

**LEE COUNTY, FLORIDA
SOLID WASTE ENERGY RECOVERY FACILITY
APPLICATION FOR
POWER PLANT CERTIFICATION**

VOLUME I - APPLICATION

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



**JUNE 1990
JUNE 1991 (REVISED)**

CDM

**LEE COUNTY, FLORIDA
SOLID WASTE ENERGY RECOVERY FACILITY
APPLICATION FOR
POWER PLANT CERTIFICATION**

VOLUME I - APPLICATION

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



JUNE 1990

CDM

**LEE COUNTY, FLORIDA
SOLID WASTE ENERGY RECOVERY FACILITY
APPLICATION FOR
POWER PLANT CERTIFICATION**

VOLUME I - APPLICATION



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

**JUNE 1990
JUNE 1991 (REVISED)**

**PREPARED BY
CAMP DRESSER & McKEE INC.**

THIS DOCUMENT IS PRINTED ON RECYCLED PAPER.

*environmental engineers, scientists,
planners, & management consultants* **CDM**



BOARD OF COUNTY COMMISSIONERS

Poor Original

P.O. Box 398
Fort Myers, Florida 33902-0398
(813) 334-2166

(813) 335-2276

Writer's Direct Dial Number
L-104-91

John E. Manning
District One

June 6, 1991

Douglas R. St. Cerny
District Two

Ray Judah
District Three

Vicki Lopez-Wolfe
District Four

Donald Slisher
District Five

Marsha Segal-George
County Administrator

James G. Yaeger
County Attorney

R. Scott Barker
County Hearing
Examiner

Mr. Hamilton Oven
Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399

Re: Lee County Resource Recovery Facility
DOAH Case No.: 90-3942EPP
DER Case No.: PA 90-30

Dear Mr. Oven:

On May 1, 1991, the Board of County Commissioners of Lee County formally adopted a resolution which expresses the Board's desire to build a resource recovery facility with an initial capacity of 1200 tons per day (tpd) and a future maximum capacity of 1800 tpd. Mr. David Dee notified you of this Board action in a May 2, 1991, letter and indicated that the County's PPSA application will be reviewed to determine if any formal modifications are necessary.

The reduction in facility size has reduced the facility's overall environmental impacts. The attached errata sheet contains the modifications to the PPSA application that are necessary to describe the facility and its impacts at ultimate future capacity of 1800 tpd. The reductions in air quality impacts are being studied and will be forwarded to you in the very near future.

Sincerely,

George E. Reilly, P.E.
Department of Lee County Utilities
Director

GER/mtv

Attachment

cc: L. S. Casey, DLCU
D. E. Strobridge, CDM
M. J. Ihnat, CDM
D. Dee, Env. Counsel
All Parties (see attached)

RECEIVED
JUN 07 1991
Division of Air
Resources Management



ALL PARTIES

RICHARD DONELAN, Asst. General Counsel
Department of Environmental Regulation
2600 Blair Stone Road., Twin Towers Office Bldg.
Tallahassee, FL 32399-2400

STEVE PFEIFFER, General Counsel
L. KATHRYN FUNCHES, Asst. General Counsel
PAUL DARST
Department of Community Affairs
2740 Centerview Dr., Rhyne Bldg.
Tallahassee, FL 32399

JOHN FUMERO
SUSAN COUGHANOUR
EDUARDO LOPEZ
South Florida Water Management District
Post Office Box 24680
West Palm Beach, FL 33416

KEN PLANTE, General Counsel
MAC MCCLELLAN, Assistant General Counsel
Department of Natural Resources
3900 Commonwealth Blvd., Douglas Bldg.
Tallahassee, FL 32399

JIM ANTISTA, General Counsel
Fla. Game & Fresh Water Fish Commission
620 South Meridan Rd., Ferris Bryant Bldg.
Tallahassee, FL 32399

SUSAN CLARK, General Counsel
MIKE PALECKI, Chief, Bureau of Electric & Gas
Florida Public Service Commission,
101E. Gaines St., Fletcher Bldg.
Tallahassee, FL 32399

WAYNE DALTRY, Executive Director
DAVID BURR
Southwest Florida Regional Planning Council
Post Office Box 3455
North Fort Myers, FL 33918-3455

JIM YAEGER, Lee County Attorney
Post Office Box 398
Fort Myers, FL 33902

Errata Sheet

June 5, 1991

VOLUMES I, II, and III

Poor Original

All Sections

- o Change the initial facility size from "1800 tpd" to "1200 tpd".
- o Change the ultimate facility size from "2400 tpd" to "1800 tpd".
- o Change all references to initial combustion/steam generator lines from "three, 600 tpd" stoker waterwall units to "two, 600 tpd" stoker waterwall units.
- o Change all references to ultimate combustion/steam generator lines from "four, 600 tpd" stoker waterwall units to "three, 600 tpd" stoker waterwall units.
- o Change all references to reclaimed water use from approximately "1.5 million gallons per day" at ultimate capacity to approximately "1.1 million gallons per day".
- o Change all references to initial or installed generating capacity from "50 megawatts" to "approximately 40 megawatts".
- o Change all references to ultimate installed generating capacity from "65 megawatts" to "60 megawatts".

VOLUME I

Introduction

- ✓ o Page ES-10 Change the total bonded indebtedness for facility development from "\$220-240 million" to "\$205-225 million".

Section 1.0

- ✓ o Page 1-1 Change "43 Mw" available for sale to Florida Power & Light to "up to 35 Mw".
- ✓ o Page 1-2 Change the estimated capital cost from "\$165 million" to "\$130 million".
- ✓ o Page 1-10 Change the facility will eliminate the need for approximately "560,000 barrels" of oil per year for electric energy generation to "372,300 barrels".

Section 3.0

- ✓ o Page 3-8 Change the pit size from "80 feet by 300 feet" to "approximately 70 feet by 235 feet".

GLC3/19
6/5/91

NO
3-4
ATTACHED

- ✓ o Page 3-12 Change "18 tipping bays, each 15 feet wide" to "13 tipping bays, each 15 feet wide and 1 bay, 24 feet wide (inside dimension)".
- ✓ o Page 3-12 Change the minimum storage capacity of "7200 tons of solid waste at a density of 450 pounds per cubic yard" to "5400 tons of solid waste at a density of 550 pounds per cubic yard".
- ✓ o Pages 3-15, 3-16, 3-17, 3-18, Replace these pages with revised pages which are attached.
- o Figure 3-4 Replace Figure 3-4 with revised Figure 3-4 which is attached.
- ✓ o Page 3-22 The application states that the average water loss due to evaporation will be "1.2 mgd at 1800 tpd". This statement should be changed to "0.70 mgd at 1200 tpd".
- ✓ o Page 3-22 The application states that the amount of reclaimed water needed is "1.1 mgd when the facility is operating at 1800 tpd". This statement should be changed to "0.80 mgd when the facility is operating at 1200 tpd".
- ✓ o Page 3-22 The application states that the reclaimed water requirement at ultimate capacity is "1.5 mgd". This statement should be changed to "1.1 mgd".
- ✓ o Page 3-29 Replace page 3-29 with revised page 3-29 which is attached.
- ✓ o Page 3-30 Delete Table 3-5.
- ✓ o Page 3-35 Replace page 3-35 with revised page 3-35 which is attached.
- ✓ o Page 3-36 Change "36 tons" of lime used each day to "24 tons".

Section 4.0

- ✓ o Page 4-12 Change the refuse bunker size from "80 foot by 300 foot" to "approximately 70 foot by 235 foot".
- ✓ o Page 4-21 Change the construction project cost range from "\$155-170" to "\$125-140".

Section 5.0

- ✓ o Page 5-24 The amount of electricity generated by the facility over 20-years will change from "6.42 billion kilowatt hours" of electricity generation to "4.28 billion kilowatt hours".
- ✓ o Page 5-24 Change the reduction in oil expenditures from "\$8.25 million" to "\$5.58 million".

- ✓ o Page 5-24 Change the reduction in oil consumption from "11 million barrels" to "7 million barrels".
- ✓ o Page 5-24 Change "243,000 tons" of coal conserved to "162,000 tons".

Section 7.0

- ✓ o Page 7-3 The amount of electricity generated by the facility each year should be changed from "321 million" kilowatt hours (kWh) to "214 million" kWh.
- ✓ o Page 7-3 The amount of electricity generated over the life of the facility should be changed from "642 billion kWh (based on an average 550,500 tons per year)" to "4.28 billion kWh (based on 372,300 tons per year)".

Poor Original

Note: The original application value of 642 billion kWh should have been 6.42 billion kWh.

- ✓ o Page 7-3 Change the decrease in use of crude oil from "550,500 barrels per year" to "372,300 barrels per year".
- ✓ o Page 7-3 Change "11 million barrels" over the life of the facility to "7 million barrels".
- ✓ o Page 7-3 Change the reduction in spending for crude oil from "\$8.25 million" per year to "\$5.58 million".
- ✓ o Page 7-3 Change the reduction in spending over the 20-year life of the facility from "\$165 million" to "\$112 million".
- ✓ o Page 7-4 Change the total bond debt from "\$220-240 million" to "\$205-225 million".
- ✓ o Page 7-5 Replace Table 7-1 with revised Table 7-1 which is attached.
- ✓ o Page 7-6 Change the contractor cost from "\$155-170" million to "\$125-150" million.
- ✓ o Page 7-6 Change the total estimated capital costs from "\$160-175 million" to "\$125-140 million".
- ✓ o Page 7-6 Change the annual operating and maintenance fee of "\$8-9.5 million (based on 550,500 tons/year)" to "\$6 to 7 million (based on 372,300 tons/year)".

Lee County RRF Mailing List

Ms. Janet Strutzel
South Florida Water Management
District
2209 Peck St.
Fort Myers, FL 33901

Poor Original

Susan F. Clark/Michael Palecki
Florida Public Service Commission
101 East Gaines St.
Tallahassee, FL 32399-0863

Brad Hartman/Doug Bailey/James Antista
Game and Fresh Water Fish Commission
P.O. Box 6256
Bryant Building
Tallahassee, FL 32304

~~Tom Gardner~~
~~Bill Howell~~ Eugene E. McClellan, Jr.
Department of Natural Resources
3900 Commonwealth Blvd.
Tallahassee, FL 32399

Jim Dean
Florida Public Service Commission
101 E. Gaines Street
Fletcher Building
Tallahassee, FL 32399-0863

Paul Darst
Department of Community Affairs
2740 Center View Drive
Tallahassee, FL 32399-2100

Louis Tesar
Division of Historical Resources
and Records Management
R.A. Gray Building
Tallahassee, FL 32301

Eannix Poole
Department of Health and
Rehabilitative Services
1323 Winewood Blvd.
Tallahassee, FL 32301

Mr. Harold K. Mikell, Director
Division of Forestry
3125 Conner Boulevard
Tallahassee, FL 32399-1650

John Wodraska, Executive Director
South Florida Water Management
District
P.O. Box 24680
West Palm Beach, FL 33416-4680

William L. Sutton
Secretary of Commerce
Collins Building
Tallahassee, FL 32399

G. Stephen Pfeiffer, Esq.
Kathryn Funchess, Esq.
Dept. of Community Affairs
2740 Centerview Drive
Tallahassee, FL 32399-2100

~~Edward B. Helvenston, Esq.
Catherine D'Andrea, Esq.
Southwest Florida Water Management District
2379 Broad Street
Brooksville, FL 34609-6899~~

John Fumero, Esq.
South Florida Water Management District
P.O. Box 24680
West Palm Beach, FL 33416-4680

David Y. Burr, Planning Director
Southwest Florida Regional Planning Council
4980 Bayline Drive, 4th Floor
North Fort Myers, Florida 33918-3455

Poor Original

IMAGE QUALITY

**AS YOU REVIEW THE NEXT GROUP OF IMAGES, PLEASE NOTE
THAT THE ORIGINAL DOCUMENTS WERE OF POOR QUALITY.**



PPS-PA-90-30
8040

BOARD OF COUNTY COMMISSIONERS

P.O. Box 398
Fort Myers, Florida 33902-0398
(813) 334-2166

335-2276

Writer's Direct Dial Number

L-219-90

John E. Manning
District One

June 28, 1990

HAND DELIVER

Douglas R. St. Cerny
District Two

Ray Judah
District Three

Bill Fussell
District Four

Donald Slisher
District Five

Marsha Segal-George
County Administrator

James G. Yaeger
County Attorney

R. Scott Barker
County Hearing
Examiner

Florida Department of Environmental Regulation
Division of Air Resources Management
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RECEIVED

JUN 29 1990

DER CA...

ATTN: Hamilton Oven, Jr., P.E.
Power Plant Siting Section

RE: Application for Power Plant Site Certification
Lee County Energy Recovery Facility

Dear Mr. Oven:

Enclosed is Lee County's application for an Electrical Power Plant Siting Certification submitted pursuant to Chapter 17-17, FAC and FDER Form 17-1.211(1).

Lee County and its engineering consultant, Camp Dresser & McKee Inc., look forward to working with you and other reviewing agencies regarding this application.

We anticipate that the information contained herein provides the data necessary to allow a thorough evaluation of our application. However, if you find that additional data or clarification is required, do not hesitate to contact us.

Also enclosed is our check for \$25,000.00 to cover the application fee.

