (\$Mil.)	\$2	\$10	400.0%	\$24	140.0%	\$34	41.7%
Per Capita	\$6,025	\$11,170	85.4%	\$16,401	46.8%	\$19,162	16.8%
Avg. Household	\$21,801	\$32,759	50.3%	\$48,354	47.6%	\$56,031	15.9%
Median HH	\$16,667	\$30,750	84.5%	\$39,559	28.6%	\$42,521	7.5%
Avg. Family HH	\$23,546	\$35,335	50.1%	\$51,710	46.3%	\$58,990	14.1%
Med. Family HH	\$18,750	\$34,250	82.7%	\$48,917	42.8%	\$50,735	3.7%
Avg. HH Wealth				\$171,744		\$193,406	12.6%
Med. HH Wealth				\$84,946		\$96,729	13.9%

Population Trend



—●— Population —■— Households
 —▲— Families —×— Housing Units

Income Trend



—●— Per Capita —■— Avg. HH
 —▲— Median HH —×— Median Fam HH

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1990-00 change of 20% greater (>) or less (<) than national average

2000-2005 change of 20% greater (>) or less (<) than national average



Household Trend Report (HTR)
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Household Trend Report

PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
LEE COUNTY, FL

2/27/01

Tract: 0401.03, Lee County, FL

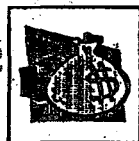
State: 12, County: 071

Weight: 100.00



Population and Household Trend

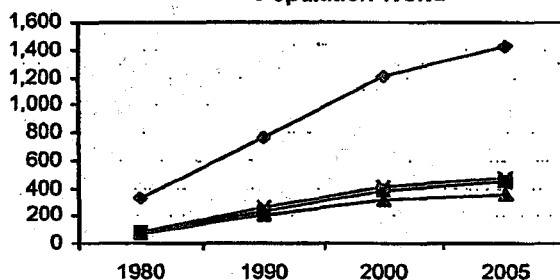
	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Universe							
Population	320	761	137.8%	1,205	58.3%	1,422	18.0%
Households	75	236	214.7%	375	58.9%	445	18.7%
Families	63	200	217.5%	307	53.5%	358	16.6%
Housing Units	81	255	214.8%	404	58.4%	480	18.8%
Grp. Qrt. Pop	87	12	-86.2%	12	0.0%	12	0.0%
Household Size	3.11	3.17	2.2%	3.18	0.2%	3.17	-0.4%



Income Trend

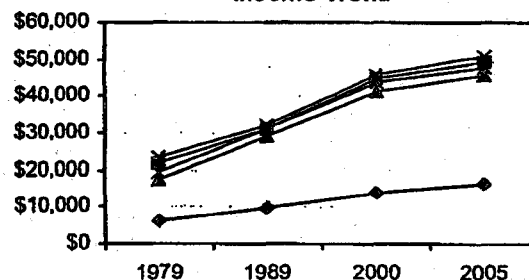
	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Income							
Aggregate (\$Mil.)	\$2	\$7	250.0%	\$17	142.9%	\$23	35.3%
Per Capita	\$6,025	\$9,608	59.5%	\$13,918	44.9%	\$16,158	16.1%
Avg. Household	\$21,801	\$30,983	42.1%	\$44,581	43.9%	\$49,406	10.8%
Median HH	\$17,188	\$29,205	69.9%	\$41,350	41.6%	\$45,893	11.0%
Avg. Family HH	\$23,546	\$32,249	37.0%	\$45,987	42.6%	\$50,873	10.6%
Med. Family HH	\$19,375	\$31,250	61.3%	\$43,750	40.0%	\$47,969	9.6%
Avg. HH Wealth				\$113,483		\$129,547	14.2%
Med. HH Wealth				\$32,292		\$38,720	19.9%

Population Trend



—●— Population —■— Households
 —▲— Families —×— Housing Units

Income Trend



—●— Per Capita —■— Avg. HH
 —▲— Median HH —×— Avg. Fam HH

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1990-00 change of 20% greater (>) or less (<) than national average

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Sales: 800-234-5973
Support: 800-780-4237

Household Trend Report

PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
SOUTHEAST LEE COUNTY, FL

2/27/01

Tract: 0401.05, Lee County, FL

State: 12, County: 071
Weight: 100.00

Population and Household Trend

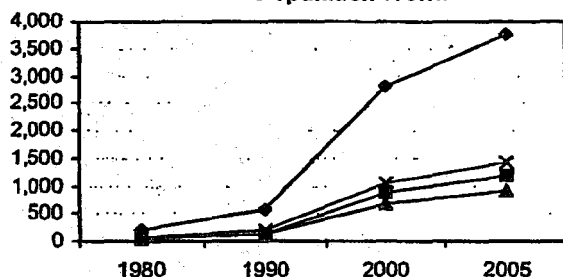
		1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Universe								
Population	▶▶	217	576	165.4%	2,816	388.9%	3,750	33.2%
Households	▶▶	52	152	192.3%	869	471.7%	1,174	35.1%
Families	▶▶	44	125	184.1%	688	450.4%	914	32.8%
Housing Units	▶▶	56	187	233.9%	1,060	466.8%	1,429	34.8%
Grp. Qrt. Pop		54	103	90.7%	100	-2.9%	101	1.0%
Household Size		3.13	3.11	-0.7%	3.13	0.4%	3.11	-0.6%



Income Trend

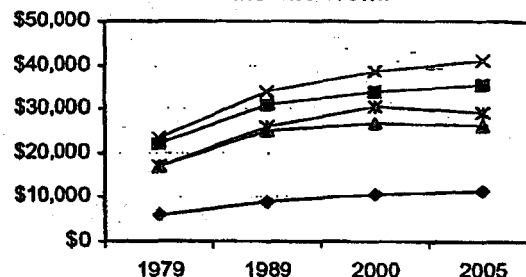
		1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Income								
Aggregate (\$Mil.)	▶	\$1	\$5	400.0%	\$30	500.0%	\$42	40.0%
Per Capita	◀	\$6,096	\$8,835	44.9%	\$10,549	19.4%	\$11,239	6.5%
Avg. Household	◀	\$21,843	\$30,836	41.2%	\$33,752	9.5%	\$35,542	5.3%
Median HH	◀	\$16,875	\$25,132	48.9%	\$26,804	6.7%	\$26,438	-1.4%
Avg. Family HH	◀	\$23,488	\$33,691	43.4%	\$38,420	14.0%	\$41,084	6.9%
Med. Family HH	◀	\$16,875	\$25,956	53.8%	\$30,444	17.3%	\$29,074	-4.5%
Avg. HH Wealth					\$113,140		\$116,967	3.4%
Med. HH Wealth					\$63,832		\$65,849	3.2%

Population Trend



Population (diamond) Households (square)
Families (triangle) Housing Units (cross)

Income Trend



Per Capita (diamond) Avg HH (square)
Median HH (triangle) Median Fam HH (cross)

NOTE: When the median household wealth for an area is less than \$25,000 it will be listed on this report as \$24,999. Data on income are expressed in "current" dollars for each year. Decennial Census data reflects prior year income.

1990-00 change of 20% greater (▶) or less (◀) than national average

2000-2005 change of 20% greater (▶) or less (◀) than national average



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Household Trend Report

PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
UNINCORPORATED LEE COUNTY, FL

2/27/01

Tract: 0402.01, Lee County, FL

State: 12, County: 071
Weight: 100.00

Population and Household Trend

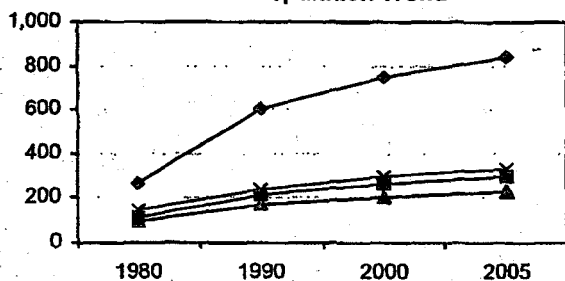
Universe	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Population	263	603	129.3%	745	23.5%	835	12.1%
Households	108	212	96.3%	261	23.1%	294	12.6%
Families	89	173	94.4%	205	18.5%	227	10.7%
Housing Units	140	240	71.4%	294	22.5%	330	12.2%
Grp. Qrt. Pop	0	0	0.0%	0	0.0%	0	0.0%
Household Size	2.44	2.84	16.8%	2.85	0.4%	2.84	-0.5%



Income Trend

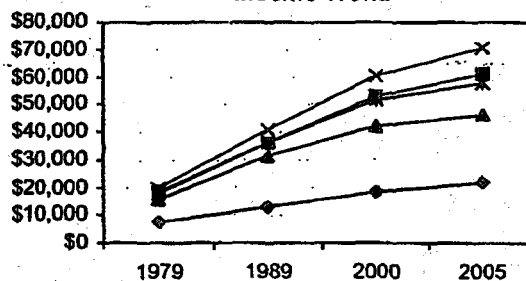
Income	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Aggregate (\$Mil.)	\$2	\$8	300.0%	\$14	75.0%	\$18	28.6%
Per Capita	\$7,430	\$12,597	69.5%	\$18,494	46.8%	\$21,601	16.8%
Avg. Household	\$18,596	\$35,831	92.7%	\$52,789	47.3%	\$61,350	16.2%
Median HH	\$15,625	\$31,429	101.1%	\$41,719	32.7%	\$46,167	10.7%
Avg. Family HH	\$19,545	\$41,003	109.8%	\$60,416	47.3%	\$70,217	16.2%
Med. Family HH	\$17,321	\$36,250	109.3%	\$51,389	41.8%	\$57,500	11.9%
Avg. HH Wealth				\$193,694		\$210,860	8.9%
Med. HH Wealth				\$93,750		\$103,659	10.6%

Population Trend



Population (diamonds), Households (squares), Families (triangles), Housing Units (crosses)

Income Trend



Per Capita (diamonds), Median HH (triangles), Avg. HH (squares), Median Fam HH (asterisks), Avg. Fam HH (crosses)

NOTE: When the median household wealth for an area is less than \$25,000 it will be listed on this report as \$24,999. Data on income are expressed in "current" dollars for each year. Decennial Census data reflects prior year income.

1990-00 change of 20% greater (►) or less (◄) than national average

2000-2005 change of 20% greater (►) or less (◄) than national average



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PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
LEE COUNTY, FL

2/27/01

Tract: 0402.03, Lee County, FL

State: 12, County: 071
Weight: 100.00

Population and Household Trend

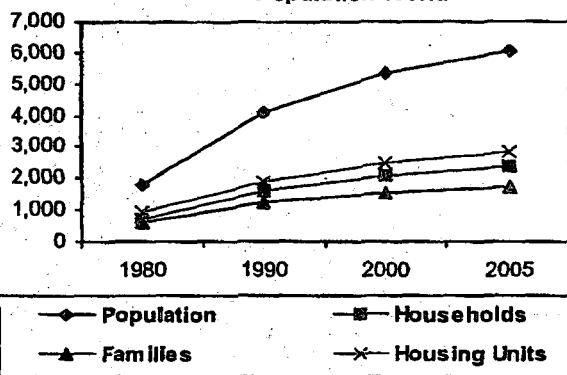
	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Universe							
Population	1,784	4,082	128.8%	5,336	30.7%	6,051	13.4%
Households	730	1,593	118.2%	2,080	30.6%	2,372	14.0%
Families	605	1,229	103.1%	1,542	25.5%	1,727	12.0%
Housing Units	947	1,915	102.2%	2,482	29.6%	2,824	13.8%
Grp. Qrt. Pop	0	0	0.0%	0	0.0%	0	0.0%
Household Size	2.44	2.56	4.9%	2.57	0.1%	2.55	-0.6%



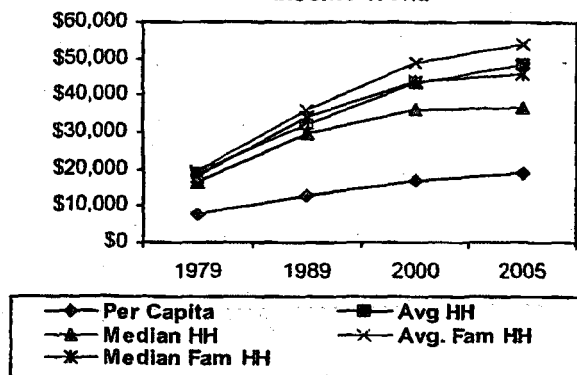
Income Trend

	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Income							
Aggregate (\$Mil.)	\$13	\$51	292.3%	\$90	76.5%	\$115	27.8%
Per Capita	\$7,430	\$12,491	68.1%	\$16,852	34.9%	\$18,945	12.4%
Avg. Household	\$18,596	\$32,007	72.1%	\$43,233	35.1%	\$48,329	11.8%
Median HH	\$16,100	\$29,453	82.9%	\$35,865	21.8%	\$36,511	1.8%
Avg. Family HH	\$19,545	\$36,260	85.5%	\$49,018	35.2%	\$54,122	10.4%
Med. Family HH	\$17,559	\$33,906	93.1%	\$43,490	28.3%	\$45,763	5.2%
Avg. HH Wealth				\$176,712		\$186,148	5.3%
Med. HH Wealth				\$87,871		\$91,320	3.9%

Population Trend



Income Trend



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1990-00 change of 20% greater (▶) or less (◀) than national average

2000-2005 change of 20% greater (▶) or less (◀) than national average



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Household Trend Report

PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
LEE COUNTY, FL

2/27/01

Tract: 0403.01, Lee County, FL

State: 12, County: 071
Weight: 100.00

Population and Household Trend

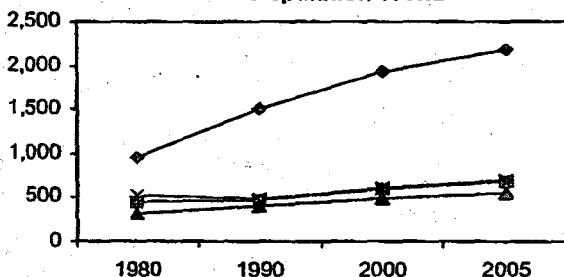
Universe	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Population	950	1,501	58.0%	1,930	28.6%	2,182	13.1%
Households	449	460	2.4%	589	28.0%	669	13.6%
Families	324	394	21.6%	487	23.6%	543	11.5%
Housing Units	525	482	-8.2%	616	27.8%	700	13.6%
Grp. Qrt. Pop	0	0	0.0%	0	0.0%	0	0.0%
Household Size	2.12	3.26	54.2%	3.28	0.4%	3.26	-0.5%



Income Trend

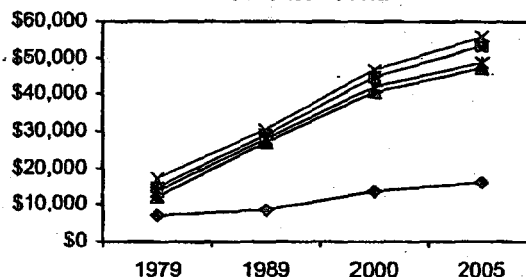
Income	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Aggregate (\$Mil.)	\$7	\$13	85.7%	\$26	100.0%	\$36	38.5%
Per Capita	\$7,081	\$8,829	24.7%	\$13,681	55.0%	\$16,397	19.9%
Avg. Household	\$14,838	\$28,810	94.2%	\$44,829	55.6%	\$53,479	19.3%
Median HH	\$11,973	\$26,938	125.0%	\$40,868	51.7%	\$47,269	15.7%
Avg. Family HH	\$17,111	\$30,408	77.7%	\$46,955	54.4%	\$55,770	18.8%
Med. Family HH	\$13,944	\$27,963	100.5%	\$42,188	50.9%	\$48,884	15.9%
Avg. HH Wealth				\$138,565		\$162,001	16.9%
Med. HH Wealth				\$72,200		\$85,795	18.8%

Population Trend



Population Households
Families Housing Units

Income Trend



Per Capita Avg. HH
Median HH Median Fam HH

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2000-2005 change of 20% greater (>) or less (<) than national average



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PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
UNINCORPORATED LEE COUNTY, FL

2/27/01

Tract: 0403.02, Lee County, FL

State: 12, County: 071
Weight: 100.00



Population and Household Trend

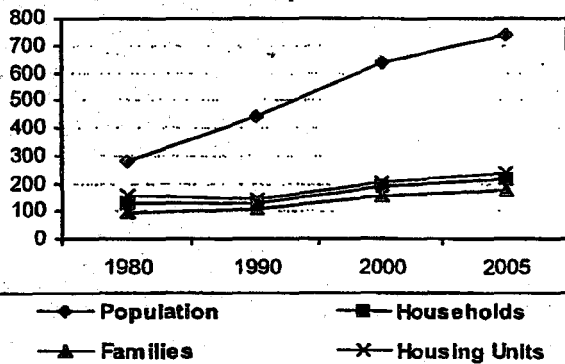
	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Universe							
Population	277	438	58.1%	637	45.4%	741	16.3%
Households	131	129	-1.5%	187	45.0%	218	16.6%
Families	95	110	15.8%	154	40.0%	176	14.3%
Housing Units	153	141	-7.8%	204	44.7%	238	16.7%
Grp. Qrt. Pop	0	0	0.0%	0	0.0%	0	0.0%
Household Size	2.11	3.40	60.6%	3.41	0.3%	3.40	-0.2%



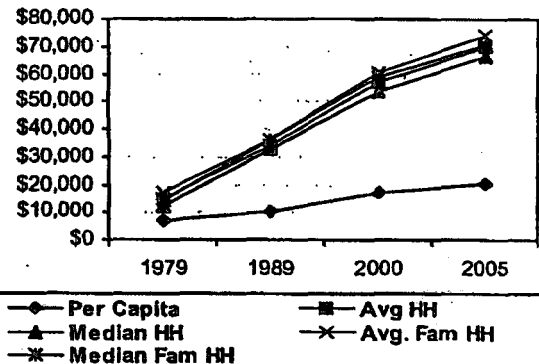
Income Trend

	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Income							
Aggregate (\$Mil.)	\$2	\$4	100.0%	\$11	175.0%	\$15	36.4%
Per Capita	\$7,081	\$9,954	40.6%	\$16,797	68.7%	\$20,562	22.4%
Avg. Household	\$14,838	\$33,798	127.8%	\$57,218	69.3%	\$69,890	22.1%
Median HH	\$11,908	\$32,417	172.2%	\$53,750	65.8%	\$66,696	24.1%
Avg. Family HH	\$17,111	\$35,971	110.2%	\$60,422	68.0%	\$73,595	21.8%
Med. Family HH	\$13,942	\$35,833	157.0%	\$59,000	64.7%	\$70,568	19.6%
Avg. HH Wealth				\$164,908		\$227,148	37.7%
Med. HH Wealth				\$93,919		\$135,294	44.1%

Population Trend



Income Trend



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1990-00 change of 20% greater (>) or less (<) than national average

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PREPARED FOR: ECONOMIC DEVELOPMENT OFFICE OF LEE COUNTY
LEE COUNTY, FL

2/27/01

Tract: 0403.04, Lee County, FL

State: 12, County: 071
Weight: 100.00

Population and Household Trend

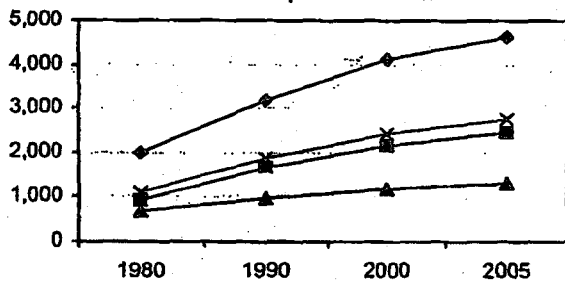
Universe	1980 Census	1990 Census	% Chg 1980-90	2000 Estimate	% Chg 1990-00	2005 Projection	% Chg 2000-05
Population	2,004	3,165	57.9%	4,091	29.3%	4,626	13.1%
Households	947	1,657	75.0%	2,149	29.7%	2,446	13.8%
Families	683	966	41.4%	1,194	23.6%	1,332	11.6%
Housing Units	1,107	1,883	70.1%	2,427	28.9%	2,757	13.6%
Grp. Qrt. Pop	0	0	0.0%	0	0.0%	0	0.0%
Household Size	2.12	1.91	-9.7%	1.90	-0.3%	1.89	-0.7%



Income Trend

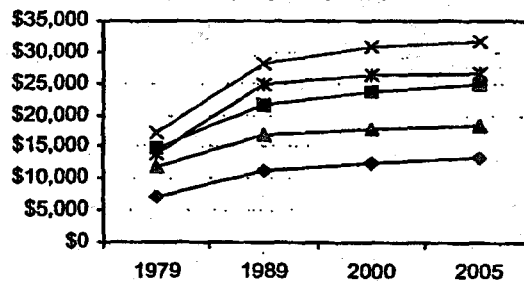
Income	1979 Census	1989 Census	% Chg 1979-89	2000 Estimate	% Chg 1989-00	2005 Projection	% Chg 2000-05
Aggregate (\$Mil.)	\$14	\$36	157.1%	\$51	41.7%	\$61	19.6%
Per Capita	\$7,081	\$11,338	60.1%	\$12,470	10.0%	\$13,205	5.9%
Avg. Household	\$14,838	\$21,657	46.0%	\$23,740	9.6%	\$24,974	5.2%
Median HH	\$11,917	\$16,797	40.9%	\$17,943	6.8%	\$18,412	2.6%
Avg. Family HH	\$17,111	\$28,113	64.3%	\$30,974	10.2%	\$31,784	2.6%
Med. Family HH	\$13,945	\$24,861	78.3%	\$26,395	6.2%	\$26,579	0.7%
Avg. HH Wealth				\$106,272		\$107,105	0.8%
Med. HH Wealth				\$55,070		\$55,361	0.5%

Population Trend



Population (diamond) Households (square)
Families (triangle) Housing Units (x)

Income Trend



Per Capita (diamond) Avg. HH (square)
Median HH (triangle) Avg. Fam HH (x)
Median Fam HH (x)

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2000-2005 change of 20% greater (>) or less (<) than national average



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13.2 – Environmental Justice Overview and Audit

**LEE COUNTY
RESOURCE RECOVERY FACILITY
ENVIRONMENTAL JUSTICE
OVERVIEW AND AUDIT**

**PREPARED BY
MALCOLM PIRNIE, INC.**

ENVIRONMENTAL JUSTICE OVERVIEW & AUDIT

Overview:

Environmental Justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental Justice also underlines the concept of fair treatment; meaning that no group of people, including racial, ethnic, or socio-economic groups, should bear a disproportionate share of any negative environmental consequences resulting from industrial, municipal, and commercial operations.

According to ENVIRONMENTAL JUSTICE, Guidance under the National Environmental Policy Act, Council on Environmental Quality, Executive Office of the President, Environmental Justice works to promote environmental and public health protection within the context of sustainable development. It is not about stopping progress or growth; it is about local people facing local problems by working collaboratively with the local government agencies and other appropriate groups to consider, if needed, such approaches as special mitigation strategies or monitoring needs to help ensure the health and safety of the community and the environment.

Therefore, as an integral part of this permitting process, an Environmental Justice Audit was undertaken. The Audit strove to 1.) Consider the scope and extent of the proposed expansion on health and the environment, and 2.) Determine whether areas potentially impacted by the expansion might include low-income populations, minority populations, or Indian tribes.

Environmental Justice Audit:

In the first quarter of 2002, an Environmental Justice Audit was undertaken to assess the potential impacts of the proposed facility as an overlay to the surrounding community and seek out opportunities for Environmental Justice considerations. The Audit was based on the Environmental Justice case study work now being advanced within the US EPA's offices of Environmental Justice (ref. Eddie L. Wright, Environmental Justice Program, Waste Management Division, Customer Service Branch, Region IV, US EPA).

This Audit considers the Four Domains of Environmental Justice:

1. Research the Potentially Impacted Community. What is known, what are the demographic, and other important considerations including any that may not be readily apparent in non-invasive research (such as migrant worker camps or clusters of the homeless)?
2. Disproportionate Impacts. If there is expected to be a health and/or environmental impact, will low income and/or minority communities be disproportionately impacted?
3. Meaningful Involvement. How does the community participate in the decision making process and how is information made available to the community (taking into account language and barriers to technical understanding)?
4. Benefits and Burdens. Consider what benefits, direct and indirect (economic, social, cultural, environmental, health), will result from the expansion. Conversely, are there burdens, and, if so, are they balanced by the benefits?

The Audit included, but was not limited to:

- A comprehensive Review of the Economic and Social Effects of Facility Construction & Operation contained in Section 7.0 of this Site Certification Application.
- Social and Economic Household Trend Reports, for incorporated and unincorporated Lee County, Florida (Prepared for the Economic Development Office of Lee County), Volume II, Appendix 13.
- An Impact Area Map of potential Environmental Justice areas near the Lee County Energy Recovery Facility (US EPA Region IV, Environmental Accountability Division).
- A Visual Confirmation Research Survey of all the areas highlighted by the Impact Area Map as potentially containing low-income populations, minority populations, and Indian tribes within a five-mile radius of the proposed expansion site.

- Meetings with the Economic Development Office of Lee County to determine the presence and nature of other industries within the five-mile area set by the Impact Area Map and consistent with air modeling data.

General Findings:

In preparation for the original permitting process for the Facility, a substantial amount of information was collected and studied concerning the various potential impacts of that construction on the population and the environment. With particular regard to whether or not there was an Environmental Justice impact, that information was re-reviewed, follow up interviews were conducted, and a confirmatory direct research initiative was undertaken with particular emphasis on a windshield survey of potential Environmental Justice areas shown on the Impact Area Map.

This study considered the basic Environmental Justice defining elements and triggers as outlined in Executive Order 12898:

- Low-income population: Low-income populations in an affected area should be identified and consideration given to common conditions of environmental exposure or effect.
- Minority: American Indian, Asian or Pacific Islander, Black, not of Hispanic origin, or Hispanic
- Minority population: Minority Populations should be identified where either the minority population of the affected area exceeds 50 percent or the minority population percentage of the minority population of the affected area is meaningfully greater than the minority population percentage in the general population. Also considered should be geographically dispersed/transient sets of individuals, e.g. migrant workers.
- Disproportionately high and adverse human health effects: Consider whether the health effects, which may be measured in risks and rates, are significant or above generally accepted norms, whether that risk to minority populations appreciably exceeds the risk to the general population, and whether these risk considerations are effected by cumulative or multiple adverse exposures from environmental hazards.

A careful and thoughtful review of these definitions and the subsequent research and comparison of the potentially impacted community found no disparate impacts to minority or low-income populations. Although there are several small pockets of areas that could be considered fitting into the categories of low-income populations, minority populations, and Indian tribes, the findings indicate that no group of people, including racial, ethnic, or socio-economic groups, bear a disproportionate share of any potential negative environmental consequences resulting from the expansion of the Facility, nor does any one minority or low income grouping, either within the context of the local community or community-at-large, exceed 50 percent of the potentially impacted population.

The following is a review of the research elements and conclusions:

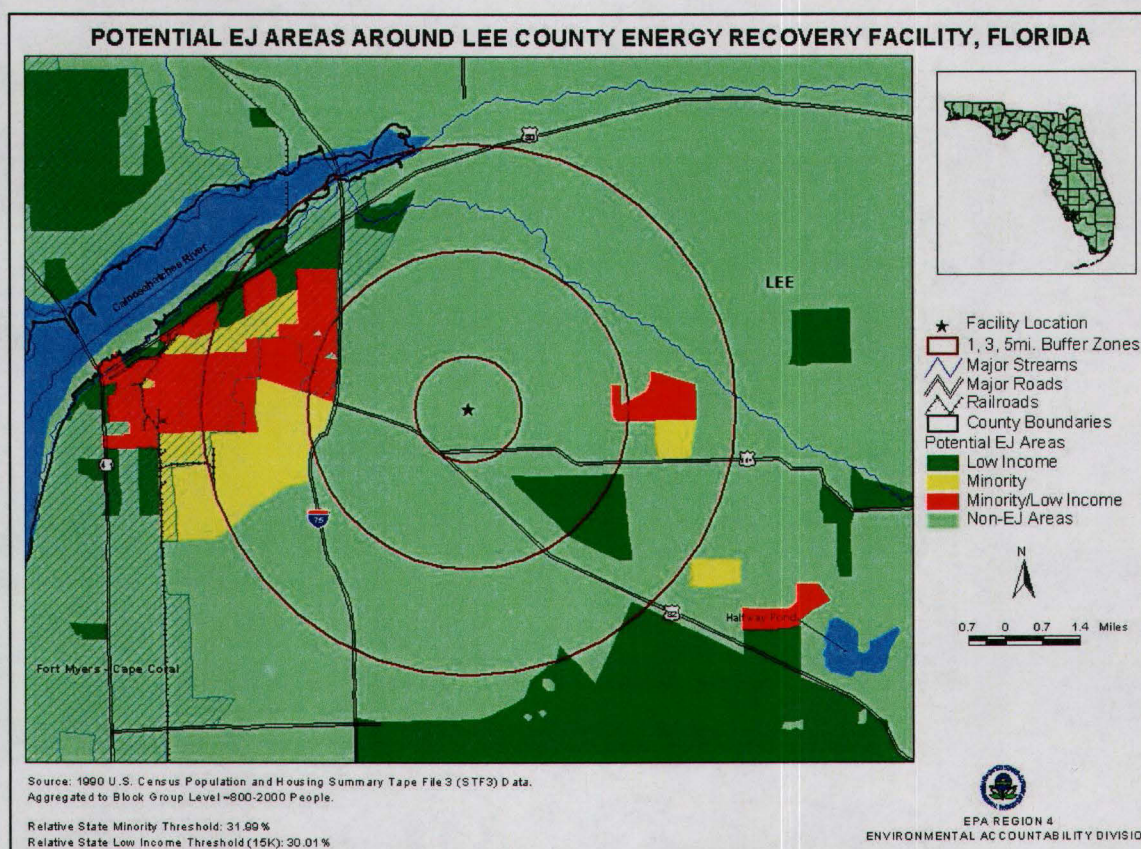
Review of the Economic and Social Effects of Facility Construction & Operation. The Facility expansion will provide a number of economic and social benefits to the area while minimizing negative impacts. The operation of the Facility leads to a decrease in the amount of land required for sanitary landfilling, and the recovery and sale of energy from the combustion of solid waste ultimately results in revenue. The decreased need for land results in improved protection of surface and groundwater resources in the area. In addition, the Facility provides full-time employment to approximately 40 personnel, which contributes an estimated \$40 million to the local economy over a 20-year period.

The location of the Facility contributes to minimizing the impact of its presence on the few surrounding residential areas that exist. In fact, with the exception of some sparsely populated agricultural land within two miles from the Facility, the largest concentration of population near the Facility lies on a small portion of the very western edge of the five-mile radius point, against the prevailing winds. The few residences to the northeast in proximity to the Facility are buffered by a County-built park, which borders on the Facility's eastern boundary. A FP&L transmission corridor, bordering on the western Facility boundary, lies between the Facility and any potential future development to the west. The presence of the park and the utility corridor will maintain a permanent green space buffer.

Social and Economic Household Trend Reports. A review of the Household Trend Report prepared by Claritas, Inc. for the Economic Development Office of Lee County indicates general positive trends of both population growth and income growth for the decade 1990-2000, with stable or continuing growth projected through 2005.

On the population side, growth either remained relatively stable or increased dramatically, with occurrences of the latter far outweighing the former. With regard to income growth during the same time period, double-digit percentage growth was prevalent, with some data indicating growth well over 100 percent. By contrast, an extremely small amount of data revealed negative income growth, outnumbered greatly by the majority indicating positive growth values.

Impact Area Map: The US EPA provided an Impact Area Map (the "Map") of potential Environmental Justice areas around the Lee County Energy Recovery Facility (US EPA Region IV, Environmental Accountability Division). The Map was based on the 1990 US Census Population and Housing Summary Tape File 3 (STF3) data. The Map which is depicted below, indicated the facility location, one, three, and five-mile buffer zones, as well as major streams, roads, and railroads.



The Map graphically depicted areas defined as low income, minority, minority/low income, and non-Environmental Justice Areas. These depicted areas were based on the 1990 relative state minority threshold (31.99 percent) and the relative state low-income threshold (30.01 percent based on \$15,000 per year household income).

Visual Confirmation Research Survey: To review the information depicted in the Impact Area Map and note changes between the Map's 1990 census data and current conditions 12 years later, a Visual Confirmation Research Survey was conducted. The Visual Confirmation Research Survey was conducted in all the areas depicted indicating potential Environmental Justice concerns within the five-mile radius buffer zone. The Survey consisted of a two-person team that drove through and photographically documented those areas depicted in the Map as potential Environmental Justice areas.

The first depiction researched was the area generally known as the East Ft. Myers-Tice neighborhoods (shown on the Map as the low-income, minority, and minority low-income areas three to five miles west and west/northwest of the Facility). The primary observation was that this area, other than for a small neighborhood at the most western limit of the buffer zone, was extremely lightly populated. Most of the area was open field, parks, and sprawling commercial properties. Of the homes present, many were recently constructed market value single-family dwellings. No readily apparent blighted conditions were observed, and the Household Income Trends indicate positive income growth in these areas.

The second area researched was the area generally known as the Buckingham neighborhoods (depicted on the Map as minority and minority-low income areas west of Buckingham Road and north of SR 884). Like the East Ft. Myers-Tice neighborhoods, this area proved to be sparsely populated except for one market value housing tract on Astoria Avenue. The majority of this area (approximately 80 percent) lies outside the three-mile buffer from the Facility.

The final area researched was the area depicted as low-income and generally known as Lehigh Estates. The Map depicts this area as south of SR 884 and west of Gunnery Road. This area is also sparsely populated and consists of a few market value homes built in a largely undeveloped housing tract consisting of a large number of streets carved in large tracts of land and only a few homes.

The Research did document a migrant labor camp located at the intersection of Interstate 75 and SR 82. This camp was not depicted on the Map but was reported to have been at that location for more than 10 years. (This area is at the western edge of the three-mile buffer, as depicted on the Map.) The camp consists of about 20 permanent dwellings and was largely unoccupied at the time of the Survey (February, 2002). Although the camp does not seem to constitute an Environmental Justice concern due to its limited size and seasonal occupation, special efforts will be undertaken to help ensure participation during the permitting public involvement process (e.g., distributing a special notice for the required hearings).

Economic Development Office of Lee County: A meeting was held with the staff of the Economic Development Office of Lee County to research industrial, commercial, and growth trends both within the County and the five-mile buffer zone depicted on the Map.

According to the Economic Development office, the largest five employers were: The School District of Lee County, Lee Memorial Health System, Publix Super Markets, Wal-Mart, and the Lee County Government. Of the top 30 employers in the County, only number 30, Conshor, Inc., a concrete forming business, is a commercial entity. There are no major industrial facilities located within the County, and the only "smoke-stack" industry, Florida Power & Light, has converted to from heavy oil to natural gas. The majority of commercial enterprises within the county are service providers and have seven or less employees.

Based upon information provided by the Economic Development Office, Fort Myers (Lee County) was named one of the best places to live by *Money Magazine* and was rated as one of the top U.S. communities in which to live and work.

Environmental Justice and Public Involvement. Although this Environmental Justice audit found no Environmental Justice impacts as defined by Executive Order 12898, the County recognizes that the primary key to maintaining meaningful dialog with all the diverse elements that make up a community is a positive and proactive community involvement program. The County is very cognizant that, regardless of whether or not a particular community or action meets the definition of Environmental Justice and disparate impact, it is important to work to ensure all elements of the host community are included in the public involvement process.

Special considerations, particularly in this part of Florida, should be made to deal with language barriers in reaching out to low-income and minority communities.

To this end, the County is committed to a comprehensive public involvement program that embodies the spirit and intent of Environmental Justice principles. Lee County is committed to public involvement as a key element of the permitting process.

13.3 – Wetland Mitigation Monitoring Report

**LEE COUNTY ENERGY RECOVERY SITE
Wetland Mitigation Monitoring Report**

**South Florida Water Management District
Site Certification
Florida Department of Environmental Protection
File # PA-90-30**

**EIGHTH ANNUAL REPORT
DECEMBER 2001**

**Section 24, Township 44 South, Range 25 East
Lee County, Florida**

Lee County Division of Solid Waste

Prepared by:

**W. Dexter Bender & Associates, Inc.
2052 Virginia Avenue
Fort Myers, Florida 33901**

I. INTRODUCTION

A. Project Objective:

The Lee County Energy Recovery Facility is a solid waste recovery center which was permitted under the Power Plant Siting Act. To offset 2.7 acres of wetland impacts, 2.9 acres of forested wetlands were created and 9.5 acres of cypress wetlands were restored as mitigation for the construction of a maintenance road for the electric power transmission line of 1.95 acres of wetlands.

The data represented in this report was collected during December 2001. Data collection was done according to the monitoring methodologies as described in the Lee County Energy Recovery Site Monitoring Plan, (dated November 1992).

The restored 9.5 acre wetland is located in the southeast corner of the property adjacent to Buckingham Road. This wetland was predominantly invaded by Brazilian pepper and melaleuca. 3.8 acres of wetlands were created from low quality upland habitat. The initial exotic/nuisance species treatment was conducted within the wetland areas in 1994.

B. SFWMD Site Certification FDEP File # PA-90-30

C. Monitoring Report Schedule:

	Date Due	Date Received
Baseline Monitoring Report	Prior to Wetland Creation	March 8, 1993
Time Zero Monitoring Report	Completion of Planting	March 25, 1994
First Monitoring Report	December 31, 1994	January 5, 1995
Second Annual Monitoring Report	December 31, 1995	March 25, 1996
Third Annual Monitoring Report	December 31, 1996	February 27, 1997
Fourth Annual Monitoring Report	December 31, 1997	January 5, 1998
Fifth Annual Monitoring Report	December 31, 1998	March 19, 1999
Site Inspection	December 31, 1998	March 29, 1999
Sixth Annual Monitoring Report	December 31, 1999	January 18, 2000
Seventh Annual Monitoring Report	December 31, 2000	February, 2001

II. SITE CONDITIONS

A. Exotic and Nuisance Plant Control

The data recorded in this report was collected after scheduled exotic/nuisance plant species treatment of the site. As shown in the baseline report, dense stands of melaleuca (*Melaleuca quinquenervia*) existed within the wetland preserve areas. Initial treatment had eradicated

these exotic and nuisance species from the site, however, scattered melaleuca and Brazilian pepper saplings remain and continuing maintenance will be needed to prevent reinfestation.

III. SAMPLING METHODOLOGY

A. Monitoring was required within the created wetland area to document mitigation plantings success. These monitoring activities seek to:

- Quantify the establishment progress and identify when success criteria are met in the created wetland;
- determine the level of exotic plant infestation and need for periodic maintenance in both the created and restored wetlands; and
- observe the hydroperiod and depth of inundation in the created and restored wetlands to see that they are adequate to maintain the long-term health of these systems.

D. Success Criteria - The following success criteria listed in the Wetland Mitigation and Monitoring Plan dated November 1992, page 11:

1. The combined percent cover of the exotics melaleuca, Brazilian pepper, Australian pine, and downy rose myrtle is less than 5 percent within each vegetation association throughout the created and restored wetlands.
2. The combined percent cover of the exotic species listed above and of nuisance species such as cattail, primrose willow, and torpedo grass is less than 5 percent within the created wetland.
3. The average percent cover of desirable wetland species is greater than 80 percent in the created wetland.
4. A planted tree density of 400 trees per acre above the herbaceous stratum with a combined canopy cover of 15 percent is surviving within the 3.5 acre area planted with tree seedlings.
5. A hydroperiod and depth of inundation is attained which will promote the long-term existence of the created and restored wetlands as functioning wetlands.

C. Monitoring Modifications:

After a on-site meeting on March 29, 1999, representatives from the Florida Department of Environmental Protection (FDEP), South Florida Water Management District (SFWMD), Lee County Division of Solid Waste Management (LCDSWM), and Natural Resource Planning Services, Inc. (NRPS) walked the project site and agreed to the following changes in monitoring and reporting methodology:

- The 9.5 acre restored wetland meets all of the success criteria and further monitoring is not required, however, exotic and nuisance vegetation control shall continue for at least one more year.

- Collection of macro-invertebrate data in both the restored and created wetlands is no longer required.
- The 2.9 acre created wetland did not meet the required success criteria at that time and shall continue to be monitored. The monitoring will be reduced from twice a year to once a year with the report due by 12/01. (Revised to 2/02 by agreement with SFWMD).
- The permittee will investigate cultural treatments and/or planting strategies that will more quickly move the created wetland toward meeting the canopy cover success criterion. These treatments/strategies will be discussed in future monitoring reports.

1. Created Forested Wetland

a. Photo Points:

A total of seven photo stations have been set up in the wetland to document site conditions. We have included these photos in the back of the report.

b. Sample Plots:

A 200' x 50' sampling transect was installed within the center of the created wetland to document qualitative and quantitative sampling and relative abundance of both desirable and exotic/nuisance vegetation and the number of planted trees present. We have shown the sample transect location on the attached map. The data collected is listed below:

TREE/SHRUB SAMPLING TRANSECT A

	7 th Annual			8 th Annual		
# PRESENT/HEIGHT						
	Healthy	Dead	Height	Healthy	Dead	Height
cypress (<i>Taxodium distichum</i>)	107	5	3-10'	105	1	4'-10'
TOTAL	107	5		105	1	
Water level			0"			0"

GROUND COVER

	7 th Annual	8 th Annual
% COVER		
centella (<i>Centella asiatica</i>)	10	10
queen Anne's lace (<i>Daucus carota</i>)	5	10
soft rush (<i>Juncus effusus</i>)	10	5
broom-sedge (<i>Andropogon virginicus</i>)	35	60
TOTAL	50%	85%
Water level	0"	0"

c. Cultural Treatments since last report.

Invasive weeds and exotic plants were hand-pulled from the created wetlands in March 2001.

d. Rainfall data (collected from Paige Field in Fort Myers, Florida).

Month	2002	2001	30 Year Average
January	0.47	trace	2.23
February	---	trace	2.19
March	---	5.02	2.74
April	---	0.52	1.67
May	---	0.20	3.42
June	---	4.71	9.77
July	---	13.94	8.98
August	---	10.32	9.54
September	---	14.26	7.86
October	---	2.20	2.59
November	---	0.41	1.71
December	---	1.84	1.58
Year	0.47	53.42	54.28

e. Wildlife

The following species of wildlife either through visual observation or signs such as tracks or nests during the monitoring event were observed:

feral hog (*Sus scrofa*)

raccoon (*Procyon lotor*)

White ibis (*Eudocimus albus*)

Anhinga (*Anhinga anhinga*)

Red shouldered hawk (*Buteo lineatus*)

Turkey vulture (*Cathartes aura*)

2. Status of the Restored Wetland

The restored wetlands were dry at the time of the survey but were in good condition. Native tree and ground cover species were abundant and exhibited no signs of unusual stress or mortality. Scattered melaleuca and Brazilian peppers were observed within the wetland but were not greater than the maximum amount allowed of 5%. The exotics will be treated during the next maintenance event.

V. CONCLUSION

The Eighth Annual Monitoring Report revealed the preserve areas are stable and in good condition. The preserves are dominated by desirable wetland vegetation and appear to be seasonally inundated. The few exotic plants evident such as scattered melaleuca and Brazilian pepper can be easily controlled with regular spot maintenance. The planted portions of the mitigation site exhibit a survival rate in excess of 90% for both ground cover and tree species.

Enclosures: Location Map, Site map, and photographs.

INSIGHT 1005

FORT MYERS AREA

- | | | | |
|------------|-------------------------|-----------------|-------|
| Expressway | Interstate Highway | County Boundary | City |
| Street | U.S. Highway | River | Park |
| | State or County Highway | Railroad | Water |

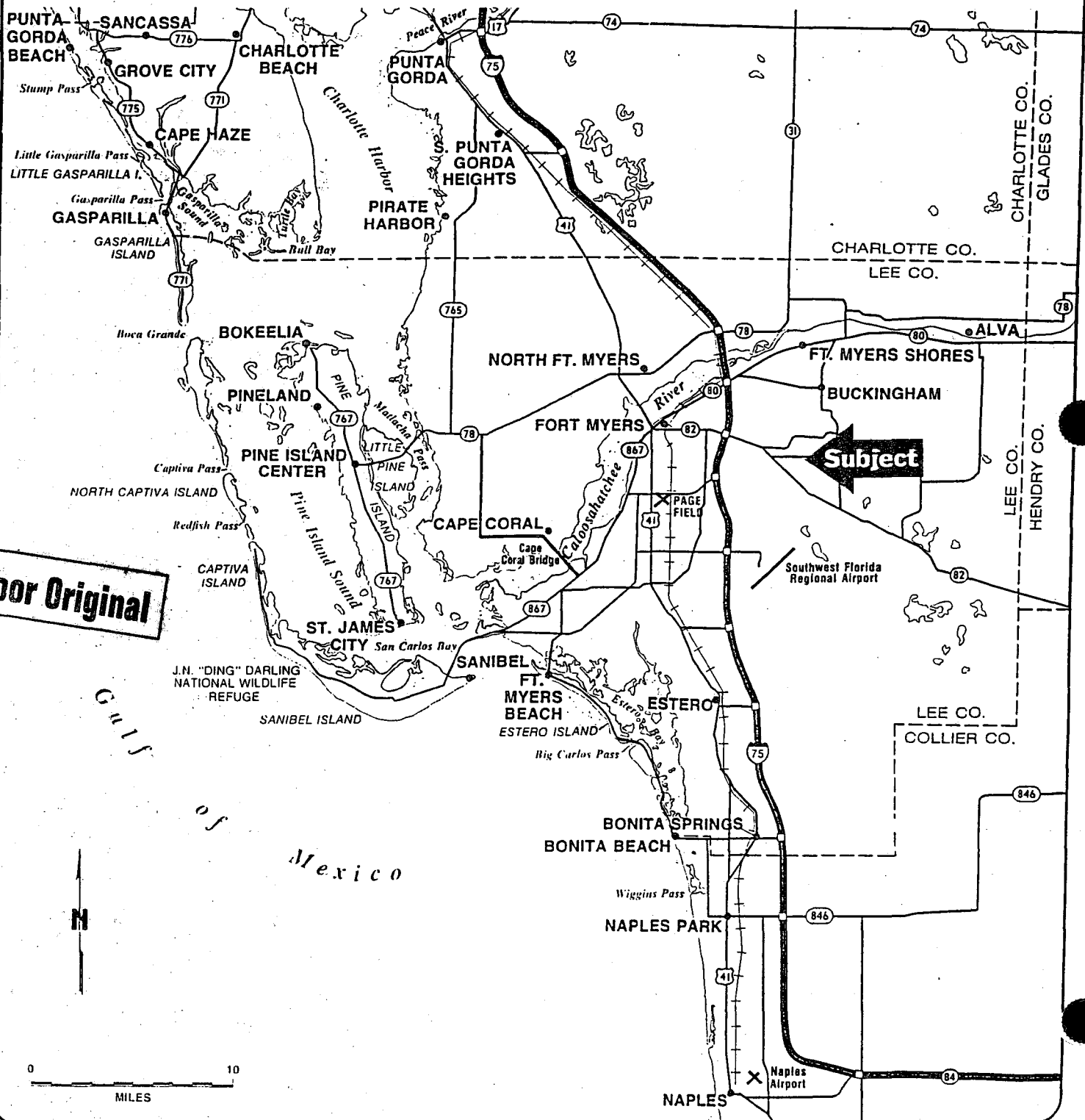
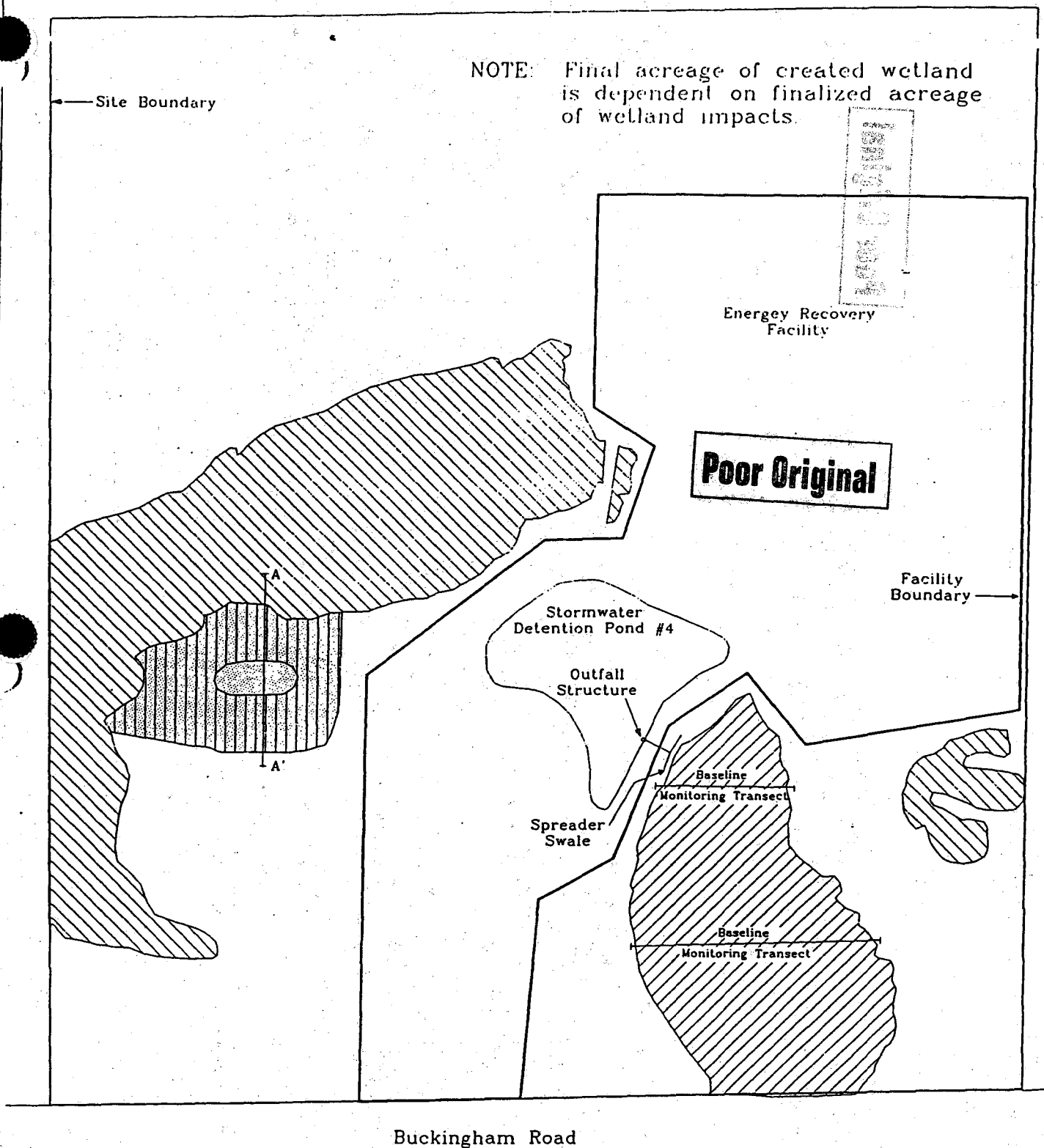
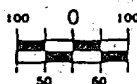


FIGURE 1. Wetland Mitigation Plan View



Kevin L. Erwin
Consulting Ecologist, Inc.

3077 Bayshore Parkway Fort Myers Florida 33901 (813) 337-1600



LEGEND

- 9.5 Acre Wetland to be Restored
- Existing Wetland
- 3.5 Acre Created Forested Wetland
- 0.3 Acre Created Herbaceous Wetland

MP1RR101	Cap No.	Survey Date	Surveyed	Client
18-17-92				Malcolm Pirnie, Inc.
CMS	Drawn	By		
CMS				
1 OF				
JMH	MP1RRKLE			
		SUBJECT IS OWNED WITH FIELD VERIFICATION		
		Lee County Energy Recovery Site Wetland Mitigation Plan		

Poor Original



Photo 1: View looking northwest of the dense cordgrass fringe around the preserved wetland with planted cypress in the background.

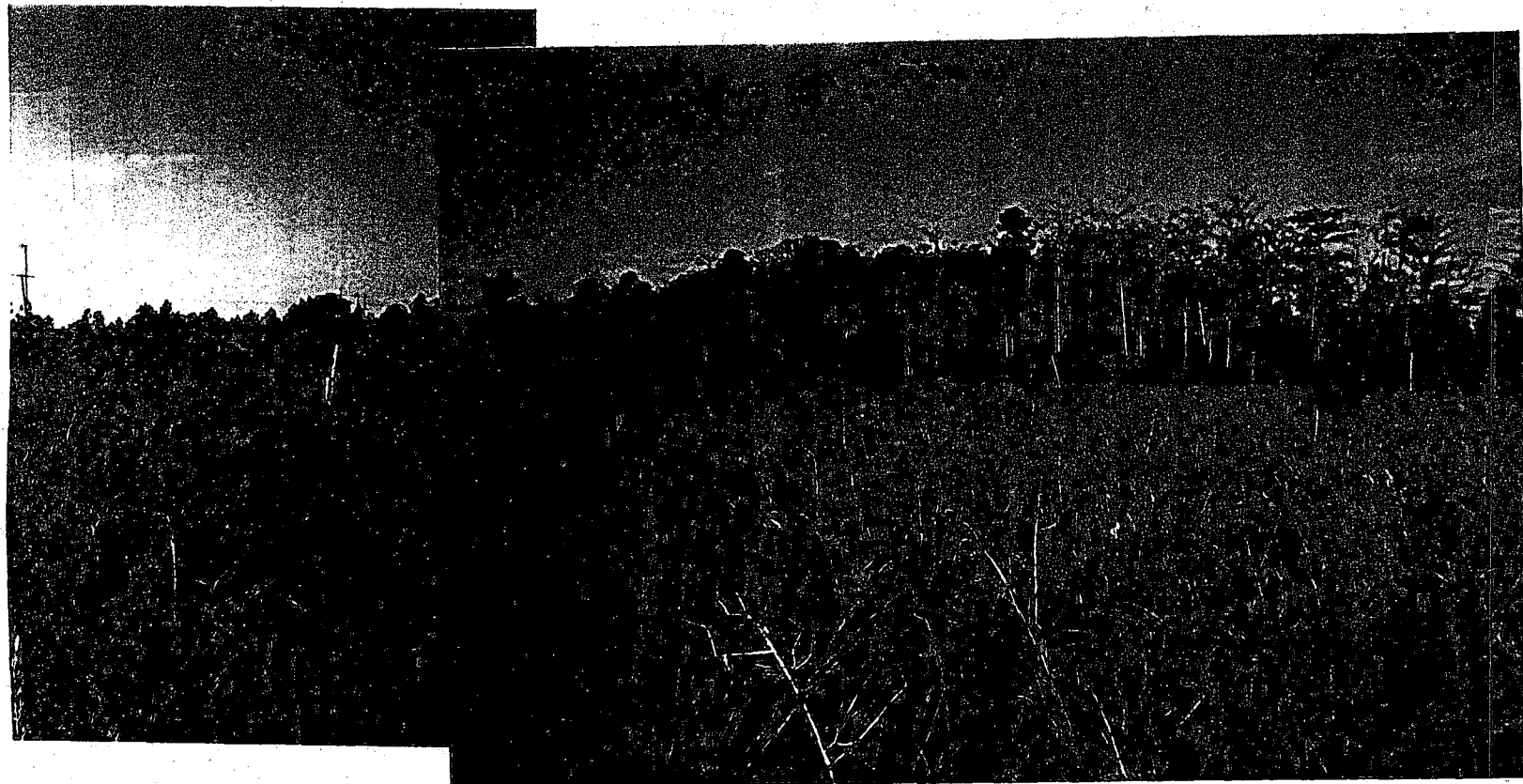


Photo 2: View looking north of the preserve area. Planted cypress were 3'-4' tall here and dormant during the time of the survey. Natural ground cover consists of broom sedge, bacopa, and various flat sedges.

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1981-1982

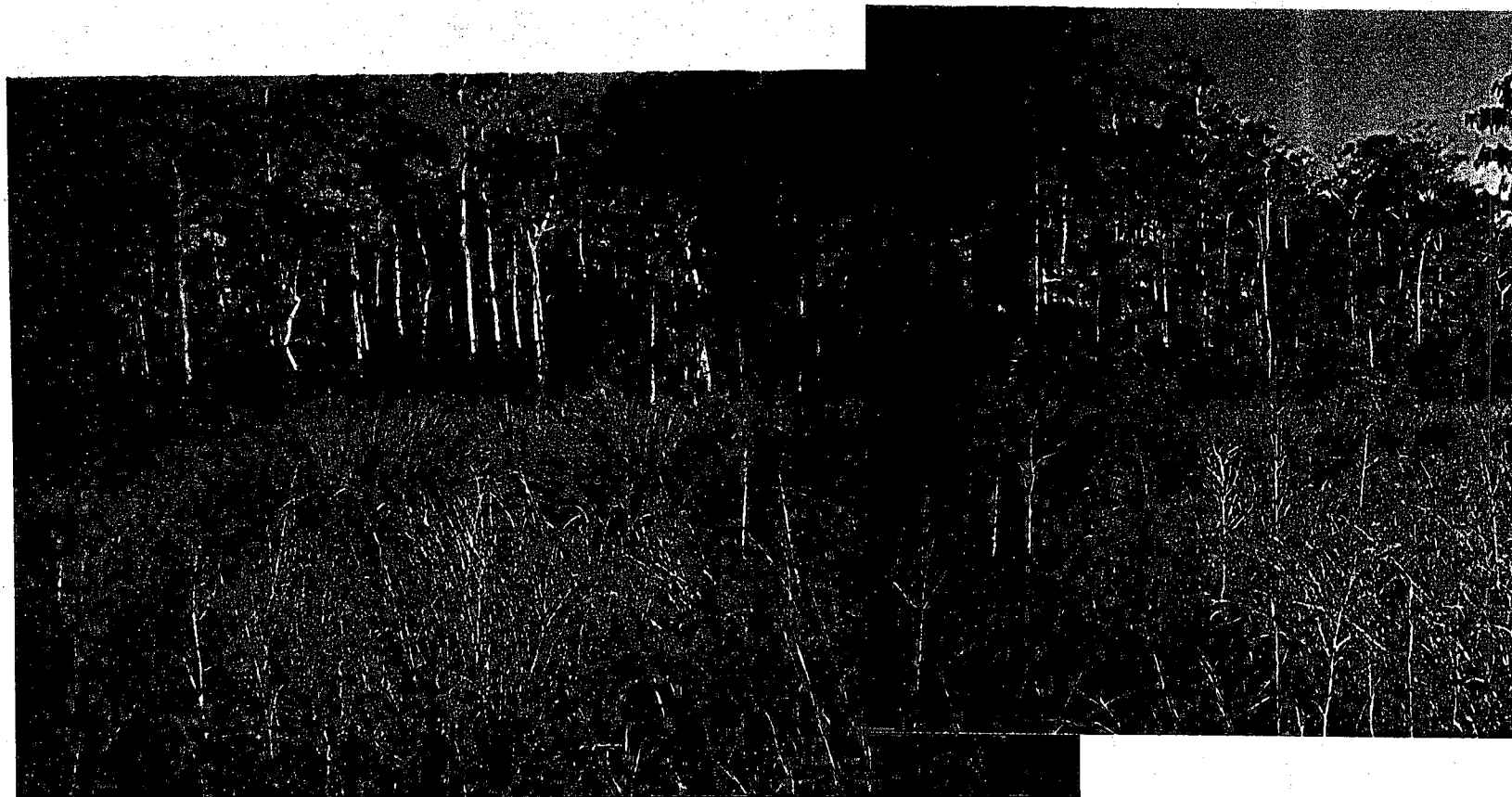


Photo 3: View of the perimeter of the preserve's north end where cordgrass and planted cypress are well established.

Poor Original



Photo 4: View looking northwest of the preserve area. Planted cypress are in good condition here as well.



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Photo 5: Close up of planted cypress tree.

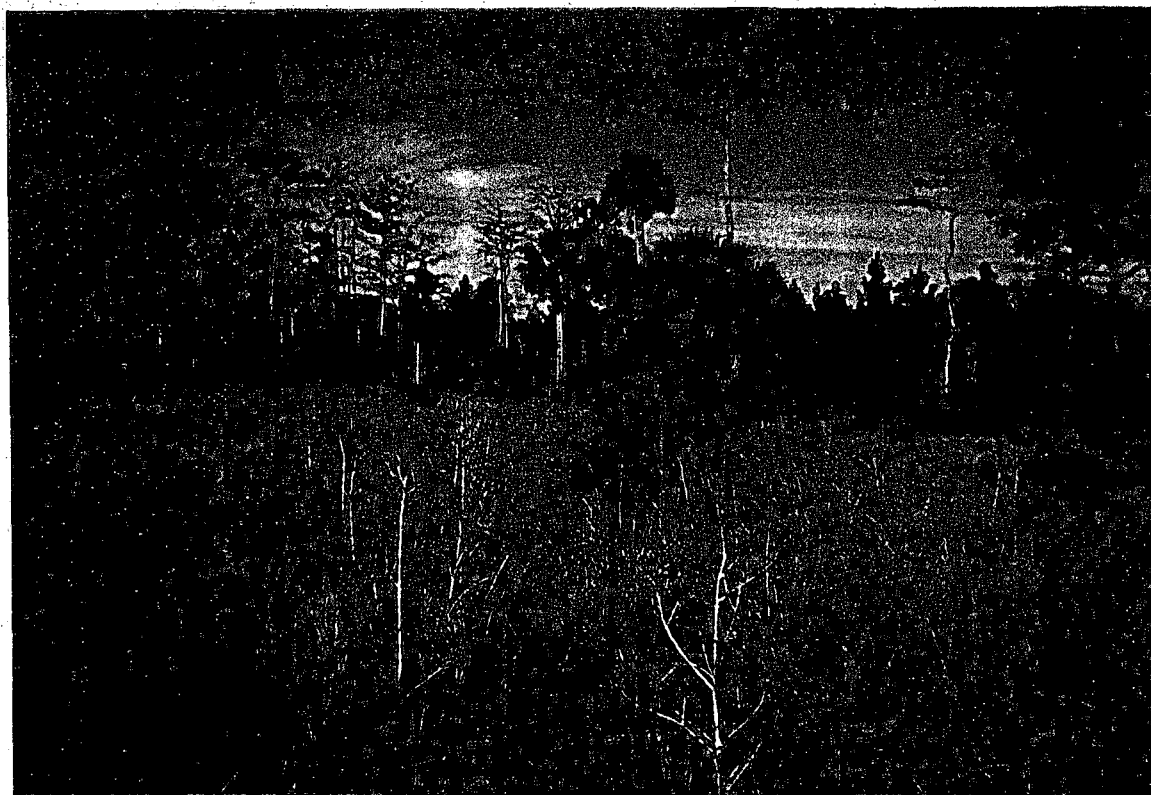


Photo 6: Cordgrass and cypress in the center of the preserve.

Poor Original

606-14034



Poor Original

Photo 7: Numerous large cypress trees are located on the east side of the preserve. Ground cover consists of dense maidencane here.



**Lee County, Florida
Solid Waste Energy Recovery Facility**

**Supplemental Application for Power
Plant Site Certification**

APPENDIX 14.0

MONITORING PLANS

14.1 – Exotic Species Control Plan

14.2 – Oil Pollution Prevention Plan

**14.3 – Stormwater Pollution
Prevention Plan**

14.1 – Exotic Species Control Plan

Exotic Species Control Plan

**Lee County
Division of Solid Waste**

Poor Original

February 1993



**MALCOLM
PIRNIE**

**EXOTIC SPECIES CONTROL PLAN
LEE COUNTY DIVISION OF SOLID WASTE**

TABLE OF CONTENTS

Section	Page
1.0 INTRODUCTION	1-1
1.1 SITE DESCRIPTION	1-1
1.2 PLAN PURPOSE	1-1
2.0 SITE VEGETATION	2-1
2.1 DESCRIPTION	2-1
2.2 EXOTIC PLANT SPECIES	2-3
2.2.1 Brazilian Pepper	2-3
2.2.2 Melaleuca (Punk Tree)	2-4
2.2.3 Australian Pine	2-5
3.0 REMOVAL OF EXOTIC PLANT SPECIES	3-1
3.1 METHODS	3-1
3.1.1 Manual	3-1
3.1.2 Mechanical	2-1
3.1.3 Herbicides	3-1
3.1.4 Physical	3-2
3.2 REMOVAL PROCEDURES	3-2
3.2.1 Melaleuca	3-2
3.2.1.1 Removal	3-2
3.2.1.2 "In-Place" Treatment	3-2
3.2.2 Brazilian Pepper	3-3
3.2.2.1 Removal	3-3
3.2.2.2 "In-Place" Treatment	3-3
3.2.3 Australian Pine	3-3
3.2.3.1 Removal	3-3
3.2.3.2 "In-Place" Treatment	3-4
4.0 PROJECT IMPLEMENTATION AND SCHEDULE	4-1
4.1 IMPLEMENTATION	4-1
4.1.1 Phase I - Fenced Facility Area	4-1
4.1.2 Phase II - Power Line Transmission Road Corridor	4-2
4.1.3 Phase III - Specific Wetland Areas	4-2
4.1.3.1 Restored Wetlands	4-2
4.1.3.2 Created Wetlands	4-3
4.1.3.3 Existing Wetlands	4-3
4.1.1 Phase IV - Remaining Areas	4-3
4.2 GENERAL PROCEDURES	4-3
4.3 RECORD KEEPING DURING REMOVAL	4-4
4.4 REMOVAL SCHEDULE	4-4

TABLE OF CONTENTS (Continued)

Section	Page
5.0 MONITORING PLAN	5-1
5.1 APPROACH	5-1
5.2 PROCEDURE	5-1
5.2.1 Created and Restored Wetlands	5-1
5.2.2 Remaining Areas	5-2
5.3 REPORTING	5-3
6.0 REFERENCES	6-1

LIST OF FIGURES

Figure No.	Description	Following Page
1-1	Facility Site Location Map	1-2
2-1	Vegetation Communities and Land Use	2-4
4-1	Exotic Plant Species Control Plan Phases	4-2

LIST OF APPENDICES

Appendix	Description
A	Lee County Ordinance No. 90-06
B	Herbicide Formulations and Application Methods

1.0 INTRODUCTION

1.1 SITE DESCRIPTION

Lee County ("County") is building a Solid Waste Energy Recovery Facility (the "Facility") on a 155 acre parcel of land located approximately 2.5 miles east of the I-75 and State Road 82, as shown in Figure 1-1. The Facility property is bordered by low density single-family residential units to the east (north half) and north and similar undeveloped land to the south and west. Along the southern half of the eastern boundary is Buckingham Road, a two-lane arterial which separates the subject property from the former City of Fort Myers Sanitary Landfill. The entire 155 acre site is owned by the County and is currently undeveloped and zoned for the Facility development. The actual Facility area will only occupy approximately 46.4 of the 155 acres. In addition to the Facility area, the power line transmission corridor is the only other currently planned improved area on the property. The corridor occupies approximately seven acres along the east and north property lines.

1.2 PLAN PURPOSE

Many exotic, non-native species have been introduced to South Florida. Most were originally imported for their landscaping or ornamental value. However, many of these species have "escaped", adapted, proliferated and are now threatening to permanently displace Florida's native vegetation. Several of these exotic species can cause various problems including:

- human illness,
- negative impact on water supply, and
- negative economic impacts.

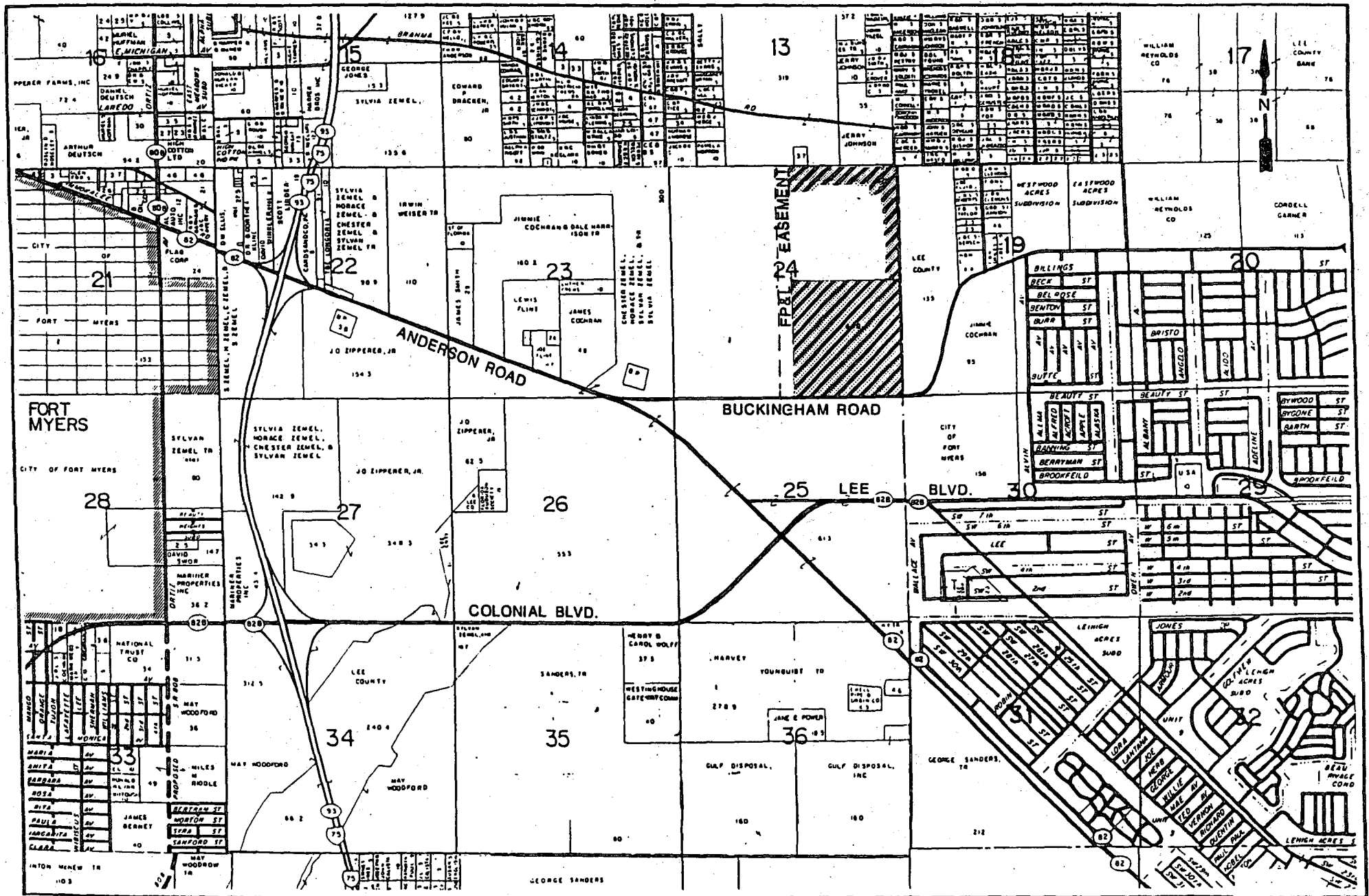
These exotic pest species are of minimal value to the environment as they form monocultures and provide poor habitat and food for native wildlife.

As required by the Conditions of Certification (Sections (XX)-Exotic Plant Removal and (XXI) (c)(1)-Natural Systems and Recreational Lands) under the Power Plant Siting Act, Lee County is required to develop and implement an Exotic Species Control Plan for

the removal of all Brazilian pepper, Australian pine, and melaleuca from the Facility site. Additionally, the removal of these exotic species are required to be part of the regular maintenance of the Facility site. This Plan describes the removal, control, and monitoring procedures to be implemented for the exotic vegetation species (Brazilian pepper, Australian pine, and melaleuca) found on the entire 155 acre Facility site. Lee County Ordinance No. 90-06, Section Five, "Maintenance of Provided Open Space", was also taken into consideration in the development of this Plan. A copy of this Section of the Ordinance is provided in Appendix A.

FIGURE 1-1
FACILITY SITE LOCATION MAP

Poor Original



2.0 SITE VEGETATION

2.1 DESCRIPTION

In November of 1992, Lee County's ecologist (Kevin Erwin Consulting Ecologist, Inc.) delineated all major upland and wetland vegetation and mapped them utilizing the FLUCFCS, Levels III and IV.⁽²⁾ As a result of the mapping, and subsequent ground truthing, a total of 17 vegetation associations were delineated on site. The vegetation associations found on the Facility site and a list of the common species found in that particular area are as follows.⁽²⁾

Cropland & Pastureland: Approximately 51.0 acres. Common Species: pasture grasses, paspalum, marsh-pink, stinkweeds, frog-fruit, cabbage palm, wax-myrtle, saw palmetto, live oak, laurel oak, slash pine, wiregrass, pawpaw, and bluestem.

Unimproved Pasture: Approximately 1.3 acres. Common Species: pasture grasses, wood sorrel, coinwort, frog-fruit, wax-myrtle, Brazilian pepper, dog-fennel and slash pine.

Palmetto Prairie: Approximately 3.8 acres. Common Species: saw palmetto, wiregrass, Brazilian pepper, melaleuca, black-root, thistle, grape, greenbriar and buckthorn.

Palmetto Prairie, Disturbed: Approximately 0.3 acre. Common Species: saw palmetto, melaleuca, wiregrass, stinkweed, dwarf wax-myrtle, slash pine and tickseed.

Pine Flatwoods: Approximately 17.9 acres. Common Species: slash pine, melaleuca, saw palmetto, wax-myrtle, cabbage palm, buckthorn, Brazilian pepper, slash pine, wiregrass, dwarf wax-myrtle, bluestem, stinkweed, black-root, tickseed, dog fennel, grape and thistle.

Pine Flatwoods, Disturbed: Approximately 2.6 acres. Common Species: slash pine, Brazilian pepper, cabbage palm, melaleuca, and wiregrass.

Wet Pine Flatwoods: Approximately 4.7 acres. Common Species: slash pine, wax-myrtle, bald-cypress, Brazilian pepper, cabbage palm, wiregrass, coinwort, stinkweed, yellow-eyed-grass, rush, Tracy's beakrush and pine.

Wet Pine Flatwoods, Disturbed: Approximately 3.1 acres. Common Species: slash pine, melaleuca, bald-cypress, Brazilian pepper, cabbage palm, wax-myrtle, slash pine, wiregrass, dwarf wax-myrtle, small pine, stinkweed, grape, Tracy's beakrush, rushes, yellow-eyed-grass, melaleuca, Brazilian pepper and pine.

Brazilian Pepper: Approximately 2.9 acres. Common Species: Brazilian pepper, stinkweed, Boston fern, coinwort, grape, greenbriar, Virginia creeper, common rag weed, thistle and slash pine.

Temperate Hardwoods: Approximately 0.7 acres. Common Species: laurel oak, live oak, wax-myrtle, cabbage palm, wiregrass, stinkweed, coinwort, yellow-eyed-grass and Boston fern.

Wax-Myrtle: Approximately 40.1 acres. Common Species: wax-myrtle, Brazilian pepper, cabbage palm, slash pine, laurel oak, live oak, wax-myrtle, saw palmetto, cabbage palm, melaleuca, wiregrass, stinkweed, greenbriar, grape, Virginia creeper, coinwort, pepper-vine, black-root, yellow-eyed-grass, aster, tickseed, frog-fruit, purple thistle, dog-fennel, hat pin bluestem, Boston fern, rag weed, beauty-berry, lantana and poison ivy.

Australian Pine: Approximately 0.8 acres. Common Species: Australian pine.

Drainage Canal: Approximately 0.6 acres. Common Species: coinwort and various grasses.

Cypress: Approximately 13.7 acres. Common Species: wax-myrtle, bald-cypress, cabbage palm, myrsine, melaleuca, Brazilian pepper, smartweed, southern blue flag, swamp fern, dwarf arrowhead, panicum, thistle, groundsel, and mock bishop's weed.



Poor Original

In compliance with the Conditions of Certification (Sections (XX) - Exotic Plant Removal and (XXI)(c)(1) - Natural Systems and Recreational Lands) under the Power Plant Siting Act, Lee County has developed this Exotic Species Control Plan for the removal of all Brazilian pepper, Australian pine, and melaleuca from the entire 155 acre site.

Cypress/Pine: Approximately 2.8 acres. Common Species: bald cypress, slash pine, wax-myrtle, cabbage palm, myrsine, Brazilian pepper, melaleuca, swamp fern, wiregrass, yellow-eyed-grass, rush, ludwigia, thistle, stinkweed, coinwort, Virginia creeper and sawgrass.

Cypress/Pine, Disturbed: Approximately 3.2 acres. Common Species: bald-cypress, slash pine, melaleuca, Brazilian pepper, wax-myrtle, cabbage palm, myrsine, frog-fruit, panicum, tickseed, bluestem, wood sorrel, dog fennel, wiregrass, stinkweed, swamp fern, yellow-eyed grass, rush and ludwigia.

Wet Prairie: Approximately 4.6 acres. Common Species: wax-myrtle, sand cordgrass, wiregrass, stinkweed, yellow-eyed-grass, milkwort, rush sedges, tickseed, saw palmetto, cabbage palm, slash pine, heliotrope, frog-fruit, coinwort, umbrella-grass, marsh-pinks, bald-cypress, bitter mint, melaleuca and Brazilian pepper.

Figure 2-1 illustrates the vegetation communities as described above.

2.2 EXOTIC PLANT SPECIES

As previously discussed, Lee County is required to remove all Brazilian pepper, Australian pine, and melaleuca from the Facility site. A brief description of these exotic species is provided below.

2.2.1 Brazilian Pepper

Schinus terebinthifolius

Many acres of South Florida, north to the Tampa Bay area, are dominated by the Brazilian pepper. Brazilian pepper is predominantly found in moist soil types of peninsular Florida occupying many sites which were formally covered with native vegetation. This pest plant frequently grows along canals and ditches, highways and powerlines, increasing the cost of roadside or right-of-way maintenance and displacing native vegetation. Brazilian pepper can also be found established along borrow-pits, levees, dikes, mangrove associations, hammocks, pinelands, and in disturbed sites.

Brazilian pepper is an aggressive growing shrub with numerous arching branches which can attain heights of over 3 m. Its rapid growth (0.9 m to 1.9 m per year) and dense

arching branches tend to shade adjacent understory and ground cover native vegetation. The shrub's leaves are pinnately compound with 3-11 lanceolate to elliptic leaflets 3-6 cm long and 2-3 cm wide. Its small white flowers are usually in large dense panicles. The seeds of this bushy shrub are contained in a small red berry that ripens in the fall. The berry appears in a cluster at the end of branches and is found only on female plants. The plant gender can only be determined during flowering in the summer or when berries form.

Small mammals and birds act as agents for the dispersal of the Brazilian pepper seeds as the seed remains viable as it passes through the digestive tract of the animal. Bird (avian) dispersal is a major avenue of dispersal for this exotic species.⁽³⁾

2.2.2 Melaleuca (Punk Tree)

Melaleuca quinquenervia

Melaleuca trees can exist in a wide range of soil conditions from dry sand to hydric soils. The cold winters have limited the melaleuca tree to the subtropical regions of the state. In certain areas of the Everglades the tree is rapidly displacing cypress heads and sawgrass stands. This species of tree can be found as far north as Gainesville, Florida, but is more common to South Florida. Melaleuca has been planted as:

- windbreakers around the periphery of agricultural fields,
- soil stabilizers along levees and roads, and
- ornamentals.

The nectar makes it a commercial honey producer, however, it is considered low grade quality honey and requires special processing.

The melaleuca tree can grow up to 25 meters tall, with several trunks each as large as 50 cm in diameter. Its bark is whitish to light brown, spongy, and forms paper-like layers. The tree's leaves are narrowly elliptic, 6-7 cm long and 1-1.5 cm wide, dark green, short petiole, and aromatic when crushed. The melaleuca tree has numerous small flowers consisting of five white petals and one stigma surrounded by 30-40 stamens. These flowers are clustered on "bottle-brush" spikes about 8 cm long and 3 cm wide. The melaleuca's woody seed capsules contain approximately 250 minute seeds providing extremely effective means for rapid dispersal. Melaleuca trees primarily spread by fire, as fire provides an enriched bare soil for germination of the seeds. The pods open only after the vascular

FIGURE 2-1
VEGETATION COMMUNITIES AND LAND USE

Poor Original

COVER TYPE SUMMARY FOR AREA WITHIN PERMIT APPLICATION				
COVER TYPE	HABITAT	ACRES	% OF TOTAL	
210	FARM PASTURE	31.8	33.12	
212	LDN PASTURE	1.3	8.82	
321	PALMETTO PRAIRIE	2.8	2.55	
3219	PALMETTO PRAIRIE INVADED BY EXOTICS	0.3	8.22	
411	PINE FLATWOODS	17.9	11.62	
4119	PINE FLATWOODS INVADED BY EXOTICS	2.6	1.72	
415	WET PINE FLATWOODS	4.7	2.82	
4159	WET PINE FLATWOODS INVADED BY EXOTICS	3.1	2.82	
422	BRAZILIAN PEPPER	2.9	1.92	
425	MEXIC DAK	0.7	0.52	
429	WAX-MYRTLE	40.1	26.82	
437	AUSTRALIAN PINE	0.8	0.52	
514	DRAINAGE CANAL	0.6	0.42	
621	CYPRESS	13.7	8.92	
624	CYPRESS/PINE	2.8	1.82	
6249	CYPRESS/PINE INVADED BY EXOTICS	3.2	2.12	
643	WET PRAIRIE	4.6	3.02	
TOTAL PROJECT ACREAGE		164.1	100%	

Kevin L. Erwin
Consulting Ecologist, Inc.

Client	Project	Location	Date	Scale
Camp, Dresser & McKee	Lee County Energy Recovery Facility Site	Lee County, FL	11-1-88	1"=100'

SECTION 24 TWP 44S RANGE 25E

WETLAND JURISDICTIONAL SUMMARY FOR AREA WITHIN PERMIT APPLICATION								
COVER TYPE	ACREAGE	%	ACREAGE	%	ACREAGE	%	ACREAGE	%
212	0.0	0.0%	0.0	0.0%	1.3	0.8%	0.0	0.0%
410	4.7	3.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
4159	3.1	2.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
514	0.8	0.4%	0.0	0.0%	0.0	0.0%	0.0	0.0%
621	13.7	8.9%	13.7	8.9%	13.7	8.9%	9.2	6.0%
624	2.8	1.8%	2.8	1.8%	2.8	1.8%	2.7	1.8%
6249	3.2	2.1%	3.2	2.1%	3.2	2.1%	0.0	0.0%
643	4.6	3.0%	4.6	3.0%	4.6	3.0%	1.4	0.9%
TOTAL	32.7	21.2%	24.3	15.0%	25.5	16.8%	13.3	8.7%

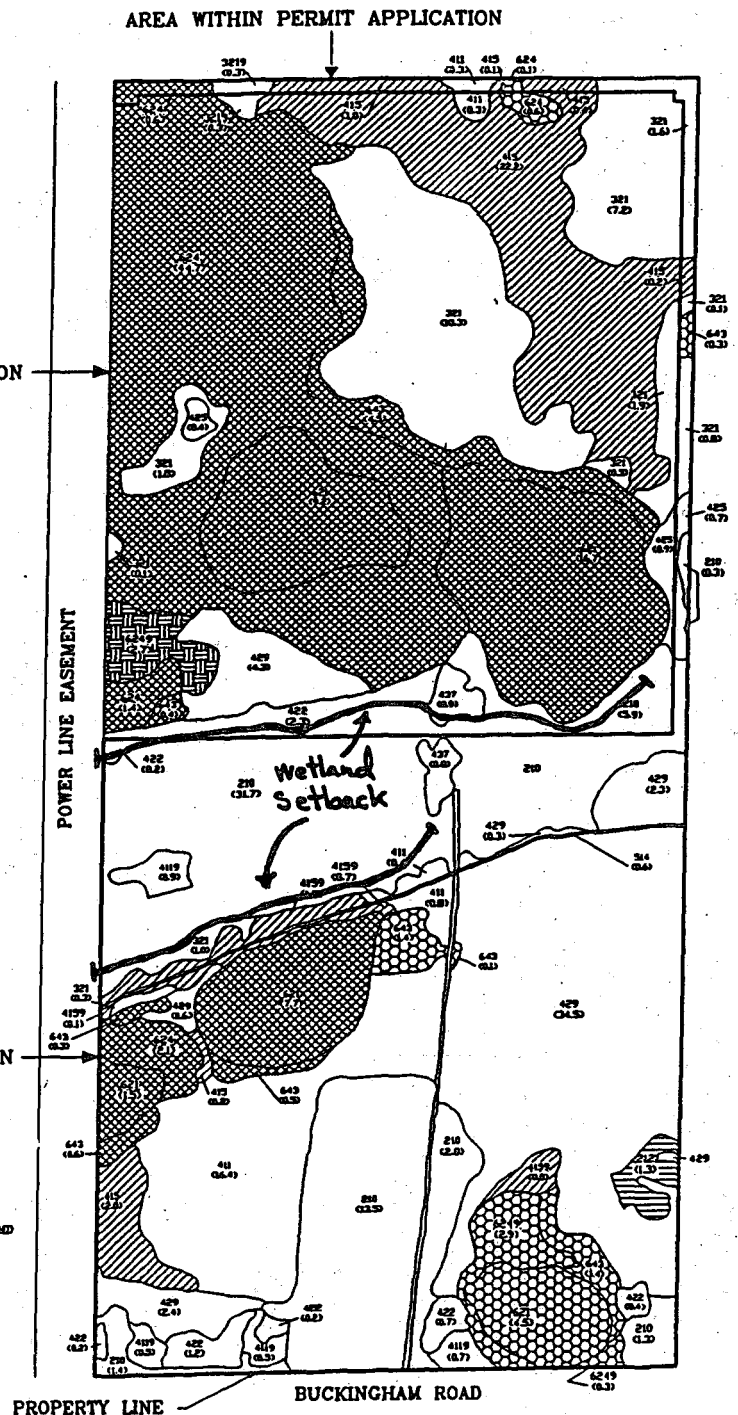
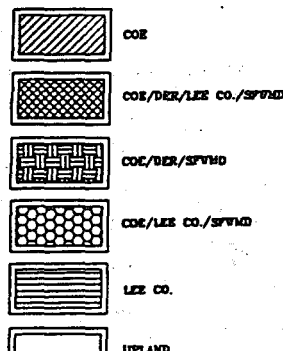
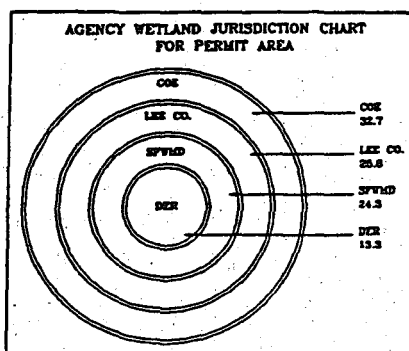
AREA OUTSIDE PERMIT APPLICATION

COVER TYPE SUMMARY FOR AREA OUTSIDE PERMIT APPLICATION			
COVER TYPE	HABITAT	ACRES	% OF TOTAL
210	FARM PASTURE	3.9	4.8%
321	PALMETTO PRAIRIE	29.6	20.1%
3219	PALMETTO PRAIRIE INVADED BY EXOTICS	0.3	0.2%
411	PINE FLATWOODS	0.3	0.2%
415	WET PINE FLATWOODS	22.2	15.1%
422	BRAZILIAN PEPPER	1.6	1.1%
425	MEXIC DAK	1.3	0.9%
429	WAX-MYRTLE	4.3	2.9%
437	AUSTRALIAN PINE	8.9	6.1%
621	CYPRESS	25.9	17.6%
624	CYPRESS/PINE	46.7	31.7%
6249	CYPRESS/PINE INVADED BY EXOTICS	2.7	1.8%
643	WET PRAIRIE	4.9	3.3%
TOTAL PROJECT ACREAGE		147.3	100.0%

WETLAND JURISDICTIONAL SUMMARY FOR AREA OUTSIDE PERMIT APPLICATION								
COVER TYPE	ACREAGE	%	ACREAGE	%	ACREAGE	%	ACREAGE	%
410	22.2	15.1%	0.0	0.0%	0.0	0.0%	0.0	0.0%
421	25.9	17.6%	25.9	17.6%	25.9	17.6%	17.6	12.0%
424	46.7	31.7%	46.7	31.7%	46.7	31.7%	46.1	31.3%
6249	2.7	1.8%	2.7	1.8%	0.0	0.0%	2.7	1.8%
643	4.9	3.3%	4.9	3.3%	4.9	3.3%	4.9	3.3%
TOTAL	102.4	69.5%	80.2	54.4%	77.5	52.6%	79.8	54.0%

AREA WITHIN PERMIT APPLICATION

LEGEND



NOTE: NOT BASED ON GROUND SURVEY OR RECTIFIED AERIAL PHOTOGRAPH.

connection between the twig and the pod is broken. Such a break can result from fire, whose heat can kill the branch but not the pod; or from frost, which can also kill branches or natural senescence of a pod-bearing branch. Melaleuca trees can store seed pods produced over many years for use in a catastrophic event such as fire. If soil, moisture, and light are adequate, these seeds can germinate rapidly, creating seedlings that grow 0.6 m to 1.2 m in the first year. Saplings, three to five years old, can begin producing seeds. Fire or frost usually does not kill the parent tree since melaleuca trees can produce new branches from the main trunk.

Problems associated with the melaleuca tree include:

- the active displacement of native vegetation;
- the population's allergic reaction to the tree's pollen;
- direct contact resulting in inflammation; and
- the fact that one acre of these trees can consume approximately 2100 gallons of water per hour.⁽³⁾

2.2.3 Australian Pine

Casuarina spp.

The Australian pine species has been predominantly found along sandy shores, within pinelands, sawgrass stands, mangrove swamps, and hardwood hammocks. This species grows in disturbed sites forming dense thickets and providing limited uses for wildlife habitat. The Australian pine is primarily found displacing mangrove communities in the Florida Keys and the lower east coast. Australian pine has naturalized significantly in south peninsular Florida, and currently exists as far north as the Tampa Bay area.

The Australian pine grows up to 25 meters or more and has branches consisting of many slender jointed branchlets and minute needle-like leaves (scales) 1-3 mm long in whorls of 6-16. The male flowers are found in spikes usually at the tip of the branchlets, while the female flowers are in dense heads located in the leaf axils. The tree bears a fruit which is a small cone-like nutlet, 8-15 mm in diameter, containing winged seeds that are easily distributed by the wind. Reproduction is by seed and from rhizomes. The plant has an extensive runner system associated with the adult tree which may creep many meters away from the trunk. This species has been frequently planted alongside highway right-of-ways as wind breakers, and as erosion stabilizers along fence lines and roads. However, the

tree comes down easily in high winds and its shallow root system does a poor job of preventing erosion.⁽³⁾

3.0 REMOVAL OF EXOTIC PLANT SPECIES

3.1 METHODS

There exists four basic methods for removing and controlling exotic plant species. These methods are described in this section.⁽⁴⁾

3.1.1 Manual

Manual removal of Australian pine, Brazilian pepper, and melaleuca is possible for seedlings and small trees. However, when removing seedlings and small trees manually, every effort needs to be made to remove the entire root system as a 1/4 inch section of root can re-sprout. Manual Labor is intensive, but it can be effective as a follow-up to other control measures, especially if a volunteer or low-cost labor force is available.

3.1.2 Mechanical

Mechanical removal involves the use of bulldozers, scrapers, or specialized logging equipment to remove woody plants. This method is used when an area is to be cleared for new land-use. Mechanical removal is not effective for control of Australian pine, Brazilian pepper, or melaleuca when used alone because disturbance of the soil creates conditions for regrowth from seeds and root fragments. Therefore, a follow up with other methods is essential. Mechanical removal is usually not appropriate in natural areas because of the disturbances to soils and non-target vegetation caused by the equipment use. In areas to be cleared and then filled, this method is acceptable.

3.1.3 Herbicides

Stumps from trees that are cut can be treated with Arsenal (melaleuca), Garlon 3A or Garlon 4 (Brazilian pepper and Australian pine). This practice does not impact adjacent vegetation if it is done properly. However, better results have been obtained with Garlon 3A, Garlon 4, and Arsenal as compared to Velpar-L, 2-4-D or other herbicides.

Aerial application is not a recommended procedure due to the concern for non-target vegetation. Foliar application is also not feasible for the same reason as aerial application; nor is it as effective as other methods. A description of the various types of

herbicide application methods and the trade names, common names, and chemical names of different types of herbicides, are provided in Appendix B.

3.1.4 Physical

Woody vegetation can be stressed or sometimes killed by physical factors. However, the need to maintain water levels in water conservation areas, the liability involved with burning, and the effects of the use of physical control on desired vegetation, will often limit the usefulness of this method. Research to determine how physical stresses can be incorporated into management programs (e.g. timing of herbicide applications with flooding) is important.

3.2 REMOVAL PROCEDURES

The following provides a brief description of those procedures which could be utilized for the removal of melaleuca, Brazilian pepper, and Australian pine.

3.2.1 Melaleuca

3.2.1.1 Removal

The melaleuca trees which are visible to the public, should be cut and chipped. Once the tree has been cut down, the stump should be treated immediately with Arsenal herbicide mixed full strength with one percent Blazon dye. The herbicide should be applied to the living tissue just inside the bark in the cambium. Only as many trees as can be chipped each day should be cut to prohibit the pods from opening on drying branches. All branches should be chipped, picked-up, and disposed of at the end of every day, as the pods on the branches can potentially open allowing seeds to spread.⁽⁴⁾ The chips should be hauled to other locations for use as mulch in landscaping applications. If the alternative is available, vegetative waste from the treatment process will be disposed of at a compost facility.

3.2.1.2 "In-Place" Treatment

Those melaleuca trees not visible to the public may be treated in place. This procedure is conducted by making approximately three machete slashes around the circumference of each tree. The slashes should cut through the bark, just to the cambium. The slashes should also be made at least one foot above the anticipated high water level.

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In conjunction with the *Lee County Energy Recovery Site Wetland Mitigation and Monitoring Plan*, this *Exotic Species Control Plan* will provide for the removal and maintenance of exotic pest plant species on approximately 31 acres of legally reserved restored, created and existing wetlands.

Arsenal shall be applied in a 50:50 herbicide/water mixture with one percent Blazon dye, one to two milliliters per inch diameter breast height (DBH) into the slashes. Arsenal shall be used over standing water only with the machete technique. Careful monitoring will be essential to determine if seedlings result from this removal method, as it will release all stored seeds. Follow-up treatment may be necessary if this occurs.⁽⁴⁾

3.2.2 Brazilian Pepper

3.2.2.1 Removal

Brazilian peppers visible to the public should be cut and chipped. The flat-cut stumps should be treated immediately, within one hour, using full-strength Garlon 3a herbicide with one percent Blazon dye added. The chips can be left in place or hauled to other locations for use as landscape mulch. Female berry-bearing trees should not be cut during the general period of September through January to avoid the spreading of seeds which can germinate in mulch. Small saplings should be hand-pulled carefully to remove all roots, and then piled such that roots are not touching the soil.⁽⁴⁾

3.2.2.2 "In-Place" Treatment

The Brazilian pepper trees located in areas not visible to the public should be treated in place with a 4:1 mixture of JLB Oil Plus and Garlon 4, with one percent Bas Oil dye added. Basal bark application shall be used. This application is done by applying the herbicide mixture directly to the bark, in a band 18 inches wide, around the entire circumference of each stem at a distance of one to two feet above the ground. Care should be taken to not allow contact with the soil. No "Garlon" herbicide formulations should be used over standing water.⁽⁴⁾

3.2.3 Australian Pine

3.2.3.1 Removal

The Australian pine is removed in the same manner as the Brazilian pepper. However, if the Australian pine is to be removed from the site, it is pertinent that the process take place while the tree is still alive. This is important because the bark of the tree is rigid while the tree is alive, and becomes more so when the tree is dead making removal much more difficult. Garlon 3A herbicide with one percent Blazon dye should be applied immediately after the tree is cut⁽⁴⁾.

3.2.3.2 "In-Place" Treatment

As with Brazilian pepper, Australian pine should be treated with a 4:1 mixture of JLB Oil Plus and Garlon 4, with one percent Bas Oil dye. The mixture is sprayed directly to the bark, in a band 18 inches wide, around the entire circumference of the tree, one to two feet above the ground. As previously stated, care should be taken not to allow contact with the soil.⁽⁴⁾

4.0 PROJECT IMPLEMENTATION AND SCHEDULE

4.1 IMPLEMENTATION

Lee County anticipates the implementation of a four phased approach for removing exotic plant species apparent on the Facility project site. These Phases, as shown in Figure 4-1, will include:

- Phase I: the area located within the fenced facility site;
- Phase II: the power transmission line road corridor area;
- Phase III: the jurisdictional wetland areas; and
- Phase IV: other areas not addressed in Phases I, II and or III.

This section provides a description of the phased approach.

4.1.1 Phase I - Fenced Facility Area

The area addressed in Phase I will include the estimated 46.4 acres which have been cleared for facility construction by Ogden Martin Systems of Lee, Inc. ("OMSL"). This upland area has been cleared of all vegetation utilizing bulldozers. The final developed 46.4 acre Facility site will consist of:

- 8.6 acres of actual Facility building and improved roadways;
- 31.2 acres of "green" areas; and
- 6.6 acres of water management areas.⁽⁹⁾

As the Facility building and improved roadways will occupy approximately 8.6 acres, the remaining estimated 37.8 acres will require ongoing monitoring and maintenance to ensure the re-sprouting of exotic pest species is kept under control. Ogden Martin Systems of Lee, Inc. will provide ongoing monitoring and maintenance of the 46.4 acre area. In the event re-sprouting of any exotics occurs on the Phase I portion of the site, either the manual or herbicide removal method, as described in Section 3.2, will be employed. In the event that the manual removal method is employed, careful attention will be given to ensure all roots are removed.

4.1.2 Phase II - Power Line Transmission Road Corridor

This phase will include the estimated seven acres of the power line transmission road corridor (as shown in Figure 4-1). The removal of the exotic species vegetation will be included as part of the scope of work for construction of the road. As noted in the Conditions of Certification, no herbicides will be utilized in this area for exotic vegetation removal. As a result, manual and mechanical removal methods will be employed for this phase. During removal, careful attention will be given to remove the entire root of the plants. This will minimize the potential for re-sprouting.

4.1.3 Phase III - Specific Wetland Areas

Phase III will concentrate on the jurisdictional wetlands located outside of the 46.4 acre fenced facility area (see Phase I). As the nature of the wetland areas provides for a difficult process for removal of exotic pest species, it will be important for the removal and control to be properly planned and coordinated to prevent damage to natives, re-occurring infestation, or release and dispersal of seeds.

4.1.3.1 Restored Wetlands

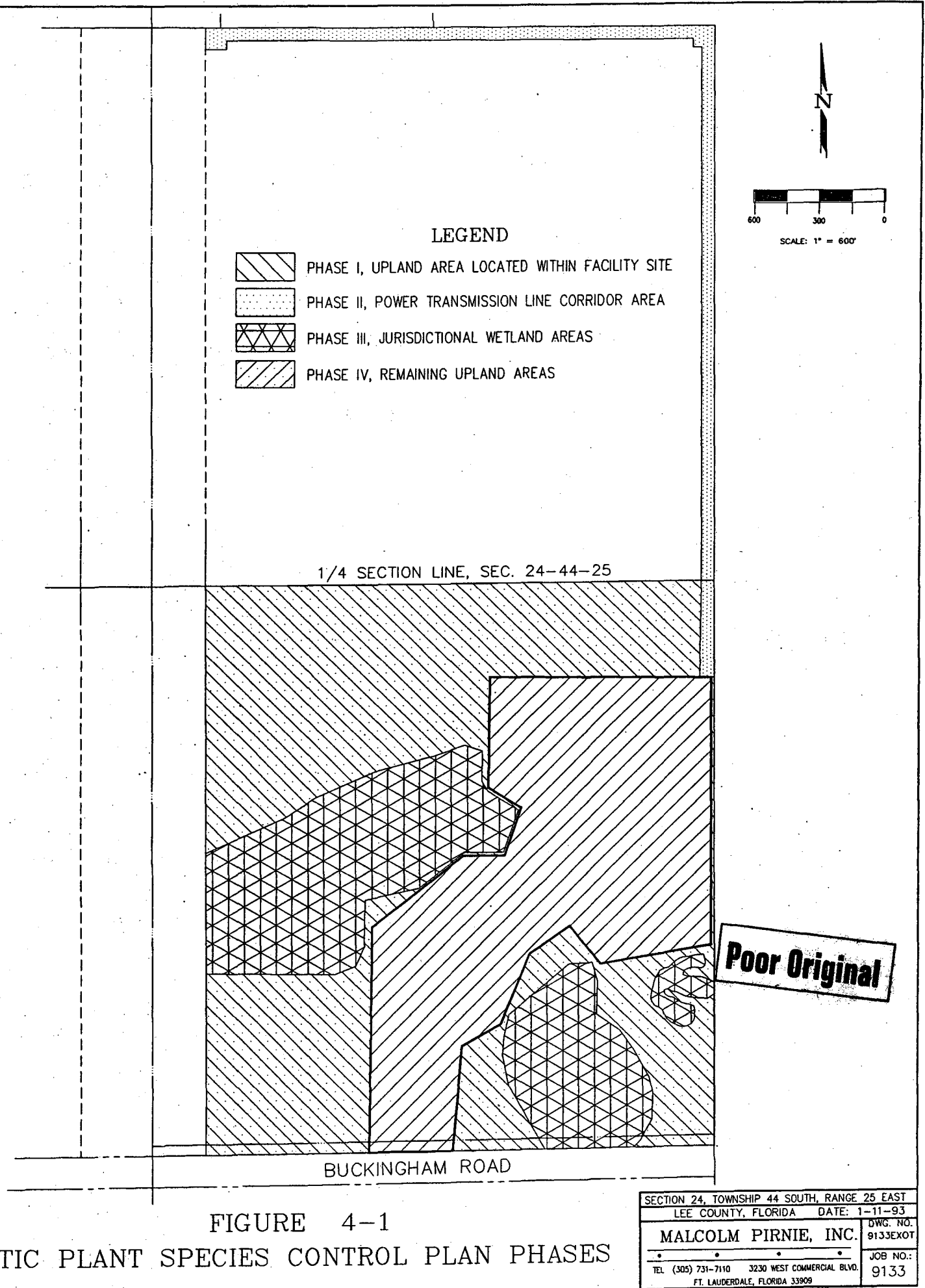
The approximate ten acres of wetlands located in the southeast corner of the property adjacent to Buckingham Road, will be restored. This wetland area has been colonized by the problematic exotic species Brazilian pepper *melaleuca*. The removal plan described in this section is based on the *Lee County Wetland Mitigation and Monitoring Plan*, dated November, 1992.

The extent of infestation by the Brazilian pepper and *melaleuca* will be documented in a baseline vegetation monitoring conducted prior to the initiation of exotic removal or wetland restoration.⁽⁹⁾ Within the approximate 10 acre area, all Brazilian pepper and *melaleuca* will be removed. All large trees (> 1.8 m height) will be physically removed from the site. The stumps will be treated with the appropriate pesticide as detailed in Section 3.2. Small trees (< 1.8 m height) will be treated in place with an approved herbicide (see Section 3.2). The removal and spraying of exotic pest species will be conducted in such a manner as to minimize disturbance to all desirable vegetation. Regular inspections of the restored wetland will be made and all exotic species which have reinvaded the wetland area will be removed.



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As the nature of wetland areas provide for a difficult process for removal of exotic pest species, the removal and control will be properly planned and coordinated to prevent damage to native species, re-occurring infestation, or release and dispersal of seeds.



4.1.3.2 Created Wetlands

Approximately 3.8 acres of wetlands adjacent to existing wetlands located on the west side of the site, will be created. The wetland area will be created from existing low quality upland habitat. A majority (3.5 acres) of the wetlands will be created forested wetlands primarily planted with cypress. The remaining area (0.3 acre) will be a created herbaceous wetland. These areas will be replanted with appropriate wetland herbaceous and tree species. Monthly inspections will be made and all seedling exotics pulled manually so as to minimize disturbance to newly established plants.

4.1.3.3 Existing Wetlands

There exists approximately 17 acres of wetlands on the west side of the SWERF site. As detailed for the wetland restoration removal plan (see Section 4.1.3.1), all large trees will be physically removed from the site and the stumps treated with a herbicide as specified in Section 3.2. The smaller trees will be treated in place (see Section 3.2). Regular inspections of the wetland will be made and all exotic species which have reinvaded the wetland will be removed.

4.1.1 Phase IV - Remaining Areas

Phase IV will address the remaining portions of the facility site, which constitutes the remaining approximate 71 acres. Lee County anticipates the utilization of the mechanical and approved herbicides methods for the removal of the exotic plant species located on the remainder of the site. The herbicides will be applied in a manner as described in Section 3.2.

4.2 GENERAL PROCEDURES

All workers will perform the work, as stated herein, under the supervision of a licensed pesticide applicator. Rubber gloves and a respirator will be worn when applying the herbicide. Chain saw chaps, goggles, helmet, and ear protection devices will be worn when cutting trees.

Dyes will be utilized during application for the following reasons:

- to ensure treatment of all trees;
- to aid in avoiding non-target vegetation
- for safety; and
- to distinguish between the different types of herbicides.

4.3 RECORD KEEPING DURING REMOVAL

Daily records will be kept in a log-type format to record all relevant data, such as water conditions, site conditions number of trees cut and treated, confirmed dead, etc. Aerial photos will be marked in the field to identify exactly where the removal and control work has occurred.

4.4 REMOVAL SCHEDULE

This section provides a schedule for the implementation of the removal plan as provided for in Section 4.1

<u>Task</u>	<u>Description</u>
1	Large scale mechanical removal of 46.4 acre fenced in facility area. October 1992. (ongoing maintenance/monitoring during facility construction and landscaping).
2	Perform removal of exotics from the power line transmission road corridor. January 1993.
3	Revisit Task 1 and 2 areas and remove or treat and trees requiring further work or re-sprouting trees or new seedlings. September/October 1993.
4	Initiate removal of exotics in jurisdictional wetland areas. February - April 1993.
5	Initiate removal of exotics in remaining areas as detailed in Phase IV. April - June 1993.
6	Revisit jurisdictional wetlands and those areas contained in Phase IV to treat and/or remove any trees requiring further work or re-sprouting trees or new seedlings. June 1993.
7	Initiate created and restored wetland time zero monitoring. June 1993.

- 8 Conduct Semi-annual monitoring. September - November and April - May.
- 9 Submit annual report to regulatory agencies within 60 days of fall data collection.

In an effort to expedite the elimination of exotic plants on the entire Facility site, the treatment and control of the exotics will be performed in accordance with the time schedule specified for exotic species removal in the *Lee County Wetland Mitigation and Monitoring Plan*. It is anticipated that initial removal efforts will be completed within one year, or within the briefest time span possible.

5.0 MONITORING PLAN

5.1 APPROACH

A monitoring plan will be instituted subsequent to removal of all Brazilian pepper, melaleuca, and Australian pine as described in Section 4.0 (Removal Plan). An initial report will be prepared documenting baseline conditions from which progress can be measured. Semi-annual site monitoring shall be conducted subsequent to completion of all phases of exotic plant removal as described in section 4.0. Monitoring shall be scheduled at the end of the growing season (September - November) and at the onset of the growing season (April - May) of each year beginning with the fall (September - November) 1993, except in the case of the created and restored wetlands. In these wetland areas, subsequent to the completion of the initial exotic removal effort, quarterly follow-up inspections will be conducted. These inspections for the created and restored wetlands may be decreased to a semi-annual inspection (September - November and April - May), subject to agency approval, based on information presented in the monitoring reports.⁽³⁾

The monitoring program will consist of site visits to identify and re-growth of exotic species, and to ensure no seedlings or adult trees have been overlooked. Following each monitoring period, a report will be filed describing the success rate of the Exotic Species Control Plan. Reports will be submitted to the regulatory agencies within 60 days of fall data collection.

5.2 PROCEDURE

The following provides a description of the monitoring procedure to be implemented for the estimated 14 acres of created and restored wetlands, and for the remainder of the Facility site.

5.2.1 Created and Restored Wetlands

The monitoring of the created and restored wetlands will consist of the following primary components:

- baseline monitoring;

- time zero monitoring; and
- semi-annual monitoring.

Baseline monitoring will be instituted to document the wetland conditions as they currently exist. The time zero report will document the conditions of the wetlands immediately following the completion of the initial wetland creation and restoration activities. The semi-annual monitoring will document the long-term success of the project and identify specific actions to be taken to remove overlooked exotic pest species or those which re-sprouted. These monitoring efforts will be conducted in accordance with the procedure provided for in the *County's Wetland Mitigation and Monitoring Plan*.

5.2.2 Remaining Areas

All Facility site areas, exclusive of the created and restored wetlands, will be visually inspected as described in Section 5.1 (Approach). Baseline photos and a site base map will be utilized to monitor progress. Initially, an overview of the entire site will be conducted from the perimeter, and sampling areas will be identified across the site. These sampling areas will be established to collect information on exotic plant species density and diversity. During the site visits, the re-generation of new exotic plant species will be measured and recorded in a field data log and on baseline site maps. The percent of new plants, if any, will be documented for each phased area. Permanent locations for fixed point photographs will be established in each of the areas to be monitored. The sampling areas will be photographed and keyed to a site base map. The photos will provide visual documentation of the site and the changes, if any, taking place. The photo point locations will remain the same throughout the entire duration of the monitoring program. The fixed point photographs will be utilized as part of the annual reports.

In the event melaleuca, Brazilian pepper, and/or Australian pine is identified on the Facility site through this monitoring program, the pest species will be removed in a manner as described in Section 3.2, "Removal Procedures,"

5.3 REPORTING

Upon completion of the seasonal inspections, a compilation of data will be prepared, complete with field data forms, mapping, and a photolog. The resulting annual report will be submitted to the regulatory agencies as previously described.

The monitoring shall be conducted as part of the continuous maintenance plan for the 155 acre Facility site as required by the Conditions of Certification, issued by the Florida Department of Environmental Regulation.

6.0 REFERENCES

- ⁽¹⁾ *Lee County, Florida Waste Energy Recovery Facility, Application for Power Plant Certification, VOL. I; Camp, Dresser & McKee Inc.; June 1990.*
- ⁽²⁾ *Lee County Solid Waste Energy Recovery Facility Listed Species Survey; Kevin L. Erwin Consulting Ecologist, Inc.; November 1992.*
- ⁽³⁾ *Lee County Energy Recovery Site Wetland Mitigation and Monitoring Plan; Kevin L. Erwin Consulting Ecologist, Inc.; November 1992.*
- ⁽⁴⁾ *Exotic Pest Plant Conceptual Removal and Control Plan for Buckingham Community Park, Lee County, Florida; 1991.*
- ⁽⁵⁾ *Lee County Solid Waste Resource Recovery Facility, Review Package for Construction; Ogden Martin Systems of Lee, Inc.; August 1992.*
- ⁽⁶⁾ *Lee County, Department of Community Services, Division of Parks; Roger S. Clark.*

APPENDICES

APPENDIX A

LEE COUNTY ORDINANCE NO. 90-06

NOTICE OF ADOPTION
OF
LEE COUNTY ORDINANCE NO. 90-06

Poor Original

SECTION FIVE:

Division C.. Section 5. Open Space. Buffering and Landscaping. Subsection C.. Open Space. is hereby amended by adding a new subsection as follows:

(4) Maintenance of Provided Open Space

Invasive exotics shall be removed from provided open space areas by using a method which shall be approved at the time of the Final Development Order. Such open space areas shall be maintained free from invasive exotics for all developments which received Final Development Order approval after (the effective date of this Ordinance). For purposes of this provision, invasive exotics include Melaleuca Species (Punk Tree, Cajuput Tree, Paperbark Tree), Casuarina Species (Australian Pines), and Schinus Species (Brazilian Pepper, Florida Holly).

for Final Development Order approval. The applicant shall include a tree location graphic or map which identifies trees or tree masses as to the particular species and a plan to remove exotic vegetation so as to preserve native trees and understory.

(b) The Letter of Substantial Compliance submitted by the project engineer shall be deemed to be a certification that the exotic vegetation was removed in compliance with the approved Exotic Vegetation Removal Plan.

(c) In the event that a prior zoning approval includes a condition which would provide for the removal of exotic vegetation through a phasing out, such provision set forth in the zoning resolution will prevail over the above provisions to the extent that they are inconsistent.

Poor Original

SECTION SIX: SEVERABILITY

If any section, subsection, sentence, clause or phrase or if any portion of this ordinance is found for any reason to be invalid, or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate and distinct, an independent provision, and such holding shall not affect the validity of any remaining portions thereof.

SECTION SEVEN: EFFECTIVE DATE

The provisions of this ordinance shall become effective immediately upon receipt from the Secretary of State that said ordinance has been duly filed with the Secretary of State of the State of Florida.

THE FOREGOING ORDINANCE was offered by Commissioner Bill Fussell, who moved its adoption. The motion was seconded by Commissioner Ray Judah and, being put to a vote, the vote was as follows:

JOHN E. MANNING	AYE
DISTRICT 2 COMMISSIONER	VACANT
RAY JUDAH	AYE
DONALD SLISHER	AYE
BILL FUSSELL	AYE

DONE AND ADOPTED this 21st day of February, 1990.

ATTEST:
CHARLIE GREEN, CLERK

By: Shirley E. Rost
Deputy Clerk

Poor Original

BOARD OF COUNTY COMMISSIONERS
OF LEE COUNTY, FLORIDA

By: J. Manning
Chairman

APPROVED AS TO FORM:

By: [Signature]
Office of County Attorney

Clerk Of Circuit Court
Lee County, Florida

STATE OF FLORIDA

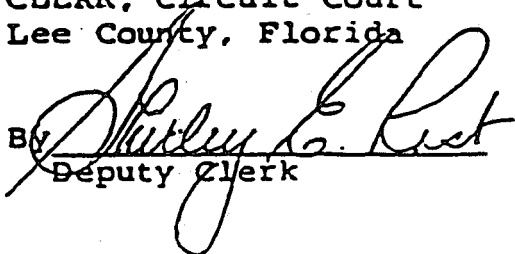
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COUNTY OF LEE

I, Charlie Green, Clerk of the Circuit Court,
Lee County, and ex-Officio Clerk to the Board of
County Commissioners, Lee County, Florida, do hereby
certify that acknowledgment has been received from
the Secretary of State on this the 5th day of March,
1990, at 7:00 a.m. of the filing of Lee County
Ordinance No. 90-06 duly adopted by the Board of
County Commisioners at their meeting held on the 21st
day of February, 1990.

Given under my hand and seal, at Fort Myers,
Florida, this 5th day of March, 1990.

CHARLIE GREEN,
CLERK, Circuit Court
Lee County, Florida

By 

Deputy Clerk

APPENDIX B

HERBICIDE FORMULATIONS AND APPLICATION METHODS*

- * This Appendix is taken from sections of the Exotic Pest Plant Council's (EPPC) publication entitled: Methods for the Control of Woody Exotic Pest Plants, Draft, 1990. Ken Langeland, Editor.

HERBICIDE APPLICATION METHODS

Basal bark applications are made by applying herbicide directly to the bark around the circumference of each stem/tree up to 15 inches above the ground. Hand-held equipment or backpack sprayers are usually used. The herbicide is sometimes in a ready to use form but is usually diluted in some carrier such as diesel fuel, kerosene, or mineral oil.

Foliar applications are usually made by diluting herbicide in water and applying to the leaves with aerial or ground equipment. Dilution is usually about 20:1 for aerial applications and 50-400:1 when making ground applications for woody plant control. Adjuvants such as surfactants, drift control agents or other spray modifiers are often added to the spray mix. Ground equipment ranges from hand-held sprayers for applications to small individual plants to large high pressure vehicle or boat-mounted sprayers for larger vegetation. Foliar applications can either be directed, to minimize damage to non-target vegetation, or broadcast. Broadcast applications are used where damage to nontarget vegetation is not a concern or where a selective herbicide is used.

Frill or girdle (sometimes called hack-and-squirt applications. Cuts, into the cambium, are made completely around the circumference of the tree with no more than 3 inch intervals between cut edges. Overlapping and continuous cuts (girdle) are, sometimes, used for difficult-to-control species and large trees. Do not make multiple cuts directly above or below each other because this will inhibit movement of the herbicide. Incisions should be angled downward to hold herbicide and must be deep enough to penetrate the bark and cambium layer. Herbicide (concentrated or diluted) is applied to each cut until the exposed area is thoroughly wet. Frill or girdle treatments are slow and kill noxious vegetation and minimize impact to desirable vegetation. To further minimize potential impact to desirable vegetation, cuts can be wrapped with masking tape to prevent rainfall from washing herbicide into the soil.

Injection. Special equipment (available from agricultural or forestry equipment suppliers) is used that delivers a measure amount of herbicide into the tree trunk. Injections should surround the tree at intervals of 2 to 3 inches between edges. They may be made at any convenient height, usually 2 to 4 feet above ground.

Stump treatments. After cutting and removing large trees or brush, herbicide (concentrated or diluted) is sprayed or painted on to the exposed cambium layer next to the bark around the entire circumference of the stump. Do not allow more than one hour to elapse between cutting and applying herbicide.

Soil applications. Granular and pellet herbicide formulations can be applied by hand, hand held spreaders, specially designed blowers, or aurally. Soil-applied, liquid, flowable or wettable powder herbicide formulations can be applied with the same type of application equipment described for foliar applications or spotguns that can accurately deliver a measured amount of herbicide.

Marker dyes are very useful for keeping track of what vegetation has been treated when making applications to large numbers of individual trees or stumps. Dyes are also a useful indicator of the applicator's efficiency of limiting herbicide contact with non-target vegetation and personal contact.

**TRADE NAMES, COMMON NAMES AND CHEMICAL NAMES
OF HERBICIDES**

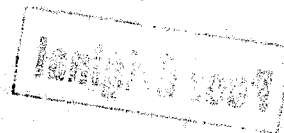
<u>Trade Name</u>	<u>Common Name</u>	<u>Chemical Name</u>
Arsenal	Imazapyr	Isopropylamine salt of 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid
	2,4-D	2,4-dichlorophenoxy-acetic acid
Banvel 720	2,4,D	Dimethylaminesalt of 2,4-dichloroacetic acid + dimethylamine salt of 3,6-dichloro-o-anisic acid
	Dicamba	
Garlon 3A	Triclopyr	Triethylamine salt of 3,5,6-trichloro-2-pyridinyloxyacetic acid
Garlon 4	Triclopyr	Butoxy ethyl ester of 3,5,6-trichloro-2-pyridinyloxyacetic acid
Spike 40P	Tebuthiuron	N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea
Spike 20P	Tebuthiuron	same as above
Spike 80W	Tebuthiuron	same as above
Trooper	Dicamba	Dimethyl amine salt of 3,6-dichloro-o-anisic acid
Velpar L	Hexazinone	3-cyclohexyl-6-(dimethylamino)-1-methyl-1,3,5-triazine-2,4(1H,3H)-dione

14.2 – Oil Pollution Prevention Plan

Lee County Solid Waste Resource Recovery Facility

40 CFR part 112

Oil Pollution Prevention



RECEIVED
JUN 19 1998
O.M.S. OF LAKE

Lee County Solid Waste Resource Recovery Facility Spill Prevention Control and Countermeasure Plan

SPCC Revision

Dated:

June 5, 1998

Professional
Engineer:

William Crellin

Signature:

Wm. R. Crellin, Jr. PE

Florida Seal:

Poor Original

Wm. R. Crellin, Jr.
6/22/98

I. Federal Requirement

This Spill Prevention Control and Countermeasure Plan (SPCC) has been prepared in accordance with Oil Pollution Prevention, 40 CFR part 112. The Lee County Solid Waste Resource Recovery Facility is arguably subject to Part 112 since it could 'reasonably' discharge oil into or upon the navigable waters of the United States. The facility has a National Pollutant Discharge Elimination System Multi-Sector Group Permit which acts as the regulatory means of controlling the quality of the discharge from the facility's storm water outfall. Since the facility started operation, it has only had to discharge storm water once from the control valves. The facility also meets the applicability definition within 40 CFR part 112, since it has a combined oil above ground storage capacity of greater than 1320 gallons, and a single oil storage container that has a capacity which exceeds 660 gallons.

II. Definitions

The term *Oil* refers to oil of any kind or in any form, including but not limited to petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil. The term *Onshore facility* means any facility of any kind located in, on, or under any land within the United States, other than submerged land, which is not a transportation-related facility. *The Owner or Operator* means any person owning or operating an onshore facility or offshore facility. A *Spill Event* means a discharge of oil into or upon the navigable waters of the United States or adjoining shorelines in harmful quantities, as defined in 40 CFR part 110.

III. SPCC Plan Requirements

A.) No SPCC Plan shall be effective to satisfy the requirements of 40 CFR part 112 unless it has been reviewed by a Registered Professional Engineer. By the means of this certification the engineer, having examined the facility and being familiar with the provision of 40 CFR part 112, shall attest that the SPCC Plan has been prepared in accordance with good engineering practices. Such certification shall in no way relieve the owner or operator from their duty to prepare and fully implement such Plan.

B.) Owners or operators of the facility shall maintain a complete copy of the Plan at such facility and make it available to the Regional Administrator for on-site review during normal working hours.

IV. Applicable Spill Event

If the facility discharges more than 1,000 Gallons of oil into or upon the navigable waters of the United States or adjoining shorelines in a **single** Spill Event, *or* discharges Oil in harmful quantities as defined in 40 CFR 110, into or upon the navigable waters of the United States or adjoining shorelines in **two** spill events, reportable under section 311(b)(5) of the FWPCA, occurring within any twelve month period; the owner or operator of such facility must submit to the Regional Administrator, within 60 days from the time that such facility becomes subject to this section, the following information:

Name of Facility: *Lee County Solid Waste Resource Recovery Facility*

Name of the Owner/Operator: *Lee County/ Ogden Martin Systems, Inc.*

Location of the Facility: *10500 Buckingham Road - Suite 400
Ft. Myers, Florida 33905
(941) 337 - 2200*

Initial Operations Date *August, 1994*

Description of Facility: *Attach Facility Plans, Flow Diagrams, & Drainage Plans.*

SPCC Plan: *Attach most updated SPCC Plan with any amendments.*

Cause of Spill: *Explanation as to the cause(s) of such spill, including failure analysis of the system or subsystem in which the failure occurred.*

Corrective Action: *Explanation to the corrective actions and/or countermeasures taken, including an adequate description of equipment repairs an/or replacement.*

Poor Original

Preventative Measures:

Additional action taken or contemplated to minimize the possibility of recurrence.

If an applicable Spill Event occurs at the facility, the Regional Administrator upon review of the above information may require the facility to amend the SPCC Plan if it is found that the Plan does not meet the requirements of 40 CFR part 112 or that the amendment of Plan is necessary to prevent and to contain discharges of oil from the facility. If the owner or operator of the facility has the ability to appeal a decision made by the Regional Administrator requiring an amendment of the facility's SPCC Plan.

V. Owner/Operator Updates of the SPCC Plan

A.) The owners or operators shall amend the facility's SPCC Plan when there is a change in facility design, construction, operation or maintenance which materially affects the facility's potential for the discharge of oil into or upon the navigable waters of the United States or adjoining shore lines. Such amendments should be implemented as soon as possible, but no later than Six Months after such change occurs.

B.) The SPCC Plan shall completed a review at least **once every three years** from the date such facility becomes subject to this part.

C.) No amendment to the SPCC Plan shall be effective to satisfy the requirements of 40 CFR 112 unless it has been certified by a Professional Engineer. By means of this certification the engineer, having examined the facility shall attest that the SPCC Plan has been prepared in accordance with good engineering practices.

Lee County Solid Waste Resource Recovery Facility Spill Prevention Control and Countermeasure Plan

The Lee County Solid Waste Resource Recovery Facility employs the appropriate containment/diversionary structures and equipment to prevent a discharge of oil from reaching a navigable water course.

The facility use a combination of dikes, berms, and retention walls that are sufficiently impervious to contain spilled oil from above ground storage tanks. The storm water outfall is regulated by NPDES Multi-Sector Group Permit. Since the facility started operation in August of 1994, it has only discharged storm water from the regulated outfall on one occasion. The facility's storm water retention ponds discharge is regulated by a weir that has a discharge control valve. The control valve is closed at all times to prevent discharge to navigable water ways.

I. Facility Oil Storage

A.) Propane Above Ground Storage Tank - Nominal 6000 Gallon Capacity

The tank is located outdoors and is placed on a concrete foundation. At atmospheric temperature and pressure, propane is in the gas phase. The tank has a level indicator and high level alarm. If there were a release it would enter the atmosphere not a navigable waterway. Please see the facility's Accidental Release Prevention Plan which addresses the control measures to reduce the probability and extent of a potential release.

B.) Diesel Fuel Above Ground Storage Tank - Nominal 350 Gallon Capacity

The tank is located within the 1st fire pump house and has a concrete retention area surrounding the base of the tank. *See Appendix A.* The secondary containment is of sufficient area to hold 275 gallons in the event of a spill. The building has no floor drains leaving the structure.

C.) Diesel Fuel Storage Tank - Nominal 350 Gallon Capacity

The tank is located within the 2nd fire pump house, and has a concrete diked retention area surrounding the base of the tank. The secondary containment is of sufficient area to hold 330 gallons in the event of a spill. *See Appendix A.* The building has no floor drains leaving the structure.

D.) Diesel Fuel Above Ground Storage Tank - Nominal 60 Gallon Capacity

The tank is located within the main building in the back up diesel generator room. The tank has a concrete diked area which surrounds the tank. The secondary containment is of sufficient area to hold the full tank capacity. *See Appendix A.* The storage tank has a sight glass to view the tank level.

E.) Various Lubrication Oils - Variable Number of 55-Gallons Drums

The drums are located on the first level of the main boiler building. The drums are enclosed in an concreted diked area designed to retain 417 gallons in the event of a spill. *See Appendix A.* The largest container within the diked area is 55 gallons, and the diked area is sufficient to hold greater than its entire capacity.

F.) Diesel Fuel Above Ground Storage Tank - Nominal 1000 Gallon Capacity

The tank is located outdoors behind the maintenance shop. The tank is enclosed within a shared diked area with the Used Oil above ground storage tank. The two tanks are surrounded by an epoxy coated, concrete diked area which can retain 1549 gallons in the event of a spill. *See Appendix A.* Thus, the secondary containment is of sufficient area to hold the largest of the two tank capacities.

G.) Used Oil Above Ground Storage Tank - Nominal 250 Gallons Capacity

The tank is located outdoors behind the maintenance shop. The tank is enclosed within a shared diked area with the Diesel Fuel above ground storage tank described in F. The two tanks are surrounded by a concrete diked area which can retain 1549 gallons in the event of a spill. *See Appendix A.* Thus, the secondary containment is of sufficient area to hold the largest of the two tank capacities.

H.) Lube Oil Above Ground Storage Tank - Nominal 1350 Gallon Capacity

The tank is located within the main building in the Condenser room. The tank is a process tank which has sight glass to view the contents level. The tank is surrounded by a concrete containment with sufficient capacity to retain 1752 gallons. *See Appendix A.* If a rupture of the reservoir tank occurs it will alarm within the control room.

II. Emptying Dike Areas

A.) If necessary, the diked areas surrounding the oil storage tanks listed above are emptied using manually operated valves or pumping equipment.

B.) Drainage of rainwater from the outdoor tanks is manually controlled under the appropriate supervision. Indoor oil storage tanks located within a building structure are not affected by precipitation.

C.) If there is any visible oil in the diked areas, it is collected using an oil dry absorbent. The oil dry absorbent is stored in the retention area along which surrounds the various 55-gallon drum containers.

II. Periodic Inspections

The facility uses a computer tracking system which notifies the Maintenance Department of the required Preventive Maintenance Schedule. After the delegated period the computer generates the notice, otherwise known as PM. Each tank and secondary containment system is visually inspected every month. The PM requires the assigned personnel to check the tank integrity and the secondary containment system for discoloration, wetting, blistering, corrosion, cracks or other signs of structural damage. If there are any signs of structural damage it will be noted in the PM report. Facility management will initiate the appropriate corrective measures.

III. Inspection and Records

A copy of the PM for each tank will be kept with the SPCC Plan for a period of 3 years in accordance with 40 CFR part 112. *See Appendix B.*

IV. Security

The facility is attended 24 hours a day, seven days a week, 365 days a year. The facility grounds are fenced, and the entrance gates are closed when the facility is not receiving incoming waste. During receiving hours individuals must either check in at the scale house or know the entrance code to access the facility.

There are no master flow or drain valves which would allow direct outward flow of the oil tank's contents to the surface.

V. Personnel, Training, and Spill Prevention Procedures

The on-duty shift supervisor is the designated position who is accountable for spill prevention and reports directly to the chief engineer or facility manager.

The facility ensures that all affected personnel are properly instructed on the operation and maintenance of equipment to prevent the discharge of oil. Once a year during a mandatory safety meeting, the SPCC Plan is discussed to assure adequate understanding of its contents. At this time, any known spill events, failures, malfunctioning component, as well as recently developed precautionary measures are discussed. The records of the annual training are kept with the SPCC Plan. *See Appendix C.*

Appendix A

Retention Area Surrounding Diesel Fuel Tank (#1 Fire Pump House Building)

Height 6 inches
Length 106 inches
Width 96 inches

Note: Any subtracted volumes if applicable.

Volume 63600 cubic in

Volume 37 cubic ft

Volume 275 Gallons

Diesel Tank Maximum Storage Capacity

Diameter 38 inches
Length 72 inches

Note: Measurements based upon outer dimensions of the tank.

Actual tank capacity will be less than presented.

Volume 81656 cubic in

Volume 47 cubic ft

Volume 353 Gallons

Retention Area Surrounding Diesel Fuel Tank (#2 Fire Pump House Building)

Height 6 inches
Length 120 inches
Width 106 inches

Note: Any subtracted volumes if applicable.

Volume 76320 cubic in

Volume 44 cubic ft

Volume 330 Gallons

Diesel Tank Maximum Storage Capacity

Diameter 38 inches
Length 72 inches

Note: Measurements based upon outer dimensions of the tank.

Actual tank capacity will be less than presented.

Volume 81656 cubic in

Volume 47 cubic ft

Volume 353 Gallons

Retention Area Surrounding Diesel Fuel Tank (Backup Diesel Generator Room)

Height 24 inches
Length 27 inches
Width 36 inches

Note: Any subtracted volumes if applicable.

Volume 23328 cubic in

Volume 14 cubic ft

Volume 101 Gallons

Diesel Tank Maximum Storage Capacity

Height 25 inches
Length 20 inches
Width 30 inches

Note: Measurements based upon outer dimensions of the tank.

Actual tank capacity will be less than presented.

Volume 15000 cubic in

Volume 9 cubic ft

Volume 65 Gallons

Retention Area Surrounding the Various Lubrication Oils Containing a Variable Number of 55 Gallon Drums

Height	4 <i>inches</i>
Length	234 <i>inches</i>
Width	103 <i>inches</i>

Note: Any subtracted volumes if applicable.

Volume	96408 <i>cubic in</i>
--------	-----------------------

Volume	56 <i>cubic ft</i>
--------	--------------------

Volume	417 <i>Gallons</i>
--------	--------------------

Retention Area Surrounding (Diesel Fuel Tank and Used Oil Tank)

Height 24 inches
Length 179 inches
Width 84 inches

Note: Any subtracted volumes if applicable.

Volume 357714 cubic in

Volume 207 cubic ft

Volume 1549 Gallons

Diesel Tank Maximum Storage Capacity

Diameter 46 inches
Length 145 inches

Note: Measurements based upon outer dimensions of the tank.

Actual tank capacity will be less than presented.

Volume 240976 cubic in

Volume 139 cubic ft

Volume 1043 Gallons

Used Oil Tank Maximum Storage Capacity

Diameter	27 inches	Width	27 inches
Length	60 inches	Length	60 inches
		Height	18 inches

Volume 33846 cubic in

Volume 29266 cubic inches

Volume 20 cubic ft

Volume 17 cubic ft

Volume 147 Gallons

Volume 127 Gallons

Total Volume 273 Gallons

Poor Original

Retention Area Surrounding the Lube Oil Reservoir

Height	32 inches
Length	102 inches
Width	124 inches

Note: Any subtracted volumes if applicable.

Volume	404736 cubic in
--------	-----------------

Volume	234 cubic ft
--------	--------------

Volume	1752 Gallons
--------	--------------

Lube Oil Tank Maximum Storage Capacity

Height	54 inches
Length	98 inches
Width	61 inches

Note: Measurements based upon outer dimensions of the tank.

Actual tank capacity will be less than presented.

Volume	322812 cubic in
--------	-----------------

Volume	187 cubic ft
--------	--------------

Volume	1397 Gallons
--------	--------------

14.3 – Stormwater Pollution Prevention Plan

STORMWATER POLLUTION PREVENTION PLAN

**Lee County Solid Waste Resource Recovery Facility
10500 Buckingham Road
Fort Myers, Florida**



LEE COUNTY
SOUTHWEST FLORIDA

NPDES MSGP PERMIT NO. FLR05B588

**REVISED
February 2002**

**Malcolm Pirnie, Inc.
1715 E. 9th Avenue
Tampa, Florida 33605**

Lee County Solid Waste Resource Recovery Facility Stormwater Pollution Prevention Plan

TABLE OF CONTENTS

	Page
1.0 INTRODUCTION.....	1-1
1.1 Regulatory Authority	1-3
1.2 General Provisions	1-3
1.2.1 SWP3 Implementation/Permit Expiration	1-3
1.2.2 Signature and Plan Review	1-4
1.2.3 SWP3 Amendments	1-4
1.2.4 Format and Contents	1-4
2.0 POLLUTION PREVENTION TEAM.....	2-1
2.1 Team Leader	2-1
2.2 Team Members	2-1
3.0 POTENTIAL POLLUTANT SOURCES	3-1
3.1 Site Drainage Map	3-1
3.2 Potential Stormwater Pollutants.....	3-3
3.2.1 Inventory of Significant Materials	3-3
3.2.2 Inventory of Exposed Materials	3-4
3.3 Sampling Data.....	3-4
3.4 Risk Identification.....	3-5
4.0 SWERF MEASURES AND CONTROLS	4-1
4.1 General Housekeeping	4-1
4.2 Preventive Maintenance	4-1
4.3 Spill Prevention and Response Procedures.....	4-2
4.3.1 Diesel Tank and Fueling Station.....	4-2
4.3.2 Soda Ash, Activated Carbon, and Dolomitic Lime Storage Silos Area (southeast exterior of water treatment building)	4-3
4.3.3 Sulfuric Acid, Caustic (NaOH), and Ferric Sulfate AST Area (northeast exterior of water treatment building)	4-3
4.3.4 Air Pollution Control Area.....	4-4
4.3.5 Ammonia Unloading Station	4-4
4.4 Inspections	4-4
4.5 Monitoring and Reporting Requirements	4-5
4.5.1 Analytical Monitoring Requirements.....	4-5
4.5.2 Reporting.....	4-7
4.5.3 Quarterly Visual Examination of Stormwater Quality.....	4-8

TABLE OF CONTENTS (Continued)

4.6	Employee Training.....	4-9
4.7	Record Keeping and Internal Reporting Procedures.....	4-10
4.8	Non-Stormwater Discharges.....	4-10
4.9	Sediment and Erosion Control.....	4-10
4.10	Management of Runoff.....	4-11
5.0	RMPF MEASURES AND CONTROLS.....	5-1
5.1	Inbound Recyclable Material Control Program.....	5-1
5.2	Outdoor Storage.....	5-1
5.3	Vehicle and Equipment Maintenance.....	5-2
5.4	Employee Training.....	5-2
5.5	Record Keeping and Internal Reporting Procedures.....	5-3
5.6	Non-Stormwater Discharges.....	5-3
6.0	COMPREHENSIVE SITE COMPLIANCE EVALUATION.....	6-1

LIST OF TABLES

Table No.	Description	Following Page
3-1A	Inventory of Significant Materials - SWERF.....	3-3
3-1B	Inventory of Significant Materials - RMPF.....	3-3
3-2A	Inventory of Exposed Materials - SWERF.....	3-4
3-2B	Inventory of Exposed Materials - RMPF.....	3-4
3-3	Stormwater Discharge Monitoring Results.....	3-4
4-1	Monitoring Requirements for Steam Electric Power Generating Facilities.....	4-5

LIST OF FIGURES

Figure No.	Description	Following Page
3-1	Site Location Map.....	3-1
3-2	Site Civil Plot Drainage Plan.....	3-1

LIST OF FIGURES (Continued)

4-1	Sample Monthly Inspection Form Control Structure #1 (Outfall 001) and Drainage Basin.....	4-5
4-2	Sample Quarterly Visual Examination of Stormwater Discharge Field Data Form.....	4-9
6-1	Sample Annual Stormwater Inspection/Site Compliance Evaluation Report.....	6-1

LIST OF APPENDICES

Appendix	Description
A	NPDES MSGP Sector O and Sector N Permits
B	Sampling Data and Laboratory Reports
C	Oil Pollution Prevention Plan
D	Pollution Prevention Team
E	Employee Training Acknowledgment
F	Completed Monthly Inspection Form - Control Structure # 1 (Outfall 001) and Drainage Basin
G	Completed Annual Stormwater Inspection/Site Compliance Evaluation
H	Completed Quarterly Stormwater Discharge Monitoring Report Forms
I	Completed Quarterly Visual Examination of Stormwater Discharge Field Data Forms

SECTION 1 INTRODUCTION

The following Stormwater Pollution Prevention Plan (SWP3) Amendment has been prepared for the Lee County Solid Waste Resource Recovery Facility (Facility) located at 10500 Buckingham Road, Fort Myers, Lee County, Florida. The SWP3 has been completed in accordance with the Florida Department of Environmental Protection (FDEP) Multi-Sector Generic Permit (MSGP) requirements. A Baseline General Permit, Number FLR00A006, authorizing discharge of stormwater associated with industrial activity, was issued to the Facility by the Environmental Protection Agency (EPA) Region IV on September 18, 1992. This permit was issued under the National Pollutant Discharge Elimination System (NPDES) general permit. Due to the discontinuance of the Baseline General Permit (permit type under which the Facility was originally covered) by the EPA, the Facility applied for coverage under the MSGP, Sector O. On September 4, 1998, the EPA provided verbal notification to the Facility granting it coverage under the MSGP, Sector O, retroactive to March 2, 1998.

In order to renew the Facility's NPDES coverage, Lee County (County) filed a Notice of Intent (NOI) to use the *Multi-Sector Generic Permit for Stormwater Discharge Associated with Industrial Activity*. The NOI was processed by the FDEP and, on March 6, 2001, the Facility was notified of coverage under the generic permit effective February 27, 2001. However, based on the notification letter, FDEP reclassified the Facility as a recycling facility, subject to the requirements of Sector N of the MSGP. The Facility is actually comprised of two industrial activities: the Solid Waste Energy Recovery Facility (SWERF) and the Recovered Materials Processing Facility (RMPF). After reviewing the MSGP language, the SWERF should be subject to Sector O requirements and the RMPF should be subject to Sector N requirements. In order to communicate the County's interpretation of the MSGP requirements, the County has sent a letter to the FDEP describing the Facility's co-located industrial activities and discussing the applicability of the pollution prevention plan and monitoring requirements for each activity, as defined in Sector N and Sector O. This revised pollution prevention plan is based on the assumption that FDEP will adopt this interpretation and classify the SWERF as Sector O and the RMPF as Sector N. Coverage under the generic permit will expire February 26, 2006. The Facility identification number is FLR05B588.

Covanta of Lee, Inc. (formerly Ogden Martin Systems of Lee) operates the SWERF under the terms and conditions of MSGP Sector O, Steam Electric Power Generating Facilities. The SWERF occupies a 46.4-acre portion of the 155-acre Facility, located within Lee County, just outside the city limits of Fort Myers. The SWERF receives, stores, and burns processable waste and produces electricity. The SWERF utilizes a technology generally known as "mass-burning," in which solid waste is burned with little or no pre-combustion processing. Refuse is received at the plant via transport trucks that unload their contents onto the tipping room floor for depositing into the storage pit. The tipping floor building maintains a negative air pressure to minimize fugitive release to the environment. The ash from the combustion process and unprocessable material is disposed off-site in a landfill. All processing activities at the SWERF are performed indoors.

A new 60,000 square foot Recovered Materials Processing Facility (RMPF) was constructed at the Facility site. The RMPF, which became fully operational in August 2001, is capable of handling approximately 400 tons per day (tpd) of recovered recyclable materials. The RMPF occupies an 11-acre portion of the 155-acre Facility. Contracted haulers transport recyclable materials from residential and commercial users to the RMPF. The recyclable materials are segregated inside the Facility, are then crushed and bailed, and sold to secondary markets. FCR operates the RMPF under the terms and conditions of MSGP Sector N, Scrap Recycling and Waste Recycling Facilities. Part XI.N of the permit defines three separate classes of recycling facilities. The RMPF is classified as a "recycling facility" since only source-separated recyclable materials, primarily from non-industrial and residential sources, are received.

In addition to the industrial activities present at the Facility, the County also operates a Household Hazardous Waste Collection Facility (HHWCF) and a Tire Receiving Station. The HHWCF was constructed at the Facility site in 1998. The County accommodates residents who are moving and require access to a receiving facility by accepting these materials at the Facility by appointment only. In July 1996, the County submitted an amendment to the County's application for site certification of the Facility under the Florida Electrical Power Plant Siting Act for building and operating a waste tire processing system on the site. The County currently uses this tire processing facility for tire storage and pays a private tire processor to haul the tires off-site for shredding. The shredded tires are then returned to the SWERF by the hauler and burned. The activities of the HHWCF and the Tire Receiving Station are not included in the eleven categories of "stormwater discharges associated with industrial activity" identified in 40CFR122.26(b)(14) and,

therefore, are not subject to regulation under Florida's National Pollutant Discharge Elimination System (NPDES) stormwater program. Hazardous waste is not accepted for processing at the Facility.

1.1 REGULATORY AUTHORITY

This SWP3 has been developed to fulfill the requirements of the Federal Water Pollution Control Act ("Clean Water Act") as amended in 1987. The amendment to the Act requires permits for stormwater discharges associated with industrial activity. The requirements for permitting, as established by the EPA, have been codified and appear in the Code of Federal Regulations, Title 40, Section 122 (40 CFR 122). The State of Florida adopted the EPA's requirements in accordance with Rule 62-621.300(5), F.A.C.

Facilities engaged in industrial activity and meeting the terms and conditions of the MSGP are permitted to discharge stormwater to waters of the United States. The permit becomes effective on the date of issuance and expires five years from the date of issuance. A primary requirement of the MSGP is the development of a SWP3.

1.2 GENERAL PROVISIONS

This SWP3 has been prepared in accordance with sound engineering practices. The purpose of the SWP3 is to identify potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges associated with the existence and operation of the Facility. The SWP3 describes and ensures the implementation of practices which are to be used to reduce the pollutants in stormwater discharges associated with activities at the Facility and to assure compliance with the terms of the Facility's MSGP. This SWP3 details the existing site conditions and includes control and management measures that will be implemented to prevent stormwater pollution (referred to as "Best Management Practices").