Sincerely,

George Reilly, P.E.
Director

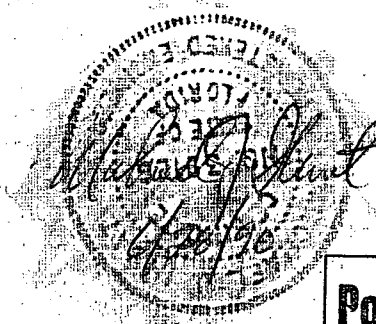
DEPARTMENT OF LEE COUNTY UTILITIES

LCL1/9

Enclosures (12 copies)

XC: M. J. Ihnat
D. E. Strobridge
R. J. Tietz

Hamilton Oven, Jr., P.E.
June 30, 1990
Page Two



Poor Original

ENGINEER SUBMITTING APPLICATION:

Michael J. Ihnat, P.E.
Principal

FLORIDA REGISTRATION NUMBER:

39126

APPLICANT INFORMATION

Applicant's Official Name: Lee County

Address: Lee County Utilities Department
2178 McGregor Boulevard
Fort Myers, Florida 33901

Business Entity: County Government

Name and Title of Business head: John Manning, Chairman
Lee County Board of County
Commissioners

Name, Title and Address of
Representative Responsible
for Obtaining Certification: George Reilly, P.E.
Administrative Director,
Lee County Utilities Department

Site Location: County - Lee

Nearest Incorporated City - Fort Myers

Latitude: 26°37'54"

Longitude: 81°45'41"

Township and Range: Section 24
Township 44S
Range 25E

Nameplate Generating Capacity of Proposed Facility: ~~40~~ 50 megawatts initially
~~65~~ megawatts ultimate
~~70~~

REMARKS: The purpose of the proposed energy recovery facility is to dispose of solid waste while recovering energy and providing an opportunity for materials recycling. This facility will afford Lee County a method of solid waste disposal which will minimize the need for landfilling operations. Lee County does not operate, maintain or construct facilities for the purpose of electric generation, and does not distribute electrical energy generated at facilities operated by others.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
VOLUME I - APPLICATION	
ABBREVIATIONS	
EXECUTIVE SUMMARY	ES-1
1.0 NEED FOR POWER AND THE PROPOSED FACILITIES	
1.1 General Description of the Project and the Affected Utility	1-1
1.2 Description of the Energy Recovery Facility	1-2
1.3 Conditions Indicating a Need for the Facility	1-3
1.4 Electrical Generating Alternatives	1-7
1.5 Non-Generating Alternatives	1-8
1.6 Consequences Without the Proposed Facility	1-9
1.7 Summary and Benefits of the Facility	1-9
2.0 SITE AND VICINITY CHARACTERIZATION	
2.1 Site and Associated Facilities Delineation	2-1
2.1.1 Site Location	2-1
2.1.2 Existing Uses	2-1
2.1.3 Site Modification	2-2
2.1.4 100-Year Flood Zone	2-3
2.2 Socio-Political Environment	2-3
2.2.1 Governmental Jurisdictions	2-3
2.2.2 Zoning and Land Use Plans	2-13
2.2.3 Demography and Ongoing Land Use	2-21
2.2.4 Easements, Title, Agency Works	2-25
2.2.5 Regional Scenic, Cultural and Natural Landmarks	2-25
2.2.6 Archaeological and Historic Sites	2-25
2.2.7 Socioeconomics and Public Services	2-26
2.3 Biophysical Environment	2-64
2.3.1 Geology and Soils	2-64
2.3.2 Groundwater Hydrology	2-76
2.3.2.1 Water Table Aquifer	2-76
2.3.2.2 Upper Hawthorn Confining Unit	2-80
2.3.2.3 Sandstone Aquifer	2-80
2.3.2.4 Water Quality	2-82
2.3.3 Site Water Budget and Area Uses	2-83
2.3.4 Surficial Hydrology	2-84
2.3.5 Vegetation/Land Use	2-86
2.3.6 Ecology	2-92
2.3.7 Meteorology and Ambient Air Quality	2-102
2.3.8 Noise	2-116

TABLE OF CONTENTS
(Continued)

<u>Section</u>	<u>Page</u>
3.0 THE FACILITY AND DIRECTLY ASSOCIATED FACILITIES	
3.1 Background	3-1
3.1.1 Solid Waste Collection	3-3
3.1.2 Facility Siting	3-4
3.1.3 Proposed Facilities	3-5
3.2 Site Layout	3-7
3.2.1 Building Dimensions	3-8
3.2.2 Visual Impact	3-9
3.3 Fuel	3-11
3.3.1 Fuel Supply	3-11
3.3.2 Fuel Storage	3-12
3.4 Air Emissions and Controls	3-18
3.4.1 Air Emission Types and Sources	3-18
3.4.2 Air Emission Controls	3-19
3.4.3 Best Available Control Technology (BACT)	3-20
3.4.4 Design Data for Control Equipment	3-20
3.4.5 Design Philosophy	3-20
3.5 Plant Water Use	3-21
3.5.1 Heat Dissipation System	3-21
3.5.2 Domestic/Sanitary Wastewater	3-26
3.5.3 Potable Water Systems	3-27
3.5.4 Process Water Systems	3-27
3.6 Chemical and Biocide Wastes	3-27
3.7 Solid and Hazardous Waste	3-27
3.7.1 Solid Wastes (Including Ash)	3-27
3.7.2 Hazardous Wastes	3-33
3.8 On site Drainage System	3-33
3.9 Materials Handling	3-34
3.10 Associated Facilities	3-36
4.0 ENVIRONMENTAL EFFECTS OF SITE PREPARATION, AND FACILITY AND ASSOCIATED FACILITIES CONSTRUCTION	
4.1 Land Impact	4-4
4.1.1 General Construction Impacts	4-4
4.1.2 Roads	4-7
4.1.3 Flood Zones	4-7
4.1.4 Topography and Soils	4-8
4.2 Impact on Surface Water Bodies and Uses	4-9
4.2.1 Impact Assessment	4-9
4.2.2 Measuring and Monitoring Programs	4-10

TABLE OF CONTENTS
(Continued)

<u>Section</u>	<u>Page</u>
4.0 ENVIRONMENTAL EFFECTS OF SITE PREPARATION, AND FACILITY AND ASSOCIATED FACILITIES CONSTRUCTION (Continued)	
4.3 Groundwater Impacts	4-11
4.3.1 Impact Assessment	4-11
4.3.2 Measuring and Monitoring Programs	4-12
4.4 Ecological Impacts	4-13
4.4.1 Impact Assessment	4-13
4.4.2 Measuring and Monitoring Programs	4-15
4.5 Air Impact	4-16
4.5.1 Emission Rates	4-16
4.6 Impact on Human Populations	4-18
4.6.1 Sensitive Receptors	4-19
4.6.2 Work Force	4-19
4.6.3 Traffic Associated with Construction	4-21
4.7 Impact on Landmarks and Sensitive Areas	4-22
4.8 Impact on Archaeological and Historic Sites	4-22
4.9 Special Features	4-22
4.10 Summary of Impacts and Benefits from Construction	4-23
4.11 Variances	4-24
5.0 EFFECTS OF PLANT OPERATION	
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	5-2
5.1.4 Effects of Offstream Cooling	5-2
5.1.5 Measurement Program	5-6
5.2 Effects of Chemical and Biocide Discharges	5-7
5.2.1 Industrial Wastewater Discharges	5-7
5.2.2 Cooling Tower Blowdown	5-7
5.2.3 Measurement Programs	5-8
5.3 Impacts on Water Supplies	5-8
5.3.1 Surface Water	5-8
5.3.2 Groundwater	5-8
5.3.3 Drinking Water	5-10
5.3.4 Leachate and Runoff	5-10
5.3.5 Groundwater Modeling and Monitoring	5-11
5.4 Solid/Hazardous Waste Disposal Impacts	5-11
5.4.1 Solid Waste	5-11
5.4.2 Hazardous Waste	5-14
5.5 Sanitary and Other Waste Discharges	5-15
5.6 Air Quality Impacts	5-15
5.6.1 Impact Assessment	5-15
5.6.2 Monitoring Program	5-18

TABLE OF CONTENTS
(continued)

<u>Section</u>	<u>Page</u>
5.0 EFFECTS OF PLANT OPERATION (continued)	
5.7 Noise	5-20
5.8 Changes in Non-Aquatic Species Populations	5-22
5.8.1 Impact	5-22
5.8.2 Monitoring	5-22
5.9 Other Plant Operation Effects	5-22
5.10 Archaeological Sites	5-23
5.11 Resources Committed	5-23
5.12 Variances	5-24
6.0 TRANSMISSION LINES AND OTHER LINEAR FACILITIES	
6.1 Transmission Lines	6-1
6.2 Associated Linear Facilities	6-2
7.0 ECONOMIC AND SOCIAL EFFECTS OF FACILITY CONSTRUCTION AND OPERATION	
7.1 Socioeconomic Benefits	7-2
7.2 Socioeconomic Costs	7-4
8.0 SITE AND FACILITY DESIGN ALTERNATIVES	
8.1 Site Alternatives	8-1
8.2 Alternative Water Source	8-2
9.0 COORDINATION	9-1
10.0 REFERENCES	10-1

VOLUME II - APPENDICES

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 SITE AND ABUTTING PROPERTY OWNERSHIP	1-1
1.1 Deed for Property and Legal Description	1-1
1.2 Abutting Property Owners	1-3
2.0 REZONING PROCEDURES	2-1
3.0 ZONING AND LAND USE PLANS	3-1
4.0 ALTERNATIVE ENERGY RECOVERY FACILITY SITE ANALYSIS	4-1
5.0 INTERLOCAL AGREEMENTS	5-1
5.1 Lee County/Hendry County Interlocal Agreement	5-1
5.2 Request for Commitment from City of Fort Myers for Reclaimed Water	5-25
6.0 FEDERAL PERMIT APPLICATIONS AND APPROVALS	6-1
6.1 NPDES Permit Application for Construction Dewatering	6-1
6.2 NPDES Permitting for Stormwater Discharge	6-8
6.3 Federal Energy Regulatory Commission Order; Public Service Commission Order	6-9
6.4 Federal Aviation Administration Coordination	6-14
6.5 Joint Application for Activities in the Waters of the State of Florida (COE/DER)	6-16
6.6 Coastal Zone Management Coordination	6-22
7.0 STATE PERMIT APPLICATIONS AND APPROVALS	7-1
7.1 Landfill Permit Application Form	7-1
7.2 SFWMD Water Use Permit Application for Emergency Supply Groundwater Wells	7-12
7.3 SFWMD 40E-4 (Stormwater) Permit Application	7-33
7.4 SFWMD Notice of Intent to Short-Term Dewater	7-111
7.5 Electric and Magnetic Field Compliance DER 17-274	7-114
8.0 CORRESPONDENCE FROM FEDERAL, STATE, AND LOCAL AGENCIES	8-1

TABLE OF CONTENTS
(Continued)

<u>Section</u>	<u>Page</u>
9.0 GROUNDWATER WELL INVENTORY	9-1
9.1 Consumptive Use Permits	9-1
9.2 Private Wells	9-38
10.0 GEOTECHNICAL REPORT AND ARCHAEOLOGICAL REPORT	10-1
10.1 Geotechnical Report	10-1
10.2 Archaeological Report	10-19
11.0 NOISE IMPACT STUDY AND TRAFFIC IMPACT STUDY	11-1
11.1 Noise Impact Study	11-1
11.2 Traffic Impact Study	11-81
12.0 ECOLOGICAL STUDIES METHODOLOGY	12-1

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1-1	Population and Waste Quantity Projections	1-5
1-2	Capacity and Energy Contribution from Qualifying Facilities	1-6
2-1	Proposed Land Use Divisions of the Facility	2-4
2-2	Governmental Jurisdictions Within a Five-Mile Radius	2-5
2-3	Governmental Jurisdictions Information Sources	2-9
2-4	Population: Lee County 1970-1988	2-22
2-5	Census Tract Population: 1980	2-28
2-6	Population Projections: Lee County 1990-2020	2-29
2-7	Planning District Permanent Population: 1990-2010	2-30
2-8	Labor Force Figures: Lee County 1980-1988	2-31
2-9	Major Private Sector Employers: Lee County	2-33
2-10	Average Monthly Employment: Lee County 1980-1988	2-34
2-11	Monthly Employment: Lee County January-June 1989	2-37
2-12	Projected Employment: Fort Myers and Cape Coral 1995-2035	2-38
2-13	Annual Payroll by Industrial Sector Lee County 1980-1988	2-39
2-14	Average Annual Salary by Industrial Sector Lee County 1980-1988	2-43
2-15	Income by Household: Lee County 1980	2-46
2-16	Housing Units: 1980	2-47
2-17	Age of Housing Stock: 1980	2-48
2-18	Housing Values: 1980	2-50
2-19	Median Housing Values: 1980	2-51
2-20	Building Permits: Lee County 1989	2-52
2-21	Existing Roadways	2-54
2-22	Existing Traffic Volumes	2-55
2-23	Performance Standards	2-56
2-24	Existing Wastewater Constituent Concentration Limits	2-61
2-25	Proposed Maximum Wastewater Discharge Limitations	2-62
2-26	Summary of Collection Practices	2-63a
2-27	Summary of Soil Borings	2-71
2-28	Summary of Sieve Data for Soil Samples	2-73
2-29	On-site Groundwater Elevation Data	2-78
2-30	Summary of Groundwater Quality Data	2-82
2-31	Hydrological Data Representative of the Project Site	2-85
2-32	Wildlife Observed or Expected to Occur on Lee County Energy Recovery Site	2-92
2-33	Normals, Means, and Extremes; Page Field Airport, Fort Myers	2-104
2-34	Holtzworth Mixing Heights for the Fort Myers Area	2-107
2-35	Comparison of Significant Emission Rates and Lee County Energy Recovery Facility Maximum Expected Controlled Emissions	2-109

LIST OF TABLES
(Continued)

<u>Table</u>		<u>Page</u>
2-36	Comparison of Maximum Predicted Concentrations of Regulated Pollutants to Significant Impact and De Minimis Monitoring Levels	2-110
2-37	Ambient Monitoring Data Used to Derive Background Concentrations	2-111
2-38	Proposed Background Concentrations for Criteria Pollutants	2-113
2-39	Air Pollution Measurement Methods	2-115
2-40	Ambient Noise Monitoring Locations	2-118
2-41	Lee County Energy Recovery Facility Existing Noise Conditions	2-119
3-1	Reference Solid Waste Composition	3-13
3-2	Reference Solid Waste Ultimate Analysis	3-14
3-3	Current Effluent Limits for the Fort Myers Central Advanced Wastewater Treatment Plant	3-23
3-4	April 19, 1990 Effluent Sample Analysis Results for the Fort Myers Central Advanced Wastewater Treatment Plant	3-24
3-5	Estimated Annual and Daily Quantities of Ash Residue for Lee and Hendry Counties	3-30
4-1	Estimate of Construction Equipment Requirements	4-5
5-1	Results of Virological Testing, City of St. Petersburg	5-5
5-2	Projected Solid Waste Quantities, Lee and Hendry Counties, 1995-2030	5-13
5-3	Comparison of Predicted Impacts from the Lee County Energy Recovery Facility and Ambient Background Concentrations to the NAAQS/FAAQS	5-17
5-4	Comparison of Impacts from the Lee County Energy Recovery Facility to PSD Class II Increments	5-19
5-5	Lee County Energy Recovery Facility; Facility Noise Levels (DBA)	5-21
7-1	Regional Economic Impact	7-5
9-1	Contacts and Correspondence	9-1

LIST OF FIGURES

<u>Figure</u>		<u>Follows Page</u>
1-1	System Net Summer Peak Load	1-5
1-2	System Net Winter Peak Load	1-5
1-3	Net Energy for Company Load	1-5
2-1	General Location Map	2-1
2-2	Site Location Map	2-1
2-3	Boundary Survey	2-1
2-4a	Abutting Properties	2-1
2-4b	Existing and Abandoned Landfills	2-2
2-5	Site Location : Aerial Survey	
	2-5a 1:1000 Scale	2-2
	2-5b 1:200 Scale	2-2
2-6	Site Layout	2-2
2-7	100 Year Flood Prone Areas	2-3
2-8	Governmental Jurisdictions Within a Five-Mile Radius	
	2-8a Local	2-3
	2-8b State	2-3
	2-8c Federal	2-3
2-9	Governmental Jurisdictions Within a One-Mile Radius(Detail)	2-3
2-10	Future Land Use	2-16
2-11	Zoning	2-20
2-12	Existing Land Use	2-23
2-13	Archaeological and Historic Sites	2-26
2-14	Planning Districts and Census Tracts	2-26
2-15	Water and Wastewater Treatment Plant Locations	2-59
2-16	Proposed Landfill Location	2-63
2-17	Soils Map	2-64
2-18	Generalized Geologic Stratigraphy	2-66
2-19	Geologic Unit Pinchout Boundaries	2-67
2-20	Site Boring Locations	2-70
2-21	Isopach Map of Top of Sandstone Aquifer	2-74
2-22	Water Table Surface	
	2-22a Wet Season	2-76
	2-22b Dry Season	2-76
2-23	Groundwater Potentiometric Surface of Sandstone Aquifer Water Level	
	2-23a Wet Season	2-79
	2-23b Dry Season	2-79
2-24	Permitted Wells Within a Five-Mile Radius	2-81
2-25	Predevelopment Surface Water Flow Patterns	2-86
2-26	Vegetational Communities and Land Use	2-86
2-27	Endangered Species Habitat Within a Five-Mile Radius	2-97
2-28	Wind Speed and Direction Rose, Five-Year Average	2-103
2-29	Area Map with Prevailing Wind Direction (1982-1986)	2-103
2-30	Seasonal Wind Speed and Direction Roses (1982-1986)	2-103
2-31	Noise Monitoring Locations	2-116

LIST OF FIGURES
(Continued)

<u>Figure</u>		<u>Follows Page</u>
3-1	Energy Recovery Schematic	3-6
3-2a	Typical Facility Cross-Section (Stoker Waterwall Design)	3-8
3-2b	Typical Facility Cross-Section (Rotary Waterwall Design)	3-8
3-3	Visual Impact Study	3-9
3-4	Quantitative Water Use Diagram	3-21
3-5	Predevelopment Surface Water Drainage Basins	3-33
3-6	Surface Water Management Area	3-34
4-1	Construction Phases and Activities	4-1
4-2	Estimated Solid Waste Generated During Construction	4-6
4-3	Estimated Work Force Requirements During Construction	4-20
5-1	Drawdown Effects on Neighboring Wells	5-9
5-2	Air Quality Impacts Compared to FAAQS	5-16
6-1	Power Line Transmission Corridor	6-1
6-2	Proposed Utility Transmission Routes	6-2

ABBREVIATIONS

Technical Terms and Units of Measurement

5-5-3-1	5 mg/L BOD, 5 mg/L TSS, 3 mg/L Nitrogen, 1 mg/L Phosphorus
AADT	Average Annual Daily Traffic
ADT	Average Daily Traffic
AWT	Advanced Wastewater Treatment
BOD	Biological Oxygen Demand
Btu	British Thermal Unit
cfs	Cubic Feet per Second
CLU	Critical Level Volume
CMP	Corrugated Metal Pipe
COD	Chemical Oxygen Demand
csm	Cubic Feet per Second per Square Mile
cy	Cubic Yards
dBA	Decibels (A-Weighted Scale)
dscf	Dry Standard Cubic Foot (Feet)
du/a	Dwelling Units per Acre
ERF	Energy Recovery Facility
ESP	Electrostatic Precipitator
ET	Evapotranspiration
FGD	Flue Gas Desulfurization
GEP	Good Engineering Practice
gpd	Gallons Per Day
gpm	Gallons Per Minute
gr	Grain(s)
HHV	Higher Heat Value
KWH	Kilowatt Hour
lb	Pound
L _{eq}	Equivalent Continuous Sound Levels
LOS	Level of Service
mgd	Million Gallons Per Day
mg/L	Milligrams per Liter

ABBREVIATIONS

(Continued)

ml	Milliliters
MPN	Most Probable Number
MSL	Mean Sea Level
MSW	Municipal Solid Waste
NGVD	National Geodetic Vertical Datum
NTU	Nephelometric Turbidity Unit
pCi/L	Pico-Curies per Liter
PFU	Plaque Forming Units
PM ₁₀	Particulate Matter with equivalent diameter of less than 10 microns
ppm	Parts Per Million
ppmdv	Parts Per Million, Dry Volume Basis
PVC	Polyvinyl Chloride
SPT	Standard Penetration Test Boring
2,3,78 TCDD	Tetrachlorodibenzo-p-dioxon
tpd	Tons Per Day
tpy	Tons Per Year
TKN	Total Kjeldahl Nitrogen
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
ug/L	Micrograms per Liter
ug/m ³	Micrograms per Cubic Meter
umhos/cm	Micro-mhos per Centimeter
VOC	Volatile Organic Compound
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

Agencies and Regulatory Terms

AAQS	Ambient Air Quality Standards
ASTM	American Society of Testing and Materials
BACT	Best Available Control Technology
CDM	Camp Dresser & McKee Inc.
CFR	Code of Federal Regulations
COE	United States Army Corps of Engineers
CUP	Consumptive Use Permit
DER	Department of Environmental Regulation, State of Florida
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FAC	Florida Administrative Code
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FGFWFC	Florida Game and Freshwater Fish Commission
FHWA	Federal Highway Administration
FLUCFCS	Florida Land Use, Cover and Forms Classification System
FMSF	State of Florida Master Site File (archaeological/historic sites)
FP&L	Florida Power and Light Corporation
FTE	Florida Transportation Engineering
ISCST	Industrial Source Complex Short Term
KLECE	Kevin L. Erwin Consulting Engineers, Inc.
NAAQS	National Ambient Air Quality Standards
NESHAPS	National Emissions Standards for Hazardous Air Pollutants
NPDES	National Pollution Discharge Elimination System
OBERS/BEA	Office of Business and Economic Research Service; Bureau of Economic Analysis
PSD	Prevention of Significant Deterioration

ABBREVIATIONS

(Continued)

SCS	Soil Conservation Service, USDA
SR	State Road
SFWMD	South Florida Water Management District
STAMINA	United States Department of Transportation, Federal Highway Administration, Noise Model, (March 1982)
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WUP	Water Use Permit

PREFACE

On May 1, 1991, the Board of County Commissioners of Lee County formally adopted a resolution to build an energy recovery facility with an initial capacity of 1,200 tons per day (tpd), and a future maximum capacity of 1,800 tpd. This facility will be smaller than that previously considered by the County (1,800 tpd initially, with a future maximum of 2,400 tpd). An Application for Power Plant Site Certification was submitted to the Florida Department of Environmental Regulation for the previously considered larger facility in June, 1990. This current permit application contains revisions to the one submitted in June, 1990, to reflect the reduced predicted air quality impacts for the current smaller Facility size. Other changes have been made to incorporate the recently promulgated New Source Performance Standards for Municipal Waste Combustors, and the passage of the Clean Air Act Amendments of 1990.

Most of the changes, updates and revisions are found in Volume III; however, changes are also found in Volume I. The changes in air quality impacts for Volume I are provided in a revised copy of Sections 3.0 and 5.0. Other changes in Volume I have been provided in the June 9, 1991 Errata Sheet. Revised Sections 3.0 and 5.0 (June 28, 1991) include the revisions provided in the June 5, 1991 Errata Sheet.

EXECUTIVE SUMMARY

INTRODUCTION AND BACKGROUND

Lee County has been investigating alternative methods of long-term solid waste disposal since 1979 when the State of Florida enacted legislation (Chapter 403.706, Florida Statutes) that required the County to submit solid waste resource recovery and management plans. Subsequent to the development of a comprehensive 40-year solid waste master plan in 1989, the County has decided to pursue the implementation of an integrated solid waste management system. Lee County has signed an interlocal agreement with adjacent Hendry County, and intends to develop the system to serve the solid waste disposal needs of both counties. The system will incorporate an aggressive recycling/materials recovery program, an ~~1,800-ton~~^{1,200} per day (tpd) energy recovery facility to process and dispose of the waste which remains after recycling (which was sized taking into account ~~the reduction~~^{1,800} in the waste stream due to recycling, and is expandable to ~~2,400-tpd~~), a new sanitary landfill/ashfill for the disposal of bypass wastes and ash residue, and a Class III landfill for construction and demolition debris.

Pursuant to Section 403.505, Florida Statutes, Lee County is applying for site certification of the solid waste energy recovery facility. This application has been prepared in accordance with Chapter 17-17, Florida Administrative Code (FAC), and follows the format prescribed in the Florida Department of Environmental Regulation (DER) Form 17-1.211(1), FAC (Instruction Guide for Certification Application: Electrical Power Plant Site, Associated Facilities, and Associated Transmission Lines).

The proposed energy recovery facility meets the State Legislature's intent "to encourage energy conservation in order to protect the health, prosperity, and general welfare of the state and its citizens." By developing this Facility, the County also recognizes the Legislature's declaration that: (1) "the disposal of solid refuse is an important governmental obligation and that, if the disposal is not accomplished in a proper manner, such refuse poses a definite threat to the public health and welfare," and (2) "the combustion of refuse by solid waste facilities to

supplement the electricity supply not only represents an effective conservation effort but also represents an environmentally preferred alternative to conventional solid waste disposal in the state" [Section 377.709(1), Florida Statutes].

This application comprises three volumes:

- o Volume I (Application) contains the applicant information sheet, and Sections 1.0 through 10.0 of the application which describe existing conditions, the proposed Facility, and construction and operational impacts.
- o Volume II (Appendices) contains the appendices to the application. In addition to the appendices required by the DER Instruction Guide, several other appendices are included to supplement Volume I.
- o Volume III (Air Quality) contains information concerning the Prevention of Significant Deterioration (PSD) determination and the Best Available Control Technology (BACT) determination.

The following summarizes the material contained in this application.

NEED FOR POWER AND THE PROPOSED FACILITIES

The purpose of the proposed energy recovery facility is to process and dispose of that solid waste generated in Lee and Hendry counties that remains after recycling. The County sought an alternative to conventional solid waste disposal methods due to the shortage of suitable land for landfilling. The combustion of solid waste will reduce the volume of waste to be landfilled by up to 90 percent, thus significantly extending the useful life of the landfill while generating electricity which will conserve traditional fossil fuels. The energy recovery facility also meets the state's objectives concerning energy conservation and reduced landfilling [Section 377.709(1), Florida Statutes].

Lee County has filed an application with the Federal Energy Regulatory Commission (FERC) for certification of the Facility as a small power production facility. The County is currently negotiating an agreement with Florida Power & Light (FP&L) for the sale of electrical power from the Facility. The terms, conditions, and pricing embodied in the power purchase agreement will be in accordance with applicable Florida Public Service Commission (FPSC) Rules and Requirements, and Florida Administrative Code Rules 25-17.082 and 25-17.083. A petition for the determination of need will be submitted to FPSC under separate cover.

SITE AND VICINITY CHARACTERIZATION

The site for the proposed energy recovery facility was selected in March 1990 following detailed site analyses and public hearing reviews. The site is located in east-central Lee County near the waste generation centroid of both counties. Lee County is in the process of purchasing a 155-acre tract constituting portions of the southeast quarter of Section 24 (145.2 acres), the northeast quarter of Section 25 (2.8 acres), and 7.0 acres along the eastern and northern boundaries of the northeast quarter of Section 24, Township 44S, Range 25E for development of the Facility. This site is approximately two and one-half miles east of the intersection of Interstate 75 and State Road 82.

The site is predominantly rural with no residences, and comprises approximately 124 acres of upland habitat and 32 acres of wetland vegetation. The wetland habitats on the site have been severely impacted by cattle grazing, logging activities, and drainage practices over the past 20 years. The site is not located within the 100-year flood zone as defined by the Federal Emergency Management Agency (FEMA).

Local, regional, state, and federal agencies were contacted to determine any areas of concern on or in proximity to the site. Zoning districts and adjacent land uses were evaluated for compliance with regional, County, and municipal comprehensive plans. Lee County is in the process of rezoning the site from AG-2 (agricultural) to IPD (industrial planned development) for consistency with its intended use. (See Section 2.2 of Volume I for a detailed discussion on land use and zoning.)

Numerous studies were conducted on the Facility site, including ecological, archaeological, geotechnical, traffic, noise, and air quality impact analyses. Copies of all of these studies are included in Volume II, with the exception of air quality impacts which are presented in Volume III. The conclusions of these studies indicate that the site is suitable for its proposed use and will have minimal impact on the surrounding environment. These studies are summarized below. In general, the Facility will be designed and operated to meet all applicable federal, state, and local requirements.

- o Air Quality - An air pollution control technology evaluation and an air quality impact assessment were conducted for the proposed Facility. The control technology evaluation considered energy, environmental, and economic criteria. Dry scrubbers and baghouses are proposed as Best Available Control Technology for the Facility. If stoker waterwall technology is selected, a deNO_x system is also recommended. If a rotary waterwall technology is selected, staged combustion/low excess air will be used to control NO_x. The air quality impact assessment compared the predicted air quality impacts from the proposed Facility to Florida and National Ambient Air Quality Standards (FAAQS/NAAQS) and PSD Class I and Class II increments. These analyses demonstrated that the predicted impacts of the proposed Facility will be extremely small—they will be less than significant levels and will not cause air quality standards or increments to be exceeded.
- o Surface Water and Groundwater - Because the Facility is totally enclosed, no contamination of stormwater runoff will occur. Stormwater runoff will be managed on-site, and discharges will be in accordance with South Florida Water Management District (SFWMD) Rule 40E-4. With the exception of dewatering activities during Facility construction, no impacts to surface water or groundwater are expected. Refuse storage and ash residue handling operations will be totally

enclosed inside the Facility so that no runoff from these operations will occur. All cooling water needed by the Facility will be drawn from the Central Fort Myers Advanced Wastewater Treatment Plant (Central WWTP), and all wastewater discharged from the Facility will be routed to the Central WWTP. Nearly all Facility process water will be recycled, with no discharge to surface or ground waters. An on-site well will provide a back-up supply of process cooling water for the Facility. Potable water needs will be met from existing municipal supplies.