1.2.1 SWP3 Implementation/Permit Expiration

This SWP3 will be implemented for the term indicated in the NPDES permit. Within the effective period of the permit, modifications to the Facility design, construction, operation, or

maintenance which have a significant effect on the potential for the discharge of pollutants to surface waters will require modification of this SWP3. A copy of the NPDES permit requirements specific to Sectors O and N is provided in Appendix A of this SWP3.

1.2.2 Signature and Plan Review

The SWP3 will be signed and retained on-site at the Facility in accordance with the MSGP. The Facility operators, Covanta and FCR, will make the SWP3 available upon request to an authorized representative of the EPA Region IV, FDEP, or the South Florida Water Management District (SFWMD).

1.2.3 SWP3 Amendments

The Lee County Department of Solid Waste will amend the SWP3 whenever there is a change in design, construction, operation, or maintenance which has the potential for the discharge of pollutants to the surface waters of the State. The SWP3 will also be amended if it proves to be ineffective in eliminating or significantly minimizing pollutants from sources identified in the SWP3.

1.2.4 Format and Contents

The format and contents of this SWP3 are consistent with the SWP3 requirements contained in the NPDES MSGP Sector O and Sector N Permit documents.

SECTION 2

POLLUTION PREVENTION TEAM

In accordance with this SWP3, the County will form two Pollution Prevention Teams based on the requirements of the Permit. One Team will be responsible for pollution prevention activities for the SWERF and other for the RMPF. Each Team will assist the Facility management with the SWP3's implementation, maintenance, and revision. Each Team will be assembled to assure that at least one member is always present during regular site operation. Team members will complete the training programs discussed in detail in Sections 4.6 and 5.4. A list of Team members is included in Appendix D.

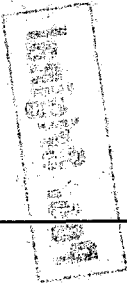
2.1 TEAM LEADER

The Team leader is responsible for overall content and implementation of the SWP3. Potential non-compliance areas or concerns are presented to the Team leader by other Team members. The Team leader will ensure that changes to Facility design, including those related to drainage, exposed materials, spill potential, pollution control measures, inspections, and training are incorporated into the SWP3. The Team leader will also lead the Comprehensive Site Compliance Evaluation (Section 5).

2.2 TEAM MEMBERS

Team members will be responsible for daily implementation of the SWP3. A sufficient number of persons will be appointed to each Team to ensure that at least one Team member is always present during each Facility's operation. Implementation of the SWP3 will include scheduling inspections of areas that have the potential to pollute stormwater runoff, updating the inventory of exposed materials, documenting spills or releases with a potential to pollute stormwater, and maintaining sampling data. Team members will also make written recommendations to maintenance personnel concerning any housekeeping, maintenance, or runoff concerns that need to be addressed to comply with the terms of the permit. Maintenance operations required to implement

the SWP3 will be directed by a Team member. Each Team member should be familiar with Facility operations and maintain a thorough understanding of the contents and procedures of the SWP3.



SECTION 3 POTENTIAL POLLUTANT SOURCES

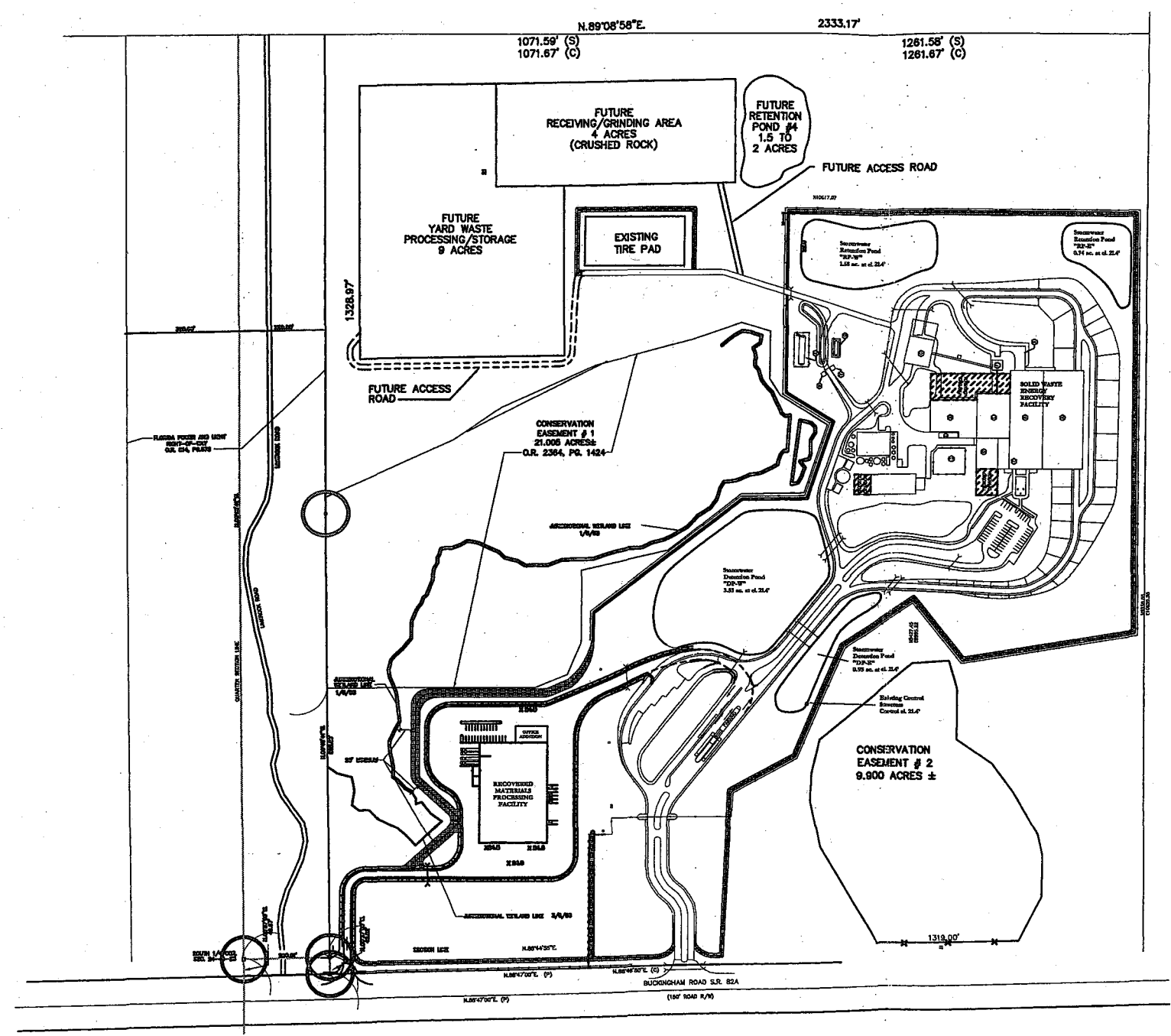
A description of potential sources that may reasonably be expected to add significant amounts of pollutants to stormwater discharges, if released, is included in this section. Activities that may potentially contribute significant pollutant sources are also identified.

Pollutant sources and activities are identified and described using the following:

- Site Civil Plot (Drainage) Plan;
- Inventory of Exposed Materials;
- History of Spills or Leaks;
- Sampling Data; and
- Risk Identification.

3.1 SITE DRAINAGE MAP

A site location map is provided as Figure 3-1. The Lee County Solid Waste Resource Recovery Facility is located at 10500 Buckingham Road, Fort Myers, Lee County, Florida. A Site Civil Plot (Drainage) Plan illustrating the topographic elevations throughout the property is included as Figure 3-2. This Site Civil Plot Plan includes surface water bodies, control structures, and the overall Facility layout. The Site Civil Plot Plan outlines the area within the Facility boundary that is drained by the two stormwater retention ponds and one stormwater detention pond. An architectural pond is also located within the Facility boundary, however, is not included in stormwater collection capacity calculations. Runoff from within the SWERF and RMPF boundaries is contained by berms that surround each Facility. The elevation of each berm is 24.0 feet, which is 2.4 feet higher than the 25-year, 3-day storm elevation. As indicated in Section 1.0, the SWERF includes approximately 46.4 acres of the 155-acre Facility, and the RMPF includes approximately 11 acres. The acreage located outside these Facilities drains to wetlands located within the 155-acre Facility property boundary.



- LEGEND**
- CONCRETE ROAD
 - ▨ GRAVEL ROAD
 - ▩ ASPHALT ROAD
 - REINFORCED CONCRETE PIPE
 - < HEADWALL
 - FENCE
 - GUARDRAIL
 - ▩ BERM
 - BASIN BOUNDARY

- BUILDING INDEX**
- (A) TIPPING AREA
 - (B) REFUSE PIT AREA
 - (C) BOILER AREA
 - (D) TURBINE/GENERATOR AREA
 - (E) FACILITY ADMINISTRATION AREA
 - (F) GRIZZLY BUILDING
 - (G) RESIDUE HANDLING BUILDING
 - (H) COOLING TOWER
 - (I) STACK
 - (J) SETTLING BASIN
 - (K) APC AREA
 - (L) SCALE HOUSE
 - (M) FIRE WATER TANK & PUMP HOUSE
 - (N) AMMONIA STORAGE
 - (O) PROPANE STORAGE
 - (P) SWITCHYARD
 - (Q) CHLORINATION BUILDING
 - (R) WATER TREATMENT BUILDING
 - (S) AMMONIA UNLOADING STATION
 - (T) PROPANE UNLOADING STATION
 - (X) DIESEL OIL TANK & FUELING STATION

Poor Original

- LEGEND:**
- T. TOWNSHIP
 - R. RANGE
 - LD. LIONESS BUSINESS
 - (C) CALCULATED
 - (S) DIMENSION AS SHOWN ON SURVEY
 - (P) PLAT
 - (F) FOUND
 - (C) CORNER
 - S.R. STATE ROAD
 - M.W. MONUMENT
 - ELEV. ELEVATION
 - M.W. MONITORING WELL

- SURVEYOR'S NOTES**
- ELEVATIONS SHOWN (IF ANY) ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM (N.G.V.D.) US GEOLOGICAL SURVEY BENCHMARK "SI WTM 1952" SURVEYOR'S NOTES
 - SURVEY BASED ON FOUND MONUMENTATION AS ESTABLISHED BY OTHERS. REFERENCE IS MADE TO A BOUNDARY SURVEY OF PART OF SECTIONS 24 AND 25, TOWNSHIP 44 SOUTH, RANGE 25 EAST, PERFORMED BY AGNOLL, BARBER & BRUNDAGE, INC. AND DATED JUNE 22, 1990.
 - BOUNDARY INFORMATION IS SHOWN FOR REFERENCE ONLY. VERIFICATION OF PREVIOUS BOUNDARY SURVEY BY AGNOLL, BARBER & BRUNDAGE, INC. NOT INCLUDED UNDER THE SCOPE OF THIS SURVEY.

- GENERAL NOTES:**
- DIMENSIONS SHOWN FOR EXISTING SITE PLAN WERE TAKEN FROM VERIFIED AS-BUILT DRAWINGS AND SURVEYS FROM ORIGINAL DESIGN DRAWINGS.

- SYMBOLS**
- ⊙ DENOTES FOUND REBAR & CAP L.B. 3664
 - +—+— BARBED WIRE FENCE AS SCALED FROM SURVEY
 - DENOTES FOUND CONCRETE MONUMENT L.B. 3664
 - DENOTES FOUND CONCRETE MONUMENT

Stormwater runoff within the Facility boundary can be distinguished by three separate drainage basins. All of these basins drain to a detention pond equipped with one discharge structure. Runoff from the SWERF is divided into two drainage basins, Basin 1 and Basin 2. Drainage associated with the RMPF drains to Basin 3. The three separate drainage areas and their corresponding stormwater ponds can be summarized as follows:

Basin 1: Runoff from the northeastern portion of the SWERF, defined as the eastern half of the area north of the centerline of the main facility building (tipping area*, refuse pit area*, boiler area, and Air Pollution Control (APC) area), is collected in stormwater retention Pond #1. This pond covers 0.74 acres at a control elevation of 21.4 feet. Runoff from the northwestern portion of the SWERF, defined as the western half of the area north of the centerline of the main facility building (tipping area*, refuse pit area*, boiler area, and APC area), is collected in stormwater retention Pond #2. This pond covers 1.58 acres at a control elevation of 21.4 feet. As retained stormwater in basin 1 exceeds elevation 23.2 feet, stormwater begins to flow through swales on the east and west sides of the SWERF to the Pond #3.

Basin 2: Runoff from the southern portion of the SWERF, defined as the area south of the centerline of the main facility building (tipping area*, refuse pit area*, boiler area, and APC area) is collected in stormwater detention Pond #3. Stormwater detention Pond #3 is located to the south of the main facility building with the largest portion of this pond situated on the west side of the facility entrance road and smaller portion of this detention pond on the east side of the entrance road (referred to as stormwater detention Pond #3 (west) and stormwater detention Pond #3 (east). The east and west portions of Pond #3 are connected with a concrete pipe that extends beneath the facility entrance road. Pond #3 (west) is approximately 3.53 acres and Pond #3 (east) is approximately 0.93 acres. This stormwater detention pond has a manual discharge gate (control structure No. 1), located at the southeast end of stormwater detention Pond #3 (east), which may be used in the event that the pond reaches capacity. In such an event, stormwater is discharged to the adjacent wetland area and then to the drainage swale along Buckingham Road. The control elevation of Pond #3 is 21.4 feet. The control structure includes a 3-inch diameter discharge pipe equipped with a manual gate valve that is kept closed and secured with a lock.

Basin 3: Runoff from the RMPF is routed to stormwater detention Pond #3. Pond #3 is the only point source released to on-site wetlands.

* It should be noted that the tipping area and refuse pit does not contribute to stormwater runoff. They are both located within building structures that are internally drained. Additional detail is provided in Section 3.2.

3.2 POTENTIAL STORMWATER POLLUTANTS

Potential pollutants are to be evaluated in terms of toxicity, quantity, likelihood of contact with stormwater, history of leaks or spills, and potential for erosion.

- History of Leaks or Spills - The Facility has no history of leaks or spills that may have impacted stormwater.
- Potentially Erosive Flows - The Facility has been designed to minimize potentially erosive flows. The Facility stormwater design has provided for permanent erosion and stabilization control by preventing flow velocities that would result in erosive flows and stabilizing non-paved areas.

3.2.1 Inventory of Significant Materials

Significant materials present within tanks and other storage containers at the Facility are described in Tables 3-1A and 3-1B. As indicated in the table, no discharges from these tanks or other storage units have occurred. Furthermore, as indicated by the location codes, several of these tanks are located within buildings, which prevents contact with stormwater. Any releases from within these buildings are captured by the Facility drainage collection system. All SWERF buildings are internally drained with a collection system that is routed to the wastewater basin in the Boiler Building or the on-site water treatment system. The RMPF is internally drained with a collection system that is connected to the sanitary system. Therefore, if a release were to occur inside of one of the buildings, none of the discharged material would have the potential to flow to any of the exterior drainage structures.

In addition to materials stored at the Facility included on Tables 3-1A and 3-1B, other materials exist that may have the potential to impact stormwater. These materials include the following:

- **Refuse** - Solid Waste is delivered to the RMPF in covered trucks and unloaded within the tipping floor/refuse pit area for storage prior to combustion. This tipping floor is policed and swept as an ongoing procedure during hours of receiving waste to ensure materials are not tracked out of the tipping floor area. A concrete berm is located at both the entrance and exit doors. In addition, dust control within the tipping floor area is achieved by drawing boiler combustion air from the tipping hall, which creates negative pressure within the building. During periods of dry weather or times of heavy dust conditions, the refuse pit is sprayed with water. In addition,

**TABLE 3-1A
INVENTORY OF SIGNIFICANT MATERIALS - SWERF**

Tank	Capacity	Location*	Diking	Level Indicators	High Level Alarm	Leak Detector	History of Leaks or Spills
Sulfuric Acid	4,500 gal.	U	Yes	Yes	Yes	No	No
Caustic	4,500 gal.	U	Yes	Yes	Yes	No	No
Ferric Sulfate	4,500 gal.	U	Yes	Yes	Yes	No	No
Chlorine	1ton Cyl.	T	No	Yes	No	Yes	No
Chlorine	3-150 lb. Cylinders	T	No	Yes	No	No	No
Ammonia	12,000 gal	Q	Yes	Yes	Yes	Yes	No
Propane	60,000 gal	R	Yes	Yes	Yes	No	No
Diesel Fuel	350 gal.	P	Yes	Yes	No	No	No
Diesel Fuel	350 gal.	P	Yes	Yes	No	No	No
Diesel Fuel	1,000 gal.	X	Yes	Yes	No	No	No
Used Oil	250 gal.	X	Yes	Yes	No	No	No
Lube Oil	1,350 gal.	G	Yes	Yes	No	No	No
Hydraulic Oil	500 gal.	B	Yes	Yes	No	No	No
Diesel Fuel	60 gal.	G	Yes	Yes	No	No	No
Lime	30 ton	U	No	Yes	No	No	No

TABLE 3-1A (Continued)

Tank	Capacity	Location*	Diking	Level Indicators	High Level Alarm	Leak Detector	History of Leaks or Spills
Soda Ash	30 ton	U	No	Yes	No	No	No
Carbon	30 ton	U	No	Yes	No	No	No
Lime	60 ton	M	No	Yes	No	No	No
Carbon	0.5 ton	M	No	Yes	No	No	No

* Location Codes:

B Boiler Building
 G Generator Building
 U Water Treatment Building
 M Air Pollution Control Area
 T Chlorine Building

P Fire Pump House
 R Propane Storage
 Q Ammonia Storage
 X Fueling Station

**TABLE 3-1B
 INVENTORY OF SIGNIFICANT MATERIALS – RMPF**

Tank	Capacity	Diking	Level Indicators	History of Leaks or Spills
Diesel Fuel	500 gal.	Self Containment	No	No
Propane	12 cylinders	No	No	No
Hydraulic Oil	2-55 gal.	No	No	No
Transmission Fluid	2-55 gal.	No	No	No
Motor Oil	2-55 gal.	No	No	No

roadways and other paved areas are routinely cleaned with a self-propelled vacuum vehicle.

- **Ash Residue** - Ash residue, a by-product of combustion of the Solid Waste, is continually transferred to the Residue Handling Building for storage. The conveyor that transfers this ash from the main SWERF building to the Residue Handling Building is covered to prohibit contact with stormwater. The Residue Handling Building is also maintained under negative pressure to provide dust control. Drainage from within this building is collected by the SWERF's internal drainage (floor drain) collection system, which is reused in facility processes. Berms located at the entrance and exit to the Residue Handling Building keep moisture from the ash inside the building. Also, as mentioned above, the roadways at the ash storage building are routinely cleaned with a self-propelled vacuum vehicle.

Various cooling and boiler water treatment chemicals are delivered to the site in 300-gallon poly-lined steel totes, and stored in a concrete dike holding area near the cooling tower. These steel totes and containment structure are inspected regularly.

3.2.2 Inventory of Exposed Materials

This section includes a description of materials handled at the Facility that potentially may be exposed to precipitation. Tables 3-2A and 3-2B provides a summary of these materials, their locations, and descriptions of materials management practices to minimize the potential for release of these materials to the environment.

3.3 SAMPLING DATA

A summary of existing discharge sampling data is presented in Table 3-3. During all sampling events to date, the measured pollutant concentration has been reported to be less than the corresponding cut-off concentration, as defined by the MSGP, Sector O and Sector N requirements. Future sampling data and laboratory analytical reports will be retained in Appendix B. Details regarding the Facility's monitoring and reporting requirements are discussed in Section 4.5.

TABLE 3-2A
INVENTORY OF EXPOSED MATERIALS – SWERF

Materials Stored Outside	Location	Method and Capacity of Storage or Disposal	Description of Material Management Practice
Diesel fuel	Fueling Station (X)	1000 gallon AST	Tank is located within secondary containment berm. The AST is visually inspected regularly.
Used Oil	Fueling Station (X)	250 gallon AST	Tank is located within secondary containment. The AST is visually inspected regularly.
Soda Ash	Water Treatment Bldg. (U)	30 ton bulk storage silo	Minimal exposure, since material is pneumatically conveyed during unloading. All silos have bin vent fabric filters. See Table 3-1A for additional leak & high level detection equipment.
Activated Carbon	Water Treatment Bldg. (U)	30 ton bulk storage silo	Minimal exposure, since material is pneumatically conveyed during unloading. All silos have bin vent fabric filters. See Table 3-1A for additional leak & high level detection equipment.
Hydrated Lime	Water Treatment Bldg. (U)	30 ton bulk storage silo	Minimal exposure, since material is pneumatically conveyed during unloading. All silos have bin vent fabric filters. See Table 3-1A for additional leak & high level detection equipment.
Sulfuric Acid	Water Treatment Bldg. (U)	4500 gallon AST	Located within secondary containment. See Table 3-1A for leak & high level detection equipment.
Caustic (NaOH)	Water Treatment Bldg. (U)	4500 gallon AST	Located within secondary containment. See Table 3-1A for leak & high level detection equipment.
Ferric Sulfate	Water Treatment Bldg. (U)	4500 gallon AST	Located within secondary containment. See Table 3-1A for leak & high level detection equipment.

TABLE 3-2A (Continued)

Materials Stored Outside	Location	Method and Capacity of Storage or Disposal	Description of Material Management Practice
Anhydrous Ammonia	Ammonia Storage (Q)	12,000 gallon AST	Located within concrete dike. Check valves within the delivery piping and numerous other safeguards. See Table 3-1A for leak & high level detection equipment.
Propane	Propane Storage (R)	60,000 gallon AST	Located within a concrete dike. See Table 3-1A for leak & high level detection equipment.
Chlorine	Chlorine building (T)	1 ton cylinder, 3-150 lb cylinders	All cylinders inspected daily. See Table 3-1A for leak & high level detection equipment.

AST - Above ground storage tank

(*) - Indicates general location on site map

***Location Codes:**

- Q Ammonia Storage
- R Propane Storage
- T Chlorine Building
- U Water Treatment Building
- X Fueling Station

**TABLE 3-2B
INVENTORY OF EXPOSED MATERIALS – RMPF**

Materials Stored Outside	Method and Capacity of Storage or Disposal	Description of Material Management Practice
Diesel fuel	500 gallon AST	Tank has integrated secondary containment and is located within secondary containment berm. The AST is visually inspected regularly.
Propane	12 cylinders	Cylinder maintained in cage.
Hydraulic Oil	2-55 gallon drums	Spill Prevention Platform
Transmission Fluid	2-55 gallon drums	Spill Prevention Platform
Motor Oil	2-55 gallon drums	Spill Prevention Platform

Table 3-3
STORMWATER DISCHARGE MONITORING RESULTS

Monitoring Event	COD mg/L	TSS mg/L	Al mg/L	Cu mg/L	Fe mg/L	Pb mg/L	Zn mg/L
<i>Cut-off Concentration</i>	120	100	0.75	0.0636	1.0	0.0816	0.117
08/08/01	31	2	0.01	BDL	0.13	BDL	BDL
09/01/99	N/A	N/A	N/A	BDL	0.04	NA	BDL
10/08/98	24	8	BDL	BDL	0.168	BDL	N/A
10/05/98	15	1	N/A	N/A	N/A	N/A	N/A
08/11/98	10	17	0.06	BDL	0.35	N/A	0.01
02/10/98	5	2	0.06	BDL	0.13	N/A	BDL
12/02/97	27	3	N/A	N/A	N/A	N/A	N/A
10/06/97	27	4	N/A	N/A	N/A	N/A	N/A
06/05/97	71	54	N/A	N/A	N/A	N/A	N/A
04/02/97	52	21.5	N/A	N/A	N/A	N/A	N/A
02/04/97	10	6.0	0.10	BDL	0.13	N/A	0.01
12/04/96	19	15	N/A	N/A	N/A	N/A	N/A
10/03/96	22	8.0	N/A	N/A	N/A	N/A	N/A
08/06/96	24	12	BDL	BDL	BDL	N/A	0.01
04/03/96	75	5.0	N/A	N/A	N/A	N/A	N/A
07/31/95	BDL	5.0	BDL	BDL	0.22	BDL	BDL

N/A – Not Analyzed

BDL – Below Detection Limit

3.4 RISK IDENTIFICATION

Under MSGP Sector O, several activities are identified that are applicable to SWERF operations that have potential pollutant sources. Above ground liquid storage tanks (AST) can be potential pollutant sources due to external corrosion and structural failure, installation problems, piping system failure, spills due to operator error, and leaks or spills during filling operations. Likely pollutants associated with the ASTs include fuel oil, sulfuric acid, sodium hydroxide, ferric sulfate, ammonia, and propane. All SWERF ASTs are located within a secondary containment berm to ensure pollutants do not impact the Facility's stormwater. The SWERF also has an ash handling area in the Residue Handling Building which can be a potential pollutant source through spills during transfer of ash to trucks that transport the ash off-site to the landfill. Likely pollutants associated with ash handling are suspended solids, chromium, copper, iron, zinc, oil and grease, and aluminum. To minimize pollutant exposure to stormwater, the Residue Handling Building is maintained under negative pressure to provide dust control, as discussed in Section 3.2.1.

Under MSGP Sector N, four areas associated with recycling facilities that are potential sources of pollutants are identified. They include inbound recyclable materials, outdoor material storage, indoor storage and material processing, and vehicle maintenance. Likely pollutants include BOD from deteriorated wastepaper, and leaks or spills of fuel, hydraulic fluids, and lubricants from vehicle maintenance activities. Measures taken to reduce pollutant potential associated with activities of the RMPF are discussed in Section 5.

SECTION 4

SWERF MEASURES AND CONTROLS

This section describes the stormwater management controls appropriate for the SWERF and provides a schedule for implementing controls. The appropriateness and priorities of the controls are consistent with the potential sources identified in Section 3. Stormwater management controls and Best Management Practices (BMPs) for the SWERF are presented in the form of the following components: general housekeeping, preventive maintenance, spill prevention and response procedures, inspections, employee training, record keeping and reporting, erosion control, and management of runoff.

4.1 GENERAL HOUSEKEEPING

General housekeeping at the SWERF includes the maintenance of a clean, orderly environment in areas that may contribute pollutants to stormwater discharges. Good housekeeping practices have been a fundamental part of the Facility's operations since startup. The Operations and Maintenance Manual for the Facility outlines procedures to be followed in order to maintain the site in a neat and orderly condition.

4.2 PREVENTIVE MAINTENANCE

The SWERF has already implemented a comprehensive preventive maintenance program for equipment and systems throughout the Facility to ensure safe, efficient, and environmentally sound operations. The preventive maintenance activities are administered by the SWERF's Maintenance Supervisor using a computerized reporting program.

In summary, the SWERF preventive maintenance program provides for:

- Identification of equipment, systems, and Facility areas;
- Scheduling of periodic inspections and maintenance;
- Appropriate and timely adjustments;

- Repairs and replacements; and
- Maintenance of records.

The program addresses all aspects of the Facility including: process, material handling, pollution control equipment, storage tanks, silos and other containers, instrumentation, electronics, pumps, piping, valves, and other connections. Monthly inspections are conducted to identify conditions that could potentially contribute to stormwater pollutant discharge. Conditions identified during the inspections are corrected as part of the preventative maintenance program.

4.3 SPILL PREVENTION AND RESPONSE PROCEDURES

Areas where potential spills may occur and contribute to stormwater discharges were presented in Section 3.0. Primary locations where spills are most likely to occur would include the diesel tank and fueling station (where the exterior diesel tank is located), the northeast exterior of the water treatment building (location of sulfuric acid, sodium hydroxide, and ferric sulfate ASTs), the southeast exterior of the water treatment building (location of the soda ash, activated carbon, and hydrated lime storage silos), and the air pollution control area (location of the pebble lime and activated carbon storage silos). The Facility's Oil Pollution Prevention Plan (OPPP) will be implemented in response to a chemical or materials spill associated with oil or oil products (as per 40 CFR 112 requirements). The OPPP identifies where spills can occur, spill prevention and cleanup procedures and equipment available to address a spill incident, and individual responsibilities during a spill. The OPPP is included in Appendix C.

4.3.1 Diesel Tank and Fueling Station

Spills in this area would flow towards the stormwater drainage structure that discharges to Pond #1. The overall site drainage design and the previously discussed berm that surrounds the entire Facility would inhibit the movement of spills off-site. Because the diesel tank and used oil tank are located within a concrete secondary containment structure, the potential for a release to the environment is minimal. In the event of a spill or leak resulting from tank failure, the concrete containment structure would prevent a release of petroleum product(s) outside of the containment structure. Since diesel fuel is utilized for on-site equipment, potential spills in this area could result

from overfilling equipment during fueling. To prevent diesel spills from occurring, operators should avoid topping fuel tanks. The used oil collected in the AST is removed for transport from the site by a recycling vendor on an as needed basis. Potential spills in this area could result from transfer of used oil to/from the AST. To prevent used oil spills, transfer of used oil should be done with extreme care. Additional details regarding the handling of spills are provided in the Facility's OPPP.

4.3.2 Soda Ash, Activated Carbon, and Dolomitic Lime Storage Silos Area (southeast exterior of water treatment building)

These materials are stored in bulk storage silos outside of the water treatment building. Potential for release is minimized since material is pneumatically conveyed during unloading of materials from the transport trucks. The storage silos are equipped with bin vent fabric filters that are operating during unloading to prevent particulate matter from becoming airborne and settling on nearby surfaces, limiting the potential for stormwater exposure. Additionally, each silo is equipped with a binicator level indicator. Because these materials are solids and not readily soluble, they would not flow a significant distance if released unless contact with stormwater occurred. Should a spill incident take place that comes in contact with stormwater, the flow of materials would be to the southwest towards Pond #3.

4.3.3 Sulfuric Acid, Caustic (NaOH), and Ferric Sulfate AST Area (northeast exterior of water treatment building)

These materials are stored in ASTs outside of the water treatment building. Potential for release of these materials is minimal since the ASTs are located within a concrete secondary containment structure. The fill lines are also located within this containment structure. Each AST is equipped with a level indicator and high level alarm. Any rain that accumulates within the containment is transported to, and processed by, on-site water treatment operations. Should a spill incident occur that is not contained by the secondary containment structure, the direction of flow would be to the southwest, towards Pond #3. The overall site drainage design and the berm that surrounds the entire Facility would inhibit the movement of spills off-site.

4.3.4 Air Pollution Control Area

One 60-ton silo of pebble lime is stored in this area. Potential for release is minimized since material is pneumatically conveyed during unloading of materials from the transport trucks. The storage silo is equipped with a bin vent fabric filter that is operating during unloading to prevent particulate matter from becoming airborne and settling on nearby surfaces, limiting the potential of stormwater exposure. Additionally, each silo is equipped with a bin indicator level indicator. Activated carbon is stored in super sacks on the tipping area floor and is used for air pollution control. The super sacks are lifted up to two hoppers from which the carbon flows to a mixing tank. Because these materials are solids, they would not flow a significant distance if released unless contact with stormwater occurred. Should a spill incident take place that comes in contact with stormwater, the materials would be collected by the facility's internal drainage system for processing in the on-site water treatment operation.

4.3.5 Ammonia Unloading Station

The 12,000-gallon anhydrous ammonia AST is equipped with numerous safe guards to prevent accidental releases of ammonia, thereby minimizing the potential exposure to stormwater. The safe guards include a concrete dike for secondary containment, check valves in the delivery piping to minimize spills during ammonia unloading from delivery trucks, and excess flow valves for each piping connection to the tank. Ammonia is delivered from the ammonia tank to vaporizers by piping that then leads directly to each combustor, also minimizing potential stormwater exposure. In accordance with Section 112R of the Clean Air Act, the Facility's Accidental Release Prevention Plan provides details on handling the release of anhydrous ammonia.

4.4 INSPECTIONS

Qualified plant personnel will be designated to routinely inspect the SWERF plant areas and equipment for evidence of, or the potential for, pollutants entering the stormwater drainage system. As required by the NPDES MSGP, Sector O, the following general areas will be checked on a monthly basis: loading/unloading areas, fueling areas, bulk storage areas, liquid storage tanks, ash handling areas, maintenance areas, and long and short term storage areas. Any problems identified during the inspections will be documented and relayed to the proper maintenance group for

corrective action. A set of tracking or follow-up procedures will be used to ensure that appropriate actions are taken in response to the inspections. Records of inspections will be maintained on site, in Appendix F of this SWP3, for a minimum of three years.

In addition to the required monthly inspections, a comprehensive site compliance evaluation will be performed annually, as required by the NPDES MSGP, Sector O permit. This inspection is discussed in Section 5.0 of this SWP3. Inspection logs will be completed reflecting the observations of the annual inspection. The Pollution Prevention Team will review the inspection and corrective action log after each inspection. These logs will be retained in Appendix G of this SWP3. A sample outfall and drainage basin inspection form is provided as Figure 4-1.

4.5 MONITORING AND REPORTING REQUIREMENTS

The EPA's stormwater monitoring and reporting requirements that are applicable to the Facility, as covered by the NPDES MSGP, are outlined in the September 29, 1995, Federal Register, Multi-Sector Group Permits for Stormwater Discharges Associated with Industrial Activity, Sector O: Steam Electric Power Generating Facilities, Including Coal Handling Areas. Because the RMPF only receives source-separated recyclable materials that are primarily from non-industrial and residential sources, it is classified as a "recycling facility" and is exempt from monitoring requirements under the MSGP, Sector N.

4.5.1 Analytical Monitoring Requirements

According to permit requirements, stormwater discharges from steam electric power generating facilities must be monitored quarterly, at a minimum, during the second year of permit coverage. Samples must be collected at least once in each of the following periods during which discharge occurs: January through March, April through June, July through September; and October through December. At the end of the second year of permit coverage, a facility must calculate the average concentration for the parameter listed below in Table 4-1.

Figure 4-1

Monthly Inspection Form - Control Structure #1 (Outfall 001) and Drainage Basin
Preventive Maintenance and Comprehensive Site Compliance
Lee County Solid Waste Resource Recovery Facility

Name of inspector(s): _____ Signature(s): _____ Date: _____

Outfall Drainage Area	YES	NO	Comments and Corrective Actions
Evidence of erosion?			
Are materials exposed to storm water?			
Are new chemicals or other potential pollutants present within the area?			
Area sightly and free of debris?			
Are surface water control structures (swales, drainage gate, basins, fencing, etc.) functioning properly?			
Staining of ground surface, stressed vegetation, or other surface indicators of spills?			
Evidence of contamination of discharge (odor, sheen on water, other)?			
Evidence of leaking, or potential leaking from ASTs or silos?			

NOTES:

- 1 - Any item requiring action must be brought to the immediate attention of the Pollution Prevention Team Leader.
- 2 - A copy of this form must be retained in the Storm Water Pollution Prevention Plan after completion.
- 3 - Control structure #1 (Outfall #1) location can be found on Figure 3-2 of the Storm Water Pollution Prevention Plan.
- 4 - Attach any additional comments to this form.

Table 4-1
MONITORING REQUIREMENTS FOR STEAM ELECTRIC POWER GENERATING FACILITIES

<u>Pollutant of Concern</u>	<u>Cut-off Concentration</u>
Total Recoverable Iron	1.0 mg/L

In addition to analytical data for the parameter listed above, the date and duration (in hours) of the storm event(s) sampled; rainfall measurements or estimates (in inches) of the storm event which generated the sampled runoff; the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and an estimate of the total volume (in gallons) of the discharge sampled must be provided.

If the average concentration for a parameter is less than or equal to the value listed above in Table 4-1, then quantitative analysis for that parameter during the fourth year of the permit is not required. If, however, the average concentration for a parameter is greater than the cut-off concentration listed in Table 4-1, then quarterly monitoring for that parameter during the fourth year of permit coverage must be conducted. The exclusion from monitoring in the fourth year of the permit is conditional on the Facility maintaining industrial operations and BMPs that will ensure a quality of stormwater discharges that is consistent with the average concentrations recorded during the second year of the permit. Monitoring is not required during the first, third, and fifth year of the permit. In addition, monitoring is not required if a stormwater discharge does not occur. A summary of the schedule of monitoring is given below:

Second Year of Permit Coverage

- 1) Conduct quarterly monitoring.
- 2) Calculate the average concentration for all samples analyzed during this period.
- 3) If the average concentration for total recoverable iron is greater than 1.0 mg/l, then quarterly sampling is required during the fourth year of the permit.
- 4) If the average concentration for total recoverable iron is less than or equal to 1.0 mg/l, then quarterly sampling is not required in the fourth year of the permit (refer to fourth year requirements below).

Fourth Year of Permit Coverage

- 1) Conduct quarterly monitoring if the average concentration of total recoverable iron in year two of the permit is greater than 1.0 mg/l.
- 2) If industrial activities or the pollution prevention plan have been altered such that stormwater discharges may be adversely affected, quarterly monitoring is required for total recoverable iron.

During periods of stormwater discharge, the Facility will collect samples during the quarterly monitoring periods (January through March, April through June, July through September, and October through December) in the years specified above. If stormwater is discharged during the required monitoring period, a minimum of one grab sample will be collected at Outfall #1 (Control Structure #1). All such samples will be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. The required 72-hour storm event interval is waived where the preceding measurable storm event did not result in a measurable discharge from the Facility. The required 72-hour storm event interval may also be waived where the Facility documents that less than a 72-hour interval is representative for local storm events during the season when sampling is being conducted.

The grab sample shall be taken during the first 30 minutes of the discharge. If the collection of a grab sample during the first 30 minutes is impracticable, a grab sample can be taken during the first hour of the discharge, and the Facility will submit, with the monitoring report, a description of why a grab sample during the first 30 minutes was impracticable. If stormwater discharges associated with industrial activity commingle with process or non-process water, then, where practicable, the Facility must attempt to sample the stormwater discharge before it mixes with the non-stormwater discharge.

4.5.2 Reporting

The Facility will submit monitoring results obtained during the second (and fourth) year of the MSGP, Sector O coverage. The reports will be submitted within three months of the conclusion of each year. In the case of waived monitoring requirements, the Facility must submit to the FDEP, in lieu the monitoring data, a certification that there has not been a significant change in industrial

activity or the pollution prevention measures in area of the Facility which drains to the outfall for which sampling was waived (i.e. fourth year of the permit).

Discharge Monitoring Report Form(s) (DMRs) should be postmarked no later than the 31st day of the following March. One signed DMR form for the Facility's outfall (Outfall #1) must be submitted to the Director per storm event sampled. If the Facility has no discharge from Outfall #1 during the monitoring period, a DMR must be completed with "No Discharge" indicated on the DMR form. Signed copies of the DMRs, or the certifications, must be submitted to the following address:

NPDES Stormwater MSGP DMR, MS#2511
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Copies of completed stormwater DMRs will be retained in Appendix H.

4.5.3 Quarterly Visual Examination of Stormwater Quality

The Facility will perform and document a visual examination of a stormwater discharge from their outfall (Outfall #1) on a quarterly basis. The examination must be made at least once in each of the following periods for the purposes of visually inspecting stormwater quality associated with stormwater runoff: January through March, April through June, July through September; and October through December. The examination must take place during daylight hours unless there is insufficient rainfall to produce a runoff event during this time.

Samples collected within the first 30 minutes (or as soon thereafter as practical, but not to exceed one hour) of when the runoff begins discharging will be examined. The examination must be conducted in a well lit area. No analytical tests are required to be performed on the samples, with the exception of the monitoring requirements identified in Section 4.5.1. The examination must be made at least once during each quarter of the permit during daylight, unless there is insufficient rainfall to generate runoff. Where practicable, the same individual will carry out the collection and examination of discharge samples throughout the term of the permit.

Visual Examination Reports will include the examination date and time, examination personnel, the nature of the discharge (i.e. runoff), visual quality of the stormwater discharge including observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam,

oil sheen, and other obvious indicators of stormwater pollution, and probable sources of any observed stormwater contamination. Completed Quarterly Stormwater Discharge Visual Examination Forms will be maintained in Appendix I of the SWP3. An example of this form is provided as Figure 4-2.

When samples can not be collected over the course of the visual examination period as a result of adverse climatic conditions, the discharger must document the reason for not performing the visual examination and retain this documentation with the records of the visual examination. Adverse weather conditions that may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricane, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.). If no discharge occurs from Outfall #1 during the reporting period, a visual examination form will be completed for that period indicating "No Discharge". These forms are not required to be submitted to the EPA or the FDEP.

4.6 EMPLOYEE TRAINING

Stormwater pollution prevention plan training is designed to inform personnel responsible for implementing activities identified in this SWP3, or otherwise responsible for stormwater management at all levels of responsibility, of the components and goals of the SWP3. Specific stormwater pollution prevention training will include topics such as:

- Goals of the Facility's pollution prevention plan;
- Spill prevention and control;
- Proper handling procedures for chemicals;
- Good housekeeping and material management practices; and
- Stormwater sampling techniques.

Training will be held at least annually in conjunction with the Environmental Compliance Operating Training Manual Program that is already in place at the Facility. All trainees, once fully familiar with the SWP3, will then read and sign the acknowledgment in Appendix E.

Poor Original

Figure 4-2

Lee County Solid Waste Resource Recovery Facility Quarterly Visual Examination of Stormwater Discharge Field Data Form				
Date _____		Day _____		
Weather _____		Precipitation _____		
Sampling Location _____		Time _____		
Outfall Location _____		Test Kit # _____		
Remarks _____ _____				
Dry Weather Flow Observed (Circle the correct response) Yes No				
Note: Complete Bottom of Data Sheet Only if Flow is Observed				
Grab Sample Descriptive Data	First Sample		Second Sample	
	Time _____	Date _____	Time _____	Date _____
	Describe	Yes/No	Describe	Yes/No
	Flow	_____	_____	_____
	Color	_____	_____	_____
	Odor	_____	_____	_____
	Oil Sheen	_____	_____	_____
	Surface Scum	_____	_____	_____
	Floating Solids	_____	_____	_____
	Settled Solids	_____	_____	_____
Suspended Solids	_____	_____	_____	
Foam	_____	_____	_____	
Phase Separation	_____	_____	_____	
Note: Sign and Date All Completed Forms				
Field Investigator _____		Date _____		
Remarks _____ _____				

[Stamp: 10/10/02 10:04]

In addition to stormwater pollution prevention plan training, periodic training is provided to provide that appropriate employees of the Facility understand and operate in compliance with the following programs: applicable OSHA Programs (Monthly Safety Meetings) and HAZCOM (Worker Right-to-Know).

4.7 RECORD KEEPING AND INTERNAL REPORTING PROCEDURES

A record of spills, discharges, or any other condition affecting stormwater quality or quantity will be included in Appendix F of this SWP3. The completed annual site compliance evaluation report forms will also be retained in Appendix G of this SWP3. Inspection deficiencies or other occurrence affecting the stormwater quality will be immediately reported to the Team leader. Plant inspection and maintenance activities related to this SWP3 will be documented and recorded using the Facility's computerized preventive maintenance program.

4.8 NON-STORMWATER DISCHARGES

Based on a review of Facility process diagrams, site plans, interviews with Facility Plant Management, and knowledge of the overall Facility layout and operations, there are no non-stormwater discharges associated with the Facility.

4.9 SEDIMENT AND EROSION CONTROL

A review of the Facility topography, design, and operations indicate that the Facility does not have areas with significant soil erosion potential. The Facility stormwater design has provided for permanent erosion and stabilization control by preventing erosive flow velocities and stabilizing non-paved areas. Surface runoff velocities have been designed to generally average less than one foot per second. All undeveloped disturbed areas have been seeded or mulched, and gravel or rip-rap are present in areas of potentially high flow velocities. To prevent erosion and facilitate maintenance, embankments have slopes of 3 to 1 or flatter. Exposed areas will be re-seeded and gravel, rip-rap or mulch will be refreshed as necessary.

4.10 MANAGEMENT OF RUNOFF

The stormwater controls in use at the Facility are appropriate for managing stormwater with respect to the conditions of the NPDES MSGP, Sectors O and N and the site conditions. The Facility has incorporated a number of traditional stormwater management practices (practices other than those that control the generation of source pollutants). These controls are identified below:

- Vegetated and rip-rap lined swales are utilized to convey flows from general access roadways and buildings.
- All water that has the potential to contact refuse or ash is directed to the SWERF's settling basin/reuse basin for subsequent use as quench water in combustor ash dischargers.
- Runoff from within the Facility boundary is contained by berms that surrounds each facility.
- Detention/Retention ponds allows the Facility's stormwater to aerate and particles to settle.
- Grease traps and trash screens provide for treatment of stormwater at various locations along the stormwater conveyance system, prior to entry into the stormwater retention/detention ponds.
- Other structural controls are listed in Section 3.0 of the SWP3.

SECTION 5

RMPF MEASURES AND CONTROLS

This section describes the stormwater management controls appropriate for the RMPF and includes a schedule for implementing controls. The appropriateness and priorities of the controls are consistent with the potential sources identified in Section 3. Stormwater management controls and BMPs for the RMPF are presented as follows: inbound recyclable material control program, outdoor storage, indoor storage and material processing, and vehicle and equipment maintenance.

5.1 INBOUND RECYCLABLE MATERIAL CONTROL PROGRAM

All suppliers of recyclable materials are made aware of the types of recyclable materials that are acceptable and those that are not acceptable at the Facility. Informational brochures are distributed to the public, educating suppliers about acceptable and unacceptable recyclable materials. The County has implemented two types of environmental education programs: one program focuses on school children, while the other program is directed at newcomers to the County. All drivers responsible for pickup of recyclable materials are trained to recognize and reject the receipt of unacceptable materials. Public drop-off containers are clearly marked as to what materials can be accepted. Non-recyclable wastes or household hazardous wastes are rejected by the drivers at the source. Household hazardous waste can be received at the Household Hazardous Waste Collection Facility located on-site by the public, by appointment only. At the Facility, RMPF personnel visually inspect all inbound material to minimize the likelihood of receiving non-recyclable materials. In the event non-recyclable materials are received at the RMPF, the materials are immediately removed from the Facility for off-site handling and disposal.

5.2 OUTDOOR STORAGE

BMPs are in place to minimize or reduce the exposure of recyclable materials to surface runoff and precipitation. The Facility does not currently have public drop-off containers. Non-recyclable residue is placed into a 20-yard roll-off container. This container is emptied daily at

the SWERF. Regularly scheduled sweeping of outdoor storage areas is conducted to minimize particulate buildup.

5.3 VEHICLE AND EQUIPMENT MAINTENANCE

Vehicle and equipment maintenance occurs inside the Facility during periods when recyclables are not being received. Outdoor maintenance activities are limited to emergency maintenance activities that must be completed during Facility operating hours. Spill prevention and clean-up procedures are established and documented in the Oil Pollution Prevention Plan included in Appendix C. Employees are trained to avoid topping off fuel tanks to prevent spills. Dry-absorbent materials are provided in the event of a spill. Employee training is provided to emphasize proper handling and storage of hydraulic fluids and lubricants.

5.4 EMPLOYEE TRAINING

Stormwater pollution prevention plan training is designed to inform personnel responsible for implementing activities identified in this SWP3, or otherwise responsible for stormwater management at all levels of responsibility, of the components and goals of the SWP3. Specific stormwater pollution prevention training will include topics such as:

- Goals of the Facility's pollution prevention plan;
- Spill prevention and control;
- Proper handling procedures for chemicals; and
- Good housekeeping and material management practices.

Training will be held at least annually. All trainees, once fully familiar with the SWP3, will then read and sign the acknowledgment in Appendix E. In addition to stormwater pollution prevention plan training, periodic training is provided to ensure appropriate employees of the Facility are in compliance with the following programs: applicable OSHA Programs (Monthly Safety Meetings) and HAZCOM (Worker Right-to-Know).

5.5 RECORD KEEPING AND INTERNAL REPORTING PROCEDURES

A record of spills, discharges, or any other condition affecting stormwater quality or quantity will be documented and included in Appendix F of this SWP3. The completed annual site compliance evaluation report forms (described in Section 6), or other forms used to document the annual evaluation, will be retained in Appendix G of this SWP3. Inspection deficiencies or other occurrence affecting the stormwater quality will be immediately reported to the Pollution Prevention Team leader. Plant inspection and maintenance activities related to this SWP3 will be documented and recorded using the Facility's preventive maintenance program.

5.6 NON-STORMWATER DISCHARGES

Based on a review of Facility process diagrams, site plans, interviews with Facility Plant Management, and knowledge of the overall Facility layout and operations, there are no non-stormwater discharges associated with the Facility.

SECTION 6

COMPREHENSIVE SITE COMPLIANCE EVALUATION

At least once per year during the term of the permit, a site compliance evaluation will be conducted. This evaluation will be consistent with the specific requirements of the NPDES MSGP, Sector O and Sector N. In summary, these permit conditions are as follows:

- Visually inspect areas contributing to stormwater discharge for evidence of, or potential for, pollutants entering the drainage system.
- Evaluate measures to reduce the potential for pollutants to come in contact with stormwater to ensure their adequacy and that the measures have been implemented.
- Structural control measures identified in this SWP3 will be inspected to ensure proper operation.
- Within 14 days of the inspection, the SWP3 will be amended as needed. All appropriate corrective actions will be completed not more than 12 weeks following the inspection.
- A compliance report summarizing the inspection and corrective actions, that has been certified appropriately, will be retained in Appendix G of this SWP3 for at least three years from the date of evaluation. Figures 6-1A and 6-1B can be used as a model data summary page for this report. Some modifications may be needed for site-specific considerations.

Figure 6-1A

**LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY
LEE COUNTY, FLORIDA**

Annual Storm Water Inspection/ Site Compliance Evaluation Report		Completed by: Title: Date:			
Instructions: Review SWP3 and conduct site inspection. Observe and record any changes since last inspection.					
Property (e.g., paving, buildings, landscaping):					
Erosion:					
New Process/Storage/Handling/Waste:					
Spill/Leaks/Areas of Staining:					
Outfalls		Condition (deterioration, staining, smell)		Flow Observed	
Control Structure #1					
Significant Materials: Exposed to Stormwater:					
	No Action	Needs Action		No Action	Needs Action
Site Drainage Map			Preventative Maintenance		
Material/Equipment/ Vehicle Management Practices			Good Housekeeping		
Loading/Unloading Areas			Spill Prevention Response		
Structural/Non- Structural Controls			Management Practices		
Treatment Facilities			Training		
On-Site Storage					
Sampling Data					
Comments/Corrective Action:					

**LEE COUNTY RECOVERED MATERIALS PROCESSING FACILITY
LEE COUNTY, FLORIDA**

Annual Storm Water Inspection/ Site Compliance Evaluation Report		Completed by: Title: Date:			
Instructions: Review SWP3 and conduct site inspection. Observe and record any changes since last inspection.					
Property (e.g., paving, buildings, landscaping):					
Erosion:					
New Process/Storage/Handling/Waste:					
Spill/Leaks/Areas of Staining:					
Significant Materials: Exposed to Stormwater:					
	No Action	Needs Action		No Action	Needs Action
Site Drainage Map			Preventative Maintenance		
Material/Equipment/ Vehicle Management Practices			Good Housekeeping		
Loading/Unloading Areas			Spill Prevention Response		
Structural/Non- Structural Controls			Management Practices		
On-Site Storage			Training		
Comments/Corrective Action:					

APPENDIX

A

NPDES MSGP SECTOR O AND SECTOR N PERMITS

Sector O

Steam Electric Power Generating Facilities, Including Coal Handling Areas Fact Sheet

Fact Sheets include a general discussion of the issues and pollutants specific to each industrial sector, including a summary of the data used to formulate the Multi-Sector General Permit. Fact Sheet topics include:

- Discharges Covered Under the Sector;
- Industry Profile;
- Associated Storm Water Pollutants;
- Pollution Control Options;
- Special Conditions;
- Storm Water Pollution Plan Requirements;
- Monitoring and Reporting Requirements; and
- Numeric Effluent Limitations, if any.

The Fact Sheet is not to be used as the basis for permit compliance. Sector-specific Permit Language, immediately following this Fact Sheet, provides specific detail for permit compliance.

*O. Storm Water Discharges Associated
With Industrial Activity From Steam
Electric Power Generating Facilities,
Including Coal Handling Areas*

1. Industrial Profile

The conditions in this section apply to storm water discharges from steam electric power generating facilities. The steam electric power generating category

includes facilities which are coal, oil, gas, or nuclear fired. Heat captured co-generation facilities are not covered under the definition of storm water discharge associated with industrial activity, however, dual fuel co-generation facilities are included in the definition. When an industrial facility, described by the above coverage provisions of this section, has industrial activities being conducted onsite that meet the description(s) of industrial activities in another section(s), that industrial facility shall comply with any and all applicable monitoring and pollution prevention plan requirements of the other section(s) in addition to all applicable requirements in this section. The monitoring and pollution prevention plan terms and conditions of this multi-sector permit are additive for industrial activities being conducted at the same industrial facility (co-located industrial activities). The operator of the facility shall determine which other monitoring and pollution prevention plan section(s) of this permit (if any) are applicable to the facility.

Storm water discharges from coal piles are eligible for coverage under this permit, where these discharges are not already subject to an existing NPDES permit.

The production of electrical energy always involves the conversion of some other form of energy. The two most important sources of energy which are converted to steam electric energy are the chemical energy of fossil fuels and the atomic energy of nuclear fuels. Current uses of fossil fuels are based on a combustion process, followed by steam generation to convert the heat first into mechanical energy and then to convert the mechanical energy into electrical energy. Nuclear power plants utilize a cycle similar to that used in fossil fueled power plants except that the source of heat is atomic interactions rather than the combustion of fossil fuel.

The steam electric power generating process for fossil fuel systems are typically enclosed and subject to effluent limitations guidelines [40 Code of Federal Regulations (CFR) Part 423], as is coal pile runoff. However, the unloading and transport of coal within the facility is subject to the conditions set forth in this section of today's permit. Likewise, the unloading and storage areas for liquid fuels and chemicals are subject to the conditions in this section of today's permit.

Industrial activities occurring at steam electric power generating facilities that pertain to the storm water rule include, " * * * but [are] not limited to, storm water discharges from industrial plant yards; material handling sites; refuse

sites; sites used for the application or disposal of process wastewaters (as defined at 40 CFR Part 401); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials and intermediate and finished materials; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to storm water" (40 CFR 122.26(b)(14)). Common industrial activities at steam electric power generating facilities include the unloading, transport, and storage of raw materials, and the disposal of waste materials.

Significant materials include, " * * * but [are] not limited to: raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; * * * hazardous substances designated under Section 101(14) of CERCLA; any chemical facilities required to report pursuant to Section 313 of Title III of SARA; fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges" (40 CFR 122.26(b)(12)). Significant materials commonly found at steam electric power generating facilities include: coal; diesel fuel; and waste materials.

Historically, steam electric power generating facilities were categorized in accordance with the type of fuel they burned. Recently, however, steam electric power generating facilities have modified their equipment to enable them to use more than one fuel. Presented below are brief descriptions of the industrial activities and significant materials associated with the production of steam electric power. Due to the increase in facilities burning multiple fuels the industrial activities and significant materials are discussed together. However, the industrial activities and significant materials for nuclear powered facilities are discussed separately. Unique practices are noted.

a. Industrial Activities: Fossil Fuel Powered Plants. Steam electric power generation can be divided into four stages. In the first operation, fossil fuel (coal, oil, or natural gas) is burned in a boiler furnace. The evolving heat is used to produce pressurized and superheated steam. This steam is conveyed to the second stage, the turbine, where it gives energy to the rotating blades and, in the process, loses pressure and increases in volume. The rotating blades of the turbine act to drive an electric generator or alternator to convert the imparted mechanical energy into electrical

energy. The steam leaving the turbine enters the third state, the condenser, where it is condensed to water. The liberated heat is transferred to a cooling medium which is normally water. Finally, the condensed steam is reintroduced into the boiler by a pump to complete the cycle.

Features unique to coal-fired plants include coal storage and preparation (transport, beneficiation, pulverization, drying), coal-fired boiler, ash handling and disposal systems, and flue gas cleaning, and desulfurization.

b. Significant Materials: Fossil Fuel Powered Plants. The type of fuel (coal, oil, gas, nuclear) used to fire power plant boilers most directly influences the number of waste streams. The influence comes principally from the effect of fuel on the volume of ash generated. Stations using heavy or residual oils generate fly ash in large quantities and may generate some bottom ash. Stations which burn coal create both fly ash and bottom ash. Bottom ash is the residue which accumulates on the furnace bottom, and fly ash is the lighter material which is carried over in the flue gas stream.

c. Industrial Activities: Nuclear Powered Plants. Nuclear power plants utilize a cycle similar to that used in fossil fueled power plants except that the source of heat is atomic interactions rather than the combustion of fossil fuel. Water serves as both moderator and coolant as it passes through the nuclear reactor core. In a pressurized water reactor, the heated water then passes through a separate heat exchanger where steam is produced on the secondary side. This steam, which contains radioactive materials, drives the turbines. In a boiling water reactor, steam is generated directly in the reactor core and is then piped directly to the turbine. This arrangement produces some radioactivity in the steam and therefore requires some shielding of the turbine and condenser.

d. Significant Materials: Nuclear Powered Plants. Few if any significant materials are exposed to storm water at nuclear powered steam electric facilities. Materials that are potentially exposed do not involve steam electric generating equipment, raw materials, or waste products. The materials that are exposed to storm water are office wastes and ground maintenance equipment and tools.

2. Pollutants in Storm Water Discharges Associated With Steam Electric Power Generating Facilities

Steam electric generating facilities are subject to effluent limitations guidelines that limit the number and variety of

industrial activities that are included in the storm water program. Pollutants may be present in storm water as a result of outdoor activities associated with steam electric power generating facilities such as: material handling and transport operations; waste disposal; and deposition of airborne particulate matter. In addition, sources of pollutants other than storm water, such

as illicit connections,⁹² spills, and other improperly dumped materials, may increase the pollutant loadings discharged into waters of the United States.

Many of the part 2 group application data submittals did not identify individual site characteristics or sources of storm water pollutants which may be responsible for pollutant loadings. In

addition, because the industry has been moving toward combined fuel generating facilities, the part 2 sampling data was reviewed in the aggregate.

Table O-1 lists potential pollutant source activities and related pollutants associated with steam electric power generating facilities. The primary and largest potential source of storm water pollutants from fossil-fueled steam electric generating facilities is ash refuse piles.

TABLE O-1.—INDUSTRIAL ACTIVITIES, POLLUTANT SOURCES, AND POLLUTANTS FOR STEAM ELECTRIC POWER GENERATING FACILITIES

Activity	Pollutant source	Pollutant
Above Ground Liquid Storage Tank.	External corrosion and structural failure	Fuel, oil, heavy metals, ammonia, chlorine, sulfuric acid, sodium hydroxide, and other materials being stored.
	Installation problems	Fuel, oil, heavy metals, ammonia, chlorine, sulfuric acid, sodium hydroxide, and other materials being stored.
	Spills due to operator error	Fuel, oil, heavy metals, ammonia, chlorine, sulfuric acid, sodium hydroxide, and other materials being stored.
	Failure of piping systems	Fuel, oil, heavy metals, ammonia, chlorine, sulfuric acid, sodium hydroxide, and other materials being stored.
	Leaks or spills during pumping of liquids from barges, trucks, rail cars to a storage facility.	Fuel, oil, heavy metals, ammonia, chlorine, sulfuric acid, sodium hydroxide, and other materials being stored.
Vehicle and Equipment Maintenance.	Parts cleaning	Oil, heavy metals, chlorinated solvents, acid/alkaline wastes, ethylene glycol.
	Spills of oil, degreasers, hydraulic fluids, transmission fluid, radiator fluids.	Oil, arsenic, heavy metals, organics, chlorinated solvents, ethylene glycol.
Fueling Operations	Fluids replacement	Oil, arsenic, heavy metals, organics, fuel.
	Spills & leaks during fuel delivery	Fuel, oil, heavy metals.
	Spills caused by "topping off" fuel tanks	Fuel, oil, heavy metals.
	Leaking storage tanks	Fuel, oil, heavy metals.
	Allowing rainfall on the fuel area or storm water to run onto the fuel area.	Fuel, oil, heavy metals.
Coal Handling Areas	Fugitive dust emissions from coal handling	Suspended solids, copper, iron, aluminum, nickel, and trace metals.
	Spills during delivery	Suspended solids, copper, iron, aluminum, nickel, and trace metals.
	Offsite tracking of coal dust	Suspended solids, copper, iron, aluminum, nickel, and trace metals.
Ash Handling Areas, Ash Landfills.	Spills during transfer of ash to landfills	Suspended solids, chromium, copper, iron, zinc, oil and grease, aluminum.
	Offsite tracking of ash	Suspended solids, chromium, copper, iron, zinc, oil and grease, aluminum.
Scrapyards, Refuse Sites	Discarded material	Fuel, oils, heavy metals.

The ash composition from oil, on a weight percent basis, is much lower than that of coal. Oil ash rarely exceeds 0.3 percent of the input oil whereas coal ash comprises from 3 to 30 percent of the coal. In general, the ash content increases with increasing asphaltic constituents in which the sulfur acts largely as a bridge between aromatic rings.

The many elements which may appear in oil ash deposits include

vanadium, sodium, and sulfur. Compounds containing these elements are found in almost every deposit in boilers fired by residual fuel oil and often constitute the major portion of these deposits. Oil ash, especially from plants using Venezuelan and certain Middle Eastern oil can contain significant amounts of nickel.

Some of the ash-forming constituents in the crude oil had their origin in animal and vegetable matter from which

the oil was derived. The remainder is extraneous material resulting from contact of the crude oil with rock structures and salt brines or picked up during refining processes, storage, and transportation. Vanadium, iron, sodium, nickel, and calcium in fuel oil are common in rock strata, but elements including vanadium, nickel, zinc, and copper are believed to come from organic matter from which the petroleum was created.

⁹² Illicit connections are contributions of unpermitted non-storm water discharges to storm sewers from any of a number of sources including

sanitary sewers, industrial facilities, commercial establishments, or residential dwellings. The probability of illicit connections at steam electric

facilities is low yet it still may be applicable at some operations.

The ash residue resulting from the combustion of coal is primarily derived from the inorganic matter in the coal. The chemical composition of dry bottom ash and fly ash are quite similar. The major constituents present in coal ash are silica, alumina, ferric oxide, calcium oxide, magnesium oxide, and minor amounts of sodium and potassium oxides. Other parameters which may be present include sulfur trioxide, carbon, boron, phosphorus, uranium, and thorium. The concentration differences can vary considerably from one site to another.⁹³

When conducting their data analysis for their 1980 Development Document, the U.S. Environmental Protection Agency (EPA) found that there was no

correlation between arsenic, nickel, zinc, copper, and selenium and total suspended solids, whenever their value was 30 mg/L or less.⁹⁴

The quality of storm water runoff from coal handling areas is dependent on pH, as pH influences the release of toxic and heavy metals. Suspended solids levels result when storm water suspends coal particulates. Most of the total dissolved solids concentrations are a consequence of enhanced pyritic oxidation.

Storm water runoff from exposed sources of coal tends to be of an acid nature, primarily as a result of the oxidation of iron sulfide in the presence of oxygen and water.⁹⁵ The presence of certain acidophilic, chemoautotrophic bacteria, and a pH of 2.0 to 4.5 generally

indicates storm water runoff high in iron, manganese, and total dissolved solids.⁹⁶

Based on the similarities of the facilities included in this sector in terms of industrial activities and significant materials, EPA believes it is appropriate to discuss the potential pollutants at steam electric power generating facilities as a whole and not subdivide this sector. Therefore, Table O-2 lists data for selected parameters from facilities in the steam electric power generating sector. These data include the eight pollutants that all facilities were required to monitor for under Form 2F, as well as the pollutants that EPA has determined may merit further monitoring.

TABLE O-2.—STATISTICS FOR SELECTED POLLUTANTS REPORTED BY STEAM ELECTRIC GENERATING FACILITIES SUBMITTING PART II SAMPLING DATA¹ (mg/L)

Pollutant, Sample type	# of Facilities		# of Samples		Mean		Minimum		Maximum		Median		95th Percentile		99th Percentile	
	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp
BOD ₅	29	33	78	80	5.8	5.7	0.0	0.0	45.0	37.0	4.3	4.0	20.3	16.8	38.4	29.5
COD	30	33	78	79	102.5	68.7	0.0	0.0	1410.0	540.0	32.5	39.0	332.8	188.3	739.8	333.6
Nitrate + Nitrite Nitrogen	30	33	78	79	5.47	0.73	0.00	0.00	350.00	3.90	0.36	0.41	4.34	2.41	11.17	4.66
Total Kjeldahl Nitrogen	30	33	78	80	2.36	1.90	0.00	0.00	22.30	19.1	1.20	0.99	7.35	5.37	14.95	10.26
Oil & Grease	34	N/A	90	N/A	1.4	N/A	0.0	N/A	20.0	N/A	0.0	N/A	7.3	N/A	19.5	N/A
pH	30	N/A	72	N/A	N/A	N/A	3.8	N/A	9.0	N/A	7.4	N/A	8.9	N/A	9.7	N/A
Total Phosphorus	30	33	77	80	0.81	0.65	0.00	0.00	6.00	7.20	0.30	0.28	3.56	2.62	9.27	6.45
Total Suspended Solids	30	33	78	79	504	208	0	0	22790	5554	44	40	1561	967	6077	3292
Iron, Total	29	32	67	73	7.0	6.3	0.0	0.0	67.0	191.0	1.8	1.4	34.7	19.9	117.0	58.1
Zinc, Total	14	17	33	38	0.300	0.250	0.000	0.000	5.500	4.200	0.07	0.08	1.164	0.725	3.389	1.607

¹Applications that did not report the units of measurement for the reported values of pollutants were not included in these statistics. Values reported as non-detect or below detection limit were assumed to be 0.

²Composite samples.

3. Pollutant Control Measures Required Under Other EPA Programs.

The Agency recognizes that other EPA programs address pollution prevention at steam electric power generating facilities. The Oil Pollution Prevention Program (40 CFR Part 112) has established procedures to prevent the discharge of oil from nontransportation related onshore and offshore facilities. This program requires owners or operators of onshore and offshore facilities to prepare a Spill Prevention Control and Countermeasure Plan (SPCC Plan) for their facility if they could reasonably be expected to discharge oil, into or upon the navigable waters of the United States or adjoining shorelines, in quantities that violate applicable water quality standards, or cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge

or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines. Guidelines for the preparation and implementation of a Spill Prevention Control and Countermeasure Plan can be found at 40 CFR 112.7.

Under the Resource Conservation and Recovery Act (RCRA) specific requirements have been established which address generators of hazardous wastes. Regulations have been developed which address the accumulation of hazardous waste onsite prior to transport to a hazardous waste disposal facility. These regulations address proper storage of hazardous wastes, emergency planning, and training personnel in proper handling procedures for hazardous wastes.

4. Storm Water Pollution Prevention Plan Requirements

The conditions that apply to steam electric power generating facilities are based on the requirements set forth in the common permit conditions for storm water discharges from industrial activities discussed in today's fact sheet. The discussion that follows only addresses conditions that differ from those common conditions. There are no additional pollution prevention requirements beyond the common conditions for nuclear powered steam electric generating facilities.

a. Description of Pollutant Sources. Under the description of pollutant sources in the storm water pollution prevention plan requirements, permittees are required to include a site map of the facility. The areas required to be identified on the site map now also include the following: landfills,

⁹³ EPA, Effluent Guidelines Division. "Development Document for Effluent Limitations Guidelines and Standards for the Steam Electric Point Source Category." September 1980. (EPA 440/1-80/029-b). Page 131.

⁹⁴ EPA, Effluent Guidelines Division. "Development Document for Effluent Limitations

Guidelines and Standards for the Steam Electric Point Source Category." September 1980. (EPA 440/1-80/029-b). Page 138.

⁹⁵ EPA, Effluent Guidelines Division. "Development Document for Effluent Limitations Guidelines and Standards for the Steam Electric

Point Source Category." September 1980. (EPA 440/1-80/029-b). Page 138.

⁹⁶ EPA, Effluent Guidelines Division. "Development Document for Effluent Limitations Guidelines and Standards for the Steam Electric Point Source Category." September 1980. (EPA 440/1-80/029-b). Page 138.

treatment ponds, scrap yards, general refuse areas, locations of short and long term storage of general materials, and the location of stock pile areas. EPA believes this is appropriate since these areas may potentially be significant sources of pollutants to storm water. In addition, the site map must also indicate the outfall locations and the types of discharges contained in the drainage areas of the outfalls (e.g., storm water and air conditioner condensate). In order to increase the readability of the map, the inventory of the types of discharges contained in each outfall may be kept as an attachment to the site map.

b. Measures and Controls. Under the description of measures and controls in the storm water pollution prevention plan requirements, this section requires that all areas that may contribute pollutants to storm water discharges shall be maintained in a clean, orderly manner. This section also requires that the following 15 areas must be specifically addressed:

(1) **Fugitive Dust Emissions.** The plan must describe measures that prevent or minimize fugitive dust emissions from coal handling areas. The permittee shall consider establishing procedures to minimize offsite tracking of coal dust. To prevent offsite tracking the facility may consider specially designed tires, or washing vehicles in a designated area before they leave the site, and controlling the wash water.

(2) **Delivery Vehicles.** The plan must describe measures that prevent or minimize contamination of storm water runoff from delivery vehicles arriving on the plant site. At a minimum the permittee should consider the following:

(a) Develop procedures for the inspection of delivery vehicles arriving on the plant site, and ensure overall integrity of the body or container.

(b) Develop procedures to control leakage or spillage from vehicles or containers, and ensure that proper protective measures are available for personnel and environment.

(3) **Fuel Oil Unloading Areas.** The plan must describe measures that prevent or minimize contamination of storm water runoff from fuel oil unloading areas. At a minimum the facility operator must consider using the following measures or an equivalent:

(a) Use containment curbs in unloading areas.

(b) During deliveries station personnel familiar with spill prevention and response procedures must be present to ensure that any leaks or spills are immediately contained and cleaned up.

(c) Use spill and overflow protection (drip pans, drip diapers, and/or other containment devices shall be placed beneath fuel oil connectors to contain any spillage that may occur during deliveries or due to leaks at such connectors).

(4) **Chemical Loading/Unloading Areas.** The plan must describe measures that prevent or minimize the contamination of storm water runoff from chemical loading/unloading areas. At a minimum the permittee must consider using the following measures or an equivalent:

(a) Use containment curbs at chemical loading/unloading areas to contain spills.

(b) During deliveries station personnel familiar with spill prevention and response procedures must be present to ensure that any leaks or spills are immediately contained and cleaned up.

Where practicable chemical loading/unloading areas should be covered, and chemicals should be stored indoors.

(5) **Miscellaneous Loading/Unloading Areas.** The plan must describe measures that prevent or minimize the contamination of storm water runoff from loading and unloading areas. The facility may consider covering the loading area, minimizing storm water runoff to the loading area by grading, berming, or curbing the area around the loading area to direct storm water away from the area, or locate the loading/unloading equipment and vehicles so that leaks can be controlled in existing containment and flow diversion systems.

(6) **Liquid Storage Tanks.** The plan must describe measures that prevent or minimize contamination of storm water runoff from above ground liquid storage tanks. At a minimum the facility operator must consider employing the following measures or an equivalent:

(a) Use protective guards around tanks.

(b) Use containment curbs.

(c) Use spill and overflow protection (drip pans, drip diapers, and/or other containment devices shall be placed beneath chemical connectors to contain any spillage that may occur during deliveries or due to leaks at such connectors).

(d) Use dry cleanup methods.

(7) **Large Bulk Fuel Storage Tanks.** The plan must describe measures that prevent or minimize contamination of storm water runoff from liquid storage tanks. At a minimum the facility operator must consider employing the following measures or an equivalent:

(a) Comply with applicable State and Federal laws, including Spill Prevention Control and Countermeasures (SPCC)

(b) Containment berms.

(8) The plan must describe measures to reduce the potential for an oil or chemical spill, or reference the appropriate section of their SPCC plan. At a minimum the structural integrity of all above ground tanks, pipelines, pumps and other related equipment shall be visually inspected on a weekly basis. All repairs deemed necessary based on the findings of the inspections shall be completed immediately to reduce the incidence of spills and leaks occurring from such faulty equipment.

(9) **Oil Bearing Equipment in Switchyards.** The plan must describe measures to reduce the potential for storm water contamination from oil bearing equipment in switchyard areas. The facility may consider level grades and gravel surfaces to retard flows and limit the spread of spills; collection of storm water runoff in perimeter ditches.

(10) **Residue Hauling Vehicles.** All residue hauling vehicles shall be inspected for proper covering over the load, adequate gate sealing and overall integrity of the body or container. Vehicles without load covers or adequate gate sealing, or with poor body or container conditions must be repaired as soon as practicable.

(11) **Ash Loading Areas.** Plant procedures shall be established to reduce and/or control the tracking of ash or residue from ash loading areas including, where practicable, requirements to clear the ash building floor and immediately adjacent roadways of spillage, debris and excess water before each loaded vehicle departs.

(12) **Areas Adjacent to Disposal Ponds or Landfills.** The plan must describe measures that prevent or minimize contamination of storm water runoff from areas adjacent to disposal ponds or landfills. The facility must develop procedures to:

(a) Reduce ash residue which may be tracked on to access roads traveled by residue trucks or residue handling vehicles.

(b) Reduce ash residue on exit roads leading into and out of residue handling areas.

(13) **Landfills, Scrapyards, and General Refuse Sites.** The plan must address landfills, scrapyards, and general refuse sites. The permittee is referred to Parts XI.L. and XI.N. of today's permit (Storm Water Discharges From Landfills and Land Application Sites and Scrap and Waste Material Processing and Recycling Facilities, respectively) for applicable Best Management Practices.

(14) **Maintenance Activities.** For vehicle maintenance activities

performed on the plant site, the permittee shall consider the applicable Best Management Practices outlined in Part XI.P. of today's permit (Storm Water Discharges From Vehicle Maintenance or Equipment Cleaning Operations at Motor Freight Transportation Facilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and Terminals, or the United States Postal Service).

(15) *Material Storage Areas.* The plan must describe measures that prevent or minimize contamination of storm water from material storage areas (including areas used for temporary storage of miscellaneous products and construction materials stored in lay down areas). The facility operator may consider flat yard grades, runoff collection in graded swales or ditches, erosion protection measures at steep outfall sites (e.g., concrete chutes, riprap, stilling basins), covering lay down areas, storing the materials indoors, covering the material with a temporary covering made of polyethylene, polyurethane, polypropylene, or hypalon. Storm water runoff may be minimized by constructing an enclosure or building a berm around the area.

Based on information provided in part 1 of the group application process, the management practices applicable to the 15 areas listed above are commonly used at many steam electric power generating facilities. EPA believes that the incorporation of management practices to accomplish the objectives described above, in conjunction with the baseline requirements, will substantially reduce the potential for these activities and areas to significantly contribute to the pollution of storm water discharges. EPA believes that these requirements provide the necessary flexibility to address the variable risk for pollutants in storm water discharges associated with different facilities.

(c) *Inspections.* Under the inspection requirements of the storm water pollution prevention plan elements, this section requires that in addition to the comprehensive site evaluation required under Part VIII.C.4. of today's permit, qualified facility personnel shall be identified to inspect designated equipment and areas of the facility on a monthly basis. The following areas shall be included in the inspection: coal handling areas, fueling areas, loading/unloading areas, switchyards, bulk storage areas, ash handling areas, areas adjacent to disposal ponds and landfills, maintenance areas, liquid storage tanks and long term and short term material storage areas. A set of tracking or follow-

up procedures shall be used to ensure that appropriate actions are taken in response to the inspections. Records of inspections shall be maintained onsite.

The purpose of the inspections is to check on the implementation of the storm water pollution prevention plan. The inspections allow facility personnel to monitor the success or failure of elements of the plan on a regular basis.

d. *Employee Training.* Steam electric power generating facilities are required to identify periodic training dates in the pollution prevention plan, but in all cases training must be held at least annually. EPA believes that such a frequency is necessary due to the many areas with a high potential for contamination of storm water.

5. Numeric Effluent Limitations

Coal pile runoff is subject to the effluent guidelines described in Part V.B of today's permit. However, steam electric generating facilities must comply with the requirement of Part V.B immediately upon permit issuance. Steam electric generating facilities are not permitted to take 3 years to meet this requirement.

6. Monitoring and Reporting Requirements

a. *Analytical Monitoring Requirements.* EPA believes that steam electric power generating facilities may reduce the level of pollutants in storm water runoff from their sites through the development and proper implementation of the storm water pollution prevention plan requirements discussed in today's permit. In order to provide a tool for evaluating the effectiveness of the pollution prevention plan and to characterize the discharge for potential environmental impacts, the permit requires steam electric power generating facilities to collect and analyze samples of their storm water discharges for the pollutant listed in Table O-3. The pollutant listed in Table O-3 was found to be above levels of concern for a significant portion of steam electric power generating facilities that submitted quantitative data in the group application process. Because this pollutant has been reported at or above levels of concern from steam electric power generating facilities, EPA is requiring monitoring after the pollution prevention plan has been implemented to assess the effectiveness of the pollution prevention plan and to help ensure that a reduction of pollutants is realized.

Under the Storm Water Regulations at 40 CFR 122.26(b)(14), EPA defined "storm water discharge associated with industrial activity". The focus of today's

permit is to address the presence of pollutants that are associated with the industrial activities identified in this definition and that might be found in storm water discharges. Under the methodology for determining analytical monitoring requirements, described in section VI.E.1 of this fact sheet, zinc is above the bench mark concentrations for the steam electric generating facilities sector. After a review of the nature of industrial activities and the significant materials exposed to storm water described by facilities in this sector, EPA has determined that the higher concentrations of zinc are not likely to be caused by the industrial activity, but may be primarily due to non-industrial activities on-site. Today's permit does not require steam electric generating facilities to conduct analytical monitoring for this parameter.

At a minimum, storm water discharges from steam electric power generating facilities must be monitored quarterly during the second year of permit coverage. Samples must be collected at least once in each of the following periods: January through March; April through June; July through September; and October through December. At the end of the second year of permit coverage, a facility must calculate the average concentration for each parameter listed in Table O-3. If the permittee collects more than four samples in this period, then they must calculate an average concentration for each pollutant of concern for all samples analyzed.

TABLE O-3.—MONITORING REQUIREMENTS FOR STEAM ELECTRIC POWER GENERATING FACILITIES

Pollutant of concern	Cut-Off concentration
Total Recoverable Iron ...	1.0 mg/L

If the average concentration for a parameter is less than or equal to the value listed in Table O-3, then the permittee is not required to conduct quantitative analysis for that parameter during the fourth year of the permit. If, however, the average concentration for a parameter is greater than the cut-off concentration listed in Table O-3, then the permittee is required to conduct quarterly monitoring for that parameter during the fourth year of permit coverage. Monitoring is not required during the first, third, and fifth year of the permit. The exclusion from monitoring in the fourth year of the permit is conditional on the facility maintaining industrial operations and BMPs that will ensure a quality of storm

water discharges consistent with the

average concentrations recorded during the second year of the permit.

TABLE O-5.—Schedule of Monitoring

2nd Year of Permit Coverage	• conduct quarterly monitoring. • calculate the average concentration for all parameters analyzed during this period. • if average concentration is greater than the value listed in Table O-3, then quarterly sampling is required during the fourth year of the permit. • if average concentration is less than or equal to the value listed in Table O-3, then no further sampling is required for that parameter.
4th Year of Permit Coverage	• conduct quarterly monitoring for any parameter where the average concentration in year two of the permit is greater than the value listed in Table O-3. • if industrial activities or the pollution prevention plan have been altered such that storm water discharges may be adversely affected, quarterly monitoring is required for all parameters of concern.

In cases where the average concentration of a parameter exceeds the cut-off concentration, EPA expects permittees to place special emphasis on methods for reducing the presence of those parameters in storm water discharges. Quarterly monitoring in the fourth year of the permit will reassess the effectiveness of the adjusted pollution prevention plan.

The monitoring cut off concentrations listed in Table O-3 are not numerical effluent limitations. These values represent a level of pollutant discharge which facilities may achieve through the implementation of pollution prevention plans. At least half of the facilities which submitted Part 2 data, reported concentrations greater than or equal to the values listed in Table O-3. Facilities which achieve average discharge concentrations which are less than or equal to the values in Table O-3 are not relieved from the pollution prevention plan requirements or any other requirements of the permit.

EPA realizes that if a facility is inactive and unstaffed it may be difficult to collect storm water discharge samples when a qualifying event occurs. Today's final permit has been revised so that inactive, unstaffed facilities can exercise a waiver of the requirement to conduct quarterly chemical sampling.

b. Alternative Certification. Throughout today's permit, EPA has included monitoring requirements for facilities which the Agency believes have the potential for contributing significant levels of pollutants to storm water discharges. The alternative described below is necessary to ensure that monitoring requirements are only imposed on those facilities which do, in fact, have storm water discharges containing pollutants at concentrations of concern. EPA has determined that if materials and activities are not exposed to storm water at the site then the potential for pollutants to contaminate

storm water discharges does not warrant monitoring.

Therefore, a discharger is not subject to the monitoring requirements of this Part provided the discharger makes a certification for a given outfall, or on a pollutant-by-pollutant basis in lieu of the monitoring reports required under paragraph c. below, under penalty of law, signed in accordance with Part VII.G. (Signatory Requirements), that material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, industrial machinery or operations, significant materials from past industrial activity that are located in areas of the facility that are within the drainage area of the outfall are not presently exposed to storm water and will not be exposed to storm water for the certification period. Such certification must be retained in the storm water pollution prevention plan, and submitted to EPA in accordance with Part VI.C. of this permit. In the case of certifying that a pollutant is not present, the permittee must submit the certification along with the monitoring reports required under paragraph c. below. If the permittee cannot certify for an entire period, they must submit the date exposure was eliminated and any monitoring required up until that date. This certification option is not applicable to compliance monitoring requirements associated with effluent limitations. EPA does not expect facilities to be able to exercise this certification for indicator parameters, such as TSS and BOD.

c. Reporting Requirements. Permittees are required to submit all monitoring results obtained during the second and fourth year of permit coverage within three months of the conclusion of each year. For each outfall, one signed Discharge Monitoring Report form must be submitted to the Director per storm event sampled. For facilities conducting monitoring beyond the minimum

requirements an additional Discharge Monitoring Report Form must be filed for each analysis.

d. Sample Type. All discharge data shall be reported for grab samples. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. The required 72-hour storm event interval is waived where the preceding measurable storm event did not result in a measurable discharge from the facility. The required 72-hour storm event interval may also be waived where the permittee documents that less than a 72-hour interval is representative for local storm events during the season when sampling is being conducted. The grab sample shall be taken during the first thirty minutes of the discharge. If the collection of a grab sample during the first thirty minutes is impracticable, a grab sample can be taken during the first hour of the discharge, and the discharger shall submit with the monitoring report a description of why a grab sample during the first thirty minutes was impracticable.

If storm water discharges associated with industrial activity commingle with process or non-process water, then where practicable permittees must attempt to sample the storm water discharge before it mixes with the non-storm water discharge.

e. Representative Discharge. When a facility has two or more outfalls that, based on a consideration of industrial activity, significant materials, and management practices and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may test the effluent of one of such outfalls and report that the quantitative data also applies to the substantially identical outfalls provided that the permittee

includes in the storm water pollution prevention plan a description of the location of the outfalls and explaining in detail why the outfalls are expected to discharge substantially identical effluent. In addition, for each outfall that the permittee believes is representative, an estimate of the size of the drainage area (in square feet) and an estimate of the runoff coefficient of the drainage area (e.g., low (under 40 percent), medium (40 to 65 percent) or high (above 65 percent)) shall be provided in the plan.

f. Compliance Monitoring

Requirements. Today's permit requires permittees with coal pile runoff associated with steam electric power generation to monitor for the presence of total suspended solids and pH at least annually. These monitoring requirements are necessary to evaluate compliance with the numeric effluent limitation imposed on these discharges. Monitoring shall be performed upon a minimum of one grab sample. All samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. The grab sample shall be taken during the first 30 minutes of the discharge. If the collection of a grab sample during the first 30 minutes is impracticable, a grab sample can be taken during the first hour of the discharge, and the discharger shall submit with the monitoring report a description of why a grab sample during the first 30 minutes was impracticable. Monitoring results shall be submitted on Discharge Monitoring Report Form(s) postmarked no later than the last day of the month following collection of the sample. For each outfall, one Discharge Monitoring Report from must be submitted per storm event sampled. Facilities which discharge through a large or medium municipal separate storm sewer system (systems serving a population of 100,000 or more) must also submit signed copies of discharge monitoring reports to the operator of the municipal separate storm sewer system. Alternative Certification provisions described in Section XI.O.5 do not apply to facilities subject to compliance monitoring requirements in this section. Compliance monitoring is required at least annually for discharges subject to effluent limitations. Therefore, EPA cannot permit a facility to waive compliance monitoring.

g. Quarterly Visual Examination of Storm Water Quality. Quarterly visual examinations of storm water discharges from each outfall are required at steam

electric generating facilities. The examination must be of a grab sample collected from each storm water outfall. The examination of storm water grab samples shall include any observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, or other obvious indicators of storm water pollution. The examination must be conducted in a well lit area. No analytical tests are required to be performed on these samples.

The examination must be made at least once in each quarter of the permit during daylight unless there is insufficient rainfall or snow-melt to runoff. Where practicable, the same individual should carry out the collection and examination of discharges throughout the life of the permit to ensure the greatest degree of consistency possible. Grab samples shall be collected within the first 30 minutes (or as soon thereafter as practical, but not to exceed 60 minutes) of when the runoff begins discharging. Reports of the visual examination include: the examination date and time, examination personnel, visual quality of the storm water discharge, and probable sources of any observed storm water contamination. The visual examination reports must be maintained onsite with the pollution prevention plan.

EPA believes that this quick and simple assessment will allow the permittee to approximate the effectiveness of his/her plan on a regular basis at very little cost. Although the visual examination cannot assess the chemical properties of the storm water discharged from the site, the examination will provide meaningful results upon which the facility may act quickly. The frequency of this visual examination will also allow for timely adjustments to be made to the plan. If BMPs are performing ineffectively, corrective action must be implemented. A set of tracking or follow-up procedures must be used to ensure that appropriate actions are taken in response to the examinations. The visual examination is intended to be performed by members of the pollution prevention team. This hands on examination will enhance the staff's understanding of the storm water problems on that site and effects on the management practices that are included in the plan.

When a discharger is unable to collect samples over the course of the visual examination period as a result of adverse climatic conditions, the discharger must document the reason for not performing the visual examination and retain this documentation onsite with the records

of the visual examinations. Adverse weather conditions which may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricane, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

EPA realizes that if a facility is inactive and unstaffed it may be difficult to collect storm water discharge samples when a qualifying event occurs. Today's final permit has been revised so that inactive, unstaffed facilities can exercise a waiver of the requirement to conduct quarterly visual examination.

Sector O

Steam Electric Power Generating Facilities, Including Coal Handling Areas Permit Language

The Permit Language section contains sector-specific requirements for each industrial sector, including:

- Discharges covered under the sector;
- Special Conditions
- Storm Water Pollution Prevention Plan Requirements;
- Numeric Effluent Limitations, if any; and
- Monitoring and Reporting Requirements.

Further guidance and discussion can be found in the Fact Sheet associated with this sector.

O. Storm Water Discharges Associated With Industrial Activity From Steam Electric Power Generating Facilities, Including Coal Handling Areas

1. Discharges Covered Under This Section

The requirements listed under this section shall apply to storm water discharges from steam electric power generating facilities, including coal handling areas. Non-storm water discharges subject to effluent limitations guidelines are not covered by this permit. Storm water discharges from coal pile runoff subject to numeric limitations are eligible for coverage under this permit, but are subject to the limitations established by 40 CFR 423.

When an industrial facility, described by the above coverage provisions of this section, has industrial activities being conducted onsite that meet the description(s) of industrial activities in another section(s), that industrial facility shall comply with any and all applicable monitoring and pollution prevention plan requirements of the other section(s) in addition to all applicable requirements in this section. The monitoring and pollution prevention plan terms and conditions of this multi-sector permit are additive for industrial activities being conducted at the same industrial facility (co-located industrial activities). The operator of the facility shall determine which other monitoring and pollution prevention plan section(s) of this permit (if any) are applicable to the facility.

a. Limitations on Coverage. Storm water discharges from ancillary facilities such as fleet centers, gas turbine stations, and substations that are not contiguous to a steam electric power generating facility are not covered by this permit. Heat capture co-generation facilities are not covered by this permit; however, dual fuel co-generation facilities are included.

2. Special Conditions

a. Prohibition of Non-storm Water Discharges. Except as provided under Part III.A.2 of this permit, non-storm water discharges are not authorized by this permit. The operators of such discharges must obtain coverage under a separate National Pollutant Discharge Elimination System (NPDES) permit if discharged to waters of the United States or through a municipal separate

storm sewer system. Storm water discharges associated with industrial activities that are mixed with sources of non-storm water are not authorized by this permit, except if mixed with non-storm water discharges that are in compliance with a different NPDES permit or identified by and in compliance with Part III.A.2 (Prohibition of Non-storm Water Discharges) of this permit.

Storm Water Pollution Prevention Plan Requirements

a. Contents of Plan. The plan shall include, at a minimum, the following items:

(1) Pollution Prevention Team. Each plan shall identify a specific individual or individuals within the facility organization as members of a storm water Pollution Prevention Team that are responsible for developing the storm water pollution prevention plan and assisting the facility or plant manager in its implementation, maintenance, and revision. The plan shall clearly identify the responsibilities of each team member. The activities and responsibilities of the team shall address all aspects of the facility's storm water pollution prevention plan.

(2) Description of Potential Pollutant Sources. Each plan shall provide a description of potential sources which may reasonably be expected to add significant amounts of pollutants to storm water discharges or which may result in the discharge of pollutants during dry weather from separate storm sewers draining the facility. Each plan shall identify all activities and significant materials which may potentially be significant pollutant sources. Each plan shall include, at a minimum:

(a) Drainage.

(i) A site map which clearly outlines the locations of the following, as they apply to the facility: The outfall locations and the types of discharges contained in the drainage areas of the outfalls, and an outline of the drainage area of each storm water outfall that is within the facility boundaries (and indicating the direction of storm water flow); processing areas and buildings; treatment ponds; locations where significant materials are exposed to precipitation; storage tanks; scrap yards, and general refuse areas; fuel storage and distribution areas; vehicle and equipment maintenance and storage areas; loading/unloading areas; locations used for treatment, storage or disposal of wastes; location of short and long term storage of general materials (including but not limited to: supplies, construction materials, plant

equipment, oils, fuels, used and unused solvents, cleaning materials, paint, water treatment chemicals, fertilizers, and pesticides); landfills; location of construction sites; locations of stock pile areas (such as coal piles and limestone piles); locations where major spills or leaks identified under Part XI.O.3.a.(2)(c) (Spills and Leaks) of this permit have occurred; surface water bodies; and existing structural control measures to reduce pollutants in storm water runoff (such as bermed areas, grassy swales, etc.).

(ii) For each storm water outfall identify the types of pollutants which are likely to be present in the storm water discharges. Factors to consider include the toxicity of a chemical; quantity of chemicals used, produced or discharged; the likelihood of contact with storm water; and history of significant leaks or spills of toxic or hazardous pollutants. Flows with a significant potential for causing erosion shall be identified.

(b) *Inventory of Exposed Materials*—An inventory of the types of materials handled at the site that potentially may be exposed to precipitation. Such inventory shall include a narrative description of significant materials that have been handled, treated, stored or disposed in a manner to allow exposure to storm water between the time of 3 years prior to the date of the submission of a Notice of Intent (NOI) to be covered under this permit and the present; method and location of onsite storage or disposal; materials management practices employed to minimize contact of materials with storm water runoff between the time of 3 years prior to the date of the submission of a Notice of Intent (NOI) to be covered under this permit and the present; the location and a description of existing structural and nonstructural control measures to reduce pollutants in storm water runoff; and a description of any treatment the storm water receives.

(c) *Spills and Leaks*—A list of significant spills and significant leaks of toxic or hazardous pollutants that occurred at areas that are exposed to precipitation or that otherwise drain to a storm water conveyance at the facility after the date of 3 years prior to the date of the submission of a Notice of Intent (NOI) to be covered under this permit. Such list shall be updated as appropriate during the term of the permit.

(d) *Sampling Data*—A summary of existing discharge sampling data describing pollutants in storm water discharges from the facility, including a summary of sampling data collected during the term of this permit.

(e) *Risk Identification and Summary of Potential Pollutant Sources*—A narrative description of the potential pollutant sources from the following activities: loading and unloading operations; outdoor storage activities; outdoor manufacturing or processing activities; significant dust or particulate generating processes; and onsite waste disposal practices. The description shall specifically list any significant potential source of pollutants at the site and for each potential source, any pollutant or pollutant parameter (e.g., total suspended solids, copper, etc.) of concern shall be identified.

(3) *Measures and Controls*. Each facility covered by this permit shall develop a description of storm water management controls appropriate for the facility, and implement such controls. The appropriateness and priorities of controls in a plan shall reflect identified potential sources of pollutants at the facility. The description of storm water management controls shall address the following minimum components, including a schedule for implementing such controls:

(a) *Good Housekeeping*—Good housekeeping requires the maintenance of areas which may contribute pollutants to storm water discharges in a clean, orderly manner. The following areas must be specifically addressed:

(i) *Fugitive Dust Emissions*—The plan must describe measures that prevent or minimize fugitive dust emissions from coal handling areas. The permittee shall consider establishing procedures to minimize offsite tracking of coal dust. To prevent offsite tracking the facility may consider specially designed tires, or washing vehicles in a designated area before they leave the site, and controlling the wash water.

(ii) *Delivery Vehicles*—The plan must describe measures that prevent or minimize contamination of storm water runoff from delivery vehicles arriving on the plant site. At a minimum the permittee should consider the following:

(a) Develop procedures for the inspection of delivery vehicles arriving on the plant site, and ensure overall integrity of the body or container; and

(b) Develop procedures to deal with leakage or spillage from vehicles or containers, and ensure that proper protective measures are available for personnel and environment.

(iii) *Fuel Oil Unloading Areas*—The plan must describe measures that prevent or minimize contamination of storm water runoff from fuel oil unloading areas. At a minimum the

facility operator must consider using the following measures, or an equivalent:

(a) Use containment curbs in unloading areas;

(b) During deliveries station personnel familiar with spill prevention and response procedures must be present to ensure that any leaks or spills are immediately contained and cleaned up; and

(c) Use spill and overflow protection (drip pans, drip diapers, and/or other containment devices shall be placed beneath fuel oil connectors to contain any spillage that may occur during deliveries or due to leaks at such connectors).

(iv) *Chemical Loading/Unloading Areas*—The plan must describe measures that prevent or minimize the contamination of storm water runoff from chemical loading/unloading areas. Where practicable, chemical loading/unloading areas should be covered, and chemicals should be stored indoors.

At a minimum the permittee must consider using the following measures or an equivalent:

(a) Use containment curbs at chemical loading/unloading areas to contain spills; and

(b) During deliveries station personnel familiar with spill prevention and response procedures must be present to ensure that any leaks or spills are immediately contained and cleaned up.

(v) *Miscellaneous Loading/Unloading Areas*—The plan must describe measures that prevent or minimizes the contamination of storm water runoff from loading and unloading areas. The facility may consider covering the loading area, minimizing storm water runoff to the loading area by grading, berming, or curbing the area around the loading area to direct storm water away from the area, or locate the loading/unloading equipment and vehicles so that leaks can be contained in existing containment and flow diversion systems.

(vi) *Liquid Storage Tanks*—The plan must describe measures that prevent or minimize contamination of storm water runoff from above ground liquid storage tanks. At a minimum the facility operator must consider employing the following measures or an equivalent:

(a) Use protective guards around tanks;

(b) Use containment curbs;

(c) Use spill and overflow protection (drip pans, drip diapers, and/or other containment devices shall be placed beneath chemical connectors to contain any spillage that may occur during deliveries or due to leaks at such connectors); and

(d) Use dry cleanup methods.

(vii) Large Bulk Fuel Storage Tanks—

The plan must describe measures that prevent or minimize contamination of storm water runoff from liquid storage tanks. At a minimum the facility operator must consider employing the following measures, or an equivalent:

(a) Comply with applicable State and Federal laws, including Spill Prevention Control and Countermeasures (SPCC); and

(b) Containment berms.

(viii) The plan must describe measures to reduce the potential for an oil spill, or a chemical spill, or reference the appropriate section of their SPCC plan. At a minimum the structural integrity of all above ground tanks, pipelines, pumps and other related equipment shall be visually inspected on a weekly basis. All repairs deemed necessary based on the findings of the inspections shall be completed immediately to reduce the incidence of spills and leaks occurring from such faulty equipment.

(ix) **Oil Bearing Equipment in Switchyards**—The plan must describe measures to reduce the potential for storm water contamination from oil bearing equipment in switchyard areas. The facility operator may consider level grades and gravel surfaces to retard flows and limit the spread of spills; collection of storm water runoff in perimeter ditches.

(x) **Residue Hauling Vehicles**—All residue hauling vehicles shall be inspected for proper covering over the load, adequate gate sealing and overall integrity of the body or container. Vehicles without load coverings or adequate gate sealing, or with leaking containers or beds must be repaired as soon as practicable.

(xi) **Ash Loading Areas**—Plant procedures shall be established to reduce and/or control the tracking of ash or residue from ash loading areas including, where practicable, requirements to clear the ash building floor and immediately adjacent roadways of spillage, debris and excess water before each loaded vehicle departs.

(xii) **Areas Adjacent to Disposal Ponds or Landfills**—The plan must describe measures that prevent or minimize contamination of storm water runoff from areas adjacent to disposal ponds or landfills. The facility must develop procedures to:

(a) Reduce ash residue which may be tracked on to access roads traveled by residue trucks or residue handling vehicles; and

(b) Reduce ash residue on exit roads leading into and out of residue handling areas.

(xiii) **Landfills, Scrapyards, Surface Impoundments, Open Dumps, General Refuse Sites**—The plan must address landfills, scrapyards, surface impoundments, open dumps and general refuse sites. The permittee is referred to Parts XI.L. and XI.N of the permit for applicable Best Management Practices (BMPs).

(xiv) **Maintenance Activities**—For vehicle maintenance activities performed on the plant site, the permittee shall use the applicable BMPs outlined in Part XI.P. of the permit (Storm Water Discharges Associated With Industrial Activity From Motor Freight Transportation Facilities, Passenger Transportation Facilities, Rail Transportation Facilities, and United States Postal Service Transportation Facilities).

(xv) **Material Storage Areas**—The plan must describe measures that prevent or minimize contamination of storm water from material storage areas (including areas used for temporary storage of miscellaneous products, and construction materials stored in lay down areas). The facility operator may consider flat yard grades, runoff collection in graded swales or ditches, erosion protection measures at steep outfall sites (e.g., concrete chutes, riprap, stilling basins), covering lay down areas, storing the materials indoors, covering the material with a temporary covering made of polyethylene, polyurethane, polypropylene, or hypalon. Storm water runoff may be minimized by constructing an enclosure or building a berm around the area.

(b) **Preventive Maintenance**—A preventive maintenance program shall be implemented and shall include timely inspection and maintenance of storm water management devices (e.g., cleaning oil/water separators, catch basins) as well as inspecting and testing facility equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters, and ensuring appropriate maintenance of such equipment and systems.

(c) **Spill Prevention and Response Procedures**—Areas where potential spills which can contribute pollutants to storm water discharges can occur, and their accompanying drainage points, shall be identified clearly in the storm water pollution prevention plan. Where appropriate, specifying material handling procedures, storage requirements, and use of equipment such as diversion valves in the plan should be considered. Procedures for cleaning up spills shall be identified in

the plan and made available to the appropriate personnel. The necessary equipment to implement a clean up should be available to personnel.

(d) **Inspections**—In addition to or as part of the comprehensive site evaluation required under Part XI.O.3.a.(4) of this section, qualified facility personnel shall be identified to inspect the following areas on a monthly basis: coal handling areas, loading/unloading areas, switchyards, fueling areas, bulk storage areas, ash handling areas, areas adjacent to disposal ponds and landfills, maintenance areas, liquid storage tanks, and long term and short term material storage areas. A set of tracking or follow-up procedures shall be used to ensure that appropriate actions are taken in response to the inspections. Records of inspections shall be maintained onsite. Such records are subject to review by the U.S. Environmental Protection Agency, and State, and local agencies with jurisdiction, and must be retained onsite a minimum of 3 years after the date of the inspection.

(e) **Employee Training**—Employee training programs shall inform personnel responsible for implementing activities identified in the storm water pollution prevention plan or otherwise responsible for storm water management at all levels of responsibility of the components and goals of the storm water pollution prevention plan. Training should address topics such as goals of the pollution prevention plan, spill prevention and control, proper handling procedures for hazardous wastes, good housekeeping and material management practices, and storm water sampling techniques. The pollution prevention plan shall identify periodic dates for such training, but in all cases training must be held at least annually.

(f) **Recordkeeping and Internal Reporting Procedures**—A description of incidents (such as spills, or other discharges), along with other information describing the quality and quantity of storm water discharges shall be included in the plan required under this part. Inspections and maintenance activities shall be documented and records of such activities shall be incorporated into the plan.

(g) **Non-storm Water Discharges.**

(i) The plan shall include a certification that the discharge has been tested or evaluated for the presence of non-storm water discharges. The certification shall include the identification of potential significant sources of non-storm water at the site, a description of the results of any test and/or evaluation for the presence of non-storm water discharges, the

evaluation criteria or testing method used, the date of any testing and/or evaluation, and the onsite drainage points that were directly observed during the test. Certifications shall be signed in accordance with Part VII.G. of this permit. Such certification may not be feasible if the facility operating the storm water discharge associated with industrial activity does not have access to an outfall, manhole, or other point of access to the ultimate conduit which receives the discharge. In such cases, the source identification section of the storm water pollution prevention plan shall indicate why the certification required by this part was not feasible, along with the identification of potential significant sources of non-storm water at the site. A discharger that is unable to provide the certification required by this paragraph must notify the Director in accordance with paragraph XI.O.3.a.(3)(g)(iii) (below).

(ii) Except for flows from fire fighting activities, sources of non-storm water listed in Part III.A.2 (Prohibition of Non-storm Water Discharges) of this permit that are combined with storm water discharges associated with industrial activity must be identified in the plan. The plan shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

(iii) *Failure to Certify*—Any facility that is unable to provide the certification required (testing for non-storm water discharges), must notify the Director by [insert date 270 days after permit issuance] or, for facilities which begin to discharge storm water associated with industrial activity after [insert date 270 days after permit issuance], 180 days after submitting an NOI to be covered by this permit. If the failure to certify is caused by the inability to perform adequate tests or evaluations, such notification shall describe: the procedure of any test conducted for the presence of non-storm water discharges; the results of such test or other relevant observations; potential sources of non-storm water discharges to the storm sewer; and, why adequate tests for such storm sewers were not feasible. Non-storm water discharges to waters of the United States which are not authorized by an NPDES permit are unlawful, and must be terminated.

(h) *Sediment and Erosion Control*—The plan shall identify areas which, due to topography, activities, or other factors, have a high potential for significant soil erosion, and identify structural, vegetative, and/or stabilization measures to be used to limit erosion.

(i) *Management of Runoff*—The plan shall contain a narrative consideration of the appropriateness of traditional storm water management practices (practices other than those which control the generation or source(s) of pollutants) used to divert, infiltrate, reuse, or otherwise manage storm water runoff in a manner that reduces pollutants in storm water discharges from the site. The plan shall provide that measures the permittee determines to be reasonable and appropriate shall be implemented and maintained. The potential of various sources at the facility to contribute pollutants to storm water discharges associated with industrial activity (see Part XI.O.3.a.(2)) shall be considered when determining reasonable and appropriate measures. Appropriate measures may include: vegetative swales and practices, reuse of collected storm water (such as for a process or as an irrigation source), inlet controls (such as oil/water separators), snow management activities, infiltration devices, wet detention/retention devices, or other equivalent measures.

(4) *Comprehensive Site Compliance Evaluation*. Qualified personnel shall conduct site compliance evaluations at appropriate intervals specified in the plan, but in no case less than once a year. Such evaluations shall provide:

(a) Areas contributing to a storm water discharge associated with industrial activity shall be visually inspected for evidence of, or the potential for, pollutants entering the drainage system. Measures to reduce pollutant loadings shall be evaluated to determine whether they are adequate and properly implemented in accordance with the terms of the permit or whether additional control measures are needed. Structural storm water management measures, sediment and erosion control measures, and other structural pollution prevention measures identified in the plan shall be observed to ensure that they are operating correctly. A visual evaluation of equipment needed to implement the plan, such as spill response equipment, shall be made.

(b) Based on the results of the evaluation, the description of potential pollutant sources identified in the plan in accordance with Part XI.O.3.a.(2) of this section (Description of Potential Pollutant Sources) and pollution prevention measures and controls identified in the plan in accordance with Part XI.O.3.a.(3) of this section (Measures and Controls) shall be revised as appropriate within 2 weeks of such evaluation and shall provide for implementation of any changes to the

plan in a timely manner, but in no case more than 12 weeks after the evaluation.

(c) A report summarizing the scope of the evaluation, personnel making the evaluation, the date(s) of the evaluation, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken in accordance with paragraph XI.O.3.a.(4)(b) (above) of the permit shall be made and retained as part of the storm water pollution prevention plan for at least 3 years from the date of the evaluation. The report shall identify any incidents of noncompliance. Where a report does not identify any incidents of noncompliance, the report shall contain a certification that the facility is in compliance with the storm water pollution prevention plan and this permit. The report shall be signed in accordance with Part VII.G. (Signatory Requirements) of this permit.

(d) Where compliance evaluation schedules overlap with inspections required under 3.a.(3)(d), the compliance evaluation may be conducted in place of one such inspection.

4. Numeric Effluent Limitations

Coal pile runoff is subject to the effluent guidelines described in Part V.B. of this permit. However, steam electric generating facilities must comply with the requirement of Part V.B. immediately upon permit issuance. Steam electric generating facilities are not permitted to take 3 years to meet this requirement.

5. Monitoring and Reporting Requirements

a. *Analytical Monitoring Requirements*. During the period beginning [insert date 1 year after permit issuance] lasting through [insert date 2 years after permit issuance] and the period beginning [insert date 3 years after permit issuance] lasting through [insert date 4 years after permit issuance], permittees with steam electric power generating facilities must monitor their storm water discharges associated with industrial activity at least quarterly (4 times per year) during years 2 and 4 except as provided in paragraphs 5.a.(3). (sampling waiver), 5.a.(4). (representative discharge), and 5.a.(5). (alternative certification), steam electric power generating facilities are required to monitor their storm water discharges for the pollutant of concern listed in Table O-1 below. Facilities must report in accordance with 5.b.(reporting). In addition to the parameter listed in Table O-1 below, the permittee shall provide the date and duration (in hours) of the storm event(s)

sampled; rainfall measurements or estimates (in inches) of the storm event which generated the sampled runoff; the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and an estimate of the total volume (in gallons) of the discharge sampled;

TABLE O-1.—MONITORING REQUIREMENTS FOR STEAM ELECTRIC POWER GENERATING FACILITIES

Pollutant of concern	Cut-Off concentration (mg/L ²)
Total Recoverable Iron	1.0

(1) *Monitoring Periods.* Steam electric power generating facilities shall monitor samples collected during the sampling periods of: January through March, April through June, July through September, and October through December for the years specified in paragraph a (above).

(2) *Sample Type.* A minimum of one grab sample shall be taken. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. The required 72-hour storm event interval is waived where the preceding measurable storm event did not result in a measurable discharge from the facility. The required 72-hour storm event interval may also be waived where the permittee documents that less than a 72-hour interval is representative for local storm events during the season when sampling is being conducted. The grab sample shall be taken during the first 30 minutes of the discharge. If the collection of a grab sample during the first 30 minutes is impracticable, a grab sample can be taken during the first hour of the discharge, and the discharger shall submit with the monitoring report a description of why a grab sample during the first 30 minutes was impracticable. If storm water discharges associated with industrial activity commingle with process or nonprocess water, then where practicable permittees must attempt to sample the storm water discharge before it mixes with the non-storm water discharge.

(3) *Sampling Waiver.*

(a) *Adverse Conditions.*—When a discharger is unable to collect samples within a specified sampling period due to adverse climatic conditions, the discharger shall collect a substitute

sample from a separate qualifying event in the next period and submit the data along with data for the routine sample in that period. Adverse weather conditions which may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricane, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

(b) *Low Concentration Waiver.*—When the average concentration for a pollutant calculated from all monitoring data collected from an outfall during the monitoring period [insert date 1 year after permit issuance] lasting through [insert date 2 years after permit issuance] is less than the corresponding value for that pollutant listed in Table O-1 under the column Monitoring Cut-off Concentration, a facility may waive monitoring and reporting requirements in the monitoring period beginning [insert date 3 years after permit issuance] lasting through [insert date 4 years after permit issuance]. The facility must submit to the Director, in lieu of the monitoring data, a certification that there has not been a significant change in industrial activity or the pollution prevention measures in area of the facility which drains to the outfall for which sampling was waived.

(c) When a discharger is unable to conduct quarterly chemical storm water sampling at an inactive and unstaffed site, the operator of the facility may exercise a waiver of the monitoring requirements as long as the facility remains inactive and unstaffed. The facility must submit to the Director, in lieu of monitoring data, a certification statement on the DMR stating that the site is inactive and unstaffed so that collecting a sample during a qualifying event is not possible.

(4) *Representative Discharge.* When a facility has 2 or more outfalls that, based on a consideration of industrial activity, significant materials, and management practices and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may test the effluent of one of such outfalls and report that the quantitative data also applies to the substantially identical outfalls provided that the permittee includes in the storm water pollution prevention plan a description of the location of the outfalls and explaining in detail why the outfalls are expected to discharge substantially identical effluents. In addition, for each outfall that the permittee believes is representative, an

estimate of the size of the drainage area (in square feet) and an estimate of the runoff coefficient of the drainage area (e.g., low (under 40 percent), medium (40 to 65 percent) or high (above 65 percent)) shall be provided in the plan. The permittee shall include the description of the location of the outfalls, explanation of why outfalls are expected to discharge substantially identical effluents, and estimate of the size of the drainage area and runoff coefficient with the Discharge Monitoring Report.

(5) *Alternative Certification.* A discharger is not subject to the monitoring requirements of this section provided the discharger makes a certification for a given outfall, or on a pollutant-by-pollutant basis in lieu of monitoring reports required under paragraph b below, under penalty of law, signed in accordance with Part VII.G. (signatory requirements), that material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, industrial machinery or operations, significant materials from past industrial activity that are located in areas of the facility within the drainage area of the outfall are not presently exposed to storm water and are not expected to be exposed to storm water for the certification period. Such certification must be retained in the storm water pollution prevention plan, and submitted to EPA in accordance with Part VI.C. of this permit. In the case of certifying that a pollutant is not present, the permittee must submit the certification along with the monitoring reports required under paragraph (b) below. If the permittee cannot certify for an entire period, they must submit the date exposure was eliminated and any monitoring required up until that date. This certification option is not applicable to compliance monitoring requirements associated with effluent limitations.

b. *Reporting.* Permittees with steam electric power generating facilities shall submit monitoring results, or a certification that there has not been a significant change in industrial activity or the pollution prevention measures in area of the facility which drains to the outfall for which sampling was waived, obtained during the reporting period beginning [insert date 1 year after permit issuance] lasting through [insert date 2 years after permit issuance] on Discharge Monitoring Report Form(s) postmarked no later than the 31st day of the following March [insert the date 2 years after permit issuance]. Monitoring results, or a certification that there has not been a significant change in

industrial activity or the pollution prevention measures in area of the facility which drains to the outfall for which sampling was waived, obtained during the period beginning [insert date 3 years after permit issuance] lasting through [insert date 4 years after permit issuance] shall be submitted on Discharge Monitoring Report Form(s) postmarked no later than the 31st day of the following March. For each outfall, one signed Discharge Monitoring Report form must be submitted to the Director per storm event sampled. Signed copies of Discharge Monitoring Reports, or said certifications, shall be submitted to the Director of the NPDES program at the address of the appropriate Regional Office listed in VI.G. of the fact sheet to this permit.

(1) *Additional Notification.* In addition to filing copies of discharge monitoring reports in accordance with paragraph b (above) steam electric power generating facilities with at least one storm water discharge associated with industrial activity through a large or medium municipal separate storm sewer system (systems serving a population of 100,000 or more) must submit signed copies of discharge monitoring reports to the operator of the municipal separate storm sewer system in accordance with the dates provided in paragraph b (above).

c. *Compliance Monitoring Requirements.* Permittees with point sources of coal pile runoff associated with steam electric power generation must monitor these storm water discharges for the presence of TSS and for pH at least annually (one time per year). Facilities must report in accordance with 5.c.(2) (reporting). In addition to the parameters listed above, the permittee shall provide the date and duration (in hours) of the storm event(s) sampled; rainfall measurements or estimates (in inches) of the storm event that generated the sampled runoff; the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and an estimate of the total volume (in gallons) of the discharge sampled.

(1) *Sample Type.* A minimum of one grab sample shall be taken. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. The grab sample shall be taken during the first 30 minutes of the discharge. If the collection of a grab sample during the first 30 minutes is impracticable, a grab sample can be

taken during the first hour of the discharge, and the discharger shall submit with the monitoring report a description of why a grab sample during the first 30 minutes was impracticable.

(2) *Reporting.* Permittees with asphalt paving or roofing emulsion production facilities shall submit monitoring results obtained during the reporting period beginning [insert date of permit issuance] on Discharge Monitoring Report Form(s) postmarked no later than the last day of the following [insert month after permit issuance date]. Signed copies of Discharge Monitoring Reports shall be submitted to the Director of the NPDES program at the address of the appropriate Regional Office indicated in Part VI.B. of this permit. For each outfall one Discharge monitoring form shall be submitted per storm event sampled.

(3) *Additional Notification.* In addition to filing copies of discharge monitoring reports in accordance with paragraph (2) (above), permittees that discharge through a large or medium municipal separate storm sewer system (systems serving a population of 100,000 or more) must submit signed copies of discharge monitoring reports to the operator of the municipal separate storm sewer system in accordance with the dates provided in paragraph (3) (above).

d. *Quarterly Visual Examination of Storm Water Quality.* Facilities shall perform and document a visual examination of a storm water discharge associated with industrial activity from each outfall, except discharges exempted below. The examination must be made at least once in each designated period [described in paragraph (1) below] during daylight hours unless there is insufficient rainfall or snow melt to produce a runoff event.

(1) Examinations shall be conducted in each of the following periods for the purposes of visually inspecting storm water quality associated with storm water runoff or snow melt: January through March; April through June; July through September; and October through December.

(2) Examinations shall be made of samples collected within the first 30 minutes (or as soon thereafter as practical, but not to exceed one hour) of when the runoff or snowmelt begins discharging. The examination must be conducted in a well lit area. No analytical tests are required to be performed on the samples. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable

(greater than 0.1 inch rainfall) storm event. Where practicable the same individual should carry out the collection and examination of discharges for entire permit term.

(3) Visual examination reports must be maintained on-site in the pollution prevention plan. The report shall include the examination date and time, examination personnel, the nature of the discharge (i.e., runoff or snow melt), visual quality of the storm water discharge including observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of storm water pollution, and probable sources of any observed storm water contamination.

(4) When a facility has two or more outfalls that, based on a consideration of industrial activity, significant materials, and management practices and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may collect a sample of effluent of one of such outfalls and report that the examination data also applies to the substantially identical outfalls provided that the permittee includes in the storm water pollution prevention plan a description of the location of the outfalls and explaining in detail why the outfalls are expected to discharge substantially identical effluents. In addition, for each outfall that the permittee believes is representative, an estimate of the size of the drainage area (in square feet) and an estimate of the runoff coefficient of the drainage area (e.g., low (under 40 percent), medium (40 to 65 percent) or high (above 65 percent)) shall be provided in the plan.

(5) When a discharger is unable to collect samples over the course of the visual examination period as a result of adverse climatic conditions, the discharger must document the reason for not performing the visual examination and retain this documentation with the records of the visual examination. Adverse weather conditions which may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricane, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

(6) When a discharger is unable to conduct visual storm water examinations at an inactive and unstaffed site, the operator of the facility may exercise a waiver of the monitoring requirement as long as the facility

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remains inactive and unstaffed. The facility must maintain a certification with the pollution prevention plan stating that the site is inactive and unstaffed so that performing visual examinations during a qualifying event is not feasible.

Sector N

Scrap Recycling and Waste Recycling Facilities Fact Sheet

Fact Sheets include a general discussion of the issues and pollutants specific to each industrial sector, including a summary of the data used to formulate the Multi-Sector General Permit. Fact Sheet topics include:

- Discharges Covered Under the Sector;
- Industry Profile;
- Associated Storm Water Pollutants;
- Pollution Control Options;
- Special Conditions;
- Storm Water Pollution Plan Requirements;
- Monitoring and Reporting Requirements; and
- Numeric Effluent Limitations, if any.

The Fact Sheet is not to be used as the basis for permit compliance. Sector-specific Permit Language, immediately following this Fact Sheet, provides specific detail for permit compliance.

N. Storm Water Discharges Associated With Industrial Activity From Scrap Recycling and Waste Recycling Facilities

1. Industry Profile

Specific requirements have been established for those facilities that are engaged in the processing, reclaiming and wholesale distribution of scrap and recyclable waste materials. As background, the storm water regulations define 11 categories of storm water discharges associated with industrial activity in 40 CFR 122.26(b)(14).

Category (vi) includes facilities that are engaged in the recycling of materials, including metal scrapyards, battery reclaimers, and salvage yards, including but limited to those classified Standard Industrial Classification (SIC) 5093. For purposes of this section, special conditions have been included for those facilities engaged in the reclaiming and retail/wholesale distribution of used

motor vehicle parts identified as SIC 5015 in Part XI.M.

SIC 5093 includes establishments engaged in assembling, breaking up, sorting and the wholesale distribution of scrap and recyclable waste materials including bag, bottle and box wastes, fur cuttings, iron and steel scrap, metal and nonferrous metal scrap, oil, plastics, rags, rubber, textiles, waste paper, aluminum and tin cans, and rag wastes. For purposes of this permit, the term waste recycling facility applies to those facilities that receive a mixed wastestream of non-recyclable and recyclable wastes. The term recycling facility applies to those facilities that receive only source-separated recyclable materials primarily from non-industrial and residential sources. For purposes of this permit the term recycling facility also applies to those facilities commonly identified as material recovery facilities (MRF).

Part XI.N of the permit is segregated into three separate classes of recycling facilities: (1) scrap recycling and waste recycling facilities (non-liquid recyclable wastes); (2) liquid recyclable waste facilities; and (3) recycling facilities. Each of these three classes of recycling facilities have separate pollution prevention plan and monitoring requirements. EPA further clarifies that battery reclaimers engaged in the breaking up of used lead-acid batteries are not eligible for coverage under this permit. Facilities that participated in U.S. Environmental Protection Agency (EPA) Group Permit Applications 195, 274, 467, 596, 647 (except facilities identified as SIC 4212), 826, 1035, 1145 and 1204 are eligible for coverage under this section.

When an industrial facility, described by the above coverage provisions of this section, has industrial activities being conducted onsite that meet the description(s) of industrial activities in another section(s), that industrial facility shall comply with any and all applicable monitoring and pollution prevention plan requirements of the other section(s) in addition to all applicable requirements in this section. The monitoring and pollution prevention plan terms and conditions of this multi-sector permit are additive for industrial activities being conducted at the same industrial facility (co-located industrial activities). The operator of the facility shall determine which other monitoring and pollution prevention plan section(s) of this permit (if any) are applicable to the facility.

2. Pollutants Found in Storm Water Discharges

This fact sheet is organized into three major subsections: scrap and waste recycling facilities (nonliquid wastes); industrial activities engaged in reclaiming and recycling liquid wastes, e.g., used oils, solvents, mineral spirits and antifreeze; and recycling facilities (including material recovery facilities) that receive only source-separated recyclable materials primarily from non-industrial and residential sources including waste paper, newspaper, glass bottles, plastic containers, aluminum and tin cans, and cardboard. Industrial operations and BMPs associated with these three groups are dissimilar enough to warrant establishing separate permit conditions for each group. Therefore, conditions for each of these three groups are identified separately.

a. Scrap and Waste Recycling Facilities (SIC 5093) (nonliquid recyclable wastes). The scrap recycling and waste recycling industry reclaims, processes and provides wholesale distribution of a diversity of materials and products. Typical recyclable materials include ferrous and nonferrous metals, paper, cardboard, animal hides, glass and plastic. Inbound recyclable materials are processed onsite in order to achieve a uniform grade product that meets a particular manufacturer's specifications. A significant inventory of processing equipment is frequently required to process recyclable waste material into a uniform grade. Processing equipment typically employ enormous physical forces such as shearing, shredding, and compacting in the process of eventually achieving a desired uniform grade product.

Individual scrap and waste recycling facilities may process one or more types of recyclable materials at a single site. Depending on the requirements of a manufacturer, recyclable waste materials, e.g., paper and cardboard, may need to be stored under cover to prevent deterioration. The bulk size of the recyclable waste materials and the processing equipment associated with these facilities frequently necessitates stockpiling materials and equipment outdoors. Consequently, there is significant opportunity for exposure of storm water runoff to pollutants. The extent of material potentially exposed to storm water runoff is illustrated in the following table based on information provided from one group application consisting of approximately 1,100 members.

TABLE N-1.—PERCENTAGE OF APPLICANTS IN ONE GROUP APPLICATION THAT PROVIDE COVER OVER MATERIALS OR PROCESSES

Material/processes	Percent of applicants
Ferrous Materials	6.6
Nonferrous Materials	53
Glass/plastic/paper	14
Other Materials	1.7
Material Processing Equipment	43

There are at least four types of activities that are common to most scrap and waste recycling facilities, they include: scrap waste material stockpiling, material processing, segregating processed materials into uniform grades, and collecting nonrecyclable materials for disposal. This fact sheet outlines pollutants of concern associated with each of these types of activities. Other operations of concern, including vehicle and equipment maintenance, are also discussed in this fact sheet.

(1) Pollutants Associated With Material Stockpiling. During material stockpiling, including unloading and loading areas, the potential exists for some types of inbound recyclable materials to deposit residual fluids on the ground. Used automotive engines, radiators, brake fluid reservoirs, transmission housings, and lead-acid from batteries may contain residual fluids that, if not properly managed, can eventually come in contact with storm water runoff. For example, sampling data from two group applications indicated the presence of oil and grease in 103 individual grab samples. In response to other Federal and State environmental regulations, such as the Resource Conservation and Recovery Act (RCRA), many scrap recycling and waste recycling facilities have instituted inspection and supplier education programs to minimize or eliminate the amount of inbound recyclable materials containing fluids and other potentially hazardous materials prior to their acceptance. Part XI.N.3.a.(3)(a)(i) of today's permit imposes conditions that will make an inbound recyclable materials inspection program part of the pollution prevention plan.

Another concern of outdoor stockpiling, including unloading and loading areas, is associated with deterioration of materials. Metal surfaces that are stockpiled for extended periods may be subject to corrosion. Corrosion is the deterioration of metal surfaces that typically results in the loss of metal to a solution, i.e., water. The following metals are referred to as the

galvanic (or electromotive) series and have a tendency to corrode and become soluble in water; magnesium, aluminum, cadmium, zinc, steel or iron, cast iron, chromium, tin, lead, nickel, soft and silver solder, copper, stainless steel, silver, gold, platinum, brass and bronze. For some metals, the extent and rate of corrosion is dependent on whether it occurs in an oxygen-starved or oxygen-abundant atmosphere.

Corrosion of stockpiled materials at scrap recycling facilities is a potential source of pollutants given that metals such as copper, lead, nickel, zinc,

chromium and cadmium were frequently detected in sampling data. In addition, the majority of these metals are associated with recyclable materials handled by the scrap recycling industry. Part XI.N.3.a.(3) of today's permit identifies BMP options to address these sources.

Another significant material of concern is the acceptance and temporary storage of scrap lead acid batteries from automotive vehicles and equipment. If a battery casing becomes cracked or damaged, special precautions are necessary to ensure that the contents

do not come in contact with storm water runoff. This includes battery terminals with visible corrosion. In all cases, used batteries shall be handled and stored in such a manner as to prevent exposure to either precipitation or runoff. Part XI.N.3.a.(3) addresses conditions for these sources.

The following table presents a list of typical materials that may be received and processed at a scrap and waste recycling facility and which may be potential pollutant sources if they are not managed properly.

TABLE N-2.—SIGNIFICANT MATERIALS POTENTIALLY EXPOSED TO STORM WATER RUNOFF AT SCRAP AND WASTE RECYCLING FACILITIES¹

Significant materials	Potential sources	Pollutants of concern
White goods (appliances)	Leaking oil-filled capacitors, ballasts, leaking compressors, pumps, leaking pressure vessels, reservoirs, sealed electrical components and chipped or deteriorated painted surfaces.	PCBs, oil, lubricants, paint pigments or additives such as lead, and other heavy metals.
Ferrous and nonferrous turnings and cuttings ... Materials from demolition projects	Cutting oil residue, metallic fines Deteriorated/damaged insulation, chipped painted surfaces, lead, copper, and steel pipes.	Oil, heavy metals. Asbestos fibers, lead, copper, zinc, cadmium, other metals, TKN.
Electrical components, transformers, switch gear, mercury float switches, sensors.	Leaking oil-filled transformer casings, oil-filled switch, float switches, radioactive materials in gauges, sensors.	PCBs, oils, mercury, ionizing radioactive isotopes.
Fluorescent lights, light fixtures	Leaking ballasts	PCBs, oil.
Food/beverage dispensing equipment	Leaking fluorescent light ballasts, chipped painted surfaces.	PCBs, oil, heavy metals from paint pigments and additives.
Hospital and dental waste and equipment	Drums/containers of hospital waste, shielding from diagnostic and other medical equipment, radioactive materials from gauges, sensors and diagnostic equipment.	Infectious/bacterial contamination, lead, ionizing radioactive isotopes.
Instruments	Radioactive material from thickness gages	Ionizing radioactive isotopes.
Insulated wire	Insulation and other coatings, wire	Lead, zinc, copper.
Lawnmowers, snowmobiles, motorcycles	Leaking engines, transmissions, fuel, oil reservoirs, leaking batteries.	Oils, transmission and brake fluids, fuel, grease, battery acid, lead acid.
Light gage materials	Deteriorating insulation, painted surfaces and other coatings.	Asbestos, lead, chromium.
Locomotives, rail cars	Leaking fuel reservoirs, fittings, hydraulic components, engines, bearings, compressors, oil reservoirs, worn brake pads, damaged insulation.	PCBs, diesel fuel, hydraulic oil, oil, brake fluid, grease from fittings, asbestos.
Motor vehicle bodies, engines, transmissions, exhaust systems.	Leaking fuel tanks, oil reservoirs, transmission housings, brake fluid reservoir and lines, brake cylinders, shock absorber casing, engine coolant, wheel weights, leaking battery casings/housings and corroded terminals, painted surfaces and corrosion inhibitors, exhaust system, catalytic converters.	Fuel, benzene, oil, hydraulic oil, transmission fluids, brake fluids, ethylene glycol (anti-freeze), lead, lead acid, lead oxides, cadmium, zinc, other heavy metals.
Miscellaneous machinery and obsolete equipment.	Leaking reservoirs, damaged or chipped painted surfaces/coatings.	Fuel, oil, lubricants, lead, cadmium, zinc.
Pipes/materials from chemical and industrial plants.	Chemical residue, insulation, lead piping, chipped or damaged painted surfaces and protective coatings.	Chemical residue, oil, lubricants, damaged insulation (asbestos), lead, cadmium, zinc, copper.
Sealed containers, hydraulic cylinders	Leaking liquid reservoirs, containers, cylinders, miscellaneous chemicals.	Oil, PCBs, solvents, chemical residue.
Salvaged construction materials	Chemical residues, oils, solvents, lubricants, damaged insulation, chipped painted surfaces and protective coatings.	Chemical residue, oily wastes, asbestos, lead, cadmium, zinc.
Tanks, containers, vessels, cans, drums	Leaking or damaged containers	Chemical residue, oily wastes, petroleum products, heating oil.
Transformers (oil filled)	Leaking transformer housings	PCBs, oil.

¹ Institute of Scrap Recycling Industries, Inc.'s "Environmental Operating Guidelines." (April 1992)

(2) **Material Processing.** The type of processes employed at a particular facility depends on the type of recyclable and waste material. Typical processes include: torch cutting, shredding, baling, briquetting, wire stripping and chopping, and compacting. Processes such as shredding and shearing reduce the bulk size of recyclable scrap and waste into a size that is more easily transportable and which allows separation into uniform grades based on manufacturer specifications. Processes such as shredding of automotive bodies include a means of segregating materials into their ferrous and nonferrous fractions.

Process equipment at scrap recycling and waste recycling facilities are also potential sources of pollutants in storm water runoff. The sources of concern will be discussed separately. Scrap process equipment such as shearers are often actuated by a hydraulic system. Components such as hydraulic reservoirs, hydraulic pumps, motors, cylinders, control valves, accumulators, filters, and fittings are prone to leaking hydraulic fluid. Some hydraulic machinery also require frequent

lubrication of cutting and wear surfaces. Storm water runoff exposure to hydraulic fluids and other lubricants is very likely unless adequate source control measures such as good housekeeping, preventive maintenance, diversion and/or containment are provided.

Stationary process equipment also produce a substantial amount of residual particulate material that tends to accumulate on and around the equipment, particularly rotating machinery, moving parts, bearings, conveyors and at the output of the equipment, e.g., storage containers. Particulate material that accumulates can become a source of contamination if it comes in contact with both precipitation and storm water runoff. Other sources of residual particulate and waste material include air pollution equipment, material handling equipment and processing equipment. In the case of shredding equipment, there are typically three (3) separate material streams produced. Shredded material is ultimately separated into its ferrous and nonferrous fractions, and a third stream referred to as fluff. The fluff

material consists of a heterogeneous mix of materials including, but not limited to, small metal fragments, plastics, rubber, wood and textiles. After the material exits the shredder (hammermill), it typically enters an air classification system that separates the lightweight fraction, e.g., particulates, from the more dense fraction. The ferrous metal fraction is then separated from the nonferrous fraction and fluff by the use of a magnetic separator (typically a belt- or drum-type magnetic separator). The separated material may be collected in a hopper or it may accumulate on the ground. If recyclable and nonrecyclable waste material is allowed to accumulate on the ground, a greater potential exists for this material to come in contact with either precipitation or storm water runoff.

The scrap and recycling industry uses a diversity of processes to reclaim and recycle materials that can contribute pollutants to storm water runoff. The following table presents a list of typical scrap equipment operations which are potential pollutant sources.

TABLE N-3.—TYPICAL PROCESS AND EQUIPMENT OPERATIONS THAT ARE LIKELY SOURCES OF POLLUTANTS¹

Activity	Potential sources	Pollutants of concern
Air Pollution Equipment (including incinerators, furnaces, wet scrubbers, filter houses, bag houses).	Normal equipment operations that include the collection and disposal of filter bag material and ash, process wastewater from scrubbers, accumulation of particulate matter around leaking joint connections, malfunctioning pumps and motors, e.g., leaking gaskets, seals or pipe connections, leaking oil-filled transformer casings.	Hydraulic fluids, oils, fuels, grease and other lubricants, accumulated particulate matter, chemical additives, PCBs from oil-filled electrical equipment.
Combustion Engines	Spills and/or leaks from fueling tanks, spills/leaks from oil/hydraulic fuel reservoirs, faulty/leaking hose connections, worn gaskets, leaking transmission crankcases and brake systems (if applicable), leaking battery casings and/or corroded terminals.	Accumulated particulate matter, oil/lubricants, fuel (gas/diesel), fuel additives, antifreeze (ethylene glycol), battery acid, products of incomplete combustion.
Material Handling Systems (forklifts, cranes, conveyors).	Normal operations including spills and leaks from fuel tanks, hydraulic and oil reservoirs due to malfunction parts, e.g., worn gaskets and parts, leaking hose connections, and faulty seals. Damaged or faulty electrical switches (mercury filled) Damaged or leaking battery casings, including exposed corroded battery terminals. Damaged or worn bearing housings.	Hydraulic fluids, oils, fuels and fuel additives, grease and other lubricants, accumulated particulate matter, chemical additives, mercury, lead, battery fluids.
Stationary Scrap Processing Facilities (balers, briquetters, shredders, shearers, compactors, engine block/cast iron breakers, wire chopper, turnings crusher).	Normal equipment operations including leaks from hydraulic reservoirs, hose and fitting connections, worn gaskets, spills or leaks from fuel tanks, particulates/residue from scrap processing, malfunctioning pumps and motors, e.g., leaking gaskets, seals or pipe connections, leaking oil-filled transformer casings.	Heavy metals, e.g., zinc, copper, lead, cadmium, chromium, hydraulic fluids.
Hydraulic equipment and systems, balers/briquetter, shredders, shearers, compactors, engine block/cast iron breaker, wire chopper, turnings crusher.	Particulate/residue from material processing, spills and/or leaks from fueling tanks, spills/leaks from oil/hydraulic fuel reservoirs, faulty/leaking hose connections/fittings, leaking gaskets.	Hydraulic fluids/oils, lubricants, particulate matter from combustion engines, PCBs (oil-filled electrical equipment components), heavy metals (nonferrous, ferrous).

TABLE N-3.—TYPICAL PROCESS AND EQUIPMENT OPERATIONS THAT ARE LIKELY SOURCES OF POLLUTANTS¹—Continued

Activity	Potential sources	Pollutants of concern
Electrical Control Systems (transformers, electrical switch gear, motor starters).	Oil leakage from transformers, leakage from mercury float switches, faulty detection devices.	PCBs, mercury (float switches), ionizing radioactive material (fire/smoke detection systems).
Torch cutting	Residual/accumulated particulates	Heavy metal fragments, fines.

¹ Institute of Scrap Recycling Industries, Inc.'s "Environmental Operating Guidelines." (April 1992)

(3) *Segregation of Processed Materials into Uniform Grades.* Processing, e.g., shearing, shredding, baling, etc., of recyclable materials is followed by its segregation into uniform grades to meet a particular manufacturer's specifications. If segregated recyclable material remains exposed to precipitation, the potential still exists for storm water contamination.

(4) *Disposal of Nonrecyclable Waste Materials.* During recycling of scrap and waste materials, a significant fraction of nonrecyclable waste materials is generated and must be disposed of properly. The volume or quantity of material that remains nonrecyclable may be too large to allow covered storage prior to shipment. Consequently, nonrecyclable waste materials may be left exposed to both precipitation and runoff and, therefore, they are a likely source of storm water pollutants.

(5) *Other Operations of Concern.* There are a number of activities of concern that frequently occur at scrap and waste recycling facilities including,

heavy vehicle traffic over unstabilized areas, vehicle maintenance and fueling, and material handling operations. Operations associated with the receipt, handling, and processing of scrap and waste material frequently occur over areas that are not stabilized to prevent erosion. Unless specific measures or controls are provided to either prevent erosion or trap the sediment, this material will be carried away in storm water runoff and eventually exit the site. Suspended solids are of significant concern given the potential amount of unstabilized area and the significant amount of particulate matter that is often produced at these facilities. For example, many facilities use spray water for dust control on heavily traveled areas. Both organic and inorganic pollutants can become bound up or absorbed to suspended solids in runoff. For this reason, today's proposed permit identifies conditions to minimize the contribution of suspended solid loadings from these facilities.

Some scrap and waste recycling facilities may also conduct vehicle maintenance onsite. Although vehicle maintenance frequently occurs indoors, there are specific activities which could contribute pollutants to storm water. This includes washdown of vehicle maintenance areas, leaks or spills of fuel, hydraulic fluids and oil and outdoor storage of lubricants, fluids, oils and oily rags. Fueling stations are also frequently located outdoors without any roof cover. Activities such as topping off fuel tanks, or overfilling storage tanks (without high-level alarms or automatic shut-offs) are also activities that can cause contamination of runoff. Vehicle washing can result in accumulated residue material being discharged to a storm sewer system.

The following table highlights activities associated with vehicle maintenance and material handling that are potential sources of storm water contamination.

TABLE N-4.—OTHER POTENTIAL POLLUTANT SOURCE ACTIVITIES

Activity	Potential sources	Pollutants of concern
Material Handling Systems (forklifts, cranes, conveyors).	Spills and/or leaks from fueling tanks, spills/leaks from oil/hydraulic fuel reservoirs, faulty/leaking hose connections/fittings, leaking gaskets.	Accumulated particulate matter (ferrous and nonferrous metals, plastics, rubber, other), oil/lubricants, PCBs (electrical equipment), mercury (electrical controls), lead/battery acids.
Vehicle Maintenance	Parts cleaning, waste disposal of rags, oil filters, air filters, batteries, hydraulic fluids, transmission fluids, brake fluids, coolants, lubricants, degreasers, spent solvents.	Fuel (gas/diesel), fuel additives, oil/lubricants, heavy metals, brake fluids, transmission fluids, chlorinated solvents, arsenic.
Fueling Stations	Spills and leaks during fuel transfer, spills due to "topping off" tanks, runoff from fueling areas, washdown of fueling areas, leaking storage tanks, spills of oils, brake fluids, transmission fluids, engine coolants.	Gas/diesel fuel, fuel additives, oil, lubricants, heavy metals.
Vehicle and Equipment Cleaning and Washing	Washing and steam cleaning	Solvent cleaners, oil/lubricants/additives, anti-freeze (ethylene glycol).

(6) *Pollutants Found in Storm Water Discharges.* Sampling data provided in part 2 of the group application process revealed that storm water discharges from scrap and waste recycling facilities contain pollutants such as heavy metals, Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), TSS, nutrients and oil and grease. The following table summarizes the statistical analysis of sampling data provided in part 2 group applications. Table N-6 provides a comparison of a selected subset of these pollutants to benchmark concentrations.

TABLE N-5.—SUMMARY STATISTICS FOR SCRAP AND WASTE RECYCLING FACILITIESⁱ (SIC 5093) (Nonliquid Recyclable Waste Materials.) All units in mg/L unless otherwise noted

Pollutant Sample type	No. of samples		Mean		Minimum		Maximum		Median		99th Percentile	
	Grab	Comp ⁱⁱ	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp
pH (std units)	136	N/A	N/A	N/A	4.93	N/A	10.2	N/A	N/A	N/A	9.58	N/A
BOD ₅	131	120	23.49	24	0.00	0.00	330.0	360	9.0	9.0	330.0	330.0
COD	131	117	251.33	204	0.00	0.00	1588.0	2400	120.0	110.0	1323	1014
TSS	131	116	437.11	375	0.00	0.00	3894	6042	148.0	84.5	3100	4860
Nitrate + Nitrite N	130	117	1.76	5.9	0.00	0.00	84.0	220.0	0.61	0.80	28	129.0
TKN	132	114	3.44	3.4	0.00	0.00	43.0	39.0	2.05	2.20	25	22.0
Oil and Grease	136	N/A	8.95	N/A	0.00	N/A	85.0	N/A	5.0	N/A	69	N/A
Total P	133	114	0.81	0.77	0.00	0.00	36.0	29.0	0.29	0.28	4.7	10.0
Total Pb	103	100	0.85	0.84	0.00	0.00	8.70	13.00	0.205	0.215	4.9	11.00
Total Cd	75	73	0.02	0.02	0.000	0.000	0.10	0.65	0.0074	0.005	0.069	.65
Total Cu	102	99	0.77	0.60	0.000	0.000	12.0	8.20	0.26	0.22	5.98	8.2
Total Zn	97	94	3.16	3.2	0.028	0.000	22.0	38.0	1.50	1.4	22.0	38.0
Total Cr	103	100	0.08	0.122	0.000	0.000	2.10	2.60	0.03	0.02	0.547	2.3
Total Fe	5	5	25.4	9.80	0.8	0.0	74.0	20.0	10.0	14.0	72.7	19.8
Total Ni	94	93	0.202	0.21	0.001	0.000	5.80	7.30	0.05	0.040	5.8	7.3
Arsenic	9	8	0.038	0.019	0.00	0.00	0.170	0.90	0.005	0.005	0.170	0.090
Total Al	5	3	4.86	3.327	.68	.68	10.0	7.6	4.0	1.70	10.0	7.6
PCB-1016	27	26	0.001	0.051	0.001	0.001	0.010	1.30	0.001	0.001	0.010	1.3
PCB-1221	26	24	0.001	0.001	0.001	0.000	0.010	0.001	0.001	0.001	0.010	0.001
PCB-1232	28	26	0.001	0.001	0.001	0.000	0.010	0.001	0.001	0.001	0.010	0.001
PCB-1242	27	26	0.001	0.047	0.000	0.000	0.010	1.30	0.001	0.001	0.010	1.3
PCB-1248	26	24	0.003	0.005	0.000	0.000	0.025	0.078	0.001	0.001	0.025	0.078
PCB-1254	28	26	0.001	0.001	0.000	0.000	0.010	0.006	0.001	0.001	0.010	0.006
PCB-1260	28	26	0.002	0.049	0.001	0.000	0.011	1.30	0.001	0.001	0.011	1.3

ⁱ Applicants that did not report the units of measurement for the reported values were not included in these statistics.ⁱⁱ Composite samples.

TABLE N-6.—COMPARISON SAMPLING DATA FOR SELECTED PARAMETERS VERSUS BENCHMARK CONCENTRATIONS (MG/L)

Pollutant Sample type	Mean		Maximum		Median		Bench- mark
	Grab	Comp	Grab	Comp	Grab	Comp	
COD	251	204	1588	2400	120	110	120
TSS	437	375	3894	6042	148	84.5	100
Total Pb	0.85	0.84	8.70	13.00	0.205	0.215	0.0816
Total Cu	0.77	0.60	12.0	8.20	0.26	0.22	0.0636
Total Fe	25.4	9.80	74.00	20.00	10.00	14.00	1.0
Total Al	4.86	3.327	10.0	7.6	4.0	1.70	0.075
Total Zn	N/A	3.2	22.0	38.0	1.5	1.4	0.065

b. Waste Recycling Facilities (SIC 5093)—(Liquid Recyclable Wastes). This subsection applies to those facilities engaged in the reclaiming and recycling of liquid wastes such as "spent solvents," "used oil," and "used ethylene glycol" typically identified under SIC 5093. This subsection is particularly applicable to those facilities that participated in EPA group application number 195. EPA received a single group application in this category of waste recycling facilities. The following is a profile of industrial activities and the types of significant materials associated with facilities participating in this group activity.

Group application number 195 included 220 facilities of which 214 were classified as service centers. Service centers accumulate spent solvent, used oil and antifreeze, filter

cartridges and still bottoms contaminated with dry cleaning solvents (typically perchloroethylene), and used lacquer thinner from paint gun cleaning machines. The typical service center has individual containers with storage capacity of up to 10,000 gallons each, and tanks with storage capacity of up to 20,000 gallons each. Service centers are typically limited to a maximum of 6 tanks (a total of 120,000 gallons). Twenty (20) of the service centers also function as accumulation centers where they have a maximum storage capacity of 70,000 gallons of liquid materials in containers. None of the containers are opened except under conditions where a container begins to leak or is damaged.

The group application also included four (4) facilities that operated only as container transfer stations and do not

operate storage tanks. These facilities are largely enclosed warehouses that provide secondarily contained storage areas. Three (3) facilities were identified as used oil depots where only oily water and/or used oil are accumulated in storage tanks. Storage tanks are limited to a maximum capacity of 20,000 gallons each. Used oil is transported to the facility in tanker trucks (3,500 gallons) and shipped out in tanker trucks (7,500 gallons). The used oil is ultimately transported to a processing or re-refining facility (not covered under this section). The following table summarizes the percentage of facilities with significant materials stored.

TABLE N-7. SIGNIFICANT MATERIALS REPORTED IN GROUP APPLICATION NUMBER 195

Significant materials	Percent of facilities
Mineral Spirits	98
Immersion Cleaner	98
Dry Cleaner Solvents	98
Paint Solvents	83
Industrial Solvents	81
Spent Antifreeze	59
Used Oil	57
Allied Products	98

The types of materials identified in Table N-7 are potential sources of storm water runoff contamination. Since these

materials are stored and transported in individual drums and bulk storage tanks, the potential exists for spills and/or leaks during all phases of waste transport, waste transfer, container/drum handling and shipping.

There are a number of operations at these facilities that have significant potential to release pollutants to the environment if recyclable waste materials are not managed properly. Potential sources of pollutants are discussed in Part XI.N.3.a.(2) of today's permit. However, in response to other Federal and State environmental regulations, such as RCRA and 40 CFR Part 112 (Oil Pollution Prevention), facilities in this group application

currently employ a range of the BMPs and structural controls that also benefit storm water quality. Typical measures and controls for controlling pollutants for facilities in this subsection are presented in Part XI.N.3.a.(3)(b).

(1) *Waste Material Handling and Storage.* Given the nature and type of materials stored and handled at these facilities, the potential exists for accidental spills and leaks. Consequently, the types of activities that occur at these facilities which could potentially result in contamination of storm water runoff is also of concern to EPA. The following table is a list of activities which may result in a release of pollutants.

TABLE N-8. TYPES OF POTENTIAL POLLUTANT-CAUSING ACTIVITIES AT WASTE RECYCLING FACILITIES THAT HANDLE LIQUID RECYCLABLE WASTES

Activity	Potential sources of pollutants	Pollutants of concern
Drum/Individual Container Storage and Handling.	Leaks or spills due to faulty container/drum integrity, e.g., leaking seals or ports. Container materials incompatible with waste material. Improper stacking and storage of containers.	Mineral spirits, industrial solvents, immersion cleaners, dry cleaner solvents, paint solvents, spent antifreeze.
Return and Fill Stations	Leaks, spills, or overflows from tanker truck transfer of wastes and hose drainage. Leaking pipes, valves, pumps, worn or deteriorated gaskets or seals.	Mineral spirits, industrial solvents, immersion cleaners, dry cleaner solvents, paint solvents, spent antifreeze.
Individual Container/Drum Storage Improper Stacking and Storage of Containers.	Leaks or spills due to faulty container/drum integrity, e.g., leaking seals or ports.	Mineral spirits, industrial solvents, immersion cleaners, dry cleaner solvents, paint solvents, spent antifreeze.
Storage Tank Operations	Overfill of storage tanks, leaking pipes, valves, worn or deteriorated pumps seals. Leaking underground storage tanks.	Mineral spirits, industrial solvents, immersion cleaners, dry cleaner solvents, paint solvents, spent antifreeze.
Material Handling Equipment	Leaking fuel lines, worn gaskets, leaking hydraulic lines and connections.	Fuel, hydraulic fluid, oil and grease.

(2). *Other Activities of Concern.* The following table highlights other types of activities that are potential sources of storm water contamination.

TABLE N-9. OTHER POTENTIAL SOURCES OF STORM WATER CONTAMINATION

Activity	Potential sources of pollutants	Pollutants of concern
Vehicle and Equipment Maintenance (if applicable).	Replacement of fluids such as transmission and brake fluids, antifreeze, oil and other lubricants, washdown of maintenance areas, dumping fluids down floor drains connected to storm sewer system, outside storage of fluids and oily rags and waste material.	Oil and grease, fuel, accumulated particulate matter, antifreeze.
Vehicle or Equipment Washing (if applicable) ...	Wash water or steam cleaning	Oil, detergents, chlorinated solvents, suspended solids and accumulated particulate matter.

(3). *Pollutants Found in Storm Water Discharges.* Based on data provided in group application sampling information, pollutants that were most frequently reported included TSS, BOD, COD, nitrite plus nitrate, oil and grease. The following table provides a statistical summary of data.

TABLE N-10. SUMMARY STATISTICS FOR WASTE RECYCLING FACILITIESⁱ (SIC 5093)—(RECYCLABLE LIQUID WASTES). ALL VALUES IN MG/L

Parameter Sample type	# of Samples		Mean		Min		Max		Median		99th percentile	
	Grab	Comp ⁱⁱ	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp
BOD ₅	22	17	18	9	2	2	94	48	5	5	79	38

TABLE N-10. SUMMARY STATISTICS FOR WASTE RECYCLING FACILITIES¹ (SIC 5093)—(RECYCLABLE LIQUID WASTES). ALL VALUES IN MG/L—Continued

Parameter Sample type	# of Samples		Mean		Min		Max		Median		99th percent- ile	
	Grab	Comp ⁱⁱ	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp
COD	22	17	133	83	12	5	660	400	45	45	449	320
TSS	21	16	51	28	5	5	500	84	28	20	68	59
Nitrite + Nitrate	22	17	0.90	0.78	0.05	0.05	3.70	3.50	0.61	0.38	3.45	3.29
TKN	22	17	3.1	2.0	1.0	1.0	11.0	6.0	1.5	1.0	9.9	5.7
Oil and Grease	22	N/A	1.8	N/A	1.0	N/A	5.0	N/A	1.5	N/A	4.0	N/A

¹ Applicants that did not report the units of measurement for the reported values were not included in these statistics.

ⁱⁱ Composite samples.

c. *Recycling Facilities.* This particular group of recycling facilities is distinguished from scrap recycling facilities and waste recycling facilities that accept a mixed wastestream of non-recyclable and recyclable wastes. Facilities included in this sub-sector would include only those facilities that receive source-separated, recyclable materials primarily from non-industrial and residential sources. This includes source-separated material recovery facilities (MRF). EPA Group Applications 274, 647, 826, and 1145 included significant numbers of facilities that would fall within this sub-sector. The recyclable materials in this sub-sector can be characterized as common consumer products such as paper, newspaper, cardboard, plastic containers, glass bottles, aluminum and tin cans. These facilities commonly accept a mix of recyclable materials and reject non-recyclable materials at the source.

(1) *Pollutant-Causing Activities Associated with Recycling Facilities.* There are basically four areas associated with these facilities that are potential sources of pollutants, they include: (1) Inbound recyclable materials; (2) outdoor material storage; (3) indoor storage and material processing; and (4) vehicle maintenance. The potential exists that recycling facilities may unknowingly accept nonrecyclable materials and/or small quantities of

household hazardous wastes (HHW). If these materials are not handled, stored or disposed of properly, they could become potential pollutant sources. Recycling facilities are already aware of this issue and have commonly instituted practices to minimize accepting such materials. These practices include public education brochures, training of curbside pick-up drivers, and rejecting non-recyclable materials at the source.

Outdoor material storage is another issue of concern given the practice of storing degradable, recyclable products outdoors such as bales of wastepaper and various types of recyclable containers containing residual fluids, e.g., beverage containers. Wastepaper exposed to weather will deteriorate and can be a source of oxygen-demanding substances. For example, biochemical oxygen demand (BOD) concentrations as high as 152 mg/l were measured at facilities that store wastepaper outdoors. Similarly, recycling facilities that stored unprocessed aluminum beverage containers outdoors can be a contaminant source of oxygen-demanding substances. BOD concentrations as high as 460 mg/l were measured at recycling facilities that store unprocessed recyclable containers outdoors.

The third area of concern is indoor processing and storage. EPA is primarily concerned with the potential for illicit connections or improper dumping to

floor drains that discharge to a storm sewer system. Another potential source of contamination is the practice of washing down tipping floor areas and allowing the washwater to drain to the storm sewer system. EPA believes that these issues can be readily addressed by disconnecting floor drains to the storm sewer, good housekeeping practices and providing routine employee training. The practice of allowing tipping floor washwaters to discharge to a storm sewer system is prohibited under this permit.

The last area of concern is vehicle maintenance. Onsite vehicle maintenance was infrequently reported in group permit applications. Although vehicle maintenance frequently occurs indoors, the following specific activities could contribute pollutants to storm water: washdown of vehicle maintenance areas, leaks or spills of fuel, hydraulic fluids, lubricants, and other fluids, and exposed oils and oily rags. Fueling areas may lack roof cover, consequently, topping off fuel tanks or overfilling storage tanks (without high-level alarms) could contribute to contamination of surface runoff. Vehicle washing can result in accumulated residue material being discharged to a storm sewer system. The following tables identify significant materials that are exposed to precipitation or runoff based on information from two group applications (274 and 647).

TABLE N-11.—SIGNIFICANT MATERIALS REPORTED IN GROUP APPLICATION NO. 274

Significant materials	Percent of facilities ¹	Pollutant-causing activities
Paper Stock	43	Outdoor exposure could result in deterioration of paper.
Wood Pallets	83	Residual materials on pallets.
Recyclable Waste Paper in Bales	83	Outdoor exposure could result in deterioration of paper.
Recyclables Plastic, Glass, and Aluminum	30	Residual fluids from containers.
Gasoline/Diesel Fuel (outside pumps)	28	Leaks or spills. Overtopping during fueling.

¹ Column totals greater than 100% because many facilities have one or more of these significant materials exposed.

TABLE N-12.—Significant Materials Reported in Group Application No. 826

Significant materials	Percent of facilities ⁱ	Pollutant-causing activity
Wood Pallets	64	Residual materials on pallets.
Waste Paper	27	Outdoor exposure could result in deterioration of paper.
Recyclable Waste Paper in Bales	41	Outdoor exposure could result in deterioration of paper.
Gasoline/Diesel Fuel (outside pumps)	55	Leaks or spills. Overtopping during fueling.
Lubricating Fluids	14	Leaks or spills.

ⁱ Column totals greater than 100% because many facilities have one or more of these significant materials exposed.

EPA has established special pollution prevention plan requirements for recycling facilities that receive only source-separated recyclable materials. Specific requirements are discussed in Part XI.N.3.a.(3)(c) of the permit.

(2) Pollutants Found in Storm Water Discharges.

Based on data provided in group applications 274, 647, 826, and 1145, pollutants that were most frequently

reported included TSS, BOD, COD, nitrite plus nitrate, TKN, total phosphorus, oil and grease, and total aluminum (group 1145 only). The table N-13 provides a statistical summary of data.

TABLE N-13.—SUMMARY STATISTICS FOR SELECTED RECYCLING FACILITIESⁱ (SIC 5093) (GROUP APPLICATIONS 247, 647, 826, AND 1145) ALL UNITS IN mg/L UNLESS OTHERWISE NOTED

Pollutant, Sample type	# of Samples	Comp ⁱⁱ	Mean		Minimum		Maximum		Median		95th percentile	
			Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp
	Grab											
BOD ₅			31	22	0	0	460	220	31	22	78	75
COD			179	118	0	0	1200	940	73	43	1005	441
TSS			495	383	0	0	7440	4860	73	40	1731	2754
Nitrate + Nitrite												
N			0.60	0.76	0	0	13	69	0.41	0.37	1.61	1.33
TKN			1.48	1.78	0	0	6.90	16.85	1.01	0.79	6.12	7.30
Oil and Grease			9.4	0.7	0	0	69.0	13.0	3.0	0.0	32.4	4.9
Total P			0.22	0.19	0	0	7.60	2.20	0.22	0.19	2.17	1.14
Total Al ⁱⁱⁱ			5.51	1.55	0	0	44.0	5.40	1.20	0.90	26.00	4.80

ⁱ Applicants that did not report the units of measurement for the reported values were not included in these statistics.

ⁱⁱ Composite samples.

ⁱⁱⁱ Values reported for Group Application No. 1145.

3. Options for Controlling Pollutants

a. Scrap and Waste Recycling Facilities (SIC 5093) (Nonliquid recyclable waste materials). This section addresses source control measures, BMPs and structural controls that are specifically applicable to the scrap recycling facilities (SIC 5093) and waste recycling facilities (SIC 5093) and which are engaged in the reclaiming and recycling of solid materials such as ferrous and nonferrous metals, plastics,

paper, glass and cardboard and automotive parts.

The BMPs described in this subsection are specifically applicable to scrap recycling and waste recycling facilities. Scrap recycling and waste recycling facilities applying for coverage under Part XI.N. of today's permit shall employ a broad and comprehensive range of BMPs and source control measures to minimize and/or eliminate the diversity of pollutants associated with scrap processing operations. In instances where facilities conduct

certain operations indoors or under cover, a determination will be made by the owner/operator of the facility as to the applicability of these BMPs and source control measures to these particular activities.

The following table summarizes alternative source control measures, nonstructural BMPs (BMPs), and structural controls that are associated with and applicable to scrap and waste processing facilities (SIC 5093) (nonliquid recyclable materials).

TABLE N-14.— SUMMARY OF ALTERNATIVE BMP OPTIONS FOR SCRAP AND WASTE RECYCLING PROCESSING FACILITIES

Activity	BMP alternatives
Inbound Recyclable and Waste Material Control.	Establish program to encourage suppliers of scrap, waste and other salvageable materials to drain residual fluids prior to arrival at the facility. Establish acceptance program for handling, storage and disposal of lead-acid batteries. Establish procedures for rejecting or handling, storing and disposal of hazardous wastes and other nonhazardous residual fluids. Establish procedures to properly handle industrial turnings and cuttings and prohibiting cutting oils and metallic fines from coming in contact with runoff. Identify inspector training requirements.
Outside Scrap Material Storage: (liquids)	Conduct inspections for fluids, e.g., oils, transmission fluids, antifreeze, brake fluid, and fuels. Establish handling/ storage/disposal procedures for these materials.

TABLE N-14.— SUMMARY OF ALTERNATIVE BMP OPTIONS FOR SCRAP AND WASTE RECYCLING PROCESSING FACILITIES—Continued

Activity	BMP alternatives
Outside Scrap Material Storage: (bulk solid materials).	Drain and collect liquids in a designated area. Provide covered storage or impervious areas with curbing/berms or other appropriate containment. Stored liquid materials in covered areas or impervious areas with curbing/berms or other appropriate measure. Establish spill prevention procedures. Provide adequate supply of materials for dry clean up of spills or leaks. Prevent runoff into liquid storage areas. Store liquid wastes in materially compatible containers. Minimize/eliminate the accumulation of liquid wastes. Establish procedures if hazardous wastes are discovered after material accepted. Conduct periodic inspections of storage areas. Conduct preventative maintenance of BMPs as necessary. Minimize runoff from coming into areas where significant materials are stored, e.g., diversion structures such as curbing, berms, containment trenches, surface grading, and elevated concrete pads or other equivalent measure. Use adsorbents to collect leaking or spills of oil, fuel, transmission and brake fluids, e.g., dry absorbent, drip pans. Install media filters such as catch basin filters and sand filters. Install oil/water separator in storage areas with vehicle transmissions and engines. Locate spill plans under stored vehicles. Provide nonrecyclable waste storage bins and containers. Conduct periodic inspections. Conduct preventative maintenance as necessary. Provide equipment operator training to minimize damage to controls, e.g., curbing and berms. Identify/provide supplier training or information bulletins on requirements for acceptance of lightweight materials.
Storage Other: (lightweight materials)	Encourage supplier participation in program to minimize/eliminate, as practicable, volume of semi-solid and liquid residues in recyclable materials, e.g., residual fluids in aluminum and plastic containers. Provide covered storage, container bins or equivalent for lighter-weight materials such as glass, plastics, aluminum cans, paper, cardboard. Minimize/eliminate residue from bottles, containers, etc. from coming in contact with runoff. Establish dry clean up methods. Establish procedures and employee training for the handling, storage and disposal of residual fluids from small containers. Prohibit washdown of tipping floor areas. Provide good housekeeping to eliminate particulate and residual materials buildup. Establish cleaning schedule for high traffic areas. Provide covered disposal containers or equivalent for residual waste materials. Eliminate floor drains discharging to storm sewer.
Scrap Processing Operations:	Provide training to equipment operators on how to minimize exposure of runoff to scrap processing areas. Schedule frequent cleaning of accumulated fluids and particulate residue around all scrap processing equipment. Schedule frequent inspections of equipment for spills or leakage of fluids, oil, fuel, hydraulic fluids. Conduct routine preventive maintenance of equipment per original manufacturer's equipment (OME) recommendations. Replace worn or malfunctioning parts. Site process equipment on elevated concrete pads or provide runoff diversion structures around process equipment, berms, containment trenches or surface grading or other equivalent measure. Discharge runoff from within bermed areas to a sump, oil/water separator, media filter or discharge to sanitary sewer. Conduct periodic maintenance and clean out of all sumps, oil/water separators, media filters. Dispose of residual waste materials properly, e.g., according to RCRA. Provide curbing, dikes, and berms around scrap processing equipment to prevent contact with runoff. Where practicable, locate process equipment e.g., balers, briquetters, small compactors, under an appropriate cover. Provide cover over hydraulic equipment and combustion engines. Provide dry-clean up materials, e.g., dry-adsorbents, drip pans, absorbent booms, etc. to prevent contact of hydraulic fluids, oils, fuels, etc., with storm water runoff. Provide alarm, pump shutoff, or sufficient containment for hydraulic reservoirs in the event of a line break. Stabilize high traffic areas, e.g., concrete pads, gravel, pavement, around processing equipment, where practicable. Provide site gages or overfill protection devices for all liquid and fuel storage reservoirs and tanks. Establish spill prevention and response procedures, including employee training. Provide containment bins or equivalent for shredded material, especially lightweight materials such as fluff (preferably at the discharge of these materials from the air classification system).
Supplies for Process Equipment	Locate storage drums containing liquids, including oils and lubricants indoors. Alternatively, site palletized drums and containers on an impervious surface and provide sufficient containment around the materials. Provide sumps, oil/water separators, if necessary.

TABLE N-14.— SUMMARY OF ALTERNATIVE BMP OPTIONS FOR SCRAP AND WASTE RECYCLING PROCESSING FACILITIES—Continued

Activity	BMP alternatives
Scrap lead acid battery Program	Conduct periodic inspections of containment areas and containers/drums for corrosion. Perform preventive maintenance of BMPs, as necessary. Instruct employees on proper material handling and storage procedures. Establish inspection and acceptance procedures for scrap lead-acid batteries. Provide supplier training on acceptance practices for scrap batteries. Provide employee training on the safe handling, storage and disposition of scrap batteries. Separate all scrap batteries from other scrap materials. Store scrap batteries under cover or equivalent. Establish procedures for the storage, handling, disposition of cracked or broken batteries in accordance with applicable Federal regulations, e.g., RCRA. Establish procedures to collect and dispose of leaking battery acid according to Federal regulations, e.g., RCRA.
Vehicle and Equipment Maintenance	Provide covered storage or equivalent to prevent exposure to either precipitation or runoff. Establish an inventory of materials used in the maintenance shop that could become a potential pollutant source with storm water runoff, e.g., fuels, solvents, oils, lubricants. Store and dispose of oily rags, filters (oil and air), batteries, engine coolant, transmission fluid, use oil, brake fluid, and solvents in a manner that minimizes potential contact with runoff and in compliance with State and Federal regulations. Label and track recycling of waste materials, e.g., batteries, solvent, used oil. Drain oil filters before disposal or recycling. Drain all fluids from all parts or components that will become scrap material or secondhand parts. Store liquid waste materials in compatible containers. Store and dispose used batteries in accordance with scrap lead acid battery program. Disconnect all floor drains connected to storm sewer system. Prohibit non-storm water discharges, e.g., dumping of used liquids down floor drains and washdown of maintenance areas. Provide employee training on appropriate storage and disposal of waste materials. Provide good housekeeping measures. Conduct inspections of work areas for compliance with BMPs.
Fueling	Use spill and overflow protection devices. Provide high level alarm on fuel storage tanks. Minimize/eliminate runoff onto fueling areas. Reduce exposure of fueling areas to precipitation by covering the fueling area. Provide dry adsorbents to clean up fuel spills. Conduct periodic inspections of fueling areas. Instruct personnel on proper fueling procedures. Provide curbing or posts around fuel pumps to prevent collisions during vehicle ingress and egress.
Vehicle and Equipment Washing	Avoid washing vehicles and equipment outdoors. Use biodegradable, phosphate free detergents. Recycle wash water. Provide vehicle wash rack with dedicated sediment trap. Use autoshut-off valves on washing equipment.
Outdoor vehicle parking and storage	Use drip pans under all equipment and vehicles waiting maintenance. Cover vehicle and equipment storage areas. Conduct inspections of storage and parking areas for leaks and filled drip pans. Provide employee training.
Vehicle and Equipment Painting (where applicable).	Keep paint and solvents away from traffic areas. Conduct sanding and painting in nonexposed areas, e.g., under cover, in accordance with OSHA standards. Cleanup accumulated particulate matter. Minimize overspraying parts. Dispose or recycle paint, solvents and thinner properly. Provide training to employees.
Erosion and Sediment Control	Conduct periodic inspections of paint spraying areas. Minimize runoff from adjacent properties, e.g., diversion dikes, berms, or equivalent. Trap sediment at downgradient locations and outlets serving unstabilized areas. This may include filter fabric fences, gravel outlet protection, sediment traps, vegetated or riprap swales, vegetated strips, diversion structures, catch-basin filters, retention/detention basins or equivalent. Runoff containing oil and grease may include the use of absorbent booms or sand filters in front of outlet structures or other equivalent measures. Stabilize all high traffic areas, including all vehicle entrances and exit points. Conduct periodic sweeping of all traffic areas. Conduct inspections of BMPs. Perform preventative maintenance as needed on BMPs. Provide employee training on the proper installation and maintenance of erosion and sediment controls.

b. Waste Recycling Facilities (SIC 5093)—(recyclable liquid wastes). This section addresses source control measures, BMPs, and structural controls that are specifically applicable to waste recycling facilities (SIC 5093) which are engaged in such activities as reclaiming and recycling of liquid wastes such as spent solvents, used oil, and used antifreeze (ethylene glycol). Waste

recycling facilities applying for coverage under Part XI.N. of today's proposed permit will be required to employ a comprehensive range of BMPs and source control measures to minimize contact of pollutants with storm water runoff and precipitation. In instances where facilities conduct certain operations indoors or under cover, a determination will be made by the

owner/operator of the facility as to the applicability of these BMPs and source control measures to their particular facility. The following table summarizes the percent breakdown of BMPs that were reported by applicants participating in group application number 195.

TABLE N-15.—TYPES OF BMPs REPORTED IN EPA GROUP APPLICATION NUMBER 195

BMP	Percent of facilities
Secondary Containment (includes tanks, piping, and return/fill stations)	70
Containment Trench (includes closed loop containment trenches with sumps, sloped floors, and/or berms)	91
Roof (includes canvass tent roofs and enclosed structures)	7
Contingency Plan (serves as Spill Prevention and Countermeasures Control Plan)	100
Prevention and Preparedness Plan (includes inspection information and general housekeeping procedures)	100

The following table summarizes types of BMPs, and structural control options that are applicable to liquid waste recycling facilities.

TABLE N-16.—TYPES OF BMP OPTIONS APPLICABLE TO LIQUID WASTE RECYCLING FACILITIES

Activity	BMP alternatives
Individual Drum/Container Storage	Ensure container/drums are in good condition. Store waste materials in materially compatible drums. Use containers that meet National Fire Protection Association (NFPA) guidelines. Put individual containers on pallets. Limit stack height of individual containers/drums. Provide straps, plastic wrap, or equivalent around stacked containers to provided stability. Label/mark drums. Segregate hazardous and flammable wastes. Comply with NFPA guidelines for segregation of flammable wastes. Provide adequate clearance to allow material movement and access by material handling equipment. Provide semipermanent or permanent cover over wastes. Provide adequate clearance between stored materials to allow movement and handling. Establish clean up procedures, including the use of dry adsorbents, in the event of spills or leaks. Prohibit washing down of material storage areas. Disconnect or seal all floor drains from storm sewer system. Develop spill prevention, countermeasures and control (SPCC) procedures for all liquid container storage areas. Ensure employees are familiar with SPCC procedures. Schedule/conduct periodic employee training. Provide secondary containment, dikes, berms, containment trench, sumps, or other equivalent measure, in all storage areas.
Bulk Liquid Storage	Use welded pipe connections versus flange connections. Inspect all flange gaskets for deterioration. Apply corrosion inhibitors to exposed metal surfaces. Provide high level alarms for storage tanks. Provide redundant piping, valves, pumps, motors, as necessary, at all pumping stations. Provide manually activated shutoff valves in the event of spill. Install visible and/or audible alarms in the event of a spill. Install manually activated drainage valves, or equivalent, versus flapper-type drain valves. Provide adequate security against vandalism and tampering. Provide secondary containment around all bulk storage tanks, including berms, dikes, surface impoundments or equivalent. Ensure surfaces of secondary containment areas are adequately sealed to prevent leaks. Provide stationary boxes around all return and fill stations to eliminate/minimize hose drainage and minor waste transfer spills.
Waste Transfer Areas	Provide secondary containment or equivalent measures around all liquid waste transfer facilities. Provide cover over liquid waste transfer areas. Establish clean up procedures for minor spills including the use of dry adsorbents.
Inspections	Conduct inspections of all material storage, handling and transfer areas. Document signs of corrosion, worn parts or components on pumps and motors, leaking seals and gaskets. Conduct periodic nondestructive testing (NDT) of all bulk storage tanks for signs of deteriorating structural integrity.
Preventive Maintenance	Conduct periodic preventive maintenance of all structural controls, replace worn parts on components on valves, pumps, motors per manufacturer's recommendations.
Vehicle Maintenance (if applicable)	Establish an inventory of materials used in the maintenance shop that could become a potential pollutant source with storm water runoff, e.g., fuels, solvents, oils, lubricants.

TABLE N-16.—TYPES OF BMP OPTIONS APPLICABLE TO LIQUID WASTE RECYCLING FACILITIES—Continued

Activity	BMP alternatives
Vehicle Cleaning (if applicable)	Store and dispose of oily rags, filters (oil and air), batteries, engine coolant, transmission fluid, use oil, brake fluid, and solvents in a manner that minimizes potential contact with runoff and in compliance with State and Federal regulations. Label and track recycling of waste materials, e.g., batteries, solvent, used oil. Drain oil filters before disposal or recycling. Drain all fluids from all parts or components that will become scrap material or secondhand parts. Store liquid waste materials in compatible containers. Store and dispose used batteries in accordance with scrap lead acid battery program. Disconnect all floor drains connected to storm sewer system. Prohibit non-storm water discharges, e.g., dumping of used liquids down floor drains and washdown of maintenance areas. Provide employee training on appropriate storage and disposal of waste materials. Provide good housekeeping measures. Conduct inspections of work areas for compliance with BMPs. Avoid washing vehicles and equipment outdoors. Use biodegradable, phosphate free detergents. Recycle wash water. Provide vehicle wash rack with dedicated sediment trap. Use autoshut-off valves on washing equipment.
Training	Provide employee training on proper material handling and storage procedures. Require familiarization with applicable SPCC measures.

c. Recycling Facilities (SIC 5093). This section addresses best management practices that have been employed by

one or more facilities within group applications 274, 647, 826, and 1145. The following table provides examples

of BMPs used by the recycling facilities within this sub-section:

TABLE N-17.—Types of BMP Options Applicable to Recycling Facilities

Activity	BMP options and alternatives
Inbound Recyclable Materials Control	Provide public education brochures on acceptable recyclable materials. Educate curbside pick-up drivers on acceptable materials. Reject unacceptable materials at the source. Employee training.
Indoor Storage	Provide totally-enclosed drop-off containers for public. Store equivalent of the average daily volume of recyclable materials indoors. Provide good housekeeping. Disconnect all floor drains from storm sewer system. Prohibit illicit discharges and illegal dumping to floor drains that are connected to the storm sewer.
Recyclable Material Processing	Direct tipping floor washwaters to sanitary sewer system if permitted by local sanitary authority. Conduct processing operations indoors. Clean up residual fluids. Conduct routine preventive maintenance on all processing equipment. Schedule frequent good housekeeping to minimize particulate and residual materials buildup.
Outdoor Storage	Store only processed materials, i.e., baled plastic and aluminum and glass cullet. Provide containment pits with sumps pumps that discharge to sanitary sewer system. Prevent discharge of residual fluids to storm sewer. Provide dikes and curbs around bales of waste paper. Use tarpaulins or covers over bales of wastepaper.
Residual Non-recyclable Materials	Conduct regularly scheduled sweeping of storage areas to minimize particulate buildup. Store residual non-recyclable materials in covered containers for transport to a proper disposal facility.
Vehicle Maintenance	Bale residual non-recyclable materials and cover with tarpaulin or equivalent. Avoid washing equipment and vehicles outdoors.
Fueling	Eliminate outdoor maintenance areas. Establish spill prevention and clean-up procedures. Provide dry-absorbent materials or equivalent. Provide employee training, i.e., avoid topping off fuel tanks.
Lubricant Storage	Divert runoff from fueling areas. Eliminate or minimize outside storage. Provide employee training on proper handling, storage. Divert runoff from storage areas.

4. Discharges Covered under this Section

The requirements listed under this section are applicable to storm water

discharges from facilities typically identified in SIC 5093 (except for battery reclaimers and auto salvage yards). This includes facilities that are

engaged in the processing, reclaiming and wholesale distribution of scrap and waste materials such as ferrous and nonferrous metals, paper, plastic,

cardboard, glass. For purposes of this permit, the term waste recycling facility applies to those facilities within SIC 5093 that receive a mixed wastestream of recyclable and non-recyclable wastes. Facilities that are engaged in reclaiming and recycling liquid wastes such as used oil, antifreeze, mineral spirits and industrial solvents and which are classified SIC 5093 are also covered under this section. The term recycling facility is used in this permit to those facilities that only receive source-separated recyclable materials primarily from non-industrial and residential sources, e.g., common consumer products including paper, newspaper, glass, cardboard, plastic containers, aluminum and tin cans.

5. Special Conditions

The following section identifies special conditions that are applicable to permittees applying for coverage under Part XI.N. of today's permit.

a. Prohibition of Non-storm Water Discharges. This section requires scrap and waste recycling facilities that are typically classified in SIC 5093 to certify that certain non-storm water discharges are not occurring at their facilities. A list of non-storm water discharges that are not authorized by this section has been identified. These discharges are prohibited due to the likelihood these discharges will contain substantial pollutant concentrations. The following non-storm water discharges are not authorized by this section: waste discharges to floor drains or sinks connected to the facilities storm sewer or storm drainage system; water originating from vehicle and equipment washing; steam cleaning wastewater; process wastewaters; washwater originating from cleaning tipping floor areas or material receiving areas that discharge to any portion of a storm sewer system; wastewater from wet scrubbers; boiler blowdown; noncontact and contact cooling water; discharges originating from dust control spray water; discharges from oil/water separators and sumps in the absence of a storm event; discharges originating from the cleaning out of oil/water separators or sumps; and non-storm water discharges from turnings containment areas.

The operators of non-storm water discharges must seek coverage for these discharges under a separate National Pollutant Discharge Elimination System (NPDES) permit if discharging to either a municipal separate storm sewer system or to waters of the United States. If such a permit has been issued, the plan shall identify the NPDES permit number and a copy of the NPDES permit

shall be located at the facility and shall be readily accessible. If a permit application has been submitted for a non-storm water discharge, the plan shall be annotated accordingly and a copy of the application shall be located at the facility and shall be readily accessible.

For facilities that have prohibited discharges identified under this section and which discharge to a sanitary sewer system, the facility operator is required to take the appropriate notification actions as may be required by the operator of the sanitary sewer system. Any relevant documentation, i.e., notification letters and approvals, shall be kept with the plan. For facilities that have been issued an industrial user permit under the pretreatment program for discharges prohibited under this section, the plan shall identify the appropriate NPDES permit number and a copy of the permit shall be kept at the facility and shall be readily accessible. EPA strongly recommends that operators keep copies of relevant documentation concerning non-storm water discharges and NPDES permits with the plan.

6. Storm Water Pollution Prevention Plan Requirements

a. Contents of the Plan. In addition to the supplemental information requirements identified in Part VI.C., scrap and waste recycling facilities in SIC 5093 are required to provide the additional information applicable to their industrial sector. The storm water pollution prevention plan is broken out into three subcategories; scrap recycling and waste recycling facilities (nonliquid materials); waste recycling facilities (liquid materials); and recycling facilities.

(1) Description of Potential Pollutant Sources

(a) Scrap Recycling and Waste Recycling Facilities (nonliquid recyclable wastes)—This section establishes that scrap recycling and waste recycling facilities shall provide the following information in their pollution prevention plan.

(i) Inbound Recyclable and Waste Material Control Program—The plan shall include a recyclable and waste material inspection program to minimize the likelihood of receiving non-recyclable materials (e.g., hazardous materials) that may be significant pollutant sources to storm water discharges. At a minimum, the plan shall address the following:

Information/education measures to encourage major suppliers of scrap and recyclable waste materials to drain residual fluids, whenever applicable,

prior to its arrival at the facility. This includes vehicles and equipment engines, radiators, and transmissions, oil-filled transformers, white goods (appliances) and individual containers or drums;

Activities which accept scrap and materials that may contain residual fluids, e.g., automotive engines containing used oil, transmission fluids, etc., shall describe procedures to minimize the potential for these fluids from coming in contact with either precipitation or runoff. The description shall also identify measures or procedures to properly store, handle, dispose and/or recycle these residual fluids;

Procedures pertaining to the acceptance of scrap lead-acid batteries. Additional requirements for the handling, storage and disposal or recycling of batteries shall be in conformance with conditions for a scrap lead-acid battery program, see below;

A description of training requirements for those personnel engaged in the inspection and acceptance of inbound recyclable materials; and

Liquid wastes, including used oil, shall be stored in materially compatible and nonleaking containers and disposed or recycled in accordance with all requirements under the Resource Recovery and Conservation Act (RCRA), and other State or local requirements.

(ii) Scrap and Waste Material Stockpiles (outdoors)—The plan shall address areas where significant materials are exposed to either storm water runoff or precipitation. The plan must describe those measures and controls used to minimize contact of storm water runoff with stockpiled materials. The plan should include measures to minimize the extent of storm water contamination from these areas. The operator shall consider (within the plan) the use of the following BMPs (either individually or in combination) or their equivalent to minimize contact with storm water runoff:

Diversion devices or structures such as dikes, berms, containment trenches, culverts and/or surface grading;

Media filtration such as catch basin filters and sand filters;

Silt fencing; and,

Oil/water separators, sumps and dry adsorbents in stockpile areas that are potential sources of residual fluids, e.g., automotive engine storage areas.

The operator may consider the use of permanent or semipermanent covers, or other similar forms of protection over stockpiled materials where the operator determines that such measures are reasonable and appropriate.

The operator may consider the use of sediment traps, vegetated swales and/or vegetated strips to facilitate settling or filtering out of pollutants and sediment.

(iii) *Stockpiling of Turnings Previously Exposed to Cutting Fluids (outdoors)*—The plan shall address all areas where stockpiling of industrial turnings (previously exposed to cutting fluids) occurs. The plan shall implement those measures necessary to minimize contact of surface runoff with residual cutting fluids. The operator shall consider implementation of either of the following two alternatives or a combination of both or equivalent measures:

Alternative 1: Storage of all turnings previously exposed to cutting fluids under some form of permanent or semi-permanent cover. Discharges of residual fluids from these areas to the storm sewer system in the absence of a storm event is prohibited. Discharges to the storm sewer system as a consequence of a storm event is permitted provided the discharge is first directed through an oil/water separator or its equivalent. Procedures to collect, handle, and dispose or recycle residual fluids that may be present shall be identified in the plan.

Alternative 2: Establish dedicated containment areas for all turnings that have been exposed to cutting fluids where runoff from these areas is directed to a storm sewer system, providing the following:

Containment areas constructed of either concrete, asphalt or other equivalent type of impermeable material;

A perimeter around containment areas to prevent runoff from moving across these areas. This would include the use of shallow berms, curbing, or constructing an elevated pad or other equivalent measure;

A suitable drainage collection system to collect all runoff generated from within containment areas. At a minimum, the drainage system shall include a plate-type oil/water separator or its equivalent. The oil/water separator or its equivalent shall be installed according to the manufacturer's recommended specifications, whenever available, specifications will be kept with the plan;

A schedule to maintain the oil/water separator (or its equivalent) to prevent the accumulation of appreciable amounts of fluids. In the absence of a storm event, no discharge from containment areas to the storm sewer system are permitted unless the discharge is covered by a separate NPDES permit; and

Identify procedures for the proper disposal or recycling of collected residual fluids.

(iv) *Scrap and Waste Material Stockpiles (covered or indoors)*—The plan shall address, at a minimum, measures and controls to minimize and, whenever feasible, eliminate residual liquids and particulate matter from materials stored indoors from coming in contact with surface runoff. The operator shall consider including in their plan: good housekeeping measures to collect residual liquids from aluminum, glass and plastic containers and prohibiting the practice of allowing washwater from tipping floors or other indoor processing areas from discharging to a storm sewer system, inspections to ensure that material stockpile areas with existing floor drains are not connected to the storm sewer system or any portion of the storm sewer system, and the disconnection of any floor drains to the storm drainage system.

(v) *Scrap and Recyclable Waste Processing Areas*—The plan shall address areas where scrap and recyclable waste processing equipment are sited. This includes measures and controls to minimize surface runoff from coming in contact with scrap processing equipment. In the case of processing equipment that generate visible amounts of particulate residue, e.g., shredding facilities, the plan shall describe good housekeeping and preventive maintenance measures to minimize contact of runoff with residual fluids and accumulated particulate matter. At a minimum, the operator shall consider including the following:

A schedule of periodic inspections of equipment for leaks, spills, malfunctioning, worn or corroded parts or equipment; preventive maintenance program to repair and/or maintain processing equipment; measures to minimize shredder fluff from coming in contact with surface runoff; use of dry-absorbents or other cleanup practices to collect and to dispose or recycle spilled or leaking fluids; and installation of low-level alarms or other equivalent protection devices on unattended hydraulic reservoirs over 150 gallons in capacity. Alternatively, provide secondary containment with sufficient volume to contain the entire volume of the reservoir.

The operator shall consider using the following types of BMPs:

(a) Diversion structures such as dikes, berms, culverts, containment trenches, elevated concrete pads, grading to minimize contact of storm water runoff with outdoor processing equipment;

(b) Oil/water separators or sumps in processing areas that are potential sources of residual fluids and grease;

(c) Permanent or semipermanent covers, or other similar measures;

(d) Retention and detention basins or ponds, sediment traps or vegetated swales and strips, to facilitate settling or filtering out of pollutants in runoff from processing areas; or

(e) Media filtration such as catch basin filters and sand filters.

(vi) *Scrap Lead-acid Battery Program*—The plan shall address measures and controls for the proper receipt, handling, storage and disposition of scrap lead-acid batteries (battery reclaiming is not eligible for coverage under this permit). The operator shall consider including: procedures for accepting scrap batteries and describing how they will be segregated from other scrap materials; procedures for managing battery casings that may be cracked or leaking, including the proper handling and disposal of residual fluids; measures to minimize and, whenever possible, eliminate exposure of scrap batteries to either runoff or precipitation; the schedule for conducting periodic inspections of scrap battery storage areas and applicable source control measures; and measures to provide employee training on the management of scrap batteries.

(vii) *Erosion and Sediment Control*—The plan shall identify all areas associated with industrial activity that have a high potential for soil erosion and suspended solids loadings, i.e., areas that tend to accumulate significant particulate matter. Appropriate source control, stabilization measures, nonstructural, structural controls, or an equivalent shall be provided in these areas. The plan shall also contain a narrative discussion of the reason(s) for selected erosion and sediment controls. At a minimum, the operator shall consider in the plan, either individually or in combination, the following erosion and sediment control measures:

Filtering or diversion practices, such as filter fabric, sediment filter boom, earthen or gravel berms, curbing or other equivalent measure;

Catch basin filters, filter fabric, or equivalent measure, placed in or around inlets or catch basins that receive runoff from scrap and waste storage areas, and processing equipment; and

Sediment traps, vegetative buffer strips, or equivalent, that effectively trap or remove sediment prior to discharge through an inlet or catch basin.

In instances where significant erosion and suspended solids loadings continue after implementation of source control

measures and nonstructural controls, the operator shall consider providing in the plan for a detention or retention basin or other equivalent structural control. All structural controls shall be designed using good engineering practice. All structural controls and outlets that are likely to receive discharges containing oil and grease must include appropriate measures to minimize the discharge of oil and grease through the outlet. This may include the use of an absorbent boom or other equivalent measure.

Where space limitations (e.g., obstructions caused by permanent structures such as buildings and permanently-sited processing equipment and limitations caused by a restrictive property boundary) prevent the siting of a structural control, i.e., retention basin, such a determination will be noted in the plan. The operator will identify in the plan what existing practices shall be modified or additional measures shall be undertaken to minimize erosion and suspended sediment loadings in lieu of a structural BMP.

(viii) Spill Prevention and Response Procedures—To prevent or minimize storm water contamination at loading and unloading areas, and from equipment or container failures, the operator shall consider including in the plan the following practices:

Description of spill prevention and response measures to address areas that are potential sources of leaks or spills of fluids;

All significant leaks and spills should be contained and cleaned up as soon as possible. If malfunctioning equipment is responsible for the spill or leak, repairs should also be conducted as soon as possible;

Cleanup procedures should be identified in the plan, including the use of dry absorbent materials or other cleanup methods. Where dry absorbent cleanup methods are used, an adequate supply of dry absorbent material should be maintained onsite. Used absorbent material should be disposed of properly;

Drums containing liquids, including oil and lubricants, should be stored indoors; or in a bermed area; or in overpack containers or spill pallets; or in similar containment devices;

Overfill prevention devices should be installed on all fuel pumps or tanks;

Drip pans or equivalent measures should be placed under any leaking piece of stationary equipment until the leak is repaired. The drip pans should be inspected for leaks and checked for potential overflow, and be emptied regularly to prevent overflow and all liquids will be disposed of in

accordance with all requirements under RCRA; and

An alarm and/or pump shut off system should be installed and maintained on all outside equipment with hydraulic reservoirs exceeding 150 gallons (only those reservoirs not directly visible by the operator of the equipment) in order to prevent draining the tank contents in the event of a line break. Alternatively, the equipment may have a secondary containment system capable of containing the contents of the hydraulic reservoir plus adequate freeboard for precipitation. Leaking hydraulic fluids should be disposed of in accordance with all requirements under RCRA.

(ix) Quarterly Inspections—A quarterly inspection shall include all designated areas of the facility and equipment identified in the plan. The inspection shall include a means of tracking and conducting follow up actions based on the results of the inspection. The inspections shall be conducted by members of the Storm Water Pollution Prevention team. At a minimum, quarterly inspections shall include the following areas:

All outdoor scrap processing areas;

All material unloading and loading areas (including rail sidings) that are exposed to either precipitation or storm water runoff;

Areas where structural BMPs have been installed;

All erosion and sediment BMPs;

Outdoor vehicle and equipment maintenance areas;

Vehicle and equipment fueling areas; and

All areas where waste is generated, received, stored, treated, or disposed and which are exposed to either precipitation or storm water runoff.

If exposed to precipitation or storm water runoff, the inspection shall attempt to identify any corroded or leaking containers, corroded or leaking pipes, leaking or improperly closed valves and valve fittings, leaking pumps and/or hose connections, and deterioration in diversionary or containment structures. Spills or leaks shall be immediately addressed according to the facilities. A record of inspections shall be maintained with the plan.

The BMPs identified above have been employed by scrap recycling and waste recycling facilities are believed to be appropriate given the types of pollutants found in storm water discharges from these facilities. In addition, the diversity of options allows permittees to select those BMPs that are most applicable to the extent of the risk that exists at a particular facility. In instances where

nonstructural measures are not sufficient, the conditions direct the permittee to more stringent requirements such as structural controls.

(b) Waste Recycling Facilities (Recyclable liquid wastes)—This section establishes that waste recycling facilities (recyclable liquid wastes) shall provide the following information.

(i) Waste Material Storage (indoors)—

The operator shall consider including in the plan measures and controls to minimize residual liquids from waste materials stored indoors from coming in contact with surface runoff and provisions to maintain a sufficient supply of dry-absorbent materials or a wet vacuum system or other equivalent measure to promptly respond to minor leaks or spills. Measures for secondary containment or its equivalent and procedures for proper material handling (including labeling and marking) and storage of containerized materials should be considered. Drainage from bermed areas should be discharged to an appropriate treatment facility or sanitary sewer system. Discharges from bermed areas should be covered by a separate NPDES permit or industrial user permit under the pretreatment program. The drainage system, where applicable, should include appropriate appurtenances such as pumps or ejectors and manually-operated valves of the open-and-close design.

(ii) Waste Material Storage (outdoors)—The plan will address areas where waste materials are exposed to either storm water runoff or precipitation. The plan must include measures to provide appropriate containment, drainage control and/or other appropriate diversionary structures. The plan must describe those measures and controls used to minimize contact of storm water runoff with stored materials. The operator shall consider including in the plan the following preventative measures or an equivalent:

An appropriate containment structure such as dikes, berms, curbing or pits, or other equivalent measure. The containment should be sufficient to store the volume of the largest single tank and should include sufficient freeboard for precipitation;

A sufficient supply of dry-absorbent materials or a wet vacuum system to collect liquids from minor spills and leaks in contained areas; and

Discharges of precipitation from containment areas containing used oil shall be in accordance with applicable sections of 40 CFR Part 112.

(iii) Truck and Rail Car Waste Transfer Areas—The plan will describe

measures and controls for truck and rail car loading and unloading areas. This includes appropriate containment and diversionary structures to minimize contact with precipitation and/or storm water runoff. The plan will also address measures to clean up minor spills and/or leaks originating from the transfer of liquid wastes. This may include dry-clean up methods, roof coverings, and other runoff controls.

(iv) Erosion and Sediment Control—

The plan shall identify all areas associated with industrial activity that have a high potential for soil erosion. Appropriate stabilization measures, nonstructural and structural controls shall be provided in these areas. The plan shall contain a narrative consideration of the appropriateness for selected erosion and sediment controls. Where applicable, the facility shall consider the use of the following types of preventive measures: sediment traps; vegetative buffer strips; filter fabric fence; sediment filtering boom; gravel outlet protection; or other equivalent measures that effectively trap or remove sediment prior to discharge through an inlet or catch basin.

*(v) Spill Prevention and Response Procedures—*The plan will address measures and procedures to address potential spill scenarios that could occur at the facility. This includes all applicable handling and storage procedures, containment, diversion controls and clean-up procedures. The plan will specifically address all outdoor and indoor storage areas, waste transfer areas, material receiving areas (loading and unloading), and waste disposal areas.

*(vi) Quarterly Inspections—*Quarterly visual inspections shall be conducted by a member, or members, of the storm water pollution prevention team. The quarterly inspection shall include all designated areas of the facility and equipment identified in the plan. The inspection shall include a means of tracking and conducting follow up actions based on the results of the inspection. At a minimum, the inspections shall include the following areas:

- Material storage areas;
- Material unloading and loading areas (including rail sidings) that are exposed to either precipitation or storm water runoff;
- Areas where structural BMPs have been installed;
- All erosion and sediment BMPs;
- Outdoor vehicle and equipment maintenance areas (if applicable);
- Vehicle and equipment fueling areas (if applicable); and

All areas where waste is generated, received, stored, treated, or disposed and which are exposed to either precipitation or storm water runoff.

If exposed to precipitation or storm water runoff, the inspection shall identify the presence of any corroded or leaking containers, corroded or leaking pipes, leaking or improperly closed valves and valve fittings, leaking pumps and/or hose connections, and deterioration in diversionary or containment structures. Spills or leaks shall be immediately addressed according to the facility's spill prevention and response procedures.

*(c) Recycling Facilities.—*This section establishes that recycling facilities (including MRFs) that receive only source-separated recyclable materials primarily from non-industrial and residential sources shall provide the following information in their pollution prevention plan.

(i) Inbound Recyclable Material Control Program. The plan shall include a recyclable material inspection program to minimize the likelihood of receiving non-recyclable materials (e.g., hazardous materials) that may be significant source of pollutants in surface runoff. At a minimum, the operator shall consider addressing in the plan the following:

A description of information and education measures to educate the appropriate suppliers of recyclable materials on the types of recyclable materials that are acceptable and those that are not acceptable, e.g., household hazardous wastes;

A description of training requirements for drivers responsible for pickup of recyclable materials;

Clearly mark public drop-off containers as to what materials can be accepted;

Rejecting non-recyclable wastes or household hazardous wastes at the source; and

A description of procedures for the handling and disposal of nonrecyclable materials.

(ii) Outdoor Storage. The plan shall include BMPs to minimize or reduce the exposure of recyclable materials to surface runoff and precipitation. The plan, at a minimum, shall include good housekeeping measures to prevent the accumulation of visible quantities of residual particulate matter and fluids, particularly in high traffic areas. The plan shall consider tarpaulins or their equivalent to be used to cover exposed bales of recyclable waste paper. The operator shall consider within the plan the use of the following types of BMPs (individually or in combination) or their equivalent:

Provide totally-enclosed drop-off containers for public.

Provide a sump and sump pump with each containment pit. Prevent the discharge of residual fluids to storm sewer system. Prevent discharging to the storm sewer system;

Provide dikes and curbs around bales of recyclable waste paper;

Divert surface runoff away from outside material storage areas;

Provide covers over containment bins, dumpsters, roll-off boxes; and,

Store the equivalent one day's volume of recyclable materials indoors.

(iii) Indoor Storage and Material Processing. The plan shall address BMPs to minimize the release of pollutants from indoor storage and processing areas to the storm sewer system. The plan shall establish specific measures to ensure that all floor drains do not discharge to the storm sewer system. The following BMPs shall be considered for inclusion in the plan:

Schedule routine good housekeeping measures for all storage and processing areas;

Prohibit the practice of allowing tipping floor washwaters from draining to any portion of a storm sewer system;

Provide employee training on pollution prevention practices;

(iv) Vehicle and Equipment Maintenance. The plan shall also provide for BMPs in those areas where vehicle and equipment maintenance is occurring outdoors. At a minimum, the following BMPs shall be considered for inclusion in the plan:

Prohibit vehicle and equipment washwater from discharging to the storm sewer system;

Minimize or eliminate outdoor maintenance areas, wherever possible;

Establish spill prevention and clean-up procedures in fueling areas;

Provide employee training on avoiding topping off fuel tanks;

Divert runoff from fueling areas;

Store lubricants and hydraulic fluids indoors;

Provide employee training on proper handling, storage of hydraulic fluids and lubricants.

Monitoring and Reporting Requirements

Analytical Monitoring Requirements. EPA believes that scrap recycling and waste recycling facilities (nonsource-separated facilities only) may reduce the level of pollutants in storm water runoff from their sites through the development and proper implementation of the storm water pollution prevention plan requirements discussed in today's permit. In order to provide a tool for evaluating the effectiveness of the pollution prevention

plan and to characterize the discharge for potential environmental impacts, the permit requires scrap recycling and waste recycling facilities to collect and analyze samples of their storm water discharges for the pollutants listed in Table N-18. The pollutants listed in Table N-18 were found to be above benchmark levels for a significant portion of scrap and waste recycling facilities that submitted quantitative data in the group application process, or are believed to be present based upon the description of industrial activities and significant materials exposed. Because these pollutants have been reported above benchmark levels, EPA is requiring monitoring after the pollution prevention plan has been implemented to assess the effectiveness of the pollution prevention plan and to help ensure that a reduction of pollutants is realized.

At a minimum, storm water discharges from scrap recycling and waste recycling facilities must be monitored quarterly during the second year of permit coverage. Samples must be collected at least once in each of the following periods: January through March; April through June; July through September; and October through

December. At the end of the second year of permit coverage, a facility must calculate the average concentration for each parameter listed in Table N-18. If the permittee collects more than four samples in this period, then they must calculate an average concentration for each pollutant of concern for all samples analyzed.

TABLE N-18.—INDUSTRY MONITORING REQUIREMENTS

Pollutants of concern ¹	Cut-off concentration
Chemical Oxygen Demand (COD)	120 mg/L
Total Suspended Solids (TSS)	100 mg/L
Total Recoverable Aluminum	0.75 mg/L
Total Recoverable Copper	0.0636 mg/L
Total Recoverable Iron ...	1.0 mg/L
Total Recoverable Lead ...	0.0816 mg/L
Total Recoverable Zinc ...	0.065 mg/L

¹ Several congeners of PCBs (PCB-1016, -1221, -1242, -1248, -1260) were above established benchmarks, however, EPA believes that these constituents will readily bound up with sediment and particulate matter. Therefore, EPA feels that monitoring for TSS will serve as an adequate indicator for the control of PCBs.

If the average concentration for a parameter is less than or equal to the value listed in Table N-18, then the permittee is not required to conduct quantitative analysis for that parameter during the fourth year of the permit. If, however, the average concentration for a parameter is greater than the cut-off concentration listed in Table N-18, then the permittee is required to conduct quarterly monitoring for that parameter during the fourth year of permit coverage. Monitoring is not required during the first, third, and fifth year of the permit. The exclusion from monitoring in the fourth year of the permit is conditional on the facility maintaining industrial operations and BMPs that will ensure a quality of storm water discharges consistent with the average concentrations recorded during the second year of the permit.

TABLE N-19.—SCHEDULE OF MONITORING

2nd Year of Permit Coverage	• Conduct quarterly monitoring. • Calculate the average concentration for all parameters analyzed during this period. • If average concentration is greater than the value listed in Table N-18, then quarterly sampling is required during the fourth year of the permit. • If average concentration is less than or equal to the value listed in Table N-18, then no further sampling is required for that parameter.
4th Year of Permit Coverage	• Conduct quarterly monitoring for any parameter where the average concentration in year 2 of the permit is greater than the value listed in Table N-18. • If industrial activities or the pollution prevention plan have been altered such that storm water discharges may be adversely affected, quarterly monitoring is required for all parameters of concern.

In cases where the average concentration of a parameter exceeds the cut-off concentration, EPA expects permittees to place special emphasis on methods for reducing the presence of those parameters in storm water discharges. Quarterly monitoring in the fourth year of the permit will reassess the effectiveness of the adjusted pollution prevention plan.

EPA realizes that if a facility is inactive and unstaffed it may be difficult to collect storm water discharge samples when a qualifying event occurs. Today's final permit has been revised so that inactive, unstaffed facilities can exercise a waiver of the requirement to conduct quarterly chemical sampling.

b. Alternative Certification. Throughout today's permit, EPA has proposed monitoring requirements for

facilities which the Agency believes have the potential for contributing significant levels of pollutants to storm water discharges. The alternative described below is necessary to ensure that monitoring requirements are only imposed on those facilities that do, in fact, have storm water discharges containing pollutants at concentrations of concern. EPA has determined that if materials and activities are not exposed to storm water at the site, then the potential for pollutants to contaminate storm water discharges does not warrant monitoring.

Therefore, a discharger is not subject to the monitoring requirements of this Part provided the discharger makes a certification for a given outfall, or on a pollutant-by-pollutant basis in lieu of

monitoring reports required, under penalty of law, signed in accordance with Part VII.G. (Signatory Requirements), that material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, industrial machinery or operations, significant materials from past industrial activity that are located in areas of the facility that are within the drainage area of the outfall are not presently exposed to storm water and will not be exposed to storm water for the certification period. Such certification must be retained in the storm water pollution prevention plan and submitted to EPA in the case of certifying that a pollutant is not present, the permittee must submit the certification along with the monitoring

reports required under paragraph (c) below. If the permittee cannot certify for an entire period, they must submit the date exposure was eliminated and any monitoring required up until that date. This certification option is not applicable to compliance monitoring requirements associated with effluent limitations. EPA does not expect facilities to be able to exercise this certification for indicator parameters, such as TSS and BOD.

c. Reporting Requirements. Permittees are required to submit all monitoring results obtained during the second and fourth year of permit coverage within 3 months of the conclusion of each year. For each outfall, one signed Discharge Monitoring Report form must be submitted to the Director per storm event sampled. For facilities conducting monitoring beyond the minimum quarterly requirements an additional Discharge Monitoring Report Form must be filed for each analysis.

d. Sample Type. All discharge data shall be reported for grab samples. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. The required 72-hour storm event interval is waived where the preceding measurable storm event did not result in a measurable discharge from the facility. The required 72-hour storm event interval may also be waived where the permittee documents that less than a 72-hour interval is representative for local storm events during the season when sampling is being conducted. The grab sample shall be taken during the first 30 minutes of the discharge. If the collection of a grab sample during the first 30 minutes is impracticable, a grab sample can be taken during the first hour of the discharge, and the discharger shall submit with the monitoring report a description of why a grab sample during the first 30 minutes was impracticable. If storm water discharges associated with industrial activity commingle with process or nonprocess water, then where practicable permittees must attempt to sample the storm water discharge before it mixes with the non-storm water discharge.

e. Representative Discharge. When a facility has two or more outfalls that, based on a consideration of industrial activity, significant materials, and management practices and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may test the

effluent of one of such outfalls and report that the quantitative data also applies to the substantially identical outfall(s) provided that the permittee includes in the storm water pollution prevention plan a description of the location of the outfalls and explains in detail why the outfalls are expected to discharge substantially identical effluent. In addition, for each outfall that the permittee believes is representative, an estimate of the size of the drainage area (in square feet) and an estimate of the runoff coefficient of the drainage area [e.g., low (under 40 percent), medium (40 to 65 percent), or high (above 65 percent)] shall be provided in the plan.

f. Quarterly Visual Examination of Storm Water Quality. Quarterly visual examinations of storm water discharges from each outfall are required. The examination must be of a grab sample collected from each storm water outfall. The examination of storm water grab samples shall include any observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, or other obvious indicators of storm water pollution. The examination must be conducted in a well lit area. No analytical tests are required to be performed on these samples. The examination must be conducted at least once in each of the following periods: January through March; April through June; July through September; and October through December.

The examination must be made at least once in each quarter of the permit during daylight unless there is insufficient rainfall or snow-melt to generate runoff. Where practicable, the same individual should carry out the collection and examination of discharges throughout the life of the permit to ensure the greatest degree of consistency possible. Grab samples shall be collected within the first 30 minutes (or as soon thereafter as practical, but not to exceed 60 minutes) of when the runoff begins discharging. Reports of the visual examination include: the examination date and time, examination personnel, visual quality of the storm water discharge, and probable sources of any observed storm water contamination. The visual examination reports must be maintained onsite with the pollution prevention plan.

EPA realizes that if a facility is inactive and unstaffed it may be difficult to collect storm water discharge samples when a qualifying event occurs. Today's final permit has been revised so that inactive, unstaffed facilities can exercise a waiver of the requirement to conduct quarterly visual examination.

EPA believes that this quick and simple assessment will allow the permittee to approximate the effectiveness of his/her plan on a regular basis at very little cost. Although the visual examination cannot assess the chemical properties of the storm water discharged from the site, the examination will provide meaningful results upon which the facility may act quickly. The frequency of this visual examination will also allow for timely adjustments to be made to the plan. If BMPs are performing ineffectively, corrective action must be implemented. A set of tracking or follow-up procedures must be used to ensure that appropriate actions are taken in response to the inspections. The visual examination is intended to be performed by members of the pollution prevention team. This hands-on examination will enhance the staff's understanding of the storm water problems on that site and effects on the management practices that are included in the plan.

When a discharger is unable to collect samples over the course of the visual examination period as a result of adverse climatic conditions, the discharger must document the reason for not performing the visual examination and retain this documentation on-site with the records of the visual examination. Adverse weather conditions which may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricane, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

g. Retention of Records

(1) The permittee shall retain records of all inspections and monitoring information, including certification reports, noncompliance reports, calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports, and supporting data, requested by the permitting authority for at least 3 years after the date of the sampling event or inspection.

Sector N

Scrap Recycling and Waste Recycling Facilities Permit Language

The Permit Language section contains sector-specific requirements for each industrial sector, including:

- Discharges covered under the sector;
- Special Conditions
- Storm Water Pollution Prevention Plan Requirements;
- Numeric Effluent Limitations, if any; and
- Monitoring and Reporting Requirements.

Further guidance and discussion can be found in the Fact Sheet associated with this sector.

N. Storm Water Discharges Associated With Industrial Activity From Scrap Recycling and Waste Recycling Facilities

1. Discharges Covered Under This Section

The requirements listed under this section are applicable to storm water discharges from the following activities: facilities that are engaged in the processing, reclaiming and wholesale distribution of scrap and waste materials such as ferrous and nonferrous metals, paper, plastic, cardboard, glass, animal hides (these types of activities are typically identified as SIC code 5093). Facilities that are engaged in reclaiming and recycling liquid wastes such as used oil, antifreeze, mineral spirits, and industrial solvents (also identified as SIC code 5093) are also covered under this section. Separate permit requirements have been established for recycling facilities that only receive source-separated recyclable materials primarily from non-industrial and residential sources (also identified as SIC 5093) (e.g., common consumer products including paper, newspaper, glass, cardboard, plastic containers, aluminum and tin cans). This includes recycling facilities commonly referred to as material recovery facilities (MRF).

When an industrial facility, described by the above coverage provisions of this section, has industrial activities being conducted onsite that meet the description(s) of industrial activities in another section(s), that industrial facility shall comply with any and all applicable monitoring and pollution prevention plan requirements of the other section(s) in addition to all

applicable requirements in this section. The monitoring and pollution prevention plan terms and conditions of this multi-sector permit are additive for industrial activities being conducted at the same industrial facility (co-located industrial activities). The operator of the facility shall determine which other monitoring and pollution prevention plan section(s) of this permit (if any) are applicable to the facility.

2. Special Conditions

a. Prohibition of Non-storm Water Discharges

(1) Except as provided in paragraph XI.N.2.b., all discharges covered by this permit shall be composed entirely of storm water. Non storm water discharges from turnings containment areas are not covered under this permit.

(a) Except as provided in paragraph XI.N.2.b. (below), discharges of material other than storm water to waters of the United States, or through municipal separate storm sewer systems, are not authorized by this permit. The operators of such discharges must obtain coverage under a separate National Pollutant Discharge Elimination System (NPDES) permit (other than this permit) issued for the discharge.

(b) The following non-storm water discharges are authorized by this permit provided the non-storm water component of the discharge is in compliance with paragraph XI.N.3.a.(3) (Measures and Controls for Storm Water Discharges): discharges from fire fighting activities; fire hydrant flushing; potable water sources including waterline flushings; irrigation drainage; lawn watering; routine external building washdown which does not use detergents or other compounds; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled materials have been removed) and where detergents are not used; air conditioning condensate; springs; and uncontaminated ground water.

3. Storm Water Pollution Prevention Plan Requirements

a. Contents of Plan. The following general requirements for the storm water pollution prevention plan are applicable to activities which reclaim and recycle either recyclable nonliquid and liquid waste materials. In addition to the general requirements, Paragraph XI.N.3.a.(3)(a) (below) identifies special requirements for scrap recycling and waste recycling facilities (nonsource-separated facilities) that handle nonliquid wastes. Paragraph XI.N.3.a.(3)(b) (below) identifies special

requirements for waste recycling facilities that handle only liquid wastes. Paragraph XI.N.3.a.(3)(c) identifies special requirements for recycling facilities, including MRFs, that receive only source-separated recyclable materials primarily from non-industrial and residential sources. The plan shall include, at a minimum, the following items:

(1) *Pollution Prevention Team.* Each plan shall identify a specific individual or individuals within the facility organization as members of a storm water Pollution Prevention Team that are responsible for developing the storm water pollution prevention plan and assisting the facility or plant manager in its implementation, maintenance, and revision. The plan shall clearly identify the responsibilities of each team member. The activities and responsibilities of the team shall address all aspects of the facility's storm water pollution prevention plan.

(2) *Description of Potential Pollutant Sources.* Each plan shall provide a description of potential sources which may reasonably be expected to add significant amounts of pollutants to storm water discharges or which may result in the discharge of pollutants during dry weather from separate storm sewers draining the facility. Each plan shall identify all activities and significant materials which may potentially be significant pollutant sources or, during periods of dry weather, result in dry weather flows. Each plan shall include, at a minimum:

(a) *Drainage*

(i) A site map indicating the outfall locations and the types of discharges contained in the drainage areas of the outfalls, an outline of the portions of the drainage area of each storm water outfall that are within the facility boundaries, each existing structural control measure to reduce pollutants in storm water runoff, surface water bodies (including wetlands), locations where significant materials are exposed to precipitation including scrap and waste material storage and outdoor scrap and waste processing equipment, locations where major spills or leaks identified in paragraph XI.N.3.a.(2)(c) of this section have occurred, and the locations of the following activities where such activities are exposed to precipitation: fueling stations, vehicle and equipment maintenance and/or cleaning areas, loading/unloading areas, locations used for the treatment, storage or disposal of wastes, material storage (including tanks or other vessels used for liquid or waste storage). Scrap recycling facilities that handle turnings that have been

previously exposed to cutting fluids will delineate these containment areas as required in paragraph XI.N.3.a.(iii). The site map must also identify monitoring locations.

(ii) For each area of the facility that generates storm water discharges associated with industrial activity with a reasonable potential for containing significant amounts of pollutants, a prediction of the direction of flow, and an identification of the types of pollutants which are likely to be present in storm water discharges associated with industrial activity. Factors to consider include the toxicity of a chemical; quantity of chemicals used, produced or discharged; the likelihood of contact with storm water; and history of significant leaks or spills of toxic or hazardous pollutants. Flows with a significant potential for causing erosion shall be identified.

(b) *Inventory of Exposed Materials.*—An inventory of the types of materials handled at the site that potentially may be exposed to precipitation. Such inventory shall include a narrative description of significant materials that have been handled, treated, stored or disposed in a manner to allow exposure to storm water; method and location of onsite storage or disposal; materials management practices employed to minimize contact of materials with storm water runoff; the location and a description of existing structural and nonstructural control measures to reduce pollutants in storm water runoff; and a description of any treatment the storm water receives.

(c) *Spills and Leaks.*—A list of significant spills and leaks of toxic or hazardous pollutants that occurred at areas that are exposed to precipitation or that otherwise drain to a storm water conveyance at the facility after the date of 3 years prior to the date of the submission of a Notice of Intent (NOI) to be covered under this permit. Significant spills include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under Section 311 of the Clean Water Act (CWA) (see 40 CFR 110.10 and 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (see 40 CFR 302.4). Such a list shall be updated as appropriate during the term of the permit.

(d) *Sampling Data.*—A summary of existing discharge sampling data describing pollutants in storm water discharges from the facility, including a summary of sampling data collected during the term of this permit.

(e) *Risk Identification and Summary of Potential Pollutant Sources.*—A

narrative description of potential pollutant sources from the following activities: loading and unloading operations; outdoor storage activities, outdoor processing activities; significant dust or particulate generating processes and onsite waste disposal practices. The description shall specifically list any significant potential source of pollutants at the site and for each potential source, any pollutant or pollutant parameter (e.g., Chemical Oxygen Demand (COD), oil and grease, Total Suspended Solids (TSS), zinc, lead, copper, etc.) of concern shall be identified.

(3) *Measures and Controls.* Each facility covered by this permit shall develop a description of storm water management controls appropriate for the facility, and implement such controls. The appropriateness and priorities of controls in a plan shall reflect identified potential sources of pollutants at the facility. The description of storm water management controls for scrap recycling and waste recycling facilities (nonsource-separated, nonliquid recyclable materials), waste recycling facilities (recyclable liquid wastes), and recycling facilities (source-separated materials) are identified in Parts XI.N.3.a.(3)(a), XI.N.3.a.(3)(b), and XI.N.3.a.(3)(c), respectively. At a minimum, the description shall also include a schedule for implementing such controls:

(a) *Scrap and Waste Recycling Facilities (nonsource-separated, nonliquid recyclable wastes).*—The following special conditions have been established for the pollution prevention plan for those scrap and waste recycling facilities that receive, process and provide wholesale distribution of nonliquid recyclable wastes, (e.g., ferrous and nonferrous metals, plastics, glass, cardboard, and paper). This section of the permit is intended to distinguish waste recycling facilities that receive both nonrecyclable and recyclable materials from those recycling facilities that only accept recyclable materials primarily from non-industrial and residential sources.

Under the description of measures and controls in the storm water pollution prevention plan, the plan will address all areas that have a reasonable potential to contribute pollutants to storm water discharges and will be maintained in a clean and orderly manner. At a minimum, the plan will address the following activities and areas within the plan:

(i) *Inbound Recyclable and Waste Material Control Program.*—The plan shall include a recyclable and waste material inspection program to

minimize the likelihood of receiving materials that may be significant pollutant sources to storm water discharges. At a minimum, the plan shall address the following:

(a) Provision of information/education (flyers, brochures and pamphlets) to encourage suppliers of scrap and recyclable waste materials to drain residual fluids, whenever applicable, prior to its arrival at the facility. This includes vehicles and equipment engines, radiators, and transmissions, oil-filled transformers, and individual containers or drums;

(b) Activities which accept scrap and materials that may contain residual fluids, e.g., automotive engines containing used oil, transmission fluids, etc., shall describe procedures to minimize the potential for these fluids from coming in contact with either precipitation or runoff. The description shall also identify measures or procedures to properly store, handle and dispose of these residual fluids;

(c) Procedures pertaining to the acceptance of scrap lead-acid batteries. Additional requirements for the handling, storage and disposal or recycling of batteries shall be in conformance with conditions for a scrap lead-acid battery program, see paragraph X.I.N.3.a.(3)(a)(vi) (below);

(d) A description of training requirements for those personnel engaged in the inspection and acceptance of inbound recyclable materials.

(e) Liquid wastes, including used oil, shall be stored in materially compatible and nonleaking containers and disposed or recycled in accordance with all requirements under the Resource Recovery and Conservation Act (RCRA), and other State or local requirements.

(ii) *Scrap and Waste Material Stockpiles/Storage (outdoors)*—The plan shall address areas where significant materials are exposed to either storm water runoff or precipitation. The plan must describe those measures and controls used to minimize contact of storm water runoff with stockpiled materials, processed materials and nonrecyclable wastes. The plan should include measures to minimize the extent of storm water contamination from these areas. The operator may consider the use of permanent or semipermanent covers, or other similar forms of protection over stockpiled materials where the operator determines that such measures are reasonable and appropriate. The operator may consider the use of sediment traps, vegetated swales and strips, to facilitate settling or filtering out of pollutants. The operator shall

consider within the plan the use of the following BMPs (either individually or in combination) or their equivalent to minimize contact with storm water runoff:

(a) Promoting the diversion of runoff away from these areas through such practices as dikes, berms, containment trenches, culverts and/or surface grading;

(b) Media filtration such as catch basin filters and sand filters; and,

(c) Silt fencing; and,

(d) Oil/water separators, sumps and dry adsorbents in stockpile areas that are potential sources of residual fluids, e.g., automotive engine storage areas.

(iii) *Stockpiling of Turnings*

Previously Exposed to Cutting Fluids (outdoors)—The plan shall address all areas where stockpiling of industrial turnings previously exposed to cutting fluids occurs. The plan shall implement those measures necessary to minimize contact of surface runoff with residual cutting fluids. The operator shall consider implementation of either of the following two alternatives or a combination of both or equivalent measures:

(a) *Alternative 1: Storage of all turnings previously exposed to cutting fluids under some form of permanent or semi-permanent cover.* Discharges of residual fluids from these areas to the storm sewer system in the absence of a storm event is prohibited. Discharges to the storm sewer system as a consequence of a storm event is permitted provided the discharge is first directed through an oil/water separator or its equivalent. Procedures to collect, handle, and dispose or recycle residual fluids that may be present shall be identified in the plan, or,

(b) *Alternative 2: Establish dedicated containment areas for all turnings that have been exposed to cutting fluids where runoff from these areas is directed to a storm sewer system, providing the following:*

(i) containment areas constructed of either concrete, asphalt or other equivalent type of impermeable material;

(ii) a perimeter around containment areas to prevent runoff from moving across these areas. This would include the use of shallow berms, curbing, or constructing an elevated pad or other equivalent measure;

(iii) a suitable drainage collection system to collect all runoff generated from within containment areas. At a minimum, the drainage system shall include a plate-type oil/water separator or its equivalent. The oil/water separator or its equivalent shall be installed according to the

manufacturer's recommended specifications, whenever available, specifications will be kept with the plan.

(iv) a schedule to maintain the oil/water separator (or its equivalent) to prevent the accumulation of appreciable amounts of fluids. In the absence of a storm event, no discharge from containment areas to the storm sewer system are prohibited unless covered by a separate NPDES permit;

(v) identify procedures for the proper disposal or recycling of collected residual fluids.

(iv) *Scrap and Waste Material Stockpiles/Storage (covered or indoor storage)*—The plan shall address measures and controls to minimize residual liquids and accumulated particulate matter, originating from scrap and recyclable waste materials stored indoors or under cover, from coming in contact with surface runoff. The operator shall consider including in the plan the following or equivalent measures:

(a) Good housekeeping measures, including the use of dry absorbent or wet vacuum clean up methods, to collect, handle, store and dispose or recycle residual liquids originating from recyclable containers, e.g., beverage containers, paint cans, household cleaning products containers, etc.;

(b) Prohibiting the practice of allowing washwater from tipping floors or other processing areas from discharging to any portion of a storm sewer system;

(c) Disconnecting or sealing off all existing floor drains connected to any portion of the storm sewer system.

(v) *Scrap and Recyclable Waste Processing Areas*—The plan shall address areas where scrap and waste processing equipment are sited. This includes measures and controls to minimize surface runoff from coming in contact with scrap processing equipment. In the case of processing equipment that generate visible amounts of particulate residue, e.g., shredding facilities, the plan shall describe good housekeeping and preventive maintenance measures to minimize contact of runoff with residual fluids and accumulated particulate matter. At a minimum, the operator shall consider including in the plan the following or other equivalent measures:

(a) A schedule of periodic inspections of equipment for leaks, spills, malfunctioning, worn or corroded parts or equipment;

(b) Preventive maintenance program to repair and/or maintain processing equipment;

(c) Measures to minimize shredder fluff from coming in contact with surface runoff;

(d) Use of dry-absorbents or other cleanup practices to collect and to dispose or recycle spilled or leaking fluids;

(e) Installation of low-level alarms or other equivalent protection devices on unattended hydraulic reservoirs over 150 gallons in capacity. Alternatively, provide secondary containment with sufficient volume to contain the entire volume of the reservoir.

The operator shall consider employing the following additional BMPs or equivalent measures: diversion structures such as dikes, berms, culverts, containment trenches, elevated concrete pads, grading to minimize contact of storm water runoff with outdoor processing equipment; oil/water separators, sumps or equivalent, in processing areas that are potential sources of residual fluids and grease; permanent or semipermanent covers, or other similar measures; retention and detention basins or ponds, sediment traps or vegetated swales and strips, to facilitate settling or filtering out of pollutants in runoff from processing areas; or media filtration such as catch basin filters and sand filters.

(vi) *Scrap Lead-Acid Battery Program*—The plan shall address measures and controls for the proper handling, storage and disposition of scrap lead-acid batteries (note: this permit does apply to the reclaiming of scrap lead-acid batteries, i.e., breaking up battery casings to recover lead). The operator shall consider including in the plan the following or equivalent measures:

(a) Segregating all scrap lead-acid batteries from other scrap materials;

(b) A description of procedures and/or measures for the handling, storage and proper disposal of cracked or broken batteries;

(c) A description of measures to collect and dispose of leaking battery fluid (lead-acid);

(d) A description of measures to minimize and, whenever possible, eliminate exposure of scrap lead-acid batteries to precipitation or runoff; and

(e) A description of employee training for the management of scrap batteries.

(vii) *Erosion and Sediment Control*—The plan shall identify all areas associated with industrial activity that have a high potential for soil erosion and suspended solids loadings, i.e., areas that tend to accumulate significant particulate matter. Appropriate source control, stabilization measures, nonstructural, structural controls or an equivalent shall be provided in these

areas. The plan shall also contain a narrative discussion of the reason(s) for selected erosion and sediment controls. At a minimum, the operator shall consider in the plan, either individually or in combination, the following erosion and sediment control measures:

(a) Filtering or diversion practices, such as filter fabric fence, sediment filter boom, earthen or gravel berms, curbing or other equivalent measure,

(b) Catch basin filters, filter fabric fence, or equivalent measure, place in or around inlets or catch basins that receive runoff from scrap and waste storage areas, and processing equipment; or

(c) Sediment traps, vegetative buffer strips, or equivalent, to remove sediment prior to discharge through an inlet or catch basin.

(viii) *Structural Controls for Sediment and Erosion Control*—In instances where significant erosion and suspended solids loadings continue after installation of one or more of the BMPs identified in paragraph X.I.N.3.a.(3)(a)(vii) (above), the operator shall consider providing in the plan for a detention or retention basin or other equivalent structural control. All structural controls shall be designed using good engineering practice. All structural controls and outlets that are likely to receive discharges containing oil and grease must include appropriate measures to minimize the discharge of oil and grease through the outlet. This may include the use of an absorbent boom or other equivalent measures.

Where space limitations (e.g., obstructions caused by permanent structures such as buildings and permanently-sited processing equipment and limitations caused by a restrictive property boundary) prevent the siting of a structural control, i.e., retention basin, such a determination will be noted in the plan. The operator will identify in the plan what existing practices shall be modified or additional measures shall be undertaken to minimize erosion and suspended sediment loadings in lieu of a structural BMP.

(ix) *Spill Prevention and Response Procedures*—To prevent or minimize storm water contamination at loading and unloading areas, and from equipment or container failures, the operator shall consider including in the plan the following practices:

(a) Description of spill prevention and response measures to address areas that are potential sources of leaks or spills of fluids;

(b) Leaks and spills should be contained and cleaned up as soon as possible. If malfunctioning equipment is

responsible for the spill or leak, repairs should also be conducted as soon as possible;

(c) Cleanup procedures should be identified in the plan, including the use of dry absorbent materials or other cleanup methods. Where dry absorbent cleanup methods are used, an adequate supply of dry absorbent material should be maintained onsite. Used absorbent material should be disposed of properly;

(d) Drums containing liquids, including oil and lubricants, should be stored indoors; or in a bermed area; or in overpack containers or spill pallets; or in similar containment devices;

(e) Overfill prevention devices should be installed on all fuel pumps or tanks;

(f) Drip pans or equivalent measures should be placed under any leaking piece of stationary equipment until the leak is repaired. The drip pans should be inspected for leaks and checked for potential overflow and emptied regularly to prevent overflow and all liquids will be disposed of in accordance with all requirements under RCRA.

(g) An alarm and/or pump shut off system should be installed and maintained on all outside equipment with hydraulic reservoirs exceeding 150 gallons (only those reservoirs not directly visible by the operator of the equipment) in order to prevent draining the tank contents in the event of a line break. Alternatively, the equipment may have a secondary containment system capable of containing the contents of the hydraulic reservoir plus adequate freeboard for precipitation. Leaking hydraulic fluids should be disposed of in accordance with all requirements under RCRA.

(x) *Quarterly Inspection Program*—A quarterly inspection shall include all designated areas of the facility and equipment identified in the plan. The inspection shall include a means of tracking and conducting follow up actions based on the results of the inspection. The inspections shall be conducted by members of the Storm Water Pollution Prevention team. At a minimum, quarterly inspections shall include the following areas: all outdoor scrap processing areas; all material unloading and loading areas (including rail sidings) that are exposed to either precipitation or storm water runoff; areas where structural BMPs have been installed; all erosion and sediment BMPs; outdoor vehicle and equipment maintenance areas; vehicle and equipment fueling areas; and all areas where waste is generated, received, stored, treated, or disposed and which are exposed to either precipitation or storm water runoff.

The objective of the inspection shall be to identify any corroded or leaking containers, corroded or leaking pipes, leaking or improperly closed valves and valve fittings, leaking pumps and/or hose connections, and deterioration in diversionary or containment structures that are exposed to precipitation or storm water runoff.

Spills or leaks identified during the visual inspection shall be immediately addressed using the procedures identified in Part XI.N.3.a.(3)(a)(ix) (Spill Prevention and Response Procedures). Structural BMPs shall be visually inspected for signs of washout, breakage, deterioration, damage, or overflowing and breaks shall be repaired or replaced as expeditiously as possible.

(xi) *Employee Training*—At a minimum, storm water control training appropriate to their job function shall be provided for truck drivers, scale operators, supervisors, buyers and other operating personnel. The plan shall include a proposed schedule for the training. The employee training program shall address at a minimum: BMPs and other requirements of the plan; proper scrap inspection, handling and storage procedures; procedures to follow in the event of a spill, leak, or break in any structural BMP. A training and education program shall be developed for employees and for suppliers for implementing appropriate activities identified in the storm water pollution prevention plan.

(xii) *Supplier Notification*—The plan shall include a supplier notification program that will be applicable to major suppliers and shall include: description of scrap materials that will not be accepted at the facility or that are accepted only under certain conditions.

(b) *Waste Recycling Facilities (liquid recyclable wastes)*—The following special conditions have been established for the pollution prevention plan for those facilities that reclaim and recycle liquid wastes (e.g., used oil, antifreeze, mineral spirits, and industrial solvents). For these facilities, the storm water pollution prevention plan shall address all areas that have a reasonable potential to contribute pollutants to storm water discharges and will be maintained in a clean and orderly manner. At a minimum, the plan shall address the following activities and areas within the plan:

(i) *Waste Material Storage (indoors)*—The plan shall address measures and controls to minimize/eliminate residual liquids from waste materials stored indoors from coming in contact with surface runoff. The plan may refer to applicable portions of other existing plans such as SPCC plans required

under 40 CFR Part 112. At a minimum, the operator shall consider including in the plan the following:

(a) Procedures for material handling (including labeling and marking);

(b) A sufficient supply of dry-absorbent materials or a wet vacuum system to collect spilled or leaked materials;

(c) An appropriate containment structure, such as trenches, curbing, gutters or other equivalent measures; and

(d) A drainage system to handle discharges from diked or bermed areas. The drainage system should include appurtenances, (e.g., pumps or ejectors, manually operated valves). Drainage should be discharged to an appropriate treatment facility, sanitary sewer system, or otherwise disposed of properly. Discharges from these areas should be covered by a separate NPDES permit or industrial user permit under the pretreatment program.

(ii) *Waste Material Storage (outdoors)*—The plan shall address areas where waste materials are exposed to either storm water runoff or precipitation. The plan shall include measures to provide appropriate containment, drainage control and other appropriate diversionary structures. The plan may refer to applicable portions of other existing plans such as SPCC plans required under 40 CFR Part 112. At a minimum, the plan shall describe those measures and controls used to minimize contact of storm water runoff with stored materials. The operator shall consider including in the plan the following preventative measures, or an equivalent:

(a) An appropriate containment structure such as dikes, berms, curbing or pits, or other equivalent measures. The containment should be sufficient to store the volume of the largest single tank and should include sufficient freeboard for precipitation;

(b) A sufficient supply of dry-absorbent materials or a wet vacuum system, or other equivalent measure, to collect liquids from minor spills and leaks in contained areas; and

(c) Discharges of precipitation from containment areas containing used oil shall be in accordance with applicable sections of 40 CFR Part 112.

(iii) *Truck and Rail Car Waste Transfer Areas*—The plan shall describe measures and controls for truck and rail car loading and unloading areas. This includes appropriate containment and diversionary structures to minimize contact with precipitation or storm water runoff. The plan shall also address measures to clean up minor spills and/or leaks originating from the

transfer of liquid wastes. This may include the use of dry-clean up methods, roof coverings, runoff controls, or other equivalent measures.

(iv) *Erosion and Sediment Control*—The plan shall identify all areas associated with industrial activity that have a high potential for soil erosion. Appropriate stabilization measures, nonstructural and structural controls shall be provided in these areas. The plan shall contain a narrative consideration of the appropriateness for selected erosion and sediment controls. Where applicable, the facility shall consider the use of the following types of preventive measures: sediment traps; vegetative buffer strips; filter fabric fence; sediment filtering boom; gravel outlet protection; or other equivalent measures that effectively trap or remove sediment prior to discharge through an inlet or catch basin.

(v) *Spill Prevention and Response Procedures*—The plan shall address measures and procedures to address potential spill scenarios that could occur at the facility. This includes all applicable handling and storage procedures, containment and/or diversion equipment, and clean-up procedures. The plan shall specifically address all outdoor and indoor storage areas, waste transfer areas, material receiving areas (loading and unloading), and waste disposal areas.

(vi) *Quarterly Inspections*—Quarterly visual inspections shall be conducted by a member, or members, of the storm water pollution prevention team. The quarterly inspection shall include all designated areas of the facility and equipment identified in the plan. The inspection shall include a means of tracking and conducting follow up actions based on the results of the inspection. At a minimum, the inspections shall include the following areas: material storage areas; material unloading and loading areas (including rail sidings) that are exposed to either precipitation or storm water runoff; areas where structural BMPs have been installed; all erosion and sediment BMPs; outdoor vehicle and equipment maintenance areas (if applicable); vehicle and equipment fueling areas (if applicable); and all areas where waste is generated, received, stored, treated, or disposed and which are exposed to either precipitation or storm water runoff.

The inspection shall identify the presence of any corroded or leaking containers, corroded or leaking pipes, leaking or improperly closed valves and valve fittings, leaking pumps and/or hose connections, and deterioration in diversionary or containment structures

that are exposed to precipitation or storm water runoff. Spills or leaks shall be immediately addressed according to the facility's spill prevention and response procedures.

(c) *Recycling Facilities (source separated materials)*—The following special conditions have been established for the pollution prevention plan for recycling facilities, including MRFs, that receive only source-separated recyclable materials primarily from non-industrial and residential sources:

(i) *Inbound Recyclable Material Control Program.* The plan shall include a recyclable material inspection program to minimize the likelihood of receiving non-recyclable materials (e.g., hazardous materials) that may be a significant source of pollutants in surface runoff. At a minimum, the operator shall consider addressing in the plan the following:

(a) A description of information and education measures to educate the appropriate suppliers of recyclable materials on the types of recyclable materials that are acceptable and those that are not acceptable, e.g., household hazardous wastes;

(b) A description of training requirements for drivers responsible for pickup of recyclable materials;

(c) Clearly mark public drop-off containers as to what materials can be accepted;

(d) Rejecting non-recyclable wastes or household hazardous wastes at the source; and

(e) A description of procedures for the handling and disposal of non-recyclable materials.

(ii) *Outdoor Storage.* The plan shall include BMPs to minimize or reduce the exposure of recyclable materials to surface runoff and precipitation. The plan, at a minimum, shall include good housekeeping measures to prevent the accumulation of visible quantities of residual particulate matter and fluids, particularly in high traffic areas. The plan shall consider tarpaulins or their equivalent to be used to cover exposed bales of recyclable waste paper. The operator shall consider within the plan the use of the following types of BMPs (individually or in combination) or their equivalent, where practicable:

(a) Provide totally enclosed drop-off containers for public.

(b) Provide a sump and sump pump with each containment pit. Discharge collected fluids to sanitary sewer system. Prevent discharging to the storm sewer system;

(c) Provide dikes and curbs for secondary containment, i.e., around bales of recyclable waste paper;

(d) Divert surface runoff away from outside material storage areas; and/or

(e) Provide covers over containment bins, dumpsters, roll-off boxes; and,

(f) Store the equivalent one day's volume of recyclable materials indoors.

(iii) *Indoor Storage and Material Processing.* The plan shall address BMPs to minimize the release of pollutants from indoor storage and processing areas to the storm sewer system. The plan shall establish specific measures to ensure that all floor drains do not discharge to the storm sewer system. The following BMPs shall be considered for inclusion in the plan:

(a) Schedule routine good housekeeping measures for all storage and processing areas;

(b) Prohibit a practice of allowing tipping floor washwaters from draining to any portion of the storm sewer system;

(c) Provide employee training on pollution prevention practices.

(iv) *Vehicle and Equipment Maintenance.* The plan shall also provide for BMPs in those areas where vehicle and equipment maintenance is occurring outdoors. At a minimum, the following BMPs or equivalent measures shall be considered for inclusion in the plan:

(a) Prohibit vehicle and equipment washwater from discharging to the storm sewer system;

(b) Minimize or eliminate outdoor maintenance areas, wherever possible;

(c) Establish spill prevention and clean-up procedures in fueling areas;

(d) Provide employee training on avoiding topping off fuel tanks;

(e) Divert runoff from fueling areas;

(f) Store lubricants and hydraulic fluids indoors;

(g) Provide employee training on proper handling, storage of hydraulic fluids and lubricants.

(d) *Recordkeeping and Internal Reporting Procedures*—The following record and internal reporting procedures are applicable to all discharges seeking coverage under this permit. The plan shall include a description of incidents (such as spills, or other discharges), along with other information describing the quality and quantity of storm water discharges.

Inspections and maintenance activities shall be documented and records of such activities shall be incorporated into the plan. The plan must address spills, monitoring, and BMP inspection and maintenance activities. BMPs which are ineffective must be reported and the date of their corrective action noted. Employees must report incidents of leaking fluids to facility management

and these reports must be incorporated into the plan.

(e) *Non-storm Water Discharges*

(i) The plan shall include a certification that the discharge has been tested or evaluated for the presence of non-storm water discharges. The certification shall include the identification of potential significant sources of non-storm water at the site, a description of the results of any test and/or evaluation for the presence of non-storm water discharges, the evaluation criteria or testing method used, the date of any testing and/or evaluation, and the onsite drainage points that were directly observed during the test. Certifications shall be signed in accordance with Part VII.G. of this permit. Such certification may not be feasible if the facility operating the storm water discharge associated with industrial activity does not have access to an outfall, manhole, or other point of access to the ultimate conduit which receives the discharge. In such cases, the source identification section of the storm water pollution prevention plan shall indicate why the certification required by this part was not feasible, along with the identification of potential significant sources of non-storm water at the site. A discharger that is unable to provide the certification required by this paragraph must notify the Director in accordance with paragraph XI.N.3.a.(3)(d)(iii) (below).

(ii) Except for flows from fire fighting activities, sources of non-storm water listed in Part III.A.2 (Prohibition of Non-storm Water Discharges) of this permit that are combined with storm water discharges associated with industrial activity must be identified in the plan. The plan shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

(iii) *Failure to Certify*—Any facility that is unable to provide the certification required (testing for non-storm water discharges), must notify the Director [Insert date 270 days after permit issuance] or, for facilities which begin to discharge storm water associated with industrial activity after [Insert date 270 days after permit issuance], 180 days after submitting an NOI to be covered by this permit. If the failure to certify is caused by the inability to perform adequate tests or evaluations, such notification shall describe: the procedure of any test conducted for the presence of non-storm water discharges; the results of such test or other relevant observations; potential sources of non-storm water discharges to the storm sewer; and why adequate

tests for such storm sewers were not feasible. Non-storm water discharges to waters of the United States which are not authorized by an NPDES permit are unlawful, and must be terminated.

(4) *Comprehensive Site Compliance Evaluation.* Qualified personnel shall conduct site compliance evaluations at appropriate intervals specified in the plan, but in no case less than once a year. Such evaluations shall provide:

(a) Areas contributing to a storm water discharge associated with industrial activity shall be visually inspected for evidence of, or the potential for, pollutants entering the drainage system. Measures to reduce pollutant loadings shall be evaluated to determine whether they are adequate and properly implemented in accordance with the terms of the permit or whether additional control measures are needed. Structural storm water management measures, sediment and erosion control measures, and other structural pollution prevention measures identified in the plan shall be observed to ensure that they are operating correctly. A visual inspection of equipment needed to implement the plan, such as spill response equipment, shall be made.

(b) Based on the results of the evaluation, the description of potential pollutant sources identified in the plan in accordance with paragraph XI.N.3.a.(2) of this section (Description of Potential Pollutant Sources) and pollution prevention measures and controls identified in the plan in accordance with paragraph XI.N.3.a.(3) of this section (Measures and Controls) shall be revised as appropriate within 2 weeks of such evaluation and shall provide for implementation of any changes to the plan in a timely manner, but in no case more than 12 weeks after the evaluation.

(c) A report summarizing the scope of the evaluation, personnel making the evaluation, the date(s) of the evaluation, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken in accordance with paragraph XI.N.3.a.(4)(b) (above) of the permit shall be made and retained as part of the storm water pollution prevention plan for at least 3 years after the date of the evaluation. The report shall identify any incidents of noncompliance. Where a report does not identify any incidents of noncompliance, the report shall contain a certification that the facility is in compliance with the storm water pollution prevention plan and this permit. The report shall be signed in accordance with Part VII.G. (Signatory Requirements) of this permit.

(d) The storm water pollution prevention plan must describe the scope and content of comprehensive site evaluations that qualified personnel shall conduct to (1) confirm the accuracy of the description of potential pollution sources contained in the plan, (2) determine the effectiveness of the plan, and (3) assess compliance with the terms and conditions of the permit. The individual or individuals who shall conduct the evaluation must be identified in the plan and should be members of the pollution prevention team.

4. Numeric Effluent Limitations

There are no additional numeric effluent limitations beyond those described in Part V.B of this permit.

5. Monitoring and Reporting Requirements

a. Analytical Monitoring Requirements. During the period beginning [insert date 1 year after permit issuance] lasting through [insert date 2 years after permit issuance] and the period beginning [insert date 3 years after permit issuance] lasting through [insert date 4 years after permit issuance], permittees with scrap recycling and waste recycling facilities must monitor their storm water discharges associated with industrial activity at least quarterly (4 times per year) during years 2 and 4 except as provided in paragraphs 5.a.(3) (Sampling Waiver), 5.a.(4) (Representative Discharge), and 5.a.(5) (Alternative Certification). Scrap recycling and waste recycling facilities are required to monitor their storm water discharges for the pollutants of concern listed in Table N-1 below. Facilities must report in accordance with 5.b. (Reporting). In addition to the parameters listed in Table N-1 below, the permittee shall provide the date and duration (in hours) of the storm event(s) sampled; rainfall measurements or estimates (in inches) of the storm event that generated the sampled runoff; the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and an estimate of the total volume (in gallons) of the discharge sampled.

TABLE N-1.—INDUSTRY MONITORING REQUIREMENTS

Pollutants of concern ¹	Cut-off concentration (mg/L)
Chemical Oxygen Demand (COD)	120
Total Suspended Solids (TSS)	100

TABLE N-1.—INDUSTRY MONITORING REQUIREMENTS—Continued

Pollutants of concern ¹	Cut-off concentration (mg/L)
Total Recoverable Aluminum	0.75
Total Recoverable Copper	0.0636
Total Recoverable Iron	1.0
Total Recoverable Lead	0.0816
Total Recoverable Zinc	0.065

¹ Several congeners of PCBs (PCB-1016, -1221, -1242, -1248, -1260) were above established benchmarks, however, EPA believes that these constituents will readily bound up with sediment and particulate matter. Therefore, EPA believes that BMPs will effectively address sources of PCBs and that monitoring for TSS will serve as an adequate indicator of the control of PCBs.

(1) *Monitoring Periods.* Scrap and waste material processing and recycling facilities shall monitor samples collected during the sampling periods of: January to March, April to June, July to September, and October to December for the years specified in paragraph a. (above).

(2) *Sample Type.* A minimum of one grab sample shall be taken. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. The required 72-hour storm event interval is waived where the preceding measurable storm event did not result in a measurable discharge from the facility. The required 72-hour storm event interval may also be waived where the permittee documents that less than a 72-hour interval is representative for local storm events during the season when sampling is being conducted. The grab sample shall be taken during the first 30 minutes of the discharge. If the collection of a grab sample during the first 30 minutes is impracticable, a grab sample can be taken during the first hour of the discharge, and the discharger shall submit with the monitoring report a description of why a grab sample during the first 30 minutes was impracticable. If storm water discharges associated with industrial activity commingle with process or non-process water, then where practicable, permittees must attempt to sample the storm water discharge before it mixes with the non-storm water discharge.

(3) Sampling Waiver

(a) *Adverse Conditions.*—When a discharger is unable to collect samples within a specified sampling period due

to adverse climatic conditions, the discharger shall collect a substitute sample from a separate qualifying event in the next period and submit the data along with data for the routine sample in that period. Adverse weather conditions that may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricane, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (e.g., drought, extended frozen conditions, etc.).

(b) *Low Concentration Waiver*—When the average concentration for a pollutant calculated from all monitoring data collected from an outfall during the monitoring period [insert date 1 year after permit issuance] lasting through [insert date 2 years after permit issuance] is less than the corresponding value for that pollutant listed in Table N-1 under the column Monitoring Cut-off Concentration, a facility may waive monitoring and reporting requirements in the monitoring period beginning [insert date 3 years after permit issuance] lasting through [insert date 4 years after permit issuance]. The facility must submit to the Director, in lieu of the monitoring data, a certification that there has not been a significant change in industrial activity or the pollution prevention measures in the area of the facility which drains to the outfall for which sampling was waived.

(c) When a discharger is unable to conduct quarterly chemical storm water sampling at an inactive and unstaffed site, the operator of the facility may exercise a waiver of the monitoring requirements as long as the facility remains inactive and unstaffed. The facility must submit to the Director, in lieu of monitoring data, a certification statement on the DMR stating that the site is inactive and unstaffed so that collecting a sample during a qualifying event is not possible.

(4) *Representative Discharge*. When a facility has two or more outfalls that, based on a consideration of industrial activity, significant materials, and management practices and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may test the effluent of one of such outfalls and report that the quantitative data also applies to the substantially identical outfall(s) provided that the permittee includes in the storm water pollution prevention plan a description of the location of the outfalls and explains in detail why the outfalls are expected to discharge substantially identical

effluents. In addition, for each outfall that the permittee believes is representative, an estimate of the size of the drainage area (in square feet) and an estimate of the runoff coefficient of the drainage area [e.g., low (under 40 percent), medium (40 to 65 percent), or high (above 65 percent)] shall be provided in the plan. The permittee shall include the description of the location of the outfalls, explanation of why outfalls are expected to discharge substantially identical effluents, and estimate of the size of the drainage area and runoff coefficient with the Discharge Monitoring Report.

(5) *Alternative Certification*. A discharger is not subject to the monitoring requirements of this section provided the discharger makes a certification for a given outfall or on a pollutant-by-pollutant basis in lieu of the monitoring reports required under paragraph b below, under penalty of law, signed in accordance with Part VI.G. (Signatory Requirements), that material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, industrial machinery or operations, or significant materials from past industrial activity, that are located in areas of the facility within the drainage area of the outfall are not presently exposed to storm water and are not expected to be exposed to storm water for the certification period. Such certification must be retained in the storm water pollution prevention plan, and submitted to EPA in accordance with Part VI.C. of this permit. In the case of certifying that a pollutant is not present, the permittee must submit the certification along with the monitoring reports required under paragraph b. below. If the permittee cannot certify for an entire period, they must submit the date exposure was eliminated and any monitoring required up until that date. This certification option is not applicable to compliance monitoring requirements associated with effluent limitations.

b. *Reporting*. Permittees with scrap and waste material processing and recycling facilities shall submit monitoring results for each outfall associated with industrial activity [or a certification in accordance with Sections (3), (4), or (5) above] obtained during the reporting period beginning [insert date 1 year after permit issuance] lasting through [insert date 2 years after permit issuance] on Discharge Monitoring Report Form(s) postmarked no later than the 31st day of the following March [insert the date 2 years after permit issuance]. Monitoring results (or a certification in accordance

with Sections (3), (4), or (5) above] obtained during the period beginning [insert date 3 years after permit issuance] lasting through [insert date 4 years after permit issuance] shall be submitted on Discharge Monitoring Report Form(s) postmarked no later than the 31st day of the following March. For each outfall, one signed Discharge Monitoring Report form must be submitted to the Director per storm event sampled. Signed copies of Discharge Monitoring Reports, or said certifications, shall be submitted to the Director of the NPDES program at the address of the appropriate Regional Office listed in Part VI.G. of the fact sheet.

(1) *Additional Notification*. In addition to filing copies of discharge monitoring reports in accordance with paragraph b (above), scrap and waste material processing and recycling facilities with at least one storm water discharge associated with industrial activity through a large or medium municipal separate storm sewer system (systems serving a population of 100,000 or more) must submit signed copies of discharge monitoring reports to the operator of the municipal separate storm sewer system in accordance with the dates provided in paragraph b (above).

c. *Quarterly Visual Examination of Storm Water Quality*. Facilities shall perform and document a visual examination of a representative storm water discharge associated with industrial activity exposed to storm water. The examination must be made at least once each quarter during daylight hours unless there is insufficient rainfall or snow melt to produce a runoff event. Examinations must be conducted at least once in each of the following periods: January through March; April through June; July through September; and October through December.

(1) Examinations shall be made of samples collected within the first 30 minutes (or as soon thereafter as practical, but not to exceed 1 hour) of when the runoff or snowmelt begins discharging. The examinations shall document observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of storm water pollution. The examination must be conducted in a well lit area. No analytical tests are required to be performed on the samples. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm

event. Where practicable, the same individual should carry out the collection and examination of discharges for the entire permit term.

(2) Visual examination reports must be maintained onsite in the pollution prevention plan. The report shall include the examination date and time, examination personnel, the nature of the discharge (i.e., runoff or snow melt), visual quality of the storm water discharge (including observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of storm water pollution), and probable sources of any observed storm water contamination.

(3) When a facility has two or more outfalls that, based on a consideration of industrial activity, significant materials, and management practices and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may collect a sample of effluent of one of such outfalls and report that the examination data also applies to the substantially identical outfall(s) provided that the permittee includes in the storm water pollution prevention plan a description of the location of the outfalls and explains in detail why the outfalls are expected to discharge substantially identical effluents. In addition, for each outfall that the permittee believes is representative, an estimate of the size of the drainage area (in square feet) and an estimate of the runoff coefficient of the drainage area [e.g., low (under 40 percent), medium (40 to 65 percent), or high (above 65 percent)] shall be provided in the plan.

(4) When a discharger is unable to collect samples over the course of the visual examination period as a result of adverse climatic conditions, the discharger must document the reason for not performing the visual examination and retain the documentation on-site with the records of the visual examinations. Adverse weather conditions which may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricane, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

(5) When a discharger is unable to conduct visual storm water examinations at an inactive and unstaffed site, the operator of the facility may exercise a waiver of the monitoring requirement as long as the facility remains inactive and unstaffed. The

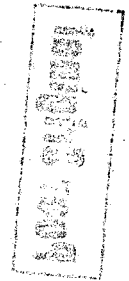
facility must maintain a certification with the pollution prevention plan stating that the site is inactive and unstaffed so that performing visual examinations during a qualifying event is not feasible.

Poor Original

APPENDIX

B

SAMPLING DATA AND LABORATORY REPORTS



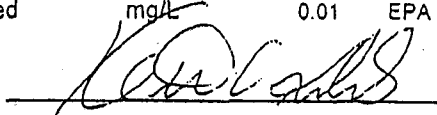
60-2 Dey Dr
Ft. Myers, FL 33907
941-278-7070

Poor Original

Report Date: 8/21/01

To: Mr. Tom Eriksen
Covanta Lee Inc
10500 Buckingham Rd
Ft Myers, FL 33905

Sample Description	Location Code	Laboratory ID	Collection Date	Analyte Name	Laboratory Result	Units	MDL	Analysis Method Reference
Waste to Energy Surface Water	WTESW	AD22560	8/8/01	Aluminum, AA furnace technique	0.01	mg/L	0.01	EPA 202.2
			8/8/01	Chemical Oxygen Demand	31	mg/L	1	EPA 410.1
			8/8/01	Copper by flame AA	Not detected	mg/L	0.02	SM18 3111B
			8/8/01	Iron by flame AA	0.13	mg/L	0.04	EPA 236.1
			8/8/01	Lead, AA furnace technique	Not detected	ug/L	1	SM18 3113 B
			8/8/01	pH, Field (electrometric)	7.9	units	0.1	EPA 150.1
			8/8/01	Specific Conductance @ 25oC	262	umhos/cm	1	EPA 120.1
			8/8/01	Total Suspended Solids	2	mg/L	1	EPA 160.2
			8/8/01	Turbidity (Nephelometric)	2.5	NTU	0.01	EPA 180.1
			8/8/01	Zinc by flame AA	Not detected	mg/L	0.01	EPA 289.1


Keith A. Kibbey
Laboratory Director

OGDEN

Poor Original

**INTEROFFICE
CORRESPONDENCE**

November 2, 1999

To: Becky Bigari

FR: Mark Mattina 

Office: Lee County

Subj.: Pond Water

The pond control structure was opened on 10/15/99 at 1030 hours in anticipation for Hurricane Irene. The pond water level at this time was 3'-6" below the top of the structure. This puts the level below the structure lip so no water was flowing at this time. The hurricane went east of Ft. Myers and we experienced only a minor rainfall. The gate valve was closed on 10/16/99 at 0930 hours. The pond level remained the same with no discharge through the control structure during this time frame.

12047984439

and Water Sample taken

9/1/99

U. Math

Poor Original

ChemTreat, Inc.

03 SEP 1999

* CERTIFICATE OF ANALYSIS *

LABORATORY NO. 99-09-0201

SAMPLE OF WATER TAKEN AT OGDEN MARTIN, FT. MEYERS, FL AND RECEIVED FROM BILL MESSER.

ANALYSIS

WATER

pH	8.5
CONDUCTIVITY, μ mho	163
'P'-ALKALINITY, as CaCO_3 , mg/L	3
'M'-ALKALINITY, as CaCO_3 , mg/L	62
TOTAL HARDNESS, as CaCO_3 , mg/L	75.6
CALCIUM HARD., as CaCO_3 , mg/L	66
MAGNESIUM HARD. as CaCO_3 , mg/L	9.6
IRON, as Fe, mg/L	0.04
COPPER, as Cu, mg/L	<0.01
ZINC, as Zn, mg/L	<0.01
SODIUM, as Na, mg/L	6.2
POTASSIUM, as K, mg/L	3
TOT. INORG. PHOSPHATE, mg/L	<0.5
CHLORIDE, as Cl, mg/L	6.0
SULFATE, as SO_4 , mg/L	4.2
NITRATE, as NO_3 , mg/L	<0.1
ORTHO-PHOSPHATE, as PO_4 , mg/L	<0.5
SILICA, as SiO_2 , mg/L	5.2

RESPECTFULLY SUBMITTED,

T. J. O'CONNOR
CHIEF CHEMIST
CHEMTREAT, INC.

CC: MESSER

OGDEN

Poor Original

INTEROFFICE
CORRESPONDENCE

August 26, 1999

To: Whom it may concern

FR: Mark Mattina

Office: Lee County

Subj.: Pond Water

In accordance with NPDES permit FLR 05B588 a water sample was taken from the southeast pond (at the control structure) at 1415 hours on August 26, 1999. OMSL personnel analyzed the sample for iron with the results as follows.

Iron = .072 Mg/L



LEE COUNTY
SOUTHWEST FLORIDA

OFFICE OF COUNTY COMMISSIONERS



(941) 479-8181

Writer's Direct Dial Number: _____

John E. Manning
District One

Douglas R. St. Cerny
District Two

Ray Judah
District Three

Andrew W. Coy
District Four

John E. Albion
District Five

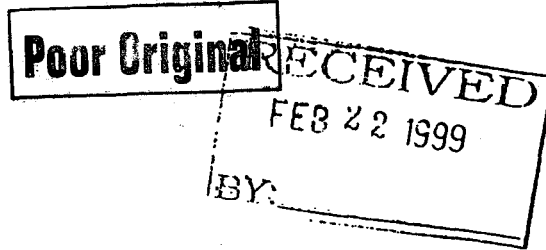
Donald D. Stilwell
County Manager

James G. Yaeger
County Attorney

Diana M. Parker
County Hearing
Examiner

February 18, 1999

Tamara Tyrell
Malcolm Pirnie Inc.
1901 N. 13th Street
Tampa, FL 33605



SUBJECT: TESTING FOR SURFACE WATER

Dear Tamara:

Attached please find the laboratory test results for surface water, taken at Waste-to-Energy facility between year 1996-1998. Please compare the test results and provide us with a report that we can use to submit to Water Management District to change our current surface water monitoring requirements.

If you have any questions regarding these results, please feel free to contact me.

Sincerely,

ENVIRONMENTAL SERVICES DEPARTMENT

Chandra Raman, Project Engineer
Solid Waste Division

CR/lm

Attachment

H:\LETTERS\CHANDRA\LETTERS\TESTING FOR SURFACE WATER.DOC

APPENDIX

C

OIL POLLUTION PREVENTION PLAN

APPENDIX

D

POLLUTION PREVENTION TEAMS

IMAGE QUALITY

**AS YOU REVIEW THE NEXT GROUP OF IMAGES, PLEASE NOTE
THAT THE ORIGINAL DOCUMENTS WERE OF POOR QUALITY.**

Pollution Prevention Team

TEAM LEADER

Name: Mark Platten

Date of Assignment: 12/1/01

Title: Chief Engineer

Qualifications/Training: Post Team Leader

TEAM MEMBERS

Name: Randal Park

Title: Shift Supervisor
Date of Assignment: _____

Name: W. J. [Signature]

Title: Shift Supervisor
Date of Assignment: _____

Name: [Signature]

Title: SHIFT SUPERVISOR
Date of Assignment: _____

Name: [Signature]

Title: Shift Supervisor
Date of Assignment: _____

Name: _____

Title: _____
Date of Assignment: _____

Pollution Prevention Team - SWERF

TEAM LEADER

Name: _____ Date of Assignment: _____

Title: _____

Qualifications/Training: _____

TEAM MEMBERS

Name: _____ Title: _____
Date of Assignment: _____

Name: _____ Title: _____
Date of Assignment: _____

Name: _____ Title: _____
Date of Assignment: _____

Name: _____ Title: _____
Date of Assignment: _____

Name: _____ Title: _____
Date of Assignment: _____

Pollution Prevention Team - RMPF

TEAM LEADER

Name: _____ Date of Assignment: _____

Title: _____

Qualifications/Training: _____

TEAM MEMBERS

Name: _____

Title: _____

Date of Assignment: _____

Name: _____

Title: _____

Date of Assignment: _____

Name: _____

Title: _____

Date of Assignment: _____

Name: _____

Title: _____

Date of Assignment: _____

Name: _____

Title: _____

Date of Assignment: _____

Pollution Prevention Team - _____

TEAM LEADER

Name: _____ Date of Assignment: _____

Title: _____

Qualifications/Training: _____

TEAM MEMBERS

Name: _____ Title: _____
Date of Assignment: _____

Name: _____ Title: _____
Date of Assignment: _____

Name: _____ Title: _____
Date of Assignment: _____

Name: _____ Title: _____
Date of Assignment: _____

Name: _____ Title: _____
Date of Assignment: _____

APPENDIX

E

EMPLOYEE TRAINING ACKNOWLEDGMENT

Employee Training Acknowledgment

The undersigned have reviewed the Storm Water Pollution Prevention Plan for the Lee County Solid Waste Resource Recovery Facility, and are familiar with the facility's potential pollutant sources, control methods, and compliance evaluation procedures.

NAME	TITLE	SIGNATURE	DATE
Mark Clatten	Chief Engineer	<i>Mark Clatten</i>	3/9/01
A. S. LONG	CRO	<i>A. S. Long</i>	3-9-01
JOHN GROENEVELD	OPERATIONS	<i>John Groeneveld</i>	3/9/01
Mike Ditt	Shift Supervisor	<i>Mike Ditt</i>	3/9/01
STEVE MOORE	CRO	<i>Steve Moore</i>	3-9-01
James K. Heffron	A.E.	<i>James K. Heffron</i>	3-10-01
Ben Burner	Utility	<i>Ben Burner</i>	3-10-01
Terry Dixon	AE	<i>Terry Dixon</i>	3-10-01
Doug MARTIN	AE	<i>Doug Martin</i>	3-11-01
Matthew Carroll	AE	<i>Matthew Carroll</i>	3-11-01
FRED LAURELLE	S/S	<i>Fred Laurelle</i>	3/11/01
Dink English	AE	<i>Dink English</i>	3/11/01
Curtis Figgers	Utility	<i>Curtis Figgers</i>	3-11-01
Bryan Attnan	Shift Supervisor	<i>Bryan Attnan</i>	3-12-2001
Jeff Coburn	C.R.O.	<i>Jeff Coburn</i>	3-12-2001
Jim Weakland	CRO	<i>Jim Weakland</i>	3-12-01
MICHAEL THOMAS	AE	<i>Michael Thomas</i>	3-12-01
Hayden Font	LT	<i>Hayden Font</i>	3-12-01
BRIAN L GRANT	AE	<i>Brian L Grant</i>	3-13-01
Chris Pinter	AE	<i>Chris Pinter</i>	3-13-01
Samuel Martinez	U.D.	<i>Samuel Martinez</i>	3-14-01
George V Thompson	AE	<i>George V Thompson</i>	3-14-01
V. Biller	AE	<i>V. Biller</i>	3-18-01
Randal Park	SS	<i>Randal Park</i>	3-21-01

APPENDIX

F

COMPLETED MONTHLY INSPECTION FORM - CONTROL STRUCTURE #1 (OUTFALL 001) AND DRAINAGE BASIN

Figure 4-1

Monthly Inspection Form - Control Structure #1 (Outfall 001) and Drainage Basin
Preventive Maintenance and Comprehensive Site Compliance
Lee County Solid Waste Resource Recovery Facility

Name of inspector(s): Becky Maciowski

Signature(s): Becky Maciowski

Date: 12/12/01

Outfall Drainage Area	YES	NO	Comments and Corrective Actions
Evidence of erosion?		X	
Are materials exposed to storm water?	X		Tire Pao Processing Center
Are new chemicals or other potential pollutants present within the area?	X		Shipping & Receiving Staging Area
Area sightly and free of debris?	X		Note: Unit Outage Material/Supplies Maintenance Area
Are surface water control structures (swales, drainage gate, basins, fencing, etc.) functioning properly?	X		Outfall Closed during the inspection.
Staining of ground surface, stressed vegetation, or other surface indicators of spills?		X	
Evidence of contamination of discharge (odor, sheen on water, other)?		X	
Evidence of leaking, or potential leaking from ASTs or silos?		X	

NOTES:

- 1 - Any item requiring action must be brought to the immediate attention of the Pollution Prevention Team Leader
- 2 - A copy of this form must be retained in the Storm Water Pollution Prevention Plan after completion
- 3 - Control structure #1 (Outfall #1) location can be found on Figure 3-2 of the Storm Water Pollution Prevention Plan
- 4 - Attach any additional comments to this form

Figure 4-1

Monthly Inspection Form - Control Structure #1 (Outfall 001) and Drainage Basin
Preventive Maintenance and Comprehensive Site Compliance
Lee County Solid Waste Resource Recovery Facility

Name of inspector(s): _____ Signature(s): _____ Date: _____

Outfall Drainage Area	YES	NO	Comments and Corrective Actions
Evidence of erosion?			
Are materials exposed to storm water?			
Are new chemicals or other potential pollutants present within the area?			
Area sightly and free of debris?			
Are surface water control structures (swales, drainage gate, basins, fencing, etc.) functioning properly?			
Staining of ground surface, stressed vegetation, or other surface indicators of spills?			
Evidence of contamination of discharge (odor, sheen on water, other)?			
Evidence of leaking, or potential leaking from ASTs or silos?			

NOTES:

- 1 - Any item requiring action must be brought to the immediate attention of the Pollution Prevention Team Leader.
- 2 - A copy of this form must be retained in the Storm Water Pollution Prevention Plan after completion.
- 3 - Control structure #1 (Outfall #1) location can be found on Figure 3-2 of the Storm Water Pollution Prevention Plan.
- 4 - Attach any additional comments to this form.

APPENDIX G

COMPLETED ANNUAL STORMWATER INSPECTION/ SITE COMPLIANCE EVALUATION

**LEE COUNTY
SOLID WASTE ENERGY RECOVERY FACILITY
MASTER PUNCH LIST REPORT**

No.	EQUIPMENT/ITEM	OBSERVATION	DATE SUBMITTED	TIER	RESOLUTION	OMSL NOTICE OF STATUS/ COMPLETION	LEE Co./MPI FINAL VERIFICATION
A. FACILITY SITE							
A1-99	Entrance Road	Transverse cracking noted on entrance road to tipping floor - consistently noted half way between control joints	3/24/99	3	OMSL to monitor and repair when required.	07/12/99	
A1-00	Perimeter Fence	Perimeter fencing and posts require repairs in some areas, especially east of tipping building and west of fire pump houses.	12/12/00	3	Added fence maintenance to landscapers scope of work.	01/12/01	
A2-00	Signage	Speed limit sign on tipping floor bypass road is obscured by vegetation.	12/12/00	3	Cleared vegetation.	04/01/01	
A3-00	Guardrails	Minor impact damage observed on tipping floor exit ramp guardrails.	12/12/00	2	Installing rocks on side of roadways, met with haulers, discussed with County and installed cameras in an effort to slow drivers down and keep them on the plant roadways.	04/06/01	
A4-00	Roadways	Ash being tracked out of ash building should be swept or hosed down more frequently.	12/12/00	3	Area being swept daily.	12/15/00	
A5-00	Vegetation	Exotic species observed growing near perimeter fence should be removed, especially melaleuca east of tipping building and Brazilian pepper west of fire pump houses and propane tank.	12/12/00	3	County issue.		
A6-00	Propane Tank	Alarm station/control panel is corroded and requires repair or replacement.	12/12/00	2			
A7-00	Ammonia Tank	Eyewash/shower station foot pedal is broken and station needs to be flushed periodically as rusty water was observed coming out.	12/12/00	1	Repaired pedal. All stations are flushed weekly.	01/01/01	
A8-00	Ammonia Tank	Tank unloading procedures are missing and sign is faded.	12/12/00	2	Replaced procedures.	01/01/01	
B. SCALE HOUSE							
B2-99	Scales	Noted peeling paint and corrosion on all scales	3/24/99	3	County issue.		

**LEE COUNTY
SOLID WASTE ENERGY RECOVERY FACILITY
MASTER PUNCH LIST REPORT**

No.	EQUIPMENT/ITEM	OBSERVATION	DATE SUBMITTED	TIER	RESOLUTION	OMSL NOTICE OF STATUS/ COMPLETION	LEE Co./MPI FINAL VERIFICATION
B3-99	Scales	Noted concrete finish damage on northern inbound scale foundation	3/24/99	3	County issue.		
B4-99	Scales	Noted excessive debris collection under all scales	3/24/99	4	County issue.		
B5-99	Scales	Calibration records not available at scale house	3/24/99	2	County issue.		
C. TIPPING BUILDING							
C3-00	Electrical	Replace electrical outlet cover on fifth column from north.	3/23/00	3	Replaced cover.	09/01/00	
C4-00	Doorways	Personnel doors on east and south side of tipping building are rusting at the bottom.	12/12/00	3			
C5-00	Vehicle Stops	Repair/replace cutout area of vehicle stop at the second bay from the north end.	12/12/00	3	Repaired stop.	12/20/01	
C6-00	Housekeeping	Ceiling of tipping building needs to be pressure washed.	12/12/00	4			
D. REFUSE STORAGE BUILDING							
D2-00	Crane Pulpit	Pulpit door opens roughly.	12/12/00	2	Lubricated door hinges.	01/05/01	
D3-00	Crane Pulpit	Replace insulation on HVAC duct to pulpit.	12/12/00	3			
D4-00	Housekeeping	Ceiling of refuse storage building needs to be pressure washed.	12/12/00	4			
E. ADMINISTRATION/BOILER/TURBINE/CONTROL ROOM BUILDING							
E2-99	Windows	One window is cracked on the second floor administration area.	3/24/99	3	OMSL investigating warranty repair/replacement.		
E27-99	Ground Floor	Repair door and frame on north side of the building.	10/01/99	4			
E2-00	T-G Crane	Finish painting access ladder to crane.	3/23/00	4			
E4-00	Roof	Squeaking belt on M3D exhaust fan.	3/23/00	2	Replaced belt.	04/03/00	
E5-00	Roof	Northeast silencer beginning to rust.	3/23/00	4			
E6-00	Access Ladders	Safety chains unhooked on many ladders.	3/23/00	1	Rehooked chains.	04/03/00	
E7-00	Control Room	Replace water-stained ceiling tiles in control room.	12/12/00	4	Replaced tiles.	01/15/01	

**LEE COUNTY
SOLID WASTE ENERGY RECOVERY FACILITY
MASTER PUNCH LIST REPORT**

No.	EQUIPMENT/ITEM	OBSERVATION	DATE SUBMITTED	TIER	RESOLUTION	OMSL NOTICE OF STATUS/ COMPLETION	LEE Co./MPI FINAL VERIFICATION
		possibly caused by boiler building washdowns.					
E8-00	Lighting	Several lights out in turbine-generator room.	12/12/00	3	Repaired lights.	03/20/01	
E9-00	Signage	Signage indicating hardhat/ear protection requirement may be necessary at doorways from electrical room and adjacent hallway into bottom floor of turbine-generator building.	12/12/00	1	Installed signage.	03/15/01	
E10-00	Ground Floor	Water damage observed on floor tiles in central hallway to boiler building.	12/12/00	4	Replaced tiles.	01/15/01	
E11-00	Stairways	Several loose stair nosings on both administration building stairways need to be secured or replaced.	12/12/00	1	Replaced loose nosings in west stairwell.	01/25/01	
E12-00	Ground Floor	Repair chipped area on wall at first floor elevator door.	12/12/00	4	Plastered and painted.	12/20/00	
E13-00	Doorways	Door/knob require adjustment on doorway from electrical room hallway to first floor of turbine-generator building, as door is difficult to open.	12/12/00	2	Repaired door latch.	02/21/01	
E14-00	Exhaust Fans	One exhaust fan on roof of boiler building appears inoperable.	12/12/00	3			
E15-00	Lighting	Two lights are out above Unit 2 north ash discharger.	12/12/00	3	Repaired lights.	12/30/00	
E16-00	Doorways	Replace rusting personnel doors/threshold on north side of boiler building.	12/12/00	2	Ordered plastic door.	03/15/01	
E17-00	Drains	Clean out surface drains in boiler basement.	12/12/00	3	Cleaned drains.	12/30/00	
F. COMBUSTION/STEAM GENERATING EQUIPMENT							
F5-00	Insulation/Lagging	Much of the insulation and lagging on the steam drum small piping is damaged. A repair program should be initiated to correct all deficiencies.	3/23/00	3			
F10-00	Insulation/Lagging	Replace insulation blankets on Unit 1 superheater hopper doors.	12/12/00	1	Replaced blankets.	01/16/01	
F11-00	Insulation/Lagging	Replace damaged insulation near Unit 1 economizer door.	12/12/00	2			

**LEE COUNTY
SOLID WASTE ENERGY RECOVERY FACILITY
MASTER PUNCH LIST REPORT**

No.	EQUIPMENT/ITEM	OBSERVATION	DATE SUBMITTED	TIER	RESOLUTION	OMSL NOTICE OF STATUS/ COMPLETION	LEE Co./MPI FINAL VERIFICATION
F12-00	Insulation/Lagging	Lagging needs to be replaced at feed table transition on south side of Unit 1 and north side of Unit 2.	12/12/00	2			
F13-00	Insulation/Lagging	Replace insulation and lagging on high-pressure to intermediate-pressure steam conditioning valve.	12/12/00	1			
F14-00	Blowdown Tank	Repair leak on boiler blowdown tank vent valve.	12/12/00	3	Repaired leak.	12/30/00	
F15-00	Overfire Air Heaters	Remove protruding piping stubs and insulation from Unit 1 and 2 overfire air heaters, and cover openings with lagging.	12/12/00	2			
G. POWER GENERATION SYSTEM							
G2-00	Insulation/Lagging	Six-inch low pressure steam piping north of turbine-generator pedestals on ground floor requires insulation and lagging	12/12/00	1			
H. AIR POLLUTION CONTROL EQUIPMENT AND STACK							
H2-00	Air Pollution Control Building	Vent pipes penetrating north wall of air pollution control building require touch-up with protective coating.	12/12/00	4			
H3-00	Sampling Ports	Repair corrosion on sampling port cover plates and bolts on discharge ducts from ID fans.	12/12/00	3			
H4-00	Lime Silo	Repair corrosion on lime silo vent on roof of air pollution control building.	12/12/00	4			
H5-00	Carbon Feeders	Carbon feeder room requires thorough cleaning.	12/12/00	3	Cleaned room.	12/15/00	
H6-00	Carbon Feeders	Personnel doors into carbon feeder room require replacement, as the bottoms are corroded away. Remove water from exit sign over south personnel door.	12/12/00	2	Ordered plastic doors. Removed water from sign.	03/15/01	
I. ASH HANDLING SYSTEM							
I1-99	Grizzly Building	Baseplates and bottoms of siding panels and personnel doors are starting to corrode.	3/24/99	3	Ordered plastic doors.	03/15/01	
I6-99	Ash Building	Bottoms of personnel doors are rusting, as well as the south roll-up doorframe.	3/24/99	3	Ordered plastic doors.	03/15/01	
I3-00	Slipstick Conveyor	Repair hydraulic leak.	3/23/00	2			

**LEE COUNTY
SOLID WASTE ENERGY RECOVERY FACILITY
MASTER PUNCH LIST REPORT**

No.	EQUIPMENT/ITEM	OBSERVATION	DATE SUBMITTED	TIER	RESOLUTION	OMSL NOTICE OF STATUS/ COMPLETION	LEE Co./MPI FINAL VERIFICATION
15-00	Incline Conveyor Enclosure	Inside surface of enclosure exhibits rust in spots.	3/23/00	4			
16-00	Ash Building	Structural steel and piping corroding on north wall above platform.	3/23/00	2			
17-00	Ash Dischargers	Access hatches on all ash dischargers should remain closed during operation.	12/12/00	1	Noted.	12/15/00	
18-00	Ash Building	Replace metal siding panels that are corroding, especially where screws attach to sheeting girls.	12/12/00	2			
19-00	Ash Building	Provide additional bracing where siding was replaced on the west wall.	12/12/00	2	Not required.	01/01/01	
110-00	Ash Building	Building interior should be thoroughly washed down to remove ash buildup on handrails, structural steel, and siding.	12/12/00	3	Ongoing.	01/01/01	
111-00	Ash Building	Angle iron needs to be replaced on front edge of bunker dividing wall.	12/12/00	3			
112-00	Ash Building	Replace surface drain grating near south personnel door.	12/12/00	2	Replaced grating.	03/15/01	
113-00	Fly Ash Screw Conveyors	Replace insulation and lagging beneath screw conveyor to Unit 2 ash discharger.	12/12/00	2			
J. CONDENSATE/FEEDWATER EQUIPMENT							
J2-99	Deaerator	The level gauge glass on the deaerator tank is unreadable and should be cleaned/repared.	3/24/99	2	Cleaned gauge.	05/08/00	
J2-00	Deaerator	Evidence of oil leak on platform/handrailing near top of deaerator, apparently from sootblower above.	3/23/00	3	Repaired and cleaned up leak.	05/08/00	
J4-00	Deaerator	Replace lagging on deaerator vent piping.	3/23/00	2			
K. COOLING TOWER AND CIRCULATING WATER EQUIPMENT							
K2-00	Piping	Repair/replace rusting flange bolts on fiberglass piping.	3/23/00	3	Painted bolts.	05/10/00	
K3-00	Piping	Expansion joint circulating water piping outlet from bypass condenser shows peeling and appears to be separating from the flange.	12/12/00	2	Painted expansion joint. No separation noted.	12/30/00	

**LEE COUNTY
SOLID WASTE ENERGY RECOVERY FACILITY
MASTER PUNCH LIST REPORT**

NO.	EQUIPMENT/ITEM	OBSERVATION	DATE SUBMITTED	TIER	RESOLUTION	OMSL NOTICE OF STATUS/ COMPLETION	LEE Co./MPI FINAL VERIFICATION
K4-00	Platforms	Repair or replace corroded platform grating, handrails, structural steel, conduit, and supports east of cooling tower (above basin).	12/12/00	2			
K5-00	Piping	Concrete delaminating on thrust block/riser support on south side of cooling tower.	12/12/00	3	Patched skim coat.	02/28/01	
K6-00	Piping	Discharge piping from circulating water pumps does not appear to be resting on its supports.	12/12/00	2	Noted this is on the two pumps in operation.	04/05/01	
K7-00	Piping	Cooling water return piping from air compressor is discharging into surface drain.	12/12/00	2	This is the water separator discharge.	12/20/00	
L. WATER TREATMENT							
L6-99	Sulfuric Acid Tank	Replace skid metal under sulfuric acid tank	3/24/99	2	Replaced skid.	05/15/00	
L8-99	Caustic Skid	Structural support steel is corroding.	3/24/99	3			
L9-99	Acid Delivery Skid	Structural steel, pipe supports, deck plate and pump supports are corroding.	3/24/99	3			
L13-99	Demineralizer Building	Tanks, equipment, piping, instrumentation and support steel located in general area adjacent to building and cooling towers - noted numerous areas of coating damage and corrosion.	3/24/99	3	Ongoing painting.		
L19-99	Water Treatment Building	Replace rusted door on south side of buildings.	10/01/99	3			
L20-99	Water Treatment Building	Repair drip edge on south side of building.	10/01/99	4			
L21-99	Demineralized Water Tank	Clean and paint electrical box - JT5.	10/01/99	2			
L22-99	Demineralized Water Tank	Sandblast and paint level control station.	10/01/99	2			
L23-99	Neutralized Pump Skid	Clean and paint base.	10/01/99	4	Painted base.	05/20/00	
L24-99	Neutralized Pump Skid	Replace 2" pressure gage on instrument air PRV.	10/01/99	4	Replaced gauge.	08/28/00	
L25-99	Neutralized Tank	Install coupling guard on mixer motor.	10/01/99	1	Installed guard.	09/20/00	

**LEE COUNTY
SOLID WASTE ENERGY RECOVERY FACILITY
MASTER PUNCH LIST REPORT**

No.	EQUIPMENT/ITEM	OBSERVATION	DATE SUBMITTED	TIER	RESOLUTION	OMSL NOTICE OF STATUS/ COMPLETION	LEE Co./MPI FINAL VERIFICATION
L26-99	Neutralized Tank	Repaint mixer motor and frame gear box.	10/01/99		Painted.	03/16/01	
L27-99	Activated Carbon Silo	GT2 Junction box needs replacing.	10/01/99	2	Replaced box.	05/15/00	
L28-99	Activated Carbon Silo	Unistrut conduit support needs repair on side of tank.	10/01/99	3	Repaired support.	05/15/00	
L29-99	Activated Carbon Silo	Rust is showing on base, needs touch up.	10/01/99	3	Touched up base.	09/15/00	
L30-99	Hydrated Lime Silo	GT3 Junction box needs replacing.	10/01/99	2	Replaced box.	02/15/01	
L31-99	Soda Ash Silo	GT4 Junction box needs replacing.	10/01/99	2			
L32-99	Soda Ash Silo	Base needs painting.	10/01/99	3	Painted base.	09/15/00	
L33-99	Soda Ash Silo	Red rubber hose on back of tank needs replacing.	10/01/99	2	Replaced hose.	02/02/01	
L2-00	Water Treatment Area (outside)	Repair corrosion on piping and supports throughout water treatment equipment area and reapply protective coating.	3/23/00	3	Ongoing.	03/23/00	
L5-00	Hydrated Lime and Soda Ash Silos	Electric panels at hydrated lime and soda ash silos need to be replaced.	12/12/00	2	Replaced hydrated lime silo box.	02/15/01	
L6-00	Water Treatment Building	Repair or replace corroded siding, gutters, and downspouts as necessary on the water treatment building, especially on the north side.	12/12/00	3			
L7-00	Chlorine Storage Area	Repair corroded doors, siding, and gutters in the chlorine storage area.	12/12/00	3			
M. FIRE PROTECTION							
M1-00	Signage	Siamese fire connection sign at front entrance to administration building is faded, as are signs on the fire pump houses.	12/12/00	3	Replaced Siamese fire connection sign.	04/06/01	
M2-00	Fire Pump Houses	Replace corroded siding and gutters on fire pump houses.	12/12/00	3			
M3-00	Fire Pump Houses	Repair doors and handle on north fire pump house double doors.	12/12/00	2	Repaired doors and handle.	02/18/01	
M4-00	Fire Pump Houses	Repair corrosion on pump engine exhaust piping outside fire pump houses.	12/12/00	3	Painted piping.	01/15/01	

**LEE COUNTY
SOLID WASTE ENERGY RECOVERY FACILITY
MASTER PUNCH LIST REPORT**

No.	EQUIPMENT/ITEM	OBSERVATION	DATE SUBMITTED	TIER	RESOLUTION	OMSL NOTICE OF STATUS/ COMPLETION	LEE Co./MPI FINAL VERIFICATION
M5-00	Fire Water Storage Tank	Repair corrosion on piping and U-bolts, and replace corroded junction box and pressure control valve at base of fire water storage tank.	12/12/00	3			
N. ELECTRICAL SYSTEMS AND EQUIPMENT							
N2-00	Electrical Room	Replace air filter for electrical room on ground floor of administration building.	12/12/00	3	Replaced filter.	02/15/01	
O. DISTRIBUTED CONTROL SYSTEM							
P. MOBILE SERVICE EQUIPMENT							

Figure 6-1A

**LEE COUNTY SOLID WASTE ENERGY RECOVERY FACILITY
LEE COUNTY, FLORIDA**

Annual Storm Water Inspection/ Site Compliance Evaluation Report		Completed by: Title: Date:			
Instructions: Review SWP3 and conduct site inspection. Observe and record any changes since last inspection.					
Property (e.g., paving, buildings, landscaping):					
Erosion:					
New Process/Storage/Handling/Waste:					
Spill/Leaks/Areas of Staining:					
Outfalls		Condition (deterioration, staining, smell)		Flow Observed	
Control Structure #1					
Significant Materials: Exposed to Stormwater:					
	No Action	Needs Action		No Action	Needs Action
Site Drainage Map			Preventative Maintenance		
Material/Equipment/ Vehicle Management Practices			Good Housekeeping		
Loading/Unloading Areas			Spill Prevention Response		
Structural/Non-Structural Controls			Management Practices		
Treatment Facilities			Training		
On-Site Storage					
Sampling Data					
Comments/Corrective Action:					

**LEE COUNTY RECOVERED MATERIALS PROCESSING FACILITY
LEE COUNTY, FLORIDA**

Annual Storm Water Inspection/ Site Compliance Evaluation Report		Completed by: Title: Date:			
Instructions: Review SWP3 and conduct site inspection. Observe and record any changes since last inspection.					
Property (e.g., paving, buildings, landscaping):					
Erosion:					
New Process/Storage/Handling/Waste:					
Spill/Leaks/Areas of Staining:					
Significant Materials: Exposed to Stormwater:					
	No Action	Needs Action		No Action	Needs Action
Site Drainage Map			Preventative Maintenance		
Material/Equipment/ Vehicle Management Practices			Good Housekeeping		
Loading/Unloading Areas			Spill Prevention Response		
Structural/Non- Structural Controls			Management Practices		
On-Site Storage			Training		
Comments/Corrective Action:					

APPENDIX

H

COMPLETED QUARTERLY STORMWATER DISCHARGE MONITORING REPORT FORMS



LEE COUNTY
SOUTHWEST FLORIDA

BOARD OF COUNTY COMMISSIONERS

(941) 479-8181

Writer's Direct Dial Number: _____

Bob Janes
District One

January 8, 2002

Douglas R. St. Cerny
District Two

Ray Judah
District Three

Andrew W. Coy
District Four

John E. Albion
District Five

Donald D. Stilwell
County Manager

James G. Yaeger
County Attorney

Diana M. Parker
County Hearing
Examiner

NPDES Stormwater Section, MS #2511
Florida Department of Environmental Protection
2600 Blair Stone Rd.
Tallahassee, Fl. 32399-2400

SUBJECT: NPDES Permit FLR 05 B 588

Dear Sir or Madam:

Attached please find the Discharge Monitoring Report for the period October 1, 2001 through December 31, 2001. No storm water was discharged during the reporting period.

Sincerely,

Lindsey J. Sampson, P.E., Director
Solid Waste Division

LJS:
Attachment

cc: T. Eriksen, OMSL ✓
S. Shannon, MPI
II E 110

S:\SW\LINDSEY\LETTERS\DEP NPDES 4Q-01.DOC

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME

ADDRESS Lee County Solid Waste Management
1500 Monroe Street, 3rd Floor
Fort Myers, Florida 33901

FACILITY LOCATION Lee County Resource Recovery
1500 Buckingham Road
Fort Myers, FL 33905

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

FLR05B588	CS No. 1
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD					
YEAR	MO	DAY	YEAR	MO	DAY
01	10	01	01	12	31
(20-21) (22-23) (24-25)			(26-27) (28-29) (30-31)		

☒ Check here if No Discharge

NOTE: Read Instructions before completing this form

PARAMETER (32-37)		(3 Card Only) QUANTITY OR LOADING (46-53)			(4 Card Only) QUALITY OR CONCENTRATION (38-45)				NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
DATE OF STORM EVENT	SAMPLE MEASUREMENT	*****	*****		*****	*****	*****		**	*****	*****
	PERMIT REQUIREMENT	*****	*****		*****	*****	*****			*****	*****
DURATION OF - HRS STORM	SAMPLE MEASUREMENT	*****		INS	*****	*****		GALS	**		*****
ELAPSED SINCE DAYS LAST STORM > 0.1 INS	PERMIT REQUIREMENT	*****	ESTIMATE RAINFALL		*****	*****	ESTIMATE VOL DIS			QTRLY	*****
CHEMICAL OXYGEN DEMAND, 00341 1 0 0	SAMPLE MEASUREMENT	*****	*****		*****	*****		MG/L	**		
EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*****	*****		*****	*****	REPORT DAILY MAX			QTRLY	GRAB
SOLIDS, TOTAL SUSPENDED 00530 1 0 0	SAMPLE MEASUREMENT	*****	*****		*****	*****		MG/L	**		
EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*****	*****		*****	*****	REPORT DAILY MAX			QTRLY	GRAB
ALUMINUM, TOTAL RECOVERABLE 01104 1 0 0	SAMPLE MEASUREMENT	*****	*****		*****	*****		MG/L	**		
EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*****	*****		*****	*****	REPORT DAILY MAX			QTRLY	GRAB
COOPER, TOTAL RECOVERABLE 01042 1 0 0	SAMPLE MEASUREMENT	*****	*****		*****	*****		MG/L	**		
EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*****	*****		*****	*****	REPORT DAILY MAX			QTRLY	GRAB
IRON, TOTAL RECOVERABLE 00980 1 0 0	SAMPLE MEASUREMENT	*****	*****		*****	*****		MG/L	**		
EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	*****	*****		*****	*****	REPORT DAILY MAX			QTRLY	GRAB
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. EPL RULE 62-620.305, F.A.C.					TELEPHONE		DATE		
Lindsey J. Sampson Director							941 479-8181		2 / 8		
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT					AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS: (Reference all attachments here)

SECTOR N: SCRAP RECYCLING FACILITIES

SIC CODE: 5093 (Note: Analytical monitoring requirements are not applicable to "clean MRFs" - See Federal Register Vol. 60, No. 189 page 51100)

DMR 1 of 2

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
 NAME Lee County Solid Waste Management
 ADDRESS 1500 Monroe Street, 3rd Floor
 Fort Myers, FL 33901
 Lee County Resource Recovery
 FACILITY 1500 Buckingham Road
 LOCATION Fort Myers, FL 33905

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
 DISCHARGE MONITORING REPORT (DMR)

(2-16) (17-19)
 FLR05B588 CS No. 1
 PERMIT NUMBER DISCHARGE NUMBER

MONITORING PERIOD
 FROM YEAR MO DAY TO YEAR MO DAY
 01 10 01 01 12 31
 (20-21) (22-23) (24-25) (26-27) (28-29) (30-31)

☒ Check here if No Discharge

NOTE: Read Instructions before completing this form

PARAMETER (32-37)		(3 Card Only) (46-53) QUANTITY OR LOADING (54-61)			(4 Card Only) (38-45) QUALITY OR CONCENTRATION (46-53) (54-61)				NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
LEAD, TOTAL RECOVERABLE 01114 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	*****	*****		*****	*****		MG/L			
	PERMIT REQUIREMENT	*****	*****		*****	*****	REPORT DAILY MAX			QTRLY	GRAB
ZINC, TOTAL RECOVERABLE 01264 1 0 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	*****	*****		*****	*****		MG/L			
	PERMIT REQUIREMENT	*****	*****		*****	*****	REPORT DAILY MAX			QTRLY	GRAB
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER Lindsey J. Sampson Director TYPED OR PRINTED	I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE RULE 62-820.305, F.A.C.	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT <i>Lindsey J. Sampson</i>	TELEPHONE	DATE		
			941 479-8181	02	1	8
AREA CODE	NUMBER	YEAR	MO	DAY		

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

SECTOR N: SCRAP RECYCLING FACILITIES

SIC CODE: 8000 (Note: Analytical monitoring requirements are not applicable to "clean MR" See Federal Register Vol. 60, No. 189, page 51100, published September 29, 1995)

DMR 2 of 2

Send completed DMR to: Florida Department of Environment



LEE COUNTY

SOUTHWEST FLORIDA

BOARD OF COUNTY COMMISSIONERS

(941) 479-8181

Writer's Direct Dial Number: _____

John E. Manning
District One

October 31, 2001

Douglas R. St. Cerny
District Two

Ray Judah
District Three

Andrew W. Doy
District Four

John E. Alton
District Five

Donald D. Stowell
County Manager

James G. Yeager
County Attorney

Diana M. Parker
County Hearing
Examiner

NPDES Stormwater Section, MS #2511
Florida Department of Environmental Protection
2600 Blair Stone Rs.
Tallahassee, FL 32399-2400

SUBJECT: NPDES Permit FLR 05 B 588

Dear Sir or Madam:

Attached please find the Discharge Monitoring Report for the period July 1, 2001 through September 30, 2001. Storm water was discharged through the 3-inch diameter bleed valve beginning August 8, 2001. The bleeder valve was closed on September 27, 2001. It is estimated that a maximum of 603,966 cubic feet was discharged. A sample of the discharge water was collected on August 8, 2001 and tested for the required analysis.