- o Impacts to Wetlands - Wetland impacts will be minimal and will be primarily associated with construction of the electrical interconnect power line. Construction of the Facility itself will not disturb any wetlands; construction of an associated transmission line may affect a maximum of 2.7 acres. An assessment of ecological impacts indicated that limited low quality wetlands exist on the Facility site. These wetland areas have been severely disturbed by 20 years of cattle grazing, logging, and drainage activities. Nevertheless, measures will be taken to avoid or minimize any impacts to any wetland areas on the site, both during construction and Facility operations.
- o Plant and Animal Communities - During more than 100 observer hours of site surveying by four professional ecologists, there were no direct observations or other evidence of species listed as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS) or the Florida Game and Fresh Water Fish Commission (FGFWFC) within the Facility site boundaries. The ecological impact assessment also concluded that species diversity and composition on the site would not be impacted by the Facility.
- o Archaeological and Historic Sites - An archaeological and historic survey was conducted of the eastern half of Section 24. The survey revealed two sites of interest: (1) a

prehistoric campsite marked by a single chert waste flake, and (2) an early 20th century board-and-batten structure which has been highly modified and is in poor condition. While these sites were discovered within the study area, neither are actually located on the Facility site, nor are either of these finds considered to be a regionally significant cultural resource.

- o Geological Conditions - Subsurface conditions at the Facility site are considered typical of those normally encountered in Lee County and southwest Florida. Certain subsurface conditions will require specific site preparation and subsurface design which has been included in the Facility design plan.
- o Noise - A technical noise analysis revealed that noise levels at the closest residence, approximately 1,500 feet away from the Facility, will only increase by 2 to 3 dBA above existing and anticipated ambient noise levels as a result of Facility operations. This small increase will not be perceptible to the human ear.
- o Traffic - A traffic impact study revealed that the Facility will have no adverse impacts or effects on the existing level of service on the surrounding roadway network. A left-turn lane for eastbound traffic on Buckingham Road is recommended to facilitate vehicle access to the site. No other road improvements associated with the Facility are required to minimize traffic impacts.
- o Aesthetics - A visual impact study revealed that a major portion of the Facility will be obscured from view from most off-site vantage points due to the natural buffer surrounding the site. The Facility stack will be visible for up to approximately two miles in some directions, but it will be fully or partially obscured at most other locations (even as close as one-half mile). Visual impacts will be minimized by

the use of existing natural buffers and planned landscaping. The design of the Facility will be aesthetically pleasing and architecturally compatible with the surrounding area.

THE FACILITY AND DIRECTLY ASSOCIATED FACILITIES

The proposed Facility will be a mass-burn energy recovery facility with an initial design-rated capacity of 1,800 tons of municipal solid waste per day. In anticipation of future waste disposal needs, Lee County is seeking certification for an ultimate design-rated capacity of 2,400 tpd with a total electrical generating capacity of approximately 65 megawatts (net). The Facility will use either three stoker waterwall combustion/steam generation units each rated at 600 tpd, or four rotary waterwall units each rated at 450 tpd. Each boiler unit will be operated and serviced independently. An additional boiler unit of the selected technology type will be added to expand the Facility to its ultimate capacity when needed. The County will contract with a full-service vendor to design, construct, and operate the Facility for 20 years.

Since the proposed Facility will use mass-burn technology, no pre-processing of wastes will be conducted at the Facility prior to combustion. However, separation of recyclables will occur at the waste generation sites. Municipal solid wastes will be reduced to about 10 percent of original volume and about 30 percent of original weight. The Facility will be equipped with a fabric filter (baghouse) for particulate removal and an acid gas dry scrubber for each combustion train. If stoker waterwall technology is selected, a deNO_x system is also recommended. If a rotary waterwall technology is selected, staged combustion/low excess air will be used to control NO_x. Bypass wastes and ash residue will be disposed of at ~~a new double-lined landfill/ashfill~~ ^{which the County hopes will be} located in Hendry County. Other facilities associated with the County's integrated solid waste management system, which will be remotely located and permitted separately, include: a Class III landfill for construction/demolition debris, a sludge composting facility, and a materials recovery facility for the initial processing of recyclables to be delivered to an end-use market.

Lee County will dispose of its ash in a properly designed, constructed, and operated ashfill. The ashfill will be reviewed and subject to approval by all of the appropriate regulatory agencies in accordance with all of the applicable local, state, and federal regulations. Lee County will designate the specific ash disposal area, and will obtain DER's prior written approval for the proposed use of the ash disposal area, before Lee County begins the operation of its resource recovery facility. All of the necessary permits and approvals for the ashfill will be obtained before the resource recovery facility begins its operations and before Lee County disposes of any ash in the disposal site.

Poor Original

Lee County hopes that the ashfill will be located somewhere in western Hendry County, consistent with the requirements of the Lee County/Hendry County interlocal agreement. However, at this time Lee County does not have a permitted ash disposal site and thus cannot say with certainty where the ash will be deposited.

ENVIRONMENTAL EFFECTS OF SITE PREPARATION, AND FACILITY AND ASSOCIATED
FACILITIES CONSTRUCTION

A 28-month construction schedule is anticipated for the Facility. Both positive and negative impacts are associated with any construction project of this size. Positive impacts include: the creation of new jobs, additional income to the area generated by the construction work force, and revenues from the purchase of goods and services related to construction operations. In addition to these positive construction impacts, long-term benefits associated with the Facility include: a safe method of solid waste processing and disposal; a reduction in landfill requirements; increased protection of groundwater supplies; the generation of electrical power for resale; the conservation of oil, gas, and coal; and increased employment associated with a permanent work force. Negative impacts include: increased waste generation from general construction activities and on-site workers; the disturbance of existing terrain; the alteration of site topography; minimal temporary aquifer drawdown due to dewatering during construction of the refuse pit; minimal impacts to existing low quality wetlands due to fill areas; localized short-term air quality impacts from fugitive dust emissions and fuel combustion; short-term noise increases due to construction; and increased traffic.

EFFECTS OF FACILITY OPERATION

There will be no discharges to surface waters or groundwater from the Facility and, therefore, no temperature effect on receiving water bodies, no effects on aquatic life, and no biological effects of modified circulation. The cooling towers and other in-plant process uses of the proposed Facility will use approximately 1.5 million gallons of reclaimed water per day from the Central WWTP. Chlorine or an equivalent will be used for high-level disinfection of the reclaimed water in compliance with Chapter 17-610.460, FAC. To assure high quality makeup water, a monitoring program will be established in compliance with Chapter 17-610.463, FAC.

A maximum of 150,000 gallons per day (gpd) of combined sanitary and process wastewater will be routed to the Central WWTP following pretreatment in accordance with the Fort Myers Sewer Use Ordinance. Cooling tower blowdown

will be treated and reused at the energy recovery facility to the greatest extent possible; any cooling tower blowdown not reused at the Facility will be blended with sanitary wastewater and discharged to the Central WWTP. Wastewater discharges will be monitored in accordance with the City of Fort Myers Sewer Use Ordinance.

There will be no long-term impacts to surface water as a result of Facility operations. A stormwater retention pond will be designed to contain Facility runoff during a 25-year storm event. Groundwater wells are proposed to provide an emergency back-up supply of cooling water for the Facility. Since the wells will only be used infrequently, if at all, no impact on surface water or wetlands is anticipated. All solid waste and ash residue will be stored in enclosed buildings to prevent contact with stormwater runoff. A groundwater monitoring program will be established.

No hazardous wastes will be accepted or created at the Facility. A chemical and toxicity analysis of the combined ash residue will be conducted during acceptance testing and quarterly thereafter to verify that the ash is not toxic or hazardous. Based upon tests at similar facilities, the ash residue is not expected to be hazardous according to U.S. Environmental Protection Agency (EPA) and DER standards. This waste material is suitable for disposal in a Class I permitted sanitary landfill/ashfill.

TRANSMISSION LINES AND OTHER LINEAR FACILITIES

Electrical power generated at the Facility will be routed to an FP&L substation via transmission lines to be constructed along the eastern and northern site boundary. Three transmission pipelines will be constructed to convey potable water and reclaimed water to the site and to transport wastewater from the site. These lines will all be constructed in existing rights-of-way and will avoid major intersections and congested areas to the maximum extent practicable. Potable water will be supplied by Lee County's Corkscrew Water Treatment Plant. Reclaimed water will be supplied by the City of Fort Myers Central Advanced Wastewater Treatment Plant, and wastewater generated at the Facility will be treated at the Central WWTP.

ECONOMIC AND SOCIAL EFFECTS OF FACILITY CONSTRUCTION AND OPERATION

Socioeconomic benefits associated with the proposed energy recovery facility include: a reduction in landfill needs and the associated public opposition and environmental risks; a significant decrease in waste quantities due to the reduction in processed waste volumes and a corresponding reduction in landfill space requirements (thus increasing the life span of the landfill); improved protection of ground and surface water resources; the generation of electricity and corresponding decrease in the use of crude oil and other fossil fuels; the full-time permanent employment of approximately 54 personnel which will contribute to the local economy; and construction related benefits to the local economy and labor market, and regional economic benefits to industries involved in the construction process.

Construction costs will be financed with system revenue bonds. The total bonded indebtedness for Facility development is estimated to range between ~~\$220 and \$240 million.~~ *\$205 and \$225 million.* The County will finance debt service and operating costs through user fees.

SITE AND FACILITY DESIGN ALTERNATIVES

Many factors were evaluated during the planning of the Lee County energy recovery facility including: alternative sites, solid waste management methods, ownership and financing options, Facility sizes, and boiler redundancy. The energy recovery facility is an integral component of the County's overall solid waste management system. The system also incorporates an aggressive recycling program that is being implemented in phases and will comply with the state's 30 percent waste reduction goal by 1994 in accordance with the 1988 Solid Waste Management Act (88-130). The alternatives chosen for implementation of the Facility were those deemed to be the most environmentally and economically sound for Lee County.

Section 1

SECTION 1.0

NEED FOR POWER

AND

THE PROPOSED FACILITIES

1.0 NEED FOR POWER AND THE PROPOSED FACILITIES

Poor Original1.1 GENERAL DESCRIPTION OF THE PROJECT AND THE AFFECTED UTILITY

This project consists of a solid waste-to-energy resource recovery facility employing mass-burn technology (energy recovery facility). The initial facility size will allow processing of 1,800 tons per day (tpd) of municipal solid waste, and will have an installed generating capacity of approximately 50 Mw of which ~~43 Mw~~ ^{UP TO 35 mw} will be available for sale to Florida Power & Light (FP&L). The Facility will be designed with expansion capability to allow processing of an additional 600 tpd (2,400 tpd ultimate capacity) and an ultimate generating capacity of approximately 65 Mw.

As alluded to above, FP&L is the utility affected by this project which will be owned by Lee County. The point of interconnection to FP&L's system will be the Buckingham substation which borders the north boundary of Section 24, Township 44 S, Range 25 E. The interconnection will be made in accordance with FP&L's technical specifications. The costs for such interconnection will be paid by Lee County. This interconnection will allow transmission via FP&L's 138 kV transmission line. This transmission line and the Buckingham Substation are adjacent to the proposed energy recovery facility.

FP&L's load in the Lee County service area stems primarily from residential, commercial, industrial, and street and lighting sales. Precise load data and forecasts specific to the Lee County service area are not available. However, population data and projections (provided by Lee County) are indicative of the existing and future loads in Lee County. The 1990 population estimate in Lee County is 400,800 which represents a seasonally adjusted average annual population. By 1994, the in-service date of the proposed Facility, the adjusted population is projected to be 470,700. By the year 2000, population is projected to be 576,324, and by 2013, the end of the 20-year Facility financing period, population is expected to be about 788,500. Population growth between now and the in-service date represents a 17.4 percent increase. By the end of the Facility financing period, population is expected to grow by 97.6 percent.

The proposed Facility, located in this high growth area, will assist in meeting future load requirements. Additional load information is provided in Section 1.3.

1.2 DESCRIPTION OF THE ENERGY RECOVERY FACILITY

A complete description of the Facility is contained in Section 3.0 of this Application. The proposed electrical generating facility is a mass-burn municipal solid waste disposal facility designed to initially process 1,800 tpd with expansion capability to ultimately process 2,400 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 to energy recovery facilities. The projected in-service date of the Facility is January 1994.

The Facility will initially have three solid waste processing units if stoker waterwall technology is selected, and four processing units if rotary waterwall technology is used.

One steam powered turbine-generator will be provided capable of using all steam generated by the combustion of 1,800 tpd of solid waste.

Expansion of the Facility will be accomplished by the construction of one additional processing unit and a turbine-generator sized to use the steam from the additional unit.

The estimated capital cost of the initial construction is ~~\$165 million.~~

— \$130 MILLION —

Solid waste collected in Lee and Hendry counties by private and municipal waste haulers will be delivered to the Facility on a 6-day per week basis. The Facility will have a refuse storage bunker sized to hold a minimum of 3 days operating fuel at the expanded Facility size of 2,400 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 rated capacity on an annual average basis.

FP&L can integrate the power from the Facility into its system. The following interconnection specifications were developed in coordination with FP&L. The interconnection to FP&L's system will be through their Buckingham substation. The interconnection equipment will meet National Electric Manufacturers Association (NEMA) standards and FP&L's technical characteristics and requirements (138 Kv transmission line, 60 cycles nominal at a power factor of 0.85 leading to 0.85 lagging, grounded wye on the high side, delta on the low side, and fault values shall be consistent with those for the Buckingham substation). Additional interconnection requirements that will be met are those contained in Florida Public Service Commission's Interconnection Guideline Rule 25-17.087. The Facility will be equipped with two half-capacity step-up transformers (13.8 kV to 138 kV with separate but identical protective relaying). The step-up transformers themselves will be designed such that a failure of one transformer will not result in damage to the other transformer. In addition, a station-service (step-down) transformer, switch gear, emergency power supply for safe facility shut-down, an uninterruptable power supply for the distributed control system, and all auxiliary equipment will be provided.