Sincerely,

Lindsey J. Sampson, P.E., Director
Solid Waste Division

LJS:
Attachment

cc: T. Eriksen, OMSL
S. Shannon, MPI
II E 110

S:\SW\LINDSEY\LETTERS\FDEP NPDES 1Q-01.DOC

PERMITTEE NAME/ADDRESS
NAME Lee County Department of Solid Waste
ADDRESS 1500 Monroe Street, 3rd Floor
Fort Myers, FL 33901

FACILITY LOCATION
Lee County Solid Waste Resource Recovery Facility
1500 Buckingham Road
Fort Myers, Florida 33905

NATIONAL POLLUTANT DISCHARGE MONITORING REPORT (DMR)
(2-16)

FLR05B598
PERMIT NUMBER

DISCHARGE NUMBER

Form Approved J.
OMB No. 2040-0004
Approval expires 05-31-98

MSGP

MONITORING PERIOD
FROM YEAR MO DAY TO YEAR MO DAY
01 07 01 TO 01 09 30
(20-21) (22-23) (24-25) (26-27) (28-29) (30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		QUANTITY OR LOADING (13 Card Only) (46-53)			QUANTITY OR CONCENTRATION (14 Card Only) (38-45)				NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
TOTAL RECOVERABLE ALUMINUM	SAMPLE MEASUREMENT					0.01		mg/l	0	1/90	GRAB
	PERMIT REQUIREMENT										
CHEM. OXYGEN DEMAND	SAMPLE MEASUREMENT					31		mg/l	0	1/90	GRAB
	PERMIT REQUIREMENT										
TOTAL RECOVERABLE COPPER	SAMPLE MEASUREMENT					NOT DETECTED			0	1/90	GRAB
	PERMIT REQUIREMENT										
TOTAL RECOVERABLE IRON	SAMPLE MEASUREMENT					0.13		mg/l	0	1/90	GRAB
	PERMIT REQUIREMENT										
TOTAL RECOVERABLE LEAD	SAMPLE MEASUREMENT					NOT DETECTED			0		
	PERMIT REQUIREMENT										
TSS	SAMPLE MEASUREMENT					2		mg/l	0	1/90	GRAB
	PERMIT REQUIREMENT										
TOTAL RECOVERABLE ZINC	SAMPLE MEASUREMENT					NOT DETECTED			0		
	PERMIT REQUIREMENT										

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Lindsey J. Sampson

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN; AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 U.S.C. § 1001 AND 33 U.S.C. § 1319. (Penalties under these statutes may include fines up to \$10,000 and/or maximum imprisonment of between 6 months and 6 years.)

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE

941 4798181

ATFA
CODE

NUMBER

DATE

01 10 31

YEAR MO DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

PERMITTEE NAME/Include Facility Name/ Location (if Different)
NAME Lee County Department of Solid Waste
ADDRESS 1500 Monroe Street, 3rd Floor
Fort Myers, FL 33901

FACILITY Lee County Solid Waste Resource Recovery Facility
LOCATION 1500 Buckingham Road
Fort Myers, Florida 33905

NATIONAL POLLUTANT DISCHARGE MONITORING REPORT (DMR)
(2-16) (17-19)
FLR05B508
PERMIT NUMBER
DISCHARGE NUMBER

Form Appr
OMB No. 2040-0004
Approval expires 05-31-98

MSGP

MONITORING PERIOD
FROM YEAR MO DAY TO YEAR MO DAY
01 07 01 TO 01 09 30
(20-21) (22-23) (24-25) (26-27) (28-29) (30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card Only) QUANTITY OR LOADING (46-53)			(4 Card Only) QUANTITY OR CONCENTRATION (54-61)			NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM			
pH (Field)	SAMPLE MEASUREMENT					7.9		UNITS	0	1/90 GRAB
	PERMIT REQUIREMENT									
Spec. Conductance	SAMPLE MEASUREMENT					262		umhos/cm	0	1/90 GRAB
	PERMIT REQUIREMENT									
TURBIDITY.	SAMPLE MEASUREMENT					2.5		NTU	0	1/90 GRAB
	PERMIT REQUIREMENT									
	SAMPLE MEASUREMENT									
	PERMIT REQUIREMENT									
	SAMPLE MEASUREMENT									
	PERMIT REQUIREMENT									
	SAMPLE MEASUREMENT									
	PERMIT REQUIREMENT									
	SAMPLE MEASUREMENT									
	PERMIT REQUIREMENT									

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Lindsey J. Sampson

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN; AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 U.S.C. § 1001 AND 33 U.S.C. § 1318. (Penalties under these statutes may include fines up to \$10,000 and/or maximum imprisonment of between 6 months and 5 years.)

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT
Lindsey J. Sampson

TELEPHONE

941 4798189

AREA CODE

NUMBER

DATE

01 10 31

YEAR MO DAY

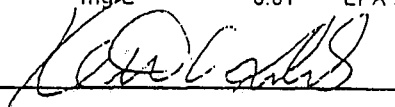
COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

60-2 P. Hwy Dr
Ft. Myers, FL 33907
941-278-7070

To: Mr. Tom Eriksen
Covanta Lee Inc
10500 Buckingham Rd
Ft Myers, FL 33905

Report Date: 8/21/01

Sample Description	Location Code	Laboratory ID	Collection Date	Analyte Name	Laboratory Result	Units	MDL	Analysis Method Reference
Waste to Energy Surface Water	WTESW	AB22560	8/8/01	Aluminum, AA furnace technique	0.01	mg/L	0.01	EPA 202.2
			8/8/01	Chemical Oxygen Demand	31	mg/L	1	EPA 410.1
			8/8/01	Copper by flame AA	Not detected	mg/L	0.02	SM18 3111B
			8/8/01	Iron by flame AA	0.13	mg/L	0.04	EPA 236.1
			8/8/01	Lead, AA furnace technique	Not detected	ug/L	1	SM18 3113 B
			8/8/01	pH, Field (electrometric)	7.9	units	0.1	EPA 150.1
			8/8/01	Specific Conductance @ 25oC	262	umhos/cm	1	EPA 120.1
			8/8/01	Total Suspended Solids	2	mg/L	1	EPA 160.2
			8/8/01	Turbidity (Nephelometric)	2.5	NTU	0.01	EPA 180.1
			8/8/01	Zinc by flame AA	Not detected	mg/L	0.01	EPA 289.1


Keith A. Kibbey
Laboratory Director

Lee County Solid Waste Resource Recovery Facility

Reference for combined site area provided in stormwater management computations for the modified site issued by Malcolm Pirnie to the South Florida Water Management District on April 26, 2001.

	Land Use	Existing Basin 1	Recovered Materials Processing Facility	Total (acres)
Impervious	Roof	1.6	1.5	3.1
	Road/Park	4.7	4.4	9.1
Basin	Pond	5.1	0	5.1
Pervious	Open spaces	20.2	5.1	25.3
Total Site Area		31.6	11	42.6

SCS Method

	Land Use	Total (acres)	Curve Number (AMC-II conditions)	Product (Area of Land*Curve Number)
Impervious	Roof	3.1	98	303.8
	Road/Park	9.1	98	891.8
Basin	Pond	5.1	100	510
Pervious	Open spaces (Hydrologic Soil Group B)	25.3	61	1543.3
Total		42.6		3248.9

Composite Curve Number
for Total Site Area

76.27

Total Product/Total Site Area

Maximum Water Retained (S)

$$= (1000 / \text{composite CN}) - 10$$

S 3.11 inches

Surface Runoff (SRO)

$$= (P - .2S)^2 / (P + .8S)$$

(where S=3.11)
.2S= 0.622426052

$$\text{SRO} = (P - .622)^2 / (P + 2.49)$$

.8S= 2.489704208

Please see next page for precipitation information during the applicable discharge period.

Note the Following Assumptions:

RMPF contributes fully to existing basin 1

SCS Method

AMC-II Conditions Present

Open spaces subject to Hydrologic soil group B

DATE	Precipitation (P) (inches)	Surface Runoff (SRO) $= (P - 0.622)^2 / (P + 2.49) \text{ for } P > 2S$	Total Site Area (acres contributing to Basin 1)	Volume (acre-inches) (If $P < 2S$ did not contribute to SRO)
27-Jul-01	0	0	42.6	0
28-Jul-01	0	0		0
29-Jul-01	0.08	0		0
30-Jul-01	0.07	0		0
31-Jul-01	0.22	0		0
1-Aug-01	0.01	0		0
2-Aug-01	0	0		0
3-Aug-01	1.79	0.318743925		13.57849121
4-Aug-01	0.03	0		0
5-Aug-01	0	0		0
6-Aug-01	0.49	0.00584698		0.249081342
7-Aug-01	0	0		0
8-Aug-01	0	0		0
9-Aug-01	0	0		0
10-Aug-01	2.52	0.719042715		30.63121964
11-Aug-01	0.31	0		0
12-Aug-01	0.2	0		0
13-Aug-01	0.43	0		0
14-Aug-01	0.3	0		0
15-Aug-01	1.18	0.084840327		3.614197929
16-Aug-01	0	0		0
17-Aug-01	0.01	0		0
18-Aug-01	0.36	0		0
19-Aug-01	0.53	0		0
20-Aug-01	0.03	0		0
21-Aug-01	0.42	0		0
22-Aug-01	2.07	0.459803509		19.58762947
23-Aug-01	3.58	1.441476771		61.40691044
24-Aug-01	0.6	0		0
25-Aug-01	0.54	0		0
26-Aug-01	0.71	0.00242		0.103092
27-Aug-01	0.01	0		0
28-Aug-01	0.02	0		0
29-Aug-01	0	0		0
30-Aug-01	0	0		0
31-Aug-01	0	0		0
1-Sep-01	0.17	0		0
2-Sep-01	0.24	0		0
3-Sep-01	0	0		0
4-Sep-01	0.36	0		0
5-Sep-01	0.01	0		0
6-Sep-01	1.56	0.217245432		9.254655407
7-Sep-01	0.05	0		0

8-Sep-01	0.09	0	0
9-Sep-01	0.04	0	0
10-Sep-01	0.95	0.031274419	1.332290233
11-Sep-01	0.62	1.28617E-06	5.4791E-05
12-Sep-01	0.29	0	0
13-Sep-01	1.1	0.063644568	2.711258607
14-Sep-01	2.45	0.676434008	28.81608874
15-Sep-01	0.47	0	0
16-Sep-01	0	0	0
17-Sep-01	0	0	0
18-Sep-01	0	0	0
19-Sep-01	1.41	0.15921641	6.782619077
20-Sep-01	0	0	0
21-Sep-01	0	0	0
22-Sep-01	0	0	0
23-Sep-01	0.48	0	0
24-Sep-01	0.09	0	0
25-Sep-01	0.01	0	0
26-Sep-01	1.18	0.084840327	3.614197929
TOTAL (acre-inches)			181.68

Pond Initial Elevation (Basin 1) on 7/27/01 at 0920	ft NGVD	Pond area (acres)	Wetted perimeter (acre-ft)
	20.625	5.1	0.6375
Pond Final Elevation (Basin 1) on 9/26/01 at 1400	20.75		1.275
Precipitation contributing as SRO (7/27/01-9/26/01)	181.68	acre-inches	
	15.14	acre-ft	
Difference in Pond Storage (1.275) and Calculated Volume SRO (15.14) =	13.87	acre-ft	

SCS Method of Calculating Discharge Volume through 3" bleeder from 7/27/01-9/26/01 (Assumes $P < 0.622$ = zero SRO)	SCS Estimated Discharge	Units
	603,966	ft^3
	4,518,269	Gallons

Estimated Discharge 3" bleeder at Avg h of 20.75 above datum for entire discharge period	Calculated Flow (Assuming $C=0.6$)	Units
	10,210	ft^3/Day
	63	Period of Days (7/27/01-9/26/01)

Rough Estimate of discharge volume through 3" bleeder (Assumes constant pond elevation)	SCS Estimated Discharge	Units
	643,207	ft^3
	4,811,829	Gallons

July, 2001

	Lake Fair(1)	N Resery(1)	Page-LT(1)	Lakes Pk(1)	Lehigh(1)	Cork(2)	Bonita(1)	Olga(2)	WTEP(1)	Alva(1)	Hendry(1)	Yellow Fever(3)	Cecil Webb(2)	Gateway(2)	FMB(2)
1	0.00	0.46	0.00	0.65	0.09	0.22	0.57	0.08	0.01	0.09	0.08	0.13	0.15	0.17	0.49
2	0.55	0.01	0.00	0.01	0.00	0.01	0.20	0.02	0.00	0.01	0.02	0.02	0.01	0.00	0.01
3	0.26	0.00	0.18	0.11	2.81	0.39	0.04	0.91	1.79	0.08	3.57	0.27	1.05	2.77	0.75
4	0.06	0.21	0.30	0.78	0.07	0.06	1.52	0.05	0.03	0.04	0.12	0.09	0.02	0.06	0.15
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.88	0.00	0.00
6	0.00	0.00	0.06	0.32	0.00	0.00	0.00	0.57	0.49	0.17	0.00	0.14	0.00	0.00	0.00
7	1.13	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
8	0.01	0.01	0.00	0.01	0.00	0.00	0.18	0.00	0.00	0.01	0.00	0.01	0.05	0.00	0.00
9	0.00	0.00	0.00	0.00	0.61	0.05	0.04	0.00	0.00	0.00	0.45	ND	0.00	0.02	0.00
10	0.71	0.52	0.76	1.36	0.97	0.70	0.64	1.55	2.52	1.56	3.97	ND	1.00	0.91	0.35
11	0.98	0.94	0.31	0.12	0.47	0.09	0.99	1.30	0.31	1.31	0.23	0.50	0.93	0.37	0.19
12	0.45	0.13	0.06	0.02	0.53	0.36	0.00	0.53	0.20	0.93	0.53	0.29	0.59	0.04	0.12
13	0.09	0.74	1.42	0.52	0.51	0.72	0.70	0.18	0.43	0.67	0.96	0.17	0.47	0.34	0.41
14	0.57	0.36	0.44	0.51	1.39	0.54	1.01	1.53	0.30	1.85	2.18	0.38	0.90	0.67	0.55
15	4.62	1.92	3.66	2.42	1.09	1.11	0.25	0.41	1.18	1.00	1.45	2.15	0.65	2.05	0.86
16	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.37	0.00	0.01
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.04	0.00	0.00	0.00
18	0.31	0.00	0.00	0.10	1.39	0.00	0.00	0.62	0.36	0.06	2.66	0.00	0.40	0.00	0.25
19	0.00	0.36	0.46	0.04	0.48	0.06	0.04	0.05	0.53	2.14	0.22	0.00	0.01	1.06	0.00
20	1.08	0.42	1.42	0.52	0.58	0.01	1.98	0.19	0.03	0.05	0.32	0.98	0.02	0.02	0.02
21	0.44	0.53	0.77	1.01	0.33	0.78	0.63	0.20	0.42	0.43	2.85	0.46	0.75	0.82	0.95
22	2.12	1.79	4.37	9.04	1.43	3.12	3.01	1.03	2.07	1.38	2.60	2.36	3.51	4.85	1.84
23	8.24	5.61	3.78	4.47	4.51	2.90	3.10	2.85	3.58	4.47	5.17	6.19	6.57	7.22	0.55+
24	0.05	0.11	0.25	0.48	0.17	0.58	1.57	0.10	0.60	0.04	0.22	0.32	0.83	0.07	0.10+
25	1.71	1.14	0.39	0.06	0.38	0.17	0.45	0.65	0.54	0.85	0.86	0.25	1.97	0.43	0.00+
26	2.18	0.22	0.36	0.15	0.01	0.03	0.17	0.61	0.71	0.15	1.91	0.16	0.48	2.57	0.00+
27	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.09	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.65	0.61	0.40	0.32	0.12	0.00	0.00	0.10	0.00	0.00	0.00	0.11	0.39	0.14	1.11
31	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.10	0.00	0.00	0.00	0.01
Total	26.23	16.35	19.40	22.38	17.94	11.90	17.12	13.62	16.14	17.30	30.47	15.16+	22.04	24.58	8.07+
* = Equipment malfunction; value in question															
ND = No Data															
+ = Partial reading; value not used to calculate mean															
(1)Stevens Tiltling Bucket Raingauge; Stevens AxSys System															
(2)Texas Electronics Tiltling Bucket Raingauge;Campbell Scientific CR500 datalogger															
(3)Campbell Scientific CR10X															

[illegible]

September, 2001

(3) Campbell Scientific CR10X

APPENDIX

I

COMPLETED QUARTERLY VISUAL EXAMINATION OF STORMWATER DISCHARGE FIELD DATA FORMS

Figure 4-2

Lee County Solid Waste Resource Recovery Facility Quarterly Visual Examination of Storm Water Discharge Field Data Form					
Date <u>7/27/01</u>		Day <u>Friday</u>		Time <u>0920</u>	
Weather <u>Clear</u>		Precip <u>None</u>		Test Kit # _____	
Sampling Location <u>At Control Structure</u>					
Outfall Location <u>At Control Structure</u> <u>South 520t pond</u>					
Remarks _____					
Dry Weather Flow Observed (Yes/No) <u>Yes</u>					
Note: Complete Bottom of Data Sheet Only if Flow is Observed					
Grab Sample <u>Descriptive Data</u>	First Sample Time <u>1000</u> Date <u>7/27/01</u>		Second Sample Time _____ Date _____		
	Describe	Yes/No	Describe	Yes/No	
Flow	<u>Slow</u>	<u>Yes</u>			
Color	<u>Clear</u>	<u>Yes</u>			
Odor	<u>None</u>	<u>No</u>			
Oil Sheen	<u>None</u>	<u>No</u>			
Surface Scum	<u>None</u>	<u>No</u>			
Floating Solids	<u>None</u>	<u>No</u>			
Settled Solids	<u>None</u>	<u>No</u>			
Suspended Solids	<u>Slight</u>	<u>Yes</u>			
Foam	<u>None</u>	<u>No</u>			
Phase Separation	<u>None</u>	<u>No</u>			
Note: Sign and Date All Completed Forms					
Field Investigator <u>Blank Mattina</u>			Date <u>7/27/01</u>		
Remarks <u>Took sample from pond shortly</u> <u>after opening weir.</u>					

Figure 4-2

Lee County Solid Waste Resource Recovery Facility Quarterly Visual Examination of Stormwater Discharge Field Data Form				
Date _____		Day _____		Time _____
Weather _____		Precipitation _____		Test Kit # _____
Sampling Location _____				
Outfall Location _____				
Remarks _____				
Dry Weather Flow Observed (Circle the correct response) Yes No				
Note: Complete Bottom of Data Sheet Only if Flow is Observed				
Grab Sample <u>Descriptive Data</u> Flow Color Odor Oil Sheen Surface Scum Floating Solids Settled Solids Suspended Solids Foam Phase Separation	First Sample Time _____ Date _____		Second Sample Time _____ Date _____	
	Describe	Yes/No	Describe	Yes/No
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
Note: Sign and Date All Completed Forms				
Field Investigator _____			Date _____	
Remarks _____				



**Lee County, Florida
Solid Waste Energy Recovery Facility**

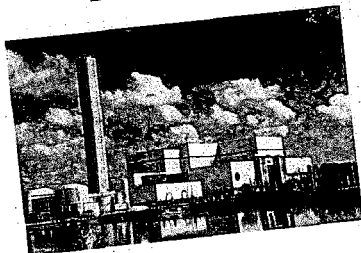
**Supplemental Application for Power
Plant Site Certification**

APPENDIX 15.0

RESERVED

**LEE COUNTY,
FLORIDA**

**SOLID WASTE
ENERGY
RECOVERY
FACILITY**



**SUPPLEMENTAL
APPLICATION
FOR
POWER PLANT SITE
CERTIFICATION**

**VOLUME III
AIR QUALITY**

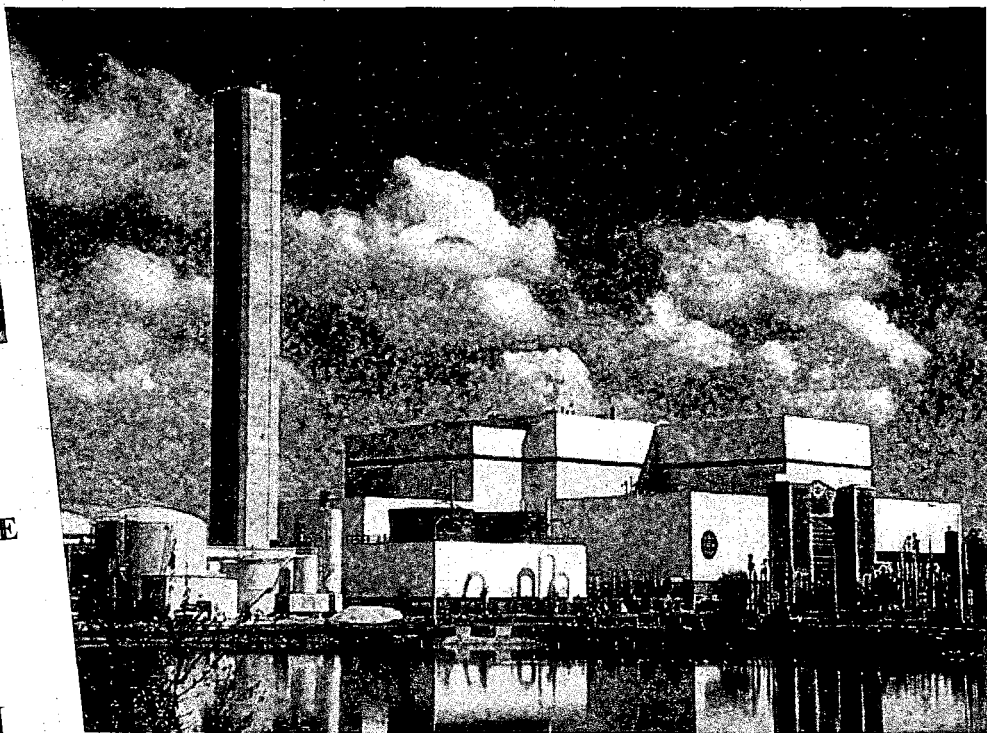
**SUBMITTED BY:
THE LEE COUNTY
BOARD OF
COUNTY
COMMISSIONERS**



NOVEMBER 7, 2002

**PREPARED BY:
MALCOLM
PIRNIE**

**LEE COUNTY, FLORIDA
SOLID WASTE ENERGY RECOVERY FACILITY**



**SUPPLEMENTAL APPLICATION FOR
POWER PLANT SITE CERTIFICATION**

VOLUME III – AIR QUALITY

**SUBMITTED BY:
THE LEE COUNTY
BOARD OF
COUNTY COMMISSIONERS**



NOVEMBER 7, 2002

**PREPARED BY:
MALCOLM
PIRNIE**

IMAGE QUALITY

**PLEASE NOTE
THE ORIGINAL DOCUMENTS
SCANNED FOR THIS RECORD
WERE OF POOR QUALITY.**

TABLE OF CONTENTS

VOLUME I - APPLICATION

SECTION OF PPSA APPLICATION	Page
EXECUTIVE SUMMARY	ES-1
1.0 NEED FOR POWER AND THE PROPOSED FACILITIES.....	1-1
2.0 SITE AND VICINITY CHARACTERIZATION.....	2-1
2.1 Site and Associated Facilities Delineation.....	2-1
2.1.1 Site Location	2-1
2.1.2 Existing Uses	2-2
2.1.3 Site Modification	2-2
2.1.4 100-Year Flood Zone.....	2-4
2.2 Socio-Political Environment.....	2-4
2.2.1 Governmental Jurisdictions	2-4
2.2.2 Zoning and Land Use Plans	2-6
2.2.3 Demography and Ongoing Land Use	2-12
2.2.4 Easements, Title, Agency Works.....	2-15
2.2.5 Regional Scenic, Cultural and Natural Landmarks.....	2-15
2.2.6 Archaeological and Historic Sites.....	2-15
2.2.7 Socioeconomics and Public Services.....	2-16
2.3 Biophysical Environment.....	2-46
2.3.1 Geology and Soils	2-46
2.3.2 Groundwater Hydrology	2-56
2.3.3 Site Water Budget and Area Uses.....	2-62
2.3.4 Surficial Hydrology	2-63
2.3.5 Vegetation/Land Use	2-64
2.3.6 Ecology	2-69
2.3.7 Meteorology and Ambient Air Quality.....	2-79
2.3.8 Noise	2-91
3.0 THE PLANT AND DIRECTLY ASSOCIATED FACILITIES.....	3-1
3.1 Background	3-1
3.1.1 Facility Siting.....	3-1
3.1.2 Existing and Proposed Facilities	3-2
3.2 Site Layout.....	3-5
3.2.1 Building Dimensions	3-5
3.2.2 Visual Impact.....	3-6
3.3 Fuel	3-7
3.3.1 Fuel Supply	3-7
3.3.2 Fuel Storage	3-7
3.4 Air Emissions and Controls	3-9

3.4.1	Air Emission Types and Sources	3-9
3.4.2	Air Emission Controls.....	3-10
3.4.3	Best Available Control Technology.....	3-10
3.4.4	Design Data for Control Equipment	3-11
3.5	Plant Water Use	3-11
3.5.1	Heat Dissipation System.....	3-12
3.5.2	Domestic/Sanitary Wastewater.....	3-14
3.5.3	Process Water Systems	3-15
3.6	Chemical and Biocide Wastes	3-15
3.7	Solid and Hazardous Waste	3-16
3.7.1	Solid Waste	3-16
3.7.2	Hazardous Waste	3-17
3.8	On-site Drainage System	3-17
3.9	Materials Handling.....	3-18
4.0	EFFECTS OF SITE PREPARATION, AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION.....	4-1
4.1	Land Impact	4-1
4.1.1	General Construction Impacts.....	4-1
4.1.2	Roads.....	4-2
4.1.3	Flood zones	4-3
4.1.4	Topography and Soils	4-3
4.2	Impact on Surface Water Bodies and Uses.....	4-4
4.2.1	Impact Assessment.....	4-4
4.2.2	Measuring and Monitoring Programs	4-4
4.3	Groundwater Impacts.....	4-5
4.3.1	Impact Assessment.....	4-5
4.3.2	Measuring and Monitoring Programs	4-5
4.4	Ecological Impacts.....	4-6
4.4.1	Impact Assessment.....	4-6
4.4.2	Measuring and Monitoring Programs	4-7
4.5	Air Impact	4-7
4.5.1	Emission Rates.....	4-7
4.6	Impact on Human Populations.....	4-8
4.6.1	Sensitive Receptors.....	4-8
4.6.2	Work Force	4-9
4.6.3	Traffic Associated with Construction	4-10
4.7	Impact on Landmarks and Sensitive Areas.....	4-10
4.8	Impact on Archaeological and Historic Sites.....	4-11
4.9	Special Features	4-11
4.10	Summary of Impacts and Benefits from Construction	4-11
4.11	Variances.....	4-12
5.0	EFFECTS OF FACILITY OPERATION	5-1
5.1	Effects of the Operation of the Heat Dissipation System	5-1

5.1.1	Temperature Effect on Receiving Water Body.....	5-1
5.1.2	Effects on Aquatic Life.....	5-1
5.1.3	Biological Effects of Modified Circulation	5-1
5.1.4	Effects of Offstream Cooling.....	5-2
5.1.5	Measurement Program.....	5-3
5.2	Effects of Chemical and Biocide Discharges.....	5-3
5.2.1	Industrial Wastewater Discharges.....	5-3
5.2.2	Cooling Tower Blowdown.....	5-3
5.2.3	Measurement Programs	5-4
5.3	Impacts on Water Supplies	5-4
5.3.1	Surface Water.....	5-4
5.3.2	Groundwater	5-4
5.3.3	Drinking Water	5-6
5.3.4	Leachate and Runoff.....	5-6
5.3.5	Groundwater Modeling and Monitoring.....	5-6
5.4	Solid/Hazardous Waste Disposal Impacts	5-7
5.4.1	Solid Waste	5-7
5.4.2	Hazardous Waste	5-8
5.5	Sanitary and Other Waste Discharges.....	5-9
5.6	Air Quality Impacts.....	5-9
5.6.1	Impact Assessment.....	5-9
5.6.2	Monitoring Program.....	5-12
5.7	Noise	5-13
5.8	Changes in Non-Aquatic Species Populations.....	5-15
5.8.1	Impact	5-15
5.8.2	Monitoring	5-15
5.9	Other Facility Operation Effects.....	5-15
5.10	Archaeological Sites	5-16
5.11	Resources Committed	5-16
5.12	Variances.....	5-17
6.0	TRANSMISSION LINES AND OTHER LINEAR FACILITIES.....	6-1
6.1	Transmission Lines	6-1
6.2	Associated Linear Facilities.....	6-2
7.0	ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION AND OPERATION.....	7-1
7.1	Socioeconomic Benefits.....	7-1
7.2	Socioeconomic Costs.....	7-3
8.0	SITE AND FACILITY DESIGN ALTERNATIVES	8-1
8.1	Site Alternatives.....	8-1
8.2	Alternative Water Source.....	8-1
9.0	COORDINATION	9-1

TABLE OF CONTENTS

VOLUME II - APPENDICES

- 1.0 SITE AND ABUTTING PROPERTY OWNERSHIP**
 - 1.1 Abutting Property Owners
 - 1.2 Governmental Properties
- 2.0 ZONING AND LAND USE PLANS**
 - 2.1 Proof of Zoning
 - 2.2 Lee County Ordinance 94-30
 - 2.3 Future Land Use
 - 2.4 Special Treatment Areas/Overlay Descriptions
 - 2.5 Zoning Categories
- 3.0 MATERIALS SEPARATION PLAN**
 - 3.1 Materials Separation Plan
- 4.0 REQUIREMENTS FOR NEW WASTE-TO-ENERGY FACILITY CAPACITY**
 - 4.1 Section 403.7061 Requirements for New Waste-to-Energy Facility Capacity
- 5.0 INTERLOCAL AGREEMENTS**
 - 5.1 Lee County/Hendry County Interlocal Agreement
 - 5.2 Lee County/City of Fort Myers Interlocal Wastewater Agreement
- 6.0 FEDERAL PERMIT APPLICATIONS AND APPROVALS**
 - 6.1 Florida Public Service Commission Declaratory Statement and Additional Background Information
 - 6.2 NPDES General Permit Coverage Notice
- 7.0 STATE PERMIT APPLICATIONS AND APPROVALS**
 - 7.1 Conditions of Certification as Modified
 - 7.2 Title V Air Operation Permit
 - 7.3 PSD Permit
 - 7.4 Discontinuance of Surface Water Monitoring Requirements
 - 7.5 Grant of Perpetual Conservation Easement and Agreement
 - 7.6 Revised Stormwater Calculations
 - 7.7 Ground Water and Surface Water Monitoring Plan
 - 7.8 Consumptive Use Report
 - 7.9 Water Conservation Plan

8.0 CORRESPONDENCE FROM FEDERAL, STATE, AND LOCAL AGENCIES

8.1 Correspondence From Federal, State, and Local Agencies

8.2 Correspondence From South Florida Water Management District

9.0 GROUNDWATER WELL INVENTORY

9.1 Permitted Wells (>500,000 gpd)

9.2 Permitted Wells (<500,000 gpd)

10.0 GEOTECHNICAL REPORTS AND ARCHAEOLOGICAL REPORT

10.1 Geotechnical Reports

10.2 Archaeological Report

11.0 NOISE STUDIES AND TRAFFIC IMPACT STUDY

11.1 Noise Impact Study

11.2 Operational Noise Study Report

11.3 Traffic Impact Study

12.0 RISK ASSESSMENT

12.1 Human Health and Ecological Risk Assessment 2002

12.2 Human Health and Ecological Risk Assessment 1992

13.0 MISCELLANEOUS REPORTS AND STUDIES

13.1 Household Trend Report

13.2 Environmental Justice Overview and Audit

13.3 Wetland Mitigation Monitoring Report

14.0 MONITORING PLANS

14.1 Exotic Species Control Plan

14.2 Oil Pollution Prevention Plan

14.3 Stormwater Pollution Prevention Plan

15.0 RESERVED

TABLE OF CONTENTS – ABBREVIATED*

VOLUME III - AIR QUALITY

INTRODUCTION

- 1.0 EXECUTIVE SUMMARY**
- 2.0 REGULATORY REVIEW**
- 3.0 AIR POLLUTANT EMISSIONS**
- 4.0 BEST AVAILABLE CONTROL TECHNOLOGY EVALUATION**
- 5.0 EXISTING AMBIENT AIR QUALITY**
- 6.0 AIR QUALITY IMPACT ANALYSES**
- 7.0 ADDITIONAL IMPACT ANALYSES**
- 8.0 REFERENCES**
- 9.0 ATTACHMENTS**

* A detailed Table of Contents for the Prevention of Significant Deterioration Air Permit Application is provided in Volume III.

LIST OF TABLES

Table	Page
2-1 Proposed Land Uses At The Site	2-3
2-2 Governmental Jurisdictions Within a Five-Mile Radius	2-5
2-3 Population: Lee County 1980-2000	2-13
2-4 2000 Census Estimates for Census Tracts in Study Area	2-17
2-5 Lee County Population Projections	2-18
2-6 Average Annual Labor Force 1990-2000	2-19
2-7 Major Private Sector Employers in 2000	2-19
2-8 Average Monthly Employment: Lee County 1990-2000	2-21
2-9 Monthly Employment: Lee County January-March 2001	2-24
2-10 Employment Estimates: Lee County 1998-2008	2-25
2-11 Annual Payroll by Industrial Sector: Lee County 1990-2000	2-26
2-12 Annual (Monthly) Payroll by Industrial Sector: Lee County 1990-2000	2-31
2-13 Income by Household: Lee County 2000	2-37
2-14 Housing Units: 2000	2-38
2-15 Age of Housing Stock as of 2000	2-39
2-16 Housing Values in 2000	2-39
2-17 Building Permits: Lee County 2000	2-40
2-18 Existing Roadways	2-41
2-19 Existing Traffic Volumes	2-41
2-20 Performance Standards	2-42
2-21 Influent Pretreatment Requirements for the Fort Myers Central Advanced Wastewater Treatment Plant	2-45
2-22 Summary of Soil Borings	2-52
2-23 Summary of Sieve Data for Soil Samples	2-54
2-24 On-site Groundwater Elevation Data	2-58
2-25 Summary of Groundwater Quality Data	2-61
2-26 Hydrological Data Representative of the Project Site	2-62
2-27 Wildlife Survey Results October 2001	2-69
2-28 Wildlife Observed or Expected to Occur on the Facility Site	2-71
2-29 Climatological Data - Normals, Means, and Extremes; Page Field Airport, Fort Myers	2-82
2-30 Annual Average Rural Mixing Heights and Stability	2-83
2-31 Frequency Distribution of Wind Speed and Stability	2-84
2-32 Frequency Distribution of Wind Speed and Wind Direction	2-85
2-33 Nearest Ambient Air Quality Monitoring Sites	2-87
2-34 Ambient Monitoring Data Used to Derive Background Concentrations	2-88
2-35 Proposed Background Concentrations for Criteria Pollutants	2-90
3-1 Reference Solid Waste Composition	3-8
3-2 Reference Solid Waste Ultimate Analysis	3-8

3-3	Pretreatment Requirements for the Fort Myers Central Advanced Wastewater Treatment Plant.....	3-13
5-1	Projected Solid Waste Quantities, Lee and Hendry Counties, 1995-2010	5-8
5-2	Comparison of Maximum Increases and Combined Facility Impacts to the NAAQS/FAAQS.....	5-11
5-3	Comparison of Maximum Increases and Combined Facility Impacts to PSD Class II Increments	5-12
5-4	Lee County Energy Recovery Facility; Facility Noise Levels	5-14
9-1	Contacts and Correspondence.....	9-1

LIST OF FIGURES

Figure	Following Page
2-1	General Location Map 2-1
2-2	Site Layout..... 2-1
2-3a	Aerial of Facility Site – February 1999 2-1
2-3b	Aerial of Facility Site – May 2002 2-1
2-4	Abutting Properties 2-2
2-5	Existing and Closed Landfills..... 2-2
2-6	Site Civil Plot Plan..... 2-2
2-7	Flood Hazard Map 2-4
2-8	Governmental Jurisdictions Within a Five-Mile Radius 2-4
2-9a	County Future Land Use Map..... 2-8
2-9b	City of Fort Myers Future Land Use Map 2-8
2-10	Existing Land Uses 2-14
2-11	Census Tract Outline Map 2-16
2-12	Water and Wastewater Treatment Plant Locations..... 2-44
2-13a	Water Table Aquifer - Wet Season 2-57
2-13b	Water Table Aquifer - Dry Season 2-57
2-14	Permitted Wells Within a Five-Mile Radius..... 2-60
2-15	Habitat Survey Results..... 2-69
2-16	Wildlife Survey Results 2-69
2-17	Page Field Airport – Fort Myers, FL NWS Station # 12835 January 1990-December 1994 2-80
2-18	Page Field Airport – Fort Myers, FL NWS Station # 12835 January 1990-1994..... 2-80
2-19	Page Field Airport – Fort Myers, FL NWS Station # 12835 February 1990-1994..... 2-80
2-20	Page Field Airport – Fort Myers, FL NWS Station # 12835 March 1990-1994..... 2-80

2-21	Page Field Airport – Fort Myers, FL NWS Station # 12835 April 1990-1994.....	2-80
2-22	Page Field Airport – Fort Myers, FL NWS Station # 12835 May 1990-1994.....	2-80
2-23	Page Field Airport – Fort Myers, FL NWS Station # 12835 June 1990-1994.....	2-80
2-24	Page Field Airport – Fort Myers, FL NWS Station # 12835 July 1990-1994.....	2-80
2-25	Page Field Airport – Fort Myers, FL NWS Station # 12835 August 1990-1994.....	2-80
2-26	Page Field Airport – Fort Myers, FL NWS Station # 12835 September 1990-1994.....	2-80
2-27	Page Field Airport – Fort Myers, FL NWS Station # 12835 October 1990-1994.....	2-80
2-28	Page Field Airport – Fort Myers, FL NWS Station # 12835 November 1990-1994.....	2-80
2-29	Page Field Airport – Fort Myers, FL NWS Station # 12835 December 1990-1994.....	2-80
3-1	Typical Stoker Mass-Burn Facility.....	3-3
3-2a	Architectural Building Elevations.....	3-5
3-2b	General Arrangement Section A-A.....	3-5
3-3	Water Balance Diagram.....	3-11
3-4	Basin and Sub-Basin Boundaries.....	3-17
4-1	Estimated Work Force Requirement During Construction.....	4-9

SUPPLEMENTAL APPLICATION FOR POWER PLANT SITE CERTIFICATION

VOLUME III – AIR QUALITY

LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
AIR PERMIT APPLICATION FOR
MUNICIPAL WASTE COMBUSTOR UNIT 3

INTRODUCTION

This Volume III – Air Quality of the Supplemental Site Certification Application contains Lee County's Prevention of Significant Deterioration (PSD) application (PSD Application) for the addition of a third municipal waste combustor unit at the existing Lee County Energy Recovery Facility (LCERF). Malcolm Pirnie, Inc., as the Engineer-of-Record for the LCERF is responsible for this permitting effort and has retained and coordinated the services necessary to complete this project in cooperation with other professionals and Lee County, a Political Subdivision of the State of Florida.

This PSD Application is submitted in accordance with Rule 62-212.400 F.A.C. and 40 CFR 52.21. Section 9-Attachment A of the PSD Application contains the completed Florida Department of Environmental Protection Air Permit Application Forms. Additionally, as required by 40 CFR 60.59b(a), Section 9-Attachment B contains a copy of the notification of the public meeting for the Preliminary Draft Materials Separation Plan (the "Plan"), and the transcript of the public meeting regarding this Plan. Volume II, Appendix 3.1 of the Supplemental Site Certification Application contains the Plan and the responses to public comments regarding this Plan.

Lee County proposes Best Available Control Technology to be Good Combustion Practices for the control of volatile organic compounds and carbon monoxide; a Spray Dryer Absorber and Fabric Filter baghouse for control of sulfur dioxide, municipal waste combustor Acid Gases (sulfur dioxide and hydrogen chloride), and particulate matter less than 10 microns in diameter; activated carbon injection for control of mercury; and selective non-catalytic reduction for control of nitrogen oxides.

Lee County proposes emission limits lower than the New Source Performance Standards (NSPS) under 40 CFR 60, Subpart Eb, and lower than existing permit limits for municipal waste combustion Units 1 and 2 at the LCERF, for particulate matter; sulfur dioxide; volatile organic compounds; and fluorides. Emission limits for other pollutants are proposed at NSPS levels (e.g., carbon monoxide, cadmium, hydrogen chloride, lead,

mercury, MWC organics, and nitrogen oxides). Actual emissions from municipal waste combustion Unit 3 are expected to be lower than the limits proposed by Lee County.

The PSD Application includes a Best Available Control Technology (BACT) evaluation for all applicable emissions, including technology evaluations and the means to achieve the proposed emission limits. The Nitrogen Oxides (NOx) BACT analysis is contained in Section 4.6 of this PSD Application. The NOx BACT technical review, with economic and engineering considerations led to the selection of Selective Non-Catalytic Reduction (SNCR) as the recommended BACT for NOx, as explained in detail in Section 4.6.

Best Available Control Technology-NOx BACT Additional Considerations

This PSD Application Introduction provides supplementary information for consideration that reinforces the SNCR BACT recommendation. Malcolm Pirnie, Inc. evaluated the cost impacts to the LCERF Unit 3 expansion project based on the Covanta Lee, Inc. SNCR cost estimate and the Babcock Borsig Power (BBP) SCR cost estimate. These cost estimates were used because they are considered to be the most complete, to be based on the equipment supplier's with waste-to-energy experience, and to be the most realistic cost estimates.

The information contained in the following figures and table depicts the economic impact to the LCERF capital and operational costs should selective Catalytic Reduction (SCR) be considered for municipal waste combustion Unit 3. Additionally the incremental cost of NOx removal for SCR relative to SNCR is also presented and reinforces the conclusion for selection of SNCR as NOx BACT.

Capital Cost Impacts

An evaluation of the Capital Cost impact to the LCERF Unit 3 expansion in considering SCR compared to SNCR was performed for 2002 dollars. Figure I-1 provides a graphic summary of the financial implications of SCR capital costs to the LCERF Unit 3 expansion project. The initial preliminary capital cost estimate of 74 million for the LCERF Unit 3 expansion project assumed that Unit 3 would be constructed utilizing a similar, but not identical, configuration as existing Units 1 and 2 (i.e. SNCR). It is clear from Figure I-1 that if SCR is proposed for Unit 3, it will have a significant impact to the Capital Costs, and will result in an increase of 21 percent, which is opined to be economically prohibitive.

Operating Cost Impacts

A 20-year municipal waste processing cost ("Operating Costs") impact analysis was performed for SNCR and SCR NOx removal technologies and is summarized in Figure I-2. The following assumptions were used for this analysis:

- Unit 3 is projected to reach the design capacity of 600 tpd (nominal) in 2009 and at this point is assumed to have 90 percent availability;
- Operating Costs are based on 7 percent annual interest, 20-year scenario; and
- Operating Costs consist of vendor operating fees and debt service payments minus energy revenues.

Figure I-2 clearly shows that the impact to the LCERF Unit 3 Operating Costs is significantly higher if SCR is considered for NOx control versus SNCR. The increased Operating Cost for Unit 3 utilizing SCR, compared to Unit 3 utilizing SNCR is approximately 40 percent. Additionally, on a Net Present Value basis the utilization of SCR on Unit 3 would correspond to an expanded LCERF (i.e. Units 1, 2 & 3) 20-year Operating Cost increase of 14 percent over that of SNCR and is considered to be a significant economic impact.

Incremental Cost Analysis

In addition to evaluating and presenting the significant economic impacts on the LCERF Unit 3 Capital and Operating Costs, an Incremental Cost Analysis was also performed for comparison of SCR versus SNCR NOx control. Table I-1 provides the Incremental Cost Analysis for NOx removal (i.e. the additional capital costs for SCR divided by the additional tons of NOx removed).

As depicted in Table I-1, the incremental cost (\$23,658) is extremely high on the basis of a cost per ton of NOx removed.

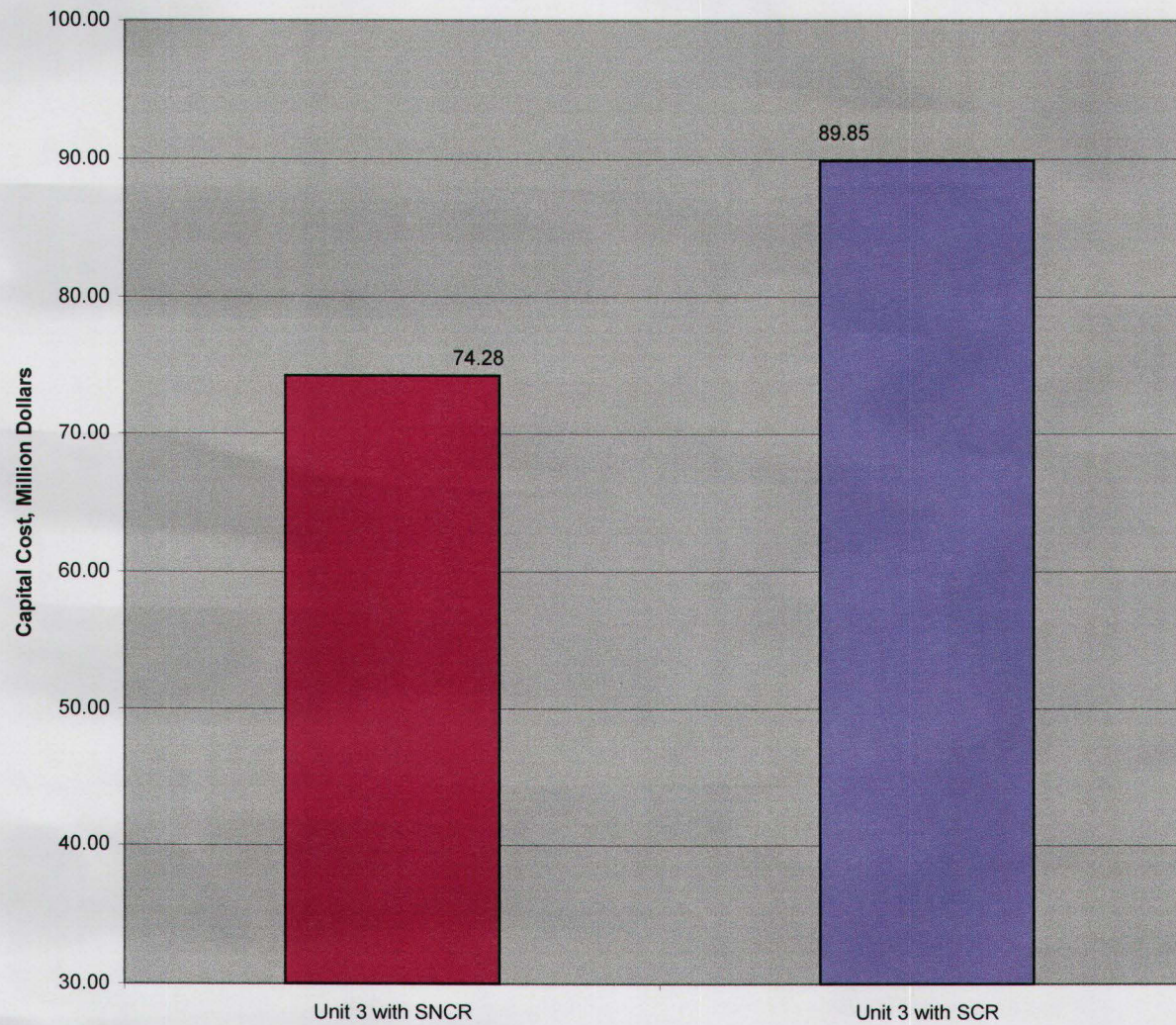
Other Salient Cost Considerations

Typically for a capital improvement project of this magnitude there are other costs to the County that have not been considered in the above cost analyses. These additional costs may include:

- Outside Financial Services
- Outside Legal (Bond) Counsel
- Outside Legal (Bond) Disclosure Counsel
- Owner's Agent Services

It is important to note that these costs will be relatively higher for more expensive capital improvement projects. Therefore it is not unreasonable to assume that the projected cost impacts may be higher than the estimated cost impacts presented in Figure I-1, Figure I-2 and Table I-1.

Figure I-1 Estimated Capital Cost Comparison (2002 Dollars)



Poor Original

Figure I-2 Unit 3 MSW Processing - Operating Cost Impacts

(Based on 7% Interest Rate & 20 Year Life)

Operating Cost = O&M Fee Paid to the
Operator + Debt Service Expenses -
Energy Revenue, on per ton MSW
basis, Estimated

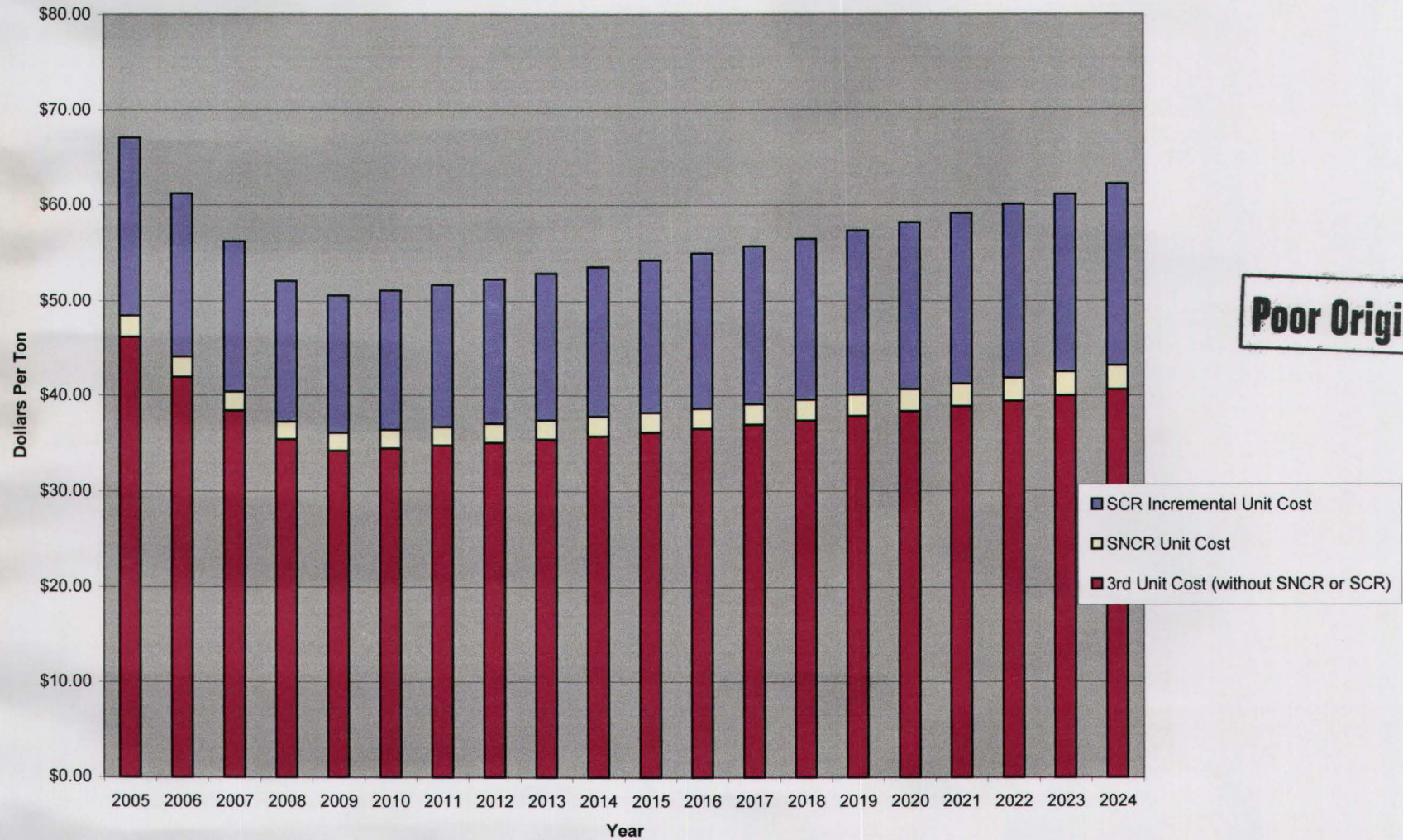


Table I-1 - Unit 3 Incremental NOx Removal Cost Analysis

Case No.	Controlled NOx	NOx Removed	Incremental NOx Removal, tpy	Annualized Cost of NOx Removal	Cost of NOx Removal dollars per ton (\$/t)	Incremental Cost of NOx Removal, \$/t
	ppmdv @ 7% O2	tons per year				
	Note (1)			Note (2)	Note (2)	Notes (2) (3)
SNCR	150	206	Base	\$415,308	\$2,016	Base
SCR (BBP)	100	301	95	\$2,662,774	\$8,846	\$23,658

Note 1: Controlled NOx performance level is estimated for long term sustained operation

Note 2: Based on 7% annual interest rate and 20 years amortization

Note 3: This column includes incremental cost of removing NOx using SCR over the cost of removing NOx using SNCR

**LEE COUNTY ENERGY RECOVERY FACILITY
LEE COUNTY SOLID WASTE DIVISION
LEE COUNTY, FLORIDA**

**PREVENTION OF SIGNIFICANT DETERIORATION
AIR PERMIT APPLICATION**

**MAJOR MODIFICATION TO ADD A THIRD
MUNICIPAL WASTE COMBUSTOR UNIT
TO THE EXISTING
LEE COUNTY ENERGY RECOVERY FACILITY**

Prepared For:
Lee County Solid Waste Division
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October 31, 2002

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION (PSD)
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

TABLE OF CONTENTS

<u>SECTION</u>	<u>SECTION NAME</u>	<u>PAGE</u>
1	EXECUTIVE SUMMARY	
1.1	INTRODUCTION	1-1
1.2	THE EXISTING FACILITY	1-1
1.3	THE PROPOSED FACILITY MODIFICATION	1-3
1.4	STRUCTURE OF PSD APPLICATION	1-4
1.5	SUMMARY OF IMPACTS AND CONCLUSIONS	1-4
1.6	SPECIFIC PERMIT ISSUES	1-5
2	REGULATORY REVIEW	
2.1	APPLICABLE REGULATIONS	2-1
2.2	FLORIDA STATE PROGRAM AUTHORITY	2-1
2.3	PREVENTION OF SIGNIFICANT DETERIORATION (PSD)	2-2
2.3.1	SOURCE APPLICABILITY	2-3
2.3.2	POLLUTANT APPLICABILITY	2-3
3	AIR POLLUTANT EMISSIONS	
3.1	INTRODUCTION	3-1
3.2	BASIS FOR EMISSION LIMITS	3-1
3.3	COMPOSITION OF MUNICIPAL SOLID WASTE	3-7
3.4	PARTICULATE MATTER AND PM ₁₀	3-8
3.5	MWC ACID GASES	3-8
3.5.1	SULFUR DIOXIDE	3-8
3.5.2	SULFURIC ACID MIST	3-9
3.5.3	HYDROGEN CHLORIDE	3-9
3.5.4	FLUORIDES	3-10
3.6	CARBON MONOXIDE	3-11
3.6.1	ADDITIONAL CARBON MONOXIDE MALFUNCTION REGULATIONS	3-11
3.7	NITROGEN OXIDES	3-12
3.8	MWC METALS	3-13
3.8.1	MERCURY	3-14
3.8.2	LEAD	3-14
3.8.3	CADMIUM	3-15
3.8.4	ARSENIC	3-15
3.8.5	BERYLLIUM	3-16
3.9	MWC ORGANICS	3-17
3.10	VOLATILE ORGANIC COMPOUNDS	3-17
3.11	VINYL CHLORIDE	3-18
3.12	TOTAL REDUCED SULFUR	3-18

**LEE COUNTY ENERGY RECOVERY FACILITY
PSD APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

TABLE OF CONTENTS (CONTINUED)

<u>SECTION</u>	<u>SECTION NAME</u>	<u>PAGE</u>
3.13	REDUCED SULFUR COMPOUNDS	3-18
3.14	HYDROGEN SULFIDE	3-18
3.15	AMMONIA	3-18
3.16	TOTAL HAZARDOUS AIR POLLUTANTS	3-19
4	BEST AVAILABLE CONTROL TECHNOLOGY EVALUATION	
4.1	DESCRIPTION OF CONTROL TECHNOLOGY REVIEW	4-1
4.2	PROPOSED CONTROL TECHNOLOGIES	4-2
4.3	MATERIALS SEPARATION	4-3
4.4	BACT REVIEW FOR PARTICULATE MATTER (PM ₁₀) AND MWC METALS	4-4
4.4.1	PARTICULATE FORMATION MECHANISMS	4-4
4.4.2	SOURCE SEPARATION IMPACT ON PARTICULATE EMISSIONS	4-5
4.4.3	AVAILABLE CONTROL TECHNOLOGIES	4-5
4.4.4	SELECTION OF BACT	4-6
4.5	BACT REVIEW FOR SULFUR DIOXIDE, MWC ACID GASES, AND SULFURIC ACID MIST	4-6
4.5.1	FORMATION MECHANISMS	4-6
4.5.2	SOURCE SEPARATION IMPACT ON MWC ACID GAS EMISSIONS	4-7
4.5.3	AVAILABLE CONTROL TECHNOLOGIES	4-9
4.5.4	RANKING OF ALTERNATIVE CONTROL TECHNOLOGIES	4-18
4.5.5	ENVIRONMENTAL IMPACT	4-18
4.5.6	ECONOMIC IMPACT	4-20
4.5.7	ENERGY IMPACT	4-22
4.5.8	SELECTION OF BACT	4-22
4.6	BACT REVIEW FOR NITROGEN OXIDES	4-23
4.6.1	FORMATION MECHANISMS	4-23
4.6.2	SOURCE SEPARATION IMPACT ON NITROGEN OXIDES EMISSIONS	4-24
4.6.3	AVAILABLE CONTROL TECHNOLOGIES	4-25
4.6.4	RANKING OF ALTERNATIVE CONTROL TECHNOLOGIES	4-39
4.6.5	ENVIRONMENTAL IMPACT	4-39
4.6.6	ECONOMIC IMPACT	4-39
4.6.7	ENERGY IMPACT	4-45
4.6.8	SELECTION OF BACT	4-45
4.7	BACT REVIEW FOR CARBON MONOXIDE	4-45
4.7.1	FORMATION MECHANISMS	4-45

**LEE COUNTY ENERGY RECOVERY FACILITY
PSD APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

TABLE OF CONTENTS (CONTINUED)

<u>SECTION</u>	<u>SECTION NAME</u>	<u>PAGE</u>
4.7.2	SOURCE SEPARATION IMPACT ON CARBON MONOXIDE	4-47
4.7.3	AVAILABLE CONTROL TECHNOLOGIES	4-48
4.7.4	RANKING OF ALTERNATIVE CONTROL TECHNOLOGIES	4-49
4.7.5	ENVIRONMENTAL IMPACT	4-50
4.7.6	ECONOMIC IMPACT	4-50
4.7.7	ENERGY IMPACT	4-50
4.7.8	SELECTION OF BACT	4-50
4.8	BACT REVIEW FOR MWC ORGANICS	4-51
4.8.1	FORMATION MECHANISMS	4-51
4.8.2	SOURCE SEPARATION IMPACT ON MWC ORGANICS	4-51
4.8.3	AVAILABLE CONTROL TECHNOLOGIES	4-52
4.8.4	RANKING OF ALTERNATIVE CONTROL TECHNOLOGIES	4-53
4.8.5	ENVIRONMENTAL IMPACT	4-54
4.8.6	ECONOMIC IMPACT	4-54
4.8.7	ENERGY IMPACT	4-54
4.8.8	SELECTION OF BACT	4-54
4.9	BACT REVIEW FOR MERCURY EMISSIONS	4-54
4.9.1	FORMATION MECHANISMS	4-55
4.9.2	SOURCE SEPARATION IMPACT ON MERCURY EMISSIONS	4-55
4.9.3	AVAILABLE CONTROL TECHNOLOGIES	4-56
4.9.4	RANKING OF ALTERNATIVE CONTROL TECHNOLOGIES	4-58
4.9.5	SELECTION OF BACT	4-58
4.10	SUMMARY OF PSD APPLICABLE POLLUTANTS AND PROPOSED BACT	4-58
5	EXISTING AMBIENT AIR QUALITY	
5.1	AMBIENT AIR QUALITY STANDARDS	5-1
5.2	AMBIENT MONITORING DATA	5-1
5.3	BASELINE AIR QUALITY	5-4
5.4	ATTAINMENT STATUS	5-8
6	AIR QUALITY IMPACT ANALYSES	
6.1	MODEL SELECTION AND OPTIONS	6-1
6.2	METEOROLOGICAL DATA	6-2
6.3	RECEPTOR DATA	6-3
6.4	SOURCE DATA	6-3
6.5	SCREENING MODELING ANALYSIS	6-11
6.6	REFINED MODELING ANALYSIS	6-13

**LEE COUNTY ENERGY RECOVERY FACILITY
PSD APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

TABLE OF CONTENTS (CONCLUDED)

<u>SECTION</u>	<u>SECTION NAME</u>	<u>PAGE</u>
6.7	SIGNIFICANT IMPACT LEVELS	6-24
6.8	DE MINIMIS MONITORING LEVELS	6-24
6.9	PSD CLASS II INCREMENTS	6-24
6.10	AMBIENT AIR QUALITY STANDARDS	6-29
6.11	AMBIENT REFERENCE CONCENTRATIONS	6-31
7	ADDITIONAL IMPACT ANALYSES	
7.1	LOCAL VISIBILITY IMPACTS	7-1
7.2	MINOR SOURCE GROWTH	7-3
7.3	SOILS AND VEGETATION	7-5
7.4	STARTUP, SHUTDOWN AND MALFUNCTION CONDITIONS	7-8
7.5	RISK ASSESSMENT ANALYSES	7-12
7.6	PSD CLASS I ANALYSIS	7-17
7.6.1	PSD CLASS I INCREMENT ANALYSIS	7-19
7.6.2	PSD CLASS I AIR QUALITY RELATED VALUES	7-19
7.6.2.1	ACID DEPOSITION ANALYSES	7-21
7.6.2.2	REGIONAL HAZE ANALYSIS	7-21
8	REFERENCES	8-1
9	ATTACHMENTS	
A	FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION AIR PERMIT APPLICATION FORMS	
B	TRANSCRIPT OF PUBLIC MEETING REGARDING PRELIMINARY DRAFT MATERIALS SEPARATION PLAN	
C	LIST OF PERSONS CONTACTED DURING PREPARATION OF BEST AVAILABLE CONTROL TECHNOLOGY	
D	LIST OF FACILITIES INCORPORATING SELECTIVE CATALYTIC REDUCTION	
E	SELECTIVE CATALYTIC REDUCTION SYSTEM BUDGETARY ESTIMATES RECEIVED DURING PREPARATION OF BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS AND SUPPORTING CORRESPONDENCE	
F	COST REMOVAL VALUES FOR NITROGEN OXIDES	
G	VERIFICATION OF FACILITY RISK MANAGEMENT PLAN SUBMISSION AND COMPLETENESS	

**LEE COUNTY ENERGY RECOVERY FACILITY
PSD APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

LIST OF TABLES

<u>TABLE NO.</u>	<u>TABLE NAME</u>	<u>PAGE</u>
TABLE 2-1	PSD POLLUTANT APPLICABILITY FOR THE ADDITION OF MWC UNIT 3 TO THE LCERF	2-4
TABLE 3-1	PROPOSED EMISSION FACTORS FOR LCERF'S MWC UNIT 3	3-5
TABLE 4-1	CONTROL EFFICIENCIES OF SULFUR DIOXIDE AND ACID GAS CONTROL TECHNOLOGIES	4-19
TABLE 4-2	ALTERNATIVE CONTROL METHODS FOR NITROGEN OXIDES	4-26
TABLE 4-3	SAMPLE LIST OF EUROPEAN MUNICIPAL WASTE COMBUSTION FACILITIES UTILIZING SCR AND THEIR AIR POLLUTION CONTROL EQUIPMENT CONFIGURATION	4-32
TABLE 4-4	EUROPEAN MUNICIPAL WASTE COMBUSTION FACILITY EMISSIONS INFORMATION RECEIVED DURING THE BACT PREPARATION PROCESS	4-33
TABLE 4-5	COMPARISON OF COST ITEMS IN SCR BUDGETARY ESTIMATES RECEIVED DURING BACT PREPARATION	4-42
TABLE 4-6	POLLUTANTS APPLICABLE TO PSD REVIEW AND PROPOSED BACT	4-59
TABLE 5-1	NATIONAL AND FLORIDA STATE AMBIENT AIR QUALITY STANDARDS	5-2
TABLE 5-2	NEAREST AMBIENT AIR QUALITY MONITORING SITES	5-3
TABLE 5-3	NEARBY AMBIENT AIR QUALITY DATA	5-5
TABLE 5-4	COMPARISON OF BASELINE CONCENTRATIONS TO AMBIENT AIR QUALITY STANDARDS	5-7
TABLE 6-1	STACK CHARACTERISTICS	6-5
TABLE 6-2	STACK GAS CONDITIONS FOR PROPOSED MWC UNIT 3	6-8
TABLE 6-3	ISCST3 SCREENING RESULTS FOR PROPOSED MWC UNIT ONLY	6-12
TABLE 6-4	STACK GAS CONDITIONS FOR LEE COUNTY FACILITY	6-14
TABLE 6-5	ISCST3 REFINED RESULTS FOR LEE COUNTY FACILITY	6-15
TABLE 6-6	MAXIMUM CRITERIA POLLUTANT IMPACTS FOR THE LEE COUNTY FACILITY EXPANSION	6-16
TABLE 6-7	COMPARISON OF MAXIMUM INCREASES AND FACILITY IMPACTS TO SIGNIFICANT IMPACT LEVELS	6-27

**LEE COUNTY ENERGY RECOVERY FACILITY
PSD APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

LIST OF TABLES (CONCLUDED)

<u>TABLE NO.</u>	<u>TABLE NAME</u>	<u>PAGE</u>
TABLE 6-8	COMPARISON OF MAXIMUM INCREASES AND FACILITY IMPACTS TO DE MINIMIS MONITORING LEVELS	6-28
TABLE 6-9	COMPARISON OF MAXIMUM INCREASES AND FACILITY IMPACTS TO PSD CLASS II INCREMENTS	6-30
TABLE 6-10	COMPARISON OF MAXIMUM INCREASES AND FACILITY IMPACTS TO AMBIENT AIR QUALITY STANDARDS	6-32
TABLE 6-11	COMPARISON OF MAXIMUM INCREASES AND FACILITY IMPACTS TO AMBIENT REFERENCE CONCENTRATIONS	6-33
TABLE 7-1	MODELING RESULTS FOR LEE COUNTY ENERGY RECOVERY FACILITY RISK ASSESSMENT FOR COMBINED (PROPOSED AND EXISTING) MWC UNITS	7-15
TABLE 7-2	COMPARISON OF MAXIMUM CLASS I IMPACTS TO USEPA PROPOSED SIGNIFICANT IMPACT LEVELS AND CLASS I INCREMENTS	7-20
TABLE 7-3	MODELING INPUTS FOR CALPUFF DEPOSITION ANALYSES	7-22
TABLE 7-4	MAXIMUM MODEL-PREDICTED NITROGEN AND SULFUR DEPOSITION RATES	7-23
TABLE 7-5	MODEL-PREDICTED CHANGE IN LIGHT EXTINCTION IN EVERGLADES NATIONAL PARK	7-25

**LEE COUNTY ENERGY RECOVERY FACILITY
PSD APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

LIST OF FIGURES

<u>FIGURE NO.</u>	<u>FIGURE NAME</u>	<u>PAGE</u>
FIGURE 1-1	GENERAL LOCATION OF THE LEE COUNTY ENERGY RECOVERY FACILITY	1-2
FIGURE 6-1	MWC UNIT 3 OPERATING WINDOW	6-7
FIGURE 6-2	CROSS-SECTIONAL VIEW OF LEE COUNTY ENERGY RECOVERY FACILITY	6-9
FIGURE 6-3	PLAN VIEW OF LEE COUNTY ENERGY RECOVERY FACILITY	6-10
FIGURE 6-4	MAXIMUM INCREASES IN FACILITY 1-HOUR CO IMPACTS (ug/m^3)	6-18
FIGURE 6-5	MAXIMUM INCREASES IN FACILITY 8-HOUR CO IMPACTS (ug/m^3)	6-19
FIGURE 6-6	MAXIMUM INCREASES IN FACILITY ANNUAL NO_x IMPACTS (ug/m^3)	6-20
FIGURE 6-7	MAXIMUM INCREASES IN FACILITY 3-HOUR SO_2 IMPACTS (ug/m^3)	6-21
FIGURE 6-8	MAXIMUM INCREASES IN FACILITY 24-HOUR SO_2 IMPACTS (ug/m^3)	6-22
FIGURE 6-9	MAXIMUM INCREASES IN FACILITY ANNUAL SO_2 IMPACTS (ug/m^3)	6-23
FIGURE 6-10	MAXIMUM INCREASES IN FACILITY 24-HOUR PM_{10} IMPACTS (ug/m^3)	6-25
FIGURE 6-11	MAXIMUM INCREASES IN FACILITY ANNUAL PM_{10} IMPACTS (ug/m^3)	6-26
FIGURE 7-1	MAXIMUM IMPACT LOCATIONS FOR RISK ASSESSMENTS	7-16

ACRONYMS AND ABBREVIATIONS

AAQS	Ambient Air Quality Standard
acf	Actual Cubic Feet
acfm	Actual Cubic Feet Per Minute
ACI	Activated Carbon Injection
APC	Air Pollution Control (Equipment)
AQCR	Air Quality Control Region
AQRV	Air Quality Related Values
ARC	Ambient Reference Concentration
As	Arsenic
ASME	American Society of Mechanical Engineers
avg	Average
BACT	Best Available Control Technology
Be	Beryllium
BPIP	USEPA Building Profile Input Program
BTU	British Thermal Unit
C	Degrees Celsius (Temperature Scale)
C&D	Construction and Demolition Waste
CAA	Clean Air Act
CARB	California Air Resources Board
CEM	Continuous Emissions Monitoring
cfm	Cubic Feet Per Minute
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
Covanta	Covanta Lee, Inc.
dscf	Dry Standard Cubic Feet
dscfm	Dry Standard Cubic Feet Per Minute
dscm	Dry Standard Cubic Meter
ESP	Electrostatic Precipitator
°F	Degrees Fahrenheit (Temperature Scale)
FAA	Federal Aviation Administration
FAAQs	Florida Ambient Air Quality Standards
F.A.C.	Florida Administrative Code (Regulations)
FDEP	Florida Department of Environmental Protection
FF	Fabric Filter (Baghouse)
FGD	Flue Gas Desulfurization
FR	Federal Register
GCP	Good Combustion Practices
GEP	Good Engineering Practice (Stack Height)
gr/cf	Grams Per Cubic Foot
gr/dscf	Grams Per Dry Standard Cubic Foot
g/s	Grams Per Second
ha	Hectare

ACRONYMS AND ABBREVIATIONS (CONTINUED)

HAPs	Hazardous Air Pollutants
HDPE	High Density Polyethylene
HF	Hydrogen Fluoride
Hg	Mercury
HHV	Higher Heating Value
HHW	Household Hazardous Waste
hrs/yr	Hours Per Year
ISC	Industrial Source Complex Model
ISCST	Industrial Source Complex Short-Term Model
km	Kilometer
LAER	Lowest Achievable Emission Rate
lb/hr	Pounds Per Hour
LCERF	Lee County Energy Recovery Facility
m ³	Cubic Meters
mg	Milligram
MACT	Maximum Achievable Control Technology
MMBTU	Million British Thermal Units
MSW	Municipal Solid Waste
MW	Megawatts
MWC	Municipal Waste Combustor
NAAQS	National Ambient Air Quality Standards
NCDC	National Climatic Data Center
NEMA	National Electrical Manufacturers Association
NESHAPs	National Emission Standards for Hazardous Air Pollutants
ng	Nanogram
ng/Nm ³	Nanograms Per Normal Cubic Meter
NMHC	Non-Methane Hydrocarbons
NO	Nitrogen Oxide
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
NPS	(U.S.) National Park Service
NSPS	New Source Performance Standards
NSR	Non-Attainment New Source Review
NWS	National Weather Service
O ₂	Oxygen
O ₃	Ozone
OAQPS	(USEPA) Office of Air Quality Planning and Standards
Pb	Lead
PCDD	Polychlorinated dibenzo-p-dioxin
PCDF	Polychlorinated dibenzofurans
PM	Particulate Matter
PM _{2.5}	Particulate Matter with an Aerodynamic Diameter Less Than 2.5 Microns

ACRONYMS AND ABBREVIATIONS (CONCLUDED)

PM ₁₀	Particulate Matter with an Aerodynamic Diameter Less Than 10 Microns
ppb	Parts Per Billion
ppm	Parts Per Million
ppmdv	Parts Per Million By Volume (Dry Basis)
ppmv	Parts Per Million By Volume
PPSA	(Florida Electrical) Power Plant Siting Act
PSD	Prevention of Significant Deterioration
PVC	Polyvinyl Chloride
REMAP	Reference Methods, Accuracy And Precision
SAM	Sulfuric Acid Mist
SCR	Selective Catalytic Reduction
SDA	Spray Dry Absorption (a.k.a. Semi-Dry Scrubber)
SIL	Significant Impact Level
SIP	State Implementation Plan
SNCR	Selective Non-Catalytic Reduction
SO ₂	Sulfur Dioxide
S/S/M	Start-Up, Shutdown, and Malfunction
TCDD	Tetrachlorodibenzo-p-dioxin
TCDF	Tetrachlorodibenzofurans
TLV	Threshold Limiting Value
tpd	Tons Per Day
tpy	Tons Per Year
TSP	Total Suspended Particulates
ug	Microgram
um	Micrometer (micron)
Unit 1	Existing MWC Unit Number 1 at the LCERF (not modified)
Unit 2	Existing MWC Unit Number 2 at the LCERF (not modified)
Unit 3	Proposed New MWC Unit Number 3 at the LCERF
UPL	Upper Predicted Limits
U.S.	United States of America
USEPA	U.S. Environmental Protection Agency
UTM	Universal Transverse Mercator (Coordinate System)
VOC	Volatile Organic Compounds

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

**SECTION 1
EXECUTIVE SUMMARY**

October 31, 2002

SECTION 1 EXECUTIVE SUMMARY

1.1 INTRODUCTION

Lee County and Hendry County have entered into an interlocal agreement that requires them to jointly provide an integrated solid waste management system to satisfy the needs of their residents. The system includes three major components: (1) an aggressive materials separation program; (2) a waste-to-energy facility that is located in Lee County and known as the Lee County Energy Recovery Facility (LCERF); and (3) a landfill located in Hendry County. Lee County now wishes to expand the LCERF so that the two counties can continue to satisfy the public demand for efficient, environmentally sound, and cost-effective solid waste disposal services.

This document contains Lee County's Prevention of Significant Deterioration (PSD) application for approval of the expansion project. Specifically as required by Rule 62-212.400, Florida Administrative Code (F.A.C.) and 40 CFR 52.21, this is Lee County's application for a PSD permit for a major modification of an existing major source, the LCERF.

1.2 THE EXISTING FACILITY

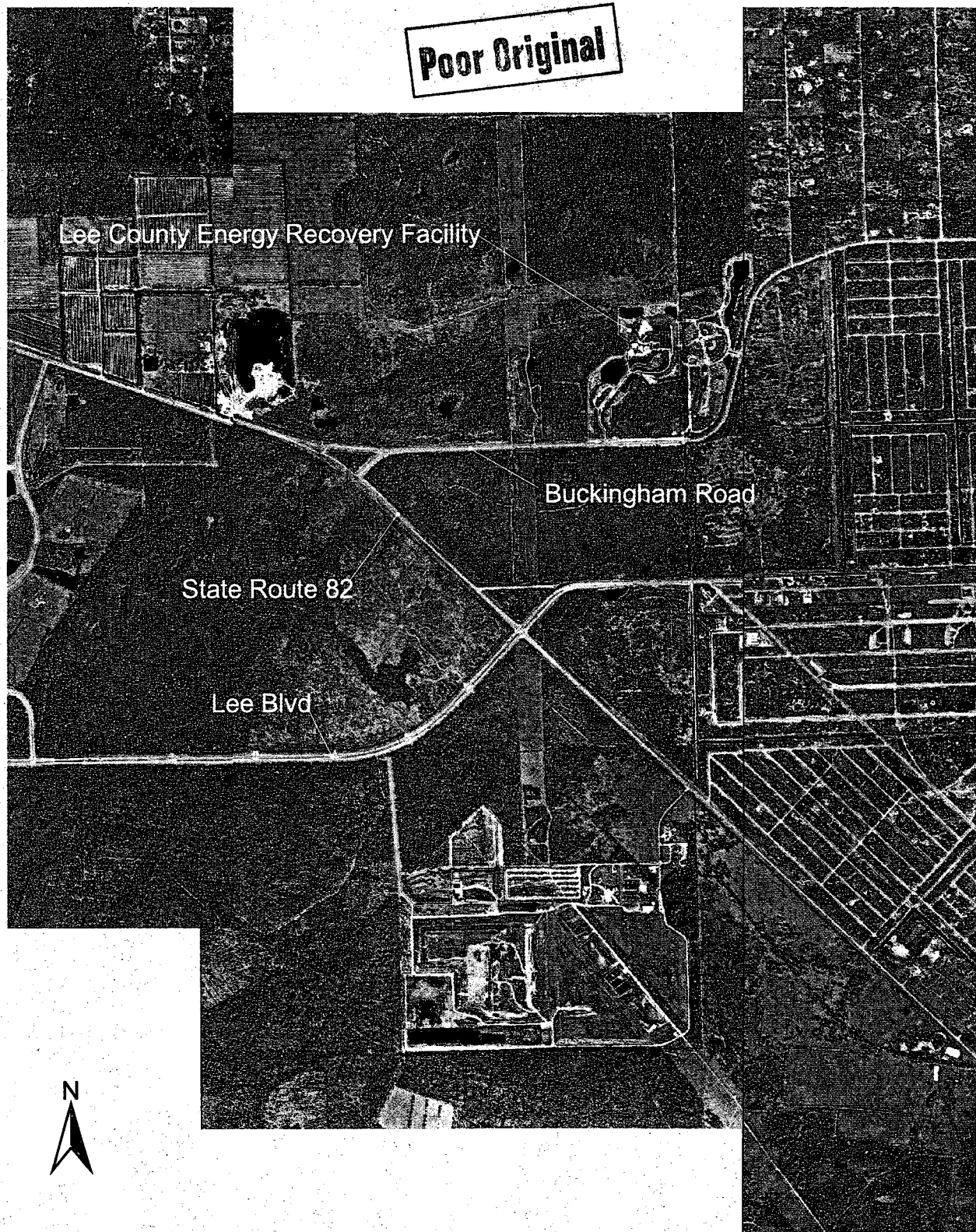
The LCERF is located at 10500 Buckingham Road, southeast of the City of Fort Myers, on a 155-acre site in an unincorporated portion of Lee County. The general location of the LCERF is shown in Figure 1-1. The specific coordinates for the LCERF are: Universal Transverse Mercator (UTM) Coordinates Zone 17, 424.21 km East and 2945.70 km North; Latitude 26° 37' 54" North, Longitude: 81° 45' 41" West.

The LCERF has been designed, built and operated by Covanta Lee, Inc. (Covanta; formerly Ogden Martin Systems of Lee, Inc.), pursuant to a long-term contract with Lee County. Covanta began commercial operations of the LCERF on December 1, 1994.

Lee County has obtained PSD and Title V permits authorizing the construction and operation of two municipal waste combustor (MWC) units at the LCERF. [See PSD-FL-151, PSD-FL-151A; PSD-FL-151B; and 0710119-001-AV]. In addition, the County obtained approval for the construction and operation of the LCERF pursuant to the Florida Electrical Power Plant Siting Act (PPSA), Sections 403.501 - .518, Florida Statutes. [See PPSA Case Number PA 90-30]. The PPSA approval expressly authorized an "ultimate site capacity" for the LCERF that is based on the use of three MWC units.

The LCERF currently is equipped with two MWC units (hereafter Units 1 and 2), which utilize the Martin reverse-reciprocating stoker grate technology. Each MWC unit is capable of processing 660 tons per day (tpd) of municipal solid waste (MSW) with a higher heating value (HHV) of 5,000 British thermal units (BTU) per pound on an annual basis. The maximum heat input of each MWC unit is 275 million BTU (MMBTU) per hour on an annual basis. The LCERF converts solid waste into saleable energy through

FIGURE 1-1
GENERAL LOCATION OF THE LEE COUNTY ENERGY RECOVERY FACILITY



the use of two water wall boilers and a steam turbine generator, which produces up to 40 megawatts (MW) of electricity. The LCERF operates on a small portion of the power it generates and the remaining electricity is sold.

Truck transport is used to deliver municipal solid waste to the LCERF and to remove ash residue from the LCERF. The MSW is brought inside the LCERF before it is dumped from the packer trucks into the refuse pit. All MSW is stored inside the fully enclosed LCERF prior to combustion and is not visible from the outside. Air is drawn from the tipping floor and refuse pit and then used in the combustion process. As a result, the tipping floor and refuse pit are kept under negative air pressure, which helps ensure that dust and odors do not escape into the ambient environment. Overhead cranes mix the MSW and then place it in charging hoppers that feed into the two MWC units. Large, bulky items and other non-processible wastes are removed and set aside for proper disposal elsewhere.

The airborne emissions from the LCERF's stack are controlled through a combination of good combustion practices (GCP), a scrubber (a.k.a. spray dry absorber or SDA), a fabric filter (FF) baghouse, an activated carbon injection (ACI) system, and a selective non-catalytic reduction (SNCR) system. Fabric filters also are used to control the emissions from the LCERF's lime silos and ash handling building. The lime silos store pebble lime, which is used to make lime slurry for the SDA. Particulate matter emissions may occur when the lime silos are loaded from delivery trucks.

Bottom ash from the MWC units, and fly ash from the fabric filters, are combined and wetted in an ash discharger and then transported inside fully enclosed conveyors to an ash management building, where ferrous and non-ferrous metals are removed. The combined ash residue is stored inside the ash management building until it is taken to the Hendry County landfill for disposal.

1.3 THE PROPOSED FACILITY MODIFICATION

Despite the comprehensive materials separation program implemented in Lee and Hendry Counties, the amount of solid waste delivered to the LCERF has increased every year since the LCERF began operating. This increase in solid waste generation is primarily due to population growth in the area. In 1999, the amount of solid waste received by the LCERF reached the facility's guaranteed annual capacity of 372,300 tons. In 2000, the LCERF processed over 392,000 tons of solid waste, but the County had to dispose of nearly 44,000 additional tons of processible solid waste in landfills because there was not sufficient capacity in the LCERF. Current population projections for Lee and Hendry Counties suggest that the amount of MSW will continue to increase, reaching nearly 550,000 tons by 2010. Since the County's aggressive materials separation program has not eliminated the need for more MSW disposal capacity, Lee County concluded that it should expand the LCERF, rather than increase its use of landfills.

Lee County will expand the LCERF by installing a third 660-tpd MWC unit (Unit 3) and associated equipment, which will increase the LCERF's capacity to 1,980-tpd. The

expansion also will include the installation of a new boiler, air pollution control system, and steam turbine generator for Unit 3.

Since the original PPSA application for the LCERF anticipated the installation of a third MWC unit, the design of the LCERF was planned to facilitate the addition of Unit 3. There is space available for an additional flue in the LCERF's stack, and the tipping floor and refuse pit have been sized to accommodate the operation of three MWC units at 1,980 tpd. Nonetheless, there is a need for an expansion to the switchyard, the ash management building and the turbine generator building. There also will need to be certain modifications and/or additions to some of the LCERF's common equipment and systems so that Unit 3 can be integrated into the existing facility. There are no PSD significant changes planned for Units 1 and 2 at this time; therefore, Units 1 and 2 are not subject to New Source Review.

1.4 STRUCTURE OF PSD APPLICATION

Section 2 (Regulatory Review) of this document contains a review of applicable air rules and regulations for the existing LCERF and proposed Unit 3 addition. Section 3 (Air Pollutant Emissions) details air pollutant emissions from municipal waste combustion and possible control options. Section 4 (Best Available Control Technology Evaluation) evaluates emissions control technologies and determines the Best Available Control Technology options based on environmental, economic and social impacts and feasibility. Section 5 (Existing Ambient Air Quality) describes the existing ambient air quality for the area surrounding the LCERF. The air quality impacts are discussed in Section 6 (Air Quality Impact Analyses) along with the approach used in the air quality dispersion modeling and results obtained from the modeling. Section 7 (Additional Impact Analyses) presents additional analyses required under PSD regulations and for the risk assessments in the PPSA permit application. Section 8 (References) contains references used in this document and attachments to this document are found in Section 9 (Attachments).

1.5 SUMMARY OF IMPACTS AND CONCLUSIONS

Lee County proposes Best Available Control Technology to be Good Combustion Practices for the control of volatile organic compounds (VOC) and carbon monoxide (CO); a SDA and FF baghouse for control of sulfur dioxide (SO₂), MWC Acid Gases (as SO₂ and hydrogen chloride [HCl]), and particulate matter less than 10 microns in diameter (PM₁₀); activated carbon injection for control of mercury (Hg); and selective non-catalytic reduction for control of nitrogen oxides (NO_x).

Lee County proposes to accept emission limits lower than the New Source Performance Standards (NSPS) under 40 CFR 60, Subpart Eb, and lower than existing permit limits for Units 1 and 2 at the LCERF, for particulate matter; sulfur dioxide; volatile organic compounds; and fluorides. Emission limits for other pollutants will be proposed at NSPS levels (e.g., carbon monoxide, cadmium, hydrogen chloride, lead, mercury, MWC

organics, and nitrogen oxides. Actual emissions from Unit 3 are expected to be lower than the limits proposed by Lee County.

Maximum increases in facility impacts due to the third MWC unit were shown to be less than the federal and state ambient air quality standards (AAQS), Class I and Class II PSD increments, de minimis monitoring levels, and Florida ambient reference concentrations (ARCs). In fact, maximum increases in facility impacts due to the third MWC unit, as well as maximum future facility impacts for all three MWC units, were shown to be less than the significant impact levels (SILs) for PSD criteria pollutants for both Class I and Class II areas. Hence, for pollutants regulated under the PSD regulations, impacts from the third MWC unit as well as the entire future facility are considered to be indistinguishable from background concentrations and are therefore considered to be negligible.

1.6 SPECIFIC PERMIT ISSUES

Lee County proposes to test for the following pollutants during the initial compliance emissions test on Unit 3 and then, upon successful demonstration that the emission levels are equal to or below their proposed emissions level, Lee County proposes to have the emissions limits deleted from the PSD air permit for Unit 3.

- Sulfuric Acid Mist
- Fluorides
- Arsenic
- Beryllium
- Volatile Organic Compounds
- Ammonia

This deletion request is based on a history of non-detectable or very low concentrations measured during prior performance tests for Units 1 and 2 at the LCERF. Unit 3 will be very similar to Units 1 and 2. Testing of a pollutant that is not measurable is expensive, without providing any benefit to human health and the environment. Lee County proposes alternative compliance measures to ensure control of emissions from the above pollutants, such as temperature of the fabric filter baghouse and control of sulfur dioxide.

As noted in condition A.41 of the current Title V permit, special conditions already are in place in the existing permit for Units 1 and 2 for start-up/shutdown/malfunction (S/S/M) operations. Similar S/S/M conditions are proposed for Unit 3. Lee County also requests relief from the carbon monoxide emission standard under the Subpart Eb NSPS during periods of malfunction for up to 15 hours per occurrence as provided in the November 16, 2001 Federal Register (see Section 3.6.1 [Additional Carbon Monoxide Malfunction Regulations]).

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

**SECTION 2
REGULATORY REVIEW**

October 31, 2002

SECTION 2 REGULATORY REVIEW

This section discusses the air quality regulations promulgated by the U.S. Environmental Protection Agency (USEPA) and the Florida Department of Environmental Protection (FDEP) applicable to Lee County's proposed project.

2.1 APPLICABLE REGULATIONS

Air quality regulations promulgated by the USEPA and the FDEP establish ambient air quality standards and regulate the sources of air contaminants in order to achieve and maintain the ambient standards. The proposed expansion to the Lee County Energy Recovery Facility (LCERF) has been evaluated to ensure compliance with the following rules and regulations.

- Prevention of Significant Deterioration (PSD)
- Non-Attainment New Source Review (NSR)
- Ambient Air Quality Standards (AAQS)
- New Source Performance Standards (NSPS)
- National Emission Standards for Hazardous Air Pollutants (NESHAP)
- Federal Aviation Administration (FAA) regulations governing stack height
- FDEP Rules (Chapter 62, Florida Administrative Code [F.A.C.]) governing air pollution
- Florida Electrical Power Plant Siting Act (PPSA)

In many cases, the FDEP air pollution regulations reflect the standards established by the USEPA; however, with respect to those cases where the Florida rules represent a more restrictive requirement, the Florida regulation has been applied.

This section focuses on the PSD regulations and discusses the applicability of the PSD program to Lee County's proposed project with respect to the source (Unit 3) and individual pollutants emitted by Unit 3. The remaining regulations referenced above are discussed further in the PPSA application.

2.2 FLORIDA STATE PROGRAM AUTHORITY

The State of Florida has been delegated full authority by the USEPA to administer the State Implementation Plan (SIP). Additionally, the FDEP has an approved program for issuing permits for new and modified sources, thereby satisfying the requirements of USEPA's PSD regulations (40 CFR Part 52.21). The USEPA also has delegated responsibility to the FDEP for administration of the PSD program for sources subject to the PPSA.

2.3 PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

The Clean Air Act (CAA) was amended in 1977 to incorporate the PSD program. To carry out the policies of the 1977 CAA amendments, USEPA adopted revised PSD regulations on June 19, 1978. These revised regulations contained the PSD increments mandated by Congress and identified the types of emission sources subject to the PSD regulations, as directed by the amended CAA (40 CFR 52.21). PSD regulations apply to attainment areas. PSD attainment areas are those areas that have been designated as in attainment or unclassifiable with respect to meeting federal or state ambient air quality standards for regulated (criteria) pollutants. The LCERF site is located in Lee County, which is part of the Southwest Florida Intrastate Air Quality Control Region (40 CFR 81.97). The project site is currently designated as attainment for the criteria pollutants (i.e., particulate matter with mean aerodynamic diameter less than 10 micron [μm] [PM_{10}]; sulfur dioxide [SO_2]; nitrogen dioxide [NO_2]; carbon monoxide [CO]; lead [Pb] and ozone [O_3]).

For PSD purposes, the primary definition of major stationary source includes any source belonging to a list of 28 specified source categories which has the potential to emit 100 tons per year (tpy) or more of any pollutant regulated under the CAA. The LCERF is classified as a major source for PSD purposes because it is one of the 28 specified sources (i.e., a municipal incinerator capable of charging more than 50 tons per day (tpd) of refuse as defined in 40 CFR 52.21 and Section 169(1) of the Clean Air Act, also known as a municipal waste combustor [MWC]) and it has the potential to emit more than 100 tpy of at least one regulated pollutant (Rule 62-210.200(159)(b)8, F.A.C., Definition of Major Source of Air Pollution).

A modification to an existing major source is subject to PSD regulation if it is located in a PSD attainment area and it is a major modification. A major modification is generally a physical change or a change in method of operation of an existing major source which would result in a contemporaneous significant increase in emissions of any regulated pollutant. A significant emissions increase is an increase greater than or equal to the emission levels listed in Table 212.400-2 (Regulated Air Pollutants - Significant Emission Rates), which is contained in Rule 62-212.400, F.A.C.

In general, a PSD application in Florida (Rule 62-212.400(5), F.A.C.) must contain the following information:

- A description of the nature, location, design capacity and typical operating schedule of the facility or modification, including specifications and drawings showing its design and plant layout.
- An estimate of the emissions associated with the project or modification.
- A Best Available Control Technology (BACT) determination.
- Information relating to the air quality impacts of the facility or modification, including meteorological and topographical data.

- Information relating to the air quality impacts of general commercial, residential, industrial and other growth which has occurred since August 7, 1977, in the area the facility or modification would affect.
- A Good Engineering Practice stack height analysis.
- An assessment of the source's impact on air quality-related values including soils, vegetation, visibility and general commercial, residential and industrial growth.

The PSD regulations establish Class I, or pristine, areas in the United States. The regulations require that any major facility proposing to locate near a Class I area have an assessment performed of the source's effect on visibility at the Class I area, on Class I increment consumption, and other air quality related values (AQRVs). The Everglades National Park, a designated Class I area, is about 90 kilometers from the LCERF site. Section 7 (Additional Impact Analyses) contains the Class I impacts analyses.

2.3.1 SOURCE APPLICABILITY

Lee County's proposed project is a major modification to an existing major stationary source because the existing LCERF is a municipal waste combustion facility that is capable of burning more than 50-tpd of waste, and Unit 3 will cause at least one of the PSD regulated pollutants to be emitted at a rate that exceeds the PSD significance levels established in Rule 62-212.400, F.A.C. PSD requirements apply to new major sources or major modifications located in areas which have been designated as in attainment or unclassifiable for the ambient air quality standards for a particular pollutant. As stated further in Section 5.4 (Attainment Status), the Unit 3 project is in an area that is classified as attainment or is unclassifiable for all criteria pollutants. This project entails the addition of MWC Unit 3; Units 1 and 2 will not be modified.

2.3.2 POLLUTANT APPLICABILITY

Under the PSD program, if the potential annual emission rate exceeds the PSD emission rates designated in Rule 62-212.400, F.A.C., then a BACT analysis and air quality modeling must be conducted for each PSD pollutant emitted at greater than the significance levels. Table 2-1 compares estimated Unit 3 annual emission rates, presented in Section 3 (Air Pollutant Emissions), with the corresponding PSD significant emission rates, and identifies those pollutants for which air quality impact and BACT analyses must be performed. The detailed approaches and considerations for performing BACT analyses are presented in Section 4 (Best Available Control Technology Evaluation). As shown in Table 2-1, formal PSD analyses (including a BACT Analysis) are required for CO, NO_x, SO₂, sulfuric acid mist (SAM), PM₁₀, mercury, MWC acid gases, MWC metals and MWC organics.

The maximum annual emission rates presented in Table 2-1 were calculated assuming that Unit 3 operates 365 days per year at 110 percent load. This assumption is conservative, because Unit 3 is expected to have an annual availability factor less than 100% due to scheduled and unscheduled downtime.

**TABLE 2-1
PSD POLLUTANT APPLICABILITY FOR THE
ADDITION OF MWC UNIT 3 TO THE LCERF**

Name of PSD Pollutant	PSD Significant Emission Rates ^a (tpy)	Proposed Unit 3 Emission Rate (tpy)	PSD Applicable
Carbon Monoxide	100	125.8	Yes
Nitrogen Oxides	40	310.1	Yes
Sulfur Dioxide	40	287.8	Yes
Sulfuric Acid Mist	7	73.51	Yes
Particulate Matter (Total)	25	22.26	No
Particulate Matter (PM ₁₀)	15	22.26	Yes
Ozone (VOCs)	40	21.62	No
Lead	0.6	0.216	No
Beryllium	4E-4	1.73E-4	No
Mercury	0.1	0.187	Yes
Fluorides	3	2.986 ^b	No
MWC Acid Gases (as SO ₂ & HCl)	40	492.7	Yes
MWC Metals (as PM)	15	22.26	Yes
Total Reduced Sulfur (Including H ₂ S)	10	Negligible	No
Reduced Sulfur Compounds (Including H ₂ S)	10	Negligible	No
Hydrogen Sulfide	10	Negligible	No
Vinyl Chloride	1	Negligible	No
MWC Organics (Total Dioxins and Furans) ^c	3.5E-6	1.41E-5	Yes

Poor Original

^a Source: Rule 61-212.400, F.A.C. Table 212.400-2 (Regulated Air Pollutants – Significant Emission Rates) and 40 CFR 52.21 (Prevention of Significant Deterioration of Air Quality).

^b Calculated from the HF emission rate of 3.145 tons per year based on the Fluorine/HF ratio of 18.9984/20.01.

^c Measured as total tetra- through octa- chlorinated dibenzo-p-dioxins and dibenzo furans.

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

**SECTION 3
AIR POLLUTANT EMISSIONS**

October 31, 2002

SECTION 3 AIR POLLUTANT EMISSIONS

3.1 INTRODUCTION

The combustion of municipal solid waste (MSW) in energy recovery facilities results in the emission of some air pollutants as a consequence of several mechanisms and processes. Emissions generated in the combustion of MSW depend upon the composition of the waste stream or reflect the character of the combustion process. The quantity of each compound released also depends on whether or not it is controlled through the use of air pollution control techniques or technology.

The discussion of emission factors and rates presented in this section focuses primarily on those pollutants of public health and regulatory concern. Emissions estimates in this section are based on available operational data from Units 1 and 2 over the past seven years in addition to other available data from the U.S. Environmental Protection Agency (USEPA) and other municipal waste combustion facilities.

3.2 BASIS FOR EMISSION LIMITS

Lee County has reviewed the current plant operational data as well as test data from other facilities. The purpose of this effort is to determine appropriate permit limits for the proposed Unit 3 at the Lee County Energy Recovery Facility (LCERF). The starting point for the permit limits begins with the 1995 New Source Performance Standards (NSPS). USEPA based the performance limits in the NSPS on the most recent available data. This included 12 units with spray dry absorbers (SDA), fabric filters (FF) and selective non-catalytic reduction (SNCR) systems operating in 1994, as well as earlier data. Overall, USEPA used performance test data from over 60 municipal waste combustor plants (60 FR 65391, 19 December 1995 and 60 FR 65396, 19 December 1995). As required by Congress, the NSPS "MACT Floor" is set at the level achieved by the best performing plant. Although USEPA did not include European test data, it did indicate that the European data would not have changed the limits (59 FR 48254, 20 September 1994, Section VII - *Comparison of the Proposal and European Emission Limits*).

Due to the United States Supreme Court "Carbone" ruling on May 16, 1994 (1994 WL 183594), little development of new municipal waste combustors (MWC) has occurred in the United States after 1994. Hence, the conclusions reached by USEPA at that time should still be valid. There has been some additional experience gained in the operation of facilities equipped with modern pollution control trains, including SDA, FF, SNCR and activated carbon injection (ACI) systems. Enhanced combustion controls have also improved overall MWC performance, and USEPA's good combustion practices (GCP) have proven to be effective. The only potential modifications to the design of a new facility could be the use of a selective catalytic reduction (SCR) system for NO_x control. These systems began being applied to MWCs in Europe and Asia in the late 1980s and

were reviewed by USEPA in setting the NSPS. They will be reviewed further, based on current costs, in the BACT review for this project.

Therefore, based on the Best Available Control Technology (BACT) considerations, Unit 3 will be designed and operated in accordance with the NSPS standards. Regardless of the permit limits, there will be no change in the basic design or operation of the proposed facility, unless SCR is added for NO_x control. The operation of the MWC, as well as the pollution control system, is continuously monitored and strictly regulated. The steam load is tied to the most recent dioxin stack tests demonstrating compliance with the applicable limit. The MWC load cannot exceed more than 110% of the rate achieved during the last approved stack test. Additionally, the inlet temperature to the bag house is monitored to ensure that condensed metals are collected and dioxins are not formed on the particulate in the bag house. The maximum temperature cannot be more than 17C (30.6°F) above the temperature measured during the last approved dioxin stack tests. The three GCP parameters (MWC load, baghouse inlet temperature and CO emissions) effectively establish operating conditions between stack testing events which will maintain compliance with the applicable standard.

In addition, there are continuous emission monitors (CEMs) for sulfur dioxide (SO₂), at the inlet of the SDA and at the stack. SO₂ is one of the more difficult acid gas species to remove. Control of SO₂ to the NSPS limits indicates sufficient control of MWC acid gases. The combustion related conditions are monitored continuously through carbon monoxide (CO) and nitrogen oxides (NO_x) continuous emission monitors. These monitors along with the automatic combustion control system ensure proper combustion control. There is also an opacity monitor that ensures proper performance of the bag house. These instruments are monitored by control room personnel to ensure the proper operation of the MWC. There is a monitoring requirement for the carbon feed rate to ensure adequate control for mercury. The accuracy of the continuous emissions monitors (CEMs) are verified by quarterly performance specification tests. Those regulated pollutants not monitored by CEMs are typically subject to periodic stack tests. The overall effect of the design, control, and monitoring systems is to ensure that the operation of the MWC is subject to continuous oversight and hence fully protective of the public and the environment.

As noted above, regardless of the emission limit set in the permits, there will be no difference in the design or operation of the facility, unless SCR is required. Permit limits more stringent than NSPS merely increase the risk of spurious "exceedances" of an overly-restrictive standard.

It should be noted that the metals emissions are not guaranteed by the vendor and are the responsibility of Lee County. The County has maintained an aggressive materials separation program as outlined in the Materials Separation Plan for this project. There is a limited ability to predict what the variability of the waste stream will be over the life of Unit 3 and life of the permit and there is no reliable means to quantify the effect of the Materials Separation Plan on stack emissions. The permit limits must be set to accommodate the full range of variability that may occur in the waste stream over this

time and should be independent of the municipal solid waste and the Materials Separation Plan. In order to provide reasonable assurance that a lower limit could be met for the NSPS metals (cadmium, lead, mercury), additional control equipment would be required. Costs for such additional control would be prohibitive, on a cost per ton removed basis.

Due to the limited amount of test data available for the stack test pollutants (21 data points per unit), there is some difficulty in determining what, if any, reductions in the federally enforceable emission limits can be achieved in practice. Since the permit limits are deterministic, pass/fail limits that can never be exceeded, it is appropriate that they accommodate the full range of normal operation.

Although Lee County believes that the NSPS limits are stringent and protective standards, additional analyses have been performed in response to Florida Department of Environmental Protection's (FDEP) requests. These analyses included both stack test data and continuous emissions monitoring data. These data were analyzed to determine appropriate permit limits for the proposed new unit. USEPA's research for the NSPS was also considered.

After compiling and analyzing the data, the Lee County Solid Waste Division worked to define permit limits that were acceptable to the vendor (operator) as well as the County. Lead and cadmium pose particular problems because emissions of these pollutants are determined by the waste stream, which is variable by nature. Further, the NSPS limits for these pollutants already are set very low. There already is a 50% reduction in the emission limit for cadmium and a greater than 50% reduction in the lead limit from the existing units, which are regulated under the Emission Guidelines, and the NSPS for the new unit. Therefore, the County and vendor are unable to accept any reduction in the NSPS limits for these two pollutants, given the potential variability in the waste stream and the already low level required by the NSPS.

Based on the County's extensive analysis of available data from Units 1 and 2 and other factors, Lee County is willing to accept permit limits for the third MWC unit that are lower than the NSPS values (or the existing permit level where no NSPS is specified) for four parameters: VOCs; fluorides; SO₂; and particulate matter. The attached table identifies the County's proposed emission factors for all pollutants. There are no NSPS limits for fluorides or VOCs because these are indirectly considered through control mechanisms for MWC acid gases and MWC organics. However, there are current permit limits for fluoride and VOCs in the Title V permit for the existing MWC units. The County is proposing an approximate 30% reduction in the limit for fluorides; an approximate 20% reduction in the VOC level; a 10% reduction in the PM level; and a 3% reduction in the SO₂ limit for the proposed new unit.

Considerable effort and expense was expended by the County, its consultants and the vendor in developing these proposed emission limits. This included a review of the Reference Methods, Accuracy And Precision (REMAP) studies performed by American Society of Mechanical Engineers (ASME) concerning USEPA Methods 5, 23, 26 and 29, as well as a review of data from other Florida MSW combustion facilities. The County

believes that the proposed levels represent stringent yet achievable standards based on the performance of the existing units, and the extensive database compiled by USEPA in developing the NSPS. The database of facility and emission control technologies that were utilized by USEPA to develop the NSPS is still current. There has been no advancement in BACT that would allow the vendor and County to propose lower limits.

While the County's effort was rigorous and extensive, this by itself is not adequate to determine an achievable emission limit. As noted above, professional judgment accrued through experience is necessary to determine whether an emission limit is achievable and is therefore appropriate for being enforceable. Achievable in the federal context of emission standards requires that the limit must be continuously achievable for known or expected variations in a process.

It should also be noted that the limit selected will have little effect on the design or operation of the facility. The facility will be designed to meet BACT requirements and the Maximum Achievable Control Technology requirements. Further, CEM data and test reports document that long term emissions are considerably less than the short term emissions factors that are monitored and regulated by continuous emission systems or short term stack tests.

Table 3-1 summarizes proposed emissions levels for LCERF's Unit 3.

The rest of Section 3 discusses the proposed permit limits by pollutant. As part of this application for a PSD permit for Unit 3, Lee County has proposed enforceable permit limits ("Primary Emission Limits") for 13 of the pollutants that will be emitted from the LCERF. Four of the proposed Primary Emission Limits are lower than the NSPS and/or the limits for LCERF's Units 1 and 2.

Lee County also is proposing "Secondary Emission Limits" for lead and cadmium. The Secondary Emission Limit for lead would be 113.5 ug/dscm, which is far less than the NSPS limit for lead (200 ug/dscm). The Secondary Emission Limit for cadmium would be 1.24E-02 mg/dscm, which also is significantly less than the applicable NSPS limit (2.00E-02 mg/dscm).

These Secondary Emission Limits would be adopted and used by the FDEP as a means of compelling the County to minimize the LCERF's emissions of these two pollutants. If there were an exceedance of a Secondary Emission Limit, the County would be required to undertake the activities described in the County's Action Plan, as described below. However, an exceedance of a Secondary Emission Limit would not be used by the FDEP or a third party as the basis for a traditional enforcement action pursuant to the Clean Air Act (CAA) or the FDEP's air quality standards.

**TABLE 3-1
PROPOSED EMISSION FACTORS FOR
LCERF'S MWC UNIT 3**

Poor Original

Pollutant Name	Emission Factor ^a
Ammonia	50 ppm _{dv}
Arsenic (Ar)	10.74 ug/dscm
Beryllium (Be)	0.16 ug/dscm
Carbon Monoxide (CO)	100 ppm _{dv}
Cadmium (Cd)	20 ug/dscm
Hydrogen Chloride (HCl)	25 ppm _{dv} or 95% Control ^b
Fluoride	3.5 ppm _{dv}
Lead (Pb)	200 ug/dscm
Mercury (Hg)	70 ug/dscm or 85% Control ^b
Municipal Waste Combustor Organics (Total PCDD/PCDF)	13 ng/dscm
Nitrogen Oxides (NO _x)	180 ppm _{dv} 1 st year; 150 ppm _{dv} thereafter
Particulate Matter (PM)	0.009 grains/dscf
Sulfur Dioxide (SO ₂)	29 ppm _{dv} or 80% Control ^b
Sulfuric Acid Mist (SAM)	16.68 ppm _{dv}
Volatile Organic Compounds (VOC)	30 ppm _{dv}

Note: ppm_{dv} = parts per million by volume (dry basis)
 ug = micrograms
 ng = nanograms
 dscm = dry standard cubic meter
 dscf = dry standard cubic foot

^a All emission factors are corrected to 7% oxygen.

^b Whichever is less restrictive.

Action Plan

Lee County shall conduct periodic stack tests for lead and cadmium in accordance with the schedule and methods required in this permit. The average of three test runs, conducted under representative conditions (i.e., not adversely affected by equipment malfunction or other unusual conditions) shall be compared to the Secondary Emission Limits. If the test data indicate that a Secondary Emission Limit was exceeded during the stack test, the County shall take the following steps:

- I. Within 60 days of receiving the final results of the original stack test, the County shall re-test for the pollutant that exceeded the Secondary Emission Limit.
 - a) If the re-test results are at or below the Secondary Emission Limit, the results of the re-test shall be provided to the FDEP. The County shall not be required to take any further action.
 - b) If the re-test results are above the Secondary Emission Limit, the County shall conduct a formal review of both stack tests and shall attempt to identify the cause of the exceedances. The County's review process may include:
 1. A review of the quality control data for the stack tests.
 2. A review of the operational conditions at the facility during the tests.
 3. A review of events and conditions that may have adversely affected the test results.
 4. A review of the scale records prior to and during the tests.
 5. Interviews with facility personnel (e.g., crane operators and tipping floor spotters) regarding relevant activities occurring prior to and during the tests.
 6. A review of the County's records concerning franchise haulers and customers to identify potential sources of problematic wastes and investigate disposal practices of those identified.
 7. A review of the records from the FDEP and local agencies (e.g., notices of violation) for potential sources of problematic wastes.
 - c) The County shall prepare and submit a report (the "Report") to the FDEP within 90 days of the second stack test. The Report shall describe the County's efforts to identify the cause of the exceedances, the County's findings, and the measures that should be undertaken to reduce the potential for future exceedances of the Secondary Emission Limit.
- II. The County shall implement the recommendations contained in the Report. The recommended action may include one or more of the following:
 - a) Implementation of an education campaign targeted at the waste generators that are identified in the Report as potential sources of problematic wastes.

- b) Modification of the spotters' procedures and activities on the tipping floor.
- c) Modification of the crane operators' procedures and practices.
- d) Modification of the other operational procedures followed at the facility.

III. If the County implements the recommendations in the Report, but nonetheless continues to experience exceedances of the Secondary Emission Limits for the same pollutant in subsequent stack tests, then the County may request the FDEP to adjust the Secondary Emission Limit for that pollutant. In such circumstances, the County's request shall contain the following information:

- a) The new proposed Secondary Emission Limit, including the methodology utilized to select the proposed limit.
- b) A summary of the actions taken to date by the County and the facility operator to reduce the emissions of the specific pollutant that is exceeding the current Secondary Emission Limit.
- c) An explanation of why the Department should accept the proposed new Secondary Emission Limit.

3.3 COMPOSITION OF MUNICIPAL SOLID WASTE

MSW is a heterogeneous mixture of materials, and the physics and chemistry of its combustion are very complex. Some emissions are products of combustion, such as NO_x and CO, while other compounds present in the flue gas reflect the amount of the compound present in the waste itself.

In Lee County, certain wastes are separated from the MSW at various points prior to combustion at the LCERF, thus limiting certain compounds in the fuel (waste) and limiting certain pollutant emissions. Lee County has residential and commercial materials separation programs to separate ferrous metals, aluminum, plastic and other materials prior to combustion. Horticulture (yard) wastes are removed from the waste stream at the point of generation and converted into mulch for County residents. Household hazardous wastes (HHW) collection centers are used to separate HHW materials from the MSW. Most importantly, Lee County attempts to remove certain items from the waste stream before they enter the LCERF, including residential biomedical waste, white goods, used motor oil, fluorescent bulbs, thermostats and thermometers.

While Lee County supports materials separation, there is no known relationship between materials separation programs and quantifiable changes in stack emissions. Therefore, while materials separation is considered in the BACT analysis, materials separation should not be considered as BACT.

A more detailed description of Lee County's Solid Waste Management programs is provided in the PPSA application.

3.4 PARTICULATE MATTER AND PM₁₀

When solid waste is burned, particulate matter (PM) may originate from three sources: inorganic substances; organometallic substances; and unburned waste. Inorganic materials are not combusted, and consequently, the majority of these materials exit the system as bottom ash. A small portion of the inorganic material may become entrained in the flue gas, carried to the air pollution control (APC) equipment, and then collected and removed. Organometallic compounds appear as inorganic oxides or metal salts in the flue gas, resulting from high temperature combustion. Unburned solid waste entrained in the flue gas is a result of non-combustible materials and agglomeration of small particles. Trace metals present in the solid waste also become entrained in the flue gas. Some trace metals also may be adsorbed onto entrained solids.

The size and quantity of particulate matter emitted during the MSW combustion process depends on such factors as residence time within the combustion chamber, combustion temperature, oxidizing/reducing conditions during the combustion process, and the chemistry of the particulate matter and solid waste. A longer residence time of MSW on the grate allows more complete combustion of organic particles and a commensurate decrease in particle size. Longer flue gas residence times also increase the likelihood that larger particles will drop out of the flue gas in the combustion chamber and boiler passages. High temperatures and oxidizing conditions also promote more complete combustion.

Particulate matter will be controlled by a SDA, which will reduce the temperature of the flue gas stream and promote condensation of vapor phase flue gas components and allow the FF system to effectively remove the resulting solid phase particulates. The County's proposed control technology also includes a FF system, which will remove fly ash (including trace metals) and other types of particulate matter from the flue gas.

The maximum PM concentration at the baghouse outlet is proposed to be limited to 0.009 grains per dry standard cubic foot (gr/dscf) at 7% O₂. This emission level is equivalent to a maximum emission rate of 5.08 pounds per hour (lb/hour) and 22.26 tons per year (tpy).

In this document, as a conservative assumption, the assessment of the potential ambient impacts from the LCERF's emissions of particulate matter assumes that the particulate matter emissions from the proposed project will consist entirely of PM₁₀ (Covanta Projects, Inc., 2002). These ambient impacts will be discussed later in Section 6 (Air Quality Impact Analyses).

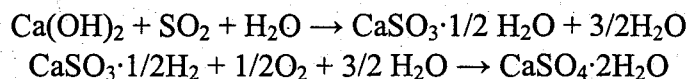
3.5 MWC ACID GASES

3.5.1 SULFUR DIOXIDE

Sulfur dioxide is formed in the furnace from the oxidation of sulfur in the solid waste during the combustion process. The sulfur content of the waste and the chemical form (organic or inorganic) of the sulfur determine the rate and quantity of sulfur dioxide

formation. Organic sulfur will oxidize during combustion to produce gaseous sulfur dioxide and sulfur trioxide. A fraction of the inorganic sulfur (e.g., sulfates, sulfides, and sulfites) will oxidize into a gaseous form at the design temperatures in the LCERF's Unit 3 and the remainder of the inorganic sulfur will remain in the bottom ash.

A SDA followed by a FF will be used to reduce sulfur dioxide emissions. The flue gas containing sulfur dioxide will enter the SDA where it will come into contact with a finely atomized alkaline slurry. The resultant reactions are:



Unit 3 will be designed to achieve lower outlet emissions for sulfur dioxide than is required by the NSPS. The NSPS standard is 30 ppmdv at 7% O₂ or 80% removal (by weight) of uncontrolled emissions, whichever is least stringent. Unit 3 will achieve 29 ppmdv at 7% O₂ or 80% removal. Maximum uncontrolled emissions of sulfur dioxide for Unit 3 are expected to be 500 ppmdv, corrected to 7% O₂. Eighty percent removal of this concentration will result in stack emissions of 100 ppmdv, corrected to 7% O₂ for Unit 3. Thus, the maximum allowable concentration of sulfur dioxide from Unit 3 will be 100 ppmdv corrected to 7% O₂. This level is equivalent to 65.72 lb/hour or 287.8 tpy based on worst-case operating conditions. Actual emissions from Unit 3 will typically be considerably less than this value.

3.5.2 SULFURIC ACID MIST

When released into the ambient environment, sulfur dioxide may react with water vapor to form sulfuric acid. Sulfuric acid may further react to form sulfate salts, a particulate aerosol. The SDA/FF system will control Sulfuric Acid Mist (SAM) emissions from Unit 3 to maximum levels of 16.68 ppmdv, corrected to 7% O₂. This level equates to 16.78 lb/hour and 73.51 tpy.

If the County successfully demonstrates that the SAM levels are 16.68 ppmdv or below during the initial compliance emissions test, the County proposes to have the SAM permit limit removed from the Prevention of Significant Deterioration (PSD) permit.

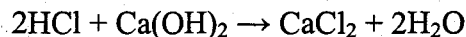
This deletion request is based on a history of low concentration measurements during prior performance tests. Testing for SAM at such low levels is an unnecessary expense and does not provide any benefit to human health and the environment. Because SAM is a function of sulfur dioxide concentration, flue gas temperature and flue gas moisture content, continuous control of sulfur dioxide is a viable surrogate for control of SAM.

3.5.3 HYDROGEN CHLORIDE

Hydrogen chloride is formed during the combustion of MSW. The amount of hydrogen chloride formed during the combustion process is related to the amount of chlorine containing products present during the combustion process. Examples of such

compounds are salts (sodium chloride and calcium chloride) and polyvinyl chloride (PVC).

A SDA followed by a FF will be used to reduce hydrogen chloride emissions from Unit 3. The flue gas containing hydrogen chloride will enter the SDA where it will come in contact with a finely atomized alkaline slurry. The resultant reaction is:



The USEPA NSPS at 40 CFR 60, Subpart Eb, establish a limit for hydrogen chloride of 25 ppm_{dv}, corrected to 7% O₂, or 95% removal (by weight) of uncontrolled hydrogen chloride emissions, whichever is least stringent. Maximum uncontrolled hydrogen chloride emissions for Unit 3 are expected to be 2500 ppm_{dv}, corrected to 7% O₂. Unit 3 will remove a minimum of 95% of this level and thus will emit a maximum of 125 ppm_{dv}, corrected to 7% O₂ which is equivalent to 46.76 lbs/hour or 204.8 tpy. Actual hydrogen chloride emissions from Unit 3 are expected to be less than these values.

3.5.4 FLUORIDES

Fluorides can be formed during the combustion of MSW. The source for fluoride is thermally driven chemical reactions between the combustion air and the fluorine in the solid waste. A majority of the fluorine found in municipal solid waste is chemically bound to other compounds. A portion of these substances is released during combustion and becomes entrained in the flue gas. Consequently, the type of fluorine compounds formed in the MWC units will be strongly dependent on the presence of gaseous compounds, combustion temperatures, and oxidizing/reducing conditions in the combustor. Similarly, the uncontrolled emission rate for fluorides is related to fuel concentrations of fluoride and the combustion technology.

Fluorides will be controlled by the SDA/FF system and the maximum allowable concentration of fluorides from Unit 3 is 3.5 ppm_{dv}, corrected to 7% O₂. This level is lower than the existing fluoride permit limit of 5 ppm_{dv} (corrected to 7% O₂) for Units 1 and 2. Unit 3 will emit a maximum of 0.718 lb/hour or 3.145 tpy of fluorides measured as hydrogen fluorides (or 2.986 tpy of fluorides). Actual fluorides emissions from Unit 3 are expected to be less than this value.

Upon successful demonstration that the fluoride levels are less than 3.5 ppm_{dv} level during the initial compliance emissions test, the County proposes to have the fluoride permit limit removed from the PSD permit.

This deletion request is based on a history of low concentration measurements during prior performance tests. Testing for fluoride at such low levels is an unnecessary expense and does not provide any benefit to human health and the environment. Because fluoride is highly soluble in water and is controlled by the semi-dry scrubber system, continuous control of SO₂ is a viable surrogate for control of fluorides.

3.6 CARBON MONOXIDE

Carbon monoxide (CO) is formed by the incomplete oxidation of carbon compounds in fuel. Some carbon monoxide is formed in all combustion processes in which carbon-containing fuel is burned. However, the amount of carbon monoxide formed is dependent upon the combustion efficiency of the fuel-burning process. Incomplete oxidation can be caused by a number of factors, including:

- Fuel-rich conditions (not enough oxygen).
- Poor fuel-air mixing (oxygen does not intimately contact fuel).
- Low combustion temperature.
- Short combustion zone residence time.

Accordingly, carbon monoxide formation is minimized by designing the combustor to provide an adequate supply of combustion air and maximizing combustion efficiency. The USEPA utilizes carbon monoxide as part of the strategy to ensure that good combustion is occurring. Good combustion practices (GCP) were developed by the EPA to minimize both formation and emission of dioxins/furans and other trace organics. There are three components to GCP: a CO emission limit, a load limit, and a temperature limit at the inlet of the PM control device (USEPA, 1995d).

Elevated emissions of carbon monoxide from a MWC may result from the failure of the combustion system to complete the burnout of the combustible gases emitted from the burning refuse on the grate. The proper utilization of underfire and overfire air provides adequate oxygen levels and gas turbulence to minimize emissions of carbon monoxide.

Section 3.6.1 below discusses in detail the carbon monoxide emissions during start-up, shutdown and malfunction of Unit 3 and the NSPS requirements for carbon monoxide during these periods as they were amended by the November 16, 2001 NSPS amendments.

Unit 3 will utilize an automatic combustion control system to minimize carbon monoxide emissions. This will enable Unit 3 to maintain a proposed maximum emission limit of 100 ppm_{dv} corrected to 7% O₂ (based on a 4-hour block average), which is also the NSPS limit. This emission rate is equivalent to 28.73 lb/hour and 125.8 tpy.

3.6.1 ADDITIONAL CARBON MONOXIDE MALFUNCTION REGULATIONS

On November 16, 2001, the USEPA proposed and promulgated through a direct final rule, amendments to the Subpart Eb NSPS concerning compliance with the CO emissions standards during periods of start-ups, shutdowns and malfunctions (S/S/M) (66 Fed. Reg. 57824-57828, November 16, 2001). Prior to the USEPA's action, the CO emissions standards in the NSPS were not enforced during periods of S/S/M, but only for a maximum duration of three hours. The November 2001 amendment extends this malfunction time period for CO emissions, if the malfunction is caused by a loss of boiler water level control or combustion air control.

During periods of boiler S/S/M, it is difficult to maintain the proper balance between the waste feed and combustion air flow to provide for sufficient control of complete combustion. Incomplete combustion will increase the amount of CO formation, and supplemental combustion with auxiliary fuel burners is typically used to provide additional oxidation of CO to carbon dioxide (CO₂).

Loss of boiler water level control, from a rupture of a boiler tube for example, exposes the metal tubes to increases in temperatures. Boiler tube metal must be kept at or below about 800°F (427°C) to prevent damage or burn-out. Proper boiler water level assists in regulating tube metal temperatures, and failure of the water level control will allow temperatures to rise above this 800°F (427°C) mark and increase damage to the remaining boiler tubes. Temperatures above this level and failure to maintain correct temperature profiles can lead to boiler damage from heat stress. Increases in CO formation normally are overcome by using auxiliary fuel burners to provide additional combustion. However, the use of the fuel burners during the failure of boiler water level will increase the temperature of the boiler water tubes and increase the potential for MWC unit failure. Indeed, the use of auxiliary fuel burners during periods of boiler tube malfunction are prohibited by the National Fire Protection Association.

A second type of malfunction covered under the amended NSPS is loss of combustion air control due to such events as loss of control or malfunction of combustion air fan, loss of control or malfunction of induced draft fan, or a failure or malfunction of the grate system. Loss of combustion air control prevents control of the MWC unit to provide for complete combustion and results in increased CO formation as well as significantly increases the risk for explosion. The increased CO formation can be remedied by using auxiliary fuel burners to provide for additional oxidation of CO into CO₂. However, the use of auxiliary fuel burners can worsen the problem by decreasing the amount of air available for combustion.

The amended NSPS requires MWCs to develop and implement operation and maintenance programs and allows CO emissions to increase during these periods of S/S/M and limits the event to 15 hours per occurrence. The LCERF has an operation and maintenance program in place to ensure that the MWC unit is operated properly and is compliant under the amended NSPS.

3.7 NITROGEN OXIDES

Nitrogen oxides are produced in all combustion processes. There are two mechanisms by which nitrogen oxides are formed during combustion.

- Thermal nitrogen oxides are formed by high temperature oxidation of nitrogen in the combustion air.
- Fuel nitrogen oxides are formed by the oxidation of nitrogen in the fuel.

The primary components of nitrogen oxides (NO_x) are nitric oxide (NO) and nitrogen dioxide (NO₂). The combination of these compounds is referred to as nitrogen oxides. Conversion of nitrogen in the waste occurs at lower temperatures (less than 1,090C [2,000°F]), while oxidation of atmospheric nitrogen occurs at higher temperatures. Because of the temperatures at which MWC furnaces operate, 70 to 80 percent of nitrogen oxides formed in MWCs is associated with nitrogen in the waste (USEPA, 1996). Accordingly, technologies that affect the formation of nitrogen oxides from fuel nitrogen would have a relatively significant effect on the overall nitrogen oxides emissions level. Factors that affect fuel nitrogen oxides formation include the amount and distribution of excess combustion air, the nitrogen content of the refuse fuel, and to some extent, changes in combustion temperature.

Research has shown that the formation of thermal nitrogen oxides is affected strongly by combustion temperature (MacKinnon, 1974). Since thermal nitrogen oxides formation is dependant on high temperatures, nitrogen oxides formation may occur in "hot spots" in the combustion zone where local temperatures reach levels much higher than the average combustion temperature. Thermal nitrogen oxides formation is also affected by the availability of oxygen in high temperature regions of the combustion zone. Consequently, thermal nitrogen oxides formation can be minimized by limiting the amount of excess air provided to the high temperature zones of the combustion chamber and by the location and manner in which air is later introduced to complete combustion.

Unit 3 will utilize an automatic combustion control system and SNCR to reduce nitrogen oxides levels and maintain a maximum emission limit of 150 ppmdv, corrected to 7% O₂ (180 ppmdv at 7% O₂ for the first year of operation), in conformance with the federal NSPS for the municipal waste combustion industry. This 150 ppmdv level equates to 70.79 lb/hour and 310.1 tpy.

3.8 MWC METALS

Combustion of solid waste may result in the emission of trace concentrations of certain metals. These metals are present in both the combustible and non-combustible parts of the waste. During combustion, the non-volatile metals are distributed in two general areas: bottom ash and fly ash. Volatile metal emissions also occur as vapor phase emissions. The distribution of trace metals is determined by their physical properties and the operating temperatures of the various components of the combustion unit and the air pollution control system. Trace metals will be removed at the LCERF by the SDA and FF system. The SDA will reduce the flue gas temperature to approximately 300°F (149C). At that temperature, most volatilized metals will condense on available particulate matter and be collected by the FF.

The USEPA NSPS specifies separate emission levels for mercury, lead, and cadmium. The Florida Mercury Rule (Rule 62-296.416, F.A.C.) provides specific limits for mercury emissions. Other metals are regulated by the particulate control standard established by the NSPS. The emission rates for mercury, lead, cadmium, arsenic and beryllium are discussed below.

The flue gas stream may contain trace amounts of nickel, antimony, copper, chromium, selenium, tin, zinc, and other metals. These trace metals will be controlled with the particulate matter.

3.8.1 MERCURY

Mercury is a trace metal found in many different waste materials. Within the temperature range of the combustion process for solid waste, mercury is found as a metallic vapor. The melting point and boiling point of mercury are -38.87C (-37.97°F) and 356.9C (674.42°F), respectively (Perry, et al., 1984).

Significant research efforts have been undertaken in order to determine the origin and nature of mercury emissions from MWCs. The origin of mercury in solid waste was investigated by Franklin Associates, "Characterization of Products Containing Mercury in Municipal Solid Waste in the United States, 1970 to 2000" (1991). According to the report, numerous field test programs established the variability of mercury emissions. The field test programs indicated that up to 89% of the mercury in solid waste at that time (1991) was from batteries and, therefore, new mercury-free or low mercury content batteries should significantly reduce the uncontrolled mercury emissions from MWCs. This conclusion was correct, as shown by the subsequent reduction of mercury levels in uncontrolled stack gases as mercury was removed from consumer batteries. Notwithstanding the reductions that have occurred, additional amounts of mercury are still introduced into the waste stream with mercury containing devices and some pesticide treatments.

With activated carbon injection, mercury is adsorbed onto the carbon particle, which is then captured in the PM control device. Test programs using activated carbon injection on MWCs in the United States have shown mercury removal efficiencies can vary from 50 to over 95 percent, depending on several factors, including the carbon feed rate (USEPA, 1996).

The activated carbon injection (ACI) system proposed by the County will provide a stable and reliable control of mercury emissions. The ACI system will reduce the concentration of mercury from Unit 3 to 70 ug/dscm as required under the Florida Mercury Rule or provide 85% removal of uncontrolled mercury emissions as required under the USEPA NSPS, whichever is less stringent. Maximum uncontrolled mercury emissions are expected to be 1,150 ug/dscm, corrected to 7% O₂. The powdered activated carbon injection system will provide 85% removal of uncontrolled mercury emissions or a level of 172.5 ug/dscm, corrected to 7% O₂. The maximum emission rate will be 0.043 lb/hour or 0.187 tpy.

3.8.2 LEAD

Lead is a trace metal found in solid waste. Lead emissions are directly proportional to the lead content of the solid waste, as long as the waste component is combustible. The

melting point and boiling point of lead are 327.5C (621.5°F) and 1,620C (2,948°F), respectively (Perry, et al., 1984). Some of the lead will volatilize and condense to become a component in the fly ash. Lead will either become part of the bottom ash or adhere to the fly ash which will be collected in the FF.

Unit 3 will maintain the USEPA NSPS limit of 200 ug/dscm at 7% O₂. This is equivalent to an emission factor of 0.0494 lb/hour or 0.216 tpy.

3.8.3 CADMIUM

Cadmium is present in both combustible and non-combustible components of municipal solid waste and is collected in the FF. The melting point and boiling point of cadmium are 320.9C (609.6°F) and 767C (1,412.6°F), respectively (Perry, et al., 1984). As with the other metals, cadmium emissions will be efficiently controlled by proper operation of the SDA/FF system. The County's proposed project will comply with the USEPA NSPS emissions level of 20 ug/dscm at 7% O₂. This is equivalent to a maximum emission factor of 0.00494 lb/hour or 0.0216 tpy.

3.8.4 ARSENIC

Arsenic is a metallic compound found in trace quantities in solid waste. Emissions of arsenic are a function of the arsenic content of the MSW.

The arsenic content of municipal solid waste is generally in the combustible fraction and, as such, is considered to be fully released and volatilized by the combustion process. Arsenic, therefore, primarily exits the furnace with the flue gas stream with a small fraction found in bottom ash. Studies involving combustion of both coal and refuse have shown that arsenic is enriched in fine particulate matter, as compared to coarser particulate matter or bottom ash. It is theorized that arsenic, and other metals as well, are volatilized in the high temperature combustion zone of the MWC. Upon cooling, these compounds are then adsorbed or condensed onto fine particulate matter. The amount of enrichment varies with particle size, amount of particulate, and flue gas temperature (California Air Resources Board [CARB], 1984). Therefore, high removal efficiencies for arsenic and other metals can be achieved by effectively controlling fine particulate matter emissions.

By operating the particulate matter control equipment at temperatures below 500°F (260C) and efficiently collecting particulate matter, the County will achieve high removal efficiencies for arsenic in flue gas (CARB, 1984). The LCERF will utilize a SDA followed by a FF to control arsenic. As stated above, the SDA/FF will condition the flue gas and cool it to approximately 300°F (149C).

Operation of the SDA/FF will reduce arsenic emissions to a maximum level of 10.74 ug/dscm, corrected to 7% O₂. This arsenic emission level equates to 0.00265 lb/hour or 0.0116 tpy.

Once Unit 3 demonstrates compliance with this arsenic emission level during its initial emissions test, Lee County proposes to have this arsenic level removed from its permit.

This deletion request is based on a history of low concentration measurements during prior performance tests. Testing for arsenic at such low levels is an unnecessary expense and does not provide any benefit to human health and the environment. Because arsenic is a function of the quantity of arsenic in the waste fuel and will be controlled using the particulate control equipment (SDA and FF), continuous monitoring of opacity, combined with annual particulate tests are viable surrogates for verifying control of arsenic.

3.8.5 BERYLLIUM

Beryllium is a metallic compound found in trace quantities in MSW. As a product of combustion, beryllium emissions are a function of the beryllium content of the MSW. Beryllium is a light metal and has a high melting point, which allows it to be used in nuclear work, ceramic applications and other uses with high temperature requirements. Beryllium is not used in appreciable quantities for consumer products which are generally found in municipal solid waste. Beryllium occurs naturally in soils in small quantities (about 2-6 ppm) (Merck and Company, Inc., 1996). The primary beryllium contribution to solid waste comes largely from newsprint, paper-board, and other paper byproducts. Yard wastes, food wastes, polyurethane foam, and polyethylene containers may also contribute to combustible constituents of beryllium. As stated above in Section 3.3 (Composition of Municipal Solid Waste), the LCERF Materials Separation Plan assists in the removal of recyclable paper products and yard wastes to the extent possible, thereby reducing the amount of beryllium introduced to the LCERF.

The maximum allowable concentration of beryllium from Unit 3 is 0.16 ug/dscm, corrected to 7% O₂. This level equates to 3.95 E-5 lb/hour or 1.730 E-4 tpy. Upon demonstration that Unit 3 is below this level during the initial emissions test, the applicant proposes to have this beryllium limit removed from the permit. Beryllium emission estimates are included primarily to demonstrate non-applicability to PSD review for Unit 3.

This deletion request is based on non-detect measurements of prior performance tests. The USEPA has determined that the beryllium National Emission Standards for Hazardous Air Pollutants (NESHAP) does not apply to MWCs. Testing of a pollutant that is not measurable is expensive without providing any benefit to human health and the environment. Continuous monitoring of opacity and annual particulate tests are viable surrogates for monitoring control of beryllium because beryllium is a function of the quantity of beryllium in the waste fuel and will be controlled using the particulate control equipment.

3.9 MWC ORGANICS

MWC Organics are defined by the USEPA in 40 CFR 60.51b as organic compounds emitted in the exhaust gases from municipal waste combustor units and includes tetra-through octa- chlorinated dibenzo-p-dioxins and dibenzofurans. Various organic compounds have been measured in emissions from solid waste combustion facilities. The principal compounds of concern are dioxins/furans.

Dioxin and tetrachlorodibenzo-p-dioxin (TCDD) are popular synonyms for the chemical 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). This chemical is one of 22 TCDD isomers, each of which is distinguished by the location of the four chlorine atoms contained within its structure. Each species of TCDD has its own chemical and physical properties.

The term polychlorinated dibenzo-p-dioxin (PCDD) refers to 75 isomers that differ in the number and position of chlorine atoms attached to the dibenzo-p-dioxin molecule and the number system for distinguishing possible chlorine site.

In a similar manner, 2,3,7,8-tetrachlorodibenzofurans (2,3,7,8-TCDF) is one of 22 tetrachlorodibenzofurans. The term polychlorinated dibenzofurans (PCDF) refers to 135 chemically, physically, and toxicologically distinct isomers (Fred C. Hart Associates, Inc., 1984).

Lee County's proposed project will employ good combustion practices in combination with a SDA and FF to minimize PCDD and PCDF formation and emissions. GCP according to the USEPA includes monitoring of steam load, carbon monoxide concentration and flue gas temperature into the fabric filter.

Further, the use of the ACI and FF systems will promote removal of dioxins/furans in flue gas. The maximum PCDD and PCDF emissions (tetra- through octa- chlorinated dibenzo-p-dioxins and dibenzofurans) from Unit 3 will be at or below 13 ng/dscm at 7% O₂ (total). This is equivalent to an emission factor of 3.21 E-6 lbs/hour or 1.41 E-5 tpy (total).

3.10 VOLATILE ORGANIC COMPOUNDS

Volatile organic compounds (VOCs) and other non-methane hydrocarbons (NMHC) are formed during the combustion of MSW and are present in the flue gas. The principal mechanism to control these organic compounds is GCP. GCP include proper design and operation of the MWC unit to maximize the thermal destruction of VOCs and NMHC.

The maximum allowable VOC concentration from Unit 3 is 30 ppm_{dv}, corrected to 7% O₂. This emission level equates to 4.936 lb/hour (as methane) or 21.62 tpy. The permit limit for the existing MWC Units 1 and 2 is 37 ppm_{dv} corrected to 7% O₂. Upon successful demonstration that the VOC levels from Unit 3 are below 30 ppm_{dv} level

3.16 TOTAL HAZARDOUS AIR POLLUTANTS

Emissions of total hazardous air pollutants (HAPs), as defined by Rule 62-210.200(130), F.A.C., will consist of arsenic, beryllium, cadmium, dioxins, hydrogen chloride, hydrogen fluoride, lead and mercury. Total HAPs from Unit 3 will 47.58 lb/hour or 208.4 tpy.

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

**SECTION 4
BEST AVAILABLE CONTROL TECHNOLOGY EVALUATION**

October 31, 2002

SECTION 4

BEST AVAILABLE CONTROL TECHNOLOGY EVALUATION

4.1 DESCRIPTION OF CONTROL TECHNOLOGY REVIEW

The proposed modification to the Lee County Energy Recovery Facility (LCERF) is a major modification to an existing major stationary source in an attainment area and is subject to Prevention of Significant Deterioration (PSD) review because this modification will result in an increase in pollutant emissions in excess of PSD significant emission rates. Specific pollutants with proposed emissions greater than PSD significant emission rates (see Table 2-1) are particulate matter [particulates with a mean aerodynamic diameter less than ten microns (PM_{10})], sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen oxides (NO_x), mercury (Hg), sulfuric acid mist (SAM), municipal waste combustor (MWC) metals (as PM), MWC acid gases (as SO_2 and hydrogen chloride [HCl]), and MWC Organics (as total dioxins and furans). A Best Available Control Technology (BACT) evaluation must be conducted for the pollutants which are subject to PSD review.

On December 20, 1989, the U.S. Environmental Protection Agency (USEPA) proposed standards and guidelines for MWCs in 40 CFR Part 60 Subparts Ea and Ca, respectively. Subparts Ea and Ca were promulgated on February 11, 1991 and were developed under the authority of paragraph (b) of Section 111 of the Clean Air Act (CAA) of 1977. These promulgated standards and guidelines were developed from a series of background information documents issued from 1987 through 1989 (60 FR 65388). On November 15, 1990, amendments to the CAA were enacted and Section 129 (Solid Waste Combustion) was added to the CAA. Section 129 specified that revised standards and guidelines must be developed for MWCs. The USEPA subsequently reviewed the Subpart Ea standards and Subpart Ca guidelines and concluded that they were not fully consistent with new requirements established in Section 129 of the CAA. Therefore, USEPA proposed to revise the standards and guidelines in a September 20, 1994 proposal that was promulgated December 19, 1995 as the final rule (Section Eb and Cb).

In preparing the final rule, USEPA did collect additional data. They reaffirmed conclusions drawn from background information documents issued from 1987 to 1989. USEPA did solicit public comments on the 1994 proposed rulemaking that was compiled into a background information document "Municipal Waste Combustion: Background Information Document for Promulgated Standards and Guidelines – Public Comments and Responses" (USEPA, 1995d). No new U.S. MWC has been permitted since the promulgation of the final standards and guidelines for MWCs. Thus, the information presented in this BACT for Lee County reflect information and conclusions contained in documents issued by USEPA in the late 1980s that were reaffirmed when USEPA established final standards and guidelines for MWCS in 1995. USEPA's conclusions have not changed because there has been a lack of any new activity in the municipal waste combustion industry.

In accordance with current USEPA policy, a BACT analysis involves, on a pollutant specific basis, the identification of all applicable emission control alternatives for the pollutants subject to PSD review and any others requested by the governing regulatory agency. The control alternatives are then evaluated using a "top down" approach where they are ranked in descending order of effectiveness. A "top down" analysis first examines the most stringent or "top" control method to determine if technical considerations or potential energy, environmental, or economic impacts justify a conclusion that the control method is not BACT. If the most stringent or "top" control alternative is determined not to be BACT using this methodology, then the next most stringent alternative is considered until BACT is determined. Equipment with equivalent control capabilities does not require an evaluation. For those pollutants which have applicable air pollutant emission standards, such as New Source Performance Standards (NSPS), BACT needs to be at least as stringent as the applicable standard.

The criteria used to evaluate BACT alternatives are as follows:

- Technical Feasibility
- Energy Impacts
- Environmental Impacts
- Economic Impacts

The technical feasibility of a control alternative relates to whether the technology can reasonably be expected to remove a specific pollutant from the source exhaust gas stream given the physical and chemical characteristics of the source and its exhaust. Energy impact evaluation relates to the determination of whether the energy needed to apply a control technology is excessive relative to other available technologies. Environmental impact evaluation relates to the identification of both beneficial and non-beneficial environmental impacts resulting from application of a given control technology. Economic impact evaluation relates to the determination of the cost-effectiveness of applying a given control technology. For purposes of the BACT analysis, cost effectiveness estimates are developed as a "cost per ton of pollutant removed" for evaluating the reasonableness of various emission control technology costs. This is done by dividing the total annual cost of each control alternative by the amount of emissions (in tons) reasonably expected to be controlled by each control alternative. Economic impacts can also be determined as an "incremental cost-effectiveness" when evaluating the added benefit of marginally different control options.

4.2 PROPOSED CONTROL TECHNOLOGIES

The applicant, Lee County, proposes to control air pollutant emissions through a combination of good combustion practices (GCP) and add-on exhaust gas controls. PM₁₀ as well as MWC Metals (as PM₁₀) will be controlled with a high efficiency fabric filter (FF) baghouse. Acid gases such as SO₂, MWC acid gases (SO₂ and HCl), and SAM will be controlled with a spray dry absorber (SDA) in combination with the FF. GCP will be utilized to maximize burnout of products of incomplete combustion such as CO, volatile organic compounds (VOCs), and trace organics. The applicant also proposes to install an

activated carbon injection system in combination with flue gas cooling in the spray dry absorber (SDA) and particulate control in the FF for control of Hg. These types of control have been proven to be effective in controlling the range of pollutants expected to be emitted from a municipal waste combustor. Thus, these proposed control options will be considered the "base" control options for the pollutant specific BACT analyses.

4.3 MATERIALS SEPARATION

Lee County has in place an aggressive county-wide materials separation plan to minimize waste generation. Residents of Lee County are required to pay for curbside collections of separated glass bottles, plastic containers (numbers 1 through 7), steel cans, aluminum cans and foil, corrugated cardboard, kraft paper bags, telephone books, magazines, newspapers and dry-cell batteries for recycling. Residents also separate household waste such as electronic equipment, motor oils, pesticides, waste fuels (gasoline/fuel oil), paints, solvents, drain cleaners, pool chemicals, anti-freeze and auto batteries. Lee County has a voluntary commercial materials separation program that provides for the collection of source separated recyclable materials from businesses and institutions. The County requires its franchise collection haulers to provide, at a minimum, recycling collection services for all businesses and institutions, and prohibits the imposition of any collection and transfer fees for recyclables. The Lee County Materials Separation Plan is more fully described in Volume II.

Source separation of combustible and non-combustible materials can result in lower emissions of various pollutants such as mercury and lead from household and industrial/commercial batteries. The Lee County Materials Separation Plan includes ferrous and non-ferrous metal collection from residential collection, private recycling facilities, "buy-back" programs for scrap steel, copper, and aluminum and post-combustion ferrous and non-ferrous metals separation and recovery at the LCERF. Segregated loads of commercial construction and demolition (C&D) waste debris are generally not accepted at the LCERF. Segregated C&D waste is directed to separate private landfills and recycling facilities. White goods (large appliances such as stoves and refrigerators) are collected separately by franchise haulers and delivered to private recycling facilities.

Lee County maintains waste tire storage and processing areas at the LCERF. Waste tires are shredded by a private tire processor and used as fuel for the LCERF combustors and for drainage media at the County's landfill.

Lee County also sponsors several additional waste programs to be utilized on a voluntary basis. Residents and business can dispose used motor oils at designated county "oil-change" business locations. The County also provides a residential used-sharps program for convenient disposal of used syringes. Biomedical waste disposal containers for used syringes can be obtained free at participating pharmacies and fire stations. Drop-off locations for the biomedical waste are available at fire stations throughout Lee County. Other commercially generated waste, such as fluorescent bulbs, thermostats and

to the screened vents, therefore preventing odors and dust from escaping to the environment.

The movement of refuse through the combustors, in addition to the refuse combustion, causes the suspension of substantial amounts of particulates. The high combustion temperatures also cause the vaporization of a portion of the MWC metals contained in the waste, which condense onto entrained particles as flue gas temperatures decrease along the exhaust gas flow pathway. Some of the larger particulates fall out in the boiler section, but the majority move downstream to the SDA unit. Particulates collected in the bottom ash from the boiler section are mixed in the ash discharger with fly ash particulate matter collected by the SDA system. All collected flyash is conveyed by enclosed screw conveyors.

Once the combustion exhaust gases enter the SDA, the flue gas cleaning system introduces a lime-slurry spray into the exhaust gas stream and thereby increases the particulate loading in the flue gas. As the lime-slurry dries and the water evaporates, the exhaust gases cool and the dry lime particles disperse from the resultant intense turbulence within the reaction chamber. This intense turbulence causes intimate contact between the fine lime particulate and acid gases and other constituents in the exhaust stream. Condensation onto particles and agglomeration of finer particles occurs. Some large particles in the exhaust gases are collected in the hopper of the SDA vessel. The remaining particles are carried to the FF control system where the combination of reacted and unreacted lime helps form a filter "cake" on the baghouse fabric that assists in particulate removal and ultimately, highly efficient exhaust gas cleaning.

4.4.2 SOURCE SEPARATION IMPACT ON PARTICULATE EMISSIONS

While certain materials separation efforts are considered in this document because of their potential to reduce air emissions, the amount of emissions reductions cannot be quantified. For this reason, materials separation activities are discussed in this BACT analysis; however, materials separation should not be imposed as BACT. There is no evidence to demonstrate that source separation of certain components by itself provides for consistent and measurable reductions of particulate emissions. Because it is not possible to quantify the effect of source separation, source separation does not qualify as a technology or clean fuel process.

4.4.3 AVAILABLE CONTROL TECHNOLOGIES

Particulate matter control devices have been employed in numerous industries and include FFs, electrostatic precipitators (ESP), cyclones, wet scrubbers, and others. From a top-down perspective the most effective types of particulate matter control equipment being successfully applied to municipal waste combustors are FF and ESP systems. USEPA, in its review of control technologies in support of the NSPS for municipal waste combustors, considers FF and ESP systems to be equivalent in providing control of particulate matter (USEPA, 1989e; and USEPA, 1995d). This equipment has been successfully applied to numerous municipal waste combustor installations in the U.S. It

is a generally accepted conclusion that either an ESP or a FF system can effectively reduce the particulate loading in an exhaust gas stream from a municipal waste combustor and either technology represents the most restrictive emission control technology available for particulate emissions. Unit 3 will incorporate a FF system designed to limit particulate emissions to 0.009 grains per dry standard cubic foot (gr/dscf) of exhaust gas, corrected to 7% oxygen.

Developments in FF technology have produced a variety of filter materials including coated or non-coated fiberglass, felts, and synthetic membranes to deal with differences in ash characteristics and resistivity, inlet flue gas temperature, filter cake cohesiveness, and other problems encountered with specific FF design parameters. Lee County will utilize a bag material that will meet the proposed PM₁₀ emission limit of 0.009 grains per dry standard cubic foot (gr/dscf) at 7% O₂.

4.4.4 SELECTION OF BACT

Lee County is proposing to install a FF system to control particulate matter emissions which represents the "top" technology available. No further evaluation of control options is considered necessary. Therefore, a FF designed to achieve a particulate matter emission rate of 0.009 gr/dscf at 7% O₂ is selected as BACT for Unit 3.

In addition, a second lime silo will be added to the facility for additional lime storage needed for the Unit 3 SDA system. The lime silo will be equipped with a FF unit to control particulate emissions during filling operations of the silo. The FF for the lime silo will be designed to achieve an outlet grain loading of 0.03 gr/dscf, which is considered BACT for small, low flow FF units.

4.5 BACT REVIEW FOR SULFUR DIOXIDE, MWC ACID GASES, AND SULFURIC ACID MIST

For purposes of this BACT review, acid gases include SO₂, MWC acid gases, such as HCl and hydrogen fluorides (HF), and SAM. SO₂ and acid gases are generated in the combustion unit. The sources of these pollutants are the thermally driven chemical reactions between the sulfur, chlorine, and other elements and compounds in the municipal solid waste (MSW) and combustion air. Gas scrubbing systems are the most effective methods currently available for application to resource recovery systems to control SO₂ and acid gases. Wet, semi-dry, and dry scrubbing systems are available and have been applied to MSW combustion facilities. The following discussion addresses the formation of SO₂, as an equivalent acid gas, in the combustor and the specific energy, economic, and environmental impacts of available control technologies.

4.5.1 FORMATION MECHANISMS

The majority of the sulfur and chlorine found in refuse is chemically bound to other compounds. A portion of these substances are released during combustion and escape the furnace in various forms. Consequently, the type of sulfur, chlorine and fluorine

compounds released from the combustion units will be strongly dependent on the presence of gaseous compounds, combustion temperatures, and oxidizing/reducing conditions in the combustor. Similarly, uncontrolled emission rates of these compounds will be related to fuel concentrations of sulfur, chlorine, and fluorine, and to the combustion technology.

Various sulfur compounds are produced from direct combustion processes. SO_2 is the predominant form of sulfur compound released from the municipal solid waste combustion process. Some of the SO_2 , when released into the ambient environment, reacts with atmospheric water vapor to form sulfuric acid. Similarly, emitted chlorine react with water vapor to form hydrochloric acid. The presence of these acid gases in the atmosphere results in reduced visibility, material corrosion, sensitive organ irritation in humans and animals, and can add to acid rain/fog problems. Sulfuric acid and emitted sulfuric acid mist may further react in the atmosphere to form sulfate salts, a particulate aerosol.

4.5.2 SOURCE SEPARATION IMPACT ON MWC ACID GAS EMISSIONS

Source Separation Impact on SO_2 and Sulfur Compound Emissions

Municipal waste combustion facility emissions of SO_2 and sulfur compounds appear to be related to both the sulfur content of the MSW and to the combustion environment. The major contributors of sulfur to the municipal solid waste stream (and their approximate sulfur content by weight) were estimated in the California Air Resources Board (CARB) document (1984) to be plastics (0.3%), textiles (0.2%), food wastes (0.25%), and yard wastes (0.35%). As can be seen by these approximate figures, the sulfur content of municipal solid waste is quite small, typically averaging less than 0.25% of the total weight (CARB, 1984). Other sources of sulfur in MSW and their approximate sulfur contents (by weight) are corrugated cardboard (0.05%), mixed paper (0.04%), newsprint (0.03%), and rubber (0.2%) (CARB, 1984). A search for more recent data regarding the chemical constituency of different components of the general municipal solid waste stream did not identify useful information. This was confirmed in discussions with Mr. Winston Porter, formerly of the USEPA (Marks, M., 2002).

With the exception of food wastes and textiles, the Lee County Materials Separation Plan provides curbside collection for a significant portion of these materials. Lee County provides weekly collection of yard and horticultural wastes from all single family residential dwellings. Commercially generated yard and horticultural wastes are generally transported to county and private facilities for recycling. Corrugated cardboard, mixed paper and newsprint are included in the residential and commercial materials separation programs. Used automotive tires are separately collected and shredded for the County by a private tire processor. Shredded tires are burned at the LCERF to recover energy and steel. Shredded tires are also used as drainage media at the County's landfill.

While certain materials separation efforts are considered in this document because of their potential to reduce air emissions, the amount of emissions reductions cannot be quantified. For this reason, materials separation activities are discussed in this BACT analysis; however, materials separation should not be imposed as BACT. There is no evidence to demonstrate that source separation of certain components by itself provides for consistent and measurable reductions of SO₂ and sulfur compounds. Because it is not possible to quantify the effect of source separation, source separation does not qualify as a technology or clean fuel process.

Source Separation Impact of HCl Emissions

HCl emissions, to a limited extent, can be related to the amount of MSW components containing chlorine. The CARB reports that plastics [mostly polyvinyl chloride (PVC) and polyurethane plastics] and miscellaneous organic wastes are the major sources of chlorine in MSW. Table salt is also regarded as a major chlorine source (CARB, 1984). Other chlorine contributors in the MSW stream are chlorine-bleached paper, yard waste, and high density polyethylene (HDPE) plastics. Based on Berkeley, California data reported by CARB, the approximate chlorine content, by weight, for these MSW components are: plastics, 6.5%; organic wastes, 1.8%; yard waste, 0.3%; rubber and textiles, 0.14%; mixed paper, 0.12%; and cardboard and newsprint, 0.05% (CARB, 1984). While separation of organic wastes, mostly food wastes, is not feasible due to their putrescible nature, recycling of other identified materials is technically and economically feasible. Recycling of plastics and paper and composting yard wastes would appear to be effective options for limiting chlorine from those contributors to the proposed Unit 3. However, tests of separated wastes have shown that removal of these wastes via materials separation programs exerts little change in facility HCl emissions. Apparently, significant chlorine exists even in source separated waste to produce significant emissions of HCl.

The Lee County Materials Separation Plan provides curbside collection of source-separated materials including plastic containers, yardwaste, mixed paper, cardboard and newsprint, as part of the residential materials separation program. These materials are also recycled at commercial businesses and institutions. Unfortunately, the plastics which are readily recycled (i.e., polyethylene) tend to contain only trace amounts of chlorine. Typical chlorine contents for various plastic materials are polyethylene (trace), polystyrene (trace), polyurethane (2.4%), and PVC (45%) (CARB, 1984). It is likely that much of the PVC plastics are used mostly for various building materials and represent only a small fraction of plastics in the normal MSW stream. Construction/demolition waste debris is not generally accepted at the Lee County ERF and is typically disposed separately from MSW at privately owned facilities identified in the Materials Separation Plan.

While certain materials separation efforts are considered in this document because of their potential to reduce air emissions, the amount of emissions reductions cannot be quantified. For this reason, materials separation activities are discussed in this BACT analysis; however, materials separation should not be imposed as BACT. There is no

evidence to demonstrate that source separation of certain components by itself provides for consistent and measurable reductions of HCl. Because it is not possible to quantify the effect of source separation, source separation does not qualify as a technology or clean fuel process.

4.5.3 AVAILABLE CONTROL TECHNOLOGIES

A number of control technologies specifically designed to reduce SO₂ and acid gas emissions have been tested and/or are operating on combustion sources in the U.S. and abroad. The most successful methods (i.e., those consistently achieving the highest control efficiencies) employ either a wet scrubbing system or an alkaline sorbent injection system of a dry or a semi-dry nature or a combination of these. Another control system that has been tested and/or employed in various forms utilizes a catalytic method of SO₂ control. These technologies are described in the following review of control alternatives for the proposed Unit 3.

Wet Scrubbing Systems

The promulgation of the CAA in 1970 and subsequent inclusion of NSPS for coal-fired utility boilers caused many new coal-fired utility boiler projects to include flue gas desulfurization (FGD) units, typically wet scrubbers, in the plant designs. The typical "first generation" wet scrubber was a wet lime or limestone spray tower which normally achieved SO₂ removal efficiencies in the 70 - 90% range. Scrubber designs included packed towers or medium high pressure drop venturi scrubbers, and many were designed for particulate removal in the same vessel. A number of design and operating problems have been associated with these "first generation" designs such as:

- Corrosion caused by improper materials selection and design;
- Equipment failure caused by improper equipment selection or design;
- Scaling and plugging caused by improper operation and control and by improper equipment design or control system design;
- Scrubber waste processing and disposal problems caused by improper equipment design, mostly related to the cementing properties and poor dewatering characteristics of calcium sulfite sludges.

As these "first generation" problems were identified, they were corrected by retrofit and improved new system designs.

The various operating problems were encountered because often the scrubber was designed for both particulate and acid gas removal. Wet scrubbing for acid gases differs markedly from wet scrubbing for particulate matter in several ways: (1) emphasis is on gas/liquid contact and not impingement of particles, (2) chemical additives to the scrubber liquid require careful attention to the system chemistry and accelerate the potential for corrosion and fouling of scrubber internals, and (3) the volume of waste is substantially increased. As a result, significantly more attention is paid to process

conditions and effluent/exhaust chemical composition with wet scrubbing for gases (USEPA, 1987d).

Many types of wet scrubbers are used for removing acid gases including spray towers, centrifugal scrubbers and low pressure drop venturi scrubbers. Scrubbers with internals, such as packed-beds and trays, are typically not incorporated with waste combustion due to the potential for plugging and corrosion (USEPA, 1987d).

Currently, wet scrubbers are operating on numerous sources in the U.S., predominantly high sulfur fuel (coal and oil) fired power plants, municipal sludge combustors, and hazardous waste combustors. Wet, calcium-based FGD systems have been the preferred acid gas control option for large utility power plants. However, wet scrubbers have not gained popularity in the U.S. waste-to-energy industry. Municipal waste combustion plants in the U.S. have predominantly utilized dry or semi-dry FGD systems in combination with a FF baghouse to minimize water use and for enhanced fine particulate control. USEPA, in evaluating data and conducting analyses in support of the established MWC emission guidelines, NSPS and maximum achievable control technology (MACT) gave little consideration to wet scrubbers as a viable acid gas control option for MWCs (USEPA, 1989b).

The bulk of recent wet scrubber experience with municipal waste combustion systems and thus, municipal waste combustion flue gas cleaning systems, comes primarily from Europe. Modern flue gas cleaning systems reflect a better quality of design based upon the experience gained from the first scrubber installations. Some specific examples of earlier designs and the modifications made include:

- The use of packed bed designs in earlier systems (e.g., turbulent contact absorbers) in lieu of the preferred open spray tower.
- Earlier designs incorporated the use of venturi scrubbers for removal of particulate, HCl and SO₂ in the same unit. The preferred method is to remove particulate separately, thus avoiding the high pressure drop of the venturi and the problems associated with scaling and mud formation. This is accomplished by placing the scrubber downstream of a particulate collection device such as an ESP.
- Location of induced draft fans downstream of wet scrubbers where the flue gas is at saturation, and thus more corrosive, was also modified in later designs (Jordan, 1987).

The original TA LUFT Legislation promulgated in West Germany in 1974 prompted the installation of wet scrubbers on a number of refuse burning facilities in West Germany. The original wet scrubber systems installed at the Kiel and Krefeld facilities were tested and reviewed to gain performance data for these systems.

The Kiel plant was the first refuse burning facility in West Germany to have used ESPs in combination with a single stage wet scrubber. The facility is equipped with two VKW furnaces and can burn up to 240 metric tons per day (265 tpd) of sewage sludge and

refuse. Flue gases exiting the furnaces are routed to ESPs for removal of particulate matter and then enter a single stage wet scrubber for control of HCl, hydrogen fluoride (HF) and SO₂. The wet scrubbers use calcium hydroxide, Ca(OH)₂, as the alkaline reagent. Air pollution tests conducted at the Kiel plant in 1976 showed HCl and HF removal efficiencies of greater than 95%. In addition, emissions of sulfur oxides (SO₂ and SO₃) were reduced by approximately 50% (CARB, 1984). The Kiel plant demonstrated high on-line reliability for continuous operation (Beaumont Environmental, Inc. (BEI), 1986).

The lower SO₂ removal efficiency relative to the higher HF and HCl removal efficiencies shown at the Kiel facility identified a problem with single-stage scrubbing utilizing a calcium based sorbent for acid gas control. The performance of wet scrubbers is dependent on many factors, and at the time, the data base was too limited on municipal waste combustion applications for detailed evaluations of the effects. Theoretically, the reaction of strong acid gases (HCl, HF) proceeds rapidly with alkaline solutions and even mildly acidic solutions. Hence, HCl and HF removal should be high (greater than 90%) in most cases, assuming proper operation. The reaction of SO₂ proceeds more slowly and over a limited pH range, the limiting factors are the rate of SO₂ absorption and, for calcium systems, the dissolution rate of solid caustic particles. Thus, SO₂ removal may vary greatly over a limited range of operation, depending on pH control, inlet SO₂ concentration, and many other factors (USEPA, 1987e). This determination of different reaction rates prompted European facilities to begin utilizing two stage wet scrubbers to separately remove first HCl and HF in the first stage and SO₂ in the second stage.

Two stage wet scrubbing also provided for better recycled products from generated wastes. Control of HCl in the combustor flue gas with a single-stage scrubber results in a significant portion of calcium chloride (CaCl₂) in waste scrubber solids as well as a buildup of chlorides in the scrubber liquor such that waste handling and liquor recycle are more difficult. Solids were also more difficult to settle and dewater with CaCl₂, making generation of a useful waste material such as gypsum (CaSO₄) impractical. Utilization of a two-stage scrubber allows removal of HF and HCl, typically with water, in the first stage with the second stage, or main absorber, utilizing reagent scrubbing for SO₂ control. This arrangement has demonstrated better control of all acid gases while providing the potential for more saleable by-product wastes (USEPA, 1987e).

The Krefeld plant, built soon after the Kiel plant, is designed to burn up to 1600 metric tpd of sewage sludge and refuse. Similar in design to the Kiel facility, the Krefeld plant at that time utilized ESPs and wet scrubbers for emissions control. However, the Krefeld plant incorporated two-stage wet scrubbers. Each stage uses a different alkaline reagent in the scrubber solution. The first stage uses calcium hydroxide to reduce emissions of gaseous HCl and HF. Emissions of sulfur oxides are reduced in the second stage through use of either a sodium or calcium based reagent (CARB, 1984). Results from tests conducted on the Krefeld facility showed an optimum 99+% HCl removal, 97+% HF removal and 96+% SO₂ reduction when firing refuse only (BEI, 1986).

Wet scrubbers have demonstrated potential for high efficiency SO₂ and acid gas control. However, it has been shown that wet scrubbers alone are only moderately effective in controlling heavy metals and organic emissions. In order to get effective metal and organic emissions control, additional reagent injection and subsequent particulate collection are employed. Generally, ESP's are used in conjunction with wet scrubbers for added particulate removal. Typically, some flue gas re-heating is necessary to reduce acid condensation within downstream equipment and to increase plume rise. FFs are not typically used with wet scrubbers due to the detrimental effect of saturated moisture on the filter bags (Davis, W.T., 2000).

Regarding the ability of wet scrubbers to remove additional pollutants, several test programs at municipal waste combustion facilities with wet scrubbers have focused on variations in dioxin/furan toxicity at different points in the process. The results indicated that although there may be a reduction in the mass rate of organics, the overall toxicity of the emission increases. This phenomenon is theorized as being attributable to stripping of chloride ions from high PCDD/PCDF isomers such as octa and hepta to the higher toxicity isomers, tetra and penta PCDD/PCDF (Franklin Associates, 1991).

Wet scrubbers are generally not effective in controlling submicron aerosol mists which would include SAM or volatilized mercury vapor. The fate of captured mercury is unknown regarding the continuous recycling of wet scrubber reagent and the disposal of sludge with captured mercury in the liquid phase. Most recent European facilities that employ wet scrubbers also include a reagent injection system for mercury control (Franklin Associates, 1991).

With introduction of very stringent emissions limitations in Germany, Austria and the Netherlands in the early 1990's, high efficiency multi-stage flue gas cleaning processes were designed and applied to new MWCs or retrofitted to existing MWCs. These typically comprised selective separation stages for each individual pollutant. The captured pollutants and their resultant waste streams were converted to recyclable products, for example, SO₂ to CaSO₄ or gypsum. In addition, it became desirable to control well below regulatory requirements to "near zero" emissions. This application of multiple control steps was often done without consideration for cost or the impact on energy production/plant efficiency. In some cases in the mid-1990's, plants were built with five to seven individual cleaning steps in the attempt to produce saleable products from the waste stream. Companies in the environmental control industry found that this approach was not transferable to many other countries due to differences in waste management practices and economics. Furthermore, it became evident that revenue generated from recycled products did not justify the added investment of separate control stages (Schüttenhelm, et al., 2000).

In Germany as well as other countries, a trend to simpler, integrated flue gas cleaning processes has been observed in the last three to four years. This trend has been prompted by more general acceptance of MWCs as well as a ban on landfilling MSW, coupled with a considerable change in the overall economic climate. Development of more thermally efficient MWC systems that include less expensive, and hence, more cost effective

control technologies has been the result. Thus, new plants are featuring integrated flue gas cleaning processes producing mixed wastes for disposal, rather than individual separation processes producing recyclable wastes (Schüttenhelm, et al., 2000).

Semi-Dry Sorbent Systems (SDA)

SDA scrubber systems effectively control SO_2 and other acid gases and have been applied to the majority of resource recovery facilities in the U.S. in the last 10 years. In addition, SDA's have been the technology of choice for retrofit to existing municipal waste combustors to meet the emission guidelines acid gas removal requirements.

Spray drying is designed to control acid gases, but also provides control of organics and volatile metal emissions from municipal waste combustion facilities. In the spray drying process, lime slurry is injected into the spray dryer chamber typically through either a rotary atomizer or two-fluid nozzles. Rotary atomizers use centrifugal energy to atomize the slurry. The slurry is fed to the center of a rapidly rotating disk or wheel where it flows outward to the edge of the disk. The slurry is atomized as it leaves the surface of the rapidly rotating disk. Two-fluid nozzles use kinetic energy to atomize the slurry. High velocity air is injected into a stream of slurry, breaking the slurry into droplets, which are ejected at near sonic velocities into the spray drying chamber. Both of these atomization methods have been used in spray dryers on municipal waste combustion facilities. Spray dryers with two-fluid nozzles are typically larger in height than diameter while those with rotary atomizers have a larger diameter than height. Slurry droplets of comparable size can be obtained with both two-fluid nozzles and rotary atomizers, minimizing differences in performance due to atomizer type.

The atomized slurry droplets contact the hot flue gas in the SDA chamber. The water in the lime slurry evaporates to cool the flue gas, and the lime reacts with the acid gases in the flue gas to form calcium salts. The SDA chamber is designed to provide sufficient contact and residence time to produce a dry product leaving the SDA chamber. The residence time in the chamber is typically 10 to 15 seconds. The particulate exiting the SDA contains fly ash plus calcium salts, water, and unreacted lime. The simultaneous evaporation and reaction in the spray drying process increases the moisture and particulate content of the flue gas.

Key design and operating parameters that can significantly affect SDA performance are SDA outlet temperature, lime-to-acid stoichiometric ratio, and slurry droplet size. The SDA outlet temperature is controlled by the amount of water in the slurry. More effective acid gas removal occurs at lower temperatures, but the temperature must be kept high enough to ensure the slurry and reaction products are adequately dried prior to collection in the particulate control device and that the flue gas temperature stays above the acid dew point. Therefore, a minimum SDA outlet temperature of approximately 240°F (116°C) or higher is typically required to control agglomeration of PM and sorbent by calcium chloride and to guarantee that wet material is not collected by the particulate control device (Davis, W.T., 2000).

The stoichiometric ratio is defined as the molar ratio of calcium in the lime slurry fed to the SDA to the theoretical amount of calcium required to completely react with the HCl and SO₂ in the flue gas at the inlet to the SDA. At a ratio of 1.0, the moles of calcium are equal to the moles of incoming HCl and SO₂. However, because of mass transfer limitations, incomplete mixing, differing rates of reaction (SO₂ reacts more slowly than HCl), and the presence of other acid gases that react with calcium (e.g., HF, sulfur trioxide), the amount of lime fed to the spray dryer is generally more than the theoretical amount. Although not usually measured during a compliance test, droplet size would be expected to affect SDA performance. Smaller droplet size increases the surface area for reaction between lime and acid gases and increases the rate of water evaporation.

The FF is generally preferred over the electrostatic precipitation (ESP) in combination with SDA because of its inherent high efficiency and especially because of its greater secondary reaction capability. This secondary reaction capability relates to the creation of a porous filter cake on the FF bags which contains both spent and unspent reagent. This filter cake is credited with controlling pressure drops, dampening surges or pollutant spikes, providing a site for increased reagent utilization, and increasing equipment reliability (BEI, 1986).

A performance summary of SDA/FF on several facilities (USEPA, 1989a and USEPA, 1995d) presented the following results which support the use of a SDA/FF as a means of controlling several pollutants in addition to MWC acid gases:

- Acid gases - Factors affecting acid gas removal by SDA/FF systems include stoichiometric ratio, SDA outlet temperature (FF inlet), and inlet SO₂ concentration to the SDA. A stoichiometric ratio in excess of three is generally necessary to obtain consistently high acid gas removal efficiencies of 90% SO₂ and 98% HCl. Suppliers have claimed that SDA/FF systems are capable of achieving 90+% SO₂ and 95+% HCl removal efficiencies. (Eight years of data from the existing Lee County facilities have demonstrated the ability to consistently achieve this performance level).
- Particulate Matter - Analysis of particulate matter emissions from the facilities averaged less than 0.01 gr/dscf at 12% CO₂.
- Metals - Based on measured removal efficiencies of metals by SDA/FF systems; arsenic, cadmium, chromium, and lead can be removed at 99% efficiency. Nickel removal is generally high (98%), but varies. The level of Mercury removal by SDA/FF systems is uncertain, given test data showing removal efficiencies ranging from zero to 95%.
- Dioxins and Furans - SDA/FF systems operating at FF inlet temperatures of 325°F (163°C) or less can consistently achieve average outlet dioxin and furan concentrations of between 1 and 30 ng/dscm at 7% O₂.

In developing and promulgating the MWC NSPS, the USEPA concluded that SDA/FF systems are the best demonstrated control technology for reducing MWC facility emissions of acid gases, particulate matter and metals, and providing additional control of

MWC facility organic emissions. This conclusion is based on operating data from a number of operating modern MWC facilities (USEPA, 1989b and USEPA, 1995d).

Dry Injection Systems

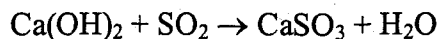
In dry SO₂ removal processes, the dry sorbent powder reacts with SO₂ and is removed in the particulate collector. Three general approaches are available or have been tested for bringing the dry sorbent into contact with the SO₂: 1) furnace sorbent injection, 2) economizer injection of calcium hydroxide sorbent, and 3) post furnace injection of dry sorbent into combustion products. These three approaches correspond to the three temperature windows that are available for SO₂ removal by a dry sorbent: furnace injection at temperatures around 1100-1250C (2012-2282°F) using a variety of calcium-based sorbents; economizer inlet injection between 450 and 550C (840-1020°F) using hydrates; and duct injection into the gas passage leading to the particulate collector, either at temperatures approaching within 5-15C (5-27°F) of adiabatic saturation for hydrates or at 130-180C (234-324°F) for sodium sorbents (Muzio, et al., 1987).

Furnace sorbent injection is a technique for controlling acid gas emissions which has been applied to conventional municipal waste combustion facilities. Lime (CaO), hydrated lime [Ca(OH)₂], or limestone (CaCO₃) is injected into the furnace section of the MWC. If limestone is used, sufficient temperature must be available for calcination of CaCO₃ to CaO and CO₂. Limestone is rapidly calcined to lime in the furnace at temperatures of 1400-2000°F (760-1093C). The lime, in turn, reacts with SO₂ and HCl to form calcium sulfate (CaSO₄) and calcium chloride (CaCl₂), which can be removed by the particulate control device. In conventional municipal waste combustion facilities, sorbent can be injected into the furnace using existing overfire air jets or through separate ports located above the fuel bed.

Furnace injection provides for effective SO₂ removal because lime and SO₂ readily react at typical furnace temperatures of 1600-2200°F (871-1204C). Furnace sorbent injection also provides extended contact time between lime and acid gases, as they are in contact in the flue gas starting in the combustor, through the heat recovery sections, and ending in the particulate control device. Control efficiencies have been estimated to range up to 50% or more for SO₂ and up to 90% for HCl (USEPA, 1989a). However, HCl and lime reportedly do not react at temperatures above 1400°F (760C). Potential disadvantages of furnace sorbent injection include fouling and erosion of convective heat transfer surfaces by the injected sorbent (USEPA 1989a).

A temperature window around 550C (1022°F) exists that yields sulfur capture rates similar to furnace injection with commercial hydrates and significantly better performance with specially prepared sorbents. This reactivity peak, found under the Electric Power Research Institute (EPRI) sorbent research program, is at a temperature frequently located near the economizer inlet. Injection at these moderate temperatures may not only result in higher sorbent utilizations but also facilitate injection due to the smaller cross-section (denser, higher velocity gas) and ability to insert lances or injection grids. The process, however, is effective only with hydrates. At these temperatures, SO₂

appears to react very rapidly and directly with calcium hydroxide, according to the following formula:



The formation of sulfite, however, has to compete with the reaction between the abundant CO_2 and Ca(OH)_2 to form CaCO_3 . Below 550C (1022°F), both sulfite and carbonate occur, but sulfite formation dominates. Above 550C (1022°F), dehydration of the Ca(OH)_2 accelerates, with carbonation and dehydration occurring at the expense of sulfite formation. Since sulfite formation is very fast and the window is approximately 100C (212°F) wide, the process is compatible with the high quench rates through economizers (Muzio, et al., 1987).

Economizer injection of sorbent appears useful for SO_2 removal, especially in retrofit situations. Study in this area is ongoing, and as yet, this control method has not been proposed or demonstrated on modern municipal waste combustion facilities in the U.S. Furthermore, interaction of the hydrates with trace contaminants in MSW combustion flue gas has not been fully evaluated. Due to a lack of available operational data, this experimental control option cannot be fully evaluated at this point. Therefore, this method is not considered further in this application.

Duct sorbent injection (DSI) is designed to control acid gas emissions by injecting powdered sorbent, usually hydrated lime [Ca(OH)_2], into the flue gas upstream of the particulate control device. The sorbent is generally injected through a venturi or into a reactor vessel just upstream of the particulate control device. The residence time prior to the particulate control device is generally one to two seconds. The sorbent reacts rapidly with the acid gases to form salts which, in addition to the fly ash and unreacted sorbent, are removed by the ESP or FF. Lower system operating temperatures increase sorbent reactivity and increase removal of acid gases as well as condensable metals and organics. At the injection point, the flue gas temperature can range from less than 300°F to roughly 600°F (149-316C). Flue gas can be conditioned (cooled) upstream of the injection point by heat exchange, such as by an economizer or air-to-air exchanger, humidification, or addition of lower temperature air (USEPA, 1989a).

Higher removal efficiencies have been observed when the flue gas is conditioned and humidified (Muzio, et al., 1987). Generally, spray drying of sorbent is more effective at removing SO_2 and acid gases than dry sorbent injection, with increasing acid gas control as the outlet gas temperature decreases toward the saturation temperature (USEPA, 1988b). Dry sorbent injection without flue gas conditioning does not appear to significantly add to the control of metals emissions more than the control supplied by the particulate control device.

Greater acid gas control can be achieved by combining the DSI system with an FF rather than an ESP. Collected particulate builds up on the FF bags forming a filter cake. The presence of unreacted sorbent in the filter cake provides additional acid gas removal. FFs

may also provide additional control of metals through control of fine particulate (USEPA, 1989a).

An analysis of performance of DSI/FFs at several facilities, including Dutchess County, New York; Claremont, New Hampshire; Quebec City, Canada; and Wurzburg, West Germany, gave the following results (USEPA, 1989a):

- Acid Gases - analysis of acid gas data shows that the FF inlet temperature significantly affects SO₂ and HCl removal efficiency (i.e., removal efficiency across the DSI/FF systems increase as temperature decreases for the data sets involved). Up to 90% SO₂ and 95% HCl removal efficiency has been demonstrated with an FF inlet temperature of 250°F (121°C) and increased stoichiometric ratio of lime to acid gas. The ability to achieve these removal levels consistently has not yet been documented.
- Particulate Matter - Outlet PM concentrations averaged 0.01 gr/dscf or lower at the tested DSI/FF systems.
- Metals - Removal efficiency for metals was available for only one facility. Removal efficiencies were estimated for other facilities based on measured outlet concentrations. Removal efficiencies for lead (Pb), cadmium (Cd), and arsenic were estimated to average 99% or better. Estimates of removal efficiencies for chromium (Cr) and nickel (Ni) ranged from 94-99%. Removal efficiencies for Hg ranged from zero control to 99% control and appeared tied to the FF inlet temperature (USEPA, 1989a).
- Dioxins and Furans - Removal of dioxins and furans also appeared dependent on the FF inlet temperature, showing decreased emissions with temperature decrease. At less than 300°F (149°C), emissions were below 7.7 ng/dscm at 7% O₂ (USEPA, 1989a).

Innovative Acid Gas Control Processes

The DeSONOX process is a flue gas purification process during which nitrogen oxides (NO_x) and SO₂ are simultaneously extracted. The essential feature of this process is the combination of catalysts for the selective reduction of nitrogen oxide by ammonia (NH₃) with oxidizing catalysts for the conversion of SO₂ to sulfur trioxide (SO₃). The derived SO₃ is extracted as usable, concentrated sulfuric acid.

The DeSONOX process was pilot tested on the Münster heating and power plant in Germany. Preliminary results from initial testing of the system showed up to 85% SO₂ removal (Brand, et al., 1989). Corresponding HF and HCl removal efficiencies were not reported.

It appears that this technology is now marketed by Mg Engineering - Lurgi and is employed as a specialty technology for low SO₂ concentration flue gas streams. This technology does not appear to be offered for large scale facilities. No information could be found indicating application of this technology to a large-scale waste-to-energy project. Emerichem, LLC (formerly Goalline Environmental Technologies), markets the

SCONOX® and SCOSOX® pollution control technologies. SCONOX® is a catalytic control method for nitrogen oxides and SCOSOX® is a catalytic control method for SO₂. SCOSOX® has not been applied to a large scale municipal waste combustion facility for SO₂ control and currently is not being marketed in this application. Furthermore, a representative of Emerichem, LLC stated that the company would decline from offering to provide a SCOSOX® system in this application due to the potential for catalyst fouling and deactivation from trace contaminants in the municipal waste combustion flue gas (Hober, M, 2002a).

Therefore, at present, it appears that these technologies must still be considered as experimental technologies and are yet undemonstrated for application to large-scale, municipal waste combustion facilities. In addition, test results have not shown acid gas control efficiencies as high as either the SDA or wet scrubber systems. Also, the systems do not appear to offer the secondary pollutant control of HCl, HF, trace metals, etc. that the SDA/FF offers. Hence, these innovative technologies will not be further considered for application to Unit 3.

4.5.4 RANKING OF ALTERNATIVE CONTROL TECHNOLOGIES

Several systems for controlling SO₂ and acid gas compounds in combustor flue gases have been reviewed. The overall ranking of systems would conclude that wet scrubbing and semi-dry (SDA) sorbent injection systems would rank the highest of the available systems with respect to SO₂ and acid gas removal efficiency. In general, it is expected that a modern wet scrubbing system would provide slightly better SO₂ and acid gas control than the SDA. Table 4-1 presents these approximate expected control efficiencies.

Based on the above analyses of control technologies available for controlling SO₂ and acid gases, two alternatives: wet scrubbers and semi-dry scrubbers will be further evaluated on the basis of energy, economics and environmental impacts. The applicant is proposing the use of an SDA system which will be considered the base case.

4.5.5 ENVIRONMENTAL IMPACT

Despite advancements in scrubber technology, some environmental impacts are unavoidable as a result of the use of wet scrubbers. Wet scrubbers consume more makeup water (by an approximate factor of three) than a SDA system. The wet scrubber also produces an acidic, high-chloride wastewater requiring treatment. Alternative treatments for the wastewater include:

- The use of cooling tower blowdown for prescrubber makeup
- Percolation of wastewater through a limestone bed
- Evaporation ponds
- Deep well injection
- Solids dewatering and disposal to a landfill

TABLE 4-1
CONTROL EFFICIENCIES OF SULFUR DIOXIDE AND
ACID GAS CONTROL TECHNOLOGIES^a

Pollution Control System	Achievable Removal Efficiencies	
	SO ₂	Acid Gas (HCl)
Wet Scrubber	90-95 %	95-99 %
Spray Dry Absorber	85-95 %	95-99 %
Dry Injection Systems	50-90 %	90-95 %

Note: SO₂ = Sulfur Dioxide
HCl = Hydrogen Chloride

Poor Original

^a Source: Air Pollution Engineering Manual (Davis, W.T., 2000)

More sophisticated (and more costly) wastewater treatment alternatives would include reverse osmosis, electrodialysis, and flash evaporation/crystallization. If organics removal is required, carbon filters, UV-ozonation, or other organic treatment methods may be considered. Because the prescrubber (cooling tower) blowdown contains dilute hydrochloric acid, there may be uses for this by-product after filtration (e.g., demineralizer regeneration). Waste solids from the SDA/FF typically do not require additional treatment or processing because potential secondary uses are limited. This material is typically used for stabilization of material to be landfilled or it is directly landfilled.

Another indirect environmental impact associated with wet scrubbers is the additional pollutant burden produced by flue gas reheat above the saturation temperature if done with gas burners. Effective wet scrubbing of flue gases requires reducing flue gas temperatures to below the saturation temperature. Excessive water carryover in the flue gas can damage or destroy the particulate control device. This problem is avoided with the SDA/FF in that the flue gas temperature is maintained above saturation. Also, while slightly higher acid gas removal efficiencies are expected with the wet scrubber, significant data exists for the removal ability of SDA/FF systems. Eight years of data from the existing LCERF Units 1 and 2 show SDA/FF systems provide high efficiency acid gas removal and comparable, if not better, secondary removal of other pollutants such as trace metals and trace organics than would be expected from a wet scrubber.

Positive environmental impacts are observed relative to MSW produced for disposal. Wet scrubbing systems produce less scrubber solid waste than that produced by an SDA/FF by an approximate ratio of 2/3. If treated, some of the wet scrubber waste solids may be saleable as by-product (e.g., gypsum); however, this potential usage is speculative at best because of the presence of other trace contaminants from the municipal solid waste. Thus, in this case, solids from either a wet scrubber or SDA/FF would most likely be disposed in a landfill.

4.5.6 ECONOMIC IMPACT

USEPA, in preparation for development of the MWC emission guidelines and NSPS published approximate capital and operating costs for a SDA/FF system in the "Municipal Waste Combustion Study", (USEPA, 1987e). USEPA failed to develop similar costs for wet scrubber systems, due to limited application of wet scrubbers to MWCs. Comparative wet scrubber capital costs are developed from supplier quotes supplied during preparation of the BACT review for the proposed Mercer County (New Jersey) Resource Recovery Facility application. These capital costs were scaled to the Unit 3 facility using the "sixth-tenths" rule and escalated to 2001 dollars. The availability of recent wet scrubber cost data from installations on MWCs is limited. Most recent European facilities, as noted previously, are opting for integrated, multi-pollutant control systems such as SDA/FFs.

When considering specific capital costs of the systems for comparative purposes, it was determined to utilize combined costs for the scrubber and particulate removal device as

neither the SDA nor the wet scrubber are as effective without added particulate removal equipment. Therefore, costs were developed for SDA/FF and wet scrubber/ESP cases. The ESP would most likely precede the wet scrubber, which significantly enhances wet scrubber acid gas removal ability while reducing the potential for plugging from collected particulate. The FF would follow the SDA to collect dry particulate matter formed in the SDA. It is expected that both systems will provide better than 95% control for HCl, HF and other acid gases. Therefore, cost comparisons will be based on removal of the more difficult pollutant, SO₂, with the SDA/FF at 80% SO₂ removal (1151 tons/year) and the wet scrubber at 90% SO₂ removal (1295 tons/year). Estimated cost removal values are:

SDA/FF	\$1,750-\$2,000 / ton SO ₂ removed
Wet Scrubber/ESP	\$3,500-\$4,300 / ton SO ₂ removed

These costs did not include waste treatment and disposal, integration of the systems with existing Units 1 and 2 and additional problems with water use and disposal, all of which are expected to be significantly costlier for the wet scrubber/ESP than the SDA/FF.

In general, and with all costs considered, the wet scrubber/ESP option is significantly more costly than the SPA/FF option, given the small increase (if any) in SO₂ and acid gas control assumed from a wet scrubber as opposed to the SDA/FF. This should also be considered relative to the demonstrated performance of the SDA/FFs currently operating on Units 1 and 2 at the LCERF. Emissions data from 1994-2001 have demonstrated removal efficiencies for SO₂ typically in excess of 90% and removal efficiencies for HCl and HF typically in excess of 95%.

When considering the incremental cost of applying a wet scrubber/ESP over a SDA/FF for assumed increased SO₂ control (additional removal of 144 tons of SO₂), the cost per ton of SO₂ removed increases to the approximate range of \$31,000.00 to \$38,500.00. This assumes the SDA/FF achieves 80% SO₂ control and wet scrubber/ESP achieves 90% control. As discussed above, actual performance of the SDA/FF has demonstrated higher removal efficiencies that would significantly increase this incremental cost.

Thus, the increase in cost of applying a wet scrubber/ESP system would appear excessive for a technology that offers potential for only a marginal increase in SO₂ control, at best. Furthermore, wet scrubber/ESP systems have not demonstrated the ability for multi-pollutant removal on MWCs that SDA/FFs have.

The SDA/FF system proposed for Unit 3 will be designed and is guaranteed by the supplier to comply with a HCl emission limit of 25 ppm_{dv} at 7% O₂ or 95% control, whichever is least stringent, a HF emission limit of 3.5 ppm_{dv} at 7% O₂, a SO₂ emission limit of 29 ppm_{dv} at 7% O₂ or 80% control, whichever is least stringent and a SAM emission limit 16.68 ppm_{dv} at 7% O₂.

4.5.7 ENERGY IMPACT

Wet scrubber systems are generally more energy intensive than SDA scrubbers systems, which translates to higher energy costs. This higher energy requirement results mainly from the slurry re-circulation pumps, the flue gas reheat system, and the scrubber wastewater treatment systems. After treatment in a wet scrubber, flue gases are typically reheated above saturation to avoid fogging, icing or condensation in the downstream equipment or stack. After treatment in a SDA/FF, flue gases typically are not reheated as temperatures are maintained above saturation. SDA/FF systems also do not require separate wastewater treatment systems or scrubber waste solids treatment and dewatering as wet scrubber systems do. Other significant energy consuming components (e.g., fans, ESPs, rotary atomizers) and additives of wet scrubbers are minor and can be safely assumed to be equivalent to corresponding components in an SDA system.

Differential energy costs were not quantified for this review. Therefore, from an electrical energy standpoint, the wet scrubber systems can be considered more energy intensive than SDA/FF system. With respect to reheat energy, the SDA/FF systems do not utilize flue gas reheat and are thus more energy conservative than wet scrubber systems. These reheat costs alone can be substantial due to continuously fluctuating fuel costs.

4.5.8 SELECTION OF BACT

The preceding analysis identified wet scrubbers and semi-dry SDA scrubbers as the two "top" acid gas control technologies as providing the highest removal efficiencies relative to other technologies. Based on a review of energy, economic and environmental impacts, wet scrubbers are rejected as BACT for the Unit 3 facility. It is generally recognized that wet scrubbers may achieve slightly lower emissions of acid gases than SDA systems; however, their effectiveness in controlling trace metals and trace organic emissions as well as SDA systems is questionable. Test results have shown that wet scrubbers and SDA systems provide comparable reductions in emissions of HCl and HF and nearly equivalent reductions in SO₂ emissions (USEPA, 1988b and USEPA, 1989a). This is also confirmed in available test data from Units 1 and 2 at the LCERF. Whether wet scrubbers provide enhanced control of trace metals and trace organics is inconclusive due to the lack of data showing this relationship. The negative aspects of wet scrubbers with respect to SDA systems include:

- Potential higher ambient impacts due to lower plume buoyancy dispersion factor
- Increased requirement of makeup water over SDA systems
- Production of wastewater effluent requiring treatment prior to discharge
- Higher capital and operating costs associated with wet scrubbers
- Increased energy utilization
- Increased secondary pollutant generation
- It is a relatively undemonstrated control technology for modern municipal waste combustion facilities in the U.S.

Also, extensive test data is available demonstrating the effectiveness of SDA/FF systems for SO₂ and acid gas emissions as well as secondary pollutant (trace organics and trace metals) control. Thus, based on an analysis of energy, economic, and environmental factors and considering the negative aspects of wet scrubbers in comparison to SDA systems, BACT for the control of SO₂ and acid gases at the proposed Unit 3 is determined to be the SDA/FF option.

Additionally, in developing the NSPS for municipal waste combustion facilities, USEPA stated that the best demonstrated technology for reducing emissions of acid gases from large MWCs (i.e., greater than 250 tpd) is a SDA followed by a FF (USEPA, 1989b and USEPA, 1995d). The system proposed for Unit 3 is a SDA system, which is a post furnace injection technology followed by a FF baghouse. The SDA system introduces a finely atomized lime-based slurry into the flue gas stream causing turbulent reaction with SO₂ and acid gases as the slurry evaporates and dries, resulting in a dry product collected in the particulate control device. The SDA system will be designed to achieve SO₂ control levels of 29 ppmdv or 80% removal of uncontrolled emissions (geometric mean 24-hour block average), whichever is least stringent. The emission rates for SO₂ and acid gases are given in Section 3.

4.6 BACT REVIEW FOR NITROGEN OXIDES EMISSIONS

NO_x emissions are formed by two mechanisms during the combustion process. The first mechanism is the formation of NO_x by high temperature oxidation of atmospheric nitrogen, which is called thermal NO_x. The second mechanism is the formation of NO_x by the oxidation of fuel-bound nitrogen, also known as fuel NO_x. The combination of higher temperature combustion required in municipal solid waste combustion units to destroy organics and air toxics precursors (which tends to increase thermal NO_x generation and subsequent emission) and concern about the role of emitted NO_x in the formation of ozone and acid rain has caused increased attention on NO_x control.

4.6.1 FORMATION MECHANISMS

Nitrogen-based compounds are products of all conventional combustion processes. Nitric oxide (NO) is the predominant form of NO_x produced in MWCs along with lesser amounts of nitrogen dioxide (NO₂). However, once emitted, it is assured that NO converts to NO₂ in the atmosphere. The generation of NO_x from MSW combustion is primarily the result of the conversion of fuel-bound nitrogen (fuel NO_x), although some nitrogen in the combustion air (thermal NO_x) may also be converted to NO in the higher temperature regions (Davis, W.T., 2000). Fuel NO_x is formed when MSW containing nitrogen and its compounds is burned, and the nitrogen is oxidized in the process. Thermal NO_x formation is a result of the relatively high concentration of nitrogen in the ambient air combustion supply (ambient air contains approximately 79% nitrogen by volume). The introduction of ambient air (excess air) to the combustion zone, which is often at high enough temperatures to oxidize the nitrogen in the ambient air, results in thermal NO_x formation.

Thus, because of the abundance of available nitrogen present in combustion makeup air, thermal NO_x formation is primarily a function of temperature and excess air (oxygen availability). Fuel NO_x formation is strongly affected by the local oxygen concentration present in the flame and also by the mixing rate of fuel (MSW) and combustion air. Like thermal NO_x, formation of fuel NO_x is dominated by the local combustion conditions (specifically how and at what temperature combustion air and MSW are mixed).

4.6.2 SOURCE SEPARATION IMPACT ON NITROGEN OXIDES EMISSIONS

Removing the materials that are relatively high in nitrogen content is one possible way of lowering the mass emission rate of NO_x. However, as noted by CARB (1984), the percent reduction in NO_x emissions from such efforts is probably not significant. Based on CARB's compilation of available data, nitrogen typically comprises less than 1% (by weight) of the total waste stream (CARB, 1984).

The major nitrogen contributors and their approximate relative percent by weight for typical MSW composition are textiles (5.5%), food wastes (10.4%), yard wastes (15.4%), and, to a lesser degree, plastics (7.5%). The nitrogen content of these respective materials is estimated by CARB as 2.2%, 2.8%, 2.9%, and 1.0%. (CARB, 1984) The largest reduction in fuel nitrogen contents can thus be realized by separation of food wastes and yard wastes. Due to the putrescible nature of food waste, source separation is not a viable option for this material.

The Lee County Materials Separation Plan provides for both residential and commercial recycling of yard and horticultural wastes. Of the remaining solid waste constituents which significantly contribute to the MSW fuel nitrogen content, residential recycling of PET, HDPE, and other plastic consumer products containers is also provided by the Materials Separation Plan. No separation of textiles is planned at this time. Paper products, while containing less than 0.3% by weight of nitrogen, constitute a significant portion of any municipal solid waste stream. Curbside collection of residentially separated corrugated cardboard, kraft paper bags, telephone books, magazines, newspapers and mixed papers is provided by the Materials Separation Plan. Separation and collection of these materials by commercial businesses and institutions is done on a voluntary basis.

While certain materials separation efforts are considered in this document because of their potential to reduce air emissions, the amount of emissions reductions cannot be quantified. For this reason, materials separation activities are discussed in this BACT analysis; however, materials separation should not be imposed as BACT. There is no evidence to demonstrate that source separation of certain components by itself provides for consistent and measurable reductions of NO_x. Because it is not possible to quantify the effect of source separation, source separation does not qualify as a technology or clean fuel process.

4.6.3 AVAILABLE CONTROL TECHNOLOGIES

Emissions of NO_x can potentially be reduced at municipal waste combustion facilities by two methods: 1) minimizing the quantity of NO_x generated during combustion (combustion modification), and 2) reducing the quantity of NO_x in the flue gas stream (flue gas controls).

Table 4-2 is a summary based on available data of the NO_x control techniques that could potentially be used at municipal solid waste combustion facilities. The information in Table 4-2 also includes the status and the control efficiency of the three major NO_x reduction methods. Combustion modifications typically include staged combustion and low excess air (LEA). Other combustion modifications tested on MWCs with mixed or inconclusive results are gas reburning and flue gas recirculation (FGR). Flue gas controls include selective catalytic reduction (SCR), selective non-catalytic reduction (SNCR), wet flue gas denitrification (FGD_n), electron beam treatment (E-Beam) and innovative methods such as SCONOX®. Of these techniques, only combustion modifications, reburning with natural gas, SNCR, and SCR have been successfully demonstrated on municipal solid waste combustion facilities or show significant potential for effective NO_x control (USEPA, 1989c). Thus, detailed descriptions of NO_x controls will be limited to these technologies.

Combustion Modifications

Techniques available for NO_x control that fall within the combustion modification category include LEA, staged combustion, FGR and gas reburning. These technologies achieve NO_x emission reductions from MSW combustors by limiting the amount of thermal and fuel NO_x formed in the combustion process.

Low Excess Air (LEA) and Staged Combustion

LEA and staged combustion can be used separately or together. With LEA, less air is supplied to the combustor than normal, lowering the supply of oxygen available in the flame zone to react with nitrogen in the combustion air. With staged combustion, the amount of underfire (primary) air is reduced, generating a starved-air region. By creating a starved-air zone, strong reducing atmosphere is generated where part of the fuel-bound nitrogen is converted to ammonia (NH₃). Secondary air to complete combustion is added as overfire air. With proper control of overfire air, NH₃, NO_x, and O₂ react to form N₂ and water.

LEA and staged combustion together reduce NO_x emission due to a combination of several factors. First, a lack of available oxygen for NO_x formation in the fuel rich combustion stage results in off-stoichiometric firing. Second, the flame temperature is generally lower in the first stage than would be expected with single stage combustion at stoichiometric conditions. Third, the peak temperature in the second stage (air rich) is lower. By creating a slow combustion air and fuel (MSW) mixing process, a greater opportunity to convert fuel bound nitrogen to molecular nitrogen occurs rather than

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**TABLE 4-2
ALTERNATIVE CONTROL METHODS
FOR NITROGEN OXIDES**

Control Method	Control Efficiency	Status
Source Separation	Not Quantifiable	Effect on MWC emissions are not quantifiable.

Combustion Modification

Good Combustion Practices (GCP), including Low Excess Air (LEA) and Staged Combustion	30-60%	Effective but unknown side effects on combustion process and combustion related pollutants
Flue Gas Recirculation	10-25%	Somewhat effective, but the relatively moist flue gas from after the baghouse in combination with GCP may lead to increased emissions of CO and boiler problems.
Gas Reburning	Unknown	Not yet applied to MWCs in the U.S.

Flue Gas Controls

Selective Catalytic Reduction (SCR)	50-90% ^a	Has not been applied to MWCs in the U.S.
Selective Non-Catalytic Reduction (SNCR)	35-60%	Has been applied to MWCs in the U.S.
Wet Flue Gas Denitrification (FGD _n)	Unknown	Has not been applied to MWCs in the U.S.
Electron-Beam (E-Beam)	Unknown	Has not been applied to MWCs in the U.S.

^a Only limited short-term data is available.

allowing it to be converted to NO_x. LEA and staged combustion have been demonstrated to be an effective technique for reducing NO_x emissions in the design of modern MWCs, and is inherent in the design of the Martin combustion system.

It should be noted that the lower NO_x emissions can be partly attributable to a lower quantity of thermal and fuel NO_x resulting from lower flue gas temperatures. These conditions are known to lower NO_x emissions, but they can also be related to higher CO emissions and lower combustion efficiency. Should the technique be improperly applied, higher emissions of CO, hydrocarbons (HC), and other products of incomplete combustion (PIC) may result.

The formation of thermal NO_x is minimized in the Martin combustor by controlling the flame temperatures below 2,400°F (1316°C). The distribution of the combustion air is controlled with the Martin reverse reciprocating grate firing system and master combustion control system such that the available oxygen in the primary combustion zone is maintained at desired levels.

Approximately 60-70% of the combustion air is introduced in the primary combustion zone, below the grates. The remainder of the combustion air is provided by overfire air ports located above the grate to ensure complete oxidation of combustibles. The fuel-rich regions of the primary flame zone cool by radiation before the combustion process is completed with the remaining combustion air. Peak flame temperatures are reduced, thus reducing thermal NO_x formation, and fuel-rich combustion regions minimize oxidation of the fuel-bound nitrogen. The lengthening of the flame path via the use of overfire air also has the favorable effect of maintaining low temperatures and thus controlling thermal NO_x formation (USEPA, 1989c).

Flue Gas Recirculation (FGR)

In FGR, cooled flue gas (i.e., after the spray dryer baghouse) is mixed with combustion air, thereby reducing the oxygen content of the combustion air supply. The flame temperature is lowered and less oxygen is present in the flame zone, reducing thermal NO_x generation. At the Long Beach, CA, mass burn combustor, where FGR was used to supply 10% of the underfire air, reductions in NO_x emissions were observed, although available quantitative results are limited. However, due to operational problems, the FGR system at Long Beach has been removed. At the Kita facility in Tokyo, Japan, a Volund mass burn/refractory combustor, where FGR is used to supply 20% of the combustion air, NO_x reductions of 10-25% were reported (CARB, 1984). Little increase in NO_x reduction was observed with FGR supplying rates in excess of 20% of the combustion air.

FGR for NO_x control may increase emissions of other pollutants. Should the technique be improperly applied, higher emissions of CO, HC, and other products of incomplete combustion (PICs) may result. For example, if the excess air is decreased too much, visible emissions and higher CO concentrations may result. If too much flue gas is recirculated, the flame zone can become unstable, causing poor combustion and higher

CO emissions (USEPA, 1989c). Also, corrosion and slagging in the boiler may occur. Thus, given the potential problems FGR can introduce, most modern MWCs do not incorporate FGR. Moreover, FGR has not been used in combination with other technologies, such as SNCR in the U.S. MWCs.

Gas Reburning

Gas reburning is a NO_x control technique that overlaps combustion modification techniques. LEA is provided in the combustor, with recirculated flue gas introduced above the grate. Natural gas is added to this LEA zone to generate a fuel-rich zone. Air is supplied above the fuel-rich zone to complete combustion. This process is designed to reduce NO_x formation without increasing CO emissions.

The goal of gas reburning is to achieve up to 75% NO_x reduction when combined with LEA, staged combustion and FGR. To date, most of the available data for gas reburning are for applications on pulverized coal-fired boilers. Initial testing for municipal waste incinerators was conducted on a six tpd pilot-scale combustor. In the pilot-scale unit, NO_x emissions without gas reburning ranged from 190 to 260 ppm at 7% O₂. With gas reburning, the NO_x emissions were 110-125 ppm at 7% O₂, an average reduction of 50%. The maximum NO_x reduction measured was 60-70%. During these tests, 15% (heat input basis) natural gas, 15% FGR (for mixing the natural gas), and 30-40% secondary excess air were used. Neither CO nor hydrocarbon emissions increased with gas reburning (Abbasi, et al., 1989).

Additional tests with natural gas reburning were conducted at the Olmsted County (Minnesota) municipal waste combustion facility by a joint program with the Gas Research Institute (Abbasi, et al., 1991). The test data showed that the natural gas injection of 12% to 15% (heat input basis) and FGR of 6% to 8% resulted in NO_x reduction of 60% and CO reduction of 50%. Natural gas reburning also allowed a reduction of excess air from 80% to 40% which provided increased boiler efficiency. The test data also indicated that optimization of residence time in the combustor is important for simultaneous reduction of NO_x and CO. However, long-term operational data on natural gas reburning in MWCs is not available.

In general, natural gas reburning has not been utilized as a NO_x control technique in new MWCs primarily due to increased fuel costs and operational costs relative to less expensive, yet equally effective, NO_x reduction techniques. Natural gas reburning has primarily been applied to fossil fuel boilers as a retrofit NO_x control technique or for seasonal NO_x reductions, where needed.

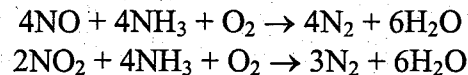
Flue Gas Controls

Flue gas controls can generally be placed into one of two categories: SCR and SNCR. Three additional technologies, flue gas denitrification (FGD_n), the electron-beam (E-Beam) process, and other catalytic methods such as SCONOX® have been tested or applied for NO_x control on industrial facilities and are discussed below. The following

discussion explains the technological aspects of each of these control methods and their associated environmental, energy and economic impacts.

Selective Catalytic Reduction (SCR)

SCR is an add-on control technology for NO_x removal. Ammonia (NH₃) is injected into the flue gas downstream of the boiler where it is mixed with the NO_x contained in the flue gas and passed through a catalyst bed. In the catalyst bed, NO_x is reduced to N₂ by reaction with NH₃. The overall reactions between NO_x and NH₃ are:



The reactions between NO_x and NH₃ occur at temperatures of 375-750°F (191-399°C), depending on the specific catalyst and the type and level of competing contaminants in the flue gas.

SCR has been tested and applied at coal, oil, and natural gas-fired facilities in the U.S. Reductions of NO_x emissions have ranged from 50-90% and have been measured at these facilities with varying NH₃ to NO_x molar ratios and varying operational temperatures. Currently there are no applications of SCR on municipal waste combustion facilities in the U.S. Therefore, no data exists regarding costing, achieved control efficiencies and longevity of systems applied to municipal waste combustors in this country. However, SCR systems have been applied and are operating on municipal waste combustion facilities in Europe and the Far East, and most recently in Canada.

Lee County attempted to obtain information from foreign facilities regarding continuous operation of the SCR units and their long-term emission reduction capabilities. An intensive search for information was initiated, with requests for information submitted to a number of catalyst manufacturers, catalyst system suppliers, individual facilities and government agencies. The focus of the information request was to obtain a list of MWCs employing SCR as well as obtain information on system operation relative to the following four questions:

- Operational history of the SCR units (installation date, life of unit, catalyst life expectancy, problems with unit, catalyst poisoning problems, etc.),
- Specific capital, installation, operating, and miscellaneous costs of SCR on waste incinerators,
- Maximum/minimum/average flue gas concentrations for 1-hour, 3-hours, 24-hours, and annual time periods for nitrogen oxides, sulfur dioxide, volatile organic compounds, and carbon monoxide; and
- Estimated system upset or downtime from SCR malfunction.

It was considered necessary to have this information in order to perform proper feasibility analyses as required by USEPA. A copy of the contact list of this data search is provided in Attachment C to this document. The only information received from this data search

was single performance test data for several European facilities and SCR system suppliers as well as one Japanese SCR system supplier with most of the test data collected at startup of the unit. Mitsubishi Heavy Industries, Ltd. (MHI) provided a letter to Covanta Projects, Inc. that included initial performance test data from two facilities collected in 1987. More recent data or a description of system performance since 1987 was not provided. No responses were received that adequately addressed the four questions noted above. This limited data set shows achievable NO_x reductions ranging from 62.5% to 85% during specific tests with no indication of system ability to continuously achieve high reductions in the long-term.

Early testing of SCR on refuse-fired boilers in Japan revealed difficulties, primarily due to catalyst fouling by particulates and condensable. In applications where the catalyst was upstream of the particulate removal device, the relatively high particulate grain and/or condensable loading of the flue gas fouled the catalyst, rendering the bed ineffective in NO₂ removal. Particulates eroded the catalyst and substrate material, and poisoned or blinded the catalyst (ENSR, 1991).

According to USEPA, earlier SCR problems such as catalyst poisoning by SO₂, plugging, ammonium bisulfate deposition, production of SO₃ and erosion of the catalyst had generally been overcome on other types of combustion units (ENSR, 1991). However, in scenarios where conventional SCR catalysts (which use a base metal with titanium oxide) were placed at the economizer outlet (to take advantage of the optimum temperature range of 530°F-800°F [277-427 C]), attack of catalyst by hydrochloric acid (HCl) was a persistent problem. Research efforts continue on developing high temperature catalysts resistant to HCl attack, metals poisoning, and high particulate loadings. MHI, which has supplied the catalyst for several Japanese facilities, considers placement of a SCR catalyst upstream of the particulate removal device in municipal solid waste combustion applications as not practical because of potential fouling. Even though MHI indicated that catalysts are available with wider pitches to handle higher particulate loadings, MHI suspects that particulate fouling would still occur (ENSR, 1991). This fouling has been confirmed with additional testing. Attempts to place SCR catalyst as a "hot-side" unit before pollution control in MWCs has continued to show rapid de-activation of the catalyst. In a discussion with a representative of Babcock-Borsig Power, the primary problem that caused catalyst de-activation was lead and other trace metals in the flue gases (Licata, T., 2001). European facilities have overcome this catalyst de-activation by placing the SCR system downstream of pollution control equipment.

Acid gas attack, metals poisoning and particulate fouling may be avoided by placing the catalyst downstream of the pollution control equipment, allowing the SCR unit to treat flue gases free of these contaminants. This is undesirable, however, for two reasons: (1) conventional catalysts do not perform well at the lower temperatures required for effective removal of acid gas and organic constituents and (2) flue gas reheat would be needed to raise the flue gas temperatures to the optimum range, the latter imposing severe energy penalties, while adding additional pollutant emissions to the flue gas. In order to reduce flue gas reheat, catalyst manufacturers have been developing low temperature

SCR catalysts. However, the ability of the catalyst to operate at low temperatures is often dependent on the quantity of competing contaminants in the flue gas (Hober, M., 2001a).

Table 4-3 provides a sample list of European municipal waste combustion facilities utilizing SCR. Additional facility listings are provided in Attachment D. As can be seen, the SCR units have often been placed at the end of relatively complex, multi-stage air pollution control trains. As stated previously, many of these facilities were constructed, and the air pollution control equipment installed, with little consideration to cost and thermal efficiency of the plant. The result of this has been a shift in European design of new facilities with fewer control stages (Schüttenhelm, et al., 2000).

Table 4-4 provides NO_x outlet emissions information received from a number of European facilities. The data provided consisted only of outlet emissions data. As shown, control efficiencies were not reported as well as averaging times and emissions compliance testing procedures. Although relatively low outlet NO_x emissions are reported, it is difficult to determine the true applicability of these levels relative to the requirement to guarantee a continuous emission level tied to a short-term averaging period as required of U.S. MWCs. This problem was highlighted by USEPA during the development of the NSPS for MWCs in that the agency did not utilize European MWC data in the establishment of NO_x emission limits (59 FR 48198-48228). The reason for this is that substantial error can be introduced in comparing data collected utilizing test methods and procedures different than those required by U.S. regulatory agencies. Thus, the emissions data presented in Table 4-4 must be viewed as indicators, for these do not provide reasonable assurance of long-term, consistently achievable emission levels that are directly comparative to the U.S. facilities due to differences in test methods.

The most recent identified application of a SCR system applied to a MWC is a system installed at a modified MWC in the Peel region of Ontario, Canada. The KMS Peel facility utilizes five Consumat® two-stage MWC units, each rated at 100 tons per day. The facility experienced design and initial construction problems but commenced operation in the fall of 2001. SCR was chosen as the preferred NO_x control technology because it was determined that application of SNCR was technically infeasible with the Consumat® combustors due to their wide temperature variations (Heath, S., 2002). The NO_x standard established for the facility is 110 ppm_{dv} at 11% O₂ (154 ppm_{dv} when corrected to 7% O₂) averaged over 24 hours. Three days of preliminary testing of NO_x emissions from facility continuous emissions monitors (CEMs) showed 24-hour average values of 90.0, 100 and 95.4 ppm_{dv} at 11% O₂ (127.6, 140.4 and 134 ppm_{dv} at 7% O₂ respectively). With projected inlet NO_x concentrations of 270 ppm_{dv} at 11% O₂ (380 ppm_{dv} at 7% O₂), the calculated NO_x control efficiency across the SCR unit ranged from 63-66% for this data set. The proposed Unit 3 NO_x emission limit is 180 ppm_{dv} at 7% O₂ averaged over a 24-hour period for the first full-year of operation and 150 ppm_{dv} at 7% O₂ averaged over a 24-hour period thereafter, based on application of SNCR. Thus, the Peel facility has a higher allowable NO_x emission limit with SCR than the proposed Unit 3 NO_x limit with SNCR.

TABLE 4-3
SAMPLE LIST OF EUROPEAN
MUNICIPAL WASTE COMBUSTION FACILITIES
UTILIZING SCR AND THEIR AIR POLLUTION
CONTROL EQUIPMENT CONFIGURATION^{ab}

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Municipal Waste Combustion Facility Name	Location	Air Pollution Control Equipment Configuration
AVR Rotterdam	Rotterdam City, The Netherlands	ESP, Two Scrubbers, Fixed Carbon Filter, SCR
SITA ReEnergy	Roosendaal, The Netherlands	ESP, Gas Suspension Absorber (lime injection), ACI, FF, SCR
COMMUNAUTE URBAINE DE LILLE	Lille, France	SDA With Rotary Atomizer, FF, Wet Scrubber, SCR
U.V.E. SMEDAR (SICDOM)	Rouen, France	ESP, SDA With Rotary Atomizer, FF, SCR
RMHKW Boblingen	Boblingen, Germany	FF, 2-Stage HCl Scrubber, 1- Stage SO ₂ Scrubber, ACR, SCR
MVA Koln	Koln, Germany	Spray Dryer, FF, 1-Stage Prescrubber, 1-Stage SO ₂ Scrubber, SCR, ACR
AEZ Kreis Wesel	Wesel, Germany	Spray Dryer, ESP, 1-Stage Prescrubber, 1-Stage SO ₂ Scrubber, SCR, ACR
GML	Ludwigshafen, Germany	SDA With Diffusers, ESP, WS, SCR
AVI TWENTE b.v.	Twente, The Netherlands	ESP, SDA With Rotary Atomizer, ESP, WS, Filsorption, SCR

Note: ESP = Electrostatic Precipitator, SCR = Selective Catalytic Reduction
 ACI = Activated Carbon Injection, ACR= Activated Carbon Reactor
 FF = Fabric Filter Baghouse, SDA = Spray Dry Absorber
 WS = Wet Scrubber

^a Sources: Fleck, E., 2001; Heath, S., 2001c; Heath, S., 2001e; Licata, T., 2001

^b See Attachment D of this PSD application for a more complete listing of Municipal Waste Combustion Facilities

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TABLE 4-4
EUROPEAN MUNICIPAL WASTE COMBUSTION FACILITY
EMISSIONS INFORMATION RECEIVED DURING
THE BACT PREPARATION PROCESS^a

Municipal Waste Combustion Facility (Location)	NO_x Emissions (ppmdv)^b	Averaging Time of Reported Emissions	Testing Procedures Information
AVR (Rotterdam, The Netherlands)	37	24-hour Avg. ^c	Not Specified
SITA ReEnergy (Formerly Heeren) (Roosendaal, The Netherlands) ^d	26-31	Three 1-hour tests	Not Specified
SITA ReEnergy (Roosendaal, The Netherlands) ^e	39, 35, 42 ^f	Not Specified	Not Specified
German Municipal Waste Combustion Facilities	19-37	Not Specified	Not Specified
MHKW (Kassel, Germany)	52	Not Specified	Not Specified
Gavi Wijster (The Netherlands)	52	Not Specified	Not Specified
Renova (Gothenburg, Sweden)	45-52	Not Specified	Not Specified
IVAGO (Ghent, Belgium)	37	Not Specified	Not Specified
(Hagen, Germany)	90	Not Specified	Not Specified
NV Huisvuilcentrale N-H (Alkmaar, The Netherlands)	41	Not Specified	Not Specified

^a Sources: CRI Catalyst Co. UK, Ltd., 1997; Hartenstein, H. and A. Licata, 1996; Heath, S., 2001a; Heath, S., 2001b; Heath, S., 2001c; Heath, S., 2001d; Heath, S., 2001e; Hober, M., 2001a.

^b Reported NO_x emissions are corrected to 7% O₂ at 20C and 1 Atmosphere.

^c Average based on reported 1-hour average values over a two-week period.

^d Reference: CRI Catalyst Co. UK Ltd., 1997.

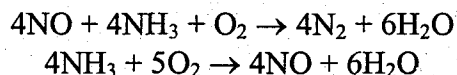
^e Reference: Heath, S., 2001c.

^f First value from year 1998, second value from year 1999, third value from year 2000 (No other information provided).

Selective Non-Catalytic Reduction (SNCR)

SNCR involves the intimate contact of injected ammonia (NH₃), urea [CO(NH₂)₂] and/or other nitrogen-bearing compounds and NO in the flue gas to control NO_x emissions by reducing NO_x to N₂ without the use of catalysts. These techniques have been most commonly applied utilizing the injection of anhydrous or aqueous ammonia. A urea injection technique which has been further developed by Fuel-Tech, Inc. (formerly Nalco Fuel-Tech) of Stamford, Connecticut has also been applied to control combustion NO_x emissions. To date, both ammonia and urea processes have been demonstrated on municipal waste combustion facilities in the U.S. As a result, discussion of SNCR techniques focuses on ammonia injection and urea injection, as these are the most widely utilized technologies.

With the ammonia injection process, either aqueous or anhydrous ammonia is injected into the upper furnace area of the combustor. Ammonia and NO react according to the following competing reactions:



At 1600-1800°F (871-982C), the first reaction dominates and NO is reduced to N₂. Above 2000°F (1093C), the second reaction dominates and NH₃ is oxidized to NO. Below 1600°F (871C) both reactions proceed slowly and NH₃ remains unreacted. NO_x reductions varying from 35-60% can be expected for municipal solid waste combustion facilities.

Furnace temperatures in the upper furnace can vary rapidly due to the variability in combustion characteristics of municipal solid waste. The sensitivity of ammonia-based SNCR reactions to temperature as well as the difficulty in handling and storing anhydrous ammonia (a hazardous substance) are two of the primary reasons behind development of the urea-based process. The only difference between these reagents is the physical form of the reagent. Anhydrous ammonia requires vaporizers to maintain the desired gaseous phase and pressure. Aqueous ammonia is stored in a liquid form with an approximate 20-29 weight percent of ammonia and the remainder being water. Storage and usage of aqueous ammonia instead of anhydrous ammonia has been adopted at numerous facilities to reduce the regulatory burden related to anhydrous ammonia.

Ammonia based SNCR has been applied to numerous municipal waste combustion facilities in the U.S. Significant operational data exists demonstrating the effectiveness of SNCR in reducing NO_x emissions from MWCs. The existing LCERF Units 1 and 2 utilize ammonia based SNCR and have consistently achieved permitted NO_x emission levels throughout the operational history of the units.

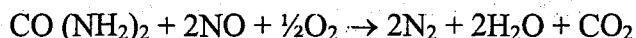
The composition of the gas stream also determines the effectiveness of the SNCR process. Not only are the NO_x levels important, but the levels of CO and O₂ (at NH₃ injection points) also affect the process chemistry. High levels of O₂, above 6 percent,

generally aid in NO_x reduction. The presence of CO above approximately 100 ppm adversely effects SNCR chemistry. The presence of CO in the combustion gases causes a shift and reduction in the effective NO_x/NH₃ temperature reaction range (USEPA, 1989c).

Ammonia emissions may result when the NH₃ is injected outside the desired temperature window at a higher than normal rate. Ammonium chloride can sometimes form due to flue gas chemistry and/or atmospheric conditions. However, there are no known absolute relationships for this process. At the Stanislaus County and Long Beach, CA facilities, a detached ammonium chloride plume has been observed downwind of the stack at times when SNCR is used. (ENSR, 1991) Continued application and experience with SNCR has helped to reduce the frequency of visible plumes.

Corrosion of the boiler tubes by corrosive ammonia salts which are formed from unreacted ammonia and SO₂ or HCl has been hypothesized to be a potential problem with SNCR. However, boiler corrosion problems attributable to ammonia salts have not been identified as a major problem at facilities utilizing SNCR.

The NO_xOUT Process, a urea based SNCR process developed under EPRI sponsorship, is licensed by Fuel-Tech, Inc. of Stamford, Connecticut. It is similar to the ammonia based SNCR process except that urea is utilized as the reagent which disassociates to ammonia in the higher temperature regions of the MWC, and reacts with NO_x producing nitrogen, carbon dioxide and water vapor. The reaction equation is:



Urea is stored typically as a 50% by weight aqueous solution. From storage, the urea is further diluted with water to a desired concentration and mixed in the flue gas at the desired urea-to-NO_x ratio. For MWCs, this concentration usually is about 4-10% urea at the injectors.

The operating range of the NO_xOUT process is 1600-2000°F (871-1093C), similar if not the same as the ammonia based SNCR process. However, Fuel-Tech has tested compounds that can be added to the urea to expand the useful temperature range of the process.

At present, Fuel-Tech sells the additive chemicals to urea suppliers. These suppliers dissolve the urea in water, add the specialty chemicals and sell/haul the blend to the end-user. Many facilities purchase urea directly from chemical suppliers without Fuel-Tech proprietary additives.

The Fuel-Tech NO_xOUT process has been installed and demonstrated on a number of utility and industrial boilers in North America and Europe, as well as several MWCs. The NO_x reductions achieved at U.S. facilities have ranged similarly to the ammonia based SNCR process. The NO_xOUT process has also been used in full-scale European

municipal waste combustion facilities at Frankfurt, Germany, and Switzerland (CDM, 1991).

Lee County is proposing to install SNCR utilizing direct injection of aqueous ammonia at the Unit 3 combustor to meet an outlet emission level of 180 ppm_{dv} corrected to 7% O₂ averaged over a 24-hour period for the first year and 150 ppm_{dv} corrected to 7% O₂ averaged over a 24-hour basis thereafter.

Wet Flue Gas Denitrification (FGD_n)

FGD_n systems may be divided into at least four major process systems: 1) oxidation-absorption-reduction, 2) oxidation-absorption, 3) absorption-reduction, 4) absorption-oxidation. Of these four types, oxidation-absorption-reduction is somewhat more advanced because it is a derivative of already established FGD systems. It is based on the principle that after the NO_x is converted from the relatively insoluble NO form to the more soluble NO₂ form, it can be reduced to N₂ by consuming some of the SO₂ already assimilated by the process. Conversion from NO to NO₂ is accomplished by spraying an oxidant such as ozone into the flue gas stream ahead of the wet scrubbers. It is also possible to add oxidizing agents to the SO₂ absorbent circulating with the scrubber fluid. In this case, both NO_x and SO₂ can be stripped simultaneously from the flue gases (BEI, 1986).

An FGD system modified in this manner can also accommodate changes in inlet flue gas conditions without much of a loss in removal efficiency. An advantage of this type of system is that high removal efficiencies can potentially be achieved at the same time for both NO_x and SO₂ removal. On the negative side, wet scrubbers have a liquid effluent which must be treated. In addition, the high cost of waste treatment and oxidation chemicals consumption are also cited as disadvantages.

A wet scrubber system utilizing oxidation-absorption is characterized by the addition of an oxidizer, such as sodium chlorite (NaClO₂) to the flue gas to oxidize NO to NO₂, which is then removed by a sodium-based wet scrubber. This is normally accomplished in a two-stage system with the addition of NaClO₂ to an upstream venturi (HCl) scrubber. The addition of NaClO₂ adjusts the pH to 3-4 which oxidizes some NO to NO₂. The NO₂ is then removed in the first scrubber as well as in the following second scrubber along with SO₂ (USEPA, 1988b).

Another approach used to deal with the limited reactivity of flue gas NO and its poor absorption in typical wet scrubber operations is absorption/reduction. This method of NO removal was applied a municipal solid waste combustion in Bremerhaven, West Germany, 1987. In this system, ferrous ions (Fe²⁺) tie up NO in the liquid phase by the formation of ethylene diamine tetraacetic acid (EDTA) complexes. These complexes, in turn, react with HSO₃⁻ and SO₃²⁻ ions (from SO₂ absorption) leaving N₂ and sulfate (SO₄²⁻) as reaction products (USEPA, 1988b). This system has not been applied to another facility in Europe as it was found that operation of the systems and chemical usage were cost-prohibitive relative to lesser expensive, more effective technologies.

Absorption-oxidation processes are not as developed as the other previously described wet NO_x control systems. Results from pilot-scale facilities indicate high NO_x removal efficiencies are achievable, but suggest that the system faces undesirable operational problems (CARB, 1984).

Supplier information was researched from several corporations specializing in pollution control technology with specific experience with wet FGD_n systems. Tri-Mer Corporation attests to having approximately 50 installations currently operating throughout the U.S. The Tri-Mer TRI-NO_x technology is proprietary but appears to be a type of absorption-reduction system with oxidation steps, if necessary. Tri-Mer's technology has not been applied to flue gas from a municipal solid waste combustion facility. Tri-Mer Corporation has specialized in controlling emissions from the chemical and metal finishing industries and normally designs systems to handle flue gas flow rates of between 20 and 20,000 scfm. These flow rates are at best an order of magnitude lower than the flue gas flow rate of Unit 3. Also, the industrial flue gases described normally contains substantially higher concentrations of NO_x than is found in the flue gas of municipal waste combustion facilities.

Wet FGD_n, though not technically infeasible, cannot be considered BACT for NO_x emissions for the proposed LCERF Unit 3 MWC. A summary of the reasons for this is as follows:

- The technology has not yet been demonstrated on modern municipal solid waste combustion facilities in the U.S.
- Wet FGD_n systems produce a liquid effluent that is difficult and expensive to treat.
- Other trace contaminants in the flue gases of MWCs may inhibit the NO_x reduction reactions taking place in the scrubber.
- A reasonable estimate of the cost to install and operate such a system is presently unattainable as these systems are typically applied to lower flow rate, higher NO_x concentrated flue gases. Based on systems installed for different source categories, the costs appear prohibitively high.
- Wet FGD_n systems produce additional environmental impacts by producing a liquid effluent that is in itself a pollutant, and by secondary pollutant production if combustion is needed for flue gas reheat.

Electron Beam

Another innovative technology for NO_x control, which has been demonstrated in other applications and which has potential for success in NO_x control from refuse-burning, is the Electron Beam (E-Beam) process. The E-Beam reacts NH₃ or lime, with NO_x and SO₂ in the presence of a high-intensity E-Beam, emitted across the flue gas by an electron gun. The E-Beam provides the necessary activation energy for the NO_x reaction which takes place in a steel vessel with a concrete shell for radiation shielding. The higher flue

gas temperatures, as required for typical SCR and Thermal DeNOx applications, are not required for this process.

The E-Beam may be fired upstream or downstream of the FF, though an additional NOx removal reactor such as a wet scrubber (followed by flue gas reheat) would be required for the downstream applications. Upstream applications proceed as follows: an open spray absorber, serving as a prescrubber, humidifies the flue gas and removes most of the HCl. The ammonium sulfate, chloride and nitrate by-products which are formed in the prescrubber and E-Beam reactor are removed in the FF.

Early pilot tests on a Japanese steel plant sintering unit using the E-Beam process with ammonia were sufficiently successful to encourage further development. Process demonstration units were developed and operated, but not in refuse-burning applications. Most current applications of E-Beam technology are for control of VOCs and other organics in low-flow flue gas situations.

The E-Beam process, though tested on combustion facilities, has not been tested or demonstrated on modern MWC units. A search of potential providers of E-Beam systems did not identify manufacturers marketing systems for NOx removal on large-scale MWCs. Thus, no cost or operational data could be obtained. It is expected that costs for this system would be substantially higher than other proven NOx control technologies in the marketplace. In addition, due to a lack of E-Beam experience and test data on large scale MWCs additional reaction species are unknown. Thus, other potentially negative environmental impacts are therefore possible.

The E-Beam process, though not technically infeasible, is an undemonstrated technology for NOx control on large scale, modern MWCs that is not expected to remove NOx as efficiently as either SCR or SNCR. This technology cannot be considered BACT and will not be evaluated further.

Innovative NOx Control Methods

Emerichem, LLC (formerly Goalline Environmental Technologies) markets the SCONOX® pollution control technology. SCONOX® is a catalytic control method for NOx that does not utilize ammonia (or urea) as a reagent. SCONOX® has been applied to clean-fuel fired combustion equipment, such as natural gas-fired boilers and turbines, and has demonstrated high NOx removal efficiencies. SCONOX® has not been tested or applied to a large-scale MWC for NOx control and is not currently marketed in this application. Furthermore, a representative of Emerichem stated that the company would decline from offering to provide SCONOX® in this application due to the potential for catalyst fouling and deactivation from trace materials in the flue gases. (Hober, M., 2002a) Hence, this innovative technology must be considered technically infeasible at this time for application to Unit 3.

4.6.4 RANKING OF ALTERNATIVE CONTROL TECHNOLOGIES

Due to technical problems and system non-availability associated with wet FGDn, the E-Beam process, and the SCONOX® process, these technologies will not be evaluated further. Relative to NOx control, the "top" control method to be evaluated is SCR with a stack emission limit of 100 ppm NOx. SNCR with a stack emission limit of 150 ppm NOx is considered the second most effective option and will be evaluated as the "base case" relative to SCR.

4.6.5 ENVIRONMENTAL IMPACT

Neither the SCR, nor SNCR systems produce liquid or solid wastes during continuous operation of the NOx reduction process. Lee County is proposing to utilize aqueous ammonia for the Unit 3 SNCR system. There is a risk associated with the release of aqueous ammonia during shipping, handling, storage, or catastrophic failure of the ammonia storage tank(s). However, use of aqueous ammonia avoids the storage issues associated with anhydrous ammonia while providing the same process capabilities. An environmental concern with any ammonia-based SNCR and SCR process is the ammonia slip produced, which may also result in visible emissions. The presence of ammonia in the flue gases allows the possibility of a visible plume when utilizing either SCR or SNCR.

Additional secondary environmental impacts are expected from the SCR system due to fossil fuel firing for flue gas reheat. Flue gas reheat will not be necessary when utilizing SNCR. The SCR technology will create catalyst waste over time that, if not capable of regeneration, will most likely need to be disposed as a hazardous waste.

4.6.6 ECONOMIC IMPACT

A determination of economic impacts of various control technology options, as previously described, involves an assessment of capital equipment costs, system installation and startup costs and annual operating costs. This is typically derived through literature data on similar applications of the technology to other categorically similar facilities. No U.S. municipal waste combustion facility currently operates with SCR for NOx control. Thus, no capital equipment cost data exists relative to SCR application to a U.S. municipal solid waste combustion facility. Efforts to obtain cost and other information from European and Asian facilities did not yield information useful in development of a capital equipment cost estimate for an economic impact analysis. Significant literature data exists regarding application of SCR to utility boilers and gas-fired turbines. However, the bulk of this information applies to "hot-side" SCR systems with relatively consistent flue gas makeup from fossil fuel combustion. Suppliers of catalysts and catalyst systems to the municipal solid waste industry informed Lee County that the only SCR systems that could be made available are "cold-side" units due to potential catalyst poisons in the flue gas from municipal solid waste combustion. Cold-side SCR units are substantially cost-disadvantageous relative to hot-side units due to the need for flue gas reheat and the fuel costs involved.

Another method of developing a capital equipment cost estimate for an economic impact analysis, in lieu of more applicable data, is to utilize standardized methods presented in the USEPA Office of Air Quality Planning and Standards (OAQPS) Air Pollution Control Costs Manual. Until only recently, this manual did not contain a costing methodology for SCR systems. The most recent (sixth) edition, published in January of 2002 (and revised in April 2002) contained a draft procedure for developing costs for a hot-side SCR system on a utility boiler. As stated on page 2-41 of the procedure "The costs for the tail-end arrangement [cold-side SCR], however, cannot be estimated from this report because they are significantly higher than the high-dust [hot-side SCR] systems due to flue gas reheating requirements." (USEPA, 2002a) As the procedure is not applicable to a cold-side tail-end SCR application, it was decided not to utilize the recent OAQPS procedure for the development of a capital cost estimate for SCR.

In order to prepare the economic impact analysis, budgetary quotes to provide a tail-end SCR system for Unit 3 were solicited from a number of SCR catalyst and catalyst system suppliers including:

- Siemens
- KWH
- Cormetech
- Mitsubishi Heavy Industries
- Babcock Borsig
- Foster Wheeler
- Mobotec
- Alstom Power
- CRI Catalyst Company
- Haldor Topsoe A/S

Four budgetary quotes were received, one each from Babcock-Borsig Power and SEGHERs and two from Haldor Topsoe A/S. Copies of these budgetary estimates, and subsequent correspondence, are contained in Attachment E. Each budgetary estimate provided a capital equipment cost. However, only Babcock-Borsig provided a budgetary installation cost. Significant disparity exists between the three budgetary estimates provided as they were not consistent relative to systems provided and guaranteed NOx reduction levels. Babcock-Borsig estimated that their costs would be within 10% of actual costs based on over 34 installations of SCR units to the municipal solid waste industry. Facility listings provided by these system suppliers were included in Attachment D.

In a personal communication with a representative of Haldor Topsoe, Inc., it was conceded that their estimate could be 25-30% low relative to actual costs. Upon request for references to the application of a Haldor Topsoe catalyst system to a municipal waste combustor, Haldor Topsoe has managed to provide one reference to a municipal solid waste combustion facility in Italy. Additional information about the facility regarding achieved outlet concentrations of NOx, operational history and installation and

operational costs were not made available by Haldor Topsoe. Another facility identified as a MSW combustion facility in Spain is actually a liquid waste incinerator for a fine chemicals factory. One problem with the Haldor Topsoe provided system that was communicated by the facility in Spain is a particulate settling problem that requires shutdown and cleaning of the catalyst every 300 hours of operation. As noted, Haldor Topsoe's estimate was the least complete and contained only one reference. Haldor Topsoe is primarily a catalyst supplier that does not specialize in supplying a total control system. Further, they provided two quotes, one with outlet NOx emissions as 100 ppm dv and one at 150 ppm dv. The more stringent control option, 100 ppm dv outlet NOx, was quoted at a lower price than the 150 ppm dv outlet (see Attachment E). Therefore, a high degree of uncertainty exists relative to the accuracy of the Haldor Topsoe quote versus the other two suppliers. Consequently, we have only used the Babcock-Borsig and Seghers cost estimates in the economic impact analysis.

Table 4-5 presents a comparison of the budgetary estimates provided by the three suppliers. As can be seen, the most expensive was the Babcock-Borsig estimate and it was the most inclusive. The Babcock-Borsig estimate also included the longest catalyst life, lowest ammonia slip, and more ancillary systems and components than the other two estimates. Thus, it is expected that actual costs from each supplier would be more similar with consistency in systems and components included in the budgetary estimates.

With capital equipment budgetary estimates provided by catalyst and SCR system suppliers, estimated installation, startup and annual operating costs were derived using typical OAQPS cost estimating factors (USEPA, 2002a). To estimate economic impacts of a particular control option, the capital equipment, installation and startup costs are summed and amortized over an assumed equipment lifetime. The annual costs resulting from the amortization is summed with annual operating costs for total annual cost of the control technology. This total annual cost, when divided by the tons of pollutant (NOx) removed by the control device, defines the economic impact on a dollars per ton of NOx removed basis.

Attachment F contains several evaluations of economic impacts of a tail-end SCR system based on the three budgetary estimates. Each budgetary quote is evaluated for the following five amortization periods:

- 7% interest, 10 years
- 7% interest, 15 years
- 7% interest, 20 years
- 10% interest, 10 years
- 10% interest, 15 years

The multiple evaluations were performed due to the inconsistency of regulatory guidance regarding the proper amortization period and interest rate for perspective control options.

Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

TABLE 4-5
COMPARISON OF COST ITEMS IN SCR BUDGETARY
ESTIMATES RECEIVED DURING BACT PREPARATION

Line Item ^a	Babcock Borsig	SEGHERs	Haldor Topsoe
Estimated Material Costs	US\$ 6,300,000	US\$ 8,000,000	EUR\$ 1,450,000
Ammonia Slip (ppmdv @ 7% O ₂)	5	Not Specified	<10
SCR Inlet Duct	Included	Included	Not Included
SCR System Bypass Duct	Included	Not Specified	Not Included
SCR Outlet Duct	Included	Included	Not Included
Heat Exchanger	Gas to Gas	Not Specified	Gas to Gas
Bypass and Isolation Dampers	Included	Not Specified	Not Included
Flue Gas Preheater	Steam/Gas	Gas	Oil/Gas
Reactor Casing and Internals	Included	Included	Included
Catalyst (Initial Loading)	Included	Included	One Charge
Catalyst Life	24,000 Hours	2 Years	16,000 Hours
Foundation Information	Included	Not Specified	Not Included
Structural Steel (Stairs, Platforms, Ladders, etc.)	Included	Included	Not Included
Catalyst Handling System (Hoist)	Included	Not Specified	Not Included
Solid Modeling for Flue Gas Flow Analysis	Included	Not Specified	Not Included
Aqueous NH ₃ Storage Systems	2 Storage Tanks	Included	Not Included
NH ₃ Delivery System to Inlet	Included	Not Specified	Included
Control System	Included	Included	Included
Instruments for Reactor Control	Included	Included	Included
Operator/Maintenance Training	Included	Not Specified	Not Included
Ammonia Leak Detectors	Included	Not Specified	Not Included
Boiler to Heat Exchanger Duct	Not Included	Not Specified	Not Included
Upgrade of Existing Equipment	Not Included	Not Included	Not Included
Fire Protection Equipment	Not Included	Not Specified	Not Included
Safety Equipment	Not Included	Not Specified	Not Included
SCR Building/Enclosure	Not Included	Not Specified	Not Included
Wind Load Design for Structural Steel	Not Included	Not Specified	Not Specified
Startup, Commissioning, Testing	Included	Not Specified	Not Included

^a Note: Items not specified in the budgetary estimate are assumed to be not included in the price provided.

TABLE 4-5
COMPARISON OF COST ITEMS IN SCR BUDGETARY
ESTIMATES RECEIVED DURING BACT PREPARATION
(CONCLUDED)

Line Item^a	Babcock Borsig	SEGHERs	Haldor Topsoe
Estimated Construction Costs	US\$ 5,675,000	Not Specified ^b	Not Specified ^c
Erection Labor and Equipment for Installation of Proposed Equipment	Included	Included	Not Included
Foundations and Civil Work	Included	Included	Not Included
Electrical Equipment (Switchgear, MCCs, Wire, etc.)	Included	Included	Not Included
Modification to Existing Structures	Not Included	Not Included	Not Included
Relocation of Overhead and Underground Utilities	Not Included	Not Specified	Not Included
Roads and Civil Betterments	Not Included	Not Specified	Not Included
System Enclosures/Buildings	Not Included	Not Included	Not Included
Hazardous Waste Material Abatement	Not Included	Not Specified	Not Included
Piping, etc.	Included	Included	Not Specified
Painting	Not Specified	Included	Not Specified
Insulation	Not Specified	Included	Not Specified

^a Note: Items not specified in the budgetary estimate are assumed to be not included in the price provided.

^b SEGHERs provided a cost of US\$ 8,000,000 for 'Turn Key Capital Cost for SCR'.

^c Estimated Construction Costs are not specified in the Budgetary Estimate provided by Haldor Topsoe. In telephone conversations between Richard Newland (Haldor Topsoe) and Michael Hober and Scott Heath (RTP Environmental Associates, Inc.) (Hober, M., 2002b) construction costs are estimated at a factor of 2.5 times provided material capital costs.

In the USEPA Air Pollution Control Cost Manual, it is stated that "the interest rate employed in this manual differs from that used in non-governmental financial analyses. It represents a social interest rate established by the Office of Management and Budget (OMB) for comparison to public policy issues." (USEPA, 2002a) Although, in the past, OMB has required the use of a 10% interest rate, it is stated in the recent OAQPS update that the OMB has revised this rate to seven percent (USEPA, 2002a). USEPA goes on to state that "However, the social rate of interest is probably not appropriate for industry. When choosing between alternative air pollution control devices, the industrial planner must not only take into consideration the costs of each device, they must also understand how the cost of each fits into the financial structure of their business". (USEPA, 2002a) In this case, it is assumed that USEPA identifies industry as subject to competitive pressures. This is exemplified within the OAQPS cost manual itself in that example problems presented in costing procedures for equipment typical to industry, rather than utility, employ higher interest rates and shorter amortization periods (i.e., thermal incinerators and carbon absorbers at 10 years, 7% versus fabric filters at 20 years, 7%). In the USEPA Alternative Control Techniques Document for Industrial/Commercial/Institutional (ICI) Boilers (USEPA, 1994), USEPA amortizes NOx control costs utilizing a 10% interest rate over 10 years. In the USEPA document on the NSPS Subpart Da (1997a), USEPA amortizes NOx control costs for utility boilers utilizing a 7% interest rate over 20 years. One can conclude that USEPA has identified that shorter amortization periods at higher interest rates are necessary when dealing with industrial applications of air pollution control. This is reinforced in the fact that the Internal Revenue Service requires companies to recoup capital investments over eight years. Regardless of the examples provided by USEPA, it is important to note that the agency does not endorse the amortization periods and interest rates provided in example calculations in their guidance documents, especially in the case of industrial applications of pollution control. At all times it is stated that the example calculation uses an "assumed" interest rate and amortization period. USEPA recognizes that the determination of interest rate and amortization period is best left to the industrial applicant to base these cost criteria on "the financial structure of their business" (USEPA, 2002a).

Relative to Unit 3, it was considered that the suggested amortization period and interest rate in the ICI Boiler ACT Document (10% over 10 years) is more representative than that assumed relative to substantially larger utility boilers. However, to address FDEP concerns related to this issue, multiple amortization periods at various interest rates were used to provide a range of economic impacts that are expected to bind the upper and lower levels for the applicable control devices. Economic impact evaluations were developed for the two budgetary estimates. In additional evaluation was done relative to the Babcock-Borsig estimate, which provided the option to use steam for flue gas reheat instead of fossil fuel.

Thus, costs to achieve an outlet NOx emission of 100 ppm_{dv} corrected to 7% O₂ utilizing SCR ranged from \$8,388 to \$15,844 per ton of NOx removed. Costs to achieve an outlet NOx emission of 150 ppm_{dv} corrected to 7% O₂ utilizing SNCR ranged from \$2,016 to \$2,586 per ton of NOx removed. Thus, the incremental cost of the application of SCR for increased NOx control would be substantially higher than the costs stated above. The

including fuel-rich conditions and low combustion temperatures cause incomplete oxidation of carbon compounds. Such factors can be produced by introducing overly wet or low BTU content fuel to the furnace, or by suppressing combustion by very high overfire air rates or providing inadequate combustion air and residence times.

The factors that are associated with elevated levels of CO can be divided into five separate components:

- Waste feed rate
- Combustion temperatures and residence time
- Amount and distribution of combustion air
- Air/fuel mixing
- Particulate Matter (PM) carryover

Waste Feed Rate

Combustion characteristics can be affected significantly by variations in waste composition or feed characteristics (e.g., moisture content, heating value, volatiles content). Excursions in waste feed rates or waste properties can deplete local oxygen levels in the furnace, allowing organics to escape complete oxidation. Alternately, combustion of low heating value fuel can lead to quenching of combustion reactions, which also allows CO to escape oxidation. Both of these conditions are accompanied by elevated concentrations of CO. Flue gas CO concentrations are continuously monitored to provide a continuous indication of proper combustion feed conditions. The appropriate design and operating procedures to minimize waste feed excursions vary according to combustor technology, and may include measures such as fuel blending by the crane operator, use of ram feeders, and use of air preheat.

Combustion Temperatures and Residence Time

The ability of a MWC to minimize CO formation is a fundamental requirement of GCP. The occurrence of spatial and temporal temperature variations during normal operating conditions necessitates that municipal waste combustion facilities be designed and operated in a manner that will ensure that all combustion products are exposed to minimum destruction temperatures for sufficient residence times. Furnace combustion gas residence time is also an important requirement to ensure minimum CO formation. Emissions of CO are limited under USEPA's definition of GCP.

Amount and Distribution of Combustion Air

The proper amount and distribution of combustion air are essential for efficient combustion. The amount of excess air introduced to the combustor must be sufficiently high to minimize the existence of fuel-rich pockets and sufficiently low to avoid quenching of combustion reactions. The range of excess air levels that will satisfy these objectives varies for each combustor technology. CO emissions typically increase when

insufficient O₂ is available to complete combustion, or when excessive amounts of O₂ quench combustion reactions. High excess air levels can also cause PM carryover.

For large MWCs such as Unit 3, total combustion air is typically split between primary and secondary supplies. The amount and distribution of primary (underfire) air controls bed burning stoichiometry and waste burnout. Secondary air is used to adjust local stoichiometry to levels needed to achieve complete combustion, to control flame height, and to complete the mixing process. Failure to distribute combustion air in the correct proportions to primary and secondary supplies can result in elevated CO emissions and PM carryover.

Air/Fuel Mixing

Mixing of combustion products and air is a key requirement to ensure destruction of CO in the furnace. The most common method used to achieve good mixing in MWCs is properly designed and operated secondary (overfire) air systems. Mixing can also be effected through combustor design measures such as bull noses, baffles, turns, and changes in duct shape or cross-sectional area. Mixing failures can be accompanied by spikes or bulk increases in CO emissions.

Particulate Matter (PM) Carryover

PM carryover is defined as the amount of entrained particulate matter, which is carried out of a combustor with flue gases. The amount of PM carryover from municipal waste combustion facilities can affect the ultimate emission of other pollutants in addition to CO. Carryover of unburned carbon from the furnace into lower temperature regions of the combustion system prior to completion of combustion will result in elevated emissions levels of CO and products of incomplete combustion. Parameters affecting PM carryover include operating load, excess air levels, and primary/secondary air ratios.

4.7.2 SOURCE SEPARATION IMPACT ON CARBON MONOXIDE

The Lee County Materials Separation Plan encourages residents to separate newsprint, magazines, corrugated cardboard, kraft paper bags, and telephone books; glass bottles; aluminum cans and foil; steel cans; and plastic containers. Commercial businesses and institutions voluntarily separate recyclable materials for collection.

While certain materials separation efforts are considered in this document because of their potential to reduce air emissions, the amount of emissions reductions cannot be quantified. For this reason, materials separation activities are discussed in this BACT analysis; however, materials separation should not be imposed as BACT. There is no evidence to demonstrate that source separation of certain components by itself provides for consistent and measurable reductions of CO. Because it is not possible to quantify the effect of source separation, source separation does not qualify as a technology or clean fuel process.

costs presented for application of SCR substantially exceed those typically considered acceptable for the application of a control technology under BACT guidelines.

4.6.7 ENERGY IMPACT

Increased electrical energy is expected for the SCR system over the SNCR system due to the increased fan pressure needed to overcome the pressure drop across the catalyst bed. The SCR system will require a certain amount of flue gas reheat that will utilize a substantial amount of fossil fuel. SNCR does not require flue gas reheat.

4.6.8 SELECTION OF BACT

Based on a review of environmental, economic and energy impacts, SCR is rejected as BACT for Unit 3 at the LCERF and SNCR is determined to be BACT. Lee County is proposing to install SNCR to meet an outlet NO_x emission level of 180 ppmdv at 7% O₂ averaged over a 24-hour period for the first year of operation and 150 ppmdv at 7% O₂ thereafter. This is an aggressive limit and will require 'fine tuning' of the SNCR control system. As noted by USEPA (60 Federal Register 65387-65436), the process of achieving 150 ppmdv would require a sufficient time period to balance facility systems in combination with the SNCR system to provide continuous compliance.

4.7 BACT REVIEW FOR CARBON MONOXIDE

CO is formed by the incomplete combustion (oxidation) of carbon containing compounds in the MSW fuel. Elevated emissions of CO in municipal waste combustion facilities may be due to a number of conditions, including:

- Insufficient bulk oxygen levels for variations in waste composition/feed characteristics
- Insufficient combustion temperatures that result in quenching of reactions
- Poor air distribution, and/or inadequate mixing which results in localized oxygen deficient conditions
- Excessive carryover of particulate-bound organics from the furnace into lower temperature regions of the combustion system prior to completion of combustion (USEPA, 1989d and USEPA, 1995d)

Emissions of CO are controlled by minimization of the above-mentioned conditions that promote increased CO emissions. Post-combustion control such as thermal oxidizers and oxidation catalyst systems for the removal of CO in flue gas streams have been utilized with other combustion sources but, have not been employed on MWCs.

4.7.1 FORMATION MECHANISMS

CO is a product of incomplete oxidation of carbon compounds. The source of carbon compounds at MWCs can be the fuel, pyrolysis products formed near the fuel bed, compounds in the combustion air, and/or intermediate combustion products. Factors

4.7.3 AVAILABLE CONTROL TECHNOLOGIES

Emissions of CO can potentially be reduced at municipal waste combustion facilities by two main methods: 1) utilizing good combustion design and operation to maximize the oxidation of CO to CO₂, and 2) reducing the quantity of CO in the post-combustion flue gas stream (flue gas controls).

GCP, as established by USEPA, involves continuous compliance of three parameters: a CO emission limit, a load limit, and a temperature limit at the inlet of the particulate matter control device. The use of GCP reduces CO emissions by promoting more thorough combustion.

Tail gas control techniques for CO have most commonly consisted of oxidation catalyst systems or thermal oxidizers. The presence of an oxidation catalyst in the flue gas pathway allows the oxidation reaction converting CO to CO₂ to proceed at a lower temperature than would otherwise be needed. Oxidation catalysts for CO control have been installed on a number of combustion turbines fired with natural gas or clean gas derivatives (e.g., digester gas or refinery gas) in the U.S. and abroad. Oxidation catalysts have not been demonstrated with facilities that combust mixed fuel or MSW that can contain trace contaminants that would deactivate (poison) the catalyst.

Thermal oxidizers employed in industrial applications include recuperative oxidizers, catalytic oxidizers and regenerative thermal oxidizers.

Oxidation Catalyst Systems

Oxidation catalysts are precious or semi-precious metal catalysts that tend to be easily poisoned by contaminants such as sulfur, phosphorous, and trace metals in flue gases. Oxidation catalysts generally cannot be installed for sources burning sulfur emitting fuels. Therefore, fuel sulfur must be limited for oxidation catalyst applications to avoid catalyst poisoning problems (EPRI, 1989).

A number of catalysts manufacturers and suppliers were researched to obtain information concerning the state-of-the-art in catalytic control of CO for municipal waste combustion facilities. Several of these companies have oxidation catalyst systems currently operating on combustion sources. It was not identified that these companies have installed oxidation catalyst systems on a municipal solid waste combustion facility. The main reason for non-application of this technology to municipal waste combustion facilities was inferred as the non-homogeneous nature of MSW, and thus, the non-homogeneous nature of the flue gas. Current species of oxidation catalysts could be quickly poisoned by potential trace contaminants in a municipal waste combustion facility's flue gas and would be prohibitively expensive to continuously replace.

Therefore, application of an oxidation catalyst to a municipal waste combustion facility is considered technically infeasible at this time. Hence, tail gas control of CO emissions

from Unit 3 utilizing a CO catalyst system cannot be considered as a viable option for BACT.

Thermal Oxidation

Thermal oxidation has been accomplished at industrial facilities utilizing three main types of thermal oxidizers:

- Recuperative Thermal Oxidizer (RCTO)
- Catalytic Thermal Oxidizer (CTO)
- Regenerative Thermal Oxidizer (RTO)

Thermal oxidation, regardless of type, works on the principal of raising the flue gas temperature to the oxidation temperature of CO for conversion to CO₂. Recuperative thermal oxidizers achieve oxidation temperatures typically through direct flame incineration. Hence, RCTOs are typically the costliest option relative to fuel use. Also, thermal efficiency of RCTOs is typically limited to a maximum of 70% before capital costs for heat exchange increase steeply. Thermal oxidizers incorporating catalysts utilize catalysts to lower the oxidation temperature of CO to reduce fuel costs. However, it is expected that the catalyst would experience deactivation and/or fouling from contaminants in the flue gas; thus, CTOs will not be considered further. Regenerative thermal oxidizers, like recuperative oxidizers, achieve CO control through heating flue gas to proper oxidation temperatures. However, in regenerative thermal oxidizers, the heat is contained in a series of ceramic beads that are alternately heated and re-heated to maximize heat efficiency. RTOs tend to have higher capital costs than catalytic or recuperative thermal oxidizers. However, RTOs typically have significantly lower operating costs due to the greater heat efficiency of the ceramic bed design which results in substantially lower fuel usage than catalytic or recuperative thermal oxidizers. RTOs have experienced problems with fouling of the ceramic heat exchange surface from flue gas contaminants and may require added filtration of flue gases prior to entry into the RTO.

Based on available data, catalytic oxidizers, recuperative thermal oxidizers, and RTOs have not been specified as BACT for MWCs nor were they evaluated as part of the USEPA's effort to establish the NSPS for new and existing MWCs. However, as thermal oxidation cannot be considered technically infeasible, application of a thermal oxidizer (either RCTO or RTO) will be evaluated on the basis of energy, environmental and economic feasibility.

4.7.4 RANKING OF ALTERNATIVE CONTROL TECHNOLOGIES

With oxidation catalyst systems and catalytic thermal oxidizers determined to be technically infeasible, thermal oxidation utilizing either a RCTO or RTO is assumed to provide enhanced CO control over good combustion design and operation and is ranked higher. In the case of Unit 3, the MWC will be designed to achieve very low CO emissions inherently; thus, thermal oxidation will only reduce CO emissions from the

already low emissions resulting from the facility. It is assumed that 90% of emitted CO (113.25 tons) is controlled by the thermal oxidizer. This is questionable in that Lee County is proposing CO emissions of 100 ppm_{dv} with good combustion design and operation. A 90% reduction would reduce CO emissions to levels below which current instruments could accurately monitor. Also, most thermal oxidizer manufacturers will not guarantee outlet CO emissions below 50 ppm_{dv}.

4.7.5 ENVIRONMENTAL IMPACT

As has been previously described, implementation of good combustion design and operation will provide the lowest environmental impact for control of CO. Based on current information, no adverse environmental impacts are projected from utilization of this technology. Utilization of thermal oxidation will result in secondary pollutant production from combustion of fossil fuels to maintain flue gas temperatures at the CO oxidation temperature.

4.7.6 ECONOMIC IMPACT

No adverse economic consequences are foreseen utilizing good combustion design and operation as it is the baseline operational requirement and it will be inherent in the design of the Martin combustor. The economic impact of applying a RCTO or RTO were determined using cost estimation algorithms provided in the USEPA's EPA Air Pollution Control Cost Manual, Sixth Edition (USEPA, 2002a). At an assumed CO reduction efficiency of 90% (113.25 tons CO), estimated costs for a RCTO ranged from \$21,200.00-\$22,600.00 per ton of CO removed. Estimated costs for a RTO ranged from approximately \$12,000.00-\$13,600.00 per ton of CO removed. Actual costs would most likely exceed these monetary values.

4.7.7 ENERGY IMPACT

No adverse energy utilization consequences are foreseen in the use of good combustion design and operation as the proposed control technology for CO. Application of either a RCTO or RTO would require increased electrical energy and fan power to drive the system. In addition, substantial amounts of fossil fuel would need to be fired to maintain temperatures for the thermal oxidizer to operate properly. Annual energy impacts based on OAQPS estimates ranged from approximately \$697,500.00 for the RTO to approximately \$1,990,000 for the RCTO.

4.7.8 SELECTION OF BACT

Based on a review of energy, environmental and economic impacts, thermal oxidation utilizing a RCTO or RTO is rejected as BACT and good combustion design and operation is determined to be BACT for CO. The BACT for CO will be achieved through the design and control of the combustion process. CO emissions will be limited to 100 ppm_{dv} at 7% O₂ for 4-hour block averaging periods, exclusive of start-up, shut-

down, and malfunction conditions. The emission rate for CO given in Section 3 represents the BACT as per PSD regulations and FDEP requirements.

4.8 BACT REVIEW FOR MWC ORGANICS

MWC organics are defined by the USEPA in 40 CFR 60.51b as organic compounds emitted in the exhaust gases from municipal waste combustor units and includes tetra-through octa- chlorinated dibenzo-p-dioxins and dibenzofurans. MWC organics can be formed and/or emitted as a result of incomplete combustion of carbon containing compounds in MSW fuel.

Stack emissions of MWC organics are controlled by utilizing GCP and by utilization of post-combustion flue gas controls. GCP, as defined by USEPA, consists of three components: a CO emission limitation, a load limit, and a temperature limitation at the inlet of the PM control device (USEPA, 1995d). Post combustion control such as thermal oxidizers and oxidation catalyst systems for the removal of MWC organics in flue gas streams have not been employed on MWCs in the U.S.

4.8.1 FORMATION MECHANISMS

MWC organics are products of incomplete oxidation of carbon compounds. The source of carbon compounds at MWCs can be the fuel, pyrolysis products formed near the fuel bed, compounds in the combustion air, and/or intermediate combustion products. The actual formation of MWC organics in the flue gases is not well understood. USEPA has determined that three continuous compliance parameters: CO emissions, load limit, and temperature at the inlet of the PM control device, have been shown to correlate with either the formation or emission of MWC organics (USEPA, 1995d).

4.8.2 SOURCE SEPARATION IMPACT ON MWC ORGANICS

The Lee County Materials Separation Plan encourages residents to separate newsprint, magazines, corrugated cardboard, kraft paper bags, and telephone books; glass bottles; aluminum cans and foil; steel cans; and plastic containers. Commercial businesses and institutions voluntarily separate recyclable materials for collection.

While certain materials separation efforts are considered in this document because of their potential to reduce air emissions, the amount of emissions reductions cannot be quantified. For this reason, materials separation activities are discussed in this BACT analysis; however, materials separation should not be imposed as BACT. There is no evidence to demonstrate that source separation of certain components by itself provides for consistent and measurable reductions of MWC organics. Because it is not possible to quantify the effect of source separation, source separation does not qualify as a technology or clean fuel process.

4.8.3 AVAILABLE CONTROL TECHNOLOGIES

Emissions of MWC organics can potentially be reduced at municipal waste combustion facilities by two main methods: 1) GCP which utilize good combustion design and operation to maximize the oxidation of CO to CO₂, and 2) flue gas controls, which reduce the quantity of MWC organics in the post-combustion flue gas stream.

Flue gas control techniques for organic compounds have most commonly consisted of thermal oxidizers. Thermal oxidizers employed in industrial applications include recuperative oxidizers, catalytic oxidizers and regenerative thermal oxidizers.

Good Combustion Practices

Good combustion practices were developed by the USEPA to minimize both formation and emissions of dioxins/furans and other trace organics. GCP involves continuous compliance of three parameters: a CO emission limit, a load limit, and a temperature limit at the inlet of the particulate matter control device. All three of these continuous compliance parameters have been shown to correlate with either formation or emission of dioxins/furans (USEPA, 1995d). The use of GCP reduces emissions of MWC organics by promoting thorough combustion, minimization of particulate carryover and condensation of vapor phase constituents through baghouse temperature control.

Low CO level is a surrogate parameter used to indicate the operation at combustion conditions conducive to the furnace destruction of trace organics. The load limit is used to control excessive entrainment PM (PM carryover) which can lead to formation of dioxins/furans downstream of the combustor. The PM control device inlet temperature limit is to limit formation of dioxins/furans on fly ash within the PM control device by controlling formation rates. Peak formation rates occur near 300 C (570 °F) and decrease with decreasing temperatures. Below about 225 to 250 C (435-480 °F) the formation rates are negligible. The temperature limit also controls partitioning of dioxin/furan between the solid and vapor phases. At lower temperatures, dioxins/furans remain absorbed on PM and are disposed with the collected fly ash. There is no evidence that dioxins/furans absorbed on fly ash can be volatilized at ambient temperatures nor leached in landfills (USEPA, 1995d).

The USEPA spent a substantial amount of resources investigating, developing and documenting GCP. USEPA's data gathering efforts were presented in a report on the combustion control of organics, *Municipal Waste Combustion Study - Combustion Control of Organic Emissions* (USEPA, 1987b and USEPA, 1995d).

Thermal Oxidation

Thermal oxidation has been accomplished at industrial facilities utilizing three main types of thermal oxidizers:

- Recuperative Thermal Oxidizer (RTO)

- Catalytic Thermal Oxidizer (CTO)
- Regenerative Thermal Oxidizer (RTO)

Thermal oxidation, regardless of type, works on the principal of raising the flue gas temperature to the oxidation temperature of CO for conversion to CO₂. Recuperative thermal oxidizers achieve oxidation temperatures typically through direct flame incineration. Hence, RCTOs are typically the costliest option relative to fuel use. Also, thermal efficiency of RCTOs is typically limited to a maximum of 70% before capital costs for heat exchange increase steeply. Thermal oxidizers incorporating catalysts utilize catalysts to lower the oxidation temperature of organics to reduce fuel costs. However, it is expected that the catalyst would experience deactivation and/or fouling from contaminants in the flue gas; thus, CTOs will not be considered further. Regenerative thermal oxidizers, like recuperative oxidizers, achieve organics control through heating flue gas to proper oxidation temperatures. However, in regenerative thermal oxidizers, the heat is contained in a series of ceramic beads that are alternately heated and re-heated to maximize heat efficiency. RTOs tend to have higher capital costs than catalytic or recuperative thermal oxidizers. However, RTOs typically have significantly lower operating costs due to the greater heat efficiency of the ceramic bed design which results in substantially lower fuel usage than catalytic or recuperative thermal oxidizers. RTOs have experienced problems with fouling of the ceramic heat exchange surface from flue gas contaminants and may require added filtration of flue gases prior to entry into the RTO.

Based on available data, catalytic oxidizers, recuperative thermal oxidizers, and RTOs have not been specified as BACT for MWCs nor were they evaluated as part of the USEPA's effort to establish the NSPS for new and existing MWCs. However, as thermal oxidation cannot be considered technically infeasible, application of a thermal oxidizer (either RCTO or RTO) will be evaluated on the basis of energy, environmental and economic feasibility.

4.8.4 RANKING OF ALTERNATIVE CONTROL TECHNOLOGIES

Oxidation catalyst systems and catalytic thermal oxidizers are determined to be technically infeasible based on analysis presented in Section 4.7. Thermal oxidation utilizing either a RCTO or RTO is assumed to provide enhanced MWC organics control over GCP and is ranked higher. In the case of Unit 3, the MWC will be designed to incorporate GCP inherently; thus, thermal oxidation will only reduce MWC organics emissions from the already low emissions resulting from GCP. For purposes of developing a conservative estimation of economic impacts, it is assumed that 90% of emitted MWC organics can be controlled by the thermal oxidizer. This assumption is conservative because Lee County is proposing MWC organics emissions of 13 ng/dscm at 7% O₂ with GCP. It is not typically possible to achieve a control level of 90% with such a low inlet level.

4.8.5 ENVIRONMENTAL IMPACT

As has been previously described, implementation of GCP will provide the lowest environmental impact for control of MWC organics. Based on current information, no adverse environmental impacts are projected from utilization of this technology. Utilization of thermal oxidation will result in secondary pollutant production from combustion of fossil fuels to maintain flue gas temperatures at the MWC organics oxidation temperature.

4.8.6 ECONOMIC IMPACT

No adverse economic consequences are foreseen utilizing GCP as it is the baseline operational requirement and it will be inherent in the design of the Martin combustor. The economic impact of applying a RCTO or RTO were determined using cost estimation algorithms provided in the USEPA's EPA Air Pollution Control Cost Manual, Sixth Edition (USEPA, 2002a). At an assumed MWC organic reduction efficiency of 90%, estimated costs for both the RCTO and a RTO would substantially exceed \$1,000,000 per ton removed.

4.8.7 ENERGY IMPACT

No adverse energy utilization consequences are foreseen in the use of GCP as the proposed control technology for MWC organics. Application of either a RCTO or RTO would require increased electrical energy and fan power to drive the system. In addition, substantial amounts of fossil fuel would need to be fired to maintain temperatures for the thermal oxidizer to operate properly. Annual energy impacts based on OAQPS estimates ranged from approximately \$697,500 for the RTO to approximately \$1,990,000 for the RCTO.

4.8.8 SELECTION OF BACT

Based on a review of energy, environmental and economic impacts, thermal oxidation utilizing a RCTO or RTO is rejected as BACT and GCP is determined to be BACT for MWC organics. The BACT for MWC organics will be achieved through the advanced design of the combustion chamber and temperature control found in the Martin combustor. MWC organics emissions will be limited to 13 ng/dscm at 7% O₂. The emission rate for MWC organics given in Section 3 represents the BACT as per PSD regulations and FDEP requirements.

4.9 BACT REVIEW FOR MERCURY EMISSIONS

Mercury (Hg) is a metal that exists in the liquid phase and is relatively volatile at ambient temperatures. Mercury, as a product of combustion, is quantitatively a function of the Hg content of the waste.

4.9.1 FORMATION MECHANISMS

Mercury and mercuric compounds have boiling points ranging from 575-1200°F (302-649°C). These compounds vaporize when heated due to their relatively low vapor pressures and can have a tendency to remain in the vapor phase at the outlet of the air pollution control equipment (BEI, 1986). It is theorized that flue gas cooling encourages deposition or enrichment of these compounds on fine particulate matter.

4.9.2 SOURCE SEPARATION IMPACT ON MERCURY EMISSIONS

The USEPA sponsored a field research program (Franklin Associates, 1991) to identify the characteristics of products containing mercury in MSW. An analysis of mercury in municipal solid waste for 1989 indicated the following categories:

Batteries	88%
Lighting	5%
Thermometers	2%
Thermostats	2%
Pigments	2%
Others	<u>1%</u>
	100%

This analysis demonstrates that discarded batteries contributed to the majority of mercury emissions at the time of the study. Since this study, no more relevant data representing the mercury content of MSW has been issued in the public domain. Later USEPA documents presenting projections of mercury content were based on this same data (Marks, M. 2002a; and Marks, M., 2002b). Two types of batteries are accountable for the mercury value: alkaline and mercury zinc. Voluntary reductions of mercury content by the battery manufacturers have significantly reduced the potential for mercury emissions from MWCs (Franklin Associates, 1991). This has been validated in annual reports prepared by the National Electrical Manufacturers Association (NEMA) regarding analyses of mercury from consumer batteries in the waste stream. In analyses conducted on a sample quantity of batteries collected annually in the Lee County Materials Separation Program from 1996 to 2000, the percentage of consumer batteries containing no added mercury increased from 62% in 1996 to 88% in 2000. This change led NEMA to project that "the average mercury level will decline exponentially, decreasing by approximately 50% every two years. This would result in mercury levels from batteries in the waste stream falling to background levels (less than 5 parts per million) by the year 2008 (NEMA, 2001)." Additionally, source separation of all of the other products above will further reduce the potential for mercury emissions Unit 3.

Another study of typical MSW stream components showed approximately 85% of the Hg content in normal household waste is contained in metal components (primarily household batteries), 5% in plastics, and 3% in paper products (Shaub, 1988). Thus, an effective means of reducing Hg components in the MSW stream would be separation of batteries, paper and plastics. As discussed earlier, the Lee County Materials Separation

Plan provides curbside collection for residential recycling of batteries and various paper and plastic materials. Commercial businesses and institutions also voluntarily recycle these materials, thus removing more from the waste stream. Lead-acid vehicle batteries are excluded from the normal waste stream for collection at established centers.

While certain materials separation efforts are considered in this document because of their potential to reduce air emissions, the amount of emissions reductions cannot be quantified. For this reason, materials separation activities are discussed in this BACT analysis; however, materials separation should not be imposed as BACT. There is no evidence to demonstrate that source separation of certain components by itself provides for consistent and measurable reductions of Hg. Because it is not possible to quantify the effect of source separation, source separation does not qualify as a technology or clean fuel process.

4.9.3 AVAILABLE CONTROL TECHNOLOGIES

The control technologies for removing Hg emissions from MWC flue gases are continuing to evolve. Methods of reducing mercury include:

- Reagent injection such as sodium sulfide or activated carbon upstream, within, or downstream of the SDA and upstream of the FF (or ESP)
- Wet scrubbing techniques
- Spray dryer followed by an FF (or ESP)
- Flue gas cooling
- Activated carbon reactor
- Source separation

In developing the MWC emissions guidelines and NSPS for mercury emissions, USEPA evaluated data and conducted tests of an activated carbon injection system at two U.S. MWCs, Stanislaus County (California) and Camden County (New Jersey). Stanislaus County utilized a SDA/FF and SNCR and the Camden facility utilized a SDA/ESP and SNCR. Use of activated carbon was evaluated, because at that time available data had shown that this reagent effectively removed mercury, and activated carbon was less expensive than other sorbents in use at that time. Based on these tests, USEPA determined that the two primary variables affecting both Hg emission and control efficiency were reagent (carbon) feed rate and uncontrolled Hg levels. Reductions in excess of 80% were achieved with high carbon feed rates. At low carbon feed rates, Hg emissions were much more variable. In addition, SNCR reagents did not appear to interfere with Hg removal nor did Hg leach from the ash over a 28-day period (USEPA, 1992b). This led to establishment of the Subpart Eb NSPS level of 80 milligrams per dry standard cubic meter (dscm) or 85% control, whichever is least stringent.

Though the Stanislaus County and Camden County testing is dated, stack test results from numerous MWCs in the U.S., including LCERF Units 1 and 2, utilizing reagent (activated carbon) injection have demonstrated compliance with the NSPS Hg emission limits. Tested levels at Lee County Units 1 and 2 from 1994 to 2000 have ranged from

non-detected to 75 mg/dscm at 7% O₂. USEPA has recognized reagent (activated carbon) injection in combination with a FF as a very effective control system for mercury.

For mercury emissions, Unit 3 will benefit from source separation and removal of mercury containing wastes due to both nationwide and local efforts. Flue gas temperatures will be cooled in the SDA/FF to assist in removal and collection of mercury. Reagent (activated carbon) is proposed for enhanced mercury control. Thus, of the available control methods discussed above, only wet scrubbers and activated carbon reactors may warrant further evaluation in comparison to reagent injection.

Reagent Injection

As stated, Lee County is proposing installation of an activated carbon injection system with subsequent collection in the downstream FF for mercury control. Other reagents such as sodium sulfide and Sorbalit® have been tested and used at other facilities. However, testing has shown that other existing reagents/sorbents are no more effective than activated carbon and typically these materials are substantially more expensive. In fact, several facilities that started utilizing these other sorbents have since switched to activated carbon.

USEPA tests and recent data from operating U.S. MWCs have shown that activated carbon injection effectively limits outlet Hg emissions to levels below the USEPA NSPS and Florida Mercury Rule levels.

Wet Scrubbing Techniques

It has been reported (Vogg, et al., 1986) that wet scrubber systems can provide effective control of Hg emissions from MWCs. However, for this to be effective, measures must be taken to avoid secondary reduction reactions of Hg compounds with SO₂. This can be done by utilizing a strong acid scrubbing solution or a similar method such as addition of an oxidizing agent (Vogg, et al., 1986).

Test results from the Coburg, Germany, facility equipped with a SDA/FF and wet scrubber have indicated that the Hg emission rates are similar to the emission rates from facilities equipped with SDA/FF only (Ogden Martin Systems, Inc., 1991).

No other more recent data relative to Hg emissions reductions from MWCs equipped with wet scrubbers was identified that showed that potential for higher removal capability than activated carbon injection.

Activated Carbon Reactors

European facilities have incorporated activated carbon reactors as tail gas control method for Hg, as well as other trace metals and air toxics. These can be either fixed bed carbon adsorbers or circulating carbon beds. In European designs, these are used as flue gas

polishing steps at the end of the pollution control train, but typically before the NO_x SCR step to allow as contaminant free flue gas as possible to enter the SCR reactor and if installed, the oxidation catalyst system. This flue gas polishing step has been installed on some European MWCs in response to a political desire in several countries (including Germany, Austria, Switzerland and the Netherlands) to reduce all air pollutants to the maximum extent possible, typically without regard to cost or the effect on plant efficiency (Hartenstein, et al, 1996). No data has been identified that indicates that significant additional Hg removal would occur with the activated carbon reactor over carbon injection with a SDA/FF. In fact, with activated carbon in the filter cake of the FF, a similar effect of an activated carbon reactor is created. Thus, for purposes of this review, it is considered that activated carbon injection in conjunction with a SDA/FF would provide equivalent control as an activated carbon reactor.

4.9.4 RANKING OF ALTERNATIVE CONTROL TECHNOLOGIES

Control of Hg emissions have been demonstrated via proper operation of acid gas/particulate control devices with low scrubber outlet temperature in conjunction with activated carbon injection. Wet scrubbers or activated carbon reactors have not demonstrated a higher removal efficiency for Hg from MWC flue gases. Using this criteria for ranking, it appears that an SDA/FF and additional control by reagent (activated carbon injection) ranks as the most effective or "top" technology for flue gas Hg removal.

4.9.5 SELECTION OF BACT

Based upon the previously set forth rationale, the proposed control technology for Hg is injection of activated carbon in conjunction with a semi-dry scrubber system consisting of an SDA and FF. This technology is considered to be the most effective in controlling Hg and therefore represents the highest ranking control technology from a top-down BACT perspective.

Hg emissions will be controlled to a level of 70 mg/dscm corrected to 7% O₂ or 85% control, whichever is least stringent.

4.10 SUMMARY OF PSD APPLICABLE POLLUTANTS AND PROPOSED BACT

Table 4-6 below summarizes those pollutants that are subject to PSD review for the proposed Unit 3 project at the LCERF. Table 4-6 also includes a summary of the proposed BACT for each pollutant.

TABLE 4-6
POLLUTANTS APPLICABLE TO PSD REVIEW AND PROPOSED BACT

PSD Pollutant	Proposed BACT
PM ₁₀	FF
MWC Metals (as PM)	FF
MWC Acid Gases ^a	SDA/FF
SO ₂	SDA/FF
SAM	SDA/FF
NO _x	SNCR
CO	GCP
Mercury	ACI
MWC Organics ^b	GCP

Poor Original

^a MWC Acid Gases as HCl and SO₂.

^b MWC Organics as Total Dioxins and Furans (measured as total tetra- through octa- chlorinated dibenzo-p-dioxins and dibenzo furans).

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

**SECTION 5
EXISTING AMBIENT AIR QUALITY**

October 31, 2002

SECTION 5 EXISTING AMBIENT AIR QUALITY

The two main factors influencing air quality are the types and amounts of pollutants, both natural and man-made, emitted directly into the atmosphere (i.e., "primary" pollutants) and the subsequent atmospheric (i.e., meteorological) conditions that disperse and transport these emissions. Meteorological conditions also determine the rate of chemical reactions that form "secondary" pollutants like ozone, which are not emitted directly from emission sources.

5.1 AMBIENT AIR QUALITY STANDARDS

The effect of pollutants on ambient air quality depends on the duration and level of pollutant concentrations. Ambient air quality standards (AAQS) specify the allowable limits of pollutant concentrations for specific durations. National AAQS have been promulgated by the U.S. Environmental Protection Agency (USEPA) in Title 40, Part 50 of the Code of Federal Regulations (40 CFR 50). Primary AAQS are designed to protect public health with an adequate margin of safety for sensitive groups of individuals (e.g., children and asthmatics). Secondary AAQS are designed to protect the public welfare from any known or anticipated adverse effects associated with air pollution. Protection of the public welfare includes the protection of property, materials, plants and animal life. The State of Florida has adopted State AAQS in Chapter 62-204, Florida Administrative Code (F.A.C.) that are at least as stringent as the National AAQS. AAQS were promulgated by USEPA and Florida for six "criteria" pollutants: sulfur dioxide (SO₂); nitrogen dioxide (NO₂); carbon monoxide (CO); lead (Pb); ozone (O₃); and particulate matter less than 10 microns (PM₁₀). Compliance with the SO₂, NO₂, CO, and Pb AAQS requires the second-highest short-term concentration (24-hours or less) and the long-term average concentrations (quarterly and annual) measured each year at a particular monitoring site to be less than or equal to the AAQS. Compliance with the short-term O₃ and PM₁₀ AAQS requires the fourth-highest concentration over three consecutive years to be less than or equal to the AAQS for "complete" datasets. These National and Florida AAQS are shown on Table 5-1.

5.2 AMBIENT MONITORING DATA

Air quality in Florida is measured by the Florida Department of Environmental Protection (FDEP) and local agencies. Table 5-2 shows the nearest monitoring sites to the Lee County Energy Recovery Facility (LCERF). Because of the LCERF's rural location, there are few monitoring sites in the immediate vicinity. Most nearby monitors are located in more urban or suburban areas. Because of their more urbanized setting, these monitoring locations are conservative for determining baseline air quality (i.e., measured concentrations would be higher than expected for the LCERF vicinity). The nearest PM₁₀ monitors are located 12 kilometers (km) from the LCERF in Lee County at the Fort Myers Water Treatment Plant and 56 km from the facility in Collier County. There are two O₃ monitor sites in Lee County -- in Cape Coral 20 km from the LCERF and in Fort Myers Beach 24 km from the LCERF. The nearest

IMAGE QUALITY

**PLEASE NOTE
THE ORIGINAL DOCUMENTS
SCANNED FOR THIS RECORD
WERE OF POOR QUALITY.**

**TABLE 5-1
NATIONAL AND FLORIDA STATE
AMBIENT AIR QUALITY STANDARDS^a**

Pollutant/Averaging Time	Florida AAQS	National AAQS	Primary/Secondary
SO ₂ 3-Hour Average	1300 ug/m ³ (0.5 ppm)	0.5 ppm (1300 ug/m ³)	Secondary
SO ₂ 24-Hour Average	260 ug/m ³ (0.1 ppm)	0.14 ppm (365 ug/m ³)	Primary
SO ₂ Annual Arithmetic Mean	60 ug/m ³ (0.02 ppm)	0.030 ppm (80 ug/m ³)	Primary
NO ₂ Annual Arithmetic Mean	100 ug/m ³ (0.05 ppm)	0.053 ppm (100 ug/m ³)	Primary & Secondary
CO 1-Hour Average	35 ppm (40,000 ug/m ³)	35 ppm (40,000 ug/m ³)	Primary
CO 8-Hour Average	9 ppm (10,000 ug/m ³)	9 ppm (10,000 ug/m ³)	Primary
PM ₁₀ 24-Hour Average ^b	150 ug/m ³	150 ug/m ³	Primary & Secondary
PM ₁₀ Annual Arithmetic Mean	50 ug/m ³	50 ug/m ³	Primary & Secondary
Lead Quarter Arithmetic Mean	1.5 ug/m ³	1.5 ug/m ³	Primary & Secondary
O ₃ Max. Daily 1-Hour Average ^b	0.12 ppm (235 ug/m ³)	0.12 ppm (235 ug/m ³)	Primary & Secondary

SOURCE: Rule 62-204.240, F.A.C. (Ambient Air Quality Standards) for Florida AAQS and 40 CFR 50 (National Primary and Secondary Ambient Air Quality Standards) for National AAQS.

^a Except as noted, short-term AAQS (i.e., averaging times of 24-hour or less) are not to be exceeded more than once a calendar year and long-term AAQS (i.e., quarterly and annual averaging times) are never to be exceeded.

^b Compliance with 24-hour PM₁₀ and 1-hour O₃ AAQS is achieved, in simplest terms, when the expected number of days exceeding the AAQS is less than or equal to 1.0 per calendar year when averaged over a consecutive three year period. Or, if data completeness criteria are met, when the fourth-highest daily maximum concentration in three consecutive years is less than or equal to the AAQS.

TABLE 5-2
NEAREST AMBIENT AIR QUALITY MONITORING SITES^a

County/Site ID	Measured Pollutant(s)	UTM Coord. (km) East, North	Distance (km), Direction^b from LCERF
<i>Lee County</i>			
071-0005	PM ₁₀	412.492, 2942.575	12.1, WSW
071-2001	O ₃	404.400, 2945.800	19.8, W
071-3002	O ₃	400.824, 2940.837	23.9, WSW
<i>Collier County</i>			
021-0003	PM ₁₀	423.500, 2890.430	55.3, S
<i>Sarasota County</i>			
115-0014	CO	358.780, 2995.250	82.1, NW
115-0013	PM ₁₀	350.800, 3019.350	104.0, NW
115-1002 ^c	SO ₂ , O ₃	349.150, 3020.375	105.9, NW
115-1006 ^c	SO ₂ , O ₃	353.620, 3025.910	106.8, NW
115-1004	CO	348.530, 3024.360	109.1, NW
115-1005	SO ₂ , O ₃	344.600, 3021.250	109.7, NW
<i>Hillsborough County</i>			
057-0081	NO ₂ , SO ₂ , O ₃	355.544, 3069.100	141.2, NNW
057-1066 ^d	Pb	364.000, 3093.400	159.5, NNW
057-1073 ^d	Pb	364.310, 3093.990	159.9, NNW
057-1074 ^d	Pb	364.050, 3094.640	160.6, NNW
<i>Broward County</i>			
011-0031	NO ₂ , O ₃	570.365, 2905.871	151.5, ESE
<i>Pinellas County</i>			
103-0024 ^e	Pb, CO	329.745, 3075.255	160.3, NW
103-3005 ^e	Pb	333.000, 3084.420	166.0, NNW
<i>Palm Beach County</i>			
099-0018	Pb	584.561, 2964.829	161.5, E

^a Only the two nearest monitoring sites for each pollutant are shown in this table.

^b Distance (km) and direction are measured from the LCERF's UTM coordinates (Zone 17) of 424.2 km East and 2945.7 km North.

^c Site was moved in mid-1999 (ID changed from 115-1002 to 115-1006) - considered as one site.

^d The Hillsborough County lead monitoring sites were not used for background because these are special purpose monitors for an industrial lead emissions source.

^e The lead monitoring at site 103-0024 (Pinellas County) was discontinued in early 1999. Lead monitoring site 103-3005 (Pinellas County) was initiated in 1999, so both are considered a single site for lead.

CO and SO₂ monitors are located in Sarasota County -- CO is measured at two locations 82 and 109 km from the LCERF while SO₂ is measured at different locations 106 and 110 km from the LCERF. The two closest NO₂ monitoring stations are in Hillsborough (141 km) and Broward (152 km) counties.

Lead monitoring has been discontinued in most areas of Florida, including Lee County. Lead concentrations in general are very low and have been decreasing statewide. Lead concentrations at the nearest monitoring sites in Hillsborough County were not considered because these monitors are special purpose monitors used to measure localized lead impacts in the vicinity of an industrial emission source. Lead concentrations at the next closest monitors (approximately 160 km away in Palm Beach and Pinellas Counties) have been used to determine background levels.

Maximum ambient concentrations measured during the last three available calendar years (1998-2000) are shown on Table 5-3. Three years are shown when available because this is the time period generally used by USEPA for determining compliance with AAQS as described above and in Table 5-1. Concentrations were generally higher in 1998 due to widespread fires in Florida and Mexico. Some, but not all, of the high PM₁₀ and O₃ concentrations due to the 1998 wildfires were excluded by USEPA from the data as extraordinary events. In spite of the high concentrations remaining in the database for 1998-2000, the data show that the area surrounding the LCERF is in compliance with the AAQS.

5.3 BASELINE AIR QUALITY

Baseline or background air quality represents the air quality in the project vicinity prior to operation of the proposed source. It is generally based on actual measurements of ambient air quality. Maximum concentrations from the two nearest monitoring sites are summarized on Table 5-4 as a conservative estimate of background air quality. Baseline concentrations are shown on Table 5-4 in the form of the applicable AAQS (e.g., the high second-high 8-hour CO concentration over three years).

The status of baseline air quality is generally evaluated by comparing baseline concentrations to the AAQS. Baseline SO₂ and NO₂ concentrations are less than one-fifth of the most restrictive National or State AAQS for all averaging times. Baseline CO concentrations are about one-third and two-thirds of the 1-hour and 8-hour AAQS, respectively. Baseline PM₁₀ concentrations are less than one-third and one-half of the PM₁₀ 24-hour and annual AAQS, respectively. Baseline O₃ concentrations are about 80% of the 1-hour AAQS. Maximum measured quarterly Pb concentrations are generally below the detection limits of the monitoring methods and are less than 1% of the quarterly AAQS. Thus, baseline ambient air quality as summarized above complies with all AAQS. Since the air quality monitoring sites are from more urbanized areas than the LCERF site, the baseline concentrations selected are a conservative representation of the project location (i.e., the baseline concentrations are higher than ambient concentrations which would actually be measured near the Facility).

TABLE 5-3
NEARBY AMBIENT AIR QUALITY DATA

Pollutant/Avg. Time/ Year	Concentration at Nearest Monitoring Site	Concentration at Next Closest Monitoring Site
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SO₂/3-hour Second-Highest Concentration (ppm)

1998	0.057 ppm ^a Sarasota County	0.056 ppm Sarasota County
1999	0.033 ppm 115-1002 (98-99)	0.032 ppm 115-1005
2000	0.044 ppm 115-1006 (99-00)	0.045 ppm

SO₂/24-hour Second-Highest Concentration (ppm)

1998	0.019 ppm Sarasota County	0.014 ppm Sarasota County
1999	0.011 ppm 115-1002 (98-99)	0.011 ppm 115-1005
2000	0.016 ppm 115-1006 (99-00)	0.019 ppm

SO₂/Annual Arithmetic Mean Concentration (ppm)

1998	0.002 ppm Sarasota County	0.003 ppm Sarasota County
1999	0.003 ppm 115-1002 (98-99)	0.002 ppm 115-1005
2000	0.002 ppm 115-1006 (99-00)	0.002 ppm

NO₂/Annual Arithmetic Mean Concentration (ppm)

1998	0.006 ppm Hillsborough County	0.009 ppm Broward County
1999	0.007 ppm 057-0081	0.010 ppm 011-0031
2000	0.008 ppm	0.009 ppm

CO/1-hour Second-Highest Concentration (ppm)

1998	5.5 ppm Sarasota County 115-0014	10.9 ppm Sarasota County 115-1004
1999	3.7 ppm	4.5 ppm
2000	4.2 ppm	6.6 ppm

CO/8-hour Second-Highest Concentration (ppm)

1998	2.6 ppm Sarasota County 115-0014	5.6 ppm Sarasota County 115-1004
1999	2.6 ppm	3.3 ppm
2000	2.1 ppm	4.3 ppm

O₃/1-hour Maximum, Fourth-Highest Day over three years (ppm)^b

1998-2000	0.096 ppm Lee County 071-2001	0.098 ppm Lee County 071-3002
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^a The baseline concentration selected (i.e., the maximum concentration appropriate for the AAQS) from both nearest monitoring sites is **bolded** and shown on Table 5-4.

^b Round to two significant digits before AAQS comparison as required by regulations (i.e., 0.098 ppm rounds to 0.10 ppm).

TABLE 5-3
NEARBY AMBIENT AIR QUALITY DATA
(CONCLUDED)

Pollutant/Avg. Time/ Year	Concentration at Nearest Monitoring Site	Concentration at Next Closest Monitoring Site
------------------------------	---	--

PM₁₀/24-hour Fourth-Highest Concentration over three years (ug/m³)

1998-2000	36 ug/m ³ Lee County 071-0005	39 ug/m³^a Collier County 021-0003
-----------	--	--

PM₁₀/Annual Arithmetic Mean Concentration (ug/m³)

1998	18 ug/m ³ Lee County 071-0005	19 ug/m ³ Collier County 021-0003
1999	19 ug/m³	17 ug/m ³
2000	19 ug/m ³	18 ug/m ³

Pb/Maximum Quarterly Arithmetic Mean Concentration (ug/m³)

1998	0.01 ug/m³ Pinellas County	0.00 ug/m ³ Palm Beach County
1999	0.01 ug/m ³ 103-0024 (98-99)	0.00 ug/m ³ 099-0018
2000	0.01 ug/m ³ 103-3005 (99-00)	N/A (1999 shutdown)

^a The baseline concentration selected (i.e., the maximum concentration appropriate for the AAQS) from both nearest monitoring sites is **bolded** and shown on Table 5-4.

TABLE 5-4
COMPARISON OF BASELINE CONCENTRATIONS
TO AMBIENT AIR QUALITY STANDARDS

Pollutant Name	Averaging Time	Baseline Concentrations (ug/m ³) ^a	AAQS ^b (ug/m ³)	Percent of AAQS
SO ₂	3-Hour	149	1,300	11%
SO ₂	24-Hour	50	260	19%
SO ₂	Annual	8	60	13%
NO ₂	Annual	19	100	19%
CO	1-Hour	12,535	40,000	31%
CO	8-Hour	6,440	10,000	64%
PM ₁₀	24-Hour	39	150	26%
PM ₁₀	Annual	19	50	38%
Pb	Quarter	0.01	1.5	<1%
O ₃	1-Hour	196	235	83%

^a Baseline concentrations are the appropriate maximum concentrations for the applicable AAQS at the two nearest monitoring sites for the most recently available three years of data. Short-term concentrations (24-hours or less) are high second-high concentrations over three years while long-term concentrations (quarterly and annual) are the maximum concentration over three years except for 24-hour PM₁₀ and 1-hour O₃ (fourth-highest daily maximum concentration over three consecutive years). SO₂, NO₂, CO and O₃ ppm converted from ppm to ug/m³ using 2620, 1881, 1150 and 1963 ug/m³ per ppm, respectively.

^b AAQS shown are generally the Florida AAQS, which are more restrictive than the National AAQS.

5.4 ATTAINMENT STATUS

Under Section 107 of the Clean Air Act, each state is required to develop a State Implementation Plan (SIP) which specifies the manner by which all areas within the state will achieve and maintain compliance with the National AAQS. All areas in the United States are designated as either attainment, nonattainment, or unclassifiable with the National AAQS for each criteria pollutant. Attainment areas are areas which are currently in compliance with the National AAQS and continued compliance is expected under the current SIP requirements. Nonattainment areas are areas which either currently do not comply with the National AAQS or which significantly contribute to nearby areas which do not comply with the National AAQS. Nonattainment areas can also be areas which previously did not comply with the National AAQS and necessary SIP revisions have not yet been approved by USEPA. Unclassifiable areas are areas where insufficient data exists to classify the area as either attainment or nonattainment and are assumed to be in attainment with the National AAQS.

Lee County is part of the Southwest Florida Intrastate Air Quality Control Region (AQCR), which includes Charlotte, Collier, De Soto, Glades, Hendry, Highlands, Lee and Sarasota Counties (40 CFR 81.97). Lee County and all of Florida is designated as attainment or unclassifiable (and presumed to be in attainment) with the National AAQS for all currently regulated criteria pollutants (Total Suspended Particulates [TSP], SO₂, NO₂, CO, Pb, and 1-hour O₃ at 40 CFR 81.310 and PM₁₀, SO₂, NO₂, CO, Pb, and 1-hour O₃ at Rule 62-204.340, F.A.C.).

Areas that were once considered to be nonattainment for one or more AAQS but are now designated as attainment or unclassifiable are considered to be "maintenance" areas. The name refers to the various regulatory requirements applied to state agency and/or emission sources in order to "maintain" future compliance with AAQS. In Florida, there are maintenance areas for O₃, Pb, and TSP, which was replaced by the AAQS for PM₁₀. The nearest maintenance areas are in the Miami and Tampa metropolitan areas. The Miami O₃ maintenance area, consisting of Broward, Dade, and Palm Beach Counties, is more than 85 km east of the LCERF. The Tampa O₃ maintenance area (Pinellas and Hillsborough Counties) is about 120 km from the facility while the Tampa Pb and TSP maintenance areas (portions of Hillsborough County) are about 150 km north-northwest of the LCERF. None of these maintenance areas are considered to be "nearby" for regulatory purposes (less than 50 km) so no permitting requirements apply to the LCERF as a result of these maintenance areas.