Reliability

The mass-burn technology for solid waste incineration has been commercially demonstrated in over 25 facilities within the United States, and is employed in six energy recovery facilities in Florida which are either under construction or in commercial operation. Those in operation in the state include those in Pinellas, Hillsborough, and Bay counties and the city of Tampa. Each of these facilities have on-line operating reliability factors in excess of 85 percent and have achieved continuous 12-month rolling average capacity factors of 70 percent or greater.

1.3 CONDITIONS INDICATING A NEED FOR THE FACILITY

The need for the Facility is primarily premised on the need for solid waste reduction in order to minimize the landfilling of solid waste. The production of electricity from the Facility is a secondary benefit, the sale of which to FP&L will provide reliable capacity for the utility's Lee

County base load demand and will reduce the overall cost of solid waste disposal to Lee and Hendry counties. As shown in Table 1-1, solid waste generation in Lee and Hendry counties is projected to be 560,976 tons per year in 1993. By the year 2013, the annual quantity of solid requiring disposal is projected to grow to 1,107,820 tons per year. Achieving the statutory goal of 30 percent recycling will reduce the quantity of solid waste requiring disposal by about 168,300 tons in 1993 and 332,350 tons in 2013, thereby leaving significant quantities of solid waste requiring other methods of disposal.

Energy loads forecasted by FP&L are shown in Figures 1-1 through 1-3. Historical loads are also shown in these figures. Load forecasts were developed by FP&L using the models described in Section IV, Florida Power & Light Company 10 Year Power Plant Site Plan 1990-1999, dated April 1, 1990. This same FP&L document identifies FP&L's Cogeneration and Small Power Production Program as an important part of the company's Energy Management Plan and states that, "Current information supports incorporating approximately 1,110 Mw (summer) and 5,971,646 Mwh of purchased power from Qualifying Facilities into FPL's power supply plans during the next ten years." Table 1-2 lists FP&L's expected annual contribution of capacity and energy from qualifying facilities through 1997.

Presently, FP&L has contracted for 315 Mw of generating capacity which nearly satisfies FP&L's projected capacity and energy contributions from qualifying facilities through 1992, leaving a requirement of 795 Mw of capacity to be satisfied by qualifying facilities. These data affirmatively support FP&L's need for the Facility.

Least Cost

The capacity and energy to be sold to FP&L by the proposed Facility will be in accordance with applicable Florida Public Service Commission rules and requirements for standard offer contracts and Florida Administrative Code Rules 25-17.082.083.

Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

TABLE 1-1
POPULATION AND WASTE QUANTITY PROJECTIONS

YEAR	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
POPULATION										
Lee Co.	453,183	470,658	488,133	505,771	523,409	541,048	558,686	576,324	595,896	615,468
Hendry Co.	28,369	28,926	29,482	29,924	30,367	30,809	31,252	31,694	32,136	32,579
Total	481,552	499,584	517,615	535,696	553,776	571,857	589,937	608,018	628,033	648,047

WASTE QUANTITY										
Lee Co.	531,042	560,895	591,610	623,408	656,116	689,756	724,350	759,921	799,086	833,897
Hendry Co.	29,934	30,521	31,109	31,575	32,042	32,509	32,976	33,443	33,909	34,376
Total	560,976	591,417	622,718	654,983	688,158	722,265	757,326	793,364	832,996	868,273

YEAR	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
POPULATION											
Lee Co.	635,041	654,613	674,185	688,588	702,991	717,394	731,797	746,200	760,293	774,386	788,479
Hendry Co.	33,021	33,464	33,906	34,348	34,791	35,233	35,676	36,118	36,560	37,003	37,445
Total	668,062	688,076	708,091	722,936	737,782	752,627	767,473	782,318	796,853	811,389	825,924

WASTE QUANTITY											
Lee Co.	860,415	886,934	913,452	932,967	952,481	971,996	991,510	1,011,025	1,030,120	1,049,214	1,068,309
Hendry Co.	34,843	35,310	35,777	36,243	36,710	37,177	37,644	38,111	38,578	39,044	39,511
Total	895,258	922,244	949,229	969,210	989,192	1,009,173	1,029,154	1,049,136	1,068,697	1,088,259	1,107,820

FIGURE 1-1

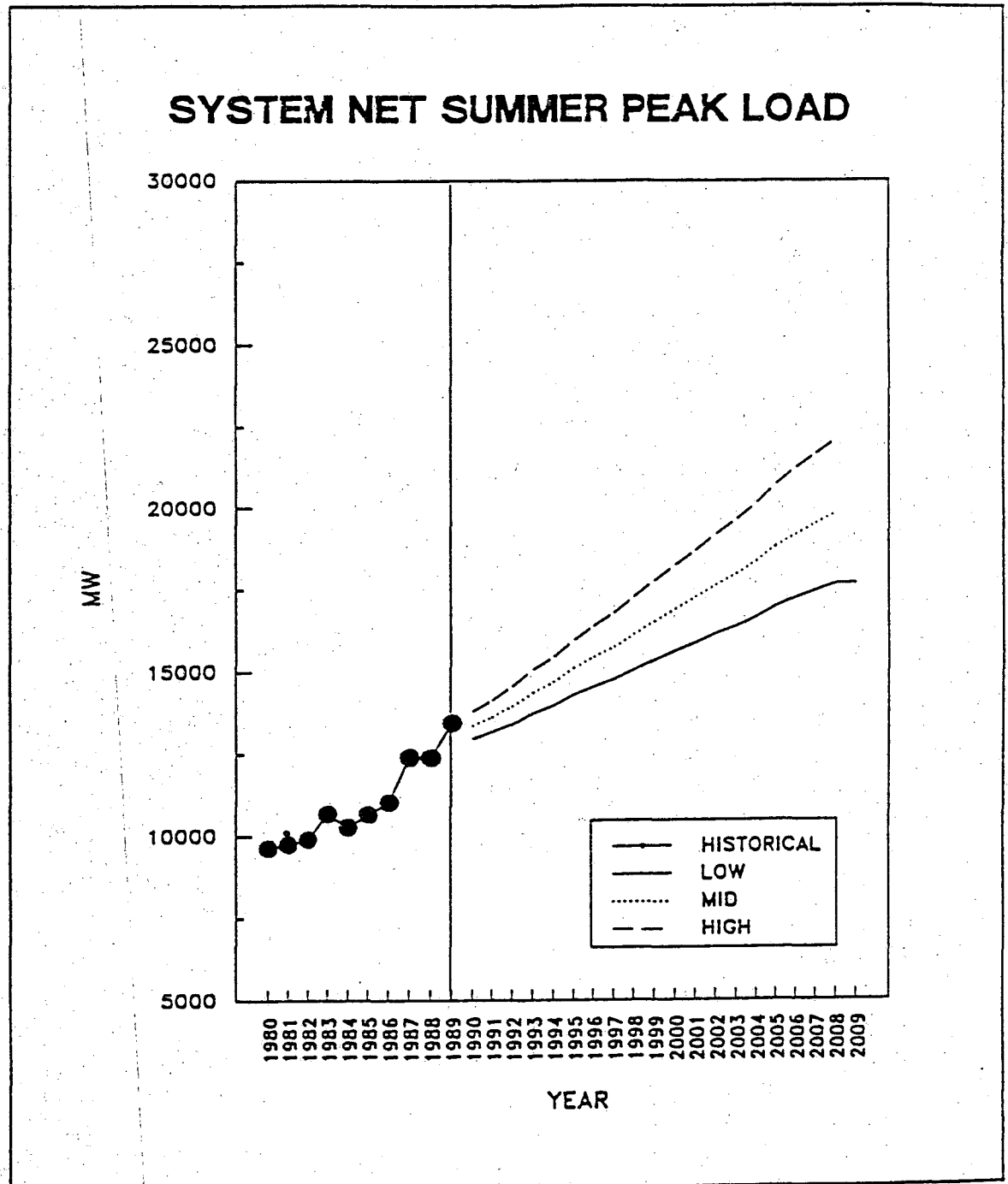
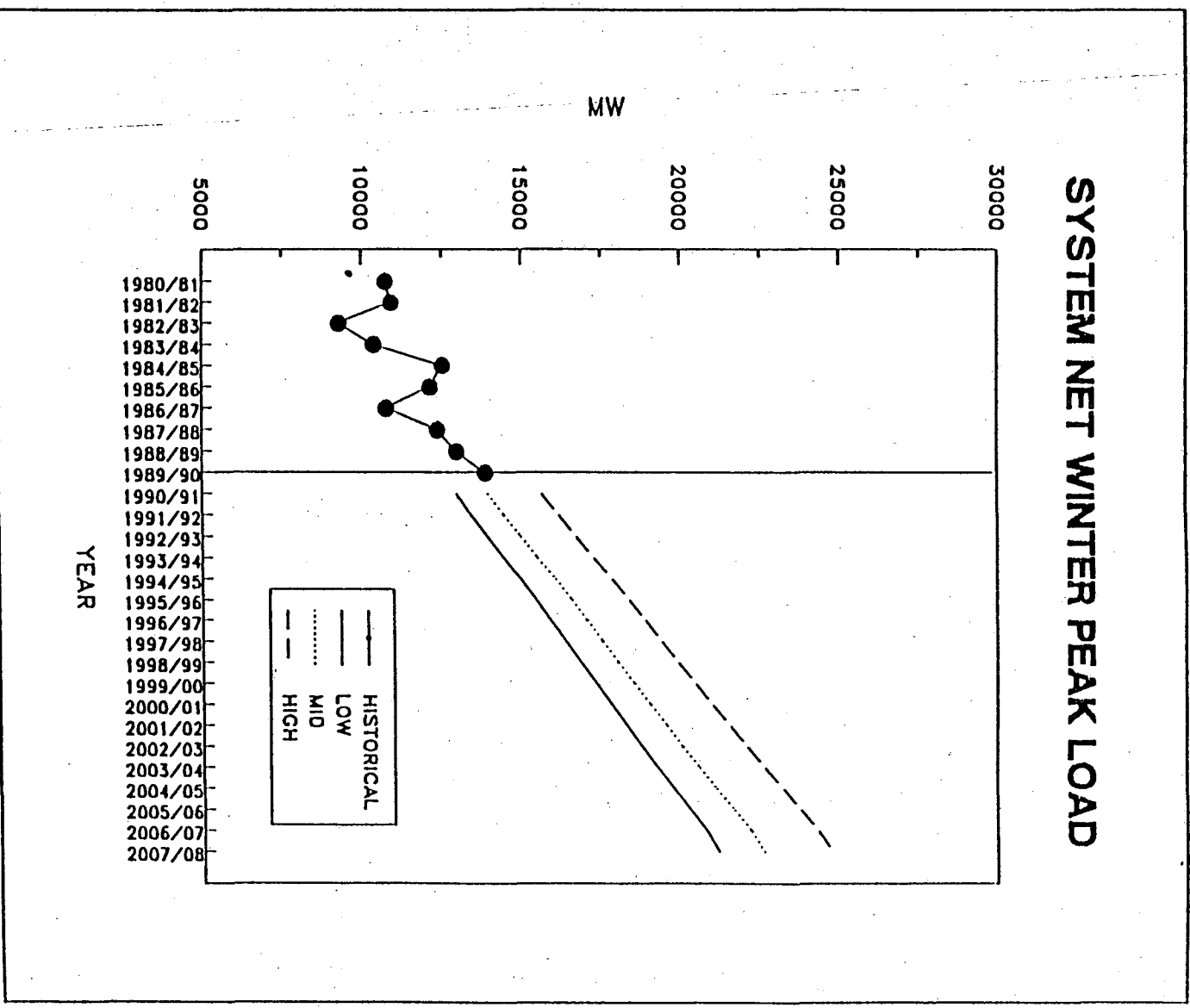


Exhibit 4

Source:

FP&L Ten Year Power Plant Site Plan 1990-1999, April 1, 1990.

FIGURE 1-2



Source:

FP&L Ten Year Power Plant Site Plan 1990-1999, April 1, 1990.

Exhibit 5

FIGURE 1-3

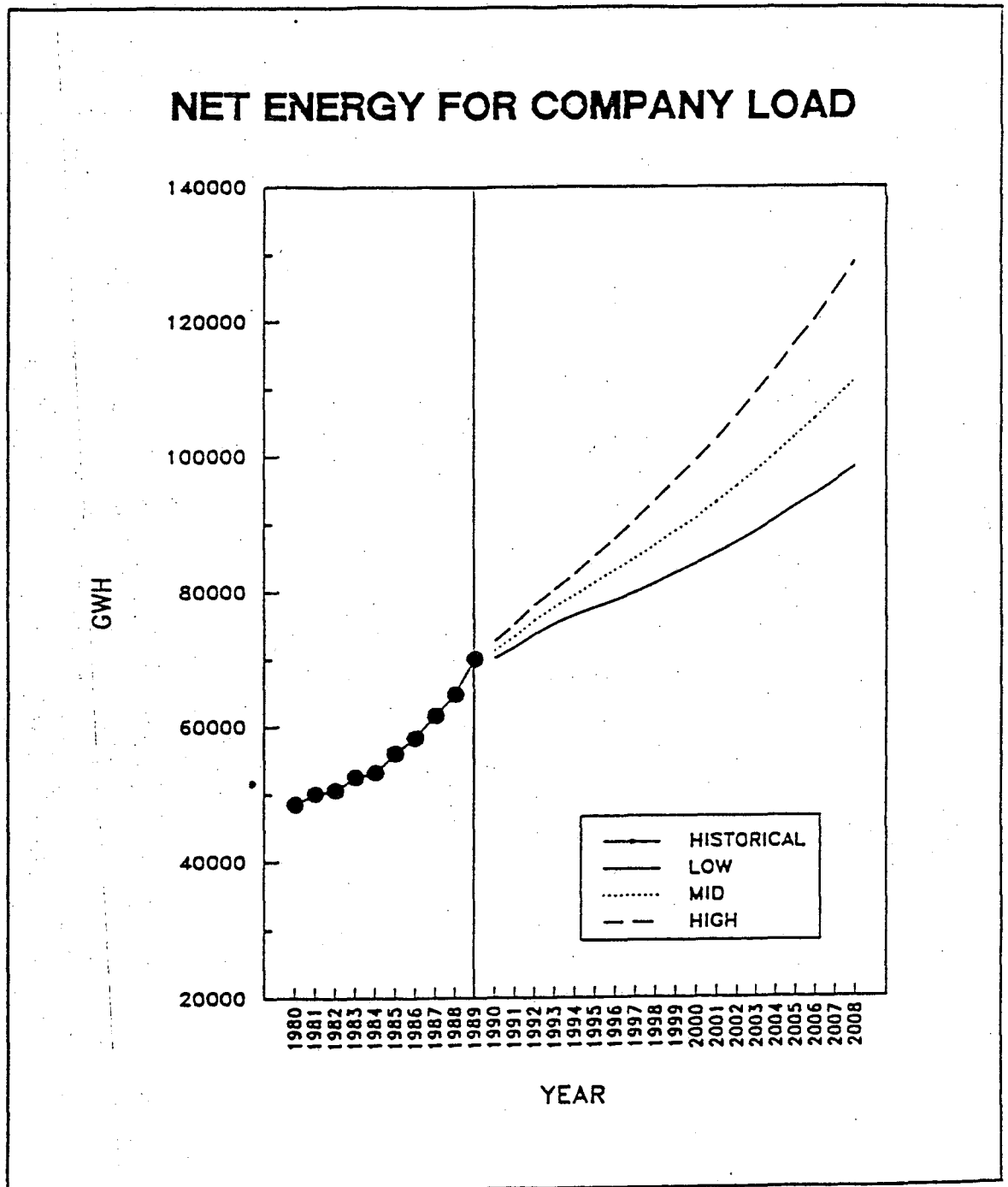


Exhibit 6

Source:

FP&L Ten Year Power Plant Site Plan 1990-1999, April 1, 1990.