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

**SECTION 6
AIR QUALITY IMPACT ANALYSES**

October 31, 2002

SECTION 6

AIR QUALITY IMPACT ANALYSES

Air quality impact analyses for the immediate project vicinity required by the Prevention of Significant Deterioration (PSD) regulations (see Section 2) are addressed in this section. Air quality impact analyses for the Everglades National Park (a Class I area), Air Quality Related Values (AQRV), and other modeling analyses such as the deposition analyses for the Human Health and Ecological Risk Assessments are given in Section 7.

As discussed in Section 1, Lee County intends to expand the Lee County Energy Recovery Facility (LCERF) by adding a third municipal waste combustor (MWC) to the two existing units. Air pollution control (APC) equipment for the new unit will be similar to APC equipment for the two existing units. The APC system will include a spray dry absorber (SDA), a fabric filter (FF) baghouse, an activated carbon injection (ACI) system, and a selective non-catalytic reduction (SNCR) system.

Maximum increases in facility impacts for the criteria pollutants due to the new MWC were determined for comparison to significant impact levels (SILs) as required by the regulations and modeling guidance. As will be shown, these maximum increases are less than the SILs, so additional multi-source modeling analyses are not required. Since such small increases are considered negligible, no assessment of compliance with ambient air quality standards (AAQS) and Class II PSD increments is required. Plume rise for the two existing units will be enhanced by the addition of the third unit so the increases in facility impacts will be less than the proportional increases in facility emissions. Although not required by the modeling guidelines, modeling analyses were performed for all three MWC units to demonstrate that the LCERF will continue to comply with all AAQS and PSD increments. In addition, a comparison of maximum increases in facility impacts to the de minimis monitoring levels is included for PSD pollutants. Finally, a comparison of maximum increases in facility impacts to Florida Ambient Reference Concentrations (ARCs) is included for non-criteria pollutants.

6.1 MODEL SELECTION AND OPTIONS

Air quality models are employed to assess the potential impacts of proposed sources on ambient air quality. The models mathematically simulate the dispersion of pollutants in the atmosphere. The models estimate potential concentrations at user-specified locations (i.e., "receptors") based on the source characteristics, meteorological data, and model options selected by the user. A modeling protocol was submitted to the Florida Department of Environmental Protection (FDEP), Region IV of the U.S. Environmental Protection Agency (USEPA), and the National Park Service (NPS) Federal Land Manager. The modeling of the LCERF was performed in accordance with the modeling protocol and the agency comments.

The LCERF vicinity is relatively flat, with no terrain approaching the height of the facility stack. Therefore, a "simple" terrain model is required for the impact assessment (i.e., complex terrain model not required) and terrain heights were not considered in the

modeling analyses. Since less than 50% of the area within 3 kilometers (km) of the LCERF stack is considered to be urban land uses (i.e., commercial, industrial, or compact residential areas), rural dispersion curves are required in the impact assessment. Therefore, the latest version of the USEPA Industrial Source Complex -- Short-Term (ISCST3) model was selected to estimate facility impacts. ISCST3 is the USEPA-recommended model for estimating point source impacts in simple terrain under rural dispersion conditions.

In addition to flat terrain and rural dispersion curves, other ISCST3 options include concentration estimates assuming non-reactive gaseous emissions using the default regulatory option. Since ISCST3 only considers non-reactive pollutants, secondary pollutants not emitted directly by the facility such as ozone and particulate matter with an aeronaual diameter less than 2.5 microns ($PM_{2.5}$) (with significant contributions from nitrates and sulfates) were not considered. Also, all nitrogen oxides (NO_x) emissions (predominantly in the form of nitric oxide [NO]) were assumed to be nitrogen dioxide [NO_2] for comparison to AAQS, SILs, and PSD increments (i.e., the ozone limiting and ambient ratio methods were not used). No plume decay or depletion was considered for the PSD analyses in this section. Wet and dry deposition considering both gaseous and particulate pollutant distributions is discussed in Section 7 for the Risk Assessments. Averaging times of 1-hour, 3-hours, 8-hours, 24-hours, and annual periods appropriate for each pollutant based on the AAQS, SILs, PSD increments, and ARCs were modeled. Maximum and second-high short-term concentrations (24-hours or less) for each year of meteorological data modeled were output from ISCST3 along with annual concentrations for each year. Maximum short-term and annual concentrations from all years were used for comparison to SILs, de minimis monitoring levels, and ARCs. High second-high short-term concentrations and maximum annual concentrations were used for comparison to AAQS and PSD increments. The use of the 24-hour high second-high concentration is more conservative for comparison to the 24-hour PM_{10} AAQS than the sixth-highest concentration over five years sometimes used. Also, maximum modeled 24-hour lead concentrations were conservatively used in place of quarterly concentrations.

Information necessary to execute ISCST3 includes hourly averages of meteorological data, emission source conditions (release height, stack diameter, etc.), and the locations for estimating facility impacts (receptors). These are described below.

6.2 METEOROLOGICAL DATA

ISCST3 considers the effect of meteorology on plume rise and dispersion in order to estimate ambient pollutant concentrations due to modeled emissions sources. Hourly averages of surface meteorological data -- wind speed and direction, temperature, atmospheric stability, pressure, relative humidity, and precipitation -- from the Fort Myers Airport (Page Field) were used in this case. The Fort Myers Airport (Page Field) is the nearest National Weather Service (NWS) surface station and is about 12 kilometers (km) southwest of the LCERF. Given the similar exposure and close physical proximity, data from the Fort Myers (Page Field) airport are very representative of surface meteorological conditions at the LCERF. Radiosonde data from Tampa International

Airport, about 165 km to the north, were also used. Twice-daily mixing heights processed by the National Climatic Data Center (NCDC) for Tampa, the nearest NWS upper air station on the Gulf Coast, are similar to the project site due to similar exposures along the Florida Gulf Coast.

Meteorological data for input to the ISCST3 model were processed with USEPA program PCRAMMET for calendar years 1990 through 1994, the last five full years of complete and available records. Surface characteristics representative of the project vicinity input to PCRAMMET were Minimum Monin-Obukhov length of 2 meters (m), measurement and project site surface roughness lengths of 0.20 m, noontime albedo of 0.20, Bowen ratio of 0.5, fraction of net radiation absorbed by the ground of 0.15, and anthropogenic heat flux of 0 Watts/square-meter. These surface characteristics are based on PCRAMMET recommendations (USEPA, 1999c, pp. 3-6 to 3-8 and Appendix B) for rural agricultural areas or summer values for cultivated land. The Fort Myers anemometer height is 20 feet.

6.3 RECEPTOR DATA

Impacts are calculated by ISCST3 only for locations specified by the user. A careful selection of receptor grids is therefore required to ascertain the magnitude and location of maximum modeled impacts. For the proposed project, ambient areas outside the facility fenceline were modeled in accordance with USEPA modeling guidance. Receptor locations were based on the Universal Transverse Mercator (UTM) coordinate system. Due to the flat terrain in Lee County and southern Florida, terrain (i.e., receptor and source elevations) were not considered in the modeling analyses (FLAT model option). Flagpole receptors were also not used.

While the main facility stack meets Good Engineering Practice (GEP) criteria, maximum facility impacts are still expected in the immediate vicinity (i.e., at or near the facility fenceline) due to the flat terrain and the relatively low exhaust temperatures caused by the spray dry absorber. Therefore, along the facility fenceline and for the area within two kilometers of the stack, "fine grid" receptors spaced 100-meters apart were modeled (the minimum spacing typically required for the stack heights and fenceline distances in this modeling analysis). For two to ten kilometers from the stack, "coarse grid" receptors spaced 500-meters apart were used. Based on the coarse and fine grid results, additional 100-meter "fine grid" receptors were required west-southwest of the original fine grid to locate the maximum annual impact and location (i.e., to cover all areas within 90% of the overall maximum and second-highest impacts for all applicable averaging times with 100-meter spaced receptor grids). This additional "fine grid" was included in all the ISCST3 modeling analyses to determine maximum impacts.

6.4 SOURCE DATA

Like most modern MWCs, there are very few fugitive or minor sources associated with the LCERF. Municipal solid waste (MSW) is delivered to the enclosed tipping floor. Air from the tipping floor is used as makeup air for the combustion process, keeping this area

under negative pressure and minimizing fugitive emissions and odors. Bottom ash from the furnace grate and flyash from the APC equipment is kept wet and handled by covered conveyors or within enclosed areas (i.e., buildings). Therefore, except for increased truck traffic, there will be only negligible increases in fugitive or secondary onsite emissions due to the increase in facility throughput for Unit 3.

The only existing minor point sources at the LCERF regulated by the Title V permit are particulate matter emissions sources -- the lime silo dust collector vent and the ash building baghouse vent. Stack and emission characteristics for these two existing sources are included in Table 6-1. Other insignificant and unregulated sources listed by the Title V permit and not considered for the modeling analysis include small chemical storage tanks and silos and the cooling tower.

USEPA Method 5 stack tests in 1998 and 1999 of the ash building vent measured an average outlet grain loading of only 0.00030 grains per cubic foot (gr/cf) and an average flowrate of 16,500 cubic feet per minute (cfm), or only 0.0424 lbs/hour $[0.00030 \text{ gr/cf} \times 16,500 \text{ cf/min} \times 60 \text{ min/hr} \times \text{lb}/7000 \text{ gr}]$ (Ogden Energy Group, Inc., 1998, 1999a). The ash building vent operates almost continuously (8760 hours per year [hrs/yr]), with actual annual emissions of about 0.2 tons/year $(0.0424 \text{ lb/hr} \times 8760 \text{ hrs/yr} \times \text{ton}/2000 \text{ lbs})$. Outlet grain loadings and PM emissions would be expected to be relatively insensitive to inlet grain loadings due to the design of the baghouses, the obviously low particulate concentrations inside the ash handling building, and the very low particulate emission rate. Therefore, the change in facility throughput would not be expected to affect PM emissions from the ash building vent. Even if operation of Unit 3 causes a 50% increase in actual emissions, it would only be 186 lbs/year. As can be seen, actual emissions are very much less than permitted emissions of 0.010 gr/cf and 26,290 cfm (2.25 lbs/hr), so no changes are needed to permitted emission levels.

The existing lime silo stores pebble lime used to control acid gas emissions from the two existing MWCs. Unlike volatile organic compound (VOC) storage tanks (with gaseous vapors), no breathing losses would be expected. The only emissions would occur during filling operations when about 26 tons of pebble lime is added to the silo by delivery truck. Filling the existing lime silo typically takes less than 100 minutes. There are approximately 74 deliveries per year under existing conditions based on records for the first half of calendar year 2000. The only permit limit for the existing lime silo dust collector is no visible emissions (less than 5% opacity) during filling operations.

A second lime silo will be added for the proposed third MWC Unit. PM emissions during filling of the additional lime silo will be controlled with a dust collector designed for an outlet grain loading of 0.015 grains per dry standard cubic foot (gr/dscf) and equipped with a fan/motor rated at 1200 scfm. Filling the new proposed lime silo is expected to take about one hour for 20 tons of lime. Based on the current 74 fills/year (at 26 tons per fill) for the existing lime silo, the new lime silo will require about 48 fills/year (at 20 tons per fill). This gives short-term emissions of 0.154 lb/fill $(0.015 \text{ gr/dscf} \times 1200$

**TABLE 6-1
STACK CHARACTERISTICS**

FACILITY SOURCES	ENGLISH UNITS	METRIC UNITS
MAIN FACILITY STACK^a		
Stack Height Above Base	275 feet	83.82 meters
Flue Diameter – New And Old Units	6 feet 2.00 inches	1.880 meters
Effective Diameter – 2 Units	8 feet 8.65 inches	2.658 meters
Effective Diameter – 3 Units	10 feet 8.17 inches	3.256 meters
Stack Location:		UTM Zone 17
East	81° 45' 41" West Longitude	424.20 UTM kilometers
North	26° 37' 54" North Latitude	2945.70 UTM kilometers
EXISTING LIME SILO DUST COLLECTOR VENT^b		
Stack Height Above Base	102 feet	31.09 meters
Exit Temperature	Ambient	Ambient
Vent Diameter	12 inches	0.305 meters
Exit Flows	1000 acfm ^c	6.5 meters/second
Short-Term PM Emissions (1 fill/day)	0.214 lb/fill	1.12E-3 g/s
Annual PM Emissions (74 fills/year)	15.836 lb/year	2.28E-4 g/s
PROPOSED LIME SILO DUST COLLECTOR VENT^d		
Stack Height Above Base	85 feet	25.91 meters
Exit Temperature	Ambient	Ambient
Vent Diameter	8 inches	0.203 meters
Exit Flows	1200 acfm ^e	17.5 meters/second
Short-Term PM Emissions (1 fill/day)	0.154 lb/fill	8.09E-4 g/s
Annual PM Emissions (48 fills/year)	7.39 lb/year	1.06 E-4 g/s
ASH HANDLING BUILDING DUST COLLECTOR VENT^f		
Stack Height Above Base	58 feet 7.25 inches	17.86 meters
Exit Temperature	Ambient	Ambient
Vent Diameter	2.8 feet	0.853 meters
Exit Flows (Design)	25000 acfm	20.6 meters/second
Exit Flows (Actual)	16500 acfm	13.6 meters/second
PM Emissions		
Permit Limit (0.010 gr/cf @ 26290 acfm)	2.25 lb/hr	0.2835 grams/second
Actuals (0.00030 gr/cf @ 16500 acfm)	0.0424 lb/hr	0.0053 grams/second
Actual Increases/Short-Term	0.0212 lb/hr	0.0027 grams/second
Actual Increases/Annual (8760 hrs/yr)	186 lb/yr	0.0027 grams/second

^a Since the actual stack height (276 feet) is greater than GEP stack height (275 feet), GEP stack height is used in the modeling analyses.

^b Existing lime silo dust collector vent location (UTM Zone 17): 424.249 km East and 2945.699 km North. Since the actual stack height (102 feet) is less than formula GEP stack height (275 feet), building dimensions were input into ISCST to include building wake effects on this emission source.

^c There is no lime silo fan – exhaust is due to the displacement caused by the pebble lime and the excess air used to pump the lime into the silo. Approximately 26 tons of pebble lime are delivered in 100 minutes through a pneumatic 4-inch delivery hose. Actual volumetric flow rates would be around 1000 acfm (115 x 26 tons x 2000 lbs/ton / [60 lb/ft³ x 100 minutes]) assuming a 115:1 air to lime volumetric ratio. This should be conservative in that the pebble lime and air would need to pass through the 4-inch diameter delivery hose at about 130 mph.

^d Proposed lime silo dust collector vent location (UTM Zone 17): 424.249 km East and 2945.717 km North. Since the actual stack height (85 feet) is less than formula GEP stack height (275 feet), building dimensions were input into ISCST to include building wake effects on this emission source.

^e Actual flowrates are conservatively assumed to be equal to the dry standard design flowrate and the exhaust temperature is conservatively assumed to be ambient temperature.

^f Ash handling building dust collector vent location (UTM Zone 17): 424.203 km East and 2945.758 km North. Since the actual stack height (58.6 feet) is less than formula GEP stack height (275 feet), building dimensions were input into ISCST to include building wake effects on this emission source.

dscf/min x 60 min/fill / 7000 gr/lb) and annual emissions of 7.39 lb/year (0.154 lbs/fill x 48 fills/year). Assuming the same outlet grain loading for the existing silo, current emissions are 0.214 lbs/fill (0.015 gr/acf x 1000 acf/min x 100 min/fill / 7000 gr/lb) and 15.836 lb/year (0.214 lb/fill x 74 fills/year). Because these emission rates are negligible, modeling analyses for the three minor PM sources were only included in the final PM modeling analyses. The lime silo information presented above is provided to allow an assessment of the impact from this type of operation based on prior operations. These values should not be included as a permit condition since emissions are insignificant and the County is only requesting an opacity limit.

The only PSD significant increase in emissions is due to the proposed MWC unit itself. Emissions for Unit 3 will be vented from a third flue in the existing facility stack shell, which already contains two flues for the existing units. An equivalent stack diameter was therefore used to represent the total area of the flues in service when performing both screening and refined modeling analyses. The main facility stack characteristics are shown on Table 6-1.

Input data to the dispersion models include emissions and stack characteristics. Emission rates reflect the requirements of the best available control technology (BACT) analysis described elsewhere. Due to the heterogeneous nature of MSW, each MWC can operate under a range of conditions. The proposed third unit will be capable of operating under a variety of thermal loads (from 60% to 110% of a nominal 250 million British Thermal Units per hour (MMBTU/hr) gross heat input) and refuse throughputs (from 60% to 110% of a nominal 600 tons/day) based on a wide range of possible MSW heat contents (from about 3,800 to 6,000 BTU per pound of MSW). This operating window is shown on Figure 6-1. Stack characteristics such as flue gas volume, temperature, and emissions for six conditions which bound the operating window are shown on Table 6-2 for the proposed MWC unit.

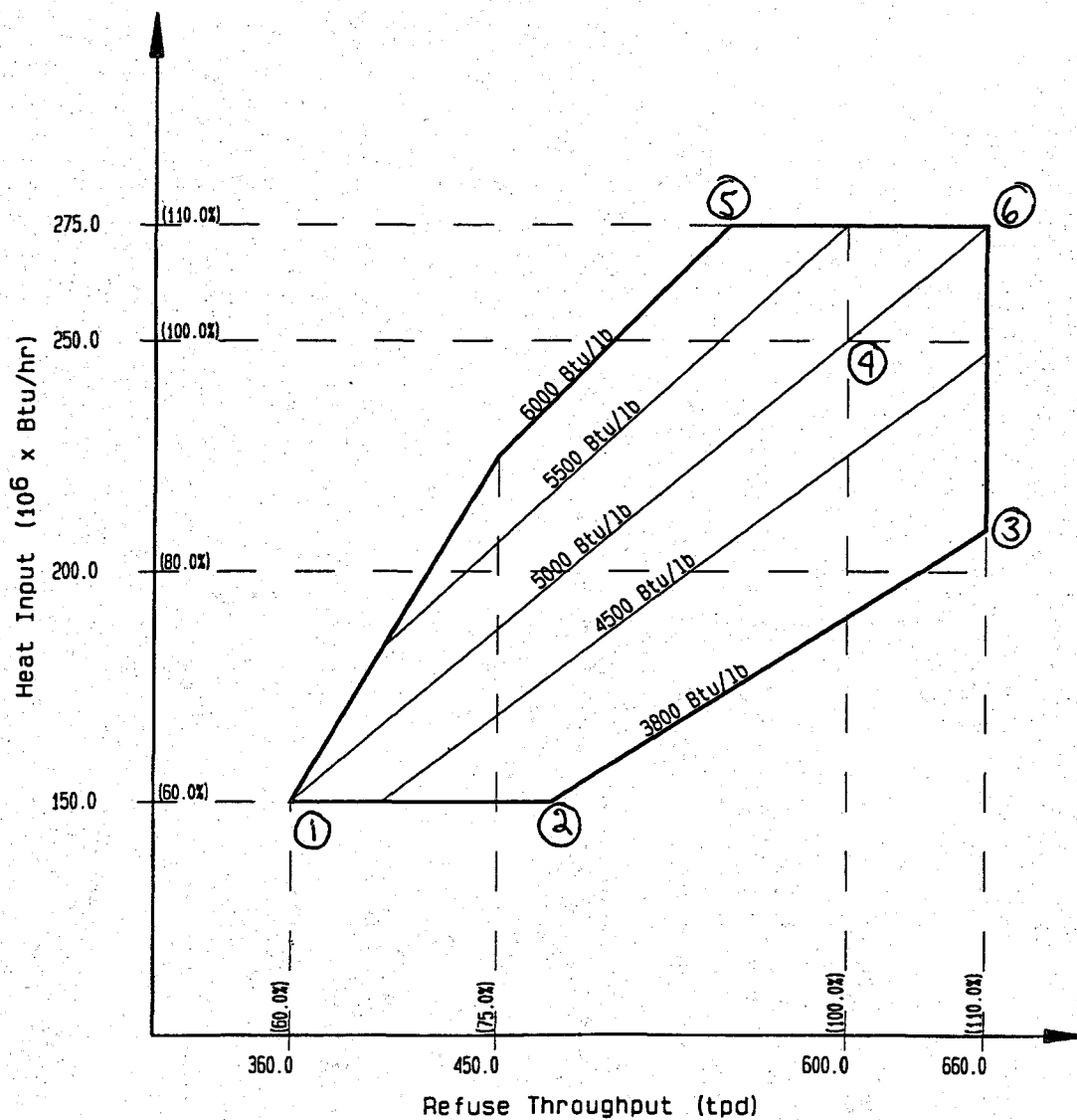
"Formula" GEP stack height is defined for each nearby structure, or combination of nearby structures, as the structure height plus 1.5 times the lesser of the projected structure height or width. If multiple structures result in more than one GEP stack height for a particular source, then the maximum GEP stack height is controlling. Only "nearby" structures are considered in the GEP analysis. "Nearby" structures are considered to be structures located less than 5.0 times the lesser of the structure height or maximum projected width from the source location. The modeled stack height in air quality analyses for PSD purposes is limited to formula GEP stack height or 65 meters, whichever is greater, for stack heights greater than GEP stack height. Air quality modeling for stacks less than formula GEP stack height must consider building-induced turbulence effects.

The tallest structure at the LCERF is the boiler enclosure building, 110 feet above grade as shown in the cross-sectional view on Figure 6-2. Since this structure is very much wider than tall and within five building heights of all the modeled sources as shown in the plan view on Figure 6-3, GEP stack height for all modeled sources is 275 feet (2.5 times

FIGURE 6-1
MUNICIPAL WASTE COMBUSTOR UNIT 3 OPERATING WINDOW

STOKER CAPACITY DIAGRAM

Lee County Expansion



Date: 10/3/01

TABLE 6-2
STACK GAS CONDITIONS FOR PROPOSED MWC UNIT 3

Case Number	1	2	3	4	5	6
BTU/lb HHV	5000	3800	3800	5000	6000	5000
Tons MSW/day	360	474	660	600	550	660
MMBTU/hour	150	150	209	250	275	275
Exit Temperature (°F)	270	270	270	270	270	270
Volumetric Flow (acfm)	82,423	80,174	109,918	137,611	155,805	151,111
Exit Velocity (m/s)	14.019	13.637	18.696	23.406	26.501	25.702
DSCFM at Actual %O ₂	49,490	46,026	63,058	82,645	96,091	90,732
Actual %O ₂ (Dry Basis)	10.90%	10.38%	10.39%	10.90%	11.38%	10.90%
DSCFM at 7% O ₂	35,598	34,845	47,711	59,461	65,868	65,264

POLLUTANT EMISSIONS FOR PROPOSED MWC UNIT (LB/HR)

CO (100 ppm _{dv})	15.527	15.199	20.811	25.936	28.730	28.467
NO _x (150 ppm _{dv})	38.258	37.449	51.276	63.904	70.790	70.141
SO ₂ (29 ppm _{dv})	10.300	10.082	13.805	17.204	19.058	18.883
80% Control (100 ppm _{dv})	35.517	34.765	47.602	59.325	65.718	65.115
HCl (25 ppm _{dv})	5.054	4.947	6.774	8.442	9.352	9.266
95% Control (125 ppm _{dv})	25.271	24.737	33.870	42.211	46.760	46.331
PM (0.009 gr/dscf)	2.746	2.688	3.681	4.587	5.081	5.035
Cd (20 ug/dscm)	2.67e-03	2.61e-03	3.57e-03	4.46e-03	4.94e-03	4.89e-03
Pb (200 ug/dscm)	2.67e-02	2.61e-02	3.57e-02	4.46e-02	4.94e-02	4.89e-02
Hg (70 ug/dscm)	9.33e-03	9.14e-03	1.25e-02	1.56e-02	1.73e-02	1.71e-02
85% Control (172.5 ug/dscm)	2.30e-02	2.25e-02	3.08e-02	3.84e-02	4.26e-02	4.22e-02
Total PCDD/F (13 ng/dscm)	1.73e-06	1.70e-06	2.32e-06	2.90e-06	3.21e-06	3.18e-06
HF (3.5 ppm _{dv})	0.388	0.380	0.520	0.648	0.718	0.712
VOC (30 ppm _{dv})	2.667	2.611	3.575	4.456	4.936	4.890
Beryllium (0.16 ug/dscm)	2.13e-05	2.09e-05	2.86e-05	3.56e-05	3.95e-05	3.91e-05
Sulfuric Acid (16.68 ppm _{dv})	9.070	8.878	12.156	15.150	16.782	16.628
Arsenic (10.74 ug/dscm)	1.43e-03	1.40e-03	1.92e-03	2.39e-03	2.65e-03	2.63e-03
Ammonia (50 ppm _{dv})	4.712	4.612	6.315	7.871	8.719	8.639



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**GENERAL ARRANGMENT
SECTION A-A**

LEE COUNTY SOLID WASTE RESOURCE RECOVERY F.

OGDEN MARTIN SYSTEMS OF LEE

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CLASS	BAR	PROJECT NO.	
		C-1033	
APPROVED	DATE	APPROVED	DATE
WED 2/1/93		7102-F-210901	



DATE	MR	PHONE NO.	pg.
WCS 4/14/93		7102-E-260500	

SUBCONTRACT OR PURCHASE ORDER	FOR BIDDING	FOR AWARD	FOR CONSTRUCTION

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110 feet). Since the main facility stack height of 276 feet is greater than GEP stack height of 275 feet, 275 feet was used as the stack height in all the air quality modeling analyses. Building-induced turbulence need not be considered in the modeling analysis for the main facility stack. However, GEP stack height for the two minor PM sources of 275 feet is greater than their actual stack heights so building wake effects must be considered for these sources. Therefore, Building Profile Input Program (BPIP) was used to determine appropriate building dimensions for input to the final PM₁₀ ISCST modeling analyses.

6.5 SCREENING MODELING ANALYSIS

Due to the variability in operating conditions, a screening analysis was performed to determine the "worst-case" source configuration. For the proposed MWC, ISCST3 modeling was performed for each source configuration shown on Table 6-2. These source conditions consider various MSW heat contents (from 3,800 to 6,000 BTU/lb) and facility throughputs (from 360 to 660 tons/day). Since emission limits are specified in ppm_{dv}, gr/dscf, or ug/dscm for dry standard conditions at 7% oxygen, emissions for the proposed MWC unit are proportional to the dry standard flow rates corrected to 7% oxygen. Therefore, for the screening analyses, "unitized" emissions were ratioed from the dry standard flow rates to give MWC unit emissions of 1 gram/second (g/s) at nominal conditions (600 tons/day and 5000 BTU/lb).

In order to tabulate the modeling results for each pollutant shown on the bottom of Table 6-3, the "unitized" screening results shown on the top of Table 6-3 for the appropriate averaging time are multiplied by the emission rates for each pollutant shown on Table 6-2 for nominal (Case 4) conditions and 0.126 g/s per lb/hr (the "unitized" emission rates modeled already include the difference between nominal emissions and emissions for each Case) as follows:

$$\text{Conc}(\text{pollutant})_{\text{Case}_X} = \text{Conc}(\text{unitized})_{\text{Case}_X} \times Q_{\text{lb/hr}_{\text{Case}_4}} \times 0.126 \text{ g/s per lb/hr}$$

Maximum ISCST3 screening results are shown on Table 6-3 using all five years (1990-1994) of Fort Myers meteorological data. For the proposed unit, maximum impacts occur for Cases 5 and 6 -- the unit operating at its maximum rated gross heat input capacity of 275 MMBTU/hour with differing BTU/lb wastes. Case 6 represents 660 tons/day at 5,000 BTU/lb while Case 5 represents 550 tons/day at 6,000 BTU/lb. These two cases were also the same cases previously predicted as worst-case in the original PSD permit application (in the original application, these two cases were essentially identical since emissions and dry standard flow rates were based on gross heat input). Generally, Case 5 produces higher impacts for 1-hour and 3-hour maximum impacts and high second-high 24-hour impacts while Case 6 produces higher impacts for maximum and high second-high impacts for other averaging times. Since Case 5 and 6 impacts are similar, the remaining modeling for the PSD permit application considered both cases.

TABLE 6-3
ISCST3 SCREENING RESULTS FOR PROPOSED MWC UNIT ONLY

Case Number	1	2	3	4	5	6
"UNITIZED" EMISSION RATES FOR MODELING PROPOSED UNIT (g/s) ^a						
1 Unit (New)	0.599	0.586	0.802	1.000	1.108	1.098
SCREENING RESULTS FOR "UNITIZED" EMISSION RATES FOR PROPOSED MWC UNIT (ug/m ³)						
1-Hour Maximum	2.05193	2.00739	2.65909	3.24606	3.56857	3.54312
1-Hour High Second-High	1.68613	1.67602	1.84911	1.96352	2.00918	2.06690
3-Hour Maximum	1.16398	1.15890	1.26647	1.29323	1.40802	1.39931
3-Hour High Second-High	0.99772	0.99048	1.11431	1.17944	1.21170	1.21212
8-Hour Maximum	0.70835	0.70475	0.78457	0.85150	0.87588	0.88387
8-Hour High Second-High	0.63273	0.63044	0.68940	0.72073	0.73925	0.74682
24-Hour Maximum	0.31877	0.31684	0.36245	0.38743	0.39863	0.40190
24-Hour High Second-High	0.26549	0.26239	0.24129	0.27316	0.28999	0.28916
Annual Maximum	0.02193	0.02183	0.02428	0.02580	0.02653	0.02677
ISCST3 SCREENING RESULTS BY POLLUTANT (ug/m ³)						
CO 1-Hour Maximum	6.706	6.560	8.690	10.608	11.662	11.579
CO 8-Hour Maximum	2.315	2.303	2.564	2.783	2.862	2.888
NO _x Annual Maximum	0.177	0.176	0.196	0.208	0.214	0.216
SO ₂ 3-Hour Maximum	8.701	8.663	9.467	9.667	10.525	10.460
SO ₂ 24-Hour Maximum	2.383	2.368	2.709	2.896	2.980	3.004
SO ₂ Annual Maximum	0.164	0.163	0.181	0.193	0.198	0.200
HCl 1-Hour Maximum	10.913	10.676	14.143	17.264	18.980	18.844
HCl Annual Maximum	0.117	0.116	0.129	0.137	0.141	0.142
PM ₁₀ 24-Hour Maximum	0.184	0.183	0.209	0.224	0.230	0.232
PM ₁₀ Annual Maximum	0.013	0.013	0.014	0.015	0.015	0.015
Cd 1-Hour Maximum	1.15e-03	1.13e-03	1.49e-03	1.82e-03	2.01e-03	1.99e-03
Cd Annual Maximum	1.23e-05	1.23e-05	1.36e-05	1.45e-05	1.49e-05	1.50e-05
Pb 1-Hour Maximum	1.15e-02	1.13e-02	1.49e-02	1.82e-02	2.01e-02	1.99e-02
Pb Annual Maximum	1.23e-04	1.23e-04	1.36e-04	1.45e-04	1.49e-04	1.50e-04
Hg 1-Hour Maximum	9.93e-03	9.71e-03	1.29e-02	1.57e-02	1.73e-02	1.71e-02
Hg Annual Maximum	1.06e-04	1.06e-04	1.17e-04	1.25e-04	1.28e-04	1.30e-04
Total PCDD/F 1-Hour Max	7.50e-07	7.34e-07	9.72e-07	1.19e-06	1.30e-06	1.29e-06
Total PCDD/F Annual Max	8.01e-09	7.98e-09	8.87e-09	9.43e-09	9.69e-09	9.78e-09
HF 1-Hour Maximum	1.68e-01	1.64e-01	2.17e-01	2.65e-01	2.91e-01	2.89e-01
HF Annual Maximum	1.79e-03	1.78e-03	1.98e-03	2.11e-03	2.17e-03	2.19e-03
Be 1-Hour Maximum	9.20e-06	9.00e-06	1.19e-05	1.46e-05	1.60e-05	1.59e-05
Be Annual Maximum	9.84e-08	9.79e-08	1.09e-07	1.16e-07	1.19e-07	1.20e-07
H ₂ SO ₄ 1-Hour Maximum	3.917	3.832	5.076	6.196	6.812	6.763
H ₂ SO ₄ Annual Maximum	0.042	0.042	0.046	0.049	0.051	0.051
As 1-Hour Maximum	6.18e-04	6.05e-04	8.01e-04	9.78e-04	1.07e-03	1.07e-03
As Annual Maximum	6.60e-06	6.57e-06	7.31e-06	7.77e-06	7.99e-06	8.06e-06
Ammonia 1-Hour Maximum	2.035	1.991	2.637	3.219	3.539	3.514
Ammonia Annual Maximum	0.022	0.022	0.024	0.026	0.026	0.027

^a "Unitized" emissions for screening purposes are calculated by ratioing the dscfm flowrate at 7% O₂ for each case to normal conditions (Case 4), or $g/s_{Case\ X} = DSCFM_{Case\ X} / 59461\ dscfm\ at\ 7\%\ O_2$.

6.6 REFINED MODELING ANALYSIS

Since the new MWC unit will be operating in addition to the existing units, additional modeling was performed to determine the maximum increase in facility impacts as well as maximum impacts due to the combined facility (proposed unit + existing units). The stack characteristics and permitted emissions for the existing facility are shown on Table 6-4. Stack characteristics from the original PSD application and permitted emission rates are shown as Cases A and B for one and two units, respectively. These two cases were modeled by themselves (as Cases A and B) as well as in combination with Cases 5 and 6 for the proposed unit -- giving rise to Cases C and D for Case 5 conditions and Cases E and F for Case 6 conditions. For the combined (existing + proposed) conditions, stack exit temperatures and oxygen contents were weighted for dry standard flowrates at actual % O₂ conditions shown on Tables 6-2 and 6-4. Dry standard flowrates at actual % O₂ conditions were added and new acfm and dry standard flowrates at 7% O₂ calculated accordingly. The modeled stack diameter was set equal to the equivalent diameter for the number of flues in service as shown on Table 6-1.

Modeling results for the existing (Cases A and B) and combined (Cases C through F) facility configurations are shown on Table 6-5. In order to tabulate the modeling results for each pollutant shown on the bottom of Table 6-5, the "unitized" screening results shown on the top of Table 6-5 for the appropriate averaging time are multiplied by the emission rates shown on Table 6-4 for the appropriate case and 0.126 g/s per lb/hr (since the "unitized" emission rate modeled on this table is 1 g/s for all cases [unlike the previous Table 6-3], emissions from the appropriate case on Table 6-4 must be used) as follows:

$$\text{Conc}(\text{pollutant})_{\text{Case}_X} = \text{Conc}(\text{unitized})_{\text{Case}_X} \times Q \text{ lb/hr}_{\text{Case}_X} \times 0.126 \text{ g/s per lb/hr}$$

As can be seen on Table 6-5, maximum facility impacts occur with two (Case E) or three (Case F) operating units under Case 6 conditions for the new MWC unit (660 tons/day/unit at 5000 BTU/lb). Maximum 1-hour impacts are greater for two operating units than three due to a single hour of unusual meteorological conditions of limited vertical mixing and plume rise for two vs. three units. Maximum and high second-high impacts for other averaging times (including 1-hour high second-high) occurred for the expected worst-case of three operating units (Case F). In general, all of the impacts from one to three operating units were similar. As can be seen on the bottom of Table 6-6, maximum criteria pollutant impacts for three units are generally only twice the maximum impacts for one proposed or existing unit because there is enhanced plume rise caused by venting the emissions from closely spaced flues in a common stack shell.

In addition to estimating facility impacts due to emissions from both existing and proposed MWC units, modeling analyses were also performed to determine the maximum increase in facility impacts due to the proposed MWC unit. Operation of Unit 3 by itself would be expected to cause the largest increase in facility impacts. This is because plume rise for one or two existing units would be enhanced by the addition of Unit 3. However, netting analyses were included to determine the increase in facility

TABLE 6-4
STACK GAS CONDITIONS FOR LEE COUNTY FACILITY

Facility Configuration (Case)	Existing Facility Only		Proposed Case 5 + Existing Facility		Proposed Case 6 + Existing Facility	
	1 (Case A)	2 (Case B)	2 (Case C)	3 (Case D)	2 (Case E)	3 (Case F)
BTU/lb HHV	6000/5000 (Case 5/6)		6000 (Case 5)		5000 (Case 6)	
Tons MSW/Day/Unit	550/660 (Case 5/6)		550 (Case 5)		660 (Case 6)	
MMBTU/Hour/Unit	275 (Case 5/6)		275 (Case 5)		275 (Case 6)	
Exit Temperature (deg. F)	240		256	251	256	251
Volumetric Flow (acfm)	127,000	254,000	238,130	343,406	230,721	335,997
Exit Velocity (m/s)	21.601	21.601	20.251	19.470	19.621	19.050
DSCFM at Actual %O ₂	79,409	158,817	175,500	254,908	170,141	249,549
Actual %O ₂ (Dry Basis)	10.01%		10.76%	10.52%	10.49%	10.33%
DSCFM at 7% O ₂	62,213	124,426	128,055	190,268	127,473	189,686

Pollutant (Existing Unit Basis)

POLLUTANT EMISSIONS (LB/HR)

CO (100 ppm _{dv})	27.2	54.4	55.930	83.130	55.667	82.867
NO _x (180 ppm _{dv})	80	160	150.790	230.790	150.141	230.141
SO ₂ (29 ppm _{dv})	18	36	37.058	55.058	36.883	54.883
80% Control (66 ppm _{dv})	41	82	106.718	147.718	106.115	147.115
HCl (25 ppm _{dv})	8.85	17.70	18.202	27.052	18.116	26.966
95% Control (50 ppm _{dv})	17.70	35.40	64.460	82.160	64.031	81.731
PM (0.010 gr/dscf)	5.34	10.68	10.421	15.761	10.375	15.715
Cd (40 ug/dscm)	9.3e-03	1.86e-02	1.42e-02	2.35e-02	1.42e-02	2.35e-02
Pb (440 ug/dscm)	0.103	0.206	1.52e-01	2.55e-01	1.52e-01	2.55e-01
Hg (70 ug/dscm)	1.63e-02	3.26e-02	3.36e-02	4.99e-02	3.34e-02	4.97e-02
85% Control (162.4 ug/dscm)	3.79e-02	7.58e-02	8.05e-02	1.18e-01	8.01e-02	1.18e-01
Total PCDD/F (30 ng/dscm)	7.0e-06	1.4e-05	1.02e-05	1.72e-05	1.02e-05	1.72e-05
HF (5.0 ppm _{dv})	0.96	1.92	1.678	2.638	1.672	2.632
VOC (37 ppm _{dv})	5.80	11.60	10.736	16.536	10.690	16.490
Beryllium (0.16 ug/dscm)	3.70e-05	7.40e-05	7.65e-05	1.14e-04	7.61e-05	1.13e-04
Sulfuric Acid (10.35 ppm _{dv})	9.85	19.70	26.632	36.482	26.478	36.328
Arsenic (10.74 ug/dscm)	2.50e-03	5.00e-03	5.15e-03	7.65e-03	5.13e-03	7.63e-03
Ammonia (50 ppm _{dv})	8.235	16.47	16.954	25.189	16.874	25.109

TABLE 6-5
ISCST3 REFINED RESULTS FOR LEE COUNTY FACILITY

Facility Configuration	Existing Facility Only		Proposed Case 5 + Existing Facility		Proposed Case 6 + Existing Facility	
Number of Operating Units (Case)	1 (Case A)	2 (Case B)	2 (Case C)	3 (Case D)	2 (Case E)	3 (Case F)
"Unitized" Emissions (g/s)	1.000	1.000	1.000	1.000	1.000	1.000
ISCST3 REFINED RESULTS FOR "UNITIZED" FACILITY EMISSION RATE (ug/m ³)						
1-Hour Maximum	3.31027	2.96878	2.35895	1.48248	2.97061	1.48618
1-Hour High Second-High	2.29284	1.58058	1.48567	1.17293	1.58028	1.19054
3-Hour Maximum	1.57179	0.99821	0.99523	0.82491	1.00247	0.82994
3-Hour High Second-High	1.38477	0.87191	0.86257	0.69521	0.88086	0.70336
8-Hour Maximum	0.97361	0.64143	0.63554	0.53232	0.64899	0.53702
8-Hour High Second-High	0.84916	0.52055	0.51756	0.39811	0.52647	0.40546
24-Hour Maximum	0.44950	0.29177	0.28942	0.23134	0.29480	0.23494
24-Hour High Second-High	0.29721	0.23136	0.23003	0.14612	0.23274	0.14854
Annual Maximum	0.02993	0.01895	0.01883	0.01482	0.01924	0.01505
ISCST3 REFINED RESULTS BY POLLUTANT (ug/m ³)						
CO 1-Hour Maximum	11.345	20.349	16.624	15.528	20.836	15.518
CO 8-Hour Maximum	3.337	4.397	4.479	5.576	4.552	5.607
NO _x Annual Maximum	0.302	0.382	0.358	0.431	0.364	0.436
SO ₂ 3-Hour Maximum	8.120	10.314	13.382	15.354	13.404	15.384
SO ₂ 24-Hour Maximum	2.322	3.015	3.892	4.306	3.942	4.355
SO ₂ Annual Maximum	0.155	0.196	0.253	0.276	0.257	0.279
HCl 1-Hour Maximum	7.383	13.242	19.159	15.347	23.967	15.305
HCl Annual Maximum	0.0667	0.0845	0.1529	0.1534	0.1552	0.1550
PM ₁₀ 24-Hour Maximum	0.302	0.393	0.380	0.459	0.385	0.465
PM ₁₀ Annual Maximum	0.020	0.026	0.025	0.029	0.025	0.030
Cd 1-Hour Maximum	3.88e-03	6.96e-03	4.23e-03	4.40e-03	5.31e-03	4.40e-03
Cd Annual Maximum	3.51e-05	4.44e-05	3.38e-05	4.40e-05	3.44e-05	4.45e-05
Pb 1-Hour Maximum	4.30e-02	7.71e-02	4.53e-02	4.77e-02	5.69e-02	4.77e-02
Pb Annual Maximum	3.88e-04	4.92e-04	3.62e-04	4.77e-04	3.68e-04	4.83e-04
Hg 1-Hour Maximum	1.58e-02	2.84e-02	2.39e-02	2.21e-02	3.00e-02	2.21e-02
Hg Annual Maximum	1.43e-04	1.81e-04	1.91e-04	2.21e-04	1.94e-04	2.24e-04
Total PCDD/F 1-Hour Max	2.92e-06	5.24e-06	3.03e-06	3.21e-06	3.81e-06	3.22e-06
Total PCDD/F Annual Max	2.64e-08	3.34e-08	2.42e-08	3.21e-08	2.47e-08	3.26e-08
HF 1-Hour Maximum	4.00e-01	7.18e-01	4.99e-01	4.93e-01	6.26e-01	4.93e-01
HF Annual Maximum	3.62e-03	4.58e-03	3.98e-03	4.93e-03	4.05e-03	4.99e-03
Be 1-Hour Maximum	1.54e-05	2.77e-05	2.27e-05	2.12e-05	2.85e-05	2.12e-05
Be Annual Maximum	1.40e-07	1.77e-07	1.82e-07	2.12e-07	1.84e-07	2.14e-07
H ₂ SO ₄ 1-Hour Maximum	4.108	7.369	7.916	6.815	9.911	6.803
H ₂ SO ₄ Annual Maximum	0.037	0.047	0.063	0.068	0.064	0.069
As 1-Hour Maximum	1.04e-03	1.87e-03	1.53e-03	1.43e-03	1.92e-03	1.43e-03
As Annual Maximum	9.43e-06	1.19e-05	1.22e-05	1.43e-05	1.24e-05	1.45e-05
Ammonia 1-Hour Max	3.435	6.161	5.039	4.705	6.316	4.702
Ammonia Annual Max	0.031	0.039	0.040	0.047	0.041	0.048

TABLE 6-6
MAXIMUM CRITERIA POLLUTANT IMPACTS
FOR THE LEE COUNTY FACILITY EXPANSION

MAXIMUM INCREASES (ug/m³) DUE TO PROPOSED UNIT

Facility Configuration	Proposed Unit 3 Only		Proposed Case 5 + Existing Facility		Proposed Case 6 + Existing Facility	
Number of Operating Units (Case)	1 (Case 5)	1 (Case 6)	2 vs 1 (Case C)	3 vs 2 (Case D)	2 vs 1 (Case E)	3 vs 2 (Case F)
CO 1-hr Maximum	11.662	11.579	8.312	4.981	10.326	4.971
CO 1-hr High Second-High	6.566	6.754	5.038	3.867	5.494	3.841
CO 8-hr Maximum	2.862	2.888	1.649	1.410	1.721	1.434
CO 8-hr High Second-High	2.416	2.441	1.464	0.908	1.484	0.911
NO _x Annual Maximum	0.214	0.216	0.074	0.060	0.078	0.064
SO ₂ 3-hr Maximum	10.525	10.460	7.436	6.300	7.958	6.282
SO ₂ 3-hr High Second-High	9.057	9.061	5.696	4.525	6.062	4.573
SO ₂ 24-hr Maximum	2.980	3.004	1.797	1.405	1.838	1.438
SO ₂ 24-hr High Second-High	2.168	2.161	1.637	0.910	1.648	0.929
SO ₂ Annual Maximum	0.198	0.200	0.105	0.084	0.109	0.087
PM ₁₀ 24-hr Maximum	0.230	0.232 ^a	0.115	0.088	0.118	0.091
PM ₁₀ 24-hr High Second-High	0.168	0.167 ^a	0.111	0.062	0.113	0.062
PM ₁₀ Annual Maximum	0.0153	0.0155 ^a	0.006	0.005	0.006	0.005

MAXIMUM IMPACTS (ug/m³) FOR COMBINED FACILITY

Number of Operating Units	One Unit		Two Units		Three Units
Facility Configuration	Proposed Unit Only	One Existing Unit	Both Existing Units	Existing (1) + Proposed (1)	Existing (2) + Proposed (1)
CO 1-hr Maximum	11.662	11.345	20.349	20.836	15.528
CO 1-hr High Second-High	6.754	7.858	10.834	11.084	12.431
CO 8-hr Maximum	2.888	3.337	4.397	4.552	5.607
CO 8-hr High Second-High	2.441	2.910	3.568	3.693	4.234
NO _x Annual Maximum	0.216	0.302	0.382	0.364	0.436
SO ₂ 3-hr Maximum	10.525	8.120	10.314	13.404	15.384
SO ₂ 3-hr High Second-High	9.061	7.154	9.009	11.778	13.038
SO ₂ 24-hr Maximum	3.004	2.322	3.015	3.942	4.355
SO ₂ 24-hr High Second-High	2.168	1.535	2.390	3.112	2.753
SO ₂ Annual Maximum	0.200	0.155	0.196	0.257	0.279
PM ₁₀ 24-hr Maximum	0.232	0.302	0.393	0.385	0.465 ^b
PM ₁₀ 24-hr High Second-High	0.168	0.200	0.311	0.304	0.294 ^b
PM ₁₀ Annual Maximum	0.015	0.020	0.026	0.025	0.030 ^b

^a Impacts with minor particulate sources are 0.398, 0.276 and 0.054 ug/m³ for 24-hour maximum, 24-hour high second-high, and annual maximum, respectively.

^b Impacts with minor particulate sources are 1.177, 0.814 and 0.161 ug/m³ for 24-hour maximum, 24-hour high second-high, and annual maximum, respectively.

impacts due to the new MWC unit when the existing units are operating as shown on the top of Table 6-6. This is done by modeling future conditions of two or three units with positive emissions and existing conditions with one or two units with negative emissions. ISCST3 then outputs the maximum increase in ambient impacts due to the additional new MWC unit. Accordingly, to determine the maximum increase for "2 vs 1" units, Cases C and E (two units) were modeled with positive emissions and Case A (one unit) was modeled concurrently with negative emissions. For determining maximum increases for "3 vs. 2" units, Cases D and F (three units) were modeled with positive emissions and Case B (two existing units) was modeled with negative emissions. For example, the top of Table 6-6 shows that the maximum annual increase in annual NO_x impacts due to the additional MWC unit is 0.060 ug/m³ for Case D. This maximum increase in modeled concentration was calculated by ISCST by modeling the impact for the future facility consisting of three MWC units (two existing and proposed Case 5) with an emission rate of 230.790 lbs/hr (Case D on Table 6-4). Concurrently, ISCST modeled the existing facility for two operating units with a negative emission rate of 160 lbs/hr (Case B on Table 6-4). The difference in emissions of 70.79 lbs/hr (230.790 lbs/hr-160 lbs/hr) that is modeled is therefore the proposed MWC unit Case 5 (see Table 6-2). When ISCST adds the resulting concentrations of 0.405 and -0.345 ug/m³ for Case D and Case B, respectively (i.e., "3 vs. 2"), it obtains the resultant increase of 0.060 ug/m³ at that receptor for that time period. Since the ratio of the mass emission rates (lb/hr) between the existing and proposed units vary for each pollutant, separate modeling analyses are required for each pollutant. Therefore, the netting analysis was restricted to the main criteria pollutants (CO, NO_x, SO₂, and PM₁₀).

Results of the netting analysis are shown on the top of Table 6-6. As expected, maximum impacts due to the new MWC unit operating alone are always greater than when either or both of the existing MWC units are operating. Maximum increases in facility impacts (i.e., the new MWC unit operating alone) are shown in Figures 6-4 and 6-5 for 1-hour and 8-hour CO concentrations, Figure 6-6 for annual NO_x concentrations, and Figures 6-7, 6-8, and 6-9 for 3-hour, 24-hour, and annual SO₂ concentrations. Concentrations shown in these figures are the maximum impacts for any of the five years of meteorological data and for either Case 5 or Case 6.

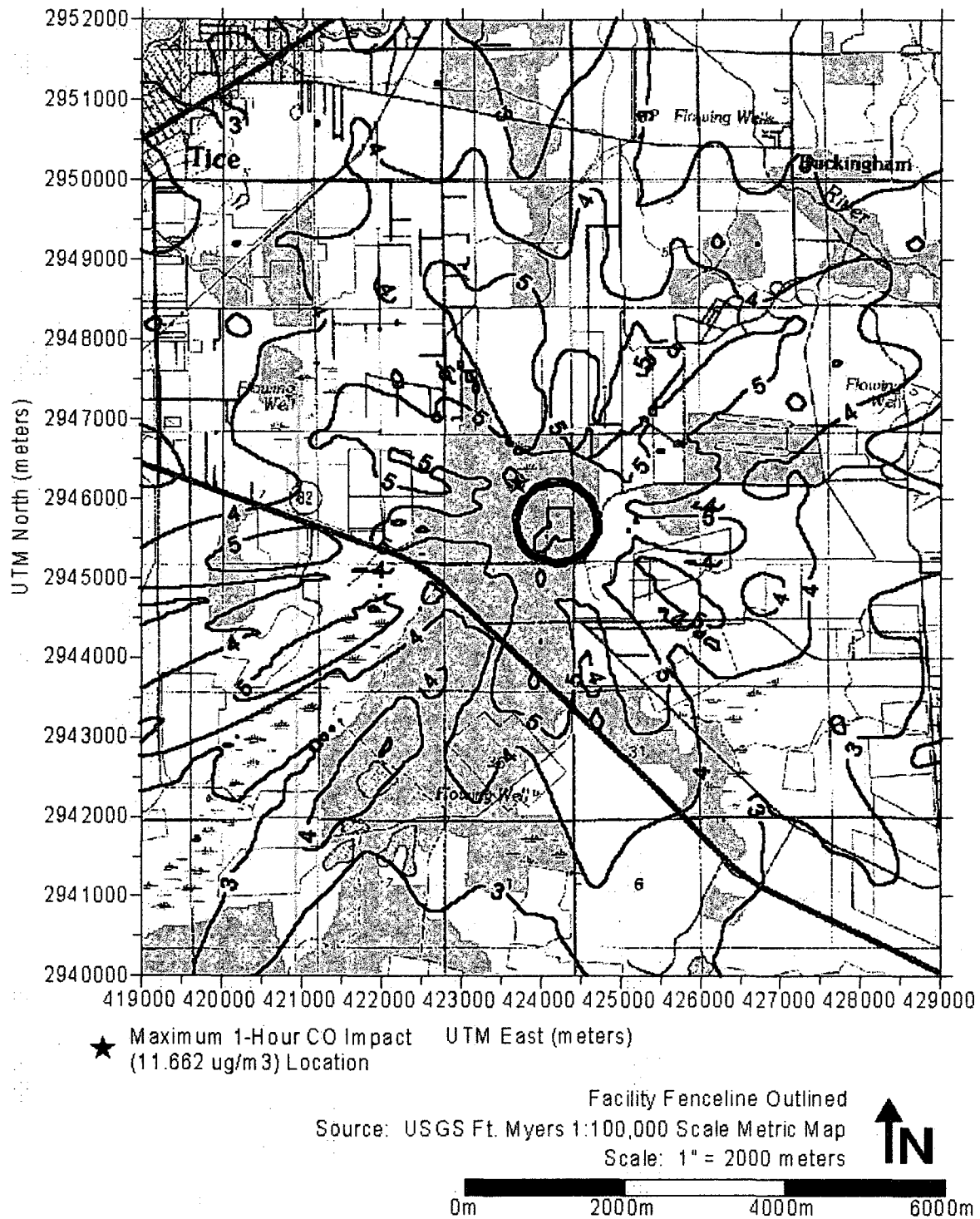
Since the existing MWC units now operate at more than 90% availability, operation of the new MWC unit by itself would be expected to be a relatively rare occurrence. As a practical matter, one of the LCERF's primary purposes is to reduce the volume of materials to be landfilled, so the most likely choice is between the new unit operating by itself versus one of the old units operating. Unit 3 will have emissions similar to or less than the existing MWC units. This case of one operating unit (i.e., the new MWC alone) would actually result in little change in modeled facility impacts.

Since compliance with PSD increments and ambient air quality standards is based on modeling high second-high short-term impacts, these impacts are included on Table 6-6. The bottom of Table 6-6 also includes a summary of the combined facility impacts for one, two, or three operating units from Tables 6-3 and 6-5 for the criteria pollutants. As can be seen, maximum impacts for the proposed unit are similar to maximum impacts for

IMAGE QUALITY

**AS YOU REVIEW THE NEXT GROUP OF IMAGES, PLEASE NOTE
THAT THE ORIGINAL DOCUMENTS WERE OF POOR QUALITY.**

FIGURE 6-4
MAXIMUM INCREASES IN FACILITY 1-HOUR CO IMPACTS ($\mu\text{g}/\text{m}^3$)



UTM North (meters)

2952000

2951000

2950000

2949000

2948000

2947000

2946000

2945000

2944000

2943000

2942000

2941000

2940000

419000 420000 421000 422000 423000 424000 425000 426000 427000 428000 429000

UTM East (meters)

★ Maximum 8-Hour CO Impact (2.888 ug/m³) Location

Facility Fenceline Outlined

Source: USGS Ft. Myers 1:100,000 Scale Metric Map

Scale: 1" = 2000 meters

0m 2000m 4000m 6000m

↑ N

Facility Fenceline Outlined
Source: USGS Ft. Myers 1:100,000 Scale Metric Map
Scale: 1" = 2000 meters

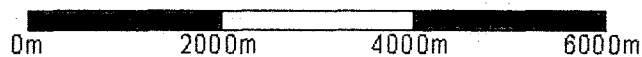


FIGURE 6-7
MAXIMUM INCREASES IN FACILITY 3-HOUR SO₂ IMPACTS (ug/m³)

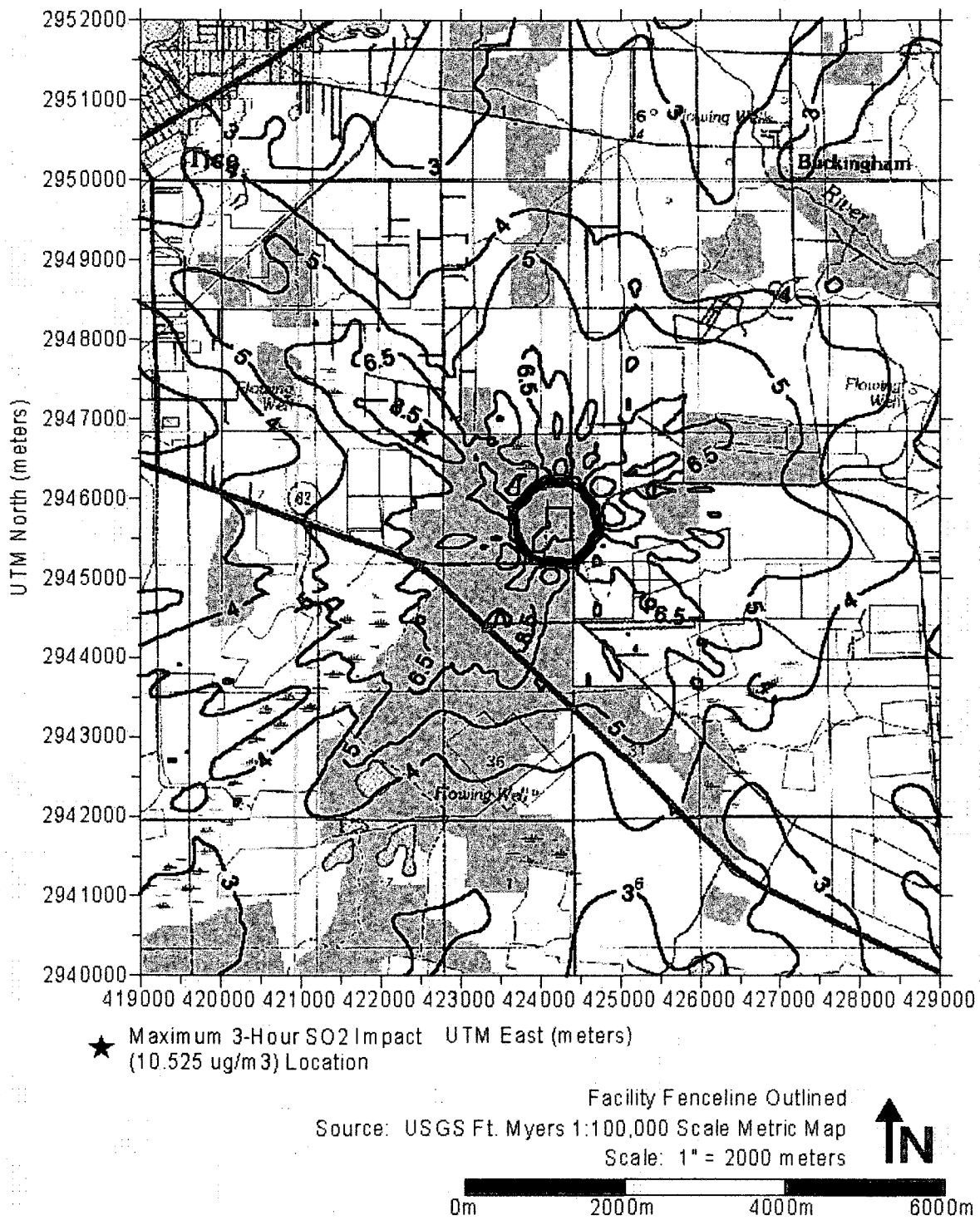


FIGURE 6-8
MAXIMUM INCREASES IN FACILITY 24-HOUR SO₂ IMPACTS (ug/m³)

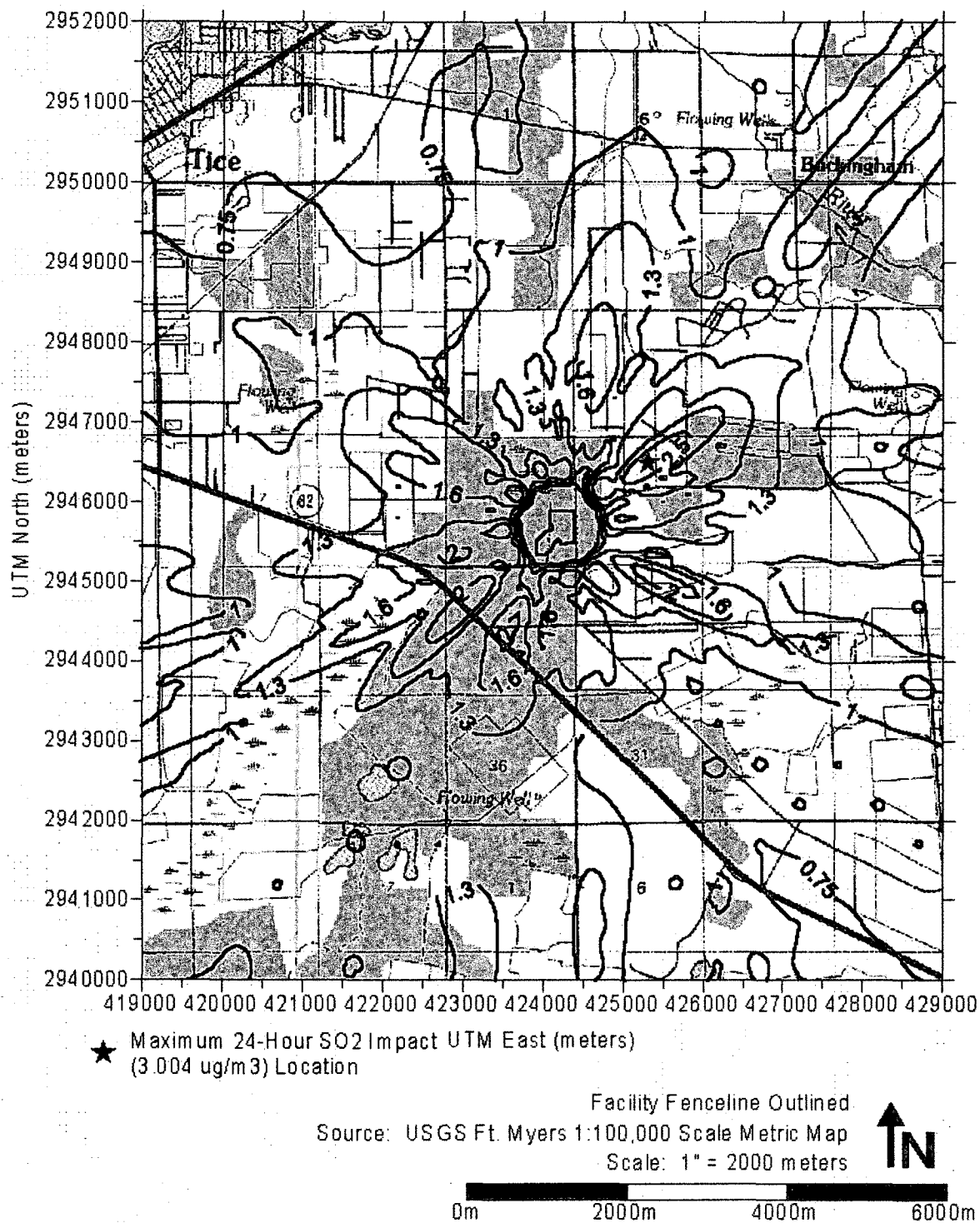
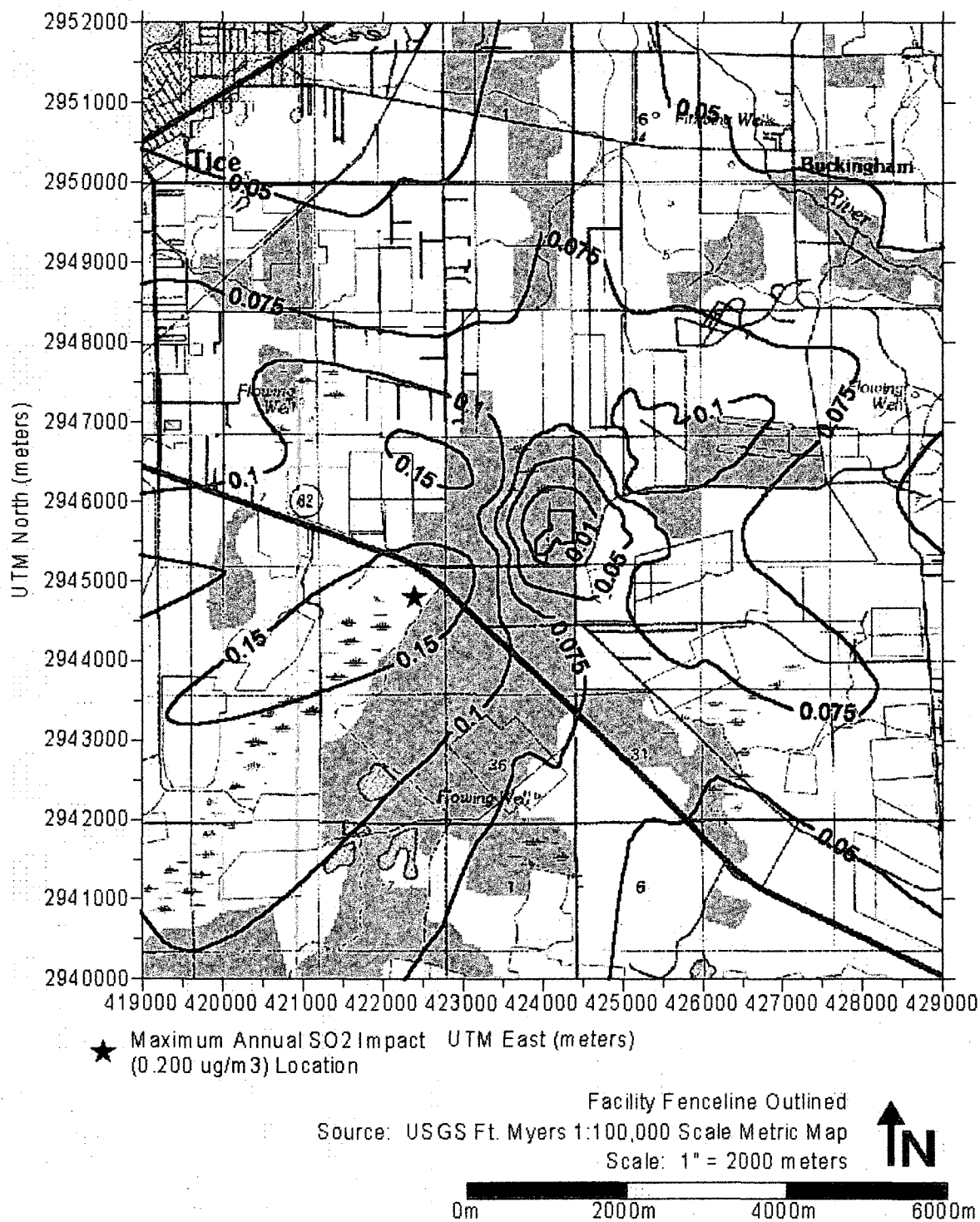


FIGURE 6-9
MAXIMUM INCREASES IN FACILITY ANNUAL SO₂ IMPACTS (ug/m³)



a single existing unit. Similarly, maximum impacts for the two existing units are similar to impacts for one existing unit plus the proposed Unit 3. Included in the PM_{10} impacts for the worst-case scenarios are the minor PM sources. Maximum increases in 24-hour and annual facility PM_{10} impacts due to the new MWC unit (Case 6) including possible increases in minor PM source emissions are shown in Figures 6-10 and 6-11.

6.7 SIGNIFICANT IMPACT LEVELS

Maximum increases in facility impacts due to Unit 3 are compared on Table 6-7 to the USEPA SILs for Class II areas. Maximum increases in facility impacts are less than the Class II SILs for all criteria pollutants (PM_{10} , SO_2 , NO_x , CO and Pb). Impacts are less than 10% of the SILs for CO, PM_{10} and Pb, about 20% of the SIL for NO_x , and 60% or less of the SILs for SO_2 . Since SILs are concentrations below which impacts are indistinguishable from background concentrations, they are generally considered to be representative of insignificant or negligible impacts. Accordingly, the proposed modification would be considered insignificant with respect to local air quality (Class I impacts in the Everglades are addressed in Section 7). Therefore, no additional impact analyses are required under PSD regulations for any of these pollutants. Maximum combined facility impacts are also compared to the SILs on Table 6-7. Again, maximum impacts for the entire facility (i.e., existing and proposed MWC units) for all criteria pollutants are less than the SILs.

6.8 DE MINIMIS MONITORING LEVELS

A proposed facility that is considered a major source under the PSD regulations is required to evaluate ambient air quality levels in the vicinity of the facility. One of the first assessments to be made is to evaluate whether ambient air quality monitoring will be required to define background air quality prior to submitting the air permit application.

Maximum increases in facility impacts due to the proposed MWC unit are compared on Table 6-8 to the USEPA de minimis monitoring levels. Maximum increases in facility impacts due to the new MWC are less than the de minimis monitoring levels for all applicable criteria and non-criteria pollutants. Since de minimis monitoring levels have been set near the lower detection limits for ambient monitoring equipment, preconstruction monitoring would not be useful because facility impacts would be difficult to detect. Therefore, no preconstruction monitoring would typically be required under PSD regulations and an exemption from ambient monitoring is requested. Maximum combined facility impacts are also compared to the de minimis monitoring levels on Table 6-8. Maximum impacts for the entire facility (i.e., existing and proposed MWC units) for all applicable pollutants are less than the de minimis monitoring levels.

6.9 PSD CLASS II INCREMENTS

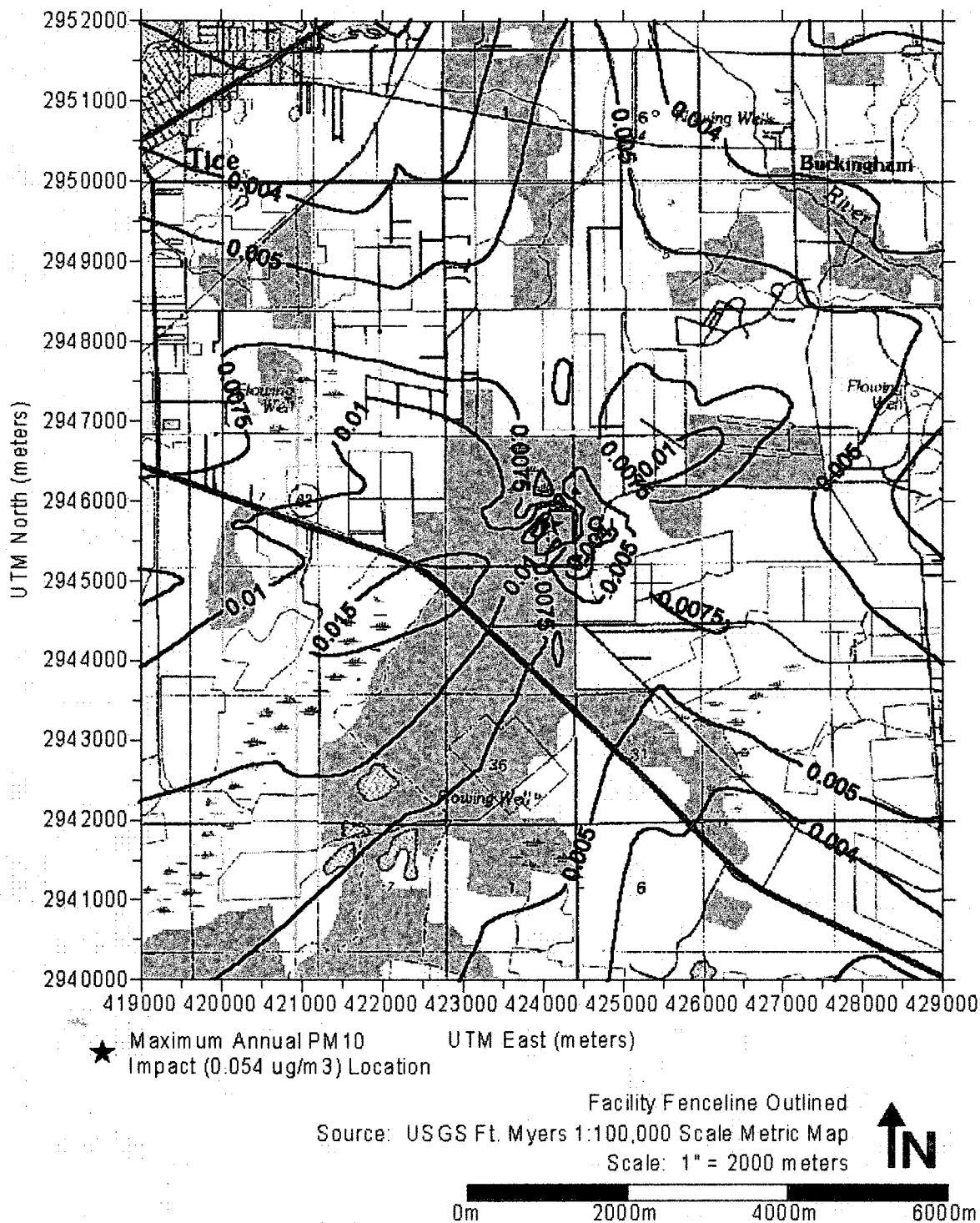
Under the original 1970 Clean Air Act (CAA), major source growth was allowed as long as violations of the AAQS would not occur. In the CAA amendments of 1977, Congress included a detailed section on PSD, designed to preserve ambient air quality levels in

The map displays the Tice and Buckingham area with UTM coordinates. The vertical axis (UTM North) ranges from 2940000 to 2952000 meters, and the horizontal axis (UTM East) ranges from 419000 to 429000 meters. The Tice River is located in the upper left, and the Buckingham River is in the upper right. Several 'Flowing Wells' are marked with dots and labels. Contour lines are drawn across the map, with values including 0.05, 0.1, 0.15, 0.25, 0.5, 0.75, and 1.0. A large, irregularly shaped shaded area is centered in the map, possibly indicating a specific geological or hydrological feature. A road labeled '82' is visible in the lower left quadrant.

Facility Fenceline Outlined
Source: USGS Ft. Myers 1:100,000 Scale Metric Map
Scale: 1" = 2000 meters



FIGURE 6-11
MAXIMUM INCREASES IN FACILITY ANNUAL PM₁₀ IMPACTS (ug/m³)



**TABLE 6-7
COMPARISON OF MAXIMUM INCREASES AND FACILITY
IMPACTS TO SIGNIFICANT IMPACT LEVELS**

Pollutant	SILS^a (ug/m³)	Max Increase^b for Proposed Unit (ug/m³)	Percent of SIL	Max Impact^b for Facility (ug/m³)	Percent of SIL
CO 1-Hour	2000	11.662	0.6%	20.836	1.0%
CO 8-Hour	500	2.888	0.6%	5.607	1.1%
NO _x Annual	1	0.216	21.6%	0.436	43.6%
SO ₂ 3-Hour	25	10.525	42.1%	15.384	61.5%
SO ₂ 24-Hour	5	3.004	60.1%	4.355	87.1%
SO ₂ Annual	1	0.200	20.0%	0.279	27.9%
PM ₁₀ 24-Hour	5	0.398	8.0%	1.177	23.5%
PM ₁₀ Annual	1	0.054	5.4%	0.161	16.1%
Pb Quarter ^c	0.03	0.0023	7.5%	0.0075	25.2%

^a From Rules 62-204.200(29) (Definition of Significant Impact) and 62-210.200(232) (Definition of Significant Impact), F.A.C.

^b Maximum short-term and long-term impacts.

^c The maximum 24-hour modeled concentrations were used to conservatively determine compliance with quarterly value.

**TABLE 6-8
COMPARISON OF MAXIMUM INCREASES
AND FACILITY IMPACTS TO
DE MINIMIS MONITORING LEVELS**

Pollutant	De Minimis ^a Monitoring Level (ug/m ³)	Max Increase ^b for Proposed Unit (ug/m ³)	Percent of de Minimis	Max Impact ^b for Facility (ug/m ³)	Percent of de Minimis
CO 8-Hour	575	2.888	0.5%	5.607	1.0%
NO _x Annual	14	0.216	1.5%	0.436	3.1%
SO ₂ 24-Hour	13	3.004	23.1%	4.355	33.5%
PM ₁₀ 24-Hour	10	0.398	4.0%	1.177	11.8%
Pb Quarter ^c	0.1	0.0023	2.3%	0.0075	7.5%
Hg 24-Hour	0.25	0.0019	0.8%	0.0035	1.4%
HF 24-Hour	0.25	0.0328	13.1%	0.0779	31.2%
Be 24-Hour	0.001	1.8e-06	0.2%	3.35e-06	0.3%
Vinyl Chloride 24-Hour	15	No Vinyl Chloride Emissions are Expected from Existing or Proposed Units			
Total Reduced Sulfur 1-Hour	10	No Total Reduced Sulfur Emissions are Expected from Existing or Proposed Units			
Reduced Sulfur Compounds 1-Hour	10	No Reduced Sulfur Compounds Emissions are Expected from Existing or Proposed Units			
H ₂ S 1-Hour	0.2	No H ₂ S Emissions are Expected from Existing or Proposed Units			

^a From Table 62-212.400-3, F.A.C. (De Minimis Ambient Impacts) and 40 CFR 51.166(i)(8)(i). No de minimis air quality level is provided for ozone. However, any net increase of 100 tons per year (tpy) or more of volatile organic compounds (VOCs) is subject to preconstruction review and would be required to perform an ambient impact analysis, including the gathering of ambient air quality data. Since the proposed net increase of VOC is 21.6 tpy, no preconstruction monitoring should be required.

^b Maximum short-term and long-term impacts.

^c The maximum 24-hour modeled concentrations were used to conservatively determine compliance with the lead quarterly value.

areas which were appreciably better (i.e., ambient concentrations considerably less) than the AAQS. The PSD increments established the maximum allowable increase in pollutant concentrations above some assumed baseline level. Increases in source emissions at all sources (whether major PSD sources or minor sources) permitted or installed after the "baseline date" consume increment. PSD increments are promulgated for SO₂, NO₂, and PM₁₀. Unlike AAQS, PSD increments are not uniform everywhere.

Three classes of PSD areas, each with specific increments, were established. Class I increments are designed to protect pristine areas such as national parks or wilderness areas. The nearest PSD Class I area to the LCERF is Everglades National Park. A discussion of Class I impacts and increments for this area is contained in Section 7. Most areas in the United States are regulated by Class II increments, designed for moderate growth. Class III increments were developed to allow concentrated industrial growth in limited areas. However, no Class III areas have been designated to date and the vast majority of the United States, including the project vicinity, is classified as a PSD Class II area. Therefore, PSD Class II increments will be considered here.

The refined modeling analyses demonstrated that maximum increases in facility impacts due to the third unit would be negligible. Although not required by PSD modeling guidelines, high second-high short-term and maximum annual impacts are compared to PSD increments in the project vicinity (both with respect to increases due to the proposed MWC unit as well as combined facility impacts). These impacts are compared on Table 6-9 to the PSD Class II increments (Class I increments are addressed in Section 7). As can be seen, maximum increases in facility impacts are 2.4% or less of the applicable Class II increments and maximum facility impacts are 3.4% or less of the same increments. Therefore, pollutant impacts for all three MWC units represent only a small percentage of the total Class II PSD increments available in the project vicinity.

6.10 AMBIENT AIR QUALITY STANDARDS

The CAA of 1970 mandated promulgation of AAQS to protect the public health and welfare. As a result, the USEPA defined AAQS for a set of criteria pollutants which have been demonstrated historically to have the ability to cause widespread, adverse health impacts. "National primary ambient air quality standards define levels of air quality which the Administrator [of the USEPA] judges are necessary, with an adequate margin of safety, to protect the public health [state of general health of a community or population]" (40 CFR 50.2(b)). "National secondary ambient air quality standards define levels of air quality which the Administrator judges necessary to protect the public welfare [non-human features and ecosystems associated with the human environment] from any known or anticipated adverse effects of a pollutant" (40 CFR 50.2(b)). To more fully address facility compliance with AAQS, maximum background values must be considered. Baseline air quality data for the study area is described in Section 5 along with discussions on the forms of the various AAQS.

Although not required by PSD regulations, overall high second-high short-term and maximum annual impacts of the facility after the addition of the third unit are compared

**TABLE 6-9
COMPARISON OF MAXIMUM INCREASES
AND FACILITY IMPACTS TO
PSD CLASS II INCREMENTS**

Pollutant	Class II Increment^a (ug/m³)	Max Increase^b for Proposed Unit (ug/m³)	Percent of PSD Class II Increment	Max Impact^b for Facility (ug/m³)	Percent of PSD Class II Increment
NO _x Annual	25	0.216	0.9%	0.436	1.7%
SO ₂ 3-hour	512	9.061	1.8%	13.038	2.5%
SO ₂ 24-hour	91	2.168	2.4%	3.112	3.4%
SO ₂ Annual	20	0.200	1.0%	0.279	1.4%
PM ₁₀ 24-hour	30	0.276	0.9%	0.814	2.7%
PM ₁₀ Annual	17	0.054	0.3%	0.161	0.9%

^a From Rule 62-204.260(2), F.A.C (Prevention of Significant Deterioration Increments).

^b Based on high second-high short-term and maximum long-term impacts.

on Table 6-10 to AAQS. As shown on the top of Table 6-10, maximum increases in facility impacts are less than 1% of the AAQS for all modeled pollutants. Maximum facility impacts after construction of the third unit are less than 2% of the AAQS as shown on the bottom of Table 6-10. As is typical with most sources, background levels are much greater than maximum modeled impacts for the facility. However, even after appropriate maximum baseline concentrations determined in Section 5 are added to the facility's impacts, compliance with the AAQS is still indicated by a wide margin.

Maximum combined facility impacts (i.e., existing and proposed MWC units including background) range from 1% (quarterly Pb) to 64% (8-hour CO) of the applicable AAQS. Thus, no AAQS are in risk of contravention due to facility emissions combined with maximum measured baseline values. As discussed above, maximum impacts are predicted to be less than the SILs in all Class II areas. Therefore, the facility will not cause or significantly contribute to existing or potential AAQS violations, regardless of their location.

6.11 AMBIENT REFERENCE CONCENTRATIONS

Section 6.10 and Table 6-10 compare the maximum increases in facility impacts to AAQS promulgated by the USEPA and State of Florida. At the request of USEPA Region IV, maximum air quality impacts of the proposed modification were also addressed for pollutants without AAQS (termed "non-criteria pollutants"). The Florida Air Toxics Working Group developed a list of ARCs for a large number of non-criteria pollutants based on a number of widely accepted reference sources. Ambient air concentrations less than the applicable ARC were deemed to pose no meaningful risk to human health. While the FDEP has ruled that the ARCs are not rules and hence do not have any statutory or legal authority (March 1, 2000 DARM-PER-28 guidance memo), they are still useful for evaluating the magnitude of non-criteria pollutant impacts.

Non-criteria pollutant impacts are compared to the latest available ARCs from the Florida Air Toxics Working Group on Table 6-11. Maximum increases in facility impacts due to the proposed unit were calculated using the equation presented in Section 6.5 with the Case 4 emissions on Table 6-2 and the maximum 8-hour, 24-hour, and annual "unitized" impacts on the top of Table 6-3 for all six cases (1-6). Maximum facility impacts including existing and proposed MWC units were calculated using the equation presented in Section 6.6 with the Case A through Case F emissions on Table 6-4 and the maximum 8-hour, 24-hour, and annual "unitized" impacts on the top of Table 6-5 for all six cases (A-F). The overall maxima for all six cases modeled (i.e., Cases 1 to 6 for the new MWC unit and Cases A to F for the overall facility) are shown in Table 6-11. Maximum increases in facility impacts due to the proposed MWC unit are less than one-third of the ARC for sulfuric acid mist (SAM or H_2SO_4) and less than 13% of the ARC for hydrochloric acid (hydrogen chloride or HCl). Maximum impacts for all other pollutants are less than 10% of the ARC. Maximum facility impacts after construction of Unit 3 are also less than one-half of the ARCs for all pollutants and averaging times. Since the ARCs were developed from a wide variety of references and include conservative safety factors when appropriate (e.g., occupational exposure levels), construction and operation

**TABLE 6-10
COMPARISON OF MAXIMUM INCREASES
AND FACILITY IMPACTS TO AMBIENT
AIR QUALITY STANDARDS**

MAXIMUM INCREASES (ug/m³) DUE TO PROPOSED UNIT

Pollutant	AAQS^a (ug/m³)	Baseline (ug/m³)	Max Increase^b for Proposed Unit (ug/m³)	Percent of AAQS	Increase + Baseline (ug/m³)	Percent of AAQS
CO 1-Hour	40,000	12,535	6.754	0.02%	12,542	31.35%
CO 8-Hour	10,000	6,440	2.441	0.02%	6,442	64.42%
NO _x Annual	100	19	0.216	0.22%	19.2	19.22%
SO ₂ 3-Hour	1,300	149	9.061	0.70%	158	12.16%
SO ₂ 24-Hour	260	50	2.168	0.83%	52	20.06%
SO ₂ Annual	60	8	0.200	0.33%	8.2	13.67%
PM ₁₀ 24-Hour	150	28	0.276	0.18%	28.3	18.87%
PM ₁₀ Annual	50	19	0.054	0.11%	19.1	38.20%
Pb Quarter ^c	1.5	0.01	0.0023	0.15%	0.012	0.82%

MAXIMUM IMPACTS (ug/m³) FOR COMBINED FACILITY

Pollutant	AAQS^a (ug/m³)	Baseline (ug/m³)	Max Impact^b for Facility (ug/m³)	Percent of AAQS	Facility + Baseline (ug/m³)	Percent of AAQS
CO 1-Hour	40,000	12,535	12.431	0.03%	12,547	31.37%
CO 8-Hour	10,000	6,440	4.234	0.04%	6,444	64.44%
NO _x Annual	100	19	0.436	0.44%	19.4	19.40%
SO ₂ 3-Hour	1,300	149	13.038	1.00%	162	12.46%
SO ₂ 24-Hour	260	50	3.112	1.20%	53	20.38%
SO ₂ Annual	60	8	0.279	0.47%	8.3	13.83%
PM ₁₀ 24-Hour	150	28	0.814	0.54%	28.8	19.20%
PM ₁₀ Annual	50	19	0.161	0.32%	19.2	38.40%
Pb Quarter ^c	1.5	0.01	0.0075	0.50%	0.018	1.20%

^a The most restrictive AAQS between the Florida AAQS (Rule 62-204.240, F.A.C.) and National AAQS (40 CFR 50) are used.

^b Based on high second-high short-term and maximum long-term impacts.

^c The maximum 24-hour modeled concentrations were used to conservatively determine compliance with quarterly value.

TABLE 6-11
COMPARISON OF MAXIMUM INCREASES AND FACILITY IMPACTS TO
AMBIENT REFERENCE CONCENTRATIONS

Pollutant	ARCs ^a (ug/m ³)	Max Increase ^b for Proposed Unit (ug/m ³)	Percent of ARC	Max Impact ^b for Facility (ug/m ³)	Percent of ARC
HCl 8-Hour	70	4.701	6.7%	5.530	7.9%
HCl 24-Hour	17	2.138	12.6%	2.419	14.2%
HCl Annual	7	0.142	2.0%	0.155	2.2%
Cd 8-Hour	0.02	4.97e-04	2.5%	1.59e-03	7.9%
Cd 24-Hour	0.005	2.26e-04	4.5%	6.95e-04	13.9%
Cd Annual	0.00056	1.50e-05	2.7%	4.45e-05	8.0%
Pb 8-Hour	0.5	4.97e-03	1.0%	1.72e-02	3.4%
Pb 24-Hour	0.1	2.26e-03	2.3%	7.55e-03	7.5%
Pb Annual	0.09	1.50e-04	0.2%	4.83e-04	0.5%
Hg 8-Hour	0.1	4.28e-03	4.3%	7.98e-03	8.0%
Hg 24-Hour	0.02	1.94e-03	9.7%	3.49e-03	17.5%
Hg Annual	0.3	1.30e-04	0.04%	2.24e-04	0.07%
TCDD ^c Annual	2.2e-08	1.96e-10	0.9%	6.52e-10	3.0%
HF 8-Hour	26	0.072	0.3%	0.178	0.7%
HF 24-Hour	6.2	0.033	0.5%	0.078	1.3%
Be 8-Hour	0.02	3.96e-06	0.02%	7.65e-06	0.04%
Be 24-Hour	0.005	1.80e-06	0.04%	3.35e-06	0.07%
Be Annual	0.00042	1.20e-07	0.03%	2.14e-07	0.05%
SAM 8-Hour	10	1.687	16.9%	2.458	24.6%
SAM 24-Hour	2.4	0.767	32.0%	1.075	44.8%
As 8-Hour	0.1	2.66e-04	0.3%	5.16e-04	0.5%
As 24-Hour	0.02	1.21e-04	0.6%	2.26e-04	1.1%
As Annual	0.00023	8.06e-06	3.5%	1.45e-05	6.3%
NH ₃ 8-Hour	170	0.877	0.5%	1.699	1.0%
NH ₃ 24-Hour	41	0.399	1.0%	0.743	1.8%
NH ₃ Annual	100	0.027	0.03%	0.048	0.05%

^a From Version 4.0 Ambient Reference Concentration (ARCs) (FDEP, 1995b) list developed by the Florida Air Toxics Working Group. The ARC list is based on occupational exposure levels developed by ACGIH and OSHA with appropriate safety factors, BIF levels, and USEPA IRIS risk factors and reference concentrations.

^b Maximum short-term and long-term impacts.

^c 2378-TCDD Toxic Equivalent (TEQ) emissions estimated as 2% of total PCDD/PCDF emissions based on the average of available stack test data for the two existing LCERF units.

of the new and existing units would not be expected to significantly impact human health in the project vicinity. A more detailed human health risk assessment which considers additional modes of exposure and other parameters is contained in the Power Plant Siting Act (PPSA) application for Unit 3. An ecological risk assessment of the impact of the LCERF on wildlife and other ecological values is also contained in the PPSA application.

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

**SECTION 7
ADDITIONAL IMPACT ANALYSES**

October 31, 2002

SECTION 7

ADDITIONAL IMPACT ANALYSES

In previous sections, the Lee County Energy Recovery Facility (LCERF) emissions increases and maximum impacts on local air quality concentrations were calculated in order to demonstrate that emissions from the proposed modification will comply with all applicable air quality and engineering standards (e.g., ambient air quality standards [AAQS], Prevention of Significant Deterioration [PSD] increments, Best Available Control Technology [BACT], etc.). The applicant is required to submit, as part of the PSD permit application, additional impact analyses for each PSD pollutant subject to preconstruction review. The additional analyses specified in 40 CFR 51.166(o) are to determine:

- An analysis of the impairment to visibility, soils, and vegetation having significant commercial or recreational value that would occur as a result of the modification and general commercial, residential, industrial, and other growth associated with the modification.
- An analysis of the air quality impact projected for the area as a result of general commercial, residential, industrial, and other growth associated with the modification.

These additional analyses of impacts from the proposed modification on air quality in the project vicinity are addressed in the next three sections. At the request of the Department, included is an assessment of minor source growth since August 7, 1977 as mentioned in 40 CFR 51.166(n)(3)(ii). In addition, an assessment of impacts during startup, shutdown, and malfunction conditions is addressed in Section 7.4. A summary of the ISCST3 modeling analyses of concentrations and deposition rates performed for the risk assessments in the Power Plant Siting Act (PPSA) application is given in Section 7.5.

Air Quality Related Values (AQRVs) for nearby Class I areas are addressed in Section 7.6 (PSD Class I Analysis). These include CALPUFF analyses to determine maximum impacts, deposition rates, and visibility impairment for comparison to Class I significance levels in the Everglades National Park.

7.1 LOCAL VISIBILITY IMPACTS

As discussed in Section 6 (Air Quality Impact Analyses), the proposed modification consists of adding Unit 3 to the two existing units. Pollutant emissions from the proposed unit will be exhausted from a third flue in the existing concrete stack shell which contains the two existing municipal waste combustor (MWC) flues. Particulate matter (PM) emissions from other existing Title V emission units at the LCERF (lime silo and ash building baghouse vent) are extremely small, as shown in Section 6, and would not be expected to cause visible emissions. Thus, local visibility issues are most likely to be due to MWC emissions and the associated 276-foot stack.

Pollutants have specific effects upon visibility within the atmosphere. The primary pollutants of concern for visibility are PM and nitrogen oxides (NO_x). PM can both scatter and absorb light, resulting in plumes which can be lighter or darker than the viewing background. Emissions of NO_x consist mostly of nitric oxide (NO) with smaller amounts (less than 10%) of nitrogen dioxide (NO₂) and other NO_x species. While NO is colorless, NO₂ can form a plume that is perceived of as yellow under certain viewing conditions. NO emissions eventually react to form NO₂ but at considerable distances. Thus, PM rather than NO_x is of primary concern when considering local visibility impacts.

In this case, visible PM emissions will not occur because Unit 3 will use a fabric filter (FF) baghouse and will comply with an emission limit of 0.009 gr/dscf corrected to 7% O₂. While bag failures can result in visible emissions, the air pollution control (APC) system is closely monitored and bag malfunctions are typically detected and corrected before visible emissions occur. Other emissions, such as acid gases, could possibly react with ammonia slip from the SNCR system and cause visible plumes in the immediate vicinity of the stack.

The addition of a third flue to the stack shell would increase the amount of emissions by roughly 50% but not the pollutant concentration in the plume (because emission limits based on stack gas concentrations are similar for proposed and existing units). Thus, potential increases in plume visibility would be due only to a slightly greater plume depth and not increases in pollutant concentrations.

Operation of the current units shows that a visible plume due to pollutant emissions occurs very rarely. Continuous opacity measurements (COM) greater than 5% opacity (based on six-minute averages) occur about 0.0057% of the time, which translates to about 5 hours per year. Thus, the chance of observing a visible plume due to primary pollutant emissions of PM or NO₂ is small. The addition of a third MWC unit would not be expected to appreciably increase the severity or frequency of a visible plume in the project vicinity.

A visible plume due to condensed water vapor is seen more frequently, based on visual observations of the stack during the past eight years of operation. A vapor plume may appear 100 days per year, typically in the winter and on mornings between 6 and 9 a.m. The vapor plume appears within 50 feet of the stack and causes a short water vapor plume which extends from 100 to 500 feet downwind and then rapidly dissipates. The vapor plume is caused by the moisture content, or humidity, of the flue gas. The flue gas moisture is from three sources: 1) MSW, 2) combustion air, and 3) water evaporated from the spray dry absorber (SDA). The SDA is essential in controlling not only acid gases (e.g., 80% and 95% reduction of SO₂ and HCl, respectively), but the water in the slurry spray also rapidly cools the exhaust gases helping to minimize dioxin/furan formation and aiding in the capture and control of mercury. For these reasons, the use of water is an integral part of the APC system to significantly reduce pollutant emissions.

In the original PPSA application, field analyses were performed using a hovering helicopter (CDM, 1990a) which showed that a 400-foot stack would be visible for up to 2.5 miles from the LCERF, depending on the direction and in the absence of vegetation and other obstructions. When considering vegetation and other obstructions, the stack would not be visible in some directions past 1.5 miles. Given that the actual stack built is 276-feet high, the area where the stack and small water vapor plume would be visible is limited to the immediate facility vicinity (probably less than 1.5 miles). Impacts of the proposed modification on visibility in nearby Class I areas are described later.

7.2 MINOR SOURCE GROWTH

Minor source growth for the project was assessed in two ways. The secondary impacts of the proposed source on local air quality is assessed as required in 40 CFR 51.166(o). An analysis of population growth and other factors is also considered to qualitatively assess the amount of PSD increment consumption by minor sources since August 7, 1977 as mentioned in 40 CFR 51.166(n)(3)(ii).

Secondary impacts of the proposed source on local air quality are related to the increase in population due to facility employment and the attraction of support industries. The LCERF currently employs about 50 persons. An additional nine persons will be required when construction of the new unit is completed. This increase of nine persons represents only 0.002% of the current Lee County population of 440,888 (U.S. Census Bureau, 2002). Since many of the new workers will likely be hired from the surrounding community, any increase in local population would be insignificant to local air quality. Construction of the new unit will take approximately 24 months and require an additional 50 to 70 persons onsite on average with a maximum number of about 100 additional persons onsite at any one time (only 0.02% of Lee County's population). Any impacts on local population, if any, would be temporary.

Waste disposal rates for Lee and Hendry Counties currently exceed existing facility capacity on average. In addition, future increases in population are likely to increase the need for additional capacity. Therefore, a third unit is proposed to meet current and future capacity requirements in an environmentally sound manner. Given that Lee County has one of the highest recycling rates in Florida, it is unlikely that increases in recycling rates alone would eliminate the need for additional capacity. These issues are discussed in more detail in the LCERF Materials Separation Plan. Municipal solid waste (MSW) generation rates in the two counties will be unaffected by whether a new unit is built or not. Therefore, no significant expansion of industry or secondary support services is expected for operation of Unit 3.

Currently, approximately 250 trucks per day visit the LCERF to dispose of MSW. As noted above, MSW generation rates will be unaffected by the new unit. If a new MWC unit is not constructed, excess MSW will need to be transported to regional landfills. In that event, a transfer station would likely be constructed at the facility site. Thus, there would be no change in inbound trucks. However, there would be an increase in outbound trucks (MSW vs. ash). Therefore, the new unit will actually decrease truck traffic and

truck-related emissions in the general project area. For these reasons, it is unlikely that the new unit will cause any appreciable deterioration of local air quality due to secondary sources or minor source growth and may actually improve local air quality.

At the request of the Florida Department of Environmental Protection (FDEP), a qualitative analysis has been performed of minor source growth and PSD increment consumption since the August 7, 1977 (effective date of PSD program and increments). The PSD minor source baseline dates in Florida are December 27, 1977 for PM and SO₂ and March 28, 1988 for NO₂ (Rule 62-204.360, F.A.C.). Since the baseline dates, any increases in ambient pollutant concentrations due to major or minor sources consume PSD increment. Conversely, any decreases in ambient pollutant concentrations would expand PSD increments. Since PSD increments are less than the AAQS, PSD increments typically restrict air quality deterioration in areas with baseline air quality considerably better (i.e., appreciably smaller) than the AAQS.

Lee County population^a during 1977, 1988, and 2000 was 175251, 309144, and 440888 persons, respectively. Thus, there were large increases in Lee County's population of about 150% and 45% since the PM/SO₂ and NO₂ baseline dates, respectively. Lee County manufacturing employment^b during the same years was 3207, 5771, and 7181 persons, respectively -- a 125% increase since the PM/SO₂ baseline dates and a 25% increase since the NO₂ baseline date. As a percentage of population, manufacturing employment has dropped from around 1.85% in 1977 and 1988 to 1.6% in 2000.

Based on population and manufacturing figures alone, it would appear that consumption of the Class II PSD increments by minor PSD sources is about 1.5 and 0.5 times the original baseline concentrations in 1977 for PM/SO₂ and in 1988 for NO₂. However, this does not consider other factors that affect emissions and air quality impacts. First, transportation emissions from automobiles and trucks have decreased sharply since 1977. These decreases in mobile source emissions generally offset any increases due to nationwide increases in vehicle-miles traveled. Also, manufacturing employment as a percentage of population has also decreased. Since industrial emissions are usually second overall to transportation emissions, this would suggest little Class II PSD increment consumption by major sources. Further, air quality regulations such as PSD, maximum achievable control technology (MACT), Title IV, and the Emission Guidelines have decreased permitted emission rates for many major PSD sources (both existing sources such as the LCERF and PSD modifications such as the Florida Power & Light Company's Fort Myers Repowering Project) and possibly expanded Class II PSD increments.

Ambient air quality monitoring data available since the baseline dates also support the conclusion that the Class II PSD increments has remained the same or expanded since the baseline dates. Due to the cost of monitoring, the length of time since the baseline dates, and the change in PM measurement methods from TSP to PM₁₀, it is difficult to obtain a complete record between 1977/1988 and 2000. However, some limited monitoring data

^a Linear interpolation of 1970, 1980, 1990, and 2000 census data.

^b Florida Labor Market Statistics (Corbin, 2002b).

representative of Lee County are available for some period of time at the same location for the three PSD increment pollutants. Available historic monitoring data (high second-high short-term and maximum annual ambient concentrations in $\mu\text{g}/\text{m}^3$ over three calendar years, if available) are compared below:

TSP 24-Hour High Second-High Concentration ($\mu\text{g}/\text{m}^3$)

Charlotte County (3760-002)	48(94-96)-59(84-86) = -10 $\mu\text{g}/\text{m}^3$ /10 yrs
Lee County (1300-005)	80(92-94)-70(84-86) = +10 $\mu\text{g}/\text{m}^3$ /8 yrs

TSP Annual Maximum Geometric Mean Concentration ($\mu\text{g}/\text{m}^3$)

Charlotte County (3760-002)	20(94-96)-27(84-86) = -7 $\mu\text{g}/\text{m}^3$ /10 yrs
Lee County (1300-005)	26(92-94)-30(84-86) = -4 $\mu\text{g}/\text{m}^3$ /8 yrs

SO₂ 3-Hour High Second-High Concentration ($\mu\text{g}/\text{m}^3$)

Sarasota County (4100-010)	242(90-92)-208(84-86) = +34 $\mu\text{g}/\text{m}^3$ /6 yrs
Sarasota County (4100-012)	291(90-92)-278(84-86) = +13 $\mu\text{g}/\text{m}^3$ /6 yrs

SO₂ 24-Hour High Second-High Concentration ($\mu\text{g}/\text{m}^3$)

Sarasota County (4100-010)	101(90-92)-137(84-86) = -36 $\mu\text{g}/\text{m}^3$ /6 yrs
Sarasota County (4100-012)	62(90-92)-85(84-86) = -23 $\mu\text{g}/\text{m}^3$ /6 yrs

SO₂ Annual Maximum Arithmetic Mean Concentration ($\mu\text{g}/\text{m}^3$)

Sarasota County (4100-010)	7(90-92)-11(84-86) = -4 $\mu\text{g}/\text{m}^3$ /6 yrs
Sarasota County (4100-012)	8(90-92)-5(84-86) = +3 $\mu\text{g}/\text{m}^3$ /6 yrs

NO₂ Annual Maximum Arithmetic Mean Concentration ($\mu\text{g}/\text{m}^3$)

Pinellas County (3980-018)	30(98-00)-30(84-85) = +0 $\mu\text{g}/\text{m}^3$ /14 yrs
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Hence, while population and manufacturing employment increases would suggest that PSD increment consumption has occurred since the baseline date, trends in mobile and point source emissions and ambient air quality data suggest little PSD increment consumption since the baseline dates.

As shown in Section 6.9, maximum increases in facility impacts in the project vicinity due to the proposed modification are less than 2.5% of the PSD Class II increments for all pollutants and averaging times. Total facility impacts for both existing and proposed units are less than 3.5% of the PSD Class II increments. Since maximum increases in facility impacts were less than the significant impact levels (SILs) for all pollutants and averaging times, no additional multisource modeling analyses for major sources were required to show overall compliance with AAQS or PSD increments.

7.3 SOILS AND VEGETATION

PSD regulations require analysis of the impact to soils and vegetation having significant commercial or recreational value that would occur due to emissions from the proposed PSD modification. Atmospheric pollutants emitted in PSD significant emission rates

from the proposed modification include NO_x, sulfur dioxide (SO₂), PM, and carbon monoxide (CO). At extreme levels, these contaminants may cause direct damage to plant tissue and may result in deposition of chemicals into surrounding soils.

The significance of the impacts to soils and vegetation depends primarily on the atmospheric concentration levels of these pollutants as well as on the types of plants grown and the land use patterns in the surrounding area. Since maximum increases in facility impacts for the proposed modification occur in the immediate project vicinity, agricultural statistics and other information were summarized for Lee County (U.S. Department of Agriculture, 1997). Approximately 25% of the land in Lee County is devoted to agricultural production. Approximately 500 farms make up a total of 129,000 acres in the county, producing agricultural products with an annual market value in excess of \$116 million.

There are approximately 25,000 acres of harvested cropland, 75,000 acres of pasture land for livestock, 13,000 acres of woodland, and 14,000 acres in orchards. Major crops grown in the county include vegetables, sweet corn, and melons (47% of the total market value of Lee County agricultural products sold, ranking as the eighth county in Florida); nursery and greenhouse crops (31% of the total Lee County market value, ranking tenth in the state); and fruits, nuts, and berries (16% of the total Lee County market value, for a county ranking of 18th in the state). Despite the number of acres devoted to pasture land, the market value of livestock is only 2% of the total market value of Lee County agricultural products sold (ranking 43rd in the state). Other uses of the land which could potentially experience significant impacts include parkland and other open areas within the County of recreational value that contain significant amounts of vegetation and exposed soils.

Historically, the majority of vegetative impacts due to air contaminants have resulted from elevated atmospheric concentrations of SO₂. At extreme levels, emissions of this contaminant can cause direct damage to plant tissue. The maximum 3-hour SO₂ impact due to facility emissions after the proposed modification is 15.4 ug/m³ (Cases C through F on Table 6-5), well below the level at which plant damage has been observed. Therefore, no significant adverse impacts to vegetation due to SO₂ emissions from the modification are expected to occur.

Two additional pollutants which could potentially have harmful impacts on area vegetation include NO_x and CO. Neither of these gases is toxic to plants except in very high concentrations. The literature on NO₂ suggests the following injury threshold doses of NO₂ on plants (Dames & Moore, 1981):

- No effect for concentrations less than 10 ppm (18,800 ug/m³) and exposures of 1 to 600 hours.
- Leaf symptoms for concentrations between 10 and 300 ppm (18,800 to 564,000 ug/m³) and exposures of ½ to 600 hours.
- Death for concentrations between 300 and 500 ppm (564,000 to 940,000 ug/m³) and exposures of ¾ to 2 hours.

The threshold concentration for visible effects of NO_2 on vegetation is therefore about 335 times higher than the maximum 1-hour NO_x facility impact of 56 ug/m^3 predicted for the facility after the proposed modification (calculated for Cases C through F using the equation in Section 6.6, the NO_x emission rates on Table 6-4, and the 1-hour maximum "unitized" impacts on the top of Table 6-5).

CO requires even higher concentrations to elicit injury in plants. According to Dames & Moore (1981), the following injury threshold levels apply:

- No effect for concentrations less than 100 ppm ($115,000 \text{ ug/m}^3$) and exposures for 1 to 3 weeks.
- Epinasty at levels greater than 500 ppm ($575,000 \text{ ug/m}^3$).
- Chlorosis and leaf abscission occur at 10,000 ppm ($11,500,000 \text{ ug/m}^3$) in sensitive plants, but tolerant plants require more than 10 times this concentration to produce the same symptoms.

Thus, the threshold concentration for visible effects is 5,500 times greater than the maximum 1-hour CO impact of 20.8 ug/m^3 predicted for the facility after the proposed modifications (Cases C through F on Table 6-5).

The impact of emission levels on soils is also not expected to cause any harmful effects. The potential for changes in rainfall pH due to the formation of sulfuric and nitric acid in the atmosphere from facility emissions of SO_2 and NO_x is minor given the expected maximum annual ambient air concentrations of SO_2 and NO_x due to facility emissions of 0.3 and 0.4 ug/m^3 , respectively. According to the literature, there is no evidence of any significant impacts of gaseous NO_x on soil microorganisms. Negative impacts of CO on soil microorganisms have only been observed at levels significantly greater than those being emitted by this facility. These effects include inhibition of nitrogen fixation by soil microorganisms and increased utilization of CO by soil microorganisms (Dames & Moore, 1981). Inhibition of nitrogen fixation has been observed only when CO concentrations are in excess of $2,000,000 \text{ ug/m}^3$, a level more than 96,000 times the maximum 1-hour facility impact of 20.8 ug/m^3 (Cases C through F on Table 6-5). Soils function as a major sink for atmospheric CO , primarily due to uptake and metabolism of CO by soil fungi. At the levels expected, facility emissions of CO are not expected to result in any significant changes to local soils or the productivity of these microorganisms. Therefore, no significant impacts from the modification are anticipated on soils.

The impacts of PM and heavy metals including lead (Pb) on soils and vegetation are also expected to be insignificant due to the low predicted concentrations of these air contaminants. Studies have shown that urban areas with higher Pb soil concentrations than those likely to occur in Lee County have observed no detectable effect on produce or on human consumers of these foods (RTP Environmental Associates, Inc., 1986).

Potential impacts on soils and vegetation have been evaluated due to facility emissions of both criteria and non-criteria (trace element) pollutants. Proposed emissions for the new unit as well as combined (proposed + existing) emissions for the entire future facility have been shown in Section 6.10 of this permit application not to interfere with the maintenance of AAQS. Since one of the factors used in developing the secondary AAQS was the prevention of significant adverse impacts on soils and vegetation, facility compliance with the AAQS also indicates that no significant adverse impact on soils and vegetation will occur. A more detailed ecological risk assessment of the proposed modification is also contained in the PPSA application.

7.4 STARTUP, SHUTDOWN, AND MALFUNCTION CONDITIONS

The U.S. Environmental Protection Agency (USEPA) has recognized that the New Source Performance Standard (NSPS) emission standards for MWCs can only be met under steady state conditions and by employing "Good Combustion Practices (GCP)." During periods of startup, shutdown, and malfunction (S/S/M) conditions, the NSPS emission limits do not apply as follows (40 CFR Part 60.58b(a) and November 16, 2001 Federal Register at 66 FR 57824):

- The NSPS emission "standards under this subpart apply at all times except during periods of startup, shutdown, or malfunction. Duration of startup, shutdown, or malfunction periods are limited to 3 hours per occurrence, except as provided" next.
- "For the purpose of compliance with the [NSPS] CO emission limits, if a loss of boiler water level control (e.g., boiler waterwall tube failure) or a loss of combustion air control (e.g., loss of combustion air fan, induced draft fan, combustion grate bar failure) is determined to be a malfunction, the duration of the malfunction period is limited to 15 hours per occurrence."
- "The startup period commences when the affected facility begins the continuous burning of municipal solid waste and does not include any warm-up period when the affected facility is combusting fossil fuel or other non-municipal solid waste fuel, and no municipal solid waste is being fed to the combustor."
- "Continuous burning is the continuous, semicontinuous, or batch feeding of municipal solid waste for purposes of waste disposal, energy production, or providing heat to the combustion system in preparation for waste disposal or energy production. The use of municipal solid waste solely to provide thermal protection of the grate or hearth during the startup period when municipal solid waste is being fed to the grate is not considered to be continuous burning."

These exclusionary periods were included in the MWC standards and guidelines since operation during these periods is unstable, transitory in nature, and outside the normal control range of the equipment. However, the NSPS language does not relieve the owner

or operator from the requirement at 40 CFR 60.11(d) of the NSPS general provisions which require:

- "At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the maximum extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions."

The NSPS language also does not alter the definition of malfunction included in 40 CFR 60.2 (Definitions) of the NSPS general provisions which is:

- "...any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions."

While malfunctions do occur at MWCs due to the complexity of the MWC and air pollution control (APC) equipment (i.e., spray dry absorber, fabric filter baghouse, selective non-catalytic reduction (SNCR), and activated carbon injection), every precaution must be taken to minimize the frequency and severity of malfunctions. The LCERF has standard procedures to maintain the integrity and reliability of capital equipment and processes including: 1) a preventative maintenance program; 2) inspections of key components on each shift; and 3) scheduled outages for internal inspection of equipment. Each of these tasks are designed to maintain the integrity of the LCERF and thereby avoid unnecessary S/S/M.

The following analyses are provided to document that the facility will continue to comply with the AAQS even during S/S/M periods. Short-term AAQS would be of concern, which requires that CO, SO₂, and PM be addressed (NO₂ has an annual standard only).

Specific startup practices for Unit 3 will vary depending whether it is initiated from a "cold" start (i.e., the furnace and associated equipment are at ambient temperature) or a "hot" start, better defined as a "restart." All startup procedures, however, include the use of MSW and residue to cover the grates to prevent the grates from overheating whenever auxiliary fuel firing is necessary. During startup, auxiliary fuel is initially combusted to preheat the furnace if necessary. After proper conditions are achieved, continuous MSW feeding is initiated and MSW throughput is ramped until full load is reached. The shutdown sequence basically involves halting the MSW feed and then firing natural or propane gas when necessary until the grates are clear (i.e., the same sequence as startup except in reverse). The auxiliary burners aid in reducing shutdown CO and VOC emissions.

During combustion of natural or propane gas only, emissions are very much less than when firing MSW due to the clean nature of these fuels and the significantly smaller size of the auxiliary burners as compared to the gross heat input capacity of the MWCs. Therefore, impacts would be less during initial startup and final shutdown conditions than

the maximum normal facility impacts shown in Section 6 (Air Quality Impact Analyses). Operating conditions during startup or shutdown operations when a combination of auxiliary fuel and MSW is combusted would be similar to conditions of reduced load. These reduced load operating conditions were modeled in Section 6 as part of the screening analyses and impacts were found to be less than under conditions of maximum load. Emissions monitored during the startup and shutdown of the Marion County, Oregon facility indicated no significant increase in flue gas concentrations of dioxins and furans (a measure of organics in general) or of metals. There was an approximate 40% increase in emissions of acid gases above average (i.e., considerably less than the 400% increase analyzed below when considering malfunctions) (USEPA, 1987b, 1987c).

While emissions and impacts during startups and scheduled shutdowns will be the same or less than for normal operations, emissions and impacts during some types of malfunctions can be greater than for normal conditions. Malfunctions can be grouped into three general categories - boiler malfunctions, miscellaneous malfunctions, and APC equipment malfunctions. These malfunctions are considered routine and are the reason for the USEPA exclusionary policy regarding malfunctions. Except for excess CO emissions associated with loss of boiler water level control as noted earlier, excess emissions during malfunctions are limited to three hours, consistent with the NSPS exemption rules. Catastrophic failure of the APC system which cannot be repaired in three hours would require the combustion unit to be taken into a shutdown sequence.

Boiler malfunctions include boiler tube ruptures (typically the single largest contributor to lost boiler availability due to repair times) and ash discharger pluggages (more frequent than tube failures but only require the temporary cessation of MSW feed until the discharger is drained and cleared). Miscellaneous malfunctions consist of site power losses, control system malfunctions, and auxiliary burner failures. Loss of the electrical connection would cause combustion instabilities resulting in shutdown. Auxiliary burner failures (mis-starts) can cause short-duration low temperatures and elevated CO and VOC concentrations. All of these malfunctions can result in elevated CO and VOC emissions until the unit is returned to normal operation or shutdown is complete. Malfunction CO emissions of 600 ppmvd corrected to 7% O₂ for all three units (i.e., a facility malfunction and shutdown including all three units) were assumed for a 15-hour period allowed for in the NSPS for certain malfunctions. This would result in high second-high 1-hour and 8-hour facility concentrations during malfunction conditions of 75 and 25 ug/m³, respectively. Added to maximum representative background concentrations of 12535 and 6440 ug/m³, respectively, gives total concentrations that are 32% and 65% of the respective AAQS (almost totally due to background). Thus, excess CO emissions would not be expected to cause or contribute to exceedances of the CO AAQS in the extremely unlikely event of simultaneous malfunction of all three units and emissions six times greater than NSPS limits. Again, most malfunction conditions do not result in emissions greater than permit limits.

APC equipment malfunctions consist of scrubber or carbon injection malfunctions (i.e., pluggage of the lime or carbon slurry systems and atomizer failures), baghouse failures, and SNCR system failures. Short-term impacts for SNCR failures were not considered

since NO₂ has no short-term AAQS. For annual emissions and impacts as described later, SNCR failures were assumed to yield uncontrolled NO_x emissions of 350 ppm_{dv} corrected to 7% O₂.

Scrubber malfunctions may be accompanied by normal flue gas temperatures (loss of lime feed only) or elevated flue gas temperatures (loss of both lime feed and water slurry). Acid gas emissions for either scenario would be similar. Since elevated temperatures result in higher plume rise and decreased impacts, impacts for normal stack gas temperatures were considered. Uncontrolled emissions during the malfunction would be five times greater than the proposed permit limits for normal conditions since the NSPS requires SO₂ control of 80%. Assuming a single 3-hour malfunction of all three units simultaneously in one 24-hour period would give 3-hour and 24-hour high second-high facility impacts of 65 and 4.7 ug/m³, respectively. Added to maximum representative background concentrations of 149 and 50 ug/m³, respectively, gives total concentrations that are 16% and 21% of the respective AAQS (mostly due to background). Thus, excess SO₂ emissions greater than the proposed permit levels as allowed in the NSPS would not be expected to cause or contribute to exceedances of the SO₂ AAQS even in the extremely unlikely event of simultaneous malfunction of all three units during periods when inlet SO₂ concentrations are at the maximum expected levels. Again, emissions during most malfunction events will comply with the proposed permit levels.

Baghouse failures may occur periodically but to a lesser extent than other APC system problems. Bag ruptures, a potential failure mode, can be detected as elevated opacity readings at the stack. In most cases, bag ruptures do not cause an opacity exceedance and can be repaired without a combustion unit shutdown. Baghouse failures resulting in emissions greater than the proposed permit limit are infrequent. The duration of excess emissions resulting from a bag failure would be expected to be limited to less than 30 minutes as the offending baghouse module would be quickly isolated. However, assuming excess emissions twice the proposed permit limits (0.018 gr/dscf) averaged over 24-hours and a complete failure of the baghouse system for all three MWC units simultaneously for a 3-hour period allowed in the NSPS would result in a high second-high 24-hour facility impact of 0.588 ug/m³. Adding the maximum 24-hour representative background value of 28 ug/m³ gives a total PM₁₀ impact that is 19% of the AAQS (again, mostly due to background). Therefore, excess PM₁₀ emissions greater than the proposed permit levels as allowed in the NSPS would not be expected to cause or contribute to exceedances of the PM₁₀ AAQS. Again, emissions during most malfunction events will comply with the proposed permit levels.

Maximum facility impacts for short-term averaging times (i.e., 24-hours or less) during S/S/M periods were shown to comply with AAQS for all criteria pollutants above. The effect of S/S/M periods on annual emissions and impacts was also considered. Recent facility operations indicate 14 scheduled startups, nine scheduled shutdown periods, and five unscheduled malfunction shutdowns per unit during a 12-month period. The number of S/S/M events presented above is provided to allow an assessment of the impact from these type of operations, based on prior operations. These values should not be included

as a permit condition as the actual number of S/S/M events will vary year to year. Startup/scheduled shutdown emissions before and after normal operations would be less than normal facility emissions as noted above due to the size and fuel used in the auxiliary burners and the reduced amount of MSW combusted. Therefore, these periods (about 0.8% of the year at three hours per occurrence) were not considered since they are expected to decrease rather than increase annual impacts. While excess emissions would not be expected to occur for all of the malfunction periods, five malfunction shutdowns (15 hours) only equals 0.17% of the year. During 1998-2000, excess emissions stated in the quarterly reports averaged 8 hours/year/unit for CO and 1 min/yr/unit for opacity (no excess emissions were reported for SO₂ or NO_x). Even if excess emissions occurred 1% of the year (88 hours), annual emissions increases would only be 5% for CO, 4% for SO₂, and 1% for NO_x and PM₁₀ (with the maximum proposed or permitted emission rates during the remaining 99% of the year).

None of the increases in annual emissions due to S/S/M conditions would appreciably change the air quality modeling results or the fact that annual impacts are less than all regulatory-defined significant impact levels, de minimis monitoring levels, AAQS, PSD increments, etc. Since the units will operate on average at less than 100% availability and less than 110% of nominal load, average annual emissions will be less than the permit limits (i.e., maximum annual emissions for the proposed MWC unit and the existing MWC units are already considerably overstated). Further, if reduced emissions during shutdown periods and periods of unit downtime for repairs associated with the malfunctions were considered, annual emissions would also likely be less than those conservatively presented in this permit application for normal operations.

7.5 RISK ASSESSMENT ANALYSES

In Section 6.10 (Ambient Air Quality Standards), maximum facility impacts were compared to AAQS and background pollutant levels. It was shown that facility emissions would not cause or significantly contribute to ambient concentrations greater than the USEPA and Florida AAQS, which are designed to protect human health or public welfare for the PSD criteria pollutants (CO, SO₂, NO₂, PM₁₀, and Pb). In Section 6.11, a comparison of maximum non-criteria pollutant concentrations to Florida Ambient Reference Concentrations (ARCs) was provided. Maximum concentration impacts less than the ARCs are generally assumed to demonstrate that facility emissions would not cause conditions injurious to human health.

While these analyses are generally considered to conservatively estimate facility impacts on public health, they do not consider non-inhalation routes of exposure and other factors which are considered in more detailed risk assessments. Therefore, a human health risk assessment is contained in the PPSA application. An ecological risk assessment of the impact of the facility emissions on wildlife and other ecological values is also included in the PPSA application.

Since additional routes of exposure are considered in the risk assessments, modeling analyses of wet and dry deposition rates are required. Also averages of concentrations

and deposition rates across particular land features are also needed (the PSD analyses focus on maximum impact locations). A summary of the ISCST3 modeling analyses performed for the risk assessments is included here.

ISCST3 was used with the same receptor grids as described in Section 6 -- the 100-meter spaced "fine" receptor grid within two kilometers of the main facility stack, the 500-meter spaced "coarse" receptor grids from two to ten kilometers from the main facility stack, and an additional 100-meter spaced "fine" receptor grid west-southwest of the source (to determine overall maximum annual concentrations). These modeled receptors are collectively referred to as the "modeling domain." In the PSD modeling analyses, the area inside the fence immediately surrounding the LCERF was excluded from the modeling domain. However, in the risk assessment modeling analyses, the area inside the property boundary, which is also fenced, was excluded from the long-term analyses. Public access is deterred by the property boundary fence, so activities related to indirect exposure pathways, such as livestock grazing and vegetable gardening, would not occur within the property boundary.

The modeling domain was sufficient in size to determine maximum impact locations. Area-averaged long-term impacts in the modeling domain were calculated for the Caloosahatchee River, and the associated watershed, and in the area of typical ponds found south of the facility (defined as that portion of the modeling domain area bounded by Interstate 75 on the west and State Route 82 on the north). Area-averaged long-term impacts were also determined for the right-of-way area used to graze cattle along the western property boundary.

All five years of Fort Myers (1990 through 1994 from Page Field) meteorological data as described in Section 6 were used. Average 5-year concentrations and deposition rates were determined (both anywhere in the modeling domain outside the property boundary and in the areas described above). Maximum 1-hour concentrations were also calculated for the overall modeling domain outside the LCERF fenceline.

Maximum 1-hour and 5-year gaseous concentrations were modeled by assuming no deposition, depletion, or gravitational settling. Since no firm guidance yet exists for using ISCST3 algorithms to estimate wet deposition rates for gaseous pollutants, 5-year wet gaseous deposition was estimated by modeling gases as 0.01 micron (μm) particles with liquid and ice wet scavenging coefficients of $1.65\text{E}-4$ (considering the effects of wet depletion but not gravitational settling on modeling impacts) based on the procedures in the USEPA Region VI Risk Assessment Protocols for Hazardous Waste Combustion Facilities (USEPA, 1998b and 1999d). Dry gaseous deposition rates were estimated later in the risk assessments by multiplying the modeled annual gaseous concentrations by an appropriate deposition velocity.

Concentrations and deposition rates were also modeled assuming the pollutants were evenly distributed across the surfaces of the particulate matter emissions. The effects of plume depletion (due to wet and dry deposition) and gravitational settling were also considered. The modeled particulate distribution was based on data from the Wurzburg,

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Germany facility (Hahn and Sussman, 1986). The mean diameter and surface area percentages, based on the USEPA Region VI Risk Assessment Protocols for Hazardous Waste Combustion Facilities (USEPA, 1998b and 1999d), are:

Particle Class	Mean Diameter	% By Mass	% By Surface Area
< 0.6 μm	0.38 μm	53%	90.0%
0.6 - 1.0 μm	0.82 μm	4%	3.1%
1.0 - 1.6 μm	1.32 μm	3%	1.5%
1.6 - 3.2 μm	2.49 μm	10%	2.6%
3.2 - 5.0 μm	4.16 μm	8%	1.2%
5.0 - 7.3 μm	6.22 μm	8%	0.8%
7.3 - 10.8 μm	9.16 μm	6%	0.4%
10.8 - 17.4 μm	14.35 μm	8%	0.4%

A mean particle density of 1.0 g/cm³ was assumed in the ISCST3 modeling since the PM distribution data were likely derived from Cascade impactor data. Wet scavenging coefficients are the ISCST3 recommended values (i.e., 0.6E-4, 0.4E-4, 0.8E-4, 1.8E-4, 3.2E-4, 4.2E-4, 5.8E-4, and 6.6E-4 calculated for the mean particle class diameters from 0.38 μm to 14.35 μm , respectively, and assuming identical values for liquid and ice precipitation).

Facility impacts were modeled for the new MWC unit operating with the two existing MWCs (i.e., future combined facility impacts for both proposed and existing MWCs). Impacts were predicted for both gaseous and particulate pollutants using a "unitized" facility emission rate of 1.0 grams/second for all conditions. The worst-case 1-hour and 5-year source configurations determined by the screening analyses in Section 6 were considered. For the combined facility, worst-case impacts occur under Case 6 conditions for the proposed facility as shown in Table 6-5. Maximum long-term impacts occur for three operating units (Case F). Maximum 1-hour impacts occur surprisingly for two operating units (Case E), probably due to the interaction between plume height and mixing height. Therefore, for the risk assessments, these cases were remodeled with an emission rate of 1 g/s and these results are shown on Table 7-1.

Because of depletion, 5-year particulate pollutant concentrations are slightly less than gaseous pollutant concentrations. Maximum 5-year wet deposition rates for both gaseous and particulate emissions decrease rapidly with increasing distance from the facility. Maximum 5-year dry deposition rates for particulate pollutants are less than maximum wet deposition rates. Finally, area-averaged maximum 5-year concentrations and deposition rates are similar for the areas considered. The locations of the maximum concentrations and deposition rates in the modeling domain are shown in Figure 7-1 for three operating units. Maximum wet and total deposition rates and 1-hour concentrations occur in the facility vicinity. Maximum 5-year concentrations and dry deposition rates occur 2.5 kilometers west-southwest of the stack.

TABLE 7-1
MODELING RESULTS FOR LEE COUNTY ENERGY RECOVERY FACILITY
RISK ASSESSMENT FOR COMBINED (PROPOSED AND EXISTING) MWC UNITS

ENTIRE FUTURE FACILITY Pollutant Type and Modeled Parameter	Overall Maximum for Modeling Domain		Modeling Domain Area-Average			
	Maximum Modeled Impact	Location UTM (km)	Watershed for Typical Ponds	Caloosahatchee River	Caloosahatchee River Watershed	Right-of-Way Grazing Area

Average Long-Term^a Gaseous Pollutant Impacts for Case F (1 g/s emissions)

Concentration (ug/m ³)	0.01289	422.0, 2944.6	0.00412	0.00340	0.00385	0.00284
Wet Deposition (g/m ² /yr)	0.08295	424.402, 2945.8	0.00092	0.00038	0.00111	0.02848

Average Long-Term^a Particulate Surface-Area Pollutant Impacts for Case F (1 g/s emissions)

Concentration (ug/m ³)	0.01278	422.0, 2944.6	0.00406	0.00332	0.00378	0.00283
Total Deposition (g/m ² /yr)	0.03811	424.402, 2945.8	0.00072	0.00039	0.00082	0.01431
Dry Deposition (g/m ² /yr)	0.00027	421.9, 2944.6	0.000086	0.000058	0.000079	0.000048
Wet Deposition (g/m ² /yr)	0.03811	424.402, 2945.8	0.00063	0.00033	0.00074	0.01426

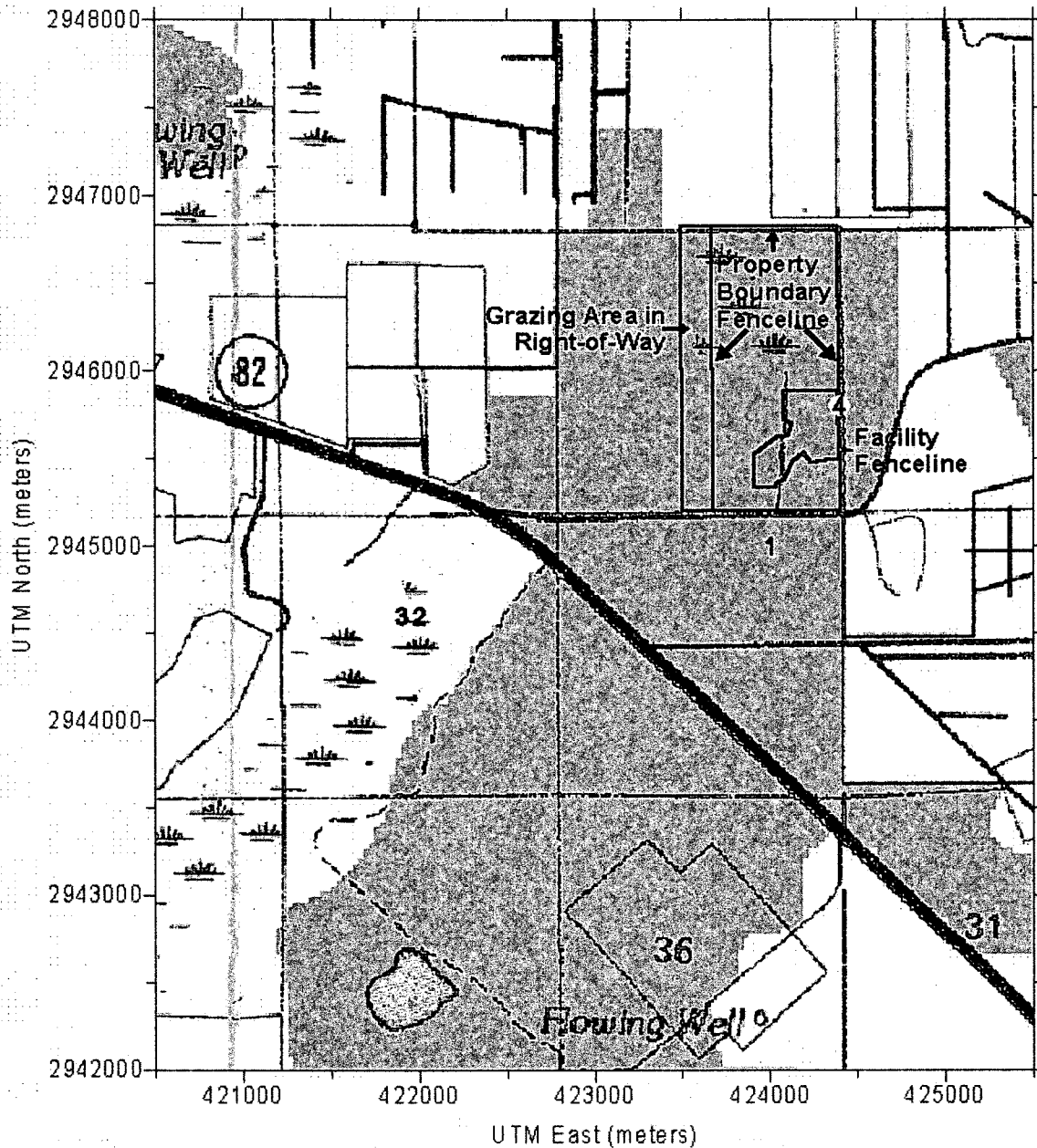
Maximum Short-Term^b Gaseous Pollutant Impacts for Case E (1 g/s emissions)

1-Hour Concentration (ug/m ³)	2.97061	424.0, 2945.0	N/A	N/A	N/A	N/A
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^a Long-term impacts averaged over the five years of meteorological data modeled (1990-94 for Fort Myers Airport) for all areas outside the property boundary.

^b Maximum 1-hour impact from all five years of meteorological data modeled (1990-94 for Fort Myers Airport) for all areas outside the facility fenceline.

FIGURE 7-1
MAXIMUM IMPACT LOCATIONS FOR RISK ASSESSMENTS



- 1 = Maximum 1-Hour Concentration
- 2 = Maximum Long-term Concentrations (Gases & Particulates)
- 3 = Maximum Long-term Dry Deposition Rate (Particulates)
- 4 = Maximum Long-term Wet Deposition Rates (Gases & Particulates)
 and Maximum Long-term Total Deposition Rate (Particulates)

Property Boundary and Facility Fencelines Shown
 Source: USGS Ft. Myers 1:100,000 Scale Metric Map
 Scale: 1" = 1000 meters

0m 1000m 2000m 3000m

7.6 PSD CLASS I ANALYSIS

As part of the PSD permit application, air quality modeling analyses of increment consumption and impacts of PSD significant increases in pollutant emissions to other AQRVs in nearby Class I areas are required. The nearest PSD Class I area to the LCERF is Everglades National Park, located approximately 90 kilometers (km) south to southeast of the LCERF. The next closest Class I area, Chassahowitzka National Wildlife Refuge, is located nearly 250 km north of the LCERF. Impacts and AQRVs were therefore evaluated for the Everglades National Park only. Impacts in Everglades National Park were quantified using the CALPUFF Modeling System operated in a screening mode.

The modeling followed guidance provided by the Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I report (U.S. Forest Service et al., 2000), the Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report, and the Guidance on Nitrogen Deposition Analysis Thresholds criteria document. Details of the modeling approach were submitted to the National Park Service (NPS) in a modeling protocol, which was approved with some changes and additional guidance by Mr. John Notar of the NPS on November 8, 2001 (Graw, 2001).

CALPUFF was used to assess the potential impacts of the proposed modification on PSD Class I increments, regional haze, and deposition rates for nitrogen- and sulfur-containing species in the Everglades National Park. When CALPUFF is operated in a screening mode, a homogeneous wind-field is assumed for the entire modeling domain. Three receptor rings centered on the LCERF (424.2 km East and 2945.7 km North in UTM Zone 17) were created to quantify impacts: one ring representing the nearest Class I area boundary (88 km), another ring for the middle of the Class I area (146 km), and the third ring at the distance to the furthest Class I area boundary (205 km). Each receptor ring consists of 360 receptors equally spaced 1 degree apart. Due to the flat nature of southern Florida, no receptor elevations were considered. Reported concentrations are the maximum model-predicted impacts anywhere within the modeling domain, regardless if pollutants are predicted to be transported in a direction away from the Class I area.

CALPUFF was used in screening mode with five years of single station meteorology. The surface data required by CALPUFF for screening analyses includes pressure, relative humidity, precipitation, and horizontal global radiation data. The latest readily available five year period with horizontal global radiation data is 1986 through 1990 from the National Climatic Data Center (NCDC) Solar and Meteorological Surface Observation Network (SAMSON) CD. The nearest National Weather Service (NWS) surface station to the LCERF, Fort Myers Airport (Page Field), is not available on the SAMSON CD. The nearest SAMSON stations with solar radiation data are West Palm Beach (164 km from LCERF), Tampa (167 km), Miami (173 km), and Vero Beach (175 km). Based on conversations between Richard Graw of RTP Environmental Associates, Inc. (RTP) and Mr. John Notar of the NPS on September 26, 2001 (Graw, 2001), the Tampa surface station located at 27° 58' North latitude and 82° 32' West longitude in Time Zone 5 (EST) was selected for the Class I area screening analyses based on its similar exposure along Florida's Gulf Coast and expected sea breeze influences. The nearest NWS upper

air stations are West Palm Beach (164 km from LCERF) and Tampa (167 km). Due to its similar exposure along Florida's Gulf Coast, the Tampa upper air station was selected to determine representative mixing heights for the modeling analyses. PCRAMMET was used to generate the extended ISCST3 meteorological dataset using wet deposition and precipitation data options. Other PCRAMMET options were based on summer values for open agricultural and cultivated areas and are the same as those used to generate the Fort Myers ISCST3 modeling dataset as described in Section 6. The Tampa anemometer height is 22 feet.

CALPUFF is capable of simulating the chemical transformation of pollutants which contribute to regional haze and atmospheric deposition such as the transformation of sulfur dioxide to ammonium sulfate – a fine particle which effectively scatters light, thereby increasing haze. CALPUFF requires the user to provide background concentrations of other pollutants (e.g., ozone and ammonia) which participate in the chemical reactions in order to accurately quantify the impacts. For ozone (O_3), an average concentration of 24 ppb (based on nearby 7 am to 7 pm ozone season measurements) was used and, for ammonia (NH_3), a domain average value of 10.0 ppb was used (grassland regions) as suggested by Mr. John Notar of NPS on September 26, 2001 (Graw, 2001).

A CALPUFF control file was used which included IWAQM recommended defaults for the model options. This included rural dispersion coefficients, default wind speed profile exponents, default vertical potential temperature gradient and default surface characteristics for irrigated agricultural land. A brief summary of the options used in the modeling analysis are listed below:

- Number of X grid cells = 2
- Number of Y grid cells = 2
- Number of vertical layers = 1
- Grid Origin = 169.2 km East and 2690.7 km North in UTM Zone 17
- Grid spacing = 255 km
- Cell face heights = 0 and 5000 meters
- Minimum mixing height = 20 meters
- Maximum mixing height = 5000 meters (based on observational data)
- Minimum windspeed for non-calm conditions = 0.5 m/s
- Vertical distribution used in the near field = Gaussian
- Terrain adjustment method = partial plume path adjustment
- No puff splitting allowed
- Chemical mechanism = MESOPUFF-II
- Wet and dry removal modeled
- Dispersion coefficients = PG dispersion coefficients
- PG sigma-y and sigma-z not adjusted for roughness
- Partial plume penetration of elevated inversion allowed
- Lateral turbulence not used

The computational grid used extended 50 kilometers beyond the furthest receptor point. The maximum concentration for each pollutant averaging time modeled was compared with the appropriate AQRV. CALPOST options include the formation of hygroscopic species based on seasonal relative humidity [f(rh)] values and background concentrations of hygroscopic and non-hygroscopic species as presented for Everglades National Park in the FLAG Phase I report (U.S. Forest Service et al., 2000). Maximum hourly relative humidity was limited to 98%. CALPUFF values of light extinction were calculated for a 24-hour averaging period while CALPUFF predicted values of deposition were calculated for annual periods (8760 hours). CALPUFF predicted concentrations of PSD criteria pollutants SO₂, NO₂, and PM₁₀ were calculated using the applicable averaging time (SO₂ = 3, 24, and 8760 hours; NO₂ = 8760 hours; and PM₁₀ = 24 and 8760 hours). Other options used in the POSTUTIL and CALPOST post-processing programs are described below for the appropriate AQRV.

Maximum emission rates for the proposed modification (i.e., the new MWC unit) and the associated stack parameters used in the Class I analysis are shown on Tables 6-1 and 6-2 for Case 5. Sulfuric acid (H₂SO₄) emissions were modeled as sulfate (SO₄) by multiplying the sulfuric acid emission rate by the ratio of molecular weights (96/98).

7.6.1 PSD CLASS I INCREMENT ANALYSIS

Maximum concentrations predicted by CALPUFF for Unit 3 are shown on Table 7-2 for the PSD increment pollutants. USEPA has established PSD Class I increments for three pollutants: PM₁₀, SO₂, and NO₂. In addition, USEPA proposed Class I significant impact levels (SILs; 61 FR 38292, July 23, 1996) for these same pollutants. The maximum predicted concentrations are less than 3% of the PSD Class I increments for all pollutants. Since the maximum impacts are less than the proposed USEPA Class I SILs, no additional multisource modeling analyses (i.e., including other PSD sources) are typically required to demonstrate compliance with the PSD Class I increments.

7.6.2 PSD CLASS I AIR QUALITY RELATED VALUES

In addition to an analysis of PSD Class I increments, the applicant must also demonstrate that AQRVs in PSD Class I areas such as scenic vistas (i.e., based on CALPUFF modeled visibility impairment) and sensitive plants and ecosystems (i.e., based on CALPUFF modeled deposition rates of nitrogen- and sulfur-containing species) will not be threatened as a result of the proposed modification. The Federal Land Managers have established AQRV screening thresholds. If the applicant demonstrates that the maximum impacts are less than these screening thresholds, then further analyses would typically not be required. However, should the impacts exceed the screening thresholds, then more refined analysis may be required, depending upon the magnitude and frequency of occurrence, as evaluated on a case-by-case basis by the Federal Land Manager.

The CALPUFF-predicted change in light extinction is compared with the FLAG threshold of 5%, below which the proposed change is considered insignificant. Additionally, model-predicted nitrogen- and sulfur-containing species deposition rates

TABLE 7-2
COMPARISON OF MAXIMUM CLASS I IMPACTS TO USEPA
PROPOSED SIGNIFICANT IMPACT LEVELS AND CLASS I INCREMENTS

Pollutant Name	Averaging Time	Maximum Unit 3 Impacts (ug/m³)	Proposed Class I SILs (ug/m³)^a	Percent of Proposed Class I SILs	PSD Class I Increments (ug/m³)	Percent of PSD Class I Increments
PM ₁₀	24-Hour	0.01404	0.3	4.68%	8	0.18%
PM ₁₀	Annual	0.00110	0.2	0.55%	4	0.03%
SO ₂	3-Hour	0.48556	1.0	48.56%	25	1.94%
SO ₂	24-Hour	0.14901	0.2	74.51%	5	2.98%
SO ₂	Annual	0.01294	0.1	12.94%	2	0.65%
NO _x	Annual	0.01171	0.1	11.71%	2.5	0.47%

^a 61 Federal Register 38250, 1996 (specifically 61 FR 38292).

are compared with the FLAG threshold of 0.01 kilograms per hectare per year (kg/ha-yr), below which the proposed change is considered insignificant.

Model-predicted impacts on air quality related values were quantified using the same model, input data, and model options, as in the PSD Class I increment analysis. Two post-processing utilities, POSTUTIL and CALPOST, were also used as discussed below.

7.6.2.1 ACID DEPOSITION ANALYSES

Acid deposition is quantified by modeling the deposition rates of nitrogen- and sulfur-containing species. Emission rates of NO_x , SO_2 , and SO_4 were input into CALPUFF, which in turn calculates the deposition rates of secondary species. Table 7-3 presents the species modeled in the CALPUFF program. Dry and wet flux output files created by CALPUFF were processed in POSTUTIL to obtain a combined total flux output file. In POSTUTIL, nitrogen and sulfur deposition fluxes were computed using a weighted sum of the deposition fluxes of all of the species computed and stored from the CALPUFF model run. Table 7-3 includes the weight of nitrogen or sulfur contained in each species modeled in the POSTUTIL program. All of the following contribute to the total nitrogen mass: SO_4 in the form of ammonium sulfate $[(\text{NH}_4)_2\text{SO}_4]$; NO_x as NO_2 ; HNO_3 ; and NO_3 in the form of ammonium nitrate $[(\text{NH}_4)\text{NO}_3]$. Only SO_2 and SO_4 contribute to the total sulfur mass. The total amount of nitrogen or sulfur contained in one gram of each of the species modeled was calculated using molecular weight ratios.

The resulting output file from the POSTUTIL program was processed in the CALPOST program to obtain total nitrogen and total sulfur deposition rates. A scaling factor was employed which converted the deposition rates from grams per square meter per second ($\text{g/m}^2\text{-sec}$) to kg/ha-yr. Table 7-4 presents the maximum model-predicted nitrogen and sulfur flux for Everglades National Park. The model-predicted nitrogen and sulfur deposition rates were lower than the FLAG thresholds of 0.01 kg/ha-yr for each compound, applicable in the Eastern United States. Therefore, the deposition impacts from the proposed modification are not considered significant and additional refined analyses are unnecessary.

7.6.2.2 REGIONAL HAZE ANALYSIS

The CALPOST post-processor was used to quantify the percent change in light extinction from the proposed modification. Since ammonium nitrate and ammonium sulfate particles form as a function of relative humidity (rh), seasonal values of this factor ($f(\text{rh})$) are provided into CALPOST to account for this phenomenon. Seasonal $f(\text{rh})$ values documented in the FLAG report for Everglades National Park were used as input. Background concentrations of light scattering and absorbing species must also be provided in order for CALPOST to calculate the change in light extinction. The FLAG document provides seasonal values of hygroscopic and non-hygroscopic species for Everglades National Park, which were also used as input into CALPOST. Light extinction is calculated as a 24-hour averaged value.

TABLE 7-3
MODELING INPUTS FOR CALPUFF DEPOSITION ANALYSES

CHEMICAL SPECIES MODELED FOR DEPOSITION

Nitrogen Containing Species	Deposition Mechanism
HNO ₃	Dry and Wet
NO ₃	Dry and Wet
NO _x	Dry
Sulfur Containing Species	Deposition Mechanism
SO ₂	Dry and Wet
SO ₄	Dry and Wet

**WEIGHT OF CHEMICAL SPECIES MODELED
FOR DEPOSITION IN POSTUTIL**

Species Contributing to Total Nitrogen	Weight^a
(NH ₄) ₂ (SO ₄) as SO ₄	$(2 \times 14) / (32 + 4 \times 16) = 0.291667$
NO _x as NO ₂	$14 / (14 + 2 \times 16) = 0.304348$
HNO ₃	$14 / (1 + 14 + 3 \times 16) = 0.222222$
(NH ₄)NO ₃ as NO ₃	$(2 \times 14) / (14 + 3 \times 16) = 0.451623$
Species Contributing to Total Sulfur	Weight^a
SO ₂	$32 / (32 + 2 \times 16) = 0.500000$
SO ₄	$32 / (32 + 4 \times 16) = 0.333333$

^a Number of grams of nitrogen or sulfur in one gram of species modeled, calculated from the molecular weights for nitrogen (14), sulfur (32), oxygen (16) and hydrogen (1) as shown above.

TABLE 7-4
MAXIMUM MODEL-PREDICTED NITROGEN
AND SULFUR DEPOSITION RATES

Chemical Species	Deposition Rate (kg/ha-yr)	Screening Threshold (kg/ha-yr)	Percent of Screening Threshold
Total Nitrogen	0.00358	0.010	35.8%
Total Sulfur	0.00669	0.010	66.9%

The maximum model-predicted light extinction (B_{ext}), background light extinction, and percent change in light extinction are presented in Table 7-5. The maximum predicted change in light extinction is slightly greater than 5%, which is predicted to occur for one day out of the five years (1826 days) modeled at five of the 1080 receptors. The results are based upon the maximum 3-hour emission rates for SO_2 and sulfuric acid (H_2SO_4) and the 24-hour averaged concentration of light scattering and absorbing species.

The analysis was refined by using the 24-hour SO_2 and sulfuric acid emission rates to be consistent with the averaging period of the light scattering and absorbing species calculated in CALPUFF. The maximum 24-hour emission rate of these species (SO_2 and sulfuric acid) is 66% of the 3-hour emission rates reported on Table 6-2 for Case 5 (i.e., outlet SO_2 concentrations of 100 and 66 ppm_{dv} corrected to 7% O_2 for 3-hour and 24-hour averaging times, respectively, with H_2SO_4 equal to 24% of SO_2 emission rate on a lb/hr or g/s basis). The results from the revised analysis with 24-hour emission rates are included on Table 7-5. For the 24-hour emission rates of SO_2 and H_2SO_4 , the model-predicted change in light extinction is 4.01%, which is less than the 5% screening threshold. This is nevertheless a very conservative assessment. Therefore, the proposed modification does not pose a threat to regional haze at Everglades National Park.

TABLE 7-5
MODEL-PREDICTED CHANGE IN LIGHT EXTINCTION IN EVERGLADES
NATIONAL PARK

Emission Source	Model-Predicted B_{ext} (Mm^{-1})	Background B_{ext} (Mm^{-1})	Percent Change in B_{ext}
Unit 3 With 3-Hour Emission Rates	1.168	21.83	5.35%
Unit 3 With 24-Hour Emission Rates	0.875	21.83	4.01%

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

**SECTION 8
REFERENCES**

October 31, 2002

SECTION 8 REFERENCES

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**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

**SECTION 9
ATTACHMENTS**

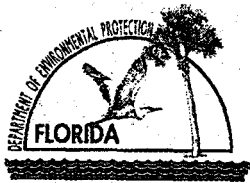
October 31, 2002

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

ATTACHMENT A

**FLORIDA DEPARTMENT OF ENVIRONMENTAL
PROTECTION AIR PERMIT APPLICATION FORMS**

October 31, 2002



Department of Environmental Protection

Division of Air Resources Management

APPLICATION FOR AIR PERMIT - TITLE V SOURCE

See Instructions for Form No. 62-210.900(1)

I. APPLICATION INFORMATION

Identification of Facility

1. Facility Owner/Company Name: Lee County Board of County Commissioners	
2. Site Name: Lee County Energy Recovery Facility	
3. Facility Identification Number: 0710119 [] Unknown	
4. Facility Location: Street Address or Other Locator: 10500 Buckingham Road City: Fort Myers County: Lee Zip Code: 33905	
5. Relocatable Facility? [] Yes [X] No	6. Existing Permitted Facility? [X] Yes [] No

Application Contact

1. Name and Title of Application Contact: Mr. Samuel M. Rosania, R.E.M./Project Scientist	
2. Application Contact Mailing Address: Organization/Firm: Malcolm Pirnie, Inc. Street Address: 1715 East 9th Avenue City: Tampa State: FL Zip Code: 33605	
3. Application Contact Telephone Numbers: Telephone: (813) 248 - 6900 Fax: (813) 248 - 8085	

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	
2. Permit Number:	
3. PSD Number (if applicable):	
4. Siting Number (if applicable):	

Purpose of Application

Air Operation Permit Application

This Application for Air Permit is submitted to obtain: (Check one)

- ☐ Initial Title V air operation permit for an existing facility which is classified as a Title V source.
- ☐ Initial Title V air operation permit for a facility which, upon start up of one or more newly constructed or modified emissions units addressed in this application, would become classified as a Title V source.

Current construction permit number: _____

- ☐ Title V air operation permit revision to address one or more newly constructed or modified emissions units addressed in this application.

Current construction permit number: _____

Operation permit number to be revised: _____

- ☐ Title V air operation permit revision or administrative correction to address one or more proposed new or modified emissions units and to be processed concurrently with the air construction permit application. (Also check Air Construction Permit Application below.)

Operation permit number to be revised/corrected: _____

- ☐ Title V air operation permit revision for reasons other than construction or modification of an emissions unit. Give reason for the revision; e.g., to comply with a new applicable requirement or to request approval of an "Early Reductions" proposal.

Operation permit number to be revised: _____

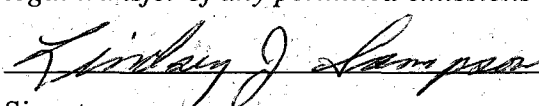
Reason for revision: _____

Air Construction Permit Application

This Application for Air Permit is submitted to obtain: (Check one)

- ☒ Air construction permit to construct or modify one or more emissions units.
- ☐ Air construction permit to make federally enforceable an assumed restriction on the potential emissions of one or more existing, permitted emissions units.
- ☐ Air construction permit for one or more existing, but unpermitted, emissions units.

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official: Mr. Lindsey Sampson
2. Owner/Authorized Representative or Responsible Official Mailing Address: Organization/Firm: Lee County Solid Waste Division Street Address: 10500 Buckingham Road City: Fort Myers State: FL Zip Code: 33905
3. Owner/Authorized Representative or Responsible Official Telephone Numbers: Telephone: (239) 338 - 3302 Fax: (239) 461 - 5871
4. Owner/Authorized Representative or Responsible Official Statement: <i>I, the undersigned, am the owner or authorized representative*(check here [], if so) or the responsible official (check here [✓], if so) of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.</i> Signature  Date <u>11/7/02</u>

* Attach letter of authorization if not currently on file.

Professional Engineer Certification

1. Professional Engineer Name: Amit Chattopadhyay, P.E. Registration Number: 52823
2. Professional Engineer Mailing Address: Organization/Firm: Malcolm Pirnie, Inc. Street Address: 17-17 Route 208 North City: Fair Lawn State: NJ Zip Code: 07410
3. Professional Engineer Telephone Numbers: Telephone: (201) 797 - 7400 Fax: (201) 797 - 4558

4. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

If the purpose of this application is to obtain a Title V source air operation permit (check here [☐], if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.

If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [☒], if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [☐], if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

Amir Chatterjee
Signature

11/7/2002
Date

(seal)

* Attach any exception to certification statement.

Scope of Application

Emissions Unit ID	Description of Emissions Unit	Permit Type	Processing Fee
	Municipal Waste Combustion Unit No. 3	AC1A	
	Lime Silo II	AC1F	

Application Processing Fee

Check one: ☐ Attached - Amount: \$ _____ ☒ Not Applicable

Construction/Modification Information

1. Description of Proposed Project or Alterations:

The Lee County Solid Waste Division operates the Lee County Energy Recovery Facility (LCERF) at 10500 Buckingham Road east of Fort Myers, Florida. The current facility consists of two Martin GmbH mass-burn traveling grate combustors each rated at a capacity of 660 tons/day (tpd) per unit for a total of 1,320 tons per day of solid waste fuel with a nominal HHV of 5,000 Btu/lb. Due to a growth in population since the facility came online in 1994, Lee County has decided to expand their current facility through the addition of a third 660-tpd combustion unit (Unit 3) that is a separate source. This facility expansion is not a modification of the existing two municipal waste combustors (Units 1 and 2).

2. Projected or Actual Date of Commencement of Construction: January 1, 2003

3. Projected Date of Completion of Construction: To Be Provided Later.

Application Comment

Application fees for this Prevention of Significant Deterioration application are covered by the LCERF's Power Plant Siting Act (PPSA) fees. The LCERF currently operates under the PPSA Conditions of Certification Case Number PA90-30.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates: Zone: 17 East (km): 424.21 North (km): 2945.70			
2. Facility Latitude/Longitude: Latitude (DD/MM/SS): 26/37/54 Longitude (DD/MM/SS): -81/45/41			
3. Governmental Facility Code: 3	4. Facility Status Code: A	5. Facility Major Group SIC Code: 49	6. Facility SIC(s): 4953
7. Facility Comment (limit to 500 characters): LCERF Operator is: Covanta Lee, Inc. (Formerly Ogden-Martin Systems of Lee, Inc.) 10500 Buckingham Road, Suite 400 Fort Myers, FL 33905 Tel: (941) 337-2200/Fax: (941) 337-2510 The Facility's two existing MWC units currently operate under the following air permits: PPSA Conditions of Certification PA90-30 FDEP Permit 0710119-001-AV PSD-FL-151 PSD-FL-151A PSD-FL-151B			

Facility Contact

1. Name and Title of Facility Contact: Tom Eriksen, Facility Manager			
2. Facility Contact Mailing Address: Organization/Firm: Covanta Lee, Inc. Street Address: 10500 Buckingham Road, Suite 400 City: Fort Myers State: FL Zip Code: 33905			
3. Facility Contact Telephone Numbers: Telephone: (941) 337 - 2200 Fax: (941) 337 - 2510			

Check all that apply:

List of Applicable Regulations

DEP Form No. 62-210.900(1) - Form
Effective: 2/11/99

B. FACILITY POLLUTANTS

List of Pollutants Emitted

1. Pollutant Emitted	2. Pollutant Classif.	3. <u>Requested Emissions Cap</u>		4. Basis for Emissions Cap	5. Pollutant Comment
		lb/hour	tons/year		
PM	B	5.08	22.26	Rule	USEPA NSPS
PM10	B	5.08	22.26	Rule	USEPA NSPS
CO	A	28.73	125.8	Rule	USEPA NSPS
SO2	A	65.72	287.8	Rule	USEPA NSPS
NOX	A	70.79	310.1	Rule	USEPA NSPS
PB	B	4.94 E-2	0.216	Rule	USEPA NSPS
VOC	B	4.936	21.62	ESCPD	
H027	B	4.94 E-3	0.0216	Rule	USEPA NSPS (Cadmium)
DIOX	B	3.21 E-6	1.406 E-5	Rule	USEPA NSPS
H107	B	0.718	3.145	Rule	40 CFR 52.21 (HF)
H106	A	46.76	204.8	Rule	USEPA NSPS (HCl)
H114	B	4.26 E-2	0.187	Rule	USEPA NSPS (Mercury)
SAM	B	16.78	73.51	Rule	40 CFR 52.21
H021	B	3.95 E-5	1.73 E-4	ESCPD	(Beryllium)
H015	B	2.65 E-3	0.0116	Other	Units 1 and 2 operation (Arsenic)
Ammonia	B	8.72	38.190	Other	Based on operation of Units 1 and 2.
HAPS	A	47.58	208.4	Rule	40 CFR 52.21

C. FACILITY SUPPLEMENTAL INFORMATION

Supplemental Requirements

1. Area Map Showing Facility Location: [X] Attached, Document ID: Fig. 1-1 [] Not Applicable [] Waiver Requested
2. Facility Plot Plan: [X] Attached, Document ID: Fig. 6-2 [] Not Applicable [] Waiver Requested
3. Process Flow Diagram(s): [X] Attached, Document ID: Below [] Not Applicable [] Waiver Requested
4. Precautions to Prevent Emissions of Unconfined Particulate Matter: [X] Attached, Document ID: Below [] Not Applicable [] Waiver Requested
5. Fugitive Emissions Identification: [X] Attached, Document ID: Below [] Not Applicable [] Waiver Requested
6. Supplemental Information for Construction Permit Application: [X] Attached, Document ID: See PSD Application Write-up [] Not Applicable
7. Supplemental Requirements Comment: The map showing facility location is Figure 1-1 of the PSD application. The facility plot plan is Figure 6-2 of the PSD application. The process flow diagram is provided in the PSD application write-up. Precautions to Prevent Emissions of Unconfined Particulate Matter are provided in the PSD application write-up in Section 6. Fugitive Emissions Identification is provided in the PSD application write-up in Section 6.4 (Source Data). Proposed Insignificant Activities are listed in the PSD application write-up in Section 6.4 (Source Data). The identification of additional applicable requirements is provided in the PSD application write-up.

Additional Supplemental Requirements for Title V Air Operation Permit Applications

8. List of Proposed Insignificant Activities: [X] Attached, Document ID: See field 7 above [] Not Applicable
9. List of Equipment/Activities Regulated under Title VI: [] Attached, Document ID: _____ [] Equipment/Activities On site but Not Required to be Individually Listed [X] Not Applicable
10. Alternative Methods of Operation: [] Attached, Document ID: _____ [X] Not Applicable
11. Alternative Modes of Operation (Emissions Trading): [] Attached, Document ID: _____ [X] Not Applicable
12. Identification of Additional Applicable Requirements: [X] Attached, Document ID: See field 7 above [] Not Applicable
13. Risk Management Plan Verification: [X] Plan previously submitted to Chemical Emergency Preparedness and Prevention Office (CEPPO). Verification of submittal attached (Document ID: Attachment G) or previously submitted to DEP (Date and DEP Office: _____) [] Plan to be submitted to CEPPO (Date required: _____) [] Not Applicable
14. Compliance Report and Plan: [] Attached, Document ID: _____ [X] Not Applicable
15. Compliance Certification (Hard-copy Required): [] Attached, Document ID: _____ [X] Not Applicable

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

A. GENERAL EMISSIONS UNIT INFORMATION
(All Emissions Units)

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in This Section: (Check one)			
☐ This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).			
☒ This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.			
☐ This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.			
2. Regulated or Unregulated Emissions Unit? (Check one)			
☒ The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.			
☐ The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.			
3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):			
Municipal waste combustor unit rated at 660 tons of municipal solid waste per day.			
4. Emissions Unit Identification Number:		☒ No ID ☐ ID Unknown	
ID:			
5. Emissions Unit Status Code:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C		49	☐
9. Emissions Unit Comment: (Limit to 500 Characters)			

Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

Air Pollution Control (APC) equipment for the third unit will be similar to APC equipment for the two existing units; namely, a spray dry absorber, fabric filter baghouse, activated carbon injection system, and selective non-catalytic reduction system.

2. Control Device or Method Code(s): 016, 025, 048, 067, 107

Emissions Unit Details

1. Package Unit:		
Manufacturer:	To Be Determined	Model Number: To Be Determined
2. Generator Nameplate Rating: +- 20 MW (Nominal)		
3. Incinerator Information: To Be Determined		
	Dwell Temperature:	°F
	Dwell Time:	seconds
	Incinerator Afterburner Temperature:	°F

B. EMISSIONS UNIT CAPACITY INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Operating Capacity and Schedule

1. Maximum Heat Input Rate:	275	mmBtu/hr
2. Maximum Incineration Rate:	55,000 lb/hr	660 tons/day
3. Maximum Process or Throughput Rate:	660 tons per day (annual basis)	
4. Maximum Production Rate:		
5. Requested Maximum Operating Schedule:		
	24 hours/day	7 days/week
	52 weeks/year	8,760 hours/year
6. Operating Capacity/Schedule Comment (limit to 200 characters):		
Municipal Waste Combustor unit 3 is rated at 660 tons per day at a reference higher heating value (HHV) of 5,000 Btu per pound of waste on an annual basis. The Lee County Energy Recovery Facility is permitted to burn waste under their Power Plant Siting Act Conditions of Certification for Case Number PA90-30.		

**C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)**

List of Applicable Regulations

40 CFR Part 50	National Primary and Secondary Ambient Air Quality Standards
40 CFR Part 52.21	Prevention of Significant Deterioration of Air Quality
40 CFR Part 60, Subpart Eb	New Source Performance Standards for Large Municipal Waste Combustors
40 CFR Part 60, Appendix A	Test Methods
40 CFR Part 60, Appendix B	Performance Specifications
40 CFR Part 64	Compliance Assurance Monitoring
Rule 62-204 F.A.C.	Air Pollution Control - General Provisions
Rule 62-210 F.A.C.	Stationary Sources - General Requirements
Rule 62-212 F.A.C.	Stationary Sources - Preconstruction Review
Rule 62-296.416 F.A.C.	Stationary Sources - Emission Standards for Waste-to-Energy Facilities
Rule 62-297 F.A.C.	Stationary Sources - Emissions Monitoring

D. EMISSION POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram? See Field 14 Below.		2. Emission Point Type Code: 1	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point):			
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:			
5. Discharge Type Code: V	6. Stack Height: 276 feet	7. Exit Diameter: 6.17 feet	
8. Exit Temperature: 270 °F	9. Actual Volumetric Flow Rate: 80,000-155,800 acfm	10. Water Vapor: 14.73 %	
11. Maximum Dry Standard Flow Rate: 35800-65,900		12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates: Zone: 17 East (km): 424.20 North (km): 2945.70			
14. Emission Point Comment (limit to 200 characters): From Field 1 Above: Emission Point is located in the upper right area of Figure 6-2 of the PSD Application. The emission point is located at an elevation of 276 feet above grade (271 feet for structural stack plus 5 feet for flue). The stack contains space three separate flues, one for each combustor unit. Flues for Units 1 and 2 currently are in the facility stack. The flue for Unit 3 will be installed during this project. The maximum dry standard flow rate in field 11 above is corrected to 7% oxygen. Flow ranges above correspond to operation of unit over the operating window. See Section 6 of the PSD application documentation for further information on this operating window, specifically Figure 6-1.			

E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)

Segment Description and Rate: Segment 1 of 1.

1. Segment Description (Process/Fuel Type) (limit to 500 characters): Municipal solid waste (MSW) generated in the Lee County area is combusted by the facility to generate thermal energy and heat water producing steam. This steam is used to power an electrical generator and produce electricity that is sold to the power grid. The MSW is rated at 5,000 Btu/pound under the PPSA Conditions of Certification Case Number PA90-30.		
2. Source Classification Code (SCC): 50100105		3. SCC Units: Tons Burned
4. Maximum Hourly Rate: 27.5	5. Maximum Annual Rate: 240,900	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: 10
10. Segment Comment (limit to 200 characters):		

Segment Description and Rate: Segment _____ of _____

1. Segment Description (Process/Fuel Type) (limit to 500 characters):		
2. Source Classification Code (SCC):		3. SCC Units:
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment (limit to 200 characters):		

F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM	016		EL
PM10	016		EL
CO	025		EL
SO2	067	016	EL
NOX	107		EL
PB	016		EL
VOC	025		EL
H027	016		EL
DIOX	025	067	EL
H107	067	016	EL
H106	067	016	EL
H114	048	016	EL
SAM	067	016	EL
H021	016		EL
H015	016		EL
Ammonia			EL
HAPS	016	025	EL

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: PM		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 5.08 lb/hour 22.26 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 to tons/year			
6. Emission Factor: 0.009 grains/dscf @ 7% O ₂ Reference: Past operation of units 1 and 2 at facility		7. Emissions Method Code: 0	
8. Calculation of Emissions (limit to 600 characters): $\frac{0.009 \text{ grains @ 7\% O}_2}{\text{dscf}} \times \frac{\text{lb}}{7,000 \text{ grains}} \times \frac{65,868 \text{ dscf @ 7\% O}_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):			

Allowable Emissions Allowable Emissions 1 of 1.

1. Basis for Allowable Emissions Code: OTHER		2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: 0.009 grains/dscf @ 7% O ₂		4. Equivalent Allowable Emissions: 5.08 lb/hour 22.26 tons/year	
5. Method of Compliance (limit to 60 characters): USEPA Method 5 [as per 40 CFR 60.58b(c)]			
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Emission factor is based on an analysis of past operation of units 1 and 2 at the facility in addition to other available data for municipal waste combustion facilities.			

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: PM10		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 5.08 lb/hour 22.26 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 to tons/year			
6. Emission Factor: 0.009 grains/dscf @ 7% O ₂ Reference: Past operation of units 1 and 2 at facility		7. Emissions Method Code: 0	
8. Calculation of Emissions (limit to 600 characters): $\frac{0.009 \text{ grains @ 7\% O}_2}{\text{dscf}} \times \frac{\text{lb}}{7,000 \text{ grains}} \times \frac{65,868 \text{ dscf @ 7\% O}_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER		2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: 0.009 grains/dscf @ 7% O ₂		4. Equivalent Allowable Emissions: 5.08 lb/hour 22.26 tons/year	
5. Method of Compliance (limit to 60 characters): USEPA Method 5 [as per 40 CFR 60.58b(c)]			
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Emission factor is based on an analysis of past operation of units 1 and 2 at the facility in addition to other available data for municipal waste combustion facilities.			

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: CO	2. Total Percent Efficiency of Control:
3. Potential Emissions: 28.73 lb/hour 125.8 tons/year	4. Synthetically Limited? []
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year	
6. Emission Factor: 100 ppm _{dv} @ 7% O ₂ Reference: 40 CFR 60, Subpart Eb	7. Emissions Method Code: 0
8. Calculation of Emissions (limit to 600 characters): $\frac{100 \text{ ppm}_{dv} @ 7\% \text{ O}_2}{1 \times 10^6} \times \frac{28.01 \text{ lb}}{\text{lb mole}} \times \frac{65,868 \text{ dscf} @ 7\% \text{ O}_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}} \times \frac{\text{mole}}{385.3 \text{ dscf}}$	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: RULE	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 100 ppm _{dv} @ 7% O ₂	4. Equivalent Allowable Emissions: 28.73 lb/hour 125.8 tons/year
5. Method of Compliance (limit to 60 characters): CEM [as per 40 CFR 60.58b(i)]	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Emission source is applicable to 40 CFR 60, Subpart Eb.	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: SO ₂	2. Total Percent Efficiency of Control: 80%
3. Potential Emissions: 65.72 lb/hour 287.8 tons/year	4. Synthetically Limited? []
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year	
6. Emission Factor: 100 ppm _{dv} @ 7% O ₂ Reference: 40 CFR 60, Subpart Eb	7. Emissions Method Code: 0
8. Calculation of Emissions (limit to 600 characters): $\frac{100 \text{ ppm}_{dv} @ 7\% O_2}{1 \times 10^6} \times \frac{64.07 \text{ lb}}{\text{lb mole}} \times \frac{65,868 \text{ dscf} @ 7\% O_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}} \times \frac{\text{mole}}{385.3 \text{ dscf}}$	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): 40 CFR 60.52b(b) limits SO ₂ emissions to 30 ppm _{dv} (at 7% O ₂) or 20% (by weight or volume) of potential SO ₂ emissions concentration, whichever is less stringent (20% of uncontrolled SO ₂ emissions is conservatively estimated to be 100 ppm _{dv} at 7% O ₂).	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: RULE	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 100 ppm _{dv} @ 7% O ₂	4. Equivalent Allowable Emissions: 65.72 lb/hour 287.8 tons/year
5. Method of Compliance (limit to 60 characters): CEM [as per 40 CFR 60.58b(e)]	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): 40 CFR 60.52b(b) limits SO ₂ emissions to 30 ppm _{dv} (at 7% O ₂) or 20% (by weight or volume) of potential SO ₂ emissions concentration, whichever is less stringent (20% of uncontrolled SO ₂ emissions is conservatively estimated to be 100 ppm _{dv} at 7% O ₂).	

Emissions Unit Information Section 1 of 2.Pollutant Detail Information Page 5 of 17.

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: NOX	2. Total Percent Efficiency of Control: Approx. 40%
3. Potential Emissions: 70.79 lb/hour 310.1 tons/year	4. Synthetically Limited? []
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 to tons/year	
6. Emission Factor: 150 ppmdv @ 7% O ₂ Reference: 40 CFR 60, Subpart Eb	7. Emissions Method Code: 0
8. Calculation of Emissions (limit to 600 characters): $\frac{150 \text{ ppmdv @ 7\% O}_2}{1 \times 10^6} \times \frac{46.01 \text{ lb}}{\text{lb mole}} \times \frac{65,868 \text{ dscf @ 7\% O}_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}} \times \frac{\text{mole}}{385.3 \text{ dscf}}$	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): 180 ppmdv at 7% O ₂ for the first year of operation, thereafter 150 ppmdv at 7% O ₂ .	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: RULE	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 150 ppmdv @ 7% O ₂	4. Equivalent Allowable Emissions: 70.79 lb/hour 310.1 tons/year
5. Method of Compliance (limit to 60 characters): CEM [as per 40 CFR 60.58b(h)]	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): 40 CFR 60, Subpart Eb establishes a NO _x limit of 180 ppmdv at 7% O ₂ for the first year of operation, thereafter the limit is 150 ppmdv at 7% O ₂ .	

Emissions Unit Information Section 1 of 2.

Pollutant Detail Information Page 6 of 17.

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: Pb		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 4.94 E-2 lb/hour		4. Synthetically Limited? [] 0.216 tons/year	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 0.200 mg/dscm @ 7% O ₂ Reference: 40 CFR 60, Subpart Eb		7. Emissions Method Code: 0	
8. Calculation of Emissions (limit to 600 characters): $\frac{0.2 \text{ mg @ 7\% O}_2}{\text{dscm}} \times \frac{\text{gram}}{1000 \text{ mg}} \times \frac{\text{dscm}}{35.31 \text{ dscf}} \times \frac{65,868 \text{ dscf @ 7\% O}_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}} \times \frac{\text{lb}}{453.59 \text{ gram}}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: RULE	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 0.200 mg/dscm @ 7% O ₂	4. Equivalent Allowable Emissions: 4.94 E-2 lb/hour 0.216 tons/year
5. Method of Compliance (limit to 60 characters): USEPA Method 29 [as per 40 CFR 60.58b(d)]	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Emission source is applicable to 40 CFR 60.58b(a)(4).	

Emissions Unit Information Section 1 of 2.

Pollutant Detail Information Page 7 of 17.

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: VOC		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 4.936 lb/hour 21.62 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 to tons/year			
6. Emission Factor: 30 ppmdv @ 7% O ₂ Reference: Past operation of units 1 and 2 at facility		7. Emissions Method Code: 0	
8. Calculation of Emissions (limit to 600 characters): $\frac{30 \text{ ppmdv @ 7\% O}_2}{1 \times 10^6} \times \frac{16.04 \text{ lb}}{\text{lb mole}} \times \frac{65,868 \text{ dscf @ 7\% O}_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}} \times \frac{\text{mole}}{385.3 \text{ dscf}}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 30 ppmdv @ 7% O ₂	4. Equivalent Allowable Emissions: 4.936 lb/hour 21.62 tons/year
5. Method of Compliance (limit to 60 characters): Proposed as initial stack test only using USEPA Method 18 or 25A.	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Emission factor is based on an analysis of past operation of units 1 and 2 at the facility in addition to other available data for municipal waste combustion facilities.	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: H027 (Cadmium)		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 4.94 E-3 lb/hour		4. Synthetically Limited? [] 0.0216 tons/year	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 0.020 mg/dscm @ 7% O ₂ Reference: 40 CFR 60, Subpart Eb		7. Emissions Method Code: 0	
8. Calculation of Emissions (limit to 600 characters): $\frac{0.02 \text{ mg @ 7\% O}_2}{\text{dscm}} \times \frac{\text{gram}}{1000 \text{ mg}} \times \frac{\text{dscm}}{35.31 \text{ dscf}} \times \frac{65,868 \text{ dscf @ 7\% O}_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}} \times \frac{\text{lb}}{453.59 \text{ gram}}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: RULE	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 0.020 mg/dscm @ 7% O ₂	4. Equivalent Allowable Emissions: 4.94 E-3 lb/hour 0.0216 tons/year
5. Method of Compliance (limit to 60 characters): USEPA Method 29 [as per 40 CFR 60.58b(d)]	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Emission source is applicable to 40 CFR 60.52b(a)(3).	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: DIOX		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 3.21 E-6 lb/hour 1.406 E-5 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 13 ng/dscm @ 7% O ₂ Reference: 40 CFR 60, Subpart Eb		7. Emissions Method Code: 0	
8. Calculation of Emissions (limit to 600 characters): $\frac{13 \text{ ng @ 7\% O}_2}{\text{dscm}} \times \frac{\text{gram}}{1 \text{ E9 ng}} \times \frac{\text{dscm}}{35.31 \text{ dscf}} \times \frac{65,868 \text{ dscf @ 7\% O}_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}} \times \frac{\text{lb}}{453.59 \text{ gram}}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: RULE	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 13 ng/dscm @ 7% O ₂	4. Equivalent Allowable Emissions: 3.21 E-6 lb/hour 1.406 E-5 tons/year
5. Method of Compliance (limit to 60 characters): USEPA Method 23 [as per 40 CFR 60.58b(g)]	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Emission source is applicable to 40 CFR 60.52b(c).	

Emissions Unit Information Section 1 of 2.

Pollutant Detail Information Page 10 of 17.

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: H107 (Fluorides)		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 0.718 lb/hour 3.145 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 to tons/year			
6. Emission Factor: 3.5 ppm _{dv} @ 7% O ₂ Reference: Past operation of units 1 and 2 at facility		7. Emissions Method Code: 0	
8. Calculation of Emissions (limit to 600 characters): $\frac{3.5 \text{ ppm}_{dv} @ 7\% \text{ O}_2}{1 \times 10^6} \times \frac{20.01 \text{ lb}}{\text{lb mole}} \times \frac{65,868 \text{ dscf @ 7\% O}_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}} \times \frac{\text{mole}}{385.3 \text{ dscf}}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 3.5 ppm _{dv} @ 7% O ₂	4. Equivalent Allowable Emissions: 0.718 lb/hour 3.145 tons/year
5. Method of Compliance (limit to 60 characters): Proposed as initial stack test only using USEPA Method 13A or 13B.	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Emission factor is based on an analysis of past operation of units 1 and 2 at the facility in addition to other available data for municipal waste combustion facilities.	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: H106 (HCl)		2. Total Percent Efficiency of Control: 95%	
3. Potential Emissions: 46.76 lb/hour 204.8 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 to tons/year			
6. Emission Factor: 125 ppmdv @ 7% O ₂ Reference: 40 CFR 60, Subpart Eb		7. Emissions Method Code: 0	
8. Calculation of Emissions (limit to 600 characters): $\frac{125 \text{ ppmdv @ 7\% O}_2}{1 \times 10^6} \times \frac{36.47 \text{ lb}}{\text{lb mole}} \times \frac{65,868 \text{ dscf @ 7\% O}_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}} \times \frac{\text{mole}}{385.3 \text{ dscf}}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): 40 CFR 60.52b(b) limits HCl emissions to 25 ppmdv (at 7% O ₂) or 5% (by weight or volume) of potential HCl emissions concentration, whichever is less stringent (5% of uncontrolled HCl emissions is conservatively estimated to be 125 ppmdv at 7% O ₂).			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: RULE		2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: 125 ppmdv @ 7% O ₂		4. Equivalent Allowable Emissions: 46.76 lb/hour 204.8 tons/year	
5. Method of Compliance (limit to 60 characters): USEPA Method 26 or 26A [as per 40 CFR 60.58b(f)]			
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): 40 CFR 60.52b(b) limits HCl emissions to 25 ppmdv (at 7% O ₂) or 5% (by weight or volume) of potential HCl emissions concentration, whichever is less stringent (5% of uncontrolled HCl emissions is conservatively estimated to be 125 ppmdv at 7% O ₂).			

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: H114 (Mercury)	2. Total Percent Efficiency of Control: 85%
3. Potential Emissions: 4.26 E-2 lb/hour 0.187 tons/year	4. Synthetically Limited? []
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 to tons/year	
6. Emission Factor: 0.1725 mg/dscm @ 7% O ₂ Reference: 40 CFR 60, Subpart Eb	7. Emissions Method Code: 0
8. Calculation of Emissions (limit to 600 characters): $\frac{0.1725 \text{ mg @ 7\% O}_2}{\text{dscm}} \times \frac{\text{gram}}{1000 \text{ mg}} \times \frac{\text{dscm}}{35.31 \text{ dscf}} \times \frac{65,868 \text{ dscf @ 7\% O}_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}} \times \frac{\text{lb}}{453.59 \text{ gram}}$	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Rule 62-296.416, F.A.C. and 40 CFR 60.52b(a) limit mercury emissions to 0.070 milligrams per dry standard cubic meter (mg/dscm) (at 7% O ₂) or removed 85% (by weight or volume) of uncontrolled mercury emissions, whichever is less stringent (15% of uncontrolled mercury emissions is conservatively estimated to be 0.1725 mg/dscm at 7% O ₂).	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: RULE	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 0.1725 mg/dscm @ 7% O ₂	4. Equivalent Allowable Emissions: 4.26 E-2 lb/hour 0.187 tons/year
5. Method of Compliance (limit to 60 characters): USEPA Method 29 [as per 40 CFR 60.58b(d)]	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Rule 62-296.416, F.A.C. and 40 CFR 60.52b(a) limit mercury emissions to 0.070 milligrams per dry standard cubic meter (mg/dscm) (at 7% O ₂) or removed 85% (by weight or volume) of uncontrolled mercury emissions, whichever is less stringent (15% of uncontrolled mercury emissions is conservatively estimated to be 0.1725 mg/dscm at 7% O ₂).	

Emissions Unit Information Section 1 of 2.

Pollutant Detail Information Page 13 of 17.

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: SAM (Sulfuric Acid Mist)		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 16.78 lb/hour 73.51 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 to tons/year			
6. Emission Factor: 16.68 ppmdv at 7% O ₂ Reference: Past operation of units 1 and 2 at facility		7. Emissions Method Code: 0	
8. Calculation of Emissions (limit to 600 characters): $\frac{16.68 \text{ ppmdv @ 7\% O}_2}{1 \times 10^6} \times \frac{98.09 \text{ lb}}{\text{lb mole}} \times \frac{65,868 \text{ dscf @ 7\% O}_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}} \times \frac{\text{mole}}{385.3 \text{ dscf}}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 16.68 ppmdv at 7% O ₂	4. Equivalent Allowable Emissions: 16.78 lb/hour 73.51 tons/year
5. Method of Compliance (limit to 60 characters): Proposed as initial stack test only using USEPA Method 8.	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Emission factor is based on an analysis of past operation of units 1 and 2 at the facility in addition to other available data for municipal waste combustion facilities.	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: H021 (Beryllium)	2. Total Percent Efficiency of Control:
3. Potential Emissions: 3.95 E-5 lb/hour 1.730 E-4	4. Synthetically Limited? []
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 to tons/year	
6. Emission Factor: 0.16 ug/dscm @ 7% O ₂ Reference: Past operation of units 1 and 2 at facility	7. Emissions Method Code: 0
8. Calculation of Emissions (limit to 600 characters): $\frac{0.16 \text{ ug @ 7\% O}_2}{\text{dscm}} \times \frac{\text{gram}}{1\text{E6 ug}} \times \frac{\text{dscm}}{35.31 \text{ dscf}} \times \frac{65,868 \text{ dscf @ 7\% O}_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}} \times \frac{\text{lb}}{453.59 \text{ gram}}$	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 0.16 ug/dscm @ 7% O ₂	4. Equivalent Allowable Emissions: 3.95 E-5 lb/hour 1.730 E-4 tons/year
5. Method of Compliance (limit to 60 characters): Proposed as initial stack test only using USEPA Method 29.	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Emission factor is based on an analysis of past operation of units 1 and 2 at the facility in addition to other available data for municipal waste combustion facilities.	

Emissions Unit Information Section 1 of 2.

Pollutant Detail Information Page 15 of 17.

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: H015 (Arsenic)		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 2.65 E-3 lb/hour 0.0116 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 to tons/year			
6. Emission Factor: 10.74 ug/dscm @ 7% O ₂ Reference: Past operation of units 1 and 2 at facility		7. Emissions Method Code: 0	
8. Calculation of Emissions (limit to 600 characters): $\frac{10.74 \text{ ug @ 7\% O}_2}{\text{dscm}} \times \frac{\text{gram}}{1\text{E6 ug}} \times \frac{\text{dscm}}{35.31 \text{ dscf}} \times \frac{65,868 \text{ dscf @ 7\% O}_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}} \times \frac{\text{lb}}{453.59 \text{ gram}}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER		2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: 10.74 ug/dscm @ 7% O ₂		4. Equivalent Allowable Emissions: 2.65 E-3 lb/hour 0.0116 tons/year	
5. Method of Compliance (limit to 60 characters): Proposed as initial stack test only using USEPA Method 29.			
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Emission factor is based on an analysis of past operation of units 1 and 2 at the facility in addition to other available data for municipal waste combustion facilities.			

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: Ammonia		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 8.72 lb/hour 38.19 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 to tons/year			
6. Emission Factor: 50 ppm _{dv} @ 7% O ₂ Reference: Past operation of units 1 and 2 at facility		7. Emissions Method Code: 0	
8. Calculation of Emissions (limit to 600 characters): $\frac{50 \text{ ppm}_{dv} @ 7\% \text{ O}_2}{1 \times 10^6} \times \frac{17.0 \text{ lb}}{\text{lb mole}} \times \frac{65,868 \text{ dscf @ 7\% O}_2}{\text{minute}} \times \frac{60 \text{ minute}}{\text{hour}} \times \frac{\text{mole}}{385.3 \text{ dscf}}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 50 ppm _{dv} @ 7% O ₂	4. Equivalent Allowable Emissions: 8.72 lb/hour 38.19 tons/year
5. Method of Compliance (limit to 60 characters): Proposed as initial stack test only using USEPA Method CTM-027 (Conditional Test Method).	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Emission factor is based on an analysis of past operation of units 1 and 2 at the facility in addition to other available data for municipal waste combustion facilities.	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: HAPS (Total HAPS)		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 47.58 lb/hour 208.4 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 47.58 lb/hour Reference: Summation of Individual HAPS		7. Emissions Method Code: 0	
8. Calculation of Emissions (limit to 600 characters): Summation of Individual HAPS: arsenic, beryllium, cadmium, dioxins, fluorides (HF), hydrochloric acid (HCl), lead, and mercury.			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):			

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER		2. Future Effective Date of Allowable Emissions:	
3. Requested Allowable Emissions and Units: 47.58 lb/hour		4. Equivalent Allowable Emissions: 47.58 lb/hour 208.4 tons/year	
5. Method of Compliance (limit to 60 characters): Not Applicable			
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Requested emission limit is summation of arsenic, beryllium, cadmium, dioxins, fluorides (HF), hydrochloric acid (HCl), lead, and mercury.			

Visible Emissions Limitation: Visible Emissions Limitation 1 of 1

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor 1 of 7

DEP Form No. 62-210.900(1) - Form
Effective: 2/11/99

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor 2 of 7

1. Parameter Code: EM	2. Pollutant(s): CO
3. CMS Requirement: ☒ Rule ☐ Other	
4. Monitor Information: To Be Provided Later. Manufacturer: Model Number: Serial Number:	
5. Installation Date: To Be Provided Later.	6. Performance Specification Test Date: To Be Provided Later.
7. Continuous Monitor Comment (limit to 200 characters): 40 CFR 60.58b(i) requires installation and operation of CO CEM.	

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor 3 of 7

1. Parameter Code: VE	2. Pollutant(s):
3. CMS Requirement: ☒ Rule ☐ Other	
4. Monitor Information: To Be Provided Later. Manufacturer: Model Number: Serial Number:	
5. Installation Date: To Be Provided Later.	6. Performance Specification Test Date: To Be Provided Later.
7. Continuous Monitor Comment (limit to 200 characters): 40 CFR 60.58b(c) requires installation and operation of a continuous opacity monitoring system.	

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor 4 of 7

1. Parameter Code: EM	2. Pollutant(s): SO2
3. CMS Requirement: [X] Rule [] Other	
4. Monitor Information: To Be Provided Later. Manufacturer: Model Number: Serial Number:	
5. Installation Date: To Be Provided Later.	6. Performance Specification Test Date: To Be Provided Later.
7. Continuous Monitor Comment (limit to 200 characters): 40 CFR 60.58b(e) requires installation and operation of inlet and outlet CEM systems (i.e., before the SDA and after the FF).	

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor 5 of 7

1. Parameter Code: TEMP	2. Pollutant(s):
3. CMS Requirement: [X] Rule [] Other	
4. Monitor Information: To Be Provided Later. Manufacturer: Model Number: Serial Number:	
5. Installation Date: To Be Provided Later.	6. Performance Specification Test Date: To Be Provided Later.
7. Continuous Monitor Comment (limit to 200 characters): A continuous monitoring system is required under 40 CFR 60.58b(i) to monitor the temperature of the flue gas stream at the inlet of the fabric filter control device.	

Continuous Monitoring System: Continuous Monitor 6 of 7

I. CONTINUOUS MONITOR INFORMATION

Continuous Monitoring System: Continuous Monitor 7 of 7

October 31, 2002

J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
(Regulated Emissions Units Only)

Supplemental Requirements

1. Process Flow Diagram [X] Attached, Document ID: Below [] Not Applicable [] Waiver Requested
2. Fuel Analysis or Specification [X] Attached, Document ID: Below [] Not Applicable [] Waiver Requested
3. Detailed Description of Control Equipment [X] Attached, Document ID: Below [] Not Applicable [] Waiver Requested
4. Description of Stack Sampling Facilities [X] Attached, Document ID: Below [] Not Applicable [] Waiver Requested
5. Compliance Test Report [] Attached, Document ID: _____ [] Previously submitted, Date: _____ [X] Not Applicable
6. Procedures for Startup and Shutdown [X] Attached, Document ID: Below [] Not Applicable [] Waiver Requested
7. Operation and Maintenance Plan [X] Attached, Document ID: Below [] Not Applicable [] Waiver Requested
8. Supplemental Information for Construction Permit Application [X] Attached, Document ID: Below [] Not Applicable
9. Other Information Required by Rule or Statute [X] Attached, Document ID: Below [] Not Applicable
10. Supplemental Requirements Comment: The following items are provided in the PSD application write-up: Process flow diagram; fuel analysis or specification; detailed description of control equipment (Section 4); supplemental information for construction permit application; other information required by rule or statute; and identification of additional applicable requirements. A description of stack sampling facilities; procedures for startup and shutdown; and operation and maintenance plan will be provided later.

Additional Supplemental Requirements for Title V Air Operation Permit Applications

11. Alternative Methods of Operation [] Attached, Document ID: _____ [X] Not Applicable
12. Alternative Modes of Operation (Emissions Trading) [] Attached, Document ID: _____ [X] Not Applicable
13. Identification of Additional Applicable Requirements [X] Attached, Document ID: See field 10 above [] Not Applicable
14. Compliance Assurance Monitoring Plan [] Attached, Document ID: _____ [X] Not Applicable
15. Acid Rain Part Application (Hard-copy Required) [] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a)) Attached, Document ID: _____ [] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) Attached, Document ID: _____ [] New Unit Exemption (Form No. 62-210.900(1)(a)2.) Attached, Document ID: _____ [] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) Attached, Document ID: _____ [] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) Attached, Document ID: _____ [] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) Attached, Document ID: _____ [X] Not Applicable

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

A. GENERAL EMISSIONS UNIT INFORMATION
(All Emissions Units)

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in This Section: (Check one) ☒ [X] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent). ☐ [] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions. ☐ [] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.			
2. Regulated or Unregulated Emissions Unit? (Check one) ☒ [X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit. ☐ [] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.			
3. Description of Emissions Unit Addressed in This Section (limit to 60 characters): Operation of a limo storage silo for the air pollution control equipment associated with Municipal Waste Combustor Unit 3 at the facility. Particulate emissions will be controlled with a baghouse.			
4. Emissions Unit Identification Number: ID:		☒ [X] No ID ☐ [] ID Unknown	
5. Emissions Unit Status Code: C	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: 49	8. Acid Rain Unit? ☐ []
9. Emissions Unit Comment: (Limit to 500 Characters)			

Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

Particulate emissions from filling operations of the lime storage silo will be controlled using a fabric filter baghouse. Emissions occur during filling operations only.

2. Control Device or Method Code(s): 018

Emissions Unit Details

1. Package Unit:	
Manufacturer: To Be Provided	Model Number: To Be Provided
2. Generator Nameplate Rating: MW	
3. Incinerator Information:	
Dwell Temperature:	°F
Dwell Time:	seconds
Incinerator Afterburner Temperature:	°F

B. EMISSIONS UNIT CAPACITY INFORMATION
(Regulated Emissions Units Only)**Emissions Unit Operating Capacity and Schedule**

1. Maximum Heat Input Rate:	mmBtu/hr
2. Maximum Incineration Rate:	lb/hr tons/day
3. Maximum Process or Throughput Rate:	
4. Maximum Production Rate:	
5. Requested Maximum Operating Schedule:	
24 hours/day	7 days/week
52 weeks/year	8760 hours/year
6. Operating Capacity/Schedule Comment (limit to 200 characters):	

C. EMISSIONS UNIT REGULATIONS (Regulated Emissions Units Only)

List of Applicable Regulations

[illegible]

D. EMISSION POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram?		2. Emission Point Type Code: 1	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point):			
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:			
5. Discharge Type Code: D	6. Stack Height: 85 feet	7. Exit Diameter: 0.67 feet	
8. Exit Temperature: Ambient °F	9. Actual Volumetric Flow Rate: 1200 acfm	10. Water Vapor: %	
11. Maximum Dry Standard Flow Rate: 1200 dscfm		12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates: Zone: 17 East (km): 424.249 North (km): 2945.717			
14. Emission Point Comment (limit to 200 characters):			

E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type) (limit to 500 characters): Lime Silo Loading Operations		
2. Source Classification Code (SCC):		3. SCC Units:
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment (limit to 200 characters):		

Segment Description and Rate: Segment _____ of _____

1. Segment Description (Process/Fuel Type) (limit to 500 characters):		
2. Source Classification Code (SCC):		3. SCC Units:
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment (limit to 200 characters):		

F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM	018		NS
PM10	018		NS

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: PM		2. Total Percent Efficiency of Control: 99%	
3. Potential Emissions: 0.154 lb/hour 0.0281 tons/year		4. Synthetically Limited? []	
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 _____ to _____ tons/year			
6. Emission Factor: 0.015 gr/dscf Reference: Engineering Estimate		7. Emissions Method Code:	
8. Calculation of Emissions (limit to 600 characters): $\frac{0.015 \text{ grains}}{\text{dscf}} \times \frac{1,200 \text{ dscf}}{\text{minute}} \times \frac{60 \text{ minutes}}{\text{fill}} \times \frac{\text{lb}}{7,000 \text{ grains}} = \frac{0.154 \text{ lb}}{\text{hour}}$			
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):			

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance (limit to 60 characters):	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters):	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: PM10	2. Total Percent Efficiency of Control: 99%
3. Potential Emissions: 0.154 lb/hour 0.0281 tons/year	4. Synthetically Limited? []
5. Range of Estimated Fugitive Emissions: [] 1 [] 2 [] 3 to tons/year	
6. Emission Factor: 0.015 grains/dscf Reference: Engineering Estimate	7. Emissions Method Code:
8. Calculation of Emissions (limit to 600 characters): $\frac{0.015 \text{ grains}}{\text{dscf}} \times \frac{1,200 \text{ dscf}}{\text{minute}} \times \frac{60 \text{ minutes}}{\text{fill}} \times \frac{\text{lb}}{7,000 \text{ grains}} = \frac{0.154 \text{ lb}}{\text{hour}}$	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance (limit to 60 characters):	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters):	

H. VISIBLE EMISSIONS INFORMATION
(Only Regulated Emissions Units Subject to a VE Limitation)

Visible Emissions Limitation: Visible Emissions Limitation 1 of 1

1. Visible Emissions Subtype: 05	2. Basis for Allowable Opacity: [X] Rule [] Other
3. Requested Allowable Opacity: Normal Conditions: 5 % Exceptional Conditions: 5 % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: USEPA Method 9	
5. Visible Emissions Comment (limit to 200 characters): Lee County proposes to demonstrate compliance under Rule 62-297.620(4), F.A.C. (Exceptions and Approval of Alternate Procedures and Requirements), which allows the Secretary of the Florida Department of Environmental Protection to waive particulate compliance test requirements when potential particulate emissions are less than 100 tons per year and the emission unit is equipped with a baghouse. An alternative compliance standard of 5% opacity can be included in the permit under this rule.	

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[] Rule [] Other
4. Monitor Information: Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters):	

J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
(Regulated Emissions Units Only)

Supplemental Requirements

1. Process Flow Diagram [X] Attached, Document ID: Below [] Not Applicable [] Waiver Requested
2. Fuel Analysis or Specification [] Attached, Document ID: _____ [X] Not Applicable [] Waiver Requested
3. Detailed Description of Control Equipment [X] Attached, Document ID: Below [] Not Applicable [] Waiver Requested
4. Description of Stack Sampling Facilities [X] Attached, Document ID: Below [] Not Applicable [] Waiver Requested
5. Compliance Test Report [] Attached, Document ID: _____ [] Previously submitted, Date: _____ [X] Not Applicable
6. Procedures for Startup and Shutdown [X] Attached, Document ID: Below [] Not Applicable [] Waiver Requested
7. Operation and Maintenance Plan [X] Attached, Document ID: Below [] Not Applicable [] Waiver Requested
8. Supplemental Information for Construction Permit Application [X] Attached, Document ID: See PSD Application Write-up [] Not Applicable
9. Other Information Required by Rule or Statute [X] Attached, Document ID: See PSD Application Write-up [] Not Applicable
10. Supplemental Requirements Comment: The following items are provided in the PSD application write-up: Process flow diagram; detailed description of control equipment (Section 4); supplemental information for construction permit application; other information required by rule or statute; and identification of additional applicable requirements. A description of stack sampling facilities; procedures for startup and shutdown; and operation and maintenance plan will be provided later.

Additional Supplemental Requirements for Title V Air Operation Permit Applications

11. Alternative Methods of Operation [] Attached, Document ID: _____ [X] Not Applicable
12. Alternative Modes of Operation (Emissions Trading) [] Attached, Document ID: _____ [X] Not Applicable
13. Identification of Additional Applicable Requirements [X] Attached, Document ID: See PSD Application Write-up [] Not Applicable
14. Compliance Assurance Monitoring Plan [] Attached, Document ID: _____ [X] Not Applicable
15. Acid Rain Part Application (Hard-copy Required) [] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a)) Attached, Document ID: _____ [] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) Attached, Document ID: _____ [] New Unit Exemption (Form No. 62-210.900(1)(a)2.) Attached, Document ID: _____ [] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) Attached, Document ID: _____ [] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) Attached, Document ID: _____ [] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) Attached, Document ID: _____ [X] Not Applicable

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

ATTACHMENT B

**TRANSCRIPT OF PUBLIC MEETING REGARDING
PRELIMINARY DRAFT MATERIALS SEPARATION PLAN**

October 31, 2002

Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

1
2 LEE COUNTY
3 PRELIMINARY DRAFT MATERIALS SEPARATION PLAN
4 PUBLIC MEETING
5
6
7
8

9 TRANSCRIPT OF PUBLIC MEETING
10
11
12

13 A Public Meeting held in the above-styled cause,
14 at the Board of County Commission Chambers, 2120 Main
15 Street, Fort Myers, Florida, on the 19th day of
16 October, 2001 commencing at 6:20 p.m.
17
18

19
20 NOLEN-MARTINA
21 REPORTING SERVICES
22 2069 First Street
23 Courtney Building, Suite 201
24 Ft. Myers, Florida 33901
25 (941) 334-6545
FAX (941) 332-2913

ORIGINAL

1 MR. DEE: Good evening, I would like to call
2 this public hearing to order. My name is David
3 Dee, I'm an attorney with the law firm of Landers
4 & Parsons in Tallahassee, Florida. I'm here
5 tonight on behalf of Lee County.

6 This public meeting is being called to
7 discuss Lee County's Preliminary Draft Materials
8 Separation Plan, which has been prepared by the
9 County for the purposes of complying with the
10 requirements in 40 CFR section 60.57, and to
11 assist with the permitting of the expansion of
12 the Lee County Resource Recovery Facility.

13 With me tonight are several representatives
14 of the County, and other people that are
15 interested in this project. If all of you would
16 introduce yourselves and give your name and
17 address.

18 MR. OWEN: My name is David Owen and I'm an
19 Assistant County Attorney for Lee County. My
20 address is post office box 398, Fort Myers,
21 Florida, 33902. I'm also here on behalf of Lee
22 County, in conjunction with Mr. David Dee.

23 MR. SAMPSON: My name is Lindsey Sampson,
24 I'm the Director of the Solid Waste Department
25 for Lee County. My address is 1500 Monroe

1 Street, Fort Myers, Florida, 33901, and I am with
2 the Lee County Government.

3 MR. CERRATO: My name is David Cerrato,
4 Vice-President with Malcolm, Pirnie Environmental
5 Consultants to the County. My address is 1715
6 East 9th Avenue, Tampa, Florida, 33605.

7 MR. ROSANIA: My name is Sam Rosania, I'm
8 with the consulting firm of Malcolm, Pirnie. My
9 address is 1715 East 9th Avenue, Tampa, Florida,
10 33605.

11 MR. DEE: We also have in the audience
12 several representatives from Covanta of Lee
13 County, Inc., the operator of the Lee County
14 resource recovery facility.

15 At this time, however, we have no members of
16 the public here in attendance. The meeting was
17 advertised to begin at 6:00, it is now
18 approximately 6:20 p.m. For the purposes of this
19 record, I would like to create an Exhibit Number
20 One, which is the Notice of the Public Meeting
21 that was published in the newspaper, also
22 attached is an Affidavit of Publication of the
23 Notice.

24 I also at this time would like to create a
25 second exhibit, which is the Preliminary Draft

1 Materials Separation Plan for the Lee County
2 Solid Waste Division, dated September 7, 2001,
3 and prepared by Malcolm, Pirnie, Inc. And the
4 third document I would like to attach to the
5 record is the meeting agenda that was prepared
6 for this meeting tonight.

7 (Whereupon, Lee County's Exhibit Nos. One,
8 Two and Three were marked for identification.)

9 MR. DEE: Since the purpose of the meeting
10 is to discuss the Materials Separation Plan and
11 there is no one here from the public to discuss
12 the plan with, I intend to adjourn the meeting at
13 this time, unless there is anyone that has any
14 comments or questions about the plan.

15 (No Response.)

16 MR. DEE: Hearing no comments or questions,
17 this meeting is adjourned.

18 Thank you.

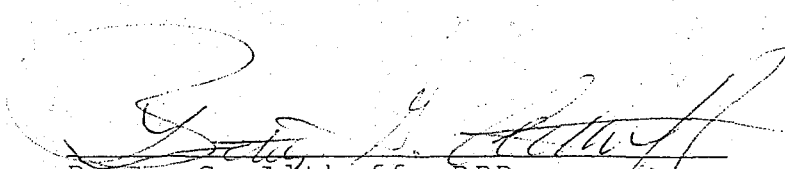
19 (Whereupon, at the hour of 6:25 p.m. the
20 proceedings were concluded.)
21
22
23
24
25

1 STATE OF FLORIDA)

2 COUNTY OF LEE)

3
4
5
6 I, Betty G. Althoff, Registered Professional
7 Court Reporter, 20th Judicial Circuit of Florida, do
8 certify that I was authorized to and did
9 stenographically report the foregoing proceedings and
10 that the typewritten transcript, consisting of pages
11 numbered 1 through 5, is a true record.

12
13
14
15 IN WITNESS WHEREOF, I have hereunto set my
16 hand this 20th day of October, 2001.

17
18
19
20
21 
22 Betty G. Althoff, RPR,
23 Court Reporter,
24 Notary Public,
25 State of Florida at Large.

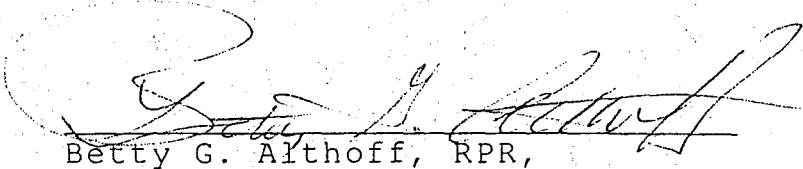
 Betty G Althoff
★ My Commission CC797438
★ Expires December 28 2002

1 STATE OF FLORIDA)

2 COUNTY OF LEE)

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4
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16 hand this 20th day of October, 2001.
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19

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23 Court Reporter,
24 Notary Public,
25 State of Florida at Large.

NEWS-PRESS

Published every morning - Daily and Sunday
Fort Myers, Florida

Affidavit of Publication

STATE OF FLORIDA
COUNTY OF LEE

Before the undersigned authority, personally appeared

Kieanna Henry

who on oath says that he/she is the

Asst. Legal Clerk of the News-Press, a daily newspaper,
published at Fort Myers, in Lee County, Florida; that the
attached copy of advertisement, being a

Display

In the matter of Notice of Public Meeting
in the _____ Court

was published in said newspaper in the issues of
September 14, 2001

Affiant further says that the said News-Press is a paper of general circulation daily in Lee, Charlotte, Collier, Glades and Hendry Counties and published at Fort Myers, in said Lee County, Florida and that said newspaper has heretofore been continuously published in said Lee County, Florida, each day, and has been entered as a second class mail matter at the post office in Fort Myers in said Lee County, Florida, for a period of one year next preceding the first publication of the attached copy of the advertisement; and affiant further says that he/she has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

Kieanna Henry

Sworn to and subscribed before me this

14th day of September 2001 by

Kieanna Henry

personally known to me or who has produced

as identification, and who did or did not take an oath.

Notary Public Brenda Leighton

Print Name _____

My commission Expires:



Brenda Leighton
MY COMMISSION # CC08905 EXPIRES
February 14, 2003
BONDED THRU TROY FAIN INSURANCE, INC.

NOTICE OF PUBLIC MEETING CONCERNING LEE COUNTY'S PRELIMINARY DRAFT MATERIALS SEPARATION PLAN

The Lee County Board of County Commissioners and the Solid Waste Division of Lee County, Florida, hereby give notice that a public meeting will be held beginning at 6:00 p.m. on October 19, 2001, to present and review Lee County's Preliminary Draft Materials Separation Plan (Plan). This Plan is being prepared in accordance with the requirements of 40 Code of Federal Regulations, section 60.57b, as part of the County's efforts to obtain the environmental permits and approvals for the expansion of the Lee County Energy Recovery Facility. Lee County will accept written and oral comments from the public regarding the Plan at the public meeting, which will be held at the Lee County Board of County Commission Chambers, 2120 Main St., Ft. Myers, Florida.

Agenda for the Public Meeting

- Introduction
- The proposed expansion of Lee County's Energy Recovery Facility
- The size of the area served by Lee County's Energy Recovery Facility
- The amount of solid waste generated in Lee County's service area
- The types and estimated amounts of materials proposed for separation
- The methods proposed for materials separation
- The amount of residual waste for disposal
- Alternate disposal methods for handling the residual waste
- Public questions and comments

Public Comment Period: In addition to commenting at the public meeting, in person or in writing, the public may submit its written comments about the Plan to the Solid Waste Division of Lee County at 1500 Monroe St., Ft. Myers, FL 33901. Comments will be accepted from the date of this notice through October 29, 2001.

The Preliminary Draft Materials Separation Plan is available for inspection at the following locations:

Lee County Solid Waste Division

1500 Monroe St.

Fort Myers, FL 33901

M-F 9:00 AM to 5:00 PM

Ft. Myers Central Library

2050 Central Avenue

Fort Myers, FL 33901

M-Th 9:00 AM to 9:00 PM

F&S 9:00 AM to 6:00 PM

Cape Coral Library

921 SW 39th Terrace

Cape Coral, FL 33914

M-Th 9:00 AM to 9:00 PM

F&S 9:00 AM to 6:00 PM

East County Regional Library

881 Gunnery Road

Lehigh Acres, FL 33971

M-Th 9:00 AM to 9:00 PM

F&S 9:00 AM to 6:00 PM

South County Regional Library

21100 Three Oaks Parkway

Estero, FL 33928

M-Th 9:00 AM to 9:00 PM

F&S 9:00 AM to 6:00 PM

After the County has received the public's comments about the Plan, the County will prepare responses to those comments. The County also will prepare a Final Draft Materials Separation Plan after the comments to the responses are developed. The County's responses to public comments and the County's Final Draft Materials Separation Plan, will be available for inspection at the same locations that are listed above for the inspection of the Preliminary Draft Materials Separation Plan beginning November 20, 2001.

EXHIBIT

1/19/01 JH

WEDNESDAY, SEPTEMBER 19th, 2001 10:30 AM TO 12:00 PM, THE BOARD OF LEE COUNTY COMMISSIONERS WILL MEET WITH THE MEMBERS OF THE LEE COUNTY LEGISLATIVE DELEGATION TO DISCUSS COUNTY'S LEGISLATIVE PRIORITIES FOR THE UPCOMING LEGISLATIVE SESSION. THE MEETING WILL BE HELD IN THE FIRST FLOOR CONFERENCE ROOM OF THE LEE COUNTY ADMINISTRATION BUILDING 1100 SECOND STREET, FORT MYERS, FLORIDA, 33901.

INTERESTED PARTIES ARE INVITED TO ATTEND; HOWEVER, NO COUNCIL INPUT WILL BE TAKEN.

ANY PARTY WHO MAY WANT TO APPEAL A DECISION OF THE BOARD MUST ENSURE THAT A VERBATIM RECORD OF THE MEETING IS MADE.

PLEASE GOVERN YOURSELF ACCORDINGLY.

Sekulski

REF.D091401-153

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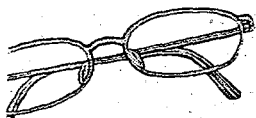
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12670 NEW BRITTANY BOULEVARD
Fort Myers Florida 33907

Notice of Public Hearing For Lee Tran Route and Schedule Restructuring

LEE COUNTY
WEST FLORIDA

Tuesday, September 25, 2001
5:00 p.m.

Old Courthouse
Lee County Board of County Commissioners' Chambers
2120 Main Street, Fort Myers, Florida 33901

Lee County's Transit Division, will be conducting a public hearing at the above time and place in order to present and discuss final route and schedule restructuring for the transit system. Recommended service modifications will affect each route in the current Lee Tran system, and create a new route and schedule network for the Lee Tran system.

Lee Tran plans to implement the recommended changes on November 1, 2001.

Highlights of the proposed changes include:

- **Route Redesign**
Routes 10, 20, 40, 50, 60, 80, 90, 100, 110, 120, 130, and Fort Myers Beach Trolley
- **Schedule Changes**
All Routes (including commuter trips)
- **New Route**
Route 15, serving central Fort Myers to Edison Mall
- **Combined with Existing Routes**
Routes 85 and 115
- **Elimination**
Route 150

Changes are recommended in order to achieve:

- A redesigned route-network reflecting travel patterns of existing Lee Tran customers as well as appeal to potential customers.
- Reallocation of revenue hours of service to those areas of the system with greatest ridership demand for transit services, and
- Financial and operational efficiency within base of revenue hours currently operated and plans for expansions over a five (5) year period.

Lee Tran welcomes all comments to the route restructuring. Please contact Lee Tran at 275-8726 or write to us at: Lee Tran, Route Restructuring, 10715 East Airport Road, Fort Myers, Florida 33907 with any comments. You should also contact us at the above phone number and address any requests for assistance if you have a disability that requires special assistance or special accommodations.

PLEASE GOVERN YOURSELF ACCORDINGLY.

This text of this Notice is pursuant to and in conformance with Section 125.66, Florida Statutes (2001).

Sekulski
D091401-152

BOARD OF COUNTY COMMISSIONERS
OF LEE COUNTY, FLORIDA

NOTICE OF PUBLIC MEETING CONCERNING LEE COUNTY'S PRELIMINARY DRAFT MATERIALS SEPARATION PLAN

The Lee County Board of County Commissioners and the Solid Waste Division of Lee County, Florida, hereby give notice that a public meeting will be held beginning at 6:00 p.m. on October 19, 2001, to present and review Lee County's Preliminary Draft Materials Separation Plan (Plan). This Plan is being prepared in accordance with the requirements of 40 Code of Federal Regulations, section 60.57b, as part of the County's efforts to obtain the environmental permits and approvals for the expansion of the Lee County Energy Recovery Facility. Lee County will accept written and oral comments from the public regarding the Plan at the public meeting, which will be held at the Lee County Board of County Commission Chambers, 2120 Main St., Ft. Myers, Florida.

Agenda for the Public Meeting

- A. Introduction
- B. The proposed expansion of Lee County's Energy Recovery Facility
- C. The size of the area served by Lee County's Energy Recovery Facility
- D. The amount of solid waste generated in Lee County's service area
- E. The types and estimated amounts of materials proposed for separation
- F. The methods proposed for materials separation
- G. The amount of residual waste for disposal
- H. Alternate disposal methods for handling the residual waste
- I. Public questions and comments

Public Comment Period: In addition to commenting at the public meeting, in person or in writing, the public may submit its written comments about the Plan to the Solid Waste Division of Lee County at 1500 Monroe St., Ft. Myers, FL 33901. Comments will be accepted from the date of this notice through October 29, 2001.

The Preliminary Draft Materials Separation Plan is available for inspection at the following locations:

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M-Th 9:00 AM to 9:00 PM
F&S 9:00 AM to 6:00 PM

Cape Coral Library
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881 Gunnery Road
Lehigh Acres, FL 33971

M-Th 9:00 AM to 9:00 PM
F&S 9:00 AM to 6:00 PM

South County Regional Library
21100 Three Oaks Parkway
Estero, FL 33928

M-Th 9:00 AM to 9:00 PM
F&S 9:00 AM to 6:00 PM

After the County has received the public's comments about the Plan, the County will prepare responses to those comments. The County also will prepare a Final Draft Materials Separation Plan after the comments to the responses are developed. The County's responses to public comments, and the County's Final Draft Materials Separation Plan, will be available for inspection at the same locations that are listed above for the inspection of the Preliminary Draft Materials Separation Plan beginning November 20, 2001.

SEPT. 14, 2001

News Press

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

ATTACHMENT C

**LIST OF PERSONS CONTACTED
DURING PREPARATION OF
BEST AVAILABLE CONTROL TECHNOLOGY**

October 31, 2002

**Lee County Energy Recovery Facility
SCR Search Summary Spreadsheet**

Contact Name	Company/Affiliation	Category	Date Contacted	Date Response Received	Status
Tony Licata	Babcock Borsig Power [Worcester, MA USA]	SCR Mfg	Aug. 13, 2001	Aug. 29, 2001	Waiting to send him flue gas flow data. Awaiting technical papers describing emissions limits and actual emissions data.
Peter Chromec	Babcock Borsig Power	SCR Mfg	Aug. 10, 2001	Sept. 19, 2001	Sent Information Request, Received general info about European experience, nothing facility specific. Received invitation to visit Swiss plants.
Peter Chromec	Babcock Borsig Power	SCR Mfg	Oct. 15, 2001	Oct. 16, 2001	Requested information on operation and emissions of facilities and list of facilities. Received list from Alfred Muller.
Edmund Fleck	ALSTOM Power	SCR Mfg	Aug. 16, 2001	Aug. 16, 2001	Sent information request, received list of plants, awaiting feasibility response.
Victor Ciarlante	Hamon Research-Cottrell	SCR Mfg	Oct. 19, 2001	Oct. 19, 2001	No direct experience of SCR on MWCs
Jim Stone	Foster Wheeler [Clinton, NJ USA]	SCR Mfg	Aug. 13, 2001		No response yet. Foster Wheeler is affiliated with Ishikawajima-Harima Heavy Industries Company of Japan.
Soren Olsen	Haldor Topsoe, Inc.		Aug. 10, 2001	Aug. 10, 2001	Does not have SCR experience on MWC or other dirty sources.
Curt McKee	Huntington Environmental		Aug. 10, 2001	Aug. 10, 2001	Does have SCR experience on diesel but not economical on a MWC.
Russ Gerlick	CRI Catalysts		Aug. 10, 2001	Aug. 10, 2001	Does have experience on dirty sources that are cleaned.
Takayuki Hishinuma	Mitsubishi Heavy Ind.	SCR Mfg	Sept. 25, 2001		No response yet.
Kurtis Gentile	Mitsubishi Heavy Ind.	SCR Mfg	Oct. 17, 2001		Will contact Mr. Hishinuma with our request. No response yet.
Robert Reed	Siemens Westinghouse Power Generation Corp.	Catalyst Mfg	Aug. 13, 2001		He sent out information request to engineers in the Germany offices.
Andreas Klatt	Siemens AG	Catalyst Mfg		Aug. 21, 2001	Received list of European facilities, paper on SCR use in MWCs and presentation on SCR use.

**Lee County Energy Recovery Facility
SCR Search Summary Spreadsheet**

Contact Name	Company/Affiliation	Category	Date Contacted	Date Response Received	Status
Paul James	European Integrated Pollution Prevention & Control Bureau (EIPPCB)	Gov't	Oct. 19, 2001, Oct. 22, 2001, Oct. 31, 2001	Oct. 31, 2001	Head of Waste Incineration Technical Work Group (TWG) of EIPPCB. Mr. James stated that the TWG has no info to date (kick-off meeting early Dec. 2001). He suggested contacting the persons from the Netherlands on the TWG.
Laetitia Reynaud	Eur. Federation of Waste Mgmt & Enviro. Services	Gov't	Oct. 22, 2001		Sent email request. Said she would locate person with knowledge and respond to our request.
Eric Lesueur	Eur. Federation of Waste Mgmt & Enviro. Services (FEAD).	Gov't	Oct. 22, 2001		Sent email request. On EIPPCB's Technical Work Group. Nadine De Greef responded saying she forwarded my request to FEAD's members.
Bernt Johnke	Germany Federal Environmental Agency	Gov't	Oct. 18, 2001	Dec. 19, 2001	Sent email request for SCR info from Germany's federal gov't. Received paper on SCR use in Germany.
David van Lochem (Webmaster of Belgium's Environmental Department)	Belgium Federal Department of the Environment	Gov't	Oct. 18, 2001	Oct. 19, 2001	Sent email requests to general information and two divisions within department to get name and number of persons with knowledge in Belgium's federal gov't. Told to contact the three regional gov'ts in Belgium.
info@ibgebim.be	Belgium Brussels Capital Region	Gov't	Oct. 19, 2001		Sent email to region in Belgium (info@ibgebim.be) to get name and numbers of persons with SCR knowledge on MWCs. No Response Yet.
aminal@lin.vlaanderen.be	Belgium Flanders Region	Gov't	Oct. 19, 2001	Nov. 5, 2001	Sent email to Flanders Region in Belgium (aminal@lin.vlaanderen.be) to get name and number of persons with SCR knowledge on MWCs. Filip Francois responded with website.
de.dgrne@mrw.wallonie.be	Belgium Walloon Region	Gov't	Oct. 19, 2001		Sent email to region in Belgium (de.dgrne@mrw.wallonie.be) to get name and number of persons with SCR knowledge on MWCs in their region. No Response Yet.
Andreas Klatt	Siemens AG [Redwitz, Germany]	Catalyst Mfg	Oct. 22, 2001		Was to provide links to cost information in Europe. Have not received this info yet.

**Lee County Energy Recovery Facility
SCR Search Summary Spreadsheet**

Contact Name	Company/Affiliation	Category	Date Contacted	Date Response Received	Status
	AGR Disposal - RZR Herten	Waste Disposal Company	Oct. 22, 2001		Sent email request. Has waste incineration plant in the District of Recklinghausen, Germany called RZR Herten
Roger Kohlmann	RWE Power	Waste Disposal Company	Oct. 22, 2001		Sent email request. Has refuse-fired power generating facility at Essen-Karnap (Germany)
Carl-Arne Pedersen	Renova AB (Sweden)	Waste Disposal Company	Oct. 22, 2001	Oct. 23, 2001	Sent email request. Has waste incinerator facility (Savenas) near Gothenburg, Sweden. Responded with two individuals to contact but did not provide means to contact them.
James Ray	Shanks Group plc (United Kingdom)	Waste Disposal Company	Oct. 22, 2001	Oct. 22, 2001	Sent email request. Lists waste incineration among their services. Responded with link to www.eurits.org (mainly Hazardous Waste related) and United Kingdom de NOx policy
Mr. Goverde Ton	AVR	Waste Disposal Company	Oct. 22, 2001		Sent email request. Lists incineration of domestic residual wastes among their services. No response yet.
Al Linero/ Mike Halpin	Florida Department of Environmental Protection	Gov't	Oct. 22, 2001	Oct. 22, 2001	Called to determine whether Florida DEP has any information relative to SCR use on MWCs. Does not have an information.
Dennis Malone	Babcock Borsig Power [Worcester, MA USA]	SCR Mfg		Oct. 22, 2001	Received budget proposal for cold end SCR system.
Tony Licata	Babcock Borsig Power [Worcester, MA USA]	SCR Mfg		Oct. 25, 2001	Received information on installation experience with SCR on MWCs outside USA.
Ludwig Ramacher	Trienekens AG International	Waste Disposal Company		Oct. 23, 2001	Member of FEAD. Responded with leads to contact Markus Heering and Bernd Hausmann (Represents SCR Constructor) of EIPPCB TWG.
Katie Willis	Dutch Waste Processing Association (VVAV)	Waste Mgmt Assoc.		Oct. 24, 2001	Member of FEAD. Received paper presented in Paris, France in March 2001.

**Lee County Energy Recovery Facility
SCR Search Summary Spreadsheet**

Contact Name	Company/Affiliation	Category	Date Contacted	Date Response Received	Status
Gerard Harmsen	RIZA (The Netherlands Institute for Inland Water Management and Waste Water Treatment)	Gov't	Oct. 31, 2001	Nov. 5, 2001	At Paul James' (EIPPCB) suggestion, I called Mr. Harmsen. He does incineration's water issues and suggested I contact Hans Holtring and Marcel Taal.
Hans W. Holtring	The Netherlands Ministry of Housing, Spacial Planning and the Environment	Gov't	Oct. 31, 2001 and Nov. 5, 2001		At Paul James' (EIPPCB) suggestion, I sent email request for information on SCR use on MWCs. No response yet.
Gert Stam	RIZA (The Netherlands Institute for Inland Water Management and Waste Water Treatment)	Gov't	Oct. 31, 2001		At Paul James' (EIPPCB) suggestion, I sent email request for information on SCR use on MWCs. No response yet.
Mr. Gerard de Vries	RIZA (The Netherlands Institute for Inland Water Management and Waste Water Treatment)	Gov't	Oct. 31, 2001		At Paul James' (EIPPCB) suggestion, I sent email request for information on SCR use on MWCs. No response yet.
Marcel Taal	INFOMIL (www.infomil.nl)	Gov't	Nov. 5, 2001	Nov. 9, 2001	At Gerard Harmsen's suggestion, I email Mr. Taal with info request and the four questions. Suggests contacting Mr. Gerben Timmer of Dutch Waste Processing Association (VVAV). Received draft document of Dutch (hazardous) waste incineration.
Filip Francois	Belgium Flanders Region	Gov't	Nov. 5, 2001	Nov. 8, 2001	Sent email follow-up asking for answers to our four questions on SCR use in Europe. Responded with individuals at two plants in Flanders.
Mr. Jacques Soenens, Mr. Johan Bonnier	IMOG in Harelbeke (Flanders Belgium)	MWC Facility	Nov. 8, 2001	Dec. 5, 2001	Sent information request email to plant director/co-director. Received information on their Belgium facility.
Mr. Paul Dobbelaere, Mr. Karel Matthys, Mr.	IVAGO in Gent (Flanders Belgium)	MWC Facility	Nov. 8, 2001		Sent email to plant director/co-director asking for answers to our four questions on SCR emissions, cost, operation, downtime.

**Lee County Energy Recovery Facility
SCR Search Summary Spreadsheet**

Contact Name	Company/Affiliation	Category	Date Contacted	Date Response Received	Status
Dr. Markus Heering	VDMA	SCR Constructor Assoc.	Nov. 8, 2001	Nov. 14, 2001	Sent email request w/ four questions at suggestion of Ludwig Ramacher. He knowledge of technology but not cost and operation. Suggested to contact Martin GmbH in Munich (partner of Covanta)
Mr. Bernd Hausmann	EBA European Boilermakers' Association	SCR Constructor Assoc.	Nov. 8, 2001		Sent email request w/ four questions at suggestion of Ludwig Ramacher. No response yet.
Filip Francois	Belgium Flanders Region	Gov't	Nov. 8, 2001	Nov. 9, 2001	Sent request for English translation of web site for IVAGO in Gent (Belgium) plant. No English translation. Given lead to contact Seghers Better Technology, builder of plant.
	Seghers Better Technology	MWC Constructor	Nov. 9, 2001		Sent email to Seghers Better Technology (info_solids-air@bettertechnology.com) builder of the IVAGO in Ghent Belgium plant at suggestion of Filip Francois.
Mr. Gerben Timmer	Dutch Waste Processing Association (VVAV)	Waste Mgmt Assoc.	Nov. 9, 2001	Nov. 9, 2001	At suggestion of Marcel Taal of INFOMIL, I emailed Mr. Timmer our four questions. Cannot provide detailed information. Sent copy of paper Katie Willis sent on Oct 24, 2001. Received names of four plant operators in The Netherlands.
Marcel Goemans	Seghers Better Technology [Belgium Office]	MWC Constructor	Nov. 12, 2001		Sent paper presented at various symposia. Needs info on Lee County site prior to answering our questions. Provided www.scientecmatrix.com. Dirk Earaerts of Atlanta, Ga office will call me.
Onno Maaskant	CRI Catalysts (Hague, The Netherlands)	Catalyst Mfg	Nov. 12, 2001	Nov. 12, 2001	RTP received an email asking for our questions. Sent email with questions. Responded with our questions are site specific and beyond scope of CRI. Contact Mr. Per R. Nielsen of FLS Miljo Denmark (supplier of turn-key installation of facility in Roosendaal, The Netherlands.

**Lee County Energy Recovery Facility
SCR Search Summary Spreadsheet**

Contact Name	Company/Affiliation	Category	Date Contacted	Date Response Received	Status
Mr. Per R. Nielsen	FLS Miljo Denmark	MWC Constructor	Nov. 12, 2001	Nov. 14, 2001	At Onno Maaskant's suggestion I emailed Mr. Nielsen and posed our four questions to him. He responded that he cannot provide the detailed information on the Roosendaal (The Netherlands) facility and suggested contacting Casper Stuard at plant.
Mr. Gerben Timmer	Dutch Waste Processing Association (VVAV)	Waste Mgmt Assoc.	Nov. 13, 2001	Nov. 13, 2001	Called Mr. Timmer to get names of plant operators using SCR in The Netherlands. Emailed me names of four plants in The Netherlands.
Mr. Leo van Putten	AVR Rotterdam (Rotterdam City, The Netherlands)	MWC Facility	Nov. 13, 2001	Nov. 21, 2001	Emailed Mr. van Putten to get info on their experience with SCR on their MWC. Responded with operational information.
Mr. Jean Luteijn	AVR Rozenburg (Rotterdam Harbor, The Netherlands)	MWC Facility	Nov. 13, 2001	Nov. 26, 2001	Emailed Mr. Luteijn to get info on their experience with SCR on their MWC. Responded with facility specific information on AVR Rozenburg
Mr. Huub Nijkamp	Twence (Hengelo, The Netherlands)	MWC Facility	Nov. 13, 2001	Nov. 14, 2001	Emailed Mr. Nijkamp to get info on their experience with SCR on their MWC. Replied that he would help us. Gave name of process engineer at plant.
Mr. Ron Slijster	HVC (Alkmaar, The Netherlands)	MWC Facility	Nov. 13, 2001	Nov. 19, 2001	Emailed Mr. Slijster to get info on their experience with SCR on their MWC. Responded with operational and emissions information. No cost information given. I sent follow-up message (on Nov. 19, 2001) to clarify a few items.
Jurgen Bruggeman	Twence (Hengelo, The Netherlands)	MWC Facility	Nov. 14, 2001		At suggestion of Mr. Nijkamp, I emailed Mr. Bruggeman (Process Engineer) to get info on their experience with SCR on their MWC. No response.
Dirk Eeraerts	Seghers Better Technology [Atlanta, GA Office]	MWC Constructor / Designer	Nov. 19, 2001	Nov. 27, 2001	Received call from Mr. Eeraerts as follow-up to Marcel Goemans email. I briefed him on the project and our needs and sent him an email and letter containing background information and our list of questions. Needs additional information.

**Lee County Energy Recovery Facility
SCR Search Summary Spreadsheet**

Contact Name	Company/Affiliation	Category	Date Contacted	Date Response Received	Status
Mr. Jonas Eek, CEO		Waste Disposal			Sent email request to these men to get operational information on their experience with SCR. Mr. Carl Arne Pedersen suggested I contact them but did not provide a means to contact them so I emailed a general mailbox for Renova.
Haakan Rylander	Renova AB (Sweden)	Company	Nov. 26, 2001		
Dirk Eraerts	Seghers Better Technology [Atlanta, GA Office]	MWC Constructor / Designer	Nov. 27, 2001	Dec. 6, 2001	Responded with budget estimate for SCR system at Lee County ERF of \$8,200,000. Additional information verification is required.
Dirk Eraerts	Seghers Better Technology [Atlanta, GA Office]	MWC Constructor / Designer	Dec. 11, 2001	Dec. 21, 2001	Sent email to get further clarification of budget estimate. Received information on Dec. 21, 2001.
Ho Y. Kwak	Hyundai Heavy Industries Co, Ltd.	MWC Facility	Jan.3, 2002		Sent email to General Manager to obtain information on three MWCs in Sung-Nam City, Myung-Ji, and Seoul, Korea.
John Chandler	AJ Chandler & Assoc. (Enviro Consultant to Peel MWC facility)	MWC Facility	Jan. 4, 2002, Jan. 7, 2002	Jan. 4, 2002, Jan. 7, 2002	Called to get information on KMS Peel MWC in Peel Region of Ontario, Canada. Received information on operational and design history of facility as well as preliminary emissions data and costs of SCR System.
Richard Newland	Haldor Topsoe, Inc.	SCR Mfg	Mar. 20, 2002	Apr 8, 2002	Sent email requesting information and budgetary estimate for SCR system. Received estimate on Apr. 8, 2002.
Brian McCarthy	Tipaz, Inc.	Control Technology Vendor	Apr. 1, 2001		Sent email requesting information on Electron Beam technology and possible application to MWCs.
Richard Newland	Haldor Topsoe, Inc.	SCR Mfg		Apr 15, 2002	Received list of facilities using Haldor Topsoe's SCR system.
Manuel Conte	Uquifa (Spain)	Facility w/ SCR System	Apr 16, 2002	Apr 16, 2002	Sent email requesting information on their facility which was referenced by Haldor Topsoe. Facility is a fine chemicals factory combusting solvents.

**Lee County Energy Recovery Facility
SCR Search Summary Spreadsheet**

Contact Name	Company/Affiliation	Category	Date Contacted	Date Response Received	Status
Stefano Rossini	Provincia Autonoma di Bolzano (Italy)	Waste Incineration Plant	Apr 16, 2002, Apr. 29, 2002		Sent email requesting information on their facility which was referenced by Haldor Topsoe. Facility is listed as a waste incineration facility (type of waste not specified).
Tony Licata	Babcock Borsig Power	SCR Mfg		Apr 23, 2002	Received comments on Haldor Topsoe budgetary estimate.
Helge Rosenberg	Haldor Topsoe A/S	SCR Mfg		May 3, 2002	Received information on a municipal waste incineration facility in Italy utilizing a Haldor Topsoe SCR system
John Chandler	AJ Chandler & Assoc. (Enviro Consultant to Peel MWC facility)	MWC Facility	May 6, 2002	May 6, 2002	Results of initial compliance emissions test still in draft form.

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

ATTACHMENT D

**LIST OF FACILITIES INCORPORATING
SELECTIVE CATALYTIC REDUCTION**

October 31, 2002

Image Quality

As you review the next group of images,

Please note that the original documents

were of poor quality.

WASTE INCINERATION PLANTS WITH SCR DENOX TREATMENT

COUNTRY / CUSTOMER	LOCATION	NUMBER OF LINES	FLOW TREATED Nm ³ /h	COMMISSIONED	TYPE OF WASTE	PROCESS
Belgium						
IMOG	HARELBEKE	2	109 000	2000	MU	XX
France						
U.V.E. SMEDAR (SICDOM)	ROUEN	3	70 000	1999	MU	ERFXRC
COMMUNAUTE URBAINE DE LILLE	LILLE	3	65 600	2001	MU	RFHEWX
Germany						
STADTWERKE MUNCHEN	MUNCHEN	2	240 000	1989	MU	CDFX
ENERGIE- UND WASSERWERKE RHEIN-NECKAR AG	MANNHEIM	2	206 000	1995	MU	XZ
RWE ENERGIE AG	ESSEN	4	168 000	1995	MU	ZX
STADTWERKE SOLINGEN	SOLINGEN	1	95 000	1995	MU	CDFX
HULS	MARL	1	40 000	1996	MS	FXXW
GML	LUDWIGSHAFEN	2	70 000	1996	MU	YEWXX
TRV	WESSELING	2	25 000	1996	HA	FXX
STADTWERKE MUNCHEN	MUNCHEN	2	200 000	1996	MU	FIX
LANDKREIS NEU-ULM	WEISSENHORN	2	48 000	1996	MU	X
ZWECKVERBAND	BAMBERG	3	40 000	1996	MU	FIX
LCB	KOLN	3	100 000	1997	MU	XX
Luxembourg						
SIDOR	LEUDELINGEN	3	42 000	1995	MU	FIX
Netherlands						
AVI TWENTE b.v.	TWENTE	2	117 000	1997	MU	EREWFIX
Sweden						
SYSAB	MALMO	2	60 000	1995	MI	X
Switzerland						
KVA LUZERN	LUZERN	2	55 000	1996	MU	WFIX
KVA NIEDERURNEN	NIEDERURNEN	2	70 000	1999	MU	EXX

LIST OF ABBREVIATIONS**TYPE OF WASTE**

<u>Code</u>	<u>Meaning</u>
MU	Municipal Solid Waste
MI	Municipal Solid Waste and Industrial Waste
IN	Industrial Waste
CH	Chemical Waste
CL	Hospital Waste
CR	Cremation
HA	Hazardous Waste
IS	Industrial Sludge
MS	Sewage Sludge
MD	Fuel Derived From Compressed Municipal Solid Waste
PS	Paper Sludge

PROCESS

<u>Code</u>	<u>Meaning</u>
B	Economizer Boiler (ECO)
C	Conditioned
D	Dry Absorption System
E	Electrostatic Precipitator
F	Fabric Filter
FI	Filsorption
HE	Heat Exchanger
N	NID – Dry Absorption System
R	Absorber-Dryer-Sprayer With Rotary Atomizer
RC	Recirculation
W	Wet Scrubber
X	SCR DeNOx
XX	SCR DeNOx and DeDiox
Y	Absorber-Dryer-Sprayer With Diffusers
Z	Fixed-bed Filter

Reference List
Flue Gas Cleaning Plants For Waste Incineration Plants

BABCOCK BORSIG POWER
ENVIRONMENT

Client	Plant	Fuel	Process steps supplied by Babcock-Steinmüller- Gummersbach	Flue gas volume m ³ /h, STP, wet	Reagents	End product	Year of Start-up
Hoechst AG	Gersthofen	Hazardous waste	Cyclone, one stage wet scrubbing	1 x 4,600	NaOH	Fly ash, waste water	1975
Stadt Kiel	Kiel	Municipal waste	Electrostatic precipitator, one stage wet scrubbing	3 x 31,000	CaO	Fly ash, sludge, waste water	1975
Stadt Wuppertal	Wuppertal	Municipal waste	Electrostatic precipitator, one stage wet scrubbing	2 x 100,000		Fly ash, sludge, waste water	1975
Bayer AG Leverkusen	Bürrig BE 2	Industrial / hazardous waste	Electrostatic precipitator, rotary scrubber, wet electrostatic precipitator	1 x 45,000	NaOH	Waste water	1976
RWTH Aachen	Aachen	Hospital waste	Electrostatic precipitator, one stage wet scrubbing	1 x 25,000	CaO	Fly ash, waste water	1977
Stadt Stuttgart	Stuttgart	Sewage sludge	One stage wet scrubbing	2 x 30,000	Alkaline process water	Waste water	1977
ZV MHKW Bamberg (Stadt und Landkreis)	Bamberg	Municipal waste, sewage sludge	Electrostatic precipitator, one stage wet scrubbing	2 x 45,000	CaO	Fly ash, sludge, waste water	1978
Ford AG	Köln	Hazardous waste	Electrostatic precipitator, one stage wet scrubbing	1 x 45,000	CaO	Fly ash, waste water	1979
GMVA Niederrhein GmbH (Pilot plant)	Oberhausen	Municipal waste	Spray absorber, fabric filter	1 x 7,000	NaOH; CaO; Ca(OH) ₂	Fly ash, reaction salts	1980
Stadt Krefeld	Krefeld	Municipal waste, sewage sludge	Electrostatic precipitator, two stage wet scrubbing	3 x 110,000	CaO NaOH	Fly ash, waste water	1980
Stadtwerke Kiel	Kiel	Municipal waste	Electrostatic precipitator, one stage wet scrubbing	1 x 62,000	CaO	Fly ash, waste water	1980
Passavant-Werke Düsseldorf	Düsseldorf	Sewage Sludge	Spray absorber, electrostatic precipitator	1 x 26,000	NaOH	Fly ash, reaction salts	1981
ZV MHKW Bamberg (Stadt und Landkreis)	Bamberg	Municipal waste, sewage sludge	Electrostatic precipitator, one stage wet scrubbing	1 x 45,000	CaO	Fly ash, sludge, waste water	1982
Zweckverband Würzburg	MHKW Würzburg	Municipal waste	Quench cooler, dry injection reactor, fabric filter with activated coke injection	2 x 65,000	Ca(OH) ₂	Salt, fly ash mixture	1984
Stadt Hamburg	Hamburg Borsigstraße	Municipal waste	Spray absorber, electrostatic precipitator	2 x 65,000		Fly ash, reaction salts	1984
Stadtwerke München (RIP north unit 3)	München	Municipal waste, sewage sludge	Spray absorber, electrostatic precipitator	2 x 170,000	CaO	Fly ash, reaction salts	1984

Reference List
Flue Gas Cleaning Plants For Waste Incineration Plants

BABCOCK BORSIG POWER
ENVIRONMENT

Client	Plant	Fuel	Process steps supplied by Babcock-Steinmüller-Gummersbach	Flue gas volume m ³ /h, STP, wet	Reagents	End product	Year of Start-up
Ford AG	Köln	Industrial sludge	Spray absorber, electrostatic precipitator	1 x 25,000	CaO	Fly ash, reaction salts	1985
Müllheizkraftwerk Göppingen	Göppingen	Municipal waste, sewage sludge	Spray dryer, electrostatic precipitator, one stage wet scrubbing	2 x 70,000	CaO	Fly ash, salts	1985
Stadt, Hagen	Hagen	Municipal waste	Spray absorber, electrostatic precipitator	3 x 32,000	CaO	Fly ash, reaction salts	1985
Stadt Hamm	Hamm	Municipal waste	Spray absorber, fabric filter	4 x 53,000	CaO	Fly ash, reaction salts	1985
Stadtwerke Düsseldorf	Düsseldorf	Municipal waste	Spray absorber, electrostatic precipitator	3 x 135,000	CaO	Fly ash, reaction salts	1985
Rhein-Neckar AG	Mannheim	Municipal waste	Spray dryer, electrostatic precipitator, two stage wet scrubbing	2 x 150,000	Dolomit	Fly ash, salts	1986
RWE Energie AG	Essen-Karap	Municipal waste	Electrostatic precipitator, one stage wet scrubbing	4 x 121,000	CaO	Fly ash, gypsum, sludge, waste water	1986
GMVA Niederrhein GmbH	Oberhausen	Municipal waste	Electrostatic precipitator, one SWS	4 x 150,000	CaO	Fly ash, sludge, waste water	1987
Müllheizkraftwerk Göppingen	Göppingen	Municipal waste, sewage sludge	Second wet scrubbing stage	2 x 70,000	CaO	Salts	1987
Remival*, France	Reims	Municipal waste	quench cooler, dry lime injection, fabric filter	2 x 34,000	Ca(OH) ₂	Fly ash, reaction salts	1987
AGR Essen	RZR Herten IM 2	Industrial waste	Electrostatic precipitator, 1-stage prescrubber, 1-stage SO ₂ -scrubber	1 x 70,000	CaO	CaCl ₂ , gypsum	1988
BWB	SV Ruhleben	Sewage sludge	Electrostatic precipitator, 1-stage SO ₂ -scrubber	3 x 54,000	CaO / CaCO ₃	Gypsum	1988
Babylon County, USA	Babylon, NJ	Municipal waste	Spray absorber, fabric filter	2 x 87,600	CaO	Fly ash, reaction salts	1988
Portland County*, USA	Portland, MA	Municipal waste	Spray absorber, electrostatic precipitator	2 x 57,000	CaO	Fly ash, reaction salts	1988
SIDOR, Luxembourg	Leudelingen	Municipal waste	Spray absorber, fabric filter	3 x 35,400	CaO	Reaction salts	1988
Bayer AG Leverkusen	Bürrig BE 1	Industrial / hazardous waste	Quench cooler*, rotary scrubber, wet electrostatic precipitator	1 x 72,000	NaOH	Waste water	1989

Reference List
Flue Gas Cleaning Plants For Waste Incineration Plants

BABCOCK BORSIG POWER
ENVIRONMENT

Client	Plant	Fuel	Process steps supplied by Babcock-Steinmüller- Gummersbach	Flue gas volume m ³ /h, STP, wet	Reagents	End product	Year of Start-up
American Ref-Fuel Company*, USA	Hempstead, NY	Municipal waste	Spray absorber, fabric filter	3 x 174,000	CaO	Fly ash, reaction salts	1989
Camden County*, USA	Camden, NJ	Municipal waste	Spray absorber, electrostatic precipitator	3 x 87,700	CaO	Fly ash, reaction salts	1989
Charleston County*, USA	Charleston, SC	Municipal waste	Spray absorber, electrostatic precipitator	2 x 83,000	CaO	Fly ash, reaction salts	1989
GML Abfallwirt- schaftsgesellschaft mbH	Ludwigshafen	Municipal waste	Spray dryer, electrostatic precipitator, two stage wet scrubber	2 x 54,000	CaO	Fly ash, salts	1989
ZV Abfallent- sorgung Offenbach	Offenbach/Main	MWS	Spray dryer, electrostatic precipitator, two stage wet scrubbing	3 x 55,000	CaO NaOH	Fly ash, salts	1989
American Ref-Fuel Company*, USA	Essex County, NJ	Municipal waste	Spray absorber, electrostatic precipitator	3 x 174,000	CaO	Fly ash, reaction salts	1990
GMVA Niederrhein GmbH	Oberhausen	Municipal waste	Retrofit of a second wet scrubbing stage	4 x 150,000	NaOH	Gypsum, waste water	1990
Indaver, Belgium	Antwerpen	Hazardous waste	Electrostatic precipitator, two stage wet scrubbing	1 x 59,000	CaO NaOH	Fly ash, waste water, sludge	1990
Syctom, France	St. Ouen, Paris	Municipal waste	Electrostatic precipitator, one stage wet scrubbing	3 x 156,000	Ca(OH) ₂	Fly ash, waste water	1990
ZV MHKW Bamberg (Stadt u. Landkreis)	Bamberg	Municipal waste	Retrofit of a second wet scrubbing stage	3 x 37,300	NaOH	Gypsum, waste water	1990
AGR Essen	RZR Herten IM 1	Industrial waste	ACR, ACCR	1 x 70,000	NH ₃	—	1991
BAG/Westfalen	Bönen	Soil treatment	Filter layer reactor	1 x 11,000	Ca(OH) ₂	Fly ash, salts, activated carbon	1991
X RWE Energie AG (Pilot plant)	Essen-Karnap	Municipal waste	Filter layer reactor, SCR	1 x 500	Ca(OH) ₂ activated carbon	Salts, activated carbon	1991
Stadtwerke München (RIP north unit 1)	München	Sewage sludge	SNCR, spray dryer, electrostatic precipitator, two stage wet scrubbing	2 x 213,500	NH ₄ OH CaO NaOH	Fly ash, salts	1991
Bayer AG Leverkusen	Bürrig VA 2	Industrial / hazardous waste	Electrostatic precipitator*, quench cooler, rotary scrubber, wet electrostatic precipitator	1 x 45,000	NaOH	Waste water	1992
X Ciba Geigy, Switzerland	Schweizerhalle	Solvents	SCR	1 x 50,000	NH ₄ OH	—	1992

Reference List
Flue Gas Cleaning Plants For Waste Incineration Plants

BABCOCK BORSIG POWER
ENVIRONMENT

Client	Plant	Fuel	Process steps supplied by Babcock-Steinmüller-Gummersbach	Flue gas volume m ³ /h, STP, wet	Reagents	End product	Year of Start-up
GEKAL, Switzerland	Buchs-Aarau	Municipal solid waste	Electrostatic precipitator, two stage scrubbing, fly ash treatment and solidification	2 x 54,000	CaO NaOH	Fly ash, sludge, waste water	1992
X City of Rotterdam, Netherlands	AVI ROTEB	Municipal waste	1-stage prescrubber, 1-stage SO ₂ -scrubber, ACR, SCR	4 x 75,000	NaOH NH ₄ OH	Waste water	1993
Papierfabrik Haindl	Schwedt	Residues from paper production	Electrostatic precipitator, one stage wet scrubbing	1 x 100,000	CaO	Fly ash, waste water	1993
HEW / VKR Hamburg	MVB Hamburg	Municipal waste	SNCR, quench cooler, fabric filter with activated coke injection, 2-stage HCl scrubber, 1-stage SO ₂ -scrubber, wet electrostatic precipitator	2 x 120,000	CaO	Gypsum, HCl	1994
AVR-Chemie Rotterdam, Netherlands	Rozenburg, DTO-8	Hazardous waste	ACR	1 x 80,000	—	—	1994
X ZAR Zweckverband Abfallbeseitigung Rangau Fürth	MVA Zimdorf	Municipal waste	SCR	1 x 25,000	NH ₄ OH	—	1994
X Entsorgungsges. Krefeld mbH & Co. KG	Krefeld	Municipal waste, sewage sludge	Spray dryer, fabric filter, two stage wet scrubbing, SCR, filter layer reactor	3 x 76,000	CaO NH ₄ OH	Fly ash, gypsum salts, activated carbon	1994
MPA Burgau Full scale tests	Burgau	Municipal waste (pyrolysis)	Filter layer reactor	1 x 60,000	Ca(OH) ₂	Fly ash, salts, activated carbon	1994
Sieparg*, France	Grenoble	Municipal waste	Spray dryer, electrostatic precipitator, two stage wet scrubbing	3 x 45,900	Ca(OH) ₂ NaOH	Fly ash, salts	1994
X Von Roll Zürich, Switzerland	MVA Ingolstadt	Municipal waste	SCR	2 x 64,000	NH ₄ OH	—	1995
(X) Abfallentsorgungsgesellschaft mbH Essen (AGR) (Permit engineering)	Herten	Municipal waste	Fabric filter, two stage wet scrubbing, fixed bed ACR, SCR, 2-stage HCl scrubber-rectification	2 x 131,000	CaO NH ₄ OH	HCl, fly ash, gypsum, OHFC to be incinerated	1995

Reference List
Flue Gas Cleaning Plants For Waste Incineration Plants

BABCOCK BORSIG POWER
ENVIRONMENT

Client	Plant	Fuel	Process steps supplied by Babcock-Steinmüller- Gummersbach	Flue gas volume m ³ /h, STP, wet	Reagents	End product	Year of Start-up
X Berliner Stadtreinigungs- betriebe	Berlin-Ruhleben	Municipal waste	SCR	4 x 148,000	NH ₄ OH	---	1995
X Ciba Geigy, Switzerland	Basel	Hazardous waste	SCR	1 x 55,000	NH ₄ OH	---	1995
X GMVA Nieder- rhein GmbH	Oberhausen	Municipal waste	SCR, filter layer reactor	4 x 150,000	NH ₄ OH Ca(OH) ₂ activated carbon	Salts, activated carbon, (re-use in waste water treatment)	1995
⊗ MVA Bielefeld- Herford GmbH	Bielefeld	Municipal waste	Electrostatic precipitator 1, spray dryer, electrostatic precipitator 2, two stage wet scrubbing, SCR, filter layer reactor	3 x 150,000	NH ₄ OH Ca(OH) ₂ activated carbon	Fly ash, salts, activated carbon	1995
Sietm*, France	Lagny / Mame-la- Vallée	Municipal waste	Electrostatic precipitator, one stage wet scrubbing	1 x 66,000 1 x 43,800	Ca(OH) ₂	Fly ash, waste water	1995
AWL GmbH Leverkusen	MHKW Leverkusen	Municipal waste	Quench cooler*, electrostatic precipitator*, 1-stage prescrubber, 1-stage SO ₂ - scrubber, filter layer reactor, SCR	3 x 69,000	NaOH, CaO Ca(OH) ₂ activated carbon	NaCl, gypsum	1996
X AGR Essen	RZR Herten IM 2	Industrial waste	ACR, SCR	70,000	NH ₃	---	1996
⊗ SWD Düsseldorf	MVA Flingern	Municipal waste	SCR	2 x 350,000	NH ₄ OH	---	1996
X Landkreis Landshut	MVA Landshut	Municipal waste	SCR-oxidation catalyst	1 x 57,000	NH ₄ OH	---	1996
Landkreis Neu- Ulm	MVA Weißenhorn	Municipal waste	ACR	2 x 51,000	---	---	1996
⊗ MVA Stapelfeld Hamburg	MVA, Stapelfeld 1 + 2	Municipal waste	ACR, SCR	2 x 120,000	NH ₄ OH	---	1996
Gesellschaft zur Entsorgung von Sondermüll in Bayern mbH	Ebenhausen	Hazardous waste	Mercury control	1 x 70,000	Na ₂ S ₄	---	1996
⊗ GEVUDO Dordrecht, Netherlands	GEVUDO Abfallverwerking	Municipal waste	Mercury control, activated carbon dosing, SCR- oxidation catalyst	2 x 125,000	Na ₂ S ₄ CaO NH ₄ OH	---	1996

BABCOCK BORSIG POWER

CT ENVIRONMENT

REFERENCE LIST

SCR DeNOx/ DeDioxin Systems

Client Country	Waste Description Project Description	Waste Capacity Flue Gas Capacity	Units Start-up
Broomchemie B.V. The Netherlands	Off-gases and liquid wastes, Br Complete plant with combustion chamber and acid recovery	750 kg/h 6'500 Nm3/h	1 2002
DIAE Switzerland	Municipal Waste SCR DeNOx, Modification of ESP	130'000 Nm3/h	3 2002
Regionale Milieuzorg Belgium	Municipal waste SCR-DeNOx	75'000 Nm3/h	2 2002
Borsodchem Rt. Hungary	Off-gas, liquid and solid wastes, N Complete plant with static furnace, boiler and flue gas cleaning	950 kg/h 13'000 Nm3/h	1 2001
Uijongbu City Korea	Municipal waste SCR DeNOx/DeDioxin	25'000 Nm3/h	2 2001
LG Philips LCD Korea	Liquid wastes SCR DeNOx/DeDioxin	8'000 Nm3/h	1 2000
TBA Neubrandenburg Germany	Municipal waste Complete thermal waste recycling plant	10'700 kg/h 40'000 Nm3/h	2 2000
MCHZ - Ostrava Czech Republic	Hazardous waste, S Complete plant with rotary kiln	1'500 kg/h 22'600 Nm3/h	1 1999
TRA Aussemzell Germany	Municipal waste Complete thermal waste recycling plant	12'500 kg/h 72'000 Nm3/h	2 1999
BASF Española Spain	Hazardous waste, Cl Rotary kiln, SCR-DeNOx	4'200 kg/h 56'000 Nm3/h	1 1998
GEKAL, Buchs Switzerland	Municipal waste SCR DeNOx	17'600 kg/h 180'000 Nm3/h	1 1998
KVA St. Gallen Switzerland	Municipal waste SCR-DeNOx	8'500 kg/h 72'000 Nm3/h	1 1996

Status: October 2001

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BABCOCK BORSIG POWER

CT ENVIRONMENT

REFERENCE LIST

SCR DeNOx/ DeDioxin Systems

Client	Waste Description	Waste Capacity	Units
Country	Project Description	Flue Gas Capacity	Start-up
KVA Thurgau	Municipal waste		2
Switzerland	Flue gas cleaning, waste water treatment	60'000 Nm3/h	1996
BASF, Ludwigshafen	Hazardous waste, Cl		2
Germany	SCR DeNOx	130'000 Nm3/h	1995
BASF, Ludwigshafen	Hazardous waste, Cl		1
Germany	SCR DeNOx	160'000 Nm3/h	1995
EVI, Rotterdam	Municipal waste	22'000 kg/h	1
Netherlands	Flue gas cleaning	155'000 Nm3/h	1995
Lonza, Visp	Hazardous waste		1
Switzerland	SCR DeNOx	166'500 Nm3/h	1995
RENI, Niedergösgen	Reject, sludge, waste wood	8'000 kg/h	1
Switzerland	Complete plant with fluid bed furnace	25'000 Nm3/h	1995
Welser Abfallverwertung	Municipal waste	8'000 kg/h	1
Austria	Complete plant with grate furnace	67'500 Nm3/h	1995
DMR Rostock	Motor off-gas		1
Germany	SCR-DeNOx	160'000 Nm3/h	1994
Mobil Oil Française	Motor off-gas		1
France	SCR-DeNOx	1'000 Nm3/h	1994
AVR Rotterdam	Municipal waste	22'000 kg/h	6
Netherlands	Flue gas cleaning	155'000 Nm3/h	1993
Du Pont de Nemours	Hazardous waste	2'700 kg/h	1
France	Complete plant with rotary and static kiln, flue gas cleaning and waste water treatment	25'000 Nm3/h	1993
Knoll	Spent solvents and off-gases, Cl, Br	1'250 kg/h	1
Switzerland	Complete plant with static furnace	5'000 Nm3/h	1993

Status: October 2001

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BABCOCK BORSIG POWER

CT ENVIRONMENT

REFERENCE LIST

SCR DeNOx/ DeDioxin Systems

Client	Waste Description	Waste Capacity	Units
Country	Project Description	Flue Gas Capacity	Start-up
Universität Heidelberg	Hospital waste	600 kg/h	2
Germany	Revamping of grate furnace, boiler, flue gas cleaning	6'500 Nm3/h	1991
MGC Plasma	Hazardous waste		1
Switzerland	Flue gas cleaning after plasma destruction	5'225 Nm3/h	1990
Fernwärme Wien	Municipal waste	17'500 kg/h	2
Austria	Revamping of grate, boiler, flue gas cleaning	110'000 Nm3/h	1989
Fernwärme Wien	Municipal waste	17'500 kg/h	2
Austria	Complete plant with grate furnace	90'000 Nm3/h	1987
Fernwärme Wien	Municipal waste	6'000 kg/h	3
Austria	Complete plant with grate furnace	52'000 Nm3/h	1985

Status: October 2001

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TOPSOE CATALYSTS



Topsøe DENOX Technology and Catalyst

Application Index

Page

Boilers

Coal Fired High Dust Installations	3
Coal Fired Low Dust Installations	4
Oil Fired Installations	4
Gas Fired Installations	5
Pet Coke Fired Installations	5

Engines

Stationary Diesel Engines	5
Marine Diesel Engines	7
Gas Engines	8

Gas Turbines	8
--------------------	---

Other Applications	9
--------------------------	---

121 References:

- 21 Coal Fired Boilers
- 11 Oil and Gas Fired Boilers
- 2 Pet Coke Fired Boilers
- 11 Gas Turbines
- 8 Gas Engines
- 31 Stationary Diesel Engines
- 18 Marine Diesel Engines
- 19 Other Applications

User (Contractor)	Plant Size	DENOX Efficiency	Catalyst Type	Topsøe's Scope of Supply	Expected Start-up
Coal Fired Boilers High Dust Installations					
Belgium Electrabel NV, Langerlo I (Deutsche Babcock)	250 MW.	80 %	DNX-558	Catalyst Design of Ammonia Storage	1998
Electrabel NV, Langerlo II (Deutsche Babcock)	250 MW.	80 %	DNX-558	Catalyst Design of Ammonia Storage	2000
Denmark Elkraft, Stigsbævs	10,000 Nm ³ /h Demonstration Unit		DNX-362		1987- 1992
ELSAM/Nordjyllandsværket (Deutsche Babcock)	411 MW.	80 %	DNX-664	Catalyst	1998
ELSAM/Preussen Elektra, Ensted (ABB, Deutsche Babcock, Haldor Topsøe A/S)	600 MW.	88-92 %	DNX-564	Catalyst System Design Hardware Construction	1996
Energi E2, Avedøre (Haldor Topsøe A/S)	250 MW.	80 %	DNX-364	Catalyst System Design Hardware Construction	1993
Energi E2 Amager, Unit 3	250 MW.	94 %	DNX-564	Catalyst	2000
USA A.E.S. Cayuga, NJ (Foster Wheeler)	150 MW.	90 %	DNX-758	Catalyst Design of Ammonia Injection and Flow Rectifiers	2001
Allegheny Energy, PA Harrison Unit 1, WV (Parsons)	650 MW.	> 90 %	DNX-664	Catalyst Design of Ammonia Injection and Flow Rectifiers	Not yet installed
Allegheny Energy, PA Harrison Unit 2, WV (Parsons)	650 MW.	> 90 %	DNX-664	Catalyst Design of Ammonia Injection and Flow Rectifiers	Not yet installed
Allegheny Energy, PA Harrison Unit 3, WV (Parsons)	650 MW.	> 90 %	DNX-664	Catalyst Design of Ammonia Injection and Flow Rectifiers	Not yet installed
Allegheny Energy Pleasant Unit 1, WV (Parsons)	650 MW.	> 90 %	DNX-664	Catalyst Design of Ammonia Injection and Flow Rectifiers	Not yet installed
Allegheny Energy Pleasant Unit 2, WV (Parsons)	650 MW.	> 90 %	DNX-664	Catalyst Design of Ammonia Injection and Flow Rectifiers	Not yet installed

SNOX™: Combined removal of NOx and SOx
 GREENOX®: Combined removal of NOx and CO

User (Contractor)	Plant Size	DENOX Efficiency	Catalyst Type	Topsøe's Scope of Supply	Expected Start-up
Reliant Energy W.A. Parish Unit 5, TX (Sargent & Lundy)	690 MW.	85 %	DNX-484	Catalyst Design of Ammonia Injection and Flow Rectifiers	2003
Reliant Energy W.A. Parish Unit 6, TX (Sargent & Lundy)	690 MW.	85 %	DNX-484	Catalyst Design of Ammonia Injection and Flow Rectifiers	2003
Reliant Energy W.A. Parish Unit 7, TX (Sargent & Lundy)	590 MW.	80 %	DNX-284	Catalyst Design of Ammonia Injection and Flow Rectifiers	2003
Reliant Energy W.A. Parish Unit 8, TX (Sargent & Lundy)	590 MW.	85 %	DNX-284	Catalyst Design of Ammonia Injection and Flow Rectifiers	2003
SIPCO, IL Marion Unit 4 (Sargent & Lundy)	195 MW.	92 %	DNX-584	Catalyst Design of Ammonia Injection and Flow Rectifiers	2003

Coal Fired Boilers Low Dust Installations

Denmark ELSAM, Skærbæk	10,000 Nm ³ /h (SNOX TM) Demonstration Plant	> 95 %	DNX-532	Catalyst System Design Hardware Construction	1987-92
Nordjyllandsværket, Vodskov (Haldor Topsøe A/S)	300 MW. (SNOX TM plant)	> 95 %	DNX-632	Catalyst System Design Hardware Construction	1991
USA Ohio Edison Co., Niles, Ohio (ABB, Snamprogetti)	35 MW. (SNOX TM plant)	> 95 %	DNX-932	Catalyst System Design	1991

Oil Fired Boilers

Sweden Shell Refinery Gothenburg	60 MW	94 %	DNX-950	Catalyst System Design Hardware	1998
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GREENOX[®]: Combined removal of NOx and CO

User (Contractor)	Plant Size	DENOX Efficiency	Catalyst Type	Topsøe's Scope of Supply	Expected Start-up
Gas Fired Boilers					
Denmark Energi E2, Avedøre II	400 MW.	94 %	DNX-350	Catalyst	2001
Russia AO Mosenergo, Moscow					
Block I	120 MW.	67 %	DNX-962	Catalyst	1996
Block II (ZAO Haldor Topsøe, Yaroslavl)	120 MW.	67 %	DNX-962	System Design Hardware Construction	1999
Dzerzhinskaya Power Station Dzerzhinsk (ZAO Haldor Topsøe, Yaroslavl)	120 MW.	80 %	DNX-652	Catalyst System Design Hardware Construction	1999
USA Inland Paper and Packaging Ontario, CA	73,400 Nm ³ /h (Steam plant)	90 %	DNX-930	Catalyst	1995
AES Huntington Beach, CA	Unit 1 (215 MW) Unit 2 (215 MW)	> 90 % > 90 %	DNX-930 DNX-930	Catalyst Catalyst	2001 2001
Reliant Etiwanda Rancho Cugamonga, CA	Unit 3 (330 MW) Unit 4 (330 MW)	> 90 % > 90 %	DNX-930 DNX-930	Catalyst Catalyst	2001 2001
Undisclosed	Unit 1 (180 MW) Unit 2 (180 MW)	> 90 % > 90 %	DNX-930 DNX-930	Catalyst Catalyst	2001 2001
Pet Coke Fired Boilers					
Italy Enichem, Gela	Demo Unit (SNOX TM Process)	95 %	DNX-950	Catalyst Design	1991
Agip Petroli Gela	300 MW. (SNOX TM Process)	95 %	DNX-950	Catalyst System Design	1999
Stationary Diesel Engines					
Denmark Grindsted El- og Varmeværk, Grindsted (Wärtsilä NSD)	6.6 MW, plants			Catalyst System Design Hardware	
	Plant No. 1	83 %	DNX-653		1994
	Plant No. 2	83 %	DNX-653		1994
IFV-Energi, Slangerup	1.6 MW.	90 %	DNX-653	Catalyst System Design Hardware	1991
IFV-Energi, Hundested	3.5 MW.	80 %	DNX-653	Catalyst	1991

SNOXTM: Combined removal of NO_x and SO_x
 GREENOX[®]: Combined removal of NO_x and CO

User (Contractor)	Plant Size	DENOX Efficiency	Catalyst Type	Topsøe's Scope of Supply	Expected Start-up
				System Design Hardware	
Finland Waasa Pilot Power Plant (Wärtsilä NSD), Vaasa	11.7 MW. (plant I)	92 %	DNX-951	Catalyst System Design Hardware	1998
	23.3 MW. (plant II)	94 %	DNX-951	Catalyst System Design Hardware	1998
Middle East Undisclosed client (Wärtsilä NSD)	6.5 MW. Plants			Catalyst System Design Hardware	
	Plant no. 1	60 %	DNX-951		1998
	Plant no. 2	60 %	DNX-951		1998
	Plant no. 3	60 %	DNX-951		1998
	Plant no. 4	60 %	DNX-951		1998
Sweden Pharmacia AB, Stockholm	3.8 MW.	95 %	DNX-650	Catalyst System Design Hardware	1993
Russia Aoot Rumo	12,000 Nm ³ /h (test stand)	90 %	DNX-951	Catalyst System Design Hardware	2000
United Kingdom Citigen Limited, London	16.3 MW. Plants			Catalyst System Design Hardware incl. Silensors	
	Plant no. 1	94 %	DNX-653		1993
	Plant no. 2	94 %	DNX-653		1993
Taiwan Taiwan Cement Corp. (Wärtsilä NSD)	6.5 MW. Plants			Catalyst System Design Hardware	
	Plant no. 1	84 %	DNX-951		1995
	Plant no. 2	84 %	DNX-951		1995
	Plant no. 3	84 %	DNX-951		1995
Tung-Chi Paper (Wärtsilä NSD)	6.5 MW.	84 %	DNX-653	Catalyst System Design Hardware	1995
Chung-Hwa (Wärtsilä NSD) Taiyuan	6.5 MW. Plants			Catalyst System Design Hardware	
	Plant no. 1	84 %	DNX-951		1996
	Plant no. 2	84 %	DNX-951		1996
	Plant no. 3	84 %	DNX-951		1997
	Plant no. 4	84 %	DNX-951		1997
TTET (Wärtsilä NSD) Taiyuan	6.5 MW. Plants			Catalyst System Design Hardware	
	Plant no. 1	84 %	DNX-951		1998
	Plant no. 2	84 %	DNX-951		1998

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User (Contractor)	Plant Size	DENOX Efficiency	Catalyst Type	Topsoe's Scope of Supply	Expected Start-up
Asia Polymer Corporation (Wärtsilä NSD) Kaohsiung	6.5 MW. Plants			Catalyst System Design Hardware	
	Plant no. 1	84 %	DNX-951		1998
	Plant no. 2	84 %	DNX-951		1998
	Plant no. 3	84 %	DNX-951		1998
TYC (Wärtsilä NSD)	10.8 MW. Plants			Catalyst System Design Hardware	
	Plant no. 1	84 %	DNX-951		1999
	Plant no. 2	84 %	DNX-951		1999
	Plant no. 3	84 %	DNX-951		1999
USA Citizen Utilities Co., Kauai, Hawaii	7.9 MW.	60 %	DNX-653	Catalyst System Design Hardware	1991

Marine Diesel Engines

Finland Silja Line Oy Helsinki					
"M/S Symphony" (Wärtsilä NSD)	3 MW. (4-stroke) Aux. engine	95 %	DNX-653	Catalyst System Design Hardware	1994
"M/S Serenade" (Wärtsilä NSD)	3 MW. (4-stroke) Aux. engine	95 %	DNX-653	Catalyst System Design Hardware	1994
"M/S Festival"	6 MW (4-stroke)	91 %	DNX-953	Catalyst System Design Hardware	2001
	Main engine 1	91 %	DNX-953		
	Main engine 2	91 %	DNX-953		
	Main engine 3	91 %	DNX-953		
	Main engine 4	91 %	DNX-953		
Sweden Stena Line AB Gothenburg				Catalyst System Design Hardware	
Ferry "M/S Jutlandica"	6.5 MW (4-stroke):				
	Main engine 1	90 %	DNX-653		1996
	Main engine 2	90 %	DNX-653		1996
	Main engine 3	90 %	DNX-653		1996
	Main engine 4	90 %	DNX-653		1996
	1.8 MW. (4-stroke):				
	Aux. engine 1	90 %	DNX-653		1996
	Aux. engine 2	90 %	DNX-653		1996
	Aux. engine 3	90 %	DNX-653		1996
	Aux. engine 4	90 %	DNX-653		1996

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User (Contractor)	Plant Size	DENOX Efficiency	Catalyst Type	Topsøe's Scope of Supply	Expected Start-up
USA					
USS-POSCO	7.9 MW _e (2-stroke)			Catalyst System Design Hardware	
South Korean cargo ships:					
"M/V Pacific Success"	Main engine	92 %	DNX-662		1989
"M/V Pittsburg"	Main engine	92 %	DNX-662		1989
"M/V Delta Pride"	Main engine	92 %	DNX-662		1991
"M/V New Horizon"	Main engine	92 %	DNX-662		1992
Gas Engines					
Denmark					
Gartneriet A. Pedersen Bellinge	3.1 MW _e (GREENOX [®] Process)	90 %	DNX-953	Catalyst System Design Hardware	1995
Gartneriet A. Pedersen Bellinge	2.7 MW _e (GREENOX [®] Process)	90 %	DNX-953	Catalyst System Design Hardware	1997
Torup Grønne Gartneri Torup	2.7 MW _e (GREENOX [®] Process)	95 %	DNX-931	Catalyst System Design Hardware	1997
Gartneriet Rosborg Brøndekilde	2.8 MW _e (GREENOX [®] Process)	94.5 %	DNX-951	Catalyst System Design Hardware	1998
Masnede Gartnerier Masnede	1.6 MW _e and 3 MW _e plants (GREENOX [®] Process)			Turnkey	
	Plant No. 1 (1.6 MW _e)	88 %	DNX-953		1998
	Plant No. 2 (1.6 MW _e)	88 %	DNX-953		1998
	Plant No. 3 (3 MW _e)	90 %	DNX-931		1999
	Plant No. 4 (3 MW _e)	90 %	DNX-931		1999
Gas Turbines					
Denmark					
I/S Nordjyllandsværket Frederikshavn	17 MW _e	48 %	DNX-930	Catalyst System Design Hardware	1998
I/S Nordjyllandsværket Hirtshals	9 MW _e	30 %	DNX-930	Catalyst System Design Hardware	1998
Italy					
ISAB, Priolo, Unit 1 (Snamprogetti SpA, Foster Wheeler Energy)	161 MW _e	80 %	DNX-930	Catalyst	1999
ISAB, Priolo, Unit 2 (Snamprogetti SpA, Foster Wheeler Energy)	161 MW _e	80 %	DNX-930	Catalyst	1999
USA					
City of Glendale CA, Greyson Station Unit (AUS)	Unit 8A (24 MW) Unit 8B and 8C (47 MW)	95 % 95 %	DNX-930 DNX-930	Catalyst Catalyst	2000 2000

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User (Contractor)	Plant Size	DENOX Efficiency	Catalyst Type	Topsøe's Scope of Supply	Expected Start-up
A.E.S. - Red Oak, NJ (Foster Wheeler)	3 units				
	Unit 1 (277 MW _e)	80 %	DNX-930	Catalyst	2001
	Unit 2 (277 MW _e)	80 %	DNX-930	Catalyst	2001
	Unit 3 (277 MW _e)	80 %	DNX-930	Catalyst	2001
Nepco - Linden, NJ (Foster Wheeler)	172 MW _e	86 %	DNX-930	Catalyst	2001
B. Braun Medical Inc. Irvine, California	45,000 Nm ³ /h (Natural gas fired Solar Simple Cycle)	90 %	DNX-930	Catalyst	2000

Other Applications

Australia Australian Gold Reagents Kwinana, Western Australia	19,000/38,000 Nm ³ /h	> 90 %	DNX-930	Catalyst System Design Hardware	1998
	(Sodium cyanide production)				
Czech Republic Palivový Kombinat, Vresová	54,000 Nm ³ /h (SNOX™ Process) Off-gas incinerator	95 %	DNX-932	Catalyst System Design	1993
Denmark Haldor Topsøe A/S Frederikssund	30,000 Nm ³ /h	90 %	DNX-652	Catalyst System Design	1999
Haldor Topsøe A/S Frederikssund	36,000 Nm ³ /h			Catalyst System Design Hardware	
	Plant No. 1	90 %	DNX-930		1999
	Plant No. 2	90 %	DNX-930		1999
	Plant No. 3	90 %	DNX-930		1999
Holland Budelco, Budel (Kvaerner Chemetics)	1000 MTPD (Sulfuric Acid Plant)	95 %	DNX-330	Catalyst System Design	1999
India Deepak Fertilizers & Petrochemicals Co. Ltd.	45,000 Nm ³ /h (Nitric acid plant)	95 %	DNX-920	Catalyst System Design	2000
Italy Provincia Autonoma di Bolzano Bolzano	117,000 Nm ³ /h Incineration Plant	85 %	DNX-930	Catalyst System Design Hardware	1996
Japan Asahi Chemical Industry Co., Ltd., Kawasaki	50,000 Nm ³ /h (SNOX™ Process Spent acid regeneration)	95 %	DNX-652	Catalyst System Design Hardware	1993
Republic of Korea Namhae Chemical Corp. Yochon	3,000 Nm ³ /h (DNT/MNT production)	99 %	DNX-930	Catalyst System Design Hardware	1998

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User (Contractor)	Plant Size	DENOX Efficiency	Catalyst Type	Topsøe's Scope of Supply	Expected Start-up
Russia Ministry of Oil Refining and Petrochemical Industry Ishimbay	8,000 Nm ³ /h	70 %	DNX-652	Catalyst System Design Hardware	
Spain Uquifa Sant Celoni	9,000 Nm ³ /h (Pharmaceutical plant)	90 %	DNX-950	Catalyst System Design Hardware	1998
Sweden ABB Atom AB Västerås	7,500 Nm ³ /h (Nuclear fuel rod production)	60 %	DNX-930	Catalyst System Design Hardware	1997
Taiwan Undisclosed client	10,000 Nm ³ /h (Waste oil incinerator)	70 %	DNX-652	Catalyst System Design Hardware	1998
USA Haldor Topsøe Inc. Houston, Texas	18,000 Nm ³ /h	90 %	DNX-652	Catalyst System Design Hardware	1994
CSI, CA (Peerless)	7,000 Nm ³ /h	88 %	DNX-930	Catalyst	2000
Chevron El Segundo, California	85 MM SCFD H ₂	> 90	DNX-930	Catalyst System Design Hardware	2000
Y2K Textiles Fullerton, CA	2 x 5,000 Nm ³ /h	< 70 %	DNX-930	Catalyst	2000
Haldor Topsøe, Inc. Houston, Texas	6,000 Nm ³ /h	97 %	DNX-951	Catalyst System Design Hardware	2001
DistriGas Boston, MA	2 x 65,000 Nm ³ /h	> 90 %	DNX-930	Catalyst	2001

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SIEMENS**Reference List - SINOx® Honeycomb Type Catalysts****Waste Incineration Plants NOx Abatement**

no.	plant	utility/operator	country	plant constructor	initial charge/ reload./change	fuel	gas flow [Nm³/h]	pitch [mm]	number of cells	start of operation
1	Cridor		CH	LAB	initial charge	municipal waste	63055	4.2	35 x 35	1998
2	Ferrara		I	Integral	initial charge	industrial waste	45000	3.7	40 x 40	
3	Kwacheon		KOR	LAB	initial charge	municipal waste	24688	4.3	35 x 35	1997
4	MHKW Kassel	MHKW Kassel GmbH	D	Steinmüller	initial charge	municipal waste	2 x 74216	4.2	35 x 35	1997
5	MHKW Leverkusen	AWL	D	Steinmüller	initial charge	municipal waste	3 x 95239	4.2	35 x 35	04/1996
6	MVA Houthalen	CVBA Region. Milieuzorg	B	CT Umwelttechnik	initial charge	municipal waste	2 x 77400	4.2	35 x 35	
7	MVA Ingolstadt	ZV MVA Ingolstadt	D	Steinmüller	initial charge	municipal waste	2 x 70500	4.2	35 x 35	10/1995
8	MVA Stapelfeld	MVA Stapelfeld GmbH	D	Steinmüller	initial charge	municipal waste	2 x 134500	4.2	35 x 35	09/1995
9	RZR Herten	RZR Herten	D	Steinmüller	initial charge	industrial waste	69735	4.2	35 x 35	10/1995
10	SBA Fürth	ZAR	D	Siemens	initial charge	municipal waste	2 x 48300	4.2	35 x 35	1997
11	Tadaepo		KOR	LAB	initial charge	municipal waste	57619	4.3	35 x 35	1997
12	Taejeon		KOR	LAB	reloading	municipal waste	73525	4.3	35 x 35	1998

* Catalyst ordered by the utility

SIEMENS**Reference List - SINOx® Honeycomb Type Catalysts****Waste Incineration Plants NOx and Dioxin/Furan**

no.	plant	utility/operator	country	plant constructor	initial charge/ reload/change	fuel	gas flow [Nm³/h]	pitch [mm]	number of cells	start of operation
1	AEZ Wesel	Abfallges. Kr. Wesel	D	Steinmüller	initial charge	municipal waste	2 x 122500	3.7	40 x 40	1996
2	AVA Velsen	KAB Velsen	D	Lentjes	initial charge	municipal waste	2 x 92000	3.7	40 x 40	1997
3	Azalys	SIDRU	F	LAB	initial charge	municipal waste	2 x 47000	4.2	35 x 35	1998
4	Borsinc	BorsodChem Rt.	HUN	CT Umwelttechnik	initial charge	industrial waste	22900	4.2	35 x 35	2001
5	Centraco		F	LAB	initial charge	municipal waste	37514	4.3	35 x 35	1997
6	Gavi Wijster	VAMIJ BV	NL	Lentjes	initial charge	municipal waste	3 x 141000	4.2	35 x 35	1996
7	Gevudo	Gevudo Afvalverwerking	NL	Steinmüller	initial charge	municipal waste	2 x 157329	4.2	35 x 35	1997
8	GMVA Niederrhein	GMVA	D	DBA	initial charge	municipal waste	4 x 178000	4.2	35 x 35	1995
9	GMVA Niederrhein	GMVA	D	DBA	change	municipal waste	178000	4.2	35 x 35	1996
10	Kunpo		KOR	Korea Cottrell	initial charge	municipal waste	51900	4.2	35 x 35	2000
11	KVA Gamsen	KVA Oberwallis	CH	Lurgi	initial charge	municipal waste	47000	4.2	35 x 35	1998
12	KVA Oftringen	Gemeinde-verba nd	CH	Lurgi	initial charge	municipal waste	75000	6.4	23 x 23	1998
13	KVA Trimmis	GEVAG	CH	Lurgi	initial charge	municipal waste	55000	4.2	35 x 35	1997
14	Melfi	Fenice Melfi	I	Fisia	initial charge	industrial waste	61125/43700	3.7	40 x 40	1998
15	MHKW Kempten	MHKW Kempten	D	Noell/KRC	initial charge	municipal waste	73000	4.2	35 x 35	1995

* Catalyst ordered by the utility

SIEMENS**Reference List - SINOx® Honeycomb Type Catalysts****Waste Incineration Plants NOx and Dioxin/Furan**

no.	plant	utility/operator	country	plant constructor	initial charge/ reload./change	fuel	gas flow [Nm³/h]	pitch [mm]	number of cells	start of operation
16	MHKW Kiel	MHKW Kiel	D	Noell/KRC	initial charge	municipal waste	46300	4.2	35 x 35	1995
17	MVA Hagen	HEB	D	DBA	initial charge	municipal waste	3 x 42265	4.2	35 x 35	1996
18	MVA Landshut	Stadtwerke Landshut	D	Hugo Petersen	initial charge	municipal waste	65650	4.2	35 x 35	1996
19	MVA Münster	TW Stuttgart	D	Noell/KRC	initial charge	municipal waste	3 x 116000	4.2	35 x 35	1994
20	MVA Offenbach	Zweckverb./ Umlandverb.	D	Lentjes	initial charge	municipal waste	3 x 65000	3.7	40 x 40	1996
21	MVA Solingen	SWS	D	EVT	initial charge	municipal waste	95000	4.2	35 x 35	1995
22	Paju		KOR	Integral	initial charge	municipal waste	2 x 33000	4.2	35 x 35	
23	Satom		CH	LAB	initial charge	municipal waste	71250	4.2	35 x 35	1999
24	Sion		CH	LAB	initial charge	municipal waste	69117	4.2	35 x 35	1999
25	TAN Nürnberg	TAN Nürnberg	D	Von Roll	initial charge	municipal waste	3 x 65300	3.7	40 x 40	2000
26	Uijongbu		KOR	CT Umwelttechnik	initial charge	municipal waste		3.7	40 x 40	
27	Wacker Chemie	Wacker Chemie	D	Noell/KRC	initial charge	chemical plant residues	24600/13400	4.2	35 x 35	1996

* Catalyst ordered by the utility

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

ATTACHMENT E

**SELECTIVE CATALYTIC REDUCTION SYSTEM
BUDGETARY ESTIMATES RECEIVED
DURING PREPARATION OF
BEST AVAILABLE CONTROL TECHNOLOGY
ANALYSIS AND SUPPORTING CORRESPONDENCE**

October 31, 2002

IMAGE QUALITY

**PLEASE NOTE
THE ORIGINAL DOCUMENTS
SCANNED FOR THIS RECORD
WERE OF POOR QUALITY.**

BABCOCK BORSIG POWER

Dennis M. Malone
Proposal Manager

October 19, 2001

Mr. Michael Hober
RTP Environmental Associates, Inc.
239 US Highway 22 East
Green Brook, NJ 08812

REFERENCE: MPLC
BBP Inquiry 501003

Dear Mr. Hober:

Per your request to Tony Licata, Babcock Borsig Power, Inc (BBP) is pleased to furnish a budget proposal to RTP Environmental Associates for a cold end SCR system to be located on the Lee County Project. The Budget proposal for this unit has the following equipment to reduce the emissions from 270 ppm to 50 ppm with a NH₃ slip of 5 ppm and a catalyst life of 24,000 hours:

SCR Inlet Duct

SCR System Bypass Duct (around the GAS to GAS heat exchanger)

SCR Outlet Duct

Gas to Gas heat exchanger

Bypass and Isolation Dampers with Seal Air Systems as required

Gas duct burners for flue gas temperature control

BBP Delta Wing® flue gas and reagent mixers

Reactor Casing and internals

Catalyst

Foundation information (loads) for all equipment furnished

Structural steel including all stairs, platforms, railing and ladders

Catalyst handling system of hoists, monorail system and loading carts

Solid Modeling for flue gas flow analysis

Aqua ammonia storage system including two storage tanks, each with the capacity of holding one truck volume (one for system operation and one for truck unloading, with truck unloading connections.

Ammonia delivery system from the tank farm to the SCR inlet duct utilizing skid mounted pumps and direct injection nozzles.

Babcock Borsig Power, Inc.
Environmental Systems Division

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Telephone: (508) 552-7100
Fax: (508) 552-7548

www.bbpwr.com

Complete controls system including engineering for draft controls for the SCR Bypass Damper system

Complete Field Instruments for control on the reactor including inlet In Situ NO_x Analyzers.
Final NO_x control will be by the CEMS monitor on the stack.

Training program for operators and Maintenance Personal

Items not included

Ductwork from the boiler to the Gas heat exchanger isolation and bypass dampers; and from the gas heater isolation dampers to the ID fan inlet.

Labor and erection equipment for the installation of the proposed equipment and any modifications to the existing structures.

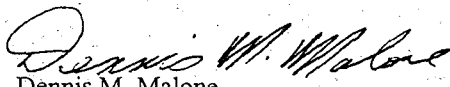
Foundations and all Civil work

Electrical equipment including switchgear, MCC's, wire, conduit, cable trays, etc.

The Budget Material Price for the design, and supply of the SCR system as described above is Six Million Three Hundred Thousand Dollars (\$6,300,000). For the above scope of supply, BBP estimates that the construction would be on the order of magnitude cost of Five Million Six Hundred Seventy Five Thousand Dollars (\$5,675,000). These estimates are conservative and with additional data and the scope further defined, BBP expects these estimates to be reduced. As this project develops and a firm price is provided, the firm price would be contingent on the Babcock Borsig Power Board's Approval.

We look forward to a successful project working with RTP to expand the facilities at the LEE County Facility. If any additional questions arise during the review of the above, please feel free to contact me at (508) 854-3850, Fax(508) 854-3800 email: DMALONE@BBPWR.COM or our District Sales Manager Mark Moulin at (856) 988-7134, Fax (856) 988-7137 or email: MMOULIN@BBPWR.COM.

Sincerely,


Dennis M. Malone
Proposal Manager

Attachments: RTP Information Request Form
Process Flow Diagram

Cc: Joe Langone, Vice President, BBP Environment
Paul Croteau, Director, Proposals, Environmental Technology
Tony Licata, Director Customer Relations
Mark Moulin, District Sales Manager

RTP ENVIRONMENTAL ASSOCIATES INC.®

Lee County Resource Recovery Facility
 Lee County, Florida
 Information Required to Determine Feasibility of SCR Technology
 August 15, 2001

Size of Combustor Unit	600 tons garbage/day
Capital Cost for SCR	<u>\$ 6,300,000. MATERIAL</u>
Annual Operating Cost of SCR	_____
Catalyst System	Hot Side or Cold Side
Catalyst Life Span	<u>24,000 HRS.</u>
Catalyst Replacement Cost	_____
Catalyst Disposal Cost	_____
Design Cost	<u>\$1,800,000. INCLUDED IN ABOVE</u>
Maintenance (hours/year)	_____
Power Requirements	<u>355 ACFM</u> Natural Gas (Amount/year)
	<u>6.5 KW</u> Electricity (Amount/year)
	Fuel Oil (Amount/year)
	<u>222 LB/HR</u> Ammonia/Urea/Other <u>19% NH₃</u>
	(amount/year)
	Other (Amount/year)

If Cold Side Unit, Amount of Reheat Required for Catalyst SEE ATTACHED PROCESS FLOW DIAGRAM

Explanation of abbreviations used in attached tables from application for first two units:

lb/ton	=	pounds per ton
lb/MMBtu	=	pounds per million British Thermal Units
Btu/lb	=	British Thermal unit/pound
tpd	=	tons per day
MMBtu/hr	=	million British Thermal Units per hour
g/s	=	grams per second
m	=	meters
K	=	temperature degrees in units of Kelvin
m/s	=	meters per second
ft ²	=	square feet
gr/dscf	=	grains per dry standard cubic feet
lb/hr	=	pounds per hour
µg/dscm	=	micrograms per dry standard cubic meter
ppmdv	=	parts per million on a dry volume basis
ng/dscm	=	nanograms per dry standard cubic meter
mg/dscm	=	milligrams per dry standard cubic meter

BABCOCK BORSIG POWER

Dennis M. Malone
Proposal Manager

October 29, 2001

Mr. Michael Hober
RTP Environmental Associates, Inc.
239 US Highway 22 East
Green Brook, NJ 08812

REFERENCE: MPLC
BBP Inquiry 501003

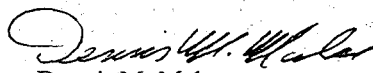
Dear Mr. Hober:

The following is the response to your question on steam consumption. The steam requirements to heat the flue gas up to the required temperature of the SCR catalyst will be 7600 LB/hr. The steam supply conditions are assumed as 850 psi and at 825°F.

The Steam coil system was not included in our original estimate but would be approximately 1% of the material cost for the additional scope.

If any additional questions arise, please feel free to contact me at (508) 854-3850, Fax(508) 854-3800 email: DMALONE@BBPWR.COM or our District Sales Manager Mark Moulin at (856) 988-7134, Fax (856) 988-7137 or email: MMOULIN@BBPWR.COM.

Sincerely,


Dennis M. Malone
Proposal Manager

Attachments: Revised Process Flow Diagram

Cc: Paul Croteau, Director, Proposals, Environmental Technology
Tony Licata, Director Customer Relations
Mark Moulin, District Sales Manager

Babcock Borsig Power, Inc.
Environmental Systems Division

Mailing Address:

Post Office Box 15040
Worcester, MA 01615-0040

Shipping Address:

5 Neponset Street
Worcester, MA 01606

Telephone: (508) 852-7100
Fax: (508) 852-7548

www.bbpwr.com

BABCOCK BORSIG POWER

Dennis M. Malone
Proposal Manager

December 4, 2001

Mr. John Ardary
Covanta Energy
40 Lane Road, CN-262615
Fairfield, NJ 07007-2615

REFERENCE: MPLC
BBP Inquiry 501003

Dear Mr. Ardary:

To further describe the scope that is included in this budget proposal and to answer questions Tony Licata and I have received, I have revised the original proposal letter and underscored the items revised. Those items changed from the original are highlighted in red and underscored for faxing. I hope this resolves any questions you have had to date.

Per your request to Tony Licata, Babcock Borsig Power, Inc (BBP) is pleased to furnish a budget proposal to RTP Environmental Associates for a cold end SCR system to be located on the Lee County Project. The Budget proposal for this unit has the following equipment to reduce the emissions from 270 ppm to 50 ppm with a NH₃ slip of 5 ppm and a catalyst life of 24,000 hours:

SCR Inlet Duct

SCR System Bypass Duct (around the GAS to GAS heat exchanger)

SCR Outlet Duct

Gas to Gas heat exchanger

Bypass and Isolation Dampers with Seal Air Systems as required

Gas duct burners for flue gas temperature control

BBP Delta Wing® flue gas and reagent mixers

Reactor Casing and internals

Catalyst

Foundation information (loads) for all equipment furnished

Structural steel including all stairs, platforms, railing and ladders

Catalyst handling system of hoists, monorail system and loading carts

Solid Modeling for flue gas flow analysis

Aqua ammonia storage system including two storage tanks, each with the capacity of holding one truck volume (one for system operation and one for truck unloading, with truck unloading connections).

Post-It® Fax Note 7671		Date 12/4/01	# of pages 3
To Mike Huber	From Dennis Malone		
Co./Dept.	Co. BBP		
Phone #	Phone # (508) 854-3850		
Fax # (732) 968-9603	Fax # (508) 854-3800		

Babcock Borsig Power, Inc.
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Fax: (508) 852-7548

www.bbpwr.com

Ammonia delivery system from the tank farm to the SCR inlet duct utilizing skid mounted pumps and direct injection nozzles.

Complete controls system including engineering for draft controls for the SCR Bypass Damper system

Complete Field Instruments for control on the reactor including inlet In Situ NO_x Analyzers. Final NO_x control will be by the CEMS monitor on the stack.