TABLE 1-2
CAPACITY AND ENERGY CONTRIBUTION
FROM QUALIFYING FACILITIES

Year	Firm Cumulative Summer	Firm ^a Cumulative Winter	Cumulative ^b Annual Energy
1990	0	0	1,513,200
1991	0	0	1,841,200
1992	391	391	2,160,600
1993	616	616	3,908,000
1994	616	616	3,936,600
1995	991	991	5,213,256
1996	1,058	1,058	5,627,156
1997	1,095	1,095	5,854,056
1998	1,110	1,110	5,971,656
1999	1,110	1,110	5,971,656

SOURCE: Florida Power and Light Ten Year Power Plant Site Plan 1990-1999,
April 1, 1990.

^a1990 Winter = Winter 1990-91.

^bIncludes as-available (non-firm) energy purchases from Qualifying
Facilities.

Note: Assumptions are based on the May 1989 "Forecast of Qualifying
Facilities for the Years 1989 through 2008."

1.4 ELECTRICAL GENERATING ALTERNATIVES

Since this project is designed to be an integral component of a solid waste management system to satisfy Lee and Hendry countie's long-term solid waste disposal needs; electrical generating alternatives were not considered per se. What were considered were alternate processing facility capacities. The facility capacities considered included:

- o A 1,200-tpd facility which would reach capacity in the first 12 to 18 months of operation;
- o A 1,500-tpd facility which would reach capacity within the first three years of operation;
- o A 1,650-tpd facility which would reach capacity within five to six years of initial operation;
- o A 1,800-tpd facility which reaches capacity after about ten years of operation; and
- o A 2,050-tpd facility which would reach capacity in about the fifteenth year of operation.

Sensitivity analyses were conducted for a range of solid waste quantity projections to determine the economic impact and the landfilling requirements associated with each. The 1,800-tpd facility size was selected by Lee County as the facility which offered the county the greatest degree of flexibility in terms of meeting near and intermediate-term solid waste disposal needs while minimizing exposure to unreasonably high solid waste disposal costs.

FP&L's Ten Year Plan evaluated various alternatives for meeting future capacity and energy needs including nuclear, oil, gas, and coal fired generating facilities, purchases from other utilities, and purchases from cogeneration and small power production facilities. The results of this analysis indicated that approximately 1,110 Mw of capacity should be purchased from qualifying facilities through 1999.

1.5 NON-GENERATING ALTERNATIVES

FP&L's non-generating alternatives include residential load control, commercial and industrial load control, and the purchase of capacity and energy from others as discussed in FP&L's Ten Year Plan. That plan presently incorporates the use of each of these alternatives to meet projected future needs.

With respect to the proposed energy recovery facility, several alternatives were investigated including recycling, composting, landfilling, and incineration without energy production.

Recycling was determined to be a viable alternative, but as a disposal method alone will not meet the volume reduction goals of Lee County. Composting the mixed municipal waste stream was determined to be a technology still in the developmental stage and not commercially demonstrated at a scale size sufficient to meet the County's solid waste disposal needs. The composting of yard wastes was only determined to be viable but, like recycling, it alone would not achieve the volume reduction goals of the County. Landfilling was determined to be technologically viable but would provide no benefit in terms of volume reduction, and does not meet the County's goal of minimizing dependency on a landfill for solid waste disposal. Incineration without energy recovery was determined to be technologically, viable but the economics in comparison to incineration with energy recovery were unfavorable resulting in a higher cost for solid waste disposal.

The selected plan includes incineration with energy recovery, the recycling of source separated materials, composting yard waste with sewage sludge, and landfilling the incinerator residue and other non-processible and non-recyclable materials.

1.6 CONSEQUENCES WITHOUT THE PROPOSED FACILITY

Without the proposed Facility, Lee County will consume landfill capacity at over twice the rate at which such landfill capacity will be consumed if the Facility is an integral part of the system. This will result in the continued and accelerated irretrievable commitment of land resources. Also as a result of increased landfilling of unprocessed solid waste, the potential for groundwater pollution will be increased.

Other adverse consequences include:

- o Loss of electricity needed from alternative fuels electric generating facilities;
- o Loss of electricity available on a least cost basis;
- o Increases in the air emission of particulates and volatile organic compounds as a result of landfilling unprocessed solid waste;
- o Loss of over 300 short-term construction jobs associated with building the Facility;
- o Loss of at more than 50 long-term jobs associated with the operation of the Facility; and
- o Increased consumption of land resources for the disposal of solid waste via landfilling.

1.7 SUMMARY AND BENEFITS OF THE FACILITY

The proposed Lee County energy recovery facility will provide capacity and energy in an area experiencing significant load growth. The energy produced will be available to FP&L at a cost consistent with Statutory requirements governing the sale of capacity and energy from small power producers under the Standard Offer Agreement for such small power producers. The power can be integrated into FP&L's system through the

Buckingham substation, and FP&L needs the power from the Facility to assist in satisfying a projected need of 1,110 Mw from qualifying facilities. Currently FP&L has contracted for power from qualifying facilities which satisfies the utility's identified need for such power only until 1992.

— 372,300 —

The Facility will eliminate the need for approximately 560,000 barrels of oil per year for electric energy generation by using an alternate fuel (e.g., municipal solid waste).

The Facility will also provide other benefits to the state and to Lee and Hendry counties. In Chapter 84-198, Laws of Florida (1984), the Florida Legislature has declared that "It is critical to encourage energy conservation in order to protect the health, prosperity, and general welfare of this state and its citizens." The Legislature has further declared that the "combustion of solid waste by small power production facilities for the production of electricity not only represents conservation efforts well-directed towards that goal, but also represents an environmentally preferred alternative to conventional solid waste disposal in this state." In Section 377.709(1), Florida Statutes, the Legislature also declares that "it is critical to encourage energy conservation in order to protect the health, prosperity, and general welfare of this state and its citizens," "that the disposal of solid refuse is an important governmental obligation and that, if the disposal is not accomplished in a proper manner, such refuse poses a definite threat to the public health and welfare," and "that the combustion of refuse by solid waste facilities to supplement the electricity supply not only represents an effective conservation effort, but also represents an environmentally preferred alternative to conventional solid waste disposal in this state." The Legislature, therefore, "directs the Florida Public Service Commission to establish a funding program to encourage the development by local governments of solid waste facilities that use solid waste as a primary source of fuel for the production of electricity." In Section 403.702 of the Florida Statutes, the Florida Resource Recovery and Management Act declares that "the purpose of this act is to promote the application of resource recovery systems which preserve and enhance the quality of air, water and land resources."

Lee and Hendry counties' proposed solid waste processing and disposal program pursues the state's policy of resource recovery as a long-term solid waste disposal solution. The proven mass-burn technology will provide a reliable and economical solution for the counties' long-term solid waste processing and disposal needs.

The proposed system is also consistent with the Florida State Comprehensive Plan (FS, 1985). The plan states the following goals and policies regarding energy and waste.

Energy Goal:

#12 Florida shall reduce its energy requirements through enhanced conservation and efficiency measures in all end-use sectors, while at the same time promoting an increased use of renewal energy resources.

Policies (Objectives):

#5 Reduce the need for new power plants by encouraging end-use efficiency, reducing peak demand, and using cost-effective alternatives.

#9 Promote the use and development of renewable energy resources.

Waste Management Goal:

All solid waste, including hazardous waste, wastewater and all hazardous materials, shall be properly managed, and the use of landfills shall be eventually eliminated.

Policies (Objectives):

#1 By 1995, reduce the volume of nonhazardous solid waste disposed of in landfills to 55 percent of the 1985 volume.

#7 Encourage the research, development, and implementation of recycling, resource recovery, energy recovery, and other methods of using garbage, trash, sewage, slime, sludge, hazardous waste, and other waste.

Section 2

SECTION 2.0

SITE AND VICINITY CHARACTERIZATION

2.0 SITE AND VICINITY CHARACTERIZATION

2.1 SITE AND ASSOCIATED FACILITIES DELINEATION

2.1.1 SITE LOCATION

Lee County is in the process of (1) rezoning the site selected for the energy recovery facility and (2) obtaining ownership of the property. The proposed County purchase will be a portion of Section 24 and Section 25, Township 44 South, Range 25 East, totaling 155 acres. The energy recovery facility site acreage delineation is as follows.

Portion of Southeast Quarter of Section 24	145.2 acres
Portion of Northeast Quarter of Section 25 to Buckingham Road	2.8 acres
Facility Power Line Corridor	<u>7.0</u> acres
	155.0 acres

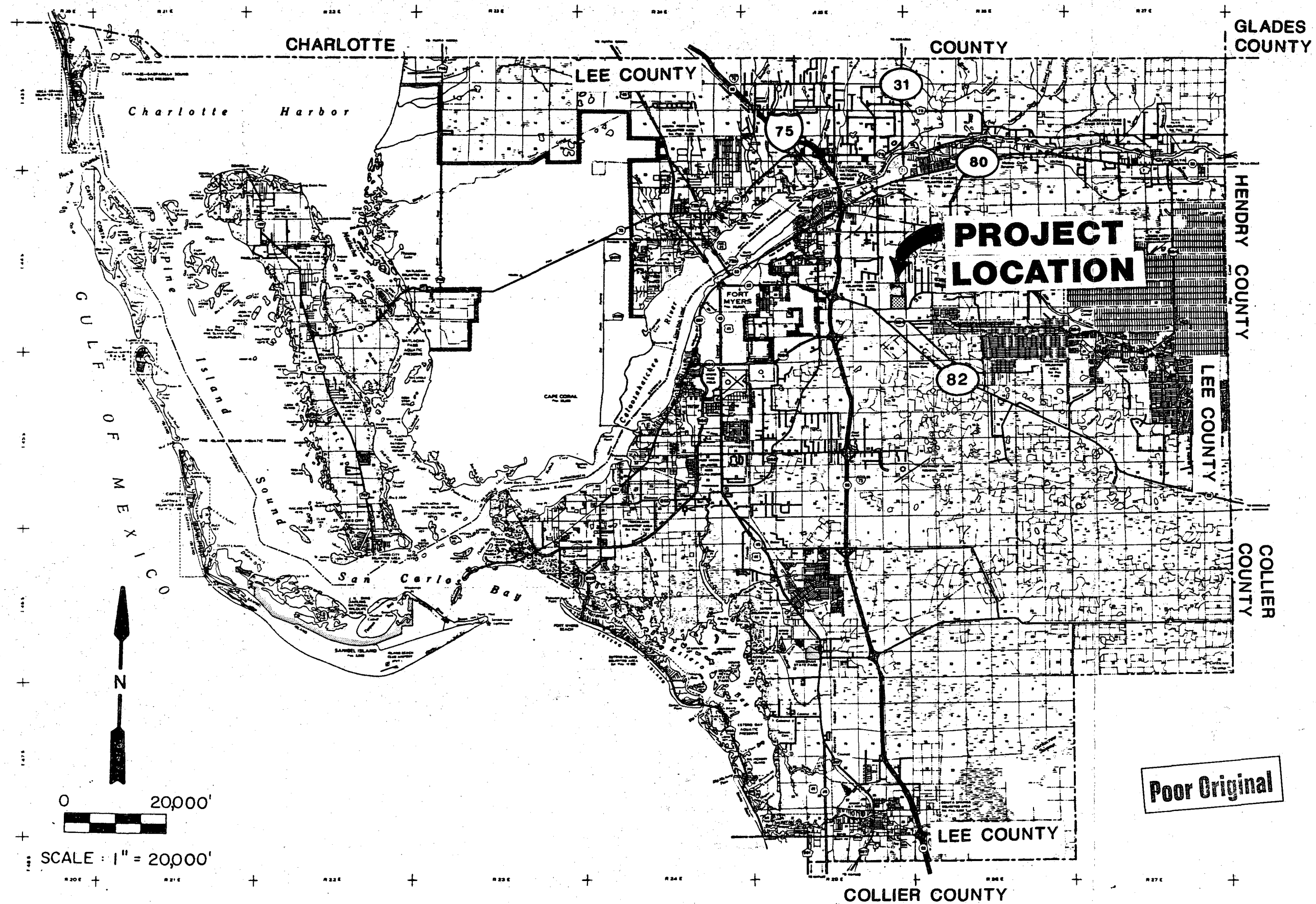
Only the portion of the southeast quarter of Section 24 (145.2 acres) and the north portion of the northeast quarter of Section 25 (2.8 acres) will be rezoned for the proposed Facility.

The site is located near the center of Lee County, as shown in Figure 2-1. Figure 2-2 details the site location. The property is north of Buckingham Road, approximately 2.5 miles east of the intersection of I-75 and State Road 82. The boundary survey for the site is presented in Figure 2-3. The property deed will be submitted supplemental to this power plant siting act permit application. The legal description of the property can be found in Appendix 1.1.

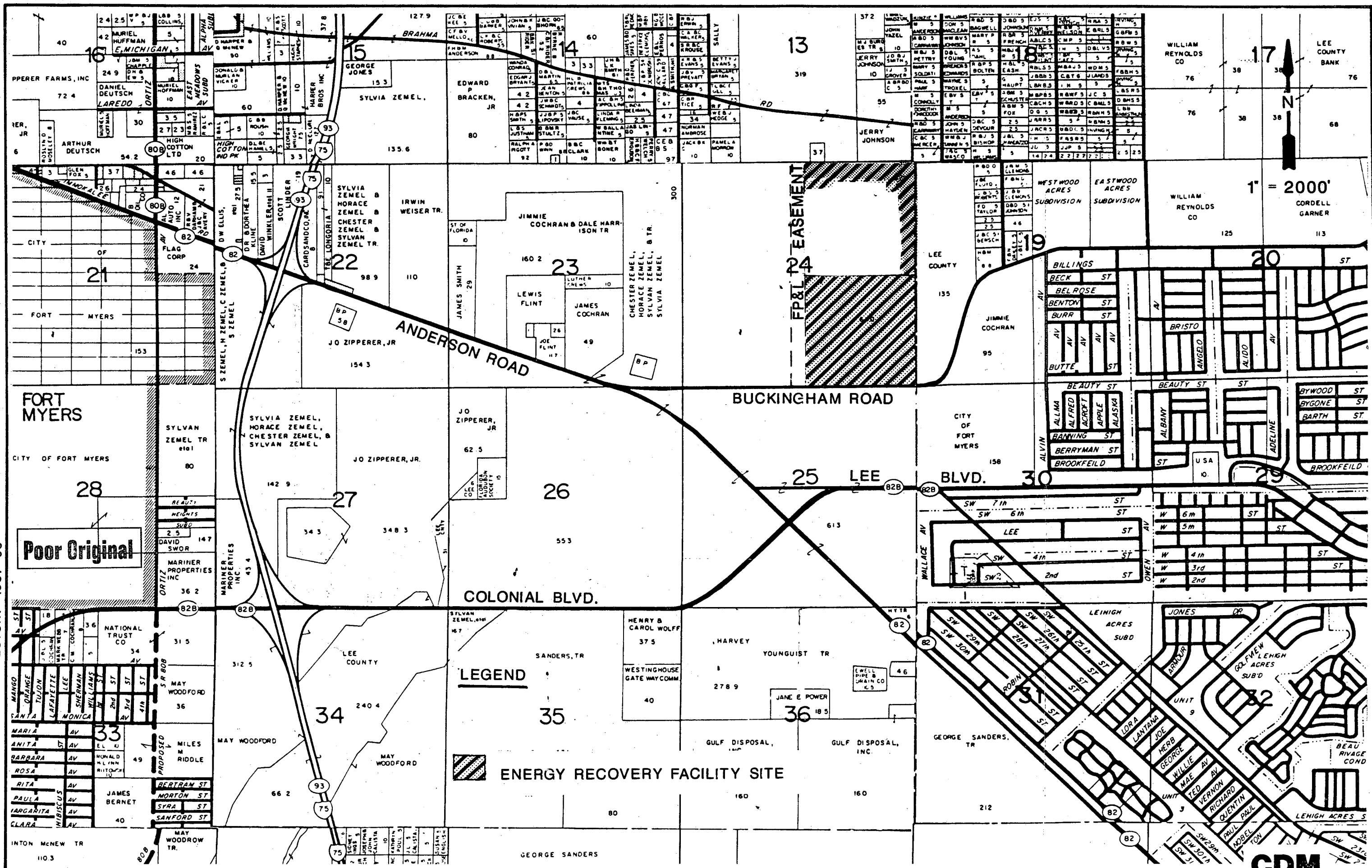
2.1.2 EXISTING USES

Properties abutting the Facility Site boundary are shown on Figure 2-4a. A complete list of abutting property owners is contained in Appendix 1.2.

SOURCE: MAP BASED ON LEE COUNTY DOT GENERAL HIGHWAY MAP, JAN. 1976



General Location Map - Lee County Energy Recovery Facility

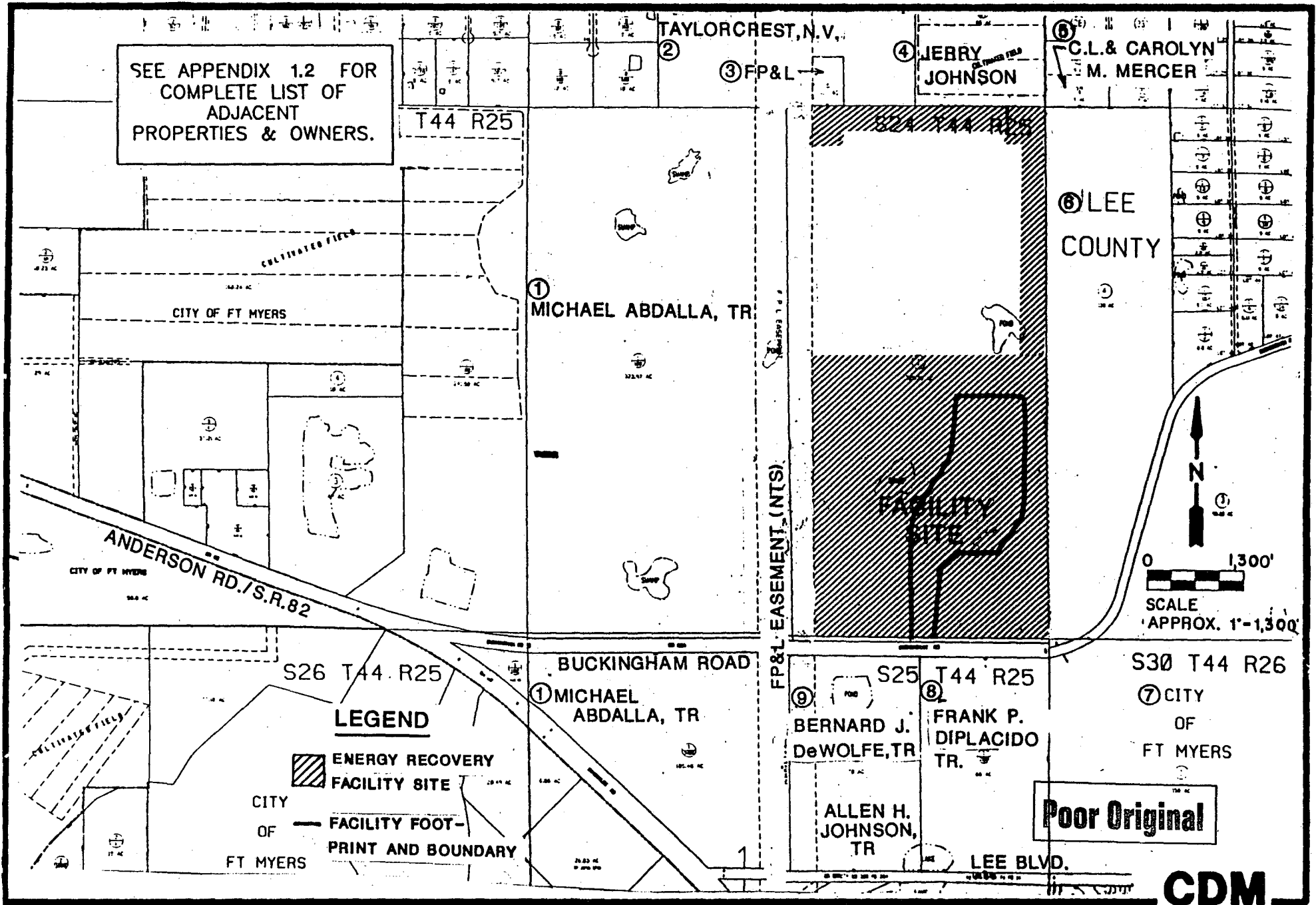


Site Location Map - Lee County Energy Recovery Facility

OVERSIZE
DOCUMENT WAS
REMOVED AND
INSERTED INTO
OCULUS
SEPARATELY.

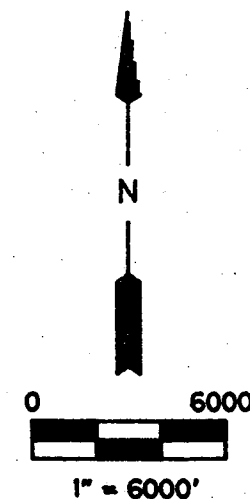
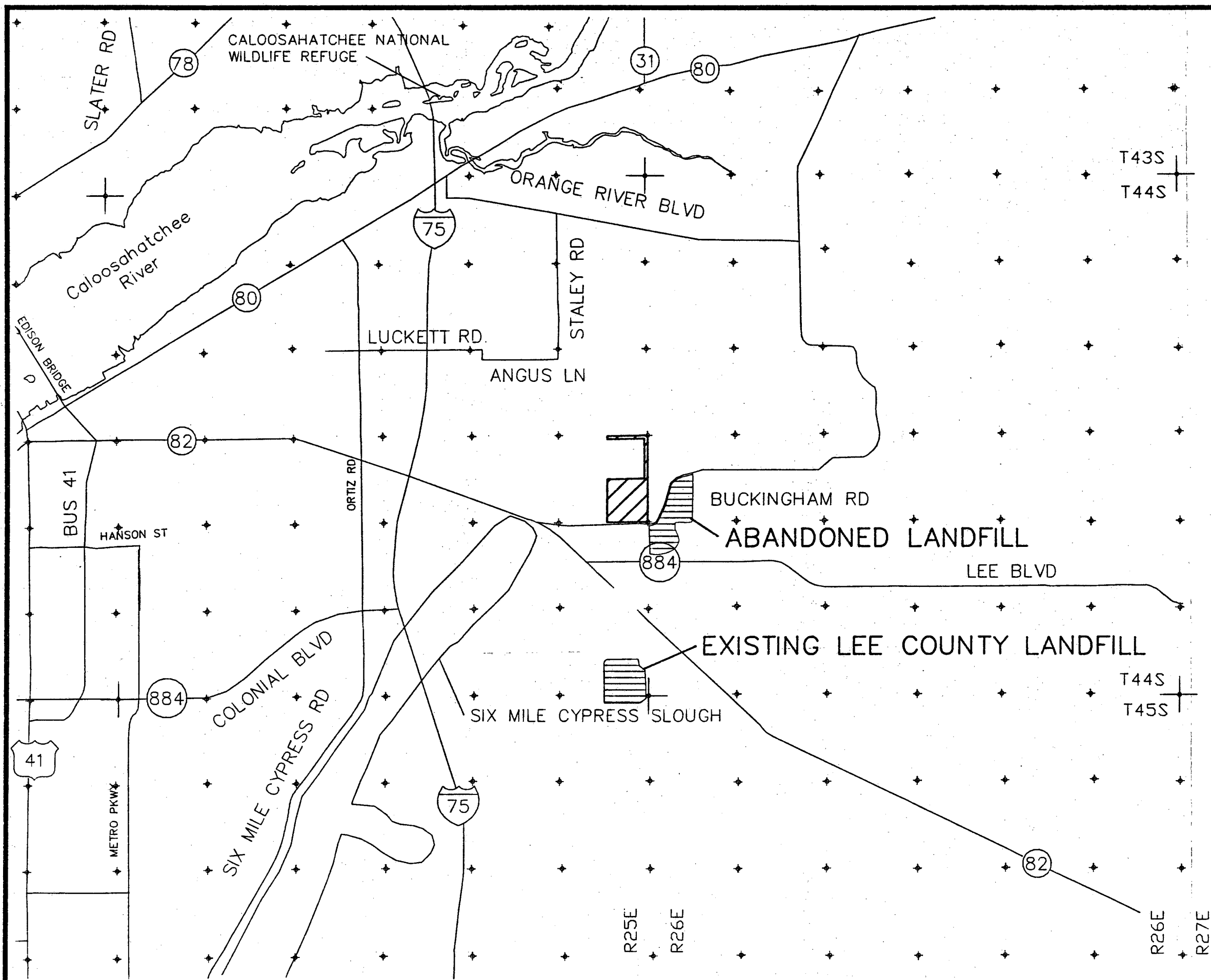
IMAGE QUALITY

**AS YOU REVIEW THE NEXT GROUP OF IMAGES, PLEASE NOTE
THAT THE ORIGINAL DOCUMENTS WERE OF POOR QUALITY.**



ABUTTING PROPERTIES - LEE COUNTY ENERGY RECOVERY FACILITY

ACAD FILE: GJ5MILE.DWG 06/19/90



LEGEND

- SECTION CORNER
- ENERGY RECOVERY FACILITY SITE

Existing and Abandoned Landfills - Lee County Energy Recovery Facility

The site is bounded on its western side by a Florida Power and Light (FP&L) easement containing power transmission lines. Approximately 3/4-mile 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, and is now owned by the City of Fort Myers and by private individuals who use it for livestock grazing. The abandoned landfill is shown in Figure 2-4b. The Gulf Coast Sanitary Landfill (Figure 2-4b) is located three miles directly south of the site and is currently contracted by Lee County for solid waste disposal. Estimates for remaining capacity for this facility are in the range of one and a half to three years. Further expansion of this facility is not practical nor proposed.

The 155-acre site includes approximately 123 acres of upland and 32 acres of wetland vegetation. Upland areas are predominated 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 Facility site revealed that land is being used primarily for raising livestock and rural residences. The site itself has been used for grazing cattle. There are no residences on the site. A detailed discussion of vegetation and land use is presented in Section 2.3.5.

Two aerial photographs are included in this application to depict the project area. Figure 2-5a is a 1:1000 scale composite of aerials obtained from the Florida Department of Transportation (FDOT) dated February 24, 1990. A 1:200 scale aerial, flown in May 1990, is provided as Figure 2-5b.

2.1.3 SITE MODIFICATION

The general site development plan is shown in Figure 2-6. The energy recovery facility will be located in the approximate center of the eastern half of the 155-acre site. The selected location produces the minimum impact to on-site wetlands and uses existing vegetation as a buffer to the greatest extent possible.

The Facility structures will occupy approximately 3.1 percent of the site; roads and parking about 4.7 percent, and stormwater retention approximately 3.2 percent. approximately 89 percent of the site will remain unused and will serve as buffer and conservation areas. Table 2-1 summarizes the proposed land use divisions of the Facility.