Training program for operators and Maintenance Personal

Ammonia leak detectors in the ammonia storage facility and the direct injection control valve locations

BBP will furnish electrical loads, compressed air, water, steam, and auxiliary fuel requirements at the battery limits

Items not included in material pricing

Ductwork from the boiler to the Gas heat exchanger isolation and bypass dampers; and from the gas heater isolation dampers to the ID fan inlet.

Labor and erection equipment for the installation of the proposed equipment and any modifications to the existing structures.

Foundations and all Civil work

Electrical equipment including switchgear, MCC's, wire, conduit, cable trays, etc.

Upgrades to existing station's systems and services for utilities.

Fire protection equipment

Safety equipment.

Building or enclosure

Wind load design into SCR, support steel and equipment. (Wind loads are to be handled by building enclosure and support steel separate from equipment support steel)

Items included in Construction estimate

Erection labor and equipment for the installation of proposed equipment

Foundations and civil work for proposed equipment furnished including materials

Electrical equipment including switchgear, MCC's, wire, conduit, cable trays, etc.

Items not included in Construction estimate

Materials, labor and erection equipment for any modifications to the existing structures

Relocation of overhead and underground utilities, services and obstructions

Roads and civil betterments

System enclosures/buildings

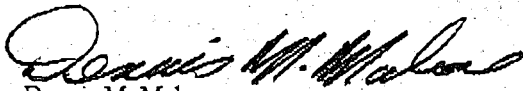
Hazardous waste material abatement

The footprint for this SCR will be approximately 23 feet square and approximately 50 feet high. This arrangement is based on the SCR directly above the gas to gas heat exchanger for a compact footprint. The height may be reduced by 10 feet if the gas to gas heat exchanger is placed to the side of the SCR and the footprint is allowed to grow in one direction by 20 feet

The Budget Material Price for the design, and supply of the SCR system as described above is Six Million Three Hundred Thousand Dollars (\$6,300,000). For the above scope of supply, BBP estimates that the construction would be on the order of magnitude cost of Five Million Six Hundred Seventy Five Thousand Dollars (\$5,675,000). These estimates are conservative and with additional data and the scope further defined, BBP expects these estimates to be reduced. As this project develops and a firm price is provided, the firm price would be contingent on the Babcock Borsig Power Board's Approval.

We look forward to a successful project working with RTP to expand the facilities at the LEE County Facility. If any additional questions arise during the review of the above, please feel free to contact me at (508) 854-3850, Fax(508) 854-3800 email: DMALONE@BBPWR.COM or our District Sales Manager Mark Moulin at (856) 988-7134, Fax (856) 988-7137 or email: MMOULIN@BBPWR.COM.

Sincerely,


Dennis M. Malone
Proposal Manager

Attachments: RTP Information Request Form
Process Flow Diagram

Cc: Joe Langone, Vice President, BBP Environment
Paul Croteau, Director, Proposals, Environmental Technology
Tony Licata, Director Customer Relations
Mark Moulin, District Sales Manager
Sam Rosania, MP
Mike Huber, RTP

Lee County Resource Recovery Facility

Waste throughput	tpd	600		
Flue gas flow , dry	dscfm	65,868	Nm3/h	145,377
Water content in flue gas	%	20%		
NOx IN	ppmdv @ 7%	260	mg/Nm3 @ 11%, dry	381
NOx OUT	ppmdv @ 7%	100	mg/Nm3 @ 11%, dry	147

Turn Key Capital Cost for SCR	million USD*	8.00	Range : +/- 10% , no building (equipment suitable for outdoor erection)
Annual Operating Cost of SCR	depends on cost of utilities		
Catalyst System	Cold Side		
Catalyst Life Span	Normal Guarantee : 2 years, expected : 5 years**		
Catalyst Replacement Cost	USD*	700,000	
Catalyst Disposal Cost	depends on local disposal cost		
Design Cost	included in capital cost		

Maintenance (hours/year)	very little maintenance required					
Utility Requirements (nominal conditions)			per hour	per year	Unit cost USD	annual cost USD
	Natural gas ***	kg	162.3	1,298,400	5 per 1000 cf	278,911
	Fuel	kg	0	0		
	Ammonia (100%)	kg	14	112,000		
	Electricity ***	kWh	320	2,560,000	0.05	128,000

* estimate based on an exchange rate of 0.9 USD per EURO

** depending on composition of flue gas.

*** does not include energy used during start-up of system

From: Dirk_Eeraerts@bettertechnology.com

To: Scott Heath <heath@rtpenv.com>

Cc: hober@rtpenv.com, Arnold_Olender@bettertechnology.com

X-Mailer: Lotus Notes Release 5.0.6a January 17, 2001

Date: Fri, 21 Dec 2001 14:38:00 -0500

Subject: Re: Further Clarification on SCR System Budgetary Estimate

X-MIMETrack: Serialize by Router on ldbel03.hudee.com/huDEE(Release 5.0.9 [November 16, 2001) at

12/21/2001 08:39:06 PM

Scott,

See my comments in your mail hereafter and the new budget and operating estimate in the attached file.

The new estimate is based on the revised flue gas flow and revised NOx level at inlet and outlet. The emission limit of 100 ppm_{dv} (147 mg/Nm³) is very high ; an SCR system can reach an emission level of 70 mg/Nm³. The higher limit suggested by Coventa does not reduce the investment cost of the system and does not allow the advantages of SCR to come out. Basically it means that you pay for a state of the art technology and then use it only at 50% of it's abilities. As a matter of fact, Seghers has built a WtE facility where we meet 150 mg/Nm³ as daily average with a simple SNCR (i.e. non-catalytic) and flue gas recirculation.

(See attached file: Boff for RTPEnv_Dec21_2001.PDF)

Happy holidays.

Sincerely,

Dirk Eeraerts

Business Development Manager

SEGHERS Scientec Matrix North America

1235 F Kennestone Circle, Marietta, Georgia 30066, USA

tel: 770 421 1181, fax: 770 421 8611

Scott Heath

<heath@rtpenv.com>

To: Dirk_Eeraerts@bettertechnology.com,

Arnold_Olender@bettertechnology.com

>

cc:

hober@rtpenv.com

Subject: Further Clarification on SCR System Budgetary Estimate

12/11/01 12:49 PM

Mr. Eeraerts,

I have received the budgetary estimate you provided to RTP Environmental Associates, Inc. concerning a Selective Catalytic Reduction system for the expansion to the Lee County Florida Energy Recovery Facility. After reviewing this estimate, I have the following questions concerning what is included in the price. Please provide the following clarification at your earliest convenience. I need to know what is included to determine extra expenses for the cost removal estimate of NOx for the BACT preparation.

In the estimate you reference NOx inlet concentration of 165 ppmdv (dry parts per million by volume) @ 7% O2 and an outlet at 50 ppmdv @ 7% O2. Covanta (operator of facility) wishes to use the following values 260 ppmdv inlet and 100 ppmdv outlet both at 7% O2. Does this affect the estimate?
--> see revised sheet attached

In the estimate you reference a dry flue gas of 90,000 dscfm (dry standard cubic feet per minute). From the operating window for the facility (as approved under Power Plant Siting Act), the maximum stack flue gas rate is 65868 dscfm corrected to 7% O2. The annual average rate is 59461 dscfm corrected to 7% O2. Please recompute for these values. I apologize for providing the other rate. The 90,000 dscfm value provide was at 10.5% O2.
--> see revised sheet attached. Please note that the values given for the composition of the flue gas in your mail dd Dec 05, result in a total of 120%.

What size ID fan is required for this system?

--> Sizing of system components goes beyond the scope of this budget estimate.

In the estimate, you use the term 'Turn Key Capital Cost for SCR'. What all does this price include?

Please note whether the following items are included in the \$8,200,000 SEGHER's estimated.

--> see hereafter, this is valid for our initial estimate as well as for the new budget in attachment:

Capital Costs

Ammonia Storage Tanks : --> included

Flue Gas Ductwork : --> included

Instrumentation: --> included

Taxes : --> taxes and import duties are not included.

Freight : --> included

System Integration: --> If this refers to the modifications in the existing control system, this is not included. I have included in the new estimate extra engineering for functional description of the interfaces with the existing control system. Actual re-programming of the existing system is not included.

Installation Costs

Foundation and Support: --> included

Handling and Erection: --> included

Electrical: --> included

Piping: --> included

Insulation: --> included

Painting: --> included

Site Preparation: --> not included, we assume site is ready since this is an existing plant. We can not estimate this cost without knowing the current status of the site.

Structural Steel: --> included

Buildings: --> not included, SCR system is designed for outdoors operation.

SCR Building enclosure : --> not included, SCR system is designed for outdoors operation.

Engineering: --> included

Construction of the SCR System and field expenses: --> included

Operating Costs

Please provide the operating requirements of the system. Lee County is using \$0.05 per kilowatt of electricity and \$5.00 per 1000 cubic feet of natural gas.

--> see attached sheet, electrical consumption is an estimate of the total consumption including the increased power consumption of the ID fan.

Can you provide an estimate of annual downtime of the system?

--> availability of the system is minimum 8000 h/y

I noticed in the estimate that it was based on a natural gas reheat configuration. Can you please provide an estimate of the cost for a configuration to use steam from the header to reheat the flue gas? How much steam (number of pounds at what pressure) would be required and what additional capital costs would be incurred with ductwork and insulation? If I can find out how much steam would be required, then I can determine the amount of cost incurred by the facility to divert steam from the generator-set.

--> I did not find the flue gas temperature in your data (I may have overlooked it) but we have assumed a temperature of 141C at the inlet of the SCR system. The flue gas has to be heated to 230C before entering the SCR. In our proposal we have assumed the following temp profile :
- first step heating in flue gas - flue gas heat exchanger which increases the temp from 141C to 200C. This involves a heat transfer of 12,070 MJ/h (11.44 million BTU/h). This heat exchanger cools the flue gas leaving the

SCR from 228C to 171C.

Second step heating with in line gas burner which increases the temp from 200C to 230C. This involves a heat transfer of 6,885 MJ/h (6.53 million BTU/h).

The optimization of this temperature profile and the possible use of steam goes beyond the scope of a simple budget estimate but I trust that with the values indicated above together with the steam characteristics of the plant (which we don't have), RTP will be able to estimate the steam consumption and possible savings on natural gas consumption. The impact on the investment cost depends on the size of the steam heat exchanger, the set-up of the existing facility (will determine length of steam pipes) and the steam characteristics (Temp and pressure).

I thank you for your assistance with this project and look forward to receiving your response. Please feel free to contact me with questions or comments on this request. Happy Holidays.

Scott Heath

Scott P. Heath
Environmental Scientist
heath@rtpenv.com

RTP Environmental Associates, Inc.
239 US Highway 22 East
Green Brook, New Jersey 08812 USA

Voice: 732-968-9600 (Main Office Line)
732-968-2569 ext. 311 (Direct Line)
Fax: 732-968-9603

<http://www.rtpenv.com>



Boff for RTPEnv_Dec21_2001.PDF



HALDOR TOPSØE A/S
DK-2800 LYNGBY
DENMARK

4 February 2002
53101-983 rev. 0 PNC

**Technical/Commercial
Budget Proposal**

Topsøe SCR DENOX Unit

Client: State of Florida

Project: Waste Incinerator

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Table of Contents

1. INTRODUCTION	3
2. DESIGN CONSIDERATION	3
3. DESIGN DATA	5
4. CONSUMPTION FIGURES	5
5. SCOPE OF SUPPLY	6
6. CLIENT'S SUPPLY	8
7. BUDGET PRICE	8
8. TERMS OF PAYMENT	9
9. DELIVERY TIME	9
10. GUARANTEES	9
11. LIMITATIONS OF LIABILITY	10
12. VALIDITY	10



1. Introduction

This Technical/Commercial Budget Proposal is in response to inquiry received on 9 January 2002 and subsequent e-mail of 16 January 2002.

2. Design Consideration

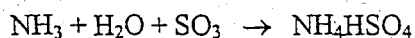
Reducing Agent

Please note that anhydrous NH_3 has been foreseen as the preferred reducing agent. Alternatively, the unit can be designed for the use of aqueous solution of urea or aqueous NH_3 . The price difference is insignificant.

Minimum Operating Temperature

The minimum operating temperature for the SCR DENOX unit is determined by the dew point of ammonium bisulphate (NH_4HSO_4). Condensation of ammonium bisulphate (ABS) on the active catalyst surface area causes some deactivation of the catalyst, and although later operation at a higher temperature may reactivate the catalyst, a certain permanent deactivation must be expected over time. An additional implication of severe condensation of ammonium bisulphate is an increased pressure drop due to clogging of the DNX catalyst channels.

The condensation of ABS is a simple thermodynamic gas phase phenomenon. The dew point temperature is only dependent on the concentration (partial pressure) of ammonia (NH_3), moisture (H_2O) and sulphur trioxide (SO_3):



A higher partial pressure of any of the reactants will lead to an increase in the dew point temperature of ABS.

When determining the minimum catalyst operating temperature, a distinction must be made between the dew point for ABS in the bulk phase and in the catalyst pores, because the vapour pressure of ABS is lower in the micropores than in the bulk phase. This effect is normally referred to as capillary condensation, and implies that the dew point temperature in the micropores is higher than the dew point temperature in the bulk phase. As a consequence, the first condensation of ABS will take place in the micropores of the catalyst.

Several references exist in the literature where the bulk phase dew point temperature of ABS is determined. The formula used by Haldor Topsøe A/S for calculation of the dew point for ABS in the catalyst pores is based on literature studies, in-house laboratory experiments, pilot tests and industrial feedback. We have found that the dew point



temperature for ABS in the micropores is approx. 35 - 40°C higher than the dew point temperature in the bulk phase. This is in general agreement with figures reported in the literature by others.

It is normally recommended to operate the SCR DENOX catalyst at a minimum temperature of 10°C above the dew point of ABS in the catalyst pores in order to account for lateral temperature differences in the SCR reactor. The minimum operating temperature is calculated for each case based on project specific operating conditions.

Finally, it should be mentioned that condensation of ABS is a thermodynamic phenomenon and will therefore be harmful to any type/manufacture of catalyst

With an assumed SO_x content of maximum 1 ppm_v after the bag filter and with an assumed maximum SO₂ to SO₃ oxidation of 3%, the minimum inlet temperature for the SCR catalyst is in the order of 270-280 (520-540°F).

Layout

In order to cope with the above minimum inlet temperature for the catalyst and also in order to ensure an acceptable catalyst activity per volume of catalyst, the flue gas has to be heated up before entering the SCR unit.

The cold non-cleaned flue gas exchanges heat with the cleaned hot flue gas in a gas/gas heat exchanger, and then the non-cleaned gas is further heated to the operating temperature of the catalyst by means of a gas or oil heater. After the heater the NH₃ is injected into the hot flue gas, and the flue gas is passed through the catalyst where the NH₃ and the NO_x will react on the surface of the catalyst and form free nitrogen and water vapour. The cleaned flue gas is then passed through the heat exchanger and the cold cleaned flue gas is routed to the stack.



3. Design Data

The design is based on the data given/assumed below:

Flue gas source:		Waste Incinerator
Flue gas mass:	ACFM	170,000 (ref. t = 300°F)
Pressure:	mmWG	800
Temperature:	°C	149
O ₂ content:	vol-%	10
H ₂ O content:	vol-%	10
SO ₂ content:	ppm _v	< 30 (at 7% O ₂)
SO ₃ content:	ppm _v	< 1 (at 7% O ₂)
NO _x content, inlet:	ppm _v	260 (at 7% O ₂)
NO _x content, outlet:	ppm _v	< 150 (at 7% O ₂)
NH ₃ slip:	ppm _v	< 5

All data at actual O₂, wet gas, unless otherwise specified.

4. Consumption Figures

At the conditions specified in Section 3 above the expected consumption is as follows:

NH ₃	kg/h	< 10
Electric Power:	kW	5 - 7
Instrument air:	NI/min	30 - 40
Oil/Gas:	MWh/h	< 2.8



5. Scope of Supply

5.1. Battery limits

Flue gas system:

- inlet/outlet heat exchanger
- inlet/outlet preheater
- inlet/outlet NH_3 injection nozzle system
- inlet/outlet mixer elements
- inlet/outlet reactor

NH_3 piping:

- inlet/outlet skid-mounted NH_3 evaporator and flow control assembly
- inlet/outlet NH_3 injection nozzle system

Control system:

- inlet/outlet locally placed transmitters
- inlet/outlet analyser
- inlet/outlet control cabinet

5.2. Equipment per unit

- one (1) charge of proprietary Topsøe deNOx catalyst type DNX 950.
- one (1) catalytic reactor (exclusive of inlet pipe).
- one (1) gas/gas heat exchanger
- one (1) oil/gas fired preheater
- one (1) NH_3 injection nozzle system for installation in the rectangular inlet pipe
- one (1) pre-fabricated NH_3 evaporator and flow control assembly fitted electrical heated evaporator, flow meter, flow control valve, indicating instruments, valves and fittings.
- one (1) NOx analyser, complete with transmitter/receiver unit, measuring probe, purge air unit, analog input/output, strip chart recorder, etc.
- one (1) control system, complete with PLC with digital/analog, input/output cards, metering pump frequency converters and control gear, flow relays, main switches, MCBs, terminals, etc.
- one (1) lot of instruments, piping, valves etc., as required within the battery limits.



5.3. Engineering and Documentation

- Project time schedule
- Layout and general arrangement
- Detailed engineering and detail drawings
- Arrangement and installation drawings
- Erection documentation
- "As built" drawings and documentation including material certificates, inspection and test reports
- Operation and maintenance manuals including sub-suppliers' documentation and specifications
- Spare parts list

5.4. Erection and Commissioning

Our scope of supply is exclusive of erection and commissioning, but we can offer supervision assistance during erection and commissioning of the unit by one of our engineers at a per diem rate as specified in Section 7.2 below.

Travelling costs, board and lodging for our supervisor will be invoiced at actual cost.

We estimate the minimum supervision assistance required to be approx. 10 man-days. The man-days are inclusive of training of personnel (see below).

In connection with the above, please note that in order to maintain our guarantee terms, as specified in Section 10.2 below, loading of catalyst into the reactor as well as commissioning of the unit must be supervised by one of our experts.

5.5. Training and Education of Operators

During commissioning/hand-over of the unit, we recommend a two-day seminar to be conducted by our supervisor giving detailed instructions on how to control, operate and maintain the unit.



6. Client's Supply

- Design and supply of equipment foundations
- Connection lines for utility supply to the unit
- Piping, power and control cables between various equipment, as per the documentation and cable list of Haldor Topsøe A/S
- Lighting and earthing installations
- NH₃ storage facilities
- Inlet pipe to reactor
- Manpower for erection, tools and assembly materials
- Manpower for insulation and cladding of the reactor
- Manpower for catalyst loading
- Manpower for commissioning
- Insulation and cladding material for the reactor.
- Flue gas fan (if applicable)

7. Budget Price

7.1. Equipment, Catalyst and Engineering

The total price of the supply of one (1) SCR DENOX unit, complete with associated equipment, accessories, materials and services, as specified in Section 5 above, is:

EUR 1,500,000.00

- The above price includes delivery of all equipment EXW Copenhagen (Incoterms 2000).
- The above price is exclusive of any duties and value added tax (VAT).
- The price is exclusive of installation, erection and supervision.

7.2. Per Diem Rates

We can offer supervision assistance by one of our engineers for erection, catalyst loading and commissioning of the unit at a per diem rate of:

EUR 950.00

for days out of office in 2002. Travelling costs, board and lodging will be charged at actual cost.



8. Terms of Payment

The price given in this proposal is based on the following terms of payment:

- a. 30% on signing of technically and commercially clarified contract
- b. 30% within 3 months after order
- c. 30% within 30 days after delivery (prorata)
- d. 10% after commissioning of the unit; however, not later than 3 months after mechanical completion.

9. Delivery Time

Our normal delivery time for one (1) SCR DENOX unit, as specified above, is 5 - 6 months.

10. Guarantees

10.1. Mechanical Guarantee

The equipment and machinery supplied are guaranteed against faulty material and bad workmanship for a period of 12 months after commissioning/acceptance; however, max. 18 months after delivery of equipment.

In case of failure to meet this guarantee, the client shall inform Haldor Topsøe A/S in writing without delay, and if it can be excluded that the failure is due to:

- a) normal wear and tear
- b) maloperation
- c) repairs, changes or replacements made by the client without consent of Haldor Topsøe A/S,

Haldor Topsøe A/S shall without delay repair or replace the faulty part. Replaced parts under the guarantee shall on request be returned to Haldor Topsøe A/S.

10.2. Performance Guarantee

At the conditions specified in Section 3 above and on the condition that the entire equipment for the unit is constructed and installed in accordance with the instruction manuals and recommendations issued by Haldor Topsøe A/S, it is guaranteed that the concentration of NO_x in the reactor outlet gas will not exceed the value, as specified in Section 3 above, at steady load conditions i.e. at stable exhaust flow rate, temperature, composition and pressure.



The guarantee period is 16,000 operating hours; however, maximum two years starting from the day the exhaust gas is passed through the unit for the first time.

The unit is designed for an NH_3 slip of less than 5 ppm_v (wet gas, actual O_2), and during steady operation this can be maintained. However, at sudden changes of load, minor overshooting may occur.

The above-mentioned performance shall be attained and proven by a performance test not later than 3 months after completion of installation of the unit. If it turns out during the initial start-up period or during the performance test run that the guaranteed performance cannot be obtained, Haldor Topsøe A/S will make good, i.e. will modify the installation or change the catalyst, at own cost.

If the performance test, due to no fault of Haldor Topsøe A/S, cannot take place within 3 months after completion of the installation of the unit, the performance test shall be deemed to have taken place, and the final instalment falls due.

If the catalyst has to be replaced or additional elements have to be added during the subsequent guarantee period in order to obtain the guaranteed performance, a prorated discount is given on the price of the replacement catalyst calculated as:

$$\frac{(16,000 - X)}{16,000} \times 100\%$$

where X is the number of actual operating hours achieved from initial start-up of the SCR unit.

11. Limitations of Liability

Haldor Topsøe A/S is under no circumstances responsible for indirect or consequential damage due to non-fulfilment of any guarantee or for any other reason.

12. Validity

This proposal is a budget proposal only and as such valid for 60 days from the date of issue.

HALDOR TOPSØE A/S

Nicolai Christoffersen
Equipment Division



HALDOR TOPSØE A/S
DK-2800 LYNGBY
DENMARK

26 March 2002
53101-1016 rev. 0 PNC

Technical/Commercial Budget Proposal

Topsøe SCR DENOX Unit

Client: RTP Environmental Associates Inc.

**Project: Energy Recovery Facility
Lee County, Florida**

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Table of Contents

1. INTRODUCTION	3
2. DESIGN CONSIDERATION	3
3. DESIGN DATA	5
4. CONSUMPTION FIGURES	5
5. SCOPE OF SUPPLY	6
6. CLIENT'S SUPPLY	8
7. BUDGET PRICE	8
8. TERMS OF PAYMENT	9
9. DELIVERY TIME	9
10. GUARANTEES	9
11. LIMITATIONS OF LIABILITY	10
12. VALIDITY	10



1. Introduction

This Technical/Commercial Budget Proposal is in response to inquiry received on 20 March 2002.

2. Design Consideration

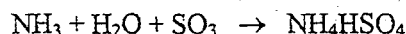
Reducing Agent

Please note that anhydrous NH_3 has been foreseen as the preferred reducing agent. Alternatively, the unit can be designed for the use of aqueous solution of urea or aqueous NH_3 . The price difference is insignificant.

Minimum Operating Temperature

The minimum operating temperature for the SCR DENOX unit is determined by the dew point of ammonium bisulphate (NH_4HSO_4). Condensation of ammonium bisulphate (ABS) on the active catalyst surface area causes some deactivation of the catalyst, and although later operation at a higher temperature may reactivate the catalyst, a certain permanent deactivation must be expected over time. An additional implication of severe condensation of ammonium bisulphate is an increased pressure drop due to clogging of the DNX catalyst channels.

The condensation of ABS is a simple thermodynamic gas phase phenomenon. The dew point temperature is only dependent on the concentration (partial pressure) of ammonia (NH_3), moisture (H_2O) and sulphur trioxide (SO_3):



A higher partial pressure of any of the reactants will lead to an increase in the dew point temperature of ABS.

When determining the minimum catalyst operating temperature, a distinction must be made between the dew point for ABS in the bulk phase and in the catalyst pores, because the vapour pressure of ABS is lower in the micropores than in the bulk phase. This effect is normally referred to as capillary condensation, and implies that the dew point temperature in the micropores is higher than the dew point temperature in the bulk phase. As a consequence, the first condensation of ABS will take place in the micropores of the catalyst.

Several references exist in the literature where the bulk phase dew point temperature of ABS is determined. The formula used by Haldor Topsøe A/S for calculation of the dew point for ABS in the catalyst pores is based on literature studies, in-house laboratory experiments, pilot tests and industrial feedback. We have found that the dew point



temperature for ABS in the micropores is approx. 35 - 40°C higher than the dew point temperature in the bulk phase. This is in general agreement with figures reported in the literature by others.

It is normally recommended to operate the SCR DENOX catalyst at a minimum temperature of 10°C above the dew point of ABS in the catalyst pores in order to account for lateral temperature differences in the SCR reactor. The minimum operating temperature is calculated for each case based on project specific operating conditions.

Finally, it should be mentioned that condensation of ABS is a thermodynamic phenomenon and will therefore be harmful to any type/manufacture of catalyst

With an SO₂ content of maximum 6 ppm_v (wet gas) after the bag filter and with an assumed maximum SO₂ to SO₃ oxidation of 3%, the minimum inlet temperature for the SCR catalyst is in the order of 270-280 (520-540°F).

Layout

In order to cope with the above minimum inlet temperature for the catalyst and also in order to ensure an acceptable catalyst activity per volume of catalyst, the flue gas has to be heated up before entering the SCR unit.

The cold non-cleaned flue gas exchanges heat with the cleaned hot flue gas in a gas/gas heat exchanger, and then the non-cleaned gas is further heated to the operating temperature of the catalyst by means of a gas or oil heater. After the heater the NH₃ is injected into the hot flue gas, and the flue gas is passed through the catalyst where the NH₃ and the NO_x will react on the surface of the catalyst and form free nitrogen and water vapour. The cleaned flue gas is then passed through the heat exchanger and the cold cleaned flue gas is routed to the stack.



3. Design Data

The design is based on the data given/assumed below:

Flue gas source:		Waste Incinerator
Flue gas flow:	scfm	99,101 ¹
Pressure:	mmWG	800
Temperature:	°F	240
O ₂ content:	vol-%	8.4
H ₂ O content:	vol-%	20
CO ₂ content:	vol-%	7.3
N ₂ content:		Balance
SO ₂ content:	ppm _v	< 6 ²
SO ₃ content:	ppm _v	< 0.2
NOx content, inlet:	ppm _v	< 156 ³
NOx content, outlet:	ppm _v	< 60 ⁴
NOx removal efficiency:	%	~ 62
Particulate matter:	gr/scf	1.2 x 10 ⁻³
NH ₃ slip:	ppm _v	< 10

All data at actual O₂, wet gas, unless otherwise specified.

4. Consumption Figures

At the conditions specified in Section 3 above the expected consumption is as follows:

NH ₃	lbs/h	< 29
Electric Power:	kW	5 - 7
Instrument air:	scfm	1 - 2
Oil/Gas:	MM BTU/hr	< 12

¹ Corresponding to 59,461 scfm @ 7 vol-% O₂, dry gas

² Corresponding to 10 ppm_v @ 7 vol-% O₂, dry gas

³ Corresponding to 260 ppm_v @ 7 vol-% O₂, dry gas

⁴ Corresponding to 100 ppm_v @ 7 vol-% O₂, dry gas



5. Scope of Supply

5.1. Battery limits

Flue gas system:

- inlet/outlet heat exchanger
- inlet/outlet preheater
- inlet/outlet NH_3 injection nozzle system
- inlet/outlet reactor

NH_3 piping:

- inlet/outlet skid-mounted NH_3 evaporator and flow control assembly
- inlet/outlet NH_3 injection nozzle system

Control system:

- inlet/outlet locally placed transmitters
- inlet/outlet analyser
- inlet/outlet control cabinet

5.2. Equipment per unit

- one (1) charge of proprietary Topsøe deNOx catalyst type DNX 950.
- one (1) catalytic reactor (exclusive of inlet pipe).
- one (1) gas/gas heat exchanger
- one (1) oil/gas fired preheater
- one (1) NH_3 injection nozzle system for installation in the rectangular inlet pipe
- one (1) pre-fabricated NH_3 evaporator and flow control assembly fitted electrical heated evaporator, flow meter, flow control valve, indicating instruments, valves and fittings.
- one (1) NOx analyser, complete with transmitter/receiver unit, measuring probe, purge air unit, analog input/output, strip chart recorder, etc.
- one (1) control system, complete with PLC with digital/analog, input/output cards, metering pump frequency converters and control gear, flow relays, main switches, MCBs, terminals, etc.
- one (1) lot of instruments, piping, valves etc., as required within the battery limits.



5.3. Engineering and Documentation

- Project time schedule
- Layout and general arrangement
- Detailed engineering and detail drawings
- Arrangement and installation drawings
- Erection documentation
- "As built" drawings and documentation including material certificates, inspection and test reports
- Operation and maintenance manuals including sub-suppliers' documentation and specifications
- Spare parts list

5.4. Erection and Commissioning

Our scope of supply is exclusive of erection and commissioning, but we can offer supervision assistance during erection and commissioning of the unit by one of our engineers at a per diem rate as specified in Section 7.2 below.

Travelling costs, board and lodging for our supervisor will be invoiced at actual cost.

We estimate the minimum supervision assistance required to be approx. 20 man-days. The man-days are inclusive of training of personnel (see below).

In connection with the above, please note that in order to maintain our guarantee terms, as specified in Section 10.2 below, loading of catalyst into the reactor as well as commissioning of the unit must be supervised by one of our experts.

5.5. Training and Education of Operators

During commissioning/hand-over of the unit, we recommend a two-day seminar to be conducted by our supervisor giving detailed instructions on how to control, operate and maintain the unit.



6. Client's Supply

- Design and supply of equipment foundations
- Connection lines for utility supply to the unit
- Piping, power and control cables between various equipment, as per the documentation and cable list of Haldor Topsøe A/S
- Lighting and earthing installations
- NH₃ storage facilities
- Inlet pipe to reactor
- Manpower for erection, tools and assembly materials
- Manpower for insulation and cladding of the reactor
- Manpower for catalyst loading
- Manpower for commissioning
- Insulation and cladding material for the reactor and heat exchanger.
- Flue gas fan (if applicable)

7. Budget Price

7.1. Equipment, Catalyst and Engineering

The total price of the supply of one (1) SCR DENOX unit, complete with associated equipment, accessories, materials and services, as specified in Section 5 above, is:

EUR 1,450,000.00

- The above price includes delivery of all equipment EXW Copenhagen (Incoterms 2000).
- The above price is exclusive of any duties and value added tax (VAT).
- The price is exclusive of installation, erection and supervision.

7.2. Per Diem Rates

We can offer supervision assistance by one of our engineers for erection, catalyst loading and commissioning of the unit at a per diem rate of:

EUR 950.00

for days out of office in 2002. Travelling costs, board and lodging will be charged at actual cost.



8. Terms of Payment

The price given in this proposal is based on the following terms of payment:

- a. 30% on signing of technically and commercially clarified contract
- b. 30% within 3 months after order
- c. 30% within 30 days after delivery (prorata)
- d. 10% after commissioning of the unit; however, not later than 3 months after mechanical completion.

9. Delivery Time

Our normal delivery time for one (1) SCR DENOX unit, as specified above, is 5 - 6 months.

10. Guarantees

10.1. Mechanical Guarantee

The equipment and machinery supplied are guaranteed against faulty material and bad workmanship for a period of 12 months after commissioning/acceptance; however, max. 18 months after delivery of equipment.

In case of failure to meet this guarantee, the client shall inform Haldor Topsøe A/S in writing without delay, and if it can be excluded that the failure is due to:

- a) normal wear and tear
- b) maloperation
- c) repairs, changes or replacements made by the client without consent of Haldor Topsøe A/S,

Haldor Topsøe A/S shall without delay repair or replace the faulty part. Replaced parts under the guarantee shall on request be returned to Haldor Topsøe A/S.

10.2. Performance Guarantee

At the conditions specified in Section 3 above and on the condition that the entire equipment for the unit is constructed and installed in accordance with the instruction manuals and recommendations issued by Haldor Topsøe A/S, it is guaranteed that the concentration of NO_x in the reactor outlet gas will not exceed the value, as specified in Section 3 above, at steady load conditions i.e. at stable exhaust flow rate, temperature, composition and pressure.



The guarantee period is 16,000 operating hours; however, maximum two years starting from the day the exhaust gas is passed through the unit for the first time.

The unit is designed for an NH_3 slip of less than 10 ppm_v (wet gas, actual O_2), and during steady operation this can be maintained. However, at sudden changes of load, minor overshooting may occur.

The above-mentioned performance shall be attained and proven by a performance test not later than 3 months after completion of installation of the unit. If it turns out during the initial start-up period or during the performance test run that the guaranteed performance cannot be obtained, Haldor Topsøe A/S will make good, i.e. will modify the installation or change the catalyst, at own cost.

If the performance test, due to no fault of Haldor Topsøe A/S, cannot take place within 3 months after completion of the installation of the unit, the performance test shall be deemed to have taken place, and the final instalment falls due.

If the catalyst has to be replaced or additional elements have to be added during the subsequent guarantee period in order to obtain the guaranteed performance, a prorated discount is given on the price of the replacement catalyst calculated as:

$$\frac{(16,000 - X)}{16,000} \times 100\%$$

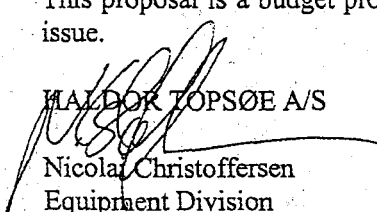
where X is the number of actual operating hours achieved from initial start-up of the SCR unit.

11. Limitations of Liability

Haldor Topsøe A/S is under no circumstances responsible for indirect or consequential damage due to non-fulfilment of any guarantee or for any other reason.

12. Validity

This proposal is a budget proposal only and as such valid for 60 days from the date of issue.


HALDOR TOPSØE A/S

Nicolai Christoffersen
Equipment Division

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

ATTACHMENT F

COST REMOVAL VALUES FOR NITROGEN OXIDES

October 31, 2002

IMAGE QUALITY

**PLEASE NOTE
THE ORIGINAL DOCUMENTS
SCANNED FOR THIS RECORD
WERE OF POOR QUALITY.**

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Steam Diverted from Header

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SCR Associated Equipment	\$6,424,110	Supplier Est. w/ 1% for Steam System, Adjusted for Temp
Ammonia Storage Tanks	Included	Ammonia Storage
Flue Gas Ductwork	\$100,000	Engineering Estimate
Instrumentation	Included	In-situ NOx Analyzer
Freight	\$321,206	5% of Associated Equip.; OAQPS Control Cost Manual
System Integration	\$100,000	Engineering Estimate
Firewater Booster Pump	\$23,000	Supplier Neutral Estimate
Increase ID Fan Size	\$50,000	Supplier Neutral Estimate; Increased size due to pressure drop across SCR System
Total Direct Capital Costs (TDCC)	\$7,018,316	
<u>Direct Installation Costs</u>		
Installation	\$5,686,750	Supplier Est. w/ 1% for Steam System, Adjusted for Temp
Foundation and Supports	Included	Included in Supplier Quote for Installation of SCR System
Handling and Erection	Included	Included in Supplier Quote for Installation of SCR System
Electrical	Included	Included in Supplier Quote for Installation of SCR System
Piping	Included	Included in Supplier Quote for Installation of SCR System
Insulation for Ductwork	Included	Included in Supplier Quote for Installation of SCR System
Painting	\$30,000	SCR Structural Steel, Piping and Exposed Metals
Site Preparation	\$29,000	Existing Roads, Demolition & Restoration, SCR Footprint
Buildings (Process CEM)	\$25,000	Engineering Estimate
Concrete	\$40,000	Aqueous Ammonia Spill Containment
Miscellaneous Steel	Included	Platforms, Ladders, etc.
SCR Building Enclosure/Struct. Steel	\$530,000	Supplier Neutral Estimate; Windload Req. for Hurricanes
Electrical Systems	\$56,000	Grounding, Lightning Protection, Lighting, etc.
Instrumentation Systems	\$8,000	Systems Monitoring and Control
Insulation Systems	\$29,000	Insulating Steam Line to SCR Building
ID Fan Increase	\$50,000	Engineering Estimate; Installation with Dampers
Piping Systems	\$216,000	Fire Protection Standpipe/Sprinklers, Steam, Service Air, Relocate Propane, Potable Water, Ammonia, Steam, Condensate Return
Total Direct Installation Costs (TDIC)	\$6,699,750	
Total Capital Costs (TCC)	\$13,718,066	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$1,097,445	8% of TCC
Construction and Field Expenses	Included	Included in Supplier Quote for SCR System
Vendor Fees	\$685,903	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$274,361	2% of TCC; OAQPS Control Cost Manual, Chapter 3
Performance Tests	\$137,181	1% of TCC; OAQPS Control Cost Manual, Chapter 3
Contingencies	\$1,371,807	10% of TCC;
Total Indirect Capital Costs (TinCC)	\$3,566,697	
Total Direct, Indirect and Capital Costs (TDICC)	\$17,284,763	

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Steam Diverted from Header

Cost Component	Costs	Basis of Cost Component
Direct Annual Costs		
Operations and Maintenance Labor	\$56,160	24 hours/week at \$45/hour
Ammonia to control 260 ppm inlet NOx	\$53,700	\$300 per ton for Ammonia*
Catalyst Disposal Costs	\$15,000	Engineering Estimate
Catalyst Cost	\$90,000	1/3 Catalyst-3 year catalyst life
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$96,362	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$336,222	
Annual Energy Costs		
Annual Electrical Needs	\$2,847	6.5 kW X 8,760 hours per year at \$0.05 per kWh
Annual Additional ID Fan Power	\$116,946	267 kW X 8,760 hours per year at \$0.05 per kWh
Total Energy Costs (TEC)	\$119,793	
Indirect Annual Costs		
Management/Overhead	\$33,696	60% of Operations and Maintenance Labor
Insurance	\$137,181	1% of Total Capital Costs
Miscellaneous Painting	\$10,000	Supplier Neutral Estimate
Miscellaneous Equipment Rebuild	\$72,271	Supplier Neutral Estimate; 75% of Spare Parts Above
Lost Power from Reheat	\$321,930	Eng. Est. -- 735 kW X 8,760 hours/year at \$0.05 per kWh
Annualized Total Direct Capital	\$2,812,231	0.1627 Capital Recovery Factor of 10% over 10 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$3,387,309	
Total Annualized Costs	\$3,843,323	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SCR System		Cost Per Ton NOx Removed
	\$12,769	301 Tons NOx Removed (260 ppm inlet; 100 ppm outlet; 62% Removal)

Note: 'Included' denotes item is assumed to be included in supplier budgetary estimate for SCR Associated Equipment and Installation. [See letter from Dennis Malone (Babcock Borsig Power) to Michael Hober (RTP Environmental) dated October 19, 2001, October 29, 2001, and December 4, 2001]

The above cost does not include revenue lost due to additional or unscheduled system shutdown. Based on a cost of \$56 per ton of waste at 600 tons of waste per day and over an annual shutdown of 10 days, this cost is estimated to be approximately \$336,000 due to lost tipping fees. In addition to this, the amount of revenue lost due to not producing steam during these 10 days is estimated to be approximately \$177,000; bringing the Total Annualized costs and cost effectiveness (respectively) to:

Total Annualized Costs	\$4,290,521	Cost per ton NOx removed	\$14,254
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This cost does not include costs for the electrical needs of the system (1008.5kW over 240 hours at \$0.05/kWh) and ammonia usage because system will not operate.

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Steam Diverted from Header

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SCR Associated Equipment	\$6,424,110	Supplier Est. w/ 1% for Steam System, Adjusted for Temp
Ammonia Storage Tanks	Included	Ammonia Storage
Flue Gas Ductwork	\$100,000	Engineering Estimate
Instrumentation	Included	In-situ NOx Analyzer
Freight	\$321,206	5% of Associated Equip.; OAQPS Control Cost Manual
System Integration	\$100,000	Engineering Estimate
Firewater Booster Pump	\$23,000	Supplier Neutral Estimate
Increase ID Fan Size	\$50,000	Supplier Neutral Estimate; Increased size due to pressure drop across SCR System
Total Direct Capital Costs (TDCC)	\$7,018,316	
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Installation	\$5,686,750	Supplier Est. w/ 1% for Steam System, Adjusted for Temp
Foundation and Supports	Included	Included in Supplier Quote for Installation of SCR System
Handling and Erection	Included	Included in Supplier Quote for Installation of SCR System
Electrical	Included	Included in Supplier Quote for Installation of SCR System
Piping	Included	Included in Supplier Quote for Installation of SCR System
Insulation for Ductwork	Included	Included in Supplier Quote for Installation of SCR System
Painting	\$30,000	SCR Structural Steel, Piping and Exposed Metals
Site Preparation	\$29,000	Existing Roads, Demolition & Restoration, SCR Footprint
Buildings (Process CEM)	\$25,000	Engineering Estimate
Concrete	\$40,000	Aqueous Ammonia Spill Containment
Miscellaneous Steel	Included	Platforms, Ladders, etc.
SCR Building Enclosure/Struct. Steel	\$530,000	Supplier Neutral Estimate; Windload Req. for Hurricanes
Electrical Systems	\$56,000	Grounding, Lightning Protection, Lighting, etc.
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Estimate of Selective Catalytic Reduction Costs
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Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$96,362	1.5% of SCR Associated Equipment
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Annual Electrical Needs	\$2,847	6.5 kW X 8,760 hours per year at \$0.05 per kWh
Annual Additional ID Fan Power	\$116,946	267 kW X 8,760 hours per year at \$0.05 per kWh
Total Energy Costs (TEC)	\$119,793	
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Management/Overhead	\$33,696	60% of Operations and Maintenance Labor
Insurance	\$137,181	1% of Total Capital Costs
Miscellaneous Painting	\$10,000	Supplier Neutral Estimate
Miscellaneous Equipment Rebuild	\$72,271	Supplier Neutral Estimate; 75% of Spare Parts Above
Lost Power from Reheat	\$321,930	Eng. Est. -- 735 kW X 8,760 hours/year at \$0.05 per kWh
Annualized Total Direct Capital	\$2,272,946	0.1315 Capital Recovery Factor of 10% over 15 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$2,848,024	
Total Annualized Costs	\$3,304,039	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SCR System		Cost Per Ton NOx Removed
	\$10,977	301 Tons NOx Removed (260 ppm inlet; 100 ppm outlet; 62% Removal)

Note: 'Included' denotes item is assumed to be included in supplier budgetary estimate for SCR Associated Equipment and Installation. [See letter from Dennis Malone (Babcock Borsig Power) to Michael Hober (RTP Environmental) dated October 19, 2001, October 29, 2001, and December 4, 2001]

The above cost does not include revenue lost due to additional or unscheduled system shutdown. Based on a cost of \$56 per ton of waste at 600 tons of waste per day and over an annual shutdown of 10 days, this cost is estimated to be approximately \$336,000 due to lost tipping fees. In addition to this, the amount of revenue lost due to not producing steam during these 10 days is estimated to be approximately \$177,000; bringing the Total Annualized costs and cost effectiveness (respectively) to:

Total Annualized Costs	\$3,751,237	Cost per ton NOx removed	\$12,463
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This cost does not include costs for the electrical needs of the system (1008.5kW over 240 hours at \$0.05/kWh) and ammonia usage because system will not operate.

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Catalytic Reduction Costs
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Ammonia Storage Tanks	Included	Ammonia Storage
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Instrumentation	Included	In-situ NOx Analyzer
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System Integration	\$100,000	Engineering Estimate
Firewater Booster Pump	\$23,000	Supplier Neutral Estimate
Increase ID Fan Size	\$50,000	Supplier Neutral Estimate; Increased size due to pressure drop across SCR System
Total Direct Capital Costs (TDCC)	\$7,018,316	
<u>Direct Installation Costs</u>		
Installation	\$5,686,750	Supplier Est. w/ 1% for Steam System, Adjusted for Temp
Foundation and Supports	Included	Included in Supplier Quote for Installation of SCR System
Handling and Erection	Included	Included in Supplier Quote for Installation of SCR System
Electrical	Included	Included in Supplier Quote for Installation of SCR System
Piping	Included	Included in Supplier Quote for Installation of SCR System
Insulation for Ductwork	Included	Included in Supplier Quote for Installation of SCR System
Painting	\$30,000	SCR Structural Steel, Piping and Exposed Metals
Site Preparation	\$29,000	Existing Roads, Demolition & Restoration, SCR Footprint
Buildings (Process CEM)	\$25,000	Engineering Estimate
Concrete	\$40,000	Aqueous Ammonia Spill Containment
Miscellaneous Steel	Included	Platforms, Ladders, etc.
SCR Building Enclosure/Struct. Steel	\$530,000	Supplier Neutral Estimate; Windload Req. for Hurricanes
Electrical Systems	\$56,000	Grounding, Lightning Protection, Lighting, etc.
Instrumentation Systems	\$8,000	Systems Monitoring and Control
Insulation Systems	\$29,000	Insulating Steam Line to SCR Building
ID Fan Increase	\$50,000	Engineering Estimate; Installation with Dampers
Piping Systems	\$216,000	Fire Protection Standpipe/Sprinklers, Steam, Service Air, Relocate Propane, Potable Water, Ammonia, Steam, Condensate Return
Total Direct Installation Costs (TDIC)	\$6,699,750	
Total Capital Costs (TCC)	\$13,718,066	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$1,097,445	8% of TCC
Construction and Field Expenses	Included	Included in Supplier Quote for SCR System
Vendor Fees	\$685,903	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$274,361	2% of TCC; OAQPS Control Cost Manual, Chapter 3
Performance Tests	\$137,181	1% of TCC; OAQPS Control Cost Manual, Chapter 3
Contingencies	\$1,371,807	10% of TCC;
Total Indirect Capital Costs (TInCC)	\$3,566,697	
Total Direct, Indirect and Capital Costs (TDICC)	\$17,284,763	

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Steam Diverted from Header

Cost Component	Costs	Basis of Cost Component
<u>Direct Annual Costs</u>		
Operations and Maintenance Labor	\$56,160	24 hours/week at \$45/hour
Ammonia to control 260 ppm inlet NOx	\$53,700	\$300 per ton for Ammonia*
Catalyst Disposal Costs	\$15,000	Engineering Estimate
Catalyst Cost	\$90,000	1/3 Catalyst-3 year catalyst life
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$96,362	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$336,222	
<u>Annual Energy Costs</u>		
Annual Electrical Needs	\$2,847	6.5 kW X 8,760 hours per year at \$0.05 per kWh
Annual Additional ID Fan Power	\$116,946	267 kW X 8,760 hours per year at \$0.05 per kWh
Total Energy Costs (TEC)	\$119,793	
<u>Indirect Annual Costs</u>		
Management/Overhead	\$33,696	60% of Operations and Maintenance Labor
Insurance	\$137,181	1% of Total Capital Costs
Miscellaneous Painting	\$10,000	Supplier Neutral Estimate
Miscellaneous Equipment Rebuild	\$72,271	Supplier Neutral Estimate; 75% of Spare Parts Above
Lost Power from Reheat	\$321,930	Eng. Est. -- 735 kW X 8,760 hours/year at \$0.05 per kWh
Annualized Total Direct Capital	\$2,461,350	0.1424 Capital Recovery Factor of 7% over 10 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$3,036,428	
Total Annualized Costs	\$3,492,443	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SCR System		Cost Per Ton NOx Removed
	\$11,603	301 Tons NOx Removed (260 ppm inlet; 100 ppm outlet; 62% Removal)

Note: 'Included' denotes item is assumed to be included in supplier budgetary estimate for SCR Associated Equipment and Installation. [See letter from Dennis Malone (Babcock Borsig Power) to Michael Hober (RTP Environmental) dated October 19, 2001, October 29, 2001, and December 4, 2001]

The above cost does not include revenue lost due to additional or unscheduled system shutdown. Based on a cost of \$56 per ton of waste at 600 tons of waste per day and over an annual shutdown of 10 days, this cost is estimated to be approximately \$336,000 due to lost tipping fees. In addition to this, the amount of revenue lost due to not producing steam during these 10 days is estimated to be approximately \$177,000; bringing the Total Annualized costs and cost effectiveness (respectively) to:

Total Annualized Costs, \$3,939,641 Cost per ton NOx removed \$13,089
This cost does not include costs for the electrical needs of the system (1008.5kW over 240 hours at \$0.05/kWh) and ammonia usage because system will not operate.

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Steam Diverted from Header

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SCR Associated Equipment	\$6,424,110	Supplier Est. w/ 1% for Steam System, Adjusted for Temp
Ammonia Storage Tanks	Included	Ammonia Storage
Flue Gas Ductwork	\$100,000	Engineering Estimate
Instrumentation	Included	In-situ NOx Analyzer
Freight	\$321,206	5% of Associated Equip.; OAQPS Control Cost Manual
System Integration	\$100,000	Engineering Estimate
Firewater Booster Pump	\$23,000	Supplier Neutral Estimate
Increase ID Fan Size	\$50,000	Supplier Neutral Estimate; Increased size due to pressure drop across SCR System
Total Direct Capital Costs (TDCC)	\$7,018,316	
<u>Direct Installation Costs</u>		
Installation	\$5,686,750	Supplier Est. w/ 1% for Steam System, Adjusted for Temp
Foundation and Supports	Included	Included in Supplier Quote for Installation of SCR System
Handling and Erection	Included	Included in Supplier Quote for Installation of SCR System
Electrical	Included	Included in Supplier Quote for Installation of SCR System
Piping	Included	Included in Supplier Quote for Installation of SCR System
Insulation for Ductwork	Included	Included in Supplier Quote for Installation of SCR System
Painting	\$30,000	SCR Structural Steel, Piping and Exposed Metals
Site Preparation	\$29,000	Existing Roads, Demolition & Restoration, SCR Footprint
Buildings (Process CEM)	\$25,000	Engineering Estimate
Concrete	\$40,000	Aqueous Ammonia Spill Containment
Miscellaneous Steel	Included	Platforms, Ladders, etc.
SCR Building Enclosure/Struct. Steel	\$530,000	Supplier Neutral Estimate; Windload Req. for Hurricanes
Electrical Systems	\$56,000	Grounding, Lightning Protection, Lighting, etc.
Instrumentation Systems	\$8,000	Systems Monitoring and Control
Insulation Systems	\$29,000	Insulating Steam Line to SCR Building
ID Fan Increase	\$50,000	Engineering Estimate; Installation with Dampers
Piping Systems	\$216,000	Fire Protection Standpipe/Sprinklers, Steam, Service Air, Relocate Propane, Potable Water, Ammonia, Steam, Condensate Return
Total Direct Installation Costs (TDIC)	\$6,699,750	
Total Capital Costs (TCC)	\$13,718,066	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$1,097,445	8% of TCC
Construction and Field Expenses	Included	Included in Supplier Quote for SCR System
Vendor Fees	\$685,903	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$274,361	2% of TCC; OAQPS Control Cost Manual, Chapter 3
Performance Tests	\$137,181	1% of TCC; OAQPS Control Cost Manual, Chapter 3
Contingencies	\$1,371,807	10% of TCC;
Total Indirect Capital Costs (TInCC)	\$3,566,697	
Total Direct, Indirect and Capital Costs (TDICC)	\$17,284,763	

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Steam Diverted from Header

Cost Component	Costs	Basis of Cost Component
Direct Annual Costs		
Operations and Maintenance Labor	\$56,160	24 hours/week at \$45/hour
Ammonia to control 260 ppm inlet NOx	\$53,700	\$300 per ton for Ammonia*
Catalyst Disposal Costs	\$15,000	Engineering Estimate
Catalyst Cost	\$90,000	1/3 Catalyst-3 year catalyst life
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$96,362	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$336,222	
Annual Energy Costs		
Annual Electrical Needs	\$2,847	6.5 kW X 8,760 hours per year at \$0.05 per kWh
Annual Additional ID Fan Power	\$116,946	267 kW X 8,760 hours per year at \$0.05 per kWh
Total Energy Costs (TEC)	\$119,793	
Indirect Annual Costs		
Management/Overhead	\$33,696	60% of Operations and Maintenance Labor
Insurance	\$137,181	1% of Total Capital Costs
Miscellaneous Painting	\$10,000	Supplier Neutral Estimate
Miscellaneous Equipment Rebuild	\$72,271	Supplier Neutral Estimate; 75% of Spare Parts Above
Lost Power from Reheat	\$321,930	Eng. Est. -- 735 kW X 8,760 hours/year at \$0.05 per kWh
Annualized Total Direct Capital	\$1,897,867	0.1098 Capital Recovery Factor of 7% over 15 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$2,472,945	
Total Annualized Costs	\$2,928,959	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SCR System		
	\$9,731	Cost Per Ton NOx Removed 301 Tons NOx Removed (260 ppm inlet; 100 ppm outlet; 62% Removal)

Note: 'Included' denotes item is assumed to be included in supplier budgetary estimate for SCR Associated Equipment and Installation. [See letter from Dennis Malone (Babcock Borsig Power) to Michael Hober (RTP Environmental) dated October 19, 2001, October 29, 2001, and December 4, 2001]

The above cost does not include revenue lost due to additional or unscheduled system shutdown. Based on a cost of \$56 per ton of waste at 600 tons of waste per day and over an annual shutdown of 10 days, this cost is estimated to be approximately \$336,000 due to lost tipping fees. In addition to this, the amount of revenue lost due to not producing steam during these 10 days is estimated to be approximately \$177,000; bringing the Total Annualized costs and cost effectiveness (respectively) to:

Total Annualized Costs	\$3,376,157	Cost per ton NOx removed	\$11,216
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This cost does not include costs for the electrical needs of the system (1008.5kW over 240 hours at \$0.05/kWh) and ammonia usage because system will not operate.

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Steam Diverted from Header

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SCR Associated Equipment	\$6,424,110	Supplier Est. w/ 1% for Steam System, Adjusted for Temp
Ammonia Storage Tanks	Included	Ammonia Storage
Flue Gas Ductwork	\$100,000	Engineering Estimate
Instrumentation	Included	In-situ NOx Analyzer
Freight	\$321,206	5% of Associated Equip.; OAQPS Control Cost Manual
System Integration	\$100,000	Engineering Estimate
Firewater Booster Pump	\$23,000	Supplier Neutral Estimate
Increase ID Fan Size	\$50,000	Supplier Neutral Estimate; Increased size due to pressure drop across SCR System
Total Direct Capital Costs (TDCC)	\$7,018,316	
<u>Direct Installation Costs</u>		
Installation	\$5,686,750	Supplier Est. w/ 1% for Steam System, Adjusted for Temp
Foundation and Supports	Included	Included in Supplier Quote for Installation of SCR System
Handling and Erection	Included	Included in Supplier Quote for Installation of SCR System
Electrical	Included	Included in Supplier Quote for Installation of SCR System
Piping	Included	Included in Supplier Quote for Installation of SCR System
Insulation for Ductwork	Included	Included in Supplier Quote for Installation of SCR System
Painting	\$30,000	SCR Structural Steel, Piping and Exposed Metals
Site Preparation	\$29,000	Existing Roads, Demolition & Restoration, SCR Footprint
Buildings (Process CEM)	\$25,000	Engineering Estimate
Concrete	\$40,000	Aqueous Ammonia Spill Containment
Miscellaneous Steel	Included	Platforms, Ladders, etc.
SCR Building Enclosure/Struct. Steel	\$530,000	Supplier Neutral Estimate; Windload Req. for Hurricanes
Electrical Systems	\$56,000	Grounding, Lightning Protection, Lighting, etc.
Instrumentation Systems	\$8,000	Systems Monitoring and Control
Insulation Systems	\$29,000	Insulating Steam Line to SCR Building
ID Fan Increase	\$50,000	Engineering Estimate; Installation with Dampers
Piping Systems	\$216,000	Fire Protection Standpipe/Sprinklers, Steam, Service Air, Relocate Propane, Potable Water, Ammonia, Steam, Condensate Return
Total Direct Installation Costs (TDIC)	\$6,699,750	
Total Capital Costs (TCC)	\$13,718,066	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$1,097,445	8% of TCC
Construction and Field Expenses	Included	Included in Supplier Quote for SCR System
Vendor Fees	\$685,903	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$274,361	2% of TCC; OAQPS Control Cost Manual, Chapter 3
Performance Tests	\$137,181	1% of TCC; OAQPS Control Cost Manual, Chapter 3
Contingencies	\$1,371,807	10% of TCC;
Total Indirect Capital Costs (TinCC)	\$3,566,697	
Total Direct, Indirect and Capital Costs (TDICC)	\$17,284,763	

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Steam Diverted from Header

Cost Component	Costs	Basis of Cost Component
Direct Annual Costs		
Operations and Maintenance Labor	\$56,160	24 hours/week at \$45/hour
Ammonia to control 260 ppm inlet NOx	\$53,700	\$300 per ton for Ammonia*
Catalyst Disposal Costs	\$15,000	Engineering Estimate
Catalyst Cost	\$90,000	1/3 Catalyst-3 year catalyst life
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$96,362	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$336,222	
Annual Energy Costs		
Annual Electrical Needs	\$2,847	6.5 kW X 8,760 hours per year at \$0.05 per kWh
Annual Additional ID Fan Power	\$116,946	267 kW X 8,760 hours per year at \$0.05 per kWh
Total Energy Costs (TEC)	\$119,793	
Indirect Annual Costs		
Management/Overhead	\$33,696	60% of Operations and Maintenance Labor
Insurance	\$137,181	1% of Total Capital Costs
Miscellaneous Painting	\$10,000	Supplier Neutral Estimate
Miscellaneous Equipment Rebuild	\$72,271	Supplier Neutral Estimate; 75% of Spare Parts Above
Lost Power from Reheat	\$321,930	Eng. Est. -- 735 kW X 8,760 hours/year at \$0.05 per kWh
Annualized Total Direct Capital	\$1,631,682	0.0944 Capital Recovery Factor of 7% over 20 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$2,206,759	
Total Annualized Costs	\$2,662,774	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SCR System		
	\$8,846	Cost Per Ton NOx Removed 301 Tons NOx Removed (260 ppm inlet; 100 ppm outlet; 62% Removal)

Note: 'Included' denotes item is assumed to be included in supplier budgetary estimate for SCR Associated Equipment and Installation. [See letter from Dennis Malone (Babcock Borsig Power) to Michael Hober (RTP Environmental) dated October 19, 2001, October 29, 2001, and December 4, 2001]

The above cost does not include revenue lost due to additional or unscheduled system shutdown. Based on a cost of \$56 per ton of waste at 600 tons of waste per day and over an annual shutdown of 10 days, this cost is estimated to be approximately \$336,000 due to lost tipping fees. In addition to this, the amount of revenue lost due to not producing steam during these 10 days is estimated to be approximately \$177,000; bringing the Total Annualized costs and cost effectiveness (respectively) to:

Total Annualized Costs \$3,109,972 Cost per ton NOx removed \$10,332
This cost does not include costs for the electrical needs of the system (1008.5kW over 240 hours at \$0.05/kWh) and ammonia usage because system will not operate.

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SCR Associated Equipment	\$6,300,000	Supplier Estimate
Ammonia Storage Tanks	Included	Ammonia Storage
Flue Gas Ductwork	\$100,000	Engineering Estimate
Instrumentation	Included	In-situ NOx Analyzer
Freight	\$315,000	5% of Associated Equip.; OAQPS Control Cost Manual
System Integration	\$100,000	Engineering Estimate
Firewater Booster Pump	\$23,000	Supplier Neutral Estimate
Increase ID Fan Size	\$60,000	Supplier Neutral Estimate; Increased size due to pressure drop across SCR System
Total Direct Capital Costs (TDCC)	\$6,898,000	
<u>Direct Installation Costs</u>		
Installation	\$5,675,000	Supplier Estimate
Foundation and Supports	Included	Included in Supplier Quote for Installation of SCR System
Handling and Erection	Included	Included in Supplier Quote for Installation of SCR System
Electrical	Included	Included in Supplier Quote for Installation of SCR System
Piping	Included	Included in Supplier Quote for Installation of SCR System
Insulation for Ductwork	Included	Included in Supplier Quote for Installation of SCR System
Painting	\$30,000	SCR Structural Steel, Piping and Exposed Metals
Site Preparation	\$29,000	Existing Roads, Demolition & Restoration, SCR Footprint
Buildings (Process CEM)	\$25,000	Engineering Estimate
Concrete	\$40,000	Aqueous Ammonia Spill Containment
Miscellaneous Steel	Included	Platforms, Ladders, etc.
SCR Building Enclosure/Struct. Steel	\$530,000	Supplier Neutral Estimate; Windload Req. for Hurricanes
Electrical Systems	\$56,000	Grounding, Lightning Protection, Lighting, etc.
Instrumentation Systems	\$8,000	Systems Monitoring and Control
ID Fan Increase	\$60,000	Engineering Estimate; Installation with Dampers
Piping Systems	\$166,000	Fire Protection Standpipe/Sprinklers, Service Air, Potable Water, Ammonia, Gas Piping
Total Direct Installation Costs (TDIC)	\$6,619,000	
Total Capital Costs (TCC)	\$13,517,000	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$1,081,360	8% of TCC
Construction and Field Expenses	Included	Included in Supplier Quote for SCR System
Vendor Fees	\$675,850	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$270,340	2% of TCC; OAQPS Control Cost Manual, Chapter 3
Performance Tests	\$135,170	1% of TCC; OAQPS Control Cost Manual, Chapter 3
Contingencies	\$1,351,700	10% of TCC;
Total Indirect Capital Costs (TInCC)	\$3,514,420	
Total Direct, Indirect and Capital Costs (TDICC)	\$17,031,420	

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Annual Costs</u>		
Operations and Maintenance Labor	\$56,160	24 hours/week at \$45/hour
Ammonia to control 260 ppm inlet NOx	\$53,700	\$300 per ton for Ammonia*
Catalyst Disposal Costs	\$15,000	Engineering Estimate
Catalyst Cost	\$90,000	1/3 Catalyst-3 year catalyst life
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$94,500	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$334,360	
<u>Annual Energy Costs</u>		
Annual Electrical Energy Usage	\$2,847	6.5 kW X 8,760 hours per year at \$0.05 per kWh
Annual Additional ID Fan Power	\$130,962	299 kW X 8,760 hours per year at \$0.05 per kWh
Annual Natural Gas Usage	\$1,280,080	256,016 Mcf at \$5.00 per 1000 cf of Natural Gas Based on Supplier Est.; Adjusted for Temp
Total Energy Costs (TEC)	\$1,413,889	
<u>Indirect Annual Costs</u>		
Management/Overhead	\$33,696	60% of Operations and Maintenance Labor
Insurance	\$135,170	1% of Total Capital Costs
Miscellaneous Painting	\$10,000	Supplier Neutral Estimate
Miscellaneous Equipment Rebuild	\$70,875	Supplier Neutral Estimate; 75% of Spare Parts Above
Annualized Total Direct Capital	\$2,771,012	0.1627 Capital Recovery Factor of 10% over 10 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$3,020,753	
Total Annualized Costs	\$4,769,002	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SCR System		Cost Per Ton NOx Removed
	\$15,844	301 Tons NOx Removed (260 ppm inlet; 100 ppm outlet; 62% Removal)

Note: 'Included' denotes item is assumed to be included in supplier budgetary estimate for SCR Associated Equipment and Installation. [See letter from Dennis Malone (Babcock Borsig Power) to Michael Hober (RTP Environmental) dated October 19, 2001, October 29, 2001, and December 4, 2001].

The above cost does not include revenue lost due to additional or unscheduled system shutdown. Based on a cost of \$56 per ton of waste at 600 tons of waste per day and over an annual shutdown of 10 days, this cost is estimated to be approximately \$336,000 due to lost tipping fees. In addition to this, the amount of revenue lost due to not producing steam during these 10 days is estimated to be approximately \$177,000; bringing the Total Annualized costs and cost effectiveness (respectively) to:

Total Annualized Costs	\$5,224,636	Cost per ton NOx removed	\$17,358
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This cost does not include costs for the electrical needs of the system (305.5kW over 240 hours at \$0.05/kWh) and ammonia usage because system will not operate.

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SCR Associated Equipment	\$6,300,000	Supplier Estimate
Ammonia Storage Tanks	Included	Ammonia Storage
Flue Gas Ductwork	\$100,000	Engineering Estimate
Instrumentation	Included	In-situ NOx Analyzer
Freight	\$315,000	5% of Associated Equip.; OAQPS Control Cost Manual
System Integration	\$100,000	Engineering Estimate
Firewater Booster Pump	\$23,000	Supplier Neutral Estimate
Increase ID Fan Size	\$60,000	Supplier Neutral Estimate; Increased size due to pressure drop across SCR System
Total Direct Capital Costs (TDCC)	\$6,898,000	
<u>Direct Installation Costs</u>		
Installation	\$5,675,000	Supplier Estimate
Foundation and Supports	Included	Included in Supplier Quote for Installation of SCR System
Handling and Erection	Included	Included in Supplier Quote for Installation of SCR System
Electrical	Included	Included in Supplier Quote for Installation of SCR System
Piping	Included	Included in Supplier Quote for Installation of SCR System
Insulation for Ductwork	Included	Included in Supplier Quote for Installation of SCR System
Painting	\$30,000	SCR Structural Steel, Piping and Exposed Metals
Site Preparation	\$29,000	Existing Roads, Demolition & Restoration, SCR Footprint
Buildings (Process CEM)	\$25,000	Engineering Estimate
Concrete	\$40,000	Aqueous Ammonia Spill Containment
Miscellaneous Steel	Included	Platforms, Ladders, etc.
SCR Building Enclosure/Struct. Steel	\$530,000	Supplier Neutral Estimate; Windload Req. for Hurricanes
Electrical Systems	\$56,000	Grounding, Lightning Protection, Lighting, etc.
Instrumentation Systems	\$8,000	Systems Monitoring and Control
ID Fan Increase	\$60,000	Engineering Estimate; Installation with Dampers
Piping Systems	\$166,000	Fire Protection Standpipe/Sprinklers, Service Air, Potable Water, Ammonia, Gas Piping
Total Direct Installation Costs (TDIC)	\$6,619,000	
Total Capital Costs (TCC)	\$13,517,000	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$1,081,360	8% of TCC
Construction and Field Expenses	Included	Included in Supplier Quote for SCR System
Vendor Fees	\$675,850	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$270,340	2% of TCC; OAQPS Control Cost Manual, Chapter 3
Performance Tests	\$135,170	1% of TCC; OAQPS Control Cost Manual, Chapter 3
Contingencies	\$1,351,700	10% of TCC;
Total Indirect Capital Costs (TInCC)	\$3,514,420	
Total Direct, Indirect and Capital Costs (TDICC)	\$17,031,420	

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
Direct Annual Costs		
Operations and Maintenance Labor	\$56,160	24 hours/week at \$45/hour
Ammonia to control 260 ppm inlet NOx	\$53,700	\$300 per ton for Ammonia*
Catalyst Disposal Costs	\$15,000	Engineering Estimate
Catalyst Cost	\$90,000	1/3 Catalyst-3 year catalyst life
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$94,500	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$334,360	
Annual Energy Costs		
Annual Electrical Energy Usage	\$2,847	6.5 kW X 8,760 hours per year at \$0.05 per kWh
Annual Additional ID Fan Power	\$130,962	299 kW X 8,760 hours per year at \$0.05 per kWh
Annual Natural Gas Usage	\$1,280,080	256,016 Mcf at \$5.00 per 1000 cf of Natural Gas Based on Supplier Est.; Adjusted for Temp
Total Energy Costs (TEC)	\$1,413,889	
Indirect Annual Costs		
Management/Overhead	\$33,696	60% of Operations and Maintenance Labor
Insurance	\$135,170	1% of Total Capital Costs
Miscellaneous Painting	\$10,000	Supplier Neutral Estimate
Miscellaneous Equipment Rebuild	\$70,875	Supplier Neutral Estimate; 75% of Spare Parts Above
Annualized Total Direct Capital	\$2,239,632	0.1315 Capital Recovery Factor of 10% over 15 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$2,489,373	
Total Annualized Costs	\$4,237,622	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SCR System		
	\$14,078	Cost Per Ton NOx Removed 301 Tons NOx Removed (260 ppm inlet; 100 ppm outlet; 62% Removal)

Note: 'Included' denotes item is assumed to be included in supplier budgetary estimate for SCR Associated Equipment and Installation. [See letter from Dennis Malone (Babcock Borsig Power) to Michael Hober (RTP Environmental) dated October 19, 2001, October 29, 2001, and December 4, 2001]

The above cost does not include revenue lost due to additional or unscheduled system shutdown. Based on a cost of \$56 per ton of waste at 600 tons of waste per day and over an annual shutdown of 10 days, this cost is estimated to be approximately \$336,000 due to lost tipping fees. In addition to this, the amount of revenue lost due to not producing steam during these 10 days is estimated to be approximately \$177,000; bringing the Total Annualized costs and cost effectiveness (respectively) to:

Total Annualized Costs \$4,693,256 Cost per ton NOx removed \$15,592

This cost does not include costs for the electrical needs of the system (305.5kW over 240 hours at \$0.05/kWh) and ammonia usage because system will not operate.

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SCR Associated Equipment	\$6,300,000	Supplier Estimate
Ammonia Storage Tanks	Included	Ammonia Storage
Flue Gas Ductwork	\$100,000	Engineering Estimate
Instrumentation	Included	In-situ NOx Analyzer
Freight	\$315,000	5% of Associated Equip.; OAQPS Control Cost Manual
System Integration	\$100,000	Engineering Estimate
Firewater Booster Pump	\$23,000	Supplier Neutral Estimate
Increase ID Fan Size	\$60,000	Supplier Neutral Estimate; Increased size due to pressure drop across SCR System
Total Direct Capital Costs (TDCC)	\$6,898,000	
<u>Direct Installation Costs</u>		
Installation	\$5,675,000	Supplier Estimate
Foundation and Supports	Included	Included in Supplier Quote for Installation of SCR System
Handling and Erection	Included	Included in Supplier Quote for Installation of SCR System
Electrical	Included	Included in Supplier Quote for Installation of SCR System
Piping	Included	Included in Supplier Quote for Installation of SCR System
Insulation for Ductwork	Included	Included in Supplier Quote for Installation of SCR System
Painting	\$30,000	SCR Structural Steel, Piping and Exposed Metals
Site Preparation	\$29,000	Existing Roads, Demolition & Restoration, SCR Footprint
Buildings (Process CEM)	\$25,000	Engineering Estimate
Concrete	\$40,000	Aqueous Ammonia Spill Containment
Miscellaneous Steel	Included	Platforms, Ladders, etc.
SCR Building Enclosure/Struct. Steel	\$530,000	Supplier Neutral Estimate; Windload Req. for Hurricanes
Electrical Systems	\$56,000	Grounding, Lightning Protection, Lighting, etc.
Instrumentation Systems	\$8,000	Systems Monitoring and Control
ID Fan Increase	\$60,000	Engineering Estimate; Installation with Dampers
Piping Systems	\$166,000	Fire Protection Standpipe/Sprinklers, Service Air, Potable Water, Ammonia, Gas Piping
Total Direct Installation Costs (TDIC)	\$6,619,000	
Total Capital Costs (TCC)	\$13,517,000	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$1,081,360	8% of TCC
Construction and Field Expenses	Included	Included in Supplier Quote for SCR System
Vendor Fees	\$675,850	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$270,340	2% of TCC; OAQPS Control Cost Manual, Chapter 3
Performance Tests	\$135,170	1% of TCC; OAQPS Control Cost Manual, Chapter 3
Contingencies	\$1,351,700	10% of TCC;
Total Indirect Capital Costs (TInCC)	\$3,514,420	
Total Direct, Indirect and Capital Costs (TDICC)	\$17,031,420	

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Annual Costs</u>		
Operations and Maintenance Labor	\$56,160	24 hours/week at \$45/hour
Ammonia to control 260 ppm inlet NOx	\$53,700	\$300 per ton for Ammonia*
Catalyst Disposal Costs	\$15,000	Engineering Estimate
Catalyst Cost	\$90,000	1/3 Catalyst-3 year catalyst life
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$94,500	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$334,360	
<u>Annual Energy Costs</u>		
Annual Electrical Energy Usage	\$2,847	6.5 kW X 8,760 hours per year at \$0.05 per kWh
Annual Additional ID Fan Power	\$130,962	299 kW X 8,760 hours per year at \$0.05 per kWh
Annual Natural Gas Usage	\$1,280,080	256,016 Mcf at \$5.00 per 1000 cf of Natural Gas Based on Supplier Est.; Adjusted for Temp
Total Energy Costs (TEC)	\$1,413,889	
<u>Indirect Annual Costs</u>		
Management/Overhead	\$33,696	60% of Operations and Maintenance Labor
Insurance	\$135,170	1% of Total Capital Costs
Miscellaneous Painting	\$10,000	Supplier Neutral Estimate
Miscellaneous Equipment Rebuild	\$70,875	Supplier Neutral Estimate; 75% of Spare Parts Above
Annualized Total Direct Capital	\$2,425,274	0.1424 Capital Recovery Factor of 7% over 10 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$2,675,015	
Total Annualized Costs	\$4,423,264	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SCR System		Cost Per Ton NOx Removed
	\$14,695	301 Tons NOx Removed (260 ppm inlet; 100 ppm outlet; 62% Removal)

Note: 'Included' denotes item is assumed to be included in supplier budgetary estimate for SCR Associated Equipment and Installation. [See letter from Dennis Malone (Babcock Borsig Power) to Michael Hober (RTP Environmental) dated October 19, 2001, October 29, 2001, and December 4, 2001]

The above cost does not include revenue lost due to additional or unscheduled system shutdown. Based on a cost of \$56 per ton of waste at 600 tons of waste per day and over an annual shutdown of 10 days, this cost is estimated to be approximately \$336,000 due to lost tipping fees. In addition to this, the amount of revenue lost due to not producing steam during these 10 days is estimated to be approximately \$177,000; bringing the Total Annualized costs and cost effectiveness (respectively) to:

Total Annualized Costs	\$4,878,898	Cost per ton NOx removed	\$16,209
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This cost does not include costs for the electrical needs of the system (305.5kW over 240 hours at \$0.05/kWh) and ammonia usage because system will not operate.

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SCR Associated Equipment	\$6,300,000	Supplier Estimate
Ammonia Storage Tanks	Included	Ammonia Storage
Flue Gas Ductwork	\$100,000	Engineering Estimate
Instrumentation	Included	In-situ NOx Analyzer
Freight	\$315,000	5% of Associated Equip.; OAQPS Control Cost Manual
System Integration	\$100,000	Engineering Estimate
Firewater Booster Pump	\$23,000	Supplier Neutral Estimate
Increase ID Fan Size	\$60,000	Supplier Neutral Estimate; Increased size due to pressure drop across SCR System
Total Direct Capital Costs (TDCC)	\$6,898,000	
<u>Direct Installation Costs</u>		
Installation	\$5,675,000	Supplier Estimate
Foundation and Supports	Included	Included in Supplier Quote for Installation of SCR System
Handling and Erection	Included	Included in Supplier Quote for Installation of SCR System
Electrical	Included	Included in Supplier Quote for Installation of SCR System
Piping	Included	Included in Supplier Quote for Installation of SCR System
Insulation for Ductwork	Included	Included in Supplier Quote for Installation of SCR System
Painting	\$30,000	SCR Structural Steel, Piping and Exposed Metals
Site Preparation	\$29,000	Existing Roads, Demolition & Restoration, SCR Footprint
Buildings (Process CEM)	\$25,000	Engineering Estimate
Concrete	\$40,000	Aqueous Ammonia Spill Containment
Miscellaneous Steel	Included	Platforms, Ladders, etc.
SCR Building Enclosure/Struct. Steel	\$530,000	Supplier Neutral Estimate; Windload Req. for Hurricanes
Electrical Systems	\$56,000	Grounding, Lightning Protection, Lighting, etc.
Instrumentation Systems	\$8,000	Systems Monitoring and Control
ID Fan Increase	\$60,000	Engineering Estimate; Installation with Dampers
Piping Systems	\$166,000	Fire Protection Standpipe/Sprinklers, Service Air, Potable Water, Ammonia, Gas Piping
Total Direct Installation Costs (TDIC)	\$6,619,000	
Total Capital Costs (TCC)	\$13,517,000	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$1,081,360	8% of TCC
Construction and Field Expenses	Included	Included in Supplier Quote for SCR System
Vendor Fees	\$675,850	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$270,340	2% of TCC; OAQPS Control Cost Manual, Chapter 3
Performance Tests	\$135,170	1% of TCC; OAQPS Control Cost Manual, Chapter 3
Contingencies	\$1,351,700	10% of TCC;
Total Indirect Capital Costs (TInCC)	\$3,514,420	
Total Direct, Indirect and Capital Costs (TDICC)	\$17,031,420	

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Annual Costs</u>		
Operations and Maintenance Labor	\$56,160	24 hours/week at \$45/hour
Ammonia to control 260 ppm inlet NOx	\$53,700	\$300 per ton for Ammonia*
Catalyst Disposal Costs	\$15,000	Engineering Estimate
Catalyst Cost	\$90,000	1/3 Catalyst-3 year catalyst life
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$94,500	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$334,360	
<u>Annual Energy Costs</u>		
Annual Electrical Energy Usage	\$2,847	6.5 kW X 8,760 hours per year at \$0.05 per kWh
Annual Additional ID Fan Power	\$130,962	299 kW X 8,760 hours per year at \$0.05 per kWh
Annual Natural Gas Usage	\$1,280,080	256,016 Mcf at \$5.00 per 1000 cf of Natural Gas Based on Supplier Est.; Adjusted for Temp
Total Energy Costs (TEC)	\$1,413,889	
<u>Indirect Annual Costs</u>		
Management/Overhead	\$33,696	60% of Operations and Maintenance Labor
Insurance	\$135,170	1% of Total Capital Costs
Miscellaneous Painting	\$10,000	Supplier Neutral Estimate
Miscellaneous Equipment Rebuild	\$70,875	Supplier Neutral Estimate; 75% of Spare Parts Above
Annualized Total Direct Capital	\$1,870,050	0.1098 Capital Recovery Factor of 7% over 15 years multiplied by sum of TDACC
Total Indirect Annual Costs (TIAC)	\$2,119,791	
Total Annualized Costs	\$3,868,040	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SCR System		Cost Per Ton NOx Removed
	\$12,851	301 Tons NOx Removed (260 ppm inlet; 100 ppm outlet; 62% Removal)

Note: 'Included' denotes item is assumed to be included in supplier budgetary estimate for SCR Associated Equipment and Installation. [See letter from Dennis Malone (Babcock Borsig Power) to Michael Hober (RTP Environmental) dated October 19, 2001, October 29, 2001, and December 4, 2001]

The above cost does not include revenue lost due to additional or unscheduled system shutdown. Based on a cost of \$56 per ton of waste at 600 tons of waste per day and over an annual shutdown of 10 days, this cost is estimated to be approximately \$336,000 due to lost tipping fees. In addition to this, the amount of revenue lost due to not producing steam during these 10 days is estimated to be approximately \$177,000; bringing the Total Annualized costs and cost effectiveness (respectively) to:

Total Annualized Costs	\$4,323,674	Cost per ton NOx removed	\$14,364
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This cost does not include costs for the electrical needs of the system (305.5kW over 240 hours at \$0.05/kWh) and ammonia usage because system will not operate.

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SCR Associated Equipment	\$6,300,000	Supplier Estimate
Ammonia Storage Tanks	Included	Ammonia Storage
Flue Gas Ductwork	\$100,000	Engineering Estimate
Instrumentation	Included	In-situ NOx Analyzer
Freight	\$315,000	5% of Associated Equip.; OAQPS Control Cost Manual
System Integration	\$100,000	Engineering Estimate
Firewater Booster Pump	\$23,000	Supplier Neutral Estimate
Increase ID Fan Size	\$60,000	Supplier Neutral Estimate; Increased size due to pressure drop across SCR System
Total Direct Capital Costs (TDCC)	\$6,898,000	
<u>Direct Installation Costs</u>		
Installation	\$5,675,000	Supplier Estimate
Foundation and Supports	Included	Included in Supplier Quote for Installation of SCR System
Handling and Erection	Included	Included in Supplier Quote for Installation of SCR System
Electrical	Included	Included in Supplier Quote for Installation of SCR System
Piping	Included	Included in Supplier Quote for Installation of SCR System
Insulation for Ductwork	Included	Included in Supplier Quote for Installation of SCR System
Painting	\$30,000	SCR Structural Steel, Piping and Exposed Metals
Site Preparation	\$29,000	Existing Roads, Demolition & Restoration, SCR Footprint
Buildings (Process CEM)	\$25,000	Engineering Estimate
Concrete	\$40,000	Aqueous Ammonia Spill Containment
Miscellaneous Steel	Included	Platforms, Ladders, etc.
SCR Building Enclosure/Struct. Steel	\$530,000	Supplier Neutral Estimate; Windload Req. for Hurricanes
Electrical Systems	\$56,000	Grounding, Lightning Protection, Lighting, etc.
Instrumentation Systems	\$8,000	Systems Monitoring and Control
ID Fan Increase	\$60,000	Engineering Estimate; Installation with Dampers
Piping Systems	\$166,000	Fire Protection Standpipe/Sprinklers, Service Air, Potable Water, Ammonia, Gas Piping
Total Direct Installation Costs (TDIC)	\$6,619,000	
Total Capital Costs (TCC)	\$13,517,000	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$1,081,360	8% of TCC
Construction and Field Expenses	Included	Included in Supplier Quote for SCR System
Vendor Fees	\$675,850	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$270,340	2% of TCC; OAQPS Control Cost Manual, Chapter 3
Performance Tests	\$135,170	1% of TCC; OAQPS Control Cost Manual, Chapter 3
Contingencies	\$1,351,700	10% of TCC;
Total Indirect Capital Costs (TinCC)	\$3,514,420	
Total Direct, Indirect and Capital Costs (TDICC)	\$17,031,420	

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Annual Costs</u>		
Operations and Maintenance Labor	\$56,160	24 hours/week at \$45/hour
Ammonia to control 260 ppm inlet NOx	\$53,700	\$300 per ton for Ammonia*
Catalyst Disposal Costs	\$15,000	Engineering Estimate
Catalyst Cost	\$90,000	1/3 Catalyst-3 year catalyst life
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$94,500	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$334,360	
<u>Annual Energy Costs</u>		
Annual Electrical Energy Usage	\$2,847	6.5 kW X 8,760 hours per year at \$0.05 per kWh
Annual Additional ID Fan Power	\$130,962	299 kW X 8,760 hours per year at \$0.05 per kWh
Annual Natural Gas Usage	\$1,280,080	256,016 Mcf at \$5.00 per 1000 cf of Natural Gas Based on Supplier Est.; Adjusted for Temp
Total Energy Costs (TEC)	\$1,413,889	
<u>Indirect Annual Costs</u>		
Management/Overhead	\$33,696	60% of Operations and Maintenance Labor
Insurance	\$135,170	1% of Total Capital Costs
Miscellaneous Painting	\$10,000	Supplier Neutral Estimate
Miscellaneous Equipment Rebuild	\$70,875	Supplier Neutral Estimate; 75% of Spare Parts Above
Annualized Total Direct Capital	\$1,607,766	0.0944 Capital Recovery Factor of 7% over 20 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$1,857,507	
Total Annualized Costs	\$3,605,756	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SCR System		Cost Per Ton NOx Removed
	\$11,979	301 Tons NOx Removed (260 ppm inlet; 100 ppm outlet; 62% Removal)

Note: 'Included' denotes item is assumed to be included in supplier budgetary estimate for SCR Associated Equipment and Installation. [See letter from Dennis Malone (Babcock Borsig Power) to Michael Hober (RTP Environmental) dated October 19, 2001, October 29, 2001, and December 4, 2001]

The above cost does not include revenue lost due to additional or unscheduled system shutdown. Based on a cost of \$56 per ton of waste at 600 tons of waste per day and over an annual shutdown of 10 days, this cost is estimated to be approximately \$336,000 due to lost tipping fees. In addition to this, the amount of revenue lost due to not producing steam during these 10 days is estimated to be approximately \$177,000; bringing the Total Annualized costs and cost effectiveness (respectively) to:

Total Annualized Costs	\$4,061,390	Cost per ton NOx removed	\$13,493
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This cost does not include costs for the electrical needs of the system (305.5kW over 240 hours at \$0.05/kWh) and ammonia usage because system will not operate.

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SCR Associated Equipment	\$8,800,000	Supplier Estimate
Ammonia Storage Tanks	Included	Ammonia Storage
Import Duty	\$110,000	5% of Estimated 25% Import Value
Flue Gas Ductwork	\$100,000	Engineering Estimate
Instrumentation	Included	In-situ NOx Analyzer
Freight	Included	Included in Supplier Quote for Capital Equipment
System Integration	\$100,000	Engineering Estimate
Firewater Booster Pump	\$23,000	Supplier Neutral Estimate
Increase ID Fan Size	\$60,000	Supplier Neutral Estimate; Increased size due to pressure drop across SCR System
Total Direct Capital Costs (TDCC)	\$9,193,000	
<u>Direct Installation Costs</u>		
Installation	Included	Included in Supplier Quote for Installation of SCR System
Foundation and Supports	Included	Included in Supplier Quote for Installation of SCR System
Handling and Erection	Included	Included in Supplier Quote for Installation of SCR System
Electrical	Included	Included in Supplier Quote for Installation of SCR System
Piping	Included	Included in Supplier Quote for Installation of SCR System
Insulation for Ductwork	Included	Included in Supplier Quote for Installation of SCR System
Painting	Included	Included in Supplier Quote for Installation of SCR System
Site Preparation	\$29,000	Existing Roads, Demolition & Restoration, SCR Footprint
Buildings (Process CEM)	\$25,000	Engineering Estimate
Concrete	\$40,000	Aqueous Ammonia Spill Containment
Miscellaneous Steel	\$11,000	Platforms, Ladders, etc.
SCR Building Enclosure/Struct. Steel	\$530,000	Supplier Neutral Estimate; Windload Req. for Hurricanes
Electrical Systems	\$56,000	Grounding, Lightning Protection, Lighting, etc.
Instrumentation Systems	\$8,000	Systems Monitoring and Control
ID Fan Increase	\$60,000	Engineering Estimate; Installation with Dampers
Piping Systems	\$166,000	Fire Protection Standpipe/Sprinklers, Service Air, Potable Water, Ammonia, Gas Piping
Total Direct Installation Costs (TDIC)	\$925,000	
Total Capital Costs (TCC)	\$10,118,000	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$809,440	8% of TCC
Construction and Field Expenses	Included	Included in Supplier Quote for SCR System
Vendor Fees	\$505,900	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$202,360	2% of TCC; OAQPS Control Cost Manual, Chapter 3
Performance Tests	\$101,180	1% of TCC; OAQPS Control Cost Manual, Chapter 3
Contingencies	\$1,011,800	10% of TCC;
Total Indirect Capital Costs (TInCC)	\$2,630,680	
Total Direct, Indirect and Capital Costs (TDICC)	\$12,748,680	

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Annual Costs</u>		
Operations and Maintenance Labor	\$56,160	24 hours/week at \$45/hour
Ammonia to control 260 ppm inlet NOx	\$53,700	\$300 per ton for Ammonia*
Catalyst Disposal Costs	\$15,000	Engineering Estimate
Catalyst Cost	\$350,000	1/2 Catalyst-2 year catalyst life
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$132,000	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$631,860	
<u>Annual Energy Costs</u>		
Annual Electrical Energy Usage (Including 250 kW for ID Fan)	\$140,160	320 kW X 8,760 hours per year at \$0.05 per kWh
Annual Natural Gas Usage	\$305,408	Based on Supplier Estimate (Based on 8,760 hr/yr)
Total Energy Costs (TEC)	\$445,568	
<u>Indirect Annual Costs</u>		
Management/Overhead	\$33,696	60% of Operations and Maintenance Labor
Insurance	\$101,180	1% of Total Capital Costs
Miscellaneous Painting	\$10,000	Supplier Neutral Estimate
Miscellaneous Equipment Rebuild	\$99,000	Supplier Neutral Estimate; 75% of Spare Parts Above
Annualized Total Direct Capital	\$2,074,210	0.1627 Capital Recovery Factor of 10% over 10 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$2,318,086	
Total Annualized Costs	\$3,395,514	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SCR System		Cost Per Ton NOx Removed
	\$11,281	301 Tons NOx Removed (260 ppm inlet; 100 ppm outlet; 62% Removal)

Note: 'Included' denotes item is assumed to be included in supplier budgetary estimate for SCR Associated Equipment and Installation. [See email from Dirk Eraerts (SEGHER's Better Technology) to Scott Heath (RTP Environmental) dated December 21, 2001]

The above cost does not include revenue lost due to additional or unscheduled system shutdown. Based on a cost of \$56 per ton of waste at 600 tons of waste per day and over an annual shutdown of 10 days, this cost is estimated to be approximately \$336,000 due to lost tipping fees. In addition to this, the amount of revenue lost due to not producing steam during these 10 days is estimated to be approximately \$177,000; bringing the Total Annualized costs and cost effectiveness (respectively) to:

Total Annualized Costs	\$3,850,896	Cost per ton NOx removed	\$12,794
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This cost does not include costs for the electrical needs of the system (326.5kW over 240 hours at \$0.05/kWh) and ammonia usage because system will not operate.

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SCR Associated Equipment	\$8,800,000	Supplier Estimate
Ammonia Storage Tanks	Included	Ammonia Storage
Import Duty	\$110,000	5% of Estimated 25% Import Value
Flue Gas Ductwork	\$100,000	Engineering Estimate
Instrumentation	Included	In-situ NOx Analyzer
Freight	Included	Included in Supplier Quote for Capital Equipment
System Integration	\$100,000	Engineering Estimate
Firewater Booster Pump	\$23,000	Supplier Neutral Estimate
Increase ID Fan Size	\$60,000	Supplier Neutral Estimate; Increased size due to pressure drop across SCR System
Total Direct Capital Costs (TDCC)	\$9,193,000	
<u>Direct Installation Costs</u>		
Installation	Included	Included in Supplier Quote for Installation of SCR System
Foundation and Supports	Included	Included in Supplier Quote for Installation of SCR System
Handling and Erection	Included	Included in Supplier Quote for Installation of SCR System
Electrical	Included	Included in Supplier Quote for Installation of SCR System
Piping	Included	Included in Supplier Quote for Installation of SCR System
Insulation for Ductwork	Included	Included in Supplier Quote for Installation of SCR System
Painting	Included	Included in Supplier Quote for Installation of SCR System
Site Preparation	\$29,000	Existing Roads, Demolition & Restoration, SCR Footprint
Buildings (Process CEM)	\$25,000	Engineering Estimate
Concrete	\$40,000	Aqueous Ammonia Spill Containment
Miscellaneous Steel	\$11,000	Platforms, Ladders, etc.
SCR Building Enclosure/Struct. Steel	\$530,000	Supplier Neutral Estimate; Windload Req. for Hurricanes
Electrical Systems	\$56,000	Grounding, Lightning Protection, Lighting, etc.
Instrumentation Systems	\$8,000	Systems Monitoring and Control
ID Fan Increase	\$60,000	Engineering Estimate; Installation with Dampers
Piping Systems	\$166,000	Fire Protection Standpipe/Sprinklers, Service Air, Potable Water, Ammonia, Gas Piping
Total Direct Installation Costs (TDIC)	\$925,000	
Total Capital Costs (TCC)	\$10,118,000	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$809,440	8% of TCC
Construction and Field Expenses	Included	Included in Supplier Quote for SCR System
Vendor Fees	\$505,900	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$202,360	2% of TCC; OAQPS Control Cost Manual, Chapter 3
Performance Tests	\$101,180	1% of TCC; OAQPS Control Cost Manual, Chapter 3
Contingencies	\$1,011,800	10% of TCC;
Total Indirect Capital Costs (TInCC)	\$2,630,680	
Total Direct, Indirect and Capital Costs (TDICC)	\$12,748,680	

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Annual Costs</u>		
Operations and Maintenance Labor	\$56,160	24 hours/week at \$45/hour
Ammonia to control 260 ppm inlet NOx	\$53,700	\$300 per ton for Ammonia*
Catalyst Disposal Costs	\$15,000	Engineering Estimate
Catalyst Cost	\$350,000	1/2 Catalyst-2 year catalyst life
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$132,000	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$631,860	
<u>Annual Energy Costs</u>		
Annual Electrical Energy Usage (Including 250 kW for ID Fan)	\$140,160	320 kW X 8,760 hours per year at \$0.05 per kWh
Annual Natural Gas Usage	\$305,408	Based on Supplier Estimate (Based on 8,760 hr/yr)
Total Energy Costs (TEC)	\$445,568	
<u>Indirect Annual Costs</u>		
Management/Overhead	\$33,696	60% of Operations and Maintenance Labor
Insurance	\$101,180	1% of Total Capital Costs
Miscellaneous Painting	\$10,000	Supplier Neutral Estimate
Miscellaneous Equipment Rebuild	\$99,000	Supplier Neutral Estimate; 75% of Spare Parts Above
Annualized Total Direct Capital	\$1,676,451	0.1315 Capital Recovery Factor of 10% over 15 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$1,920,327	
Total Annualized Costs	\$2,997,755	Sum of TDAC, TEC and TIAC (for 260 ppm)
<u>Cost Effectiveness of SCR System</u>		
	\$9,959	Cost Per Ton NOx Removed 301 Tons NOx Removed (260 ppm inlet; 100 ppm outlet; 62% Removal)

Note: 'Included' denotes item is assumed to be included in supplier budgetary estimate for SCR Associated Equipment and Installation. [See email from Dirk Eeraerts (SEGHER's Better Technology) to Scott Heath (RTP Environmental) dated December 21, 2001]

The above cost does not include revenue lost due to additional or unscheduled system shutdown. Based on a cost of \$56 per ton of waste at 600 tons of waste per day and over an annual shutdown of 10 days, this cost is estimated to be approximately \$336,000 due to lost tipping fees. In addition to this, the amount of revenue lost due to not producing steam during these 10 days is estimated to be approximately \$177,000; bringing the Total Annualized costs and cost effectiveness (respectively) to:

Total Annualized Costs \$3,453,137. Cost per ton NOx removed \$11,472
This cost does not include costs for the electrical needs of the system (326.5kW over 240 hours at \$0.05/kWh) and ammonia usage because system will not operate.

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SCR Associated Equipment	\$8,800,000	Supplier Estimate
Ammonia Storage Tanks	Included	Ammonia Storage
Import Duty	\$110,000	5% of Estimated 25% Import Value
Flue Gas Ductwork	\$100,000	Engineering Estimate
Instrumentation	Included	In-situ NOx Analyzer
Freight	Included	Included in Supplier Quote for Capital Equipment
System Integration	\$100,000	Engineering Estimate
Firewater Booster Pump	\$23,000	Supplier Neutral Estimate
Increase ID Fan Size	\$60,000	Supplier Neutral Estimate; Increased size due to pressure drop across SCR System
Total Direct Capital Costs (TDCC)	\$9,193,000	
<u>Direct Installation Costs</u>		
Installation	Included	Included in Supplier Quote for Installation of SCR System
Foundation and Supports	Included	Included in Supplier Quote for Installation of SCR System
Handling and Erection	Included	Included in Supplier Quote for Installation of SCR System
Electrical	Included	Included in Supplier Quote for Installation of SCR System
Piping	Included	Included in Supplier Quote for Installation of SCR System
Insulation for Ductwork	Included	Included in Supplier Quote for Installation of SCR System
Painting	Included	Included in Supplier Quote for Installation of SCR System
Site Preparation	\$29,000	Existing Roads; Demolition & Restoration, SCR Footprint
Buildings (Process CEM)	\$25,000	Engineering Estimate
Concrete	\$40,000	Aqueous Ammonia Spill Containment
Miscellaneous Steel	\$11,000	Platforms, Ladders, etc.
SCR Building Enclosure/Struct. Steel	\$530,000	Supplier Neutral Estimate; Windload Req. for Hurricanes
Electrical Systems	\$56,000	Grounding, Lightning Protection, Lighting, etc.
Instrumentation Systems	\$8,000	Systems Monitoring and Control
ID Fan Increase	\$60,000	Engineering Estimate; Installation with Dampers
Piping Systems	\$166,000	Fire Protection Standpipe/Sprinklers, Service Air, Potable Water, Ammonia, Gas Piping
Total Direct Installation Costs (TDIC)	\$925,000	
Total Capital Costs (TCC)	\$10,118,000	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$809,440	8% of TCC
Construction and Field Expenses	Included	Included in Supplier Quote for SCR System
Vendor Fees	\$505,900	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$202,360	2% of TCC; OAQPS Control Cost Manual, Chapter 3
Performance Tests	\$101,180	1% of TCC; OAQPS Control Cost Manual, Chapter 3
Contingencies	\$1,011,800	10% of TCC;
Total Indirect Capital Costs (TInCC)	\$2,630,680	
Total Direct, Indirect and Capital Costs (TDICC)	\$12,748,680	

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Annual Costs</u>		
Operations and Maintenance Labor	\$56,160	24 hours/week at \$45/hour
Ammonia to control 260 ppm inlet NOx	\$53,700	\$300 per ton for Ammonia*
Catalyst Disposal Costs	\$15,000	Engineering Estimate
Catalyst Cost	\$350,000	1/2 Catalyst-2 year catalyst life
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$132,000	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$631,860	
<u>Annual Energy Costs</u>		
Annual Electrical Energy Usage (Including 250 kW for ID Fan)	\$140,160	320 kW X 8,760 hours per year at \$0.05 per kWh
Annual Natural Gas Usage	\$305,408	Based on Supplier Estimate (Based on 8,760 hr/yr)
Total Energy Costs (TEC)	\$445,568	
<u>Indirect Annual Costs</u>		
Management/Overhead	\$33,696	60% of Operations and Maintenance Labor
Insurance	\$101,180	1% of Total Capital Costs
Miscellaneous Painting	\$10,000	Supplier Neutral Estimate
Miscellaneous Equipment Rebuild	\$99,000	Supplier Neutral Estimate; 75% of Spare Parts Above
Annualized Total Direct Capital	\$1,815,412	0.1424 Capital Recovery Factor of 7% over 10 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$2,059,288	
Total Annualized Costs	\$3,136,716	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SCR System		
	\$10,421	Cost Per Ton NOx Removed 301 Tons NOx Removed (260 ppm inlet; 100 ppm outlet; 62% Removal)

Note: 'Included' denotes item is assumed to be included in supplier budgetary estimate for SCR Associated Equipment and Installation. [See email from Dirk Eeraerts (SEGHER's Better Technology) to Scott Heath (RTP Environmental) dated December 21, 2001]

The above cost does not include revenue lost due to additional or unscheduled system shutdown. Based on a cost of \$56 per ton of waste at 600 tons of waste per day and over an annual shutdown of 10 days, this cost is estimated to be approximately \$336,000 due to lost tipping fees. In addition to this, the amount of revenue lost due to not producing steam during these 10 days is estimated to be approximately \$177,000; bringing the Total Annualized costs and cost effectiveness (respectively) to:

Total Annualized Costs	\$3,592,098	Cost per ton NOx removed	\$11,934
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This cost does not include costs for the electrical needs of the system (326.5kW over 240 hours at \$0.05/kWh) and ammonia usage because system will not operate.

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SCR Associated Equipment	\$8,800,000	Supplier Estimate
Ammonia Storage Tanks	Included	Ammonia Storage
Import Duty	\$110,000	5% of Estimated 25% Import Value
Flue Gas Ductwork	\$100,000	Engineering Estimate
Instrumentation	Included	In-situ NOx Analyzer
Freight	Included	Included in Supplier Quote for Capital Equipment
System Integration	\$100,000	Engineering Estimate
Firewater Booster Pump	\$23,000	Supplier Neutral Estimate
Increase ID Fan Size	\$60,000	Supplier Neutral Estimate; Increased size due to pressure drop across SCR System
Total Direct Capital Costs (TDCC)	\$9,193,000	
<u>Direct Installation Costs</u>		
Installation	Included	Included in Supplier Quote for Installation of SCR System
Foundation and Supports	Included	Included in Supplier Quote for Installation of SCR System
Handling and Erection	Included	Included in Supplier Quote for Installation of SCR System
Electrical	Included	Included in Supplier Quote for Installation of SCR System
Piping	Included	Included in Supplier Quote for Installation of SCR System
Insulation for Ductwork	Included	Included in Supplier Quote for Installation of SCR System
Painting	Included	Included in Supplier Quote for Installation of SCR System
Site Preparation	\$29,000	Existing Roads, Demolition & Restoration, SCR Footprint
Buildings (Process CEM)	\$25,000	Engineering Estimate
Concrete	\$40,000	Aqueous Ammonia Spill Containment
Miscellaneous Steel	\$11,000	Platforms, Ladders, etc.
SCR Building Enclosure/Struct. Steel	\$530,000	Supplier Neutral Estimate; Windload Req. for Hurricanes
Electrical Systems	\$56,000	Grounding, Lightning Protection, Lighting, etc.
Instrumentation Systems	\$8,000	Systems Monitoring and Control
ID Fan Increase	\$60,000	Engineering Estimate; Installation with Dampers
Piping Systems	\$166,000	Fire Protection Standpipe/Sprinklers, Service Air, Potable Water, Ammonia, Gas Piping
Total Direct Installation Costs (TDIC)	\$925,000	
Total Capital Costs (TCC)	\$10,118,000	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$809,440	8% of TCC
Construction and Field Expenses	Included	Included in Supplier Quote for SCR System
Vendor Fees	\$505,900	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$202,360	2% of TCC; OAQPS Control Cost Manual, Chapter 3
Performance Tests	\$101,180	1% of TCC; OAQPS Control Cost Manual, Chapter 3
Contingencies	\$1,011,800	10% of TCC;
Total Indirect Capital Costs (TnCC)	\$2,630,680	
Total Direct, Indirect and Capital Costs (TDICC)	\$12,748,680	

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Annual Costs</u>		
Operations and Maintenance Labor	\$56,160	24 hours/week at \$45/hour
Ammonia to control 260 ppm inlet NOx	\$53,700	\$300 per ton for Ammonia*
Catalyst Disposal Costs	\$15,000	Engineering Estimate
Catalyst Cost	\$350,000	1/2 Catalyst-2 year catalyst life
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$132,000	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$631,860	
<u>Annual Energy Costs</u>		
Annual Electrical Energy Usage (Including 250 kW for ID Fan)	\$140,160	320 kW X 8,760 hours per year at \$0.05 per kWh
Annual Natural Gas Usage	\$305,408	Based on Supplier Estimate (Based on 8,760 hr/yr)
Total Energy Costs (TEC)	\$445,568	
<u>Indirect Annual Costs</u>		
Management/Overhead	\$33,696	60% of Operations and Maintenance Labor
Insurance	\$101,180	1% of Total Capital Costs
Miscellaneous Painting	\$10,000	Supplier Neutral Estimate
Miscellaneous Equipment Rebuild	\$99,000	Supplier Neutral Estimate; 75% of Spare Parts Above
Annualized Total Direct Capital	\$1,399,805	0.1098 Capital Recovery Factor of 7% over 15 years multiplied by sum of TDACC
Total Indirect Annual Costs (TIAC)	\$1,643,681	
Total Annualized Costs	\$2,721,109	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SCR System		
	\$9,040	Cost Per Ton NOx Removed 301 Tons NOx Removed (260 ppm inlet; 100 ppm outlet; 62% Removal)

Note: 'Included' denotes item is assumed to be included in supplier budgetary estimate for SCR Associated Equipment and Installation. [See email from Dirk Eraerts (SEGHER's Better Technology) to Scott Heath (RTP Environmental) dated December 21, 2001]

The above cost does not include revenue lost due to additional or unscheduled system shutdown. Based on a cost of \$56 per ton of waste at 600 tons of waste per day and over an annual shutdown of 10 days, this cost is estimated to be approximately \$336,000 due to lost tipping fees. In addition to this, the amount of revenue lost due to not producing steam during these 10 days is estimated to be approximately \$177,000; bringing the Total Annualized costs and cost effectiveness (respectively) to:

Total Annualized Costs	\$3,176,491	Cost per ton NOx removed	\$10,553
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This cost does not include costs for the electrical needs of the system (326.5kW over 240 hours at \$0.05/kWh) and ammonia usage because system will not operate.

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SCR Associated Equipment	\$8,800,000	Supplier Estimate
Ammonia Storage Tanks	Included	Ammonia Storage
Import Duty	\$110,000	5% of Estimated 25% Import Value
Flue Gas Ductwork	\$100,000	Engineering Estimate
Instrumentation	Included	In-situ NOx Analyzer
Freight	Included	Included in Supplier Quote for Capital Equipment
System Integration	\$100,000	Engineering Estimate
Firewater Booster Pump	\$23,000	Supplier Neutral Estimate
Increase ID Fan Size	\$60,000	Supplier Neutral Estimate; Increased size due to pressure drop across SCR System
Total Direct Capital Costs (TDCC)	\$9,193,000	
<u>Direct Installation Costs</u>		
Installation	Included	Included in Supplier Quote for Installation of SCR System
Foundation and Supports	Included	Included in Supplier Quote for Installation of SCR System
Handling and Erection	Included	Included in Supplier Quote for Installation of SCR System
Electrical	Included	Included in Supplier Quote for Installation of SCR System
Piping	Included	Included in Supplier Quote for Installation of SCR System
Insulation for Ductwork	Included	Included in Supplier Quote for Installation of SCR System
Painting	Included	Included in Supplier Quote for Installation of SCR System
Site Preparation	\$29,000	Existing Roads, Demolition & Restoration, SCR Footprint
Buildings (Process CEM)	\$25,000	Engineering Estimate
Concrete	\$40,000	Aqueous Ammonia Spill Containment
Miscellaneous Steel	\$11,000	Platforms, Ladders, etc.
SCR Building Enclosure/Struct. Steel	\$530,000	Supplier Neutral Estimate; Windload Req. for Hurricanes
Electrical Systems	\$56,000	Grounding, Lightning Protection, Lighting, etc.
Instrumentation Systems	\$8,000	Systems Monitoring and Control
ID Fan Increase	\$60,000	Engineering Estimate; Installation with Dampers
Piping Systems	\$166,000	Fire Protection Standpipe/Sprinklers, Service Air, Potable Water, Ammonia, Gas Piping
Total Direct Installation Costs (TDIC)	\$925,000	
Total Capital Costs (TCC)	\$10,118,000	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$809,440	8% of TCC
Construction and Field Expenses	Included	Included in Supplier Quote for SCR System
Vendor Fees	\$505,900	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$202,360	2% of TCC; OAQPS Control Cost Manual, Chapter 3
Performance Tests	\$101,180	1% of TCC; OAQPS Control Cost Manual, Chapter 3
Contingencies	\$1,011,800	10% of TCC;
Total Indirect Capital Costs (TInCC)	\$2,630,680	
Total Direct, Indirect and Capital Costs (TDICC)	\$12,748,680	

Estimate of Selective Catalytic Reduction Costs
for Lee County Energy Recovery Facility
With Flue Gas Reheat Using Natural Gas Combustion

Cost Component	Costs	Basis of Cost Component
Direct Annual Costs		
Operations and Maintenance Labor	\$56,160	24 hours/week at \$45/hour
Ammonia to control 260 ppm inlet NOx	\$53,700	\$300 per ton for Ammonia*
Catalyst Disposal Costs	\$15,000	Engineering Estimate
Catalyst Cost	\$350,000	1/2 Catalyst-2 year catalyst life
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$132,000	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$631,860	
Annual Energy Costs		
Annual Electrical Energy Usage (Including 250 kW for ID Fan)	\$140,160	320 kW X 8,760 hours per year at \$0.05 per kWh
Annual Natural Gas Usage	\$305,408	Based on Supplier Estimate (Based on 8,760 hr/yr)
Total Energy Costs (TEC)	\$445,568	
Indirect Annual Costs		
Management/Overhead	\$33,696	60% of Operations and Maintenance Labor
Insurance	\$101,180	1% of Total Capital Costs
Miscellaneous Painting	\$10,000	Supplier Neutral Estimate
Miscellaneous Equipment Rebuild	\$99,000	Supplier Neutral Estimate; 75% of Spare Parts Above
Annualized Total Direct Capital	\$1,203,475	0.0944 Capital Recovery Factor of 7% over 20 years multiplied by sum of TDACC
Total Indirect Annual Costs (TIAC)	\$1,447,351	
Total Annualized Costs	\$2,524,779	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SCR System		Cost Per Ton NOx Removed
	\$8,388	301 Tons NOx Removed (260 ppm inlet; 100 ppm outlet; 62% Removal)

Note: 'Included' denotes item is assumed to be included in supplier budgetary estimate for SCR Associated Equipment and Installation. [See email from Dirk Eraerts (SEGHER's Better Technology) to Scott Heath (RTP Environmental) dated December 21, 2001]

The above cost does not include revenue lost due to additional or unscheduled system shutdown. Based on a cost of \$56 per ton of waste at 600 tons of waste per day and over an annual shutdown of 10 days, this cost is estimated to be approximately \$336,000 due to lost tipping fees. In addition to this, the amount of revenue lost due to not producing steam during these 10 days is estimated to be approximately \$177,000; bringing the Total Annualized costs and cost effectiveness (respectively) to:

Total Annualized Costs \$2,980,161 Cost per ton NOx removed \$9,901
This cost does not include costs for the electrical needs of the system (326.5kW over 240 hours at \$0.05/kWh) and ammonia usage because system will not operate.

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Non-Catalytic Reduction Costs
for Lee County Energy Recovery Facility
Aqueous Ammonia SNCR System

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SNCR Associated Equipment	\$655,400	Engineering Estimate
Ammonia Storage Tank	Included	Ammonia Storage
Pumps and Blowers	Included	Engineering Estimate
Electrical & Instrumentation	Included	Engineering Estimate
Freight	Included	Included in Vendor Quote for Capital Equipment
System Integration	\$50,000	Engineering Estimate
Total Direct Capital Costs (TDCC)	\$705,400	
<u>Direct Installation Costs</u>		
Installation	\$582,230	Engineering Estimate
Foundation and Supports	Included	Included in Eng. Est. for Installation of SNCR System
Handling and Erection	Included	Included in Eng. Est. for Installation of SNCR System
Electrical	Included	Included in Eng. Est. for Installation of SNCR System
Piping	Included	Included in Eng. Est. for Installation of SNCR System
Insulation for Ductwork	Included	Included in Eng. Est. for Installation of SNCR System
Painting	Included	Included in Eng. Est. for Installation of SNCR System
Site Preparation	\$16,300	Existing Roads, Demolition & Restoration
Total Direct Installation Costs (TDIC)	\$598,530	
Total Capital Costs (TCC)	\$1,303,930	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$104,314	8% of TCC
Construction and Field Expenses	Included	Included in Engineering Estimate of SNCR System
Vendor Fees	\$65,197	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$114,800	Vendor Neutral Estimate
Performance Tests	Included	Included in Engineering Estimate of SNCR System
Contingencies	\$130,393	10% of TCC;
Total Indirect Capital Costs (TInCC)	\$414,704	
Total Direct, Indirect and Capital Costs (TDICC)	\$1,718,634	

Estimate of Selective Non-Catalytic Reduction Costs
for Lee County Energy Recovery Facility
Aqueous Ammonia SNCR System

Cost Component	Costs	Basis of Cost Component
<u>Direct Annual Costs</u>		
Operations and Maintenance Labor	\$54,000	1200 Man hours per year @ \$45/hour
Ammonia to control NOx to 150 ppm	\$53,700	\$300 per ton for Ammonia*
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$9,831	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$142,531	
<u>Annual Energy Costs</u>		
Annual Electrical Energy Usage	\$3,066	7 kW X 8,760 hours per year at \$0.05 per kWh at 100% System Availability
Total Energy Costs (TEC)	\$3,066	
<u>Indirect Annual Costs</u>		
Management/Overhead	\$32,400	60% of Operations and Maintenance Labor
Administration	\$34,373	2% of TDICC
Insurance	\$17,186	1% of TDICC
Miscellaneous Painting	\$3,000	Vendor Neutral Estimate
Miscellaneous Equipment Rebuild	\$7,373	Vendor Neutral Estimate; 75% of Spare Parts Above
Lost Power	\$13,140	Eng. Est. (30kW X 8,760 hours/year X \$0.05/kWh)
Annualized Total Direct Capital	\$279,622	0.1627 Capital Recovery Factor of 10% over 10 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$387,094	
Total Annualized Costs	\$532,691	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SNCR System		
	\$2,586	Cost Per Ton NOx Removed 206 Tons NOx Removed (260 ppm inlet; 150 ppm outlet; 42% Removal)

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Non-Catalytic Reduction Costs
for Lee County Energy Recovery Facility
Aqueous Ammonia SNCR System

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SNCR Associated Equipment	\$655,400	Engineering Estimate
Ammonia Storage Tank	Included	Ammonia Storage
Pumps and Blowers	Included	Engineering Estimate
Electrical & Instrumentation	Included	Engineering Estimate
Freight	Included	Included in Vendor Quote for Capital Equipment
System Integration	\$50,000	Engineering Estimate
Total Direct Capital Costs (TDCC)	\$705,400	
<u>Direct Installation Costs</u>		
Installation	\$582,230	Engineering Estimate
Foundation and Supports	Included	Included in Eng. Est. for Installation of SNCR System
Handling and Erection	Included	Included in Eng. Est. for Installation of SNCR System
Electrical	Included	Included in Eng. Est. for Installation of SNCR System
Piping	Included	Included in Eng. Est. for Installation of SNCR System
Insulation for Ductwork	Included	Included in Eng. Est. for Installation of SNCR System
Painting	Included	Included in Eng. Est. for Installation of SNCR System
Site Preparation	\$16,300	Existing Roads, Demolition & Restoration
Total Direct Installation Costs (TDIC)	\$598,530	
Total Capital Costs (TCC)	\$1,303,930	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$104,314	8% of TCC
Construction and Field Expenses	Included	Included in Engineering Estimate of SNCR System
Vendor Fees	\$65,197	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$114,800	Vendor Neutral Estimate
Performance Tests	Included	Included in Engineering Estimate of SNCR System
Contingencies	\$130,393	10% of TCC;
Total Indirect Capital Costs (TInCC)	\$414,704	
Total Direct, Indirect and Capital Costs (TDICC)	\$1,718,634	

Estimate of Selective Non-Catalytic Reduction Costs
for Lee County Energy Recovery Facility
Aqueous Ammonia SNCR System

Cost Component	Costs	Basis of Cost Component
<u>Direct Annual Costs</u>		
Operations and Maintenance Labor	\$54,000	1200 Man hours per year @ \$45/hour
Ammonia to control NOx to 150 ppm	\$53,700	\$300 per ton for Ammonia*
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$9,831	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$142,531	
<u>Annual Energy Costs</u>		
Annual Electrical Energy Usage	\$3,066	7 kW X 8,760 hours per year at \$0.05 per kWh at 100% System Availability
Total Energy Costs (TEC)	\$3,066	
<u>Indirect Annual Costs</u>		
Management/Overhead	\$32,400	60% of Operations and Maintenance Labor
Administration	\$34,373	2% of TDICC
Insurance	\$17,186	1% of TDICC
Miscellaneous Painting	\$3,000	Vendor Neutral Estimate
Miscellaneous Equipment Rebuild	\$7,373	Vendor Neutral Estimate; 75% of Spare Parts Above
Lost Power	\$13,140	Eng. Est. (30kW X 8,760 hours/year X \$0.05/kWh)
Annualized Total Direct Capital	\$226,000	0.1315 Capital Recovery Factor of 10% over 15 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$333,473	
Total Annualized Costs	\$479,070	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SNCR System		Cost Per Ton NOx Removed
	\$2,326	206 Tons NOx Removed (260 ppm inlet; 150 ppm outlet; 42% Removal)

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Non-Catalytic Reduction Costs
for Lee County Energy Recovery Facility
Aqueous Ammonia SNCR System

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SNCR Associated Equipment	\$655,400	Engineering Estimate
Ammonia Storage Tank	Included	Ammonia Storage
Pumps and Blowers	Included	Engineering Estimate
Electrical & Instrumentation	Included	Engineering Estimate
Freight	Included	Included in Vendor Quote for Capital Equipment
System Integration	\$50,000	Engineering Estimate
Total Direct Capital Costs (TDCC)	\$705,400	
<u>Direct Installation Costs</u>		
Installation	\$582,230	Engineering Estimate
Foundation and Supports	Included	Included in Eng. Est. for Installation of SNCR System
Handling and Erection	Included	Included in Eng. Est. for Installation of SNCR System
Electrical	Included	Included in Eng. Est. for Installation of SNCR System
Piping	Included	Included in Eng. Est. for Installation of SNCR System
Insulation for Ductwork	Included	Included in Eng. Est. for Installation of SNCR System
Painting	Included	Included in Eng. Est. for Installation of SNCR System
Site Preparation	\$16,300	Existing Roads, Demolition & Restoration
Total Direct Installation Costs (TDIC)	\$598,530	
Total Capital Costs (TCC)	\$1,303,930	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$104,314	8% of TCC
Construction and Field Expenses	Included	Included in Engineering Estimate of SNCR System
Vendor Fees	\$65,197	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$114,800	Vendor Neutral Estimate
Performance Tests	Included	Included in Engineering Estimate of SNCR System
Contingencies	\$130,393	10% of TCC;
Total Indirect Capital Costs (TInCC)	\$414,704	
Total Direct, Indirect and Capital Costs (TDICC)	\$1,718,634	

Estimate of Selective Non-Catalytic Reduction Costs
for Lee County Energy Recovery Facility
Aqueous Ammonia SNCR System

Cost Component	Costs	Basis of Cost Component
<u>Direct Annual Costs</u>		
Operations and Maintenance Labor	\$54,000	1200 Man hours per year @ \$45/hour
Ammonia to control NOx to 150 ppm	\$53,700	\$300 per ton for Ammonia*
Regulatory Compliance Costs	\$25,000	Engineering Estimate
Spare Parts Inventory Replacement	\$9,831	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$142,531	
<u>Annual Energy Costs</u>		
Annual Electrical Energy Usage	\$3,066	7 kW X 8,760 hours per year at \$0.05 per kWh at 100% System Availability
Total Energy Costs (TEC)	\$3,066	
<u>Indirect Annual Costs</u>		
Management/Overhead	\$32,400	60% of Operations and Maintenance Labor
Administration	\$34,373	2% of TDICC
Insurance	\$17,186	1% of TDICC
Miscellaneous Painting	\$3,000	Vendor Neutral Estimate
Miscellaneous Equipment Rebuild	\$7,373	Vendor Neutral Estimate; 75% of Spare Parts Above
Lost Power	\$13,140	Eng. Est. (30kW X 8,760 hours/year X \$0.05/kWh)
Annualized Total Direct Capital	\$244,733	0.1424 Capital Recovery Factor of 7% over 10 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$352,206	
Total Annualized Costs	\$497,803	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SNCR System	\$2,417	Cost Per Ton NOx Removed 206 Tons NOx Removed (260 ppm inlet; 150 ppm outlet; 42% Removal)

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Non-Catalytic Reduction Costs
for Lee County Energy Recovery Facility
Aqueous Ammonia SNCR System

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SNCR Associated Equipment	\$655,400	Engineering Estimate
Ammonia Storage Tank	Included	Ammonia Storage
Pumps and Blowers	Included	Engineering Estimate
Electrical & Instrumentation	Included	Engineering Estimate
Freight	Included	Included in Vendor Quote for Capital Equipment
System Integration	\$50,000	Engineering Estimate
Total Direct Capital Costs (TDCC)	\$705,400	
<u>Direct Installation Costs</u>		
Installation	\$582,230	Engineering Estimate
Foundation and Supports	Included	Included in Eng. Est. for Installation of SNCR System
Handling and Erection	Included	Included in Eng. Est. for Installation of SNCR System
Electrical	Included	Included in Eng. Est. for Installation of SNCR System
Piping	Included	Included in Eng. Est. for Installation of SNCR System
Insulation for Ductwork	Included	Included in Eng. Est. for Installation of SNCR System
Painting	Included	Included in Eng. Est. for Installation of SNCR System
Site Preparation	\$16,300	Existing Roads, Demolition & Restoration
Total Direct Installation Costs (TDIC)	\$598,530	
Total Capital Costs (TCC)	\$1,303,930	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
Vendor Engineering and Related Costs	\$104,314	8% of TCC
Construction and Field Expenses	Included	Included in Engineering Estimate of SNCR System
Vendor Fees	\$65,197	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$114,800	Vendor Neutral Estimate
Performance Tests	Included	Included in Engineering Estimate of SNCR System
Contingencies	\$130,393	10% of TCC;
Total Indirect Capital Costs (TInCC)	\$414,704	
Total Direct, Indirect and Capital Costs (TDICC)	\$1,718,634	

Estimate of Selective Non-Catalytic Reduction Costs
for Lee County Energy Recovery Facility
Aqueous Ammonia SNCR System

Cost Component	Costs	Basis of Cost Component
<u>Direct Annual Costs</u>		
Operations and Maintenance Labor	\$54,000	1200 Man hours per year @ \$45/hour
Ammonia to control NOx to 150 ppm	\$53,700	\$300 per ton for Ammonia*
Regulatory Compliance Costs	\$25,000	Engineering Estimate
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Total Direct Annual Costs (TDAC)	\$142,531	
<u>Annual Energy Costs</u>		
Annual Electrical Energy Usage	\$3,066	7 kW X 8,760 hours per year at \$0.05 per kWh at 100% System Availability
Total Energy Costs (TEC)	\$3,066	
<u>Indirect Annual Costs</u>		
Management/Overhead	\$32,400	60% of Operations and Maintenance Labor
Administration	\$34,373	2% of TDACC
Insurance	\$17,186	1% of TDACC
Miscellaneous Painting	\$3,000	Vendor Neutral Estimate
Miscellaneous Equipment Rebuild	\$7,373	Vendor Neutral Estimate; 75% of Spare Parts Above
Lost Power	\$13,140	Eng. Est. (30kW X 8,760 hours/year X \$0.05/kWh)
Annualized Total Direct Capital	\$188,706	0.1098 Capital Recovery Factor of 7% over 15 years multiplied by sum of TDACC
Total Indirect Annual Costs (TIAC)	\$296,178	
Total Annualized Costs	\$441,775	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SNCR System		Cost Per Ton NOx Removed
	\$2,145	206 Tons NOx Removed (260 ppm inlet; 150 ppm outlet; 42% Removal)

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

Estimate of Selective Non-Catalytic Reduction Costs
for Lee County Energy Recovery Facility
Aqueous Ammonia SNCR System

Cost Component	Costs	Basis of Cost Component
<u>Direct Capital Costs</u>		
SNCR Associated Equipment	\$655,400	Engineering Estimate
Ammonia Storage Tank	Included	Ammonia Storage
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System Integration	\$50,000	Engineering Estimate
Total Direct Capital Costs (TDCC)	\$705,400	
<u>Direct Installation Costs</u>		
Installation	\$582,230	Engineering Estimate
Foundation and Supports	Included	Included in Eng. Est. for Installation of SNCR System
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Total Direct Installation Costs (TDIC)	\$598,530	
Total Capital Costs (TCC)	\$1,303,930	Sum of TDCC and TDIC
<u>Indirect Costs</u>		
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Vendor Fees	\$65,197	5% of TCC
Project Management & Oversight	Included	Included in Vendor Engineering and Related Costs
Start-Up	\$114,800	Vendor Neutral Estimate
Performance Tests	Included	Included in Engineering Estimate of SNCR System
Contingencies	\$130,393	10% of TCC;
Total Indirect Capital Costs (TInCC)	\$414,704	
Total Direct, Indirect and Capital Costs (TDICC)	\$1,718,634	

Estimate of Selective Non-Catalytic Reduction Costs
for Lee County Energy Recovery Facility
Aqueous Ammonia SNCR System

Cost Component	Costs	Basis of Cost Component
<u>Direct Annual Costs</u>		
Operations and Maintenance Labor	\$54,000	1200 Man hours per year @ \$45/hour
Ammonia to control NOx to 150 ppm	\$53,700	\$300 per ton for Ammonia*
Regulatory Compliance Costs	\$25,000	Engineering Estimate,
Spare Parts Inventory Replacement	\$9,831	1.5% of SCR Associated Equipment
Total Direct Annual Costs (TDAC)	\$142,531	
<u>Annual Energy Costs</u>		
Annual Electrical Energy Usage	\$3,066	7 kW X 8,760 hours per year at \$0.05 per kWh at 100% System Availability
Total Energy Costs (TEC)	\$3,066	
<u>Indirect Annual Costs</u>		
Management/Overhead	\$32,400	60% of Operations and Maintenance Labor
Administration	\$34,373	2% of TDICC
Insurance	\$17,186	1% of TDICC
Miscellaneous Painting	\$3,000	Vendor Neutral Estimate
Miscellaneous Equipment Rebuild	\$7,373	Vendor Neutral Estimate; 75% of Spare Parts Above
Lost Power	\$13,140	Eng. Est. (30kW X 8,760 hours/year X \$0.05/kWh)
Annualized Total Direct Capital	\$162,239	0.0944 Capital Recovery Factor of 7% over 20 years multiplied by sum of TDICC
Total Indirect Annual Costs (TIAC)	\$269,711	
Total Annualized Costs	\$415,308	Sum of TDAC, TEC and TIAC (for 260 ppm)
Cost Effectiveness of SNCR System		Cost Per Ton NOx Removed
	\$2,016	206 Tons NOx Removed (260 ppm inlet; 150 ppm outlet; 42% Removal)

* Note: Ammonia usage is based on information provided by Covanta and ratioed based on 100% availability of Unit 3.

**LEE COUNTY ENERGY RECOVERY FACILITY
PREVENTION OF SIGNIFICANT DETERIORATION
APPLICATION FOR MUNICIPAL WASTE COMBUSTOR UNIT 3**

ATTACHMENT G

**VERIFICATION OF FACILITY
RISK MANAGEMENT PLAN
SUBMISSION AND COMPLETENESS**

October 31, 2002

Sep 22 02 05:22p

SolidWast

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p.2

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RECEIVED

Facility Name: Lee County Solid Waste Resource Recovery Facility
EPA ID: 1000 0006 8749

JUL 13 1999



OGDEN MARTIN SYSTEMS OF LEE, INC.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460
OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE

T. Eriksen
OMS of Lee, Inc. (Operator)
10500 Buckingham Road
Fort Myers, FL 33905

June 29, 1999

Poor Original

EPA Facility ID#: 1000 0006 8749
Postmark Date: 06/20/1999
Anniversary Date: 06/20/2004

NOTIFICATION LETTER: COMPLETE RMP

The U.S. Environmental Protection Agency (EPA) received your Risk Management Plan (RMP) dated with the above postmark date. This letter notifies you that your RMP is "complete" according to EPA's completion check. The completion check is a program implemented by EPA to determine whether a submitted RMP includes the minimum amount of information every RMP must provide. The completion check does not assess whether a submitted RMP should have provided additional information or whether the information it provides is accurate or appropriate. In other words, it does not indicate that the RMP meets the requirements of 40 CFR Part 68.

Please note the anniversary date indicated above. Your RMP must be revised and updated by this date or earlier as required by 40 CFR §68.190. Please also note your EPA Facility ID number as identified at the top of this letter; all future Risk Management Plan submissions, corrections and other correspondence must include this number.

Your RMP (excluding the Offsite Consequence Analysis data) can be viewed on RMP*Info™, a national database on the Internet at <http://www.epa.gov/enviro>.

Poor Original

Facility Name: Lee County Solid Waste Resource Recovery Facility
EPA ID: 1000 0006 8749

If you have any questions, please call one of the following numbers:

(1) For RMP rule interpretation questions, call the EPCRA Hotline at (800) 424-9346 or (703) 412-9810 (in the D.C. Metro area).

(2) For RMP*Submit installation and software questions, or information on the status of your RMP, contact the RMP Reporting Center at (703) 816-4434, or write to the:

RMP Reporting Center
P.O. Box 3346
Merrifield, VA 22116-3346

(3) For more information on the Risk Management Program, you can contact your Implementing Agency. Your Implementing Agency is Florida Department of Community Affairs, 2555 Shumard Oak Boulevard, Tallahassee, FL, 32399, Phone: 850-413-9970.

Thank you for your cooperation in this matter.

Sincerely,

RMP Reporting Center

Enclosure:

Risk Management Plan (if submitted on paper)

OGDEN

Ogden Martin Systems of Lee, Inc.

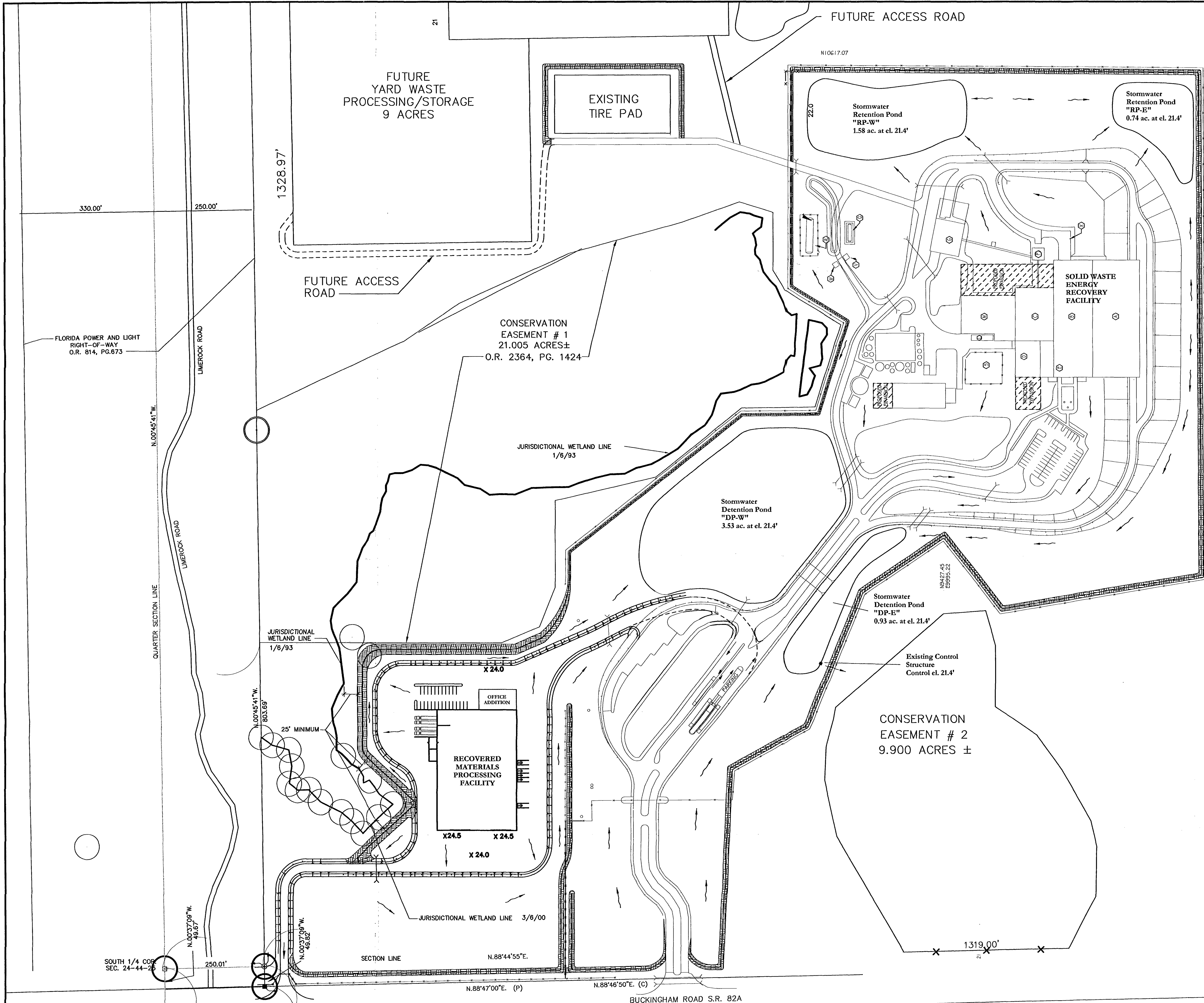
10500 Buckingham Road
Suite 400
Ft. Myers, FL 33905

February 3, 2000

Poor OriginalDirector, FBI
Attention: RMP Program - Room 1B327
935 Pennsylvania Ave. N.W.
Washington, D.C. 20535-0001**RE: Risk Management Program Certification Statement to the FBI**
EPA Facility Identification Number: 1000 0006 8749

In accordance with P.L. 106-40, after reasonable public notice, the Lee County Solid Waste Resource Recovery Facility operated by Ogden Martin Systems of Lee, Inc. (EPA Facility Identification #: 1000 0006 8749) convened a public meeting on November 24, 1999. At that time, the Facility was prepared to describe and discuss the local implications of our risk management plan, including a summary of the Offsite Consequence Analysis (OCA) portion of the plan. No member of the general public was in attendance at the meeting.

Lindsey J. Sampson
Facility Owner RepresentativeLINDSEY J. SAMPSON
Print NameSolid Waste
Department Director
Title Lee County Florida2/7/00
DateT. Erikson
Facility Operator RepresentativeThomas C Erikson
Print NameFacility Manager
Title2/3/00
Date



LEGEND

- CONCRETE ROAD
- GRAVEL ROAD
- ASPHALT ROAD
- REINFORCED CONCRETE PIPE
- HEADWALL
- FENCE
- GUARDRAIL
- BERM
- BASIN BOUNDARY

BUILDING INDEX

- (A) TIPPING AREA
- (B) REFUSE PIT AREA
- (C) BOILER AREA
- (D) TURBINE/GENERATOR AREA
- (E) FACILITY ADMINISTRATION AREA
- (F) GRIZZLY BUILDING
- (G) RESIDUE HANDLING BUILDING
- (H) COOLING TOWER
- (I) STACK
- (L) SETTLING BASIN
- (M) APC AREA
- (N) SCALE HOUSE
- (P) FIRE WATER TANK & PUMP HOUSE
- (Q) AMMONIA STORAGE
- (R) PROPANE STORAGE
- (S) SWITCHYARD
- (T) CHLORINATION BUILDING
- (U) WATER TREATMENT BUILDING
- (V) AMMONIA UNLOADING STATION
- (W) PROPANE UNLOADING STATION
- (X) DIESEL OIL TANK & FUELING STATION

LEGEND:

- T. TOWNSHIP
- R. RANGE
- LB. LICENSED BUSINESS
- (C) CALCULATED
- (S) DIMENSION AS SHOWN ON SURVEY
- (P) PLAT
- FD FOUND
- COR CORNER
- S.R. STATE ROAD
- MON. MONUMENT
- ELEV. ELEVATION
- M.W. MONITORING WELL

SURVEYOR'S NOTES

- ELEVATIONS SHOWN (IF ANY) ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM (N.G.V.D.) US GEOLOGICAL SURVEY BENCHMARK "51 WTM 1952"
- SURVEY BASED ON FOUND MONUMENTATION AS ESTABLISHED BY OTHERS. REFERENCE IS MADE TO A BOUNDARY SURVEY OF PART OF SECTIONS 24 AND 25, TOWNSHIP 44 SOUTH, RANGE 25 EAST, PERFORMED BY AGNOLI, BARBER & BRUNDAGE, INC., AND DATED JUNE 22, 1990.
- BOUNDARY INFORMATION IS SHOWN FOR REFERENCE ONLY. VERIFICATION OF PREVIOUS BOUNDARY SURVEY BY AGNOLI, BARBER & BRUNDAGE, INC. NOT INCLUDED UNDER THE SCOPE OF THIS SURVEY.

SYMBOLS

- ⊙ DENOTES FOUND REBAR & CAP L.B. 3664
- ✕✕✕ BARBED WIRE FENCE AS SCALED FROM SURVEY
- DENOTES FOUND CONCRETE MONUMENT L.B. 3664
- DENOTES FOUND CONCRETE MONUMENT

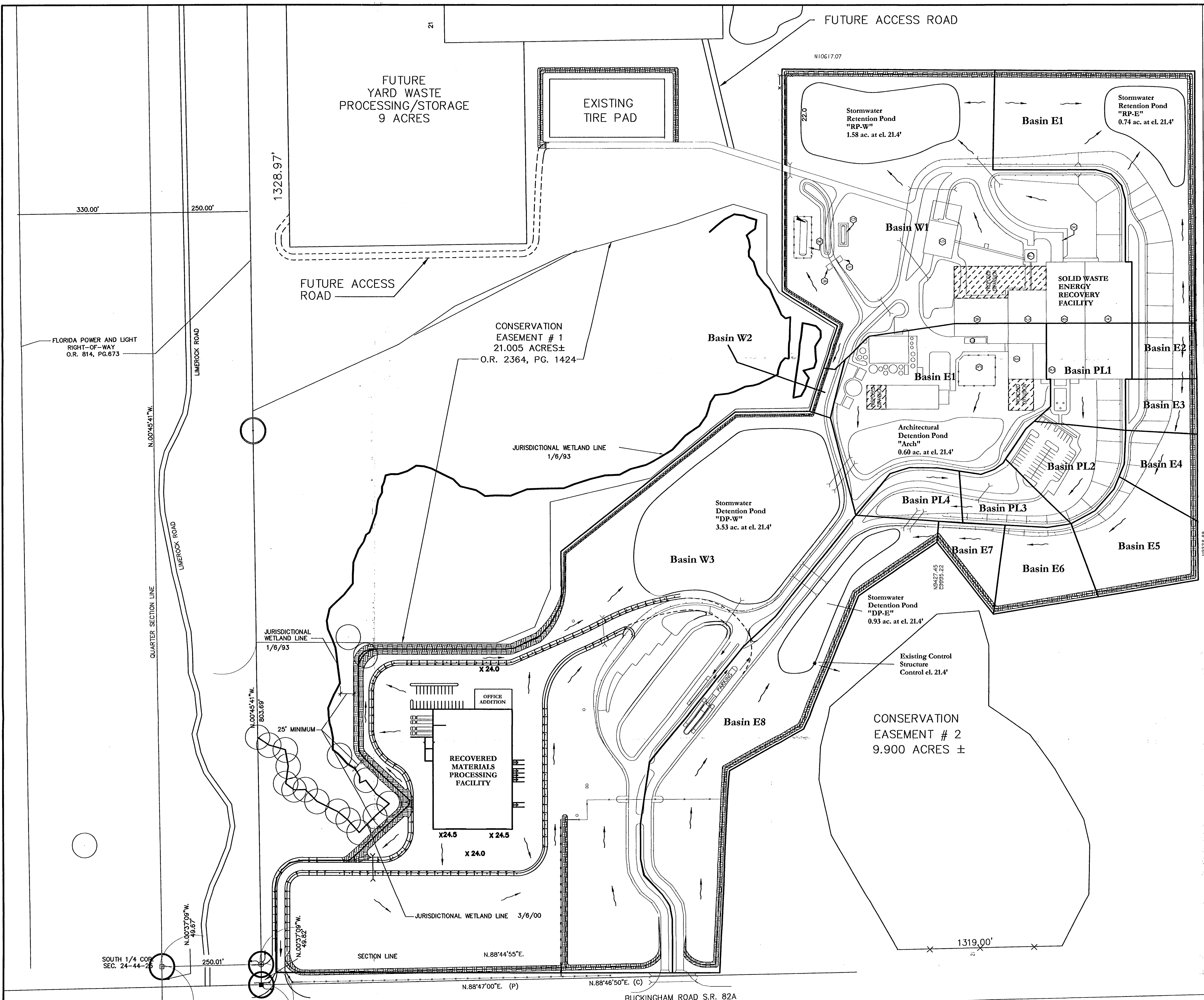
MALCOLM
PIRNIE

REVISIONS					DES	DWN	CKD
NO.	BY	DATE	REVISIONS	REMARKS			
					CCT	CCT	RHF

LEE COUNTY ENERGY RECOVERY FACILITY
LEE COUNTY, BUCKINGHAM RD.
FT. MYERS, FLORIDA

CONCEPTUAL SITE PLAN

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MALCOLM PIRNIE, INC.
DATE FEBRUARY 18, 2002
SHEET 1 OF 2
CAD REF. NO.



LEGEND	
	CONCRETE ROAD
	GRAVEL ROAD
	ASPHALT ROAD
	REINFORCED CONCRETE PIPE
	HEADWALL
	FENCE
	GUARDRAIL
	BERM
	BASIN BOUNDARY

BASIN INFORMATION	
PL1	- 1.25 AC.
PL2	- 1.15 AC.
PL3	- 0.66 AC.
PL4	- 0.62 AC.
E1	- 4.37 AC.
E2	- 0.53 AC.
E3	- 0.55 AC.
E4	- 0.71 AC.
E5	- 1.47 AC.
E6	- 1.00 AC.
E7	- 0.53 AC.
E8	- 5.55 AC.
A1	- 4.19 AC.
W1	- 10.78 AC.
W2	- 0.14 AC.
W3	- 24.09 AC.

BUILDING INDEX	
(A)	TIPPING AREA
(B)	REFUSE PIT AREA
(C)	BOILER AREA
(D)	TURBINE/GENERATOR AREA
(E)	FACILITY ADMINISTRATION AREA
(F)	GRIZZLY BUILDING
(G)	RESIDUE HANDLING BUILDING
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- SURVEYOR'S NOTES
- ELEVATIONS SHOWN (IF ANY) ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM (N.G.V.D.) US GEOLOGICAL SURVEY BENCHMARK "51 WIM 1952" SURVEYOR'S NOTES
 - SURVEY BASED ON FOUND MONUMENTATION AS ESTABLISHED BY OTHERS. REFERENCE IS MADE TO A BOUNDARY SURVEY OF PART OF SECTIONS 24 AND 25, TOWNSHIP 44 SOUTH, RANGE 28 EAST, PERFORMED BY AGNOLI, BARBER & BRUNDAGE, INC., AND DATED JUNE 22, 1990.
 - BOUNDARY INFORMATION IS SHOWN FOR REFERENCE ONLY. VERIFICATION OF PREVIOUS BOUNDARY SURVEY BY AGNOLI, BARBER & BRUNDAGE, INC. NOT INCLUDED UNDER THE SCOPE OF THIS SURVEY.
- GENERAL NOTES:
- DIMENSIONS SHOWN FOR EXISTING SITE PLAN WERE TAKEN FROM VERIFIED AS-BUILT DRAWINGS AND SURVEYS FROM ORIGINAL DESIGN DRAWINGS.

SYMBOLS	
	DENOTES FOUND REBAR & CAP L.B. 3664
	BARBED WIRE FENCE AS SCALED FROM SURVEY
	DENOTES FOUND CONCRETE MONUMENT L.B. 3664
	DENOTES FOUND CONCRETE MONUMENT

**MALCOLM
PIRNIE**

REVISIONS			
NO.	BY	DATE	REMARKS

DES CCT
DWN CCT
CKO RHF

LEE COUNTY ENERGY RECOVERY FACILITY
LEE COUNTY, BUCKINGHAM RD.
FT. MYERS, FLORIDA

BASIN AND SUB-BASIN BOUNDARIES

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MALCOLM PIRNIE, INC.
DATE FEBRUARY 18, 2002
SHEET 2 OF 2
CAD REF. NO.