2.1.4 100-YEAR FLOOD ZONE

The proposed Facility site is not located within the 100-year flood zone as defined by the Federal Emergency Management Agency (FEMA). The site is located in an area designated as Zone B which is defined as:

"Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood."

The 100-year flood zone and its relation to the project site is shown in Figure 2-7.

2.2 SOCIO-POLITICAL ENVIRONMENT

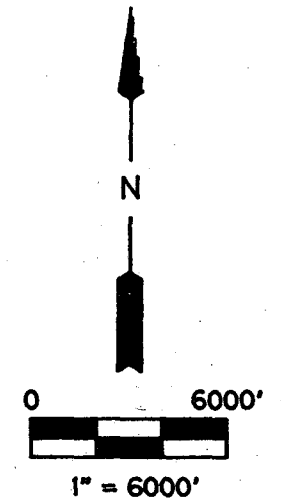
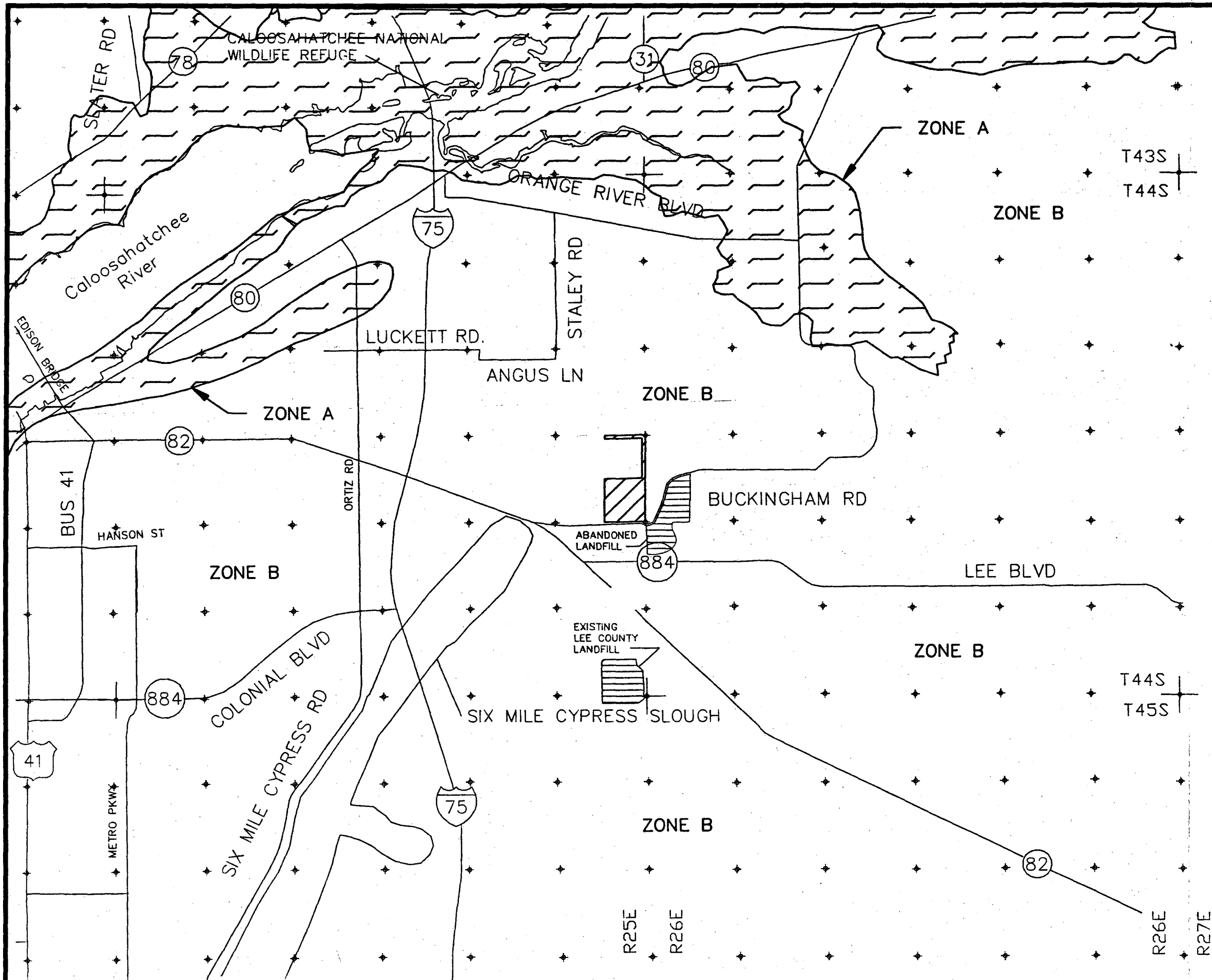
2.2.1 GOVERNMENTAL JURISDICTIONS

The majority of the area within a five-mile radius of the proposed Facility is unincorporated Lee County, except for portions of the City of Fort Myers which extend to within about one mile west of the site. Figures 2-8a indicates the locations of County and city parks and other local/regional governmental jurisdictional areas. Figures 2-8b and 2-8c indicate state and federal governmental jurisdictional areas, respectively. Table 2-2 summarizes the data shown on these three figures. Figure 2-9 details areas of concern within a one-mile radius of the site.

In order to identify local, regional, state, and federal areas of concern, the agencies listed in Table 2-3 were contacted. Information provided by each agency is summarized in the table.

2 OVERSIZE
DOCUMENT WAS
REMOVED AND
INSERTED INTO
OCULUS
SEPARATELY.

ACAD FILE: GJ5MILE.DWG 06/19/90

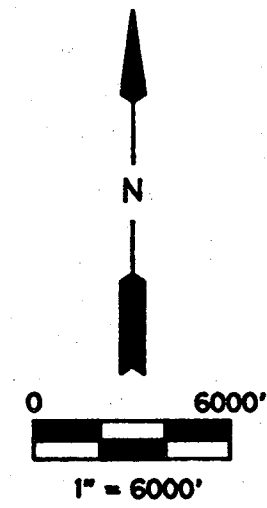
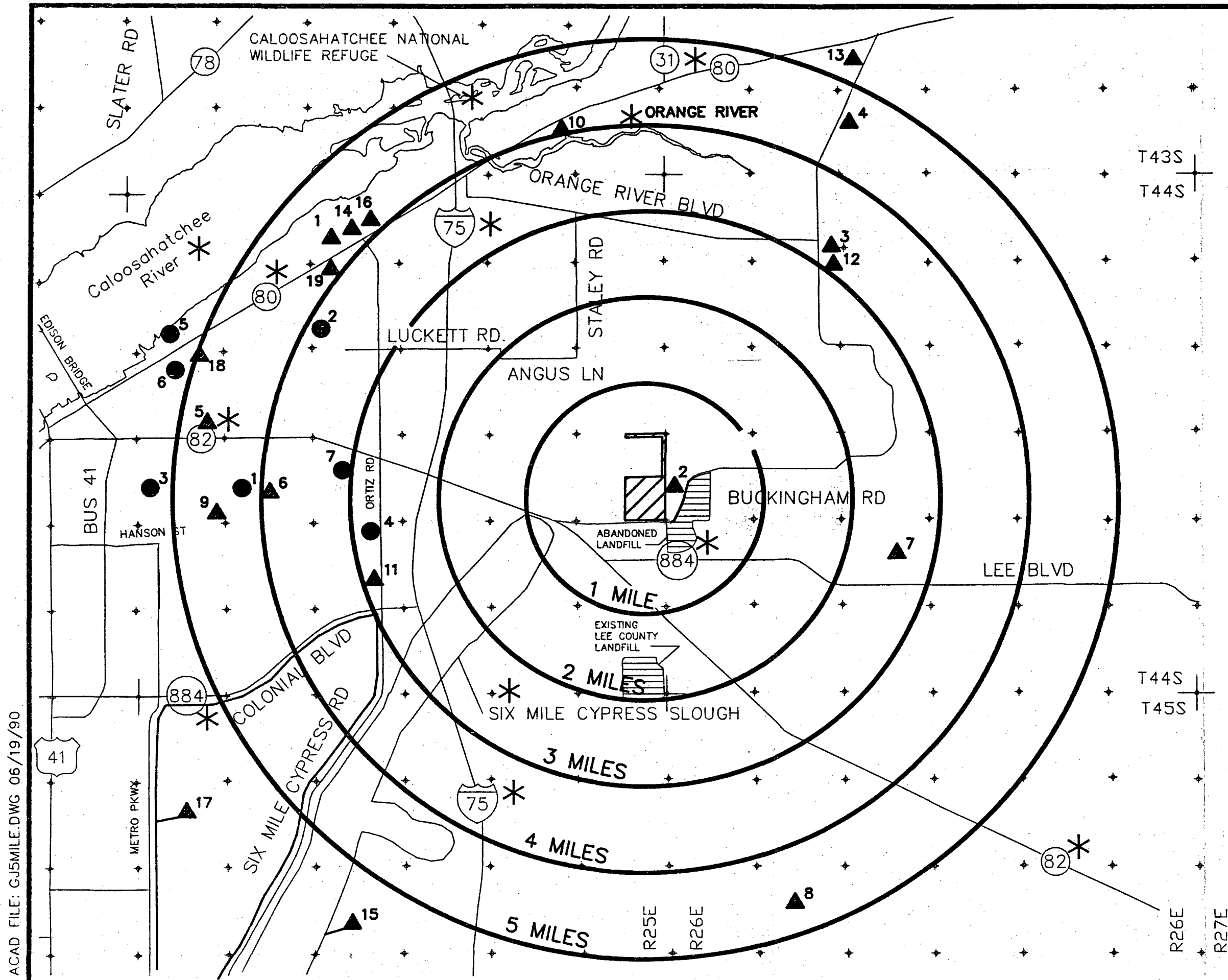


LEGEND

- ✦ SECTION CORNER
-  ENERGY RECOVERY FACILITY SITE
-  100-YEAR FLOOD AREA (ZONE A)
-  500-YEAR FLOOD AREA (ZONE B)

100 Year Flood Prone Areas — Lee County Energy Recovery Facility

CDM

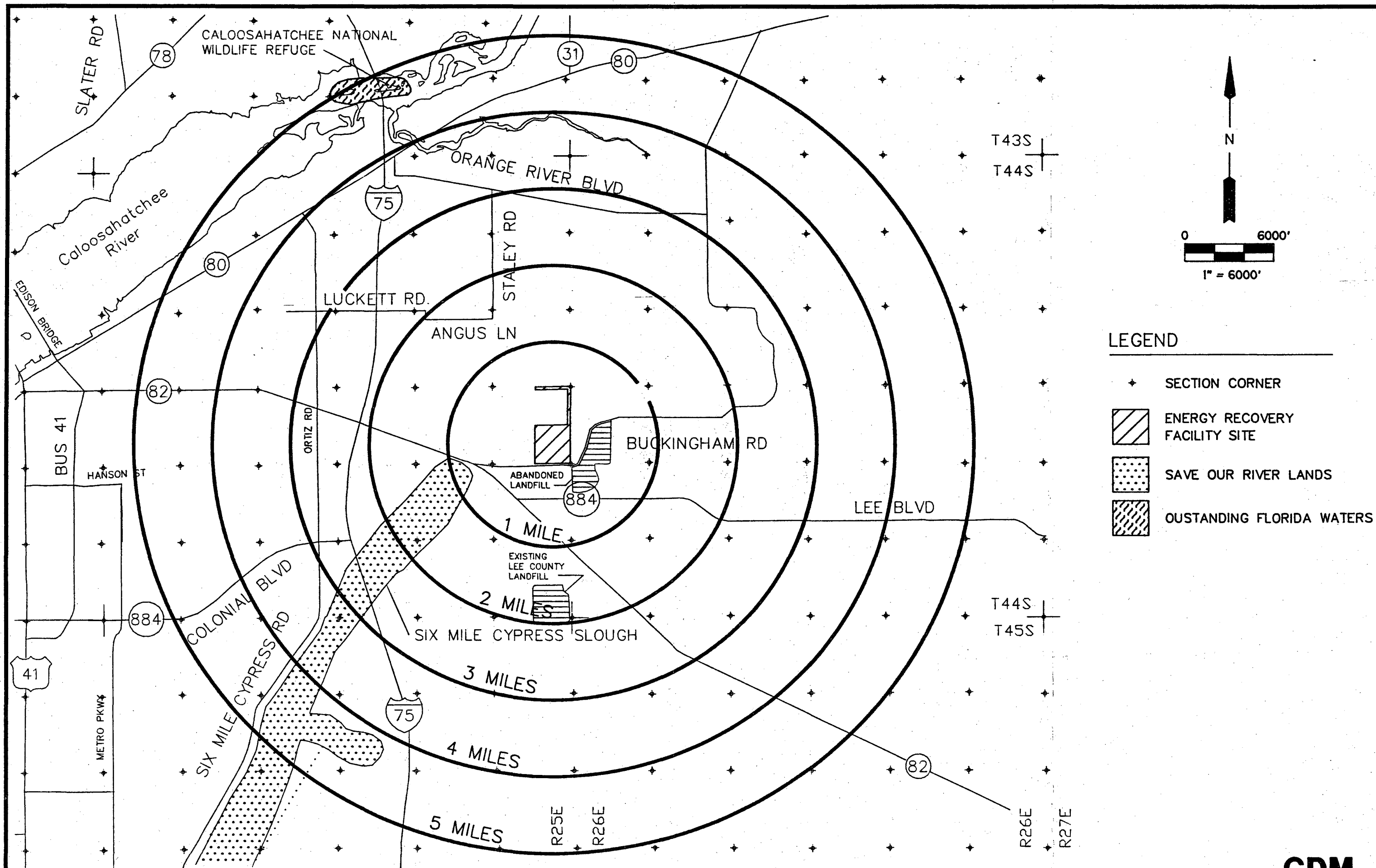


- LEGEND**
- ✦ SECTION CORNER
 - ENERGY RECOVERY FACILITY SITE
 - ⁷ CITY PARK & REF. NO.
 - ▲¹⁹ COUNTY PARK & REF. NO.
 - * S.W. FLORIDA PLANNING COUNCIL—AREAS OF CONCERN

ACAD FILE: GJ5MILE.DWG 06/19/90

Local Governmental Jurisdictions Within a Five-Mile Radius - Lee County Energy Recovery Facility

ACAD FILE: CJ5MILE.DWG 06/19/90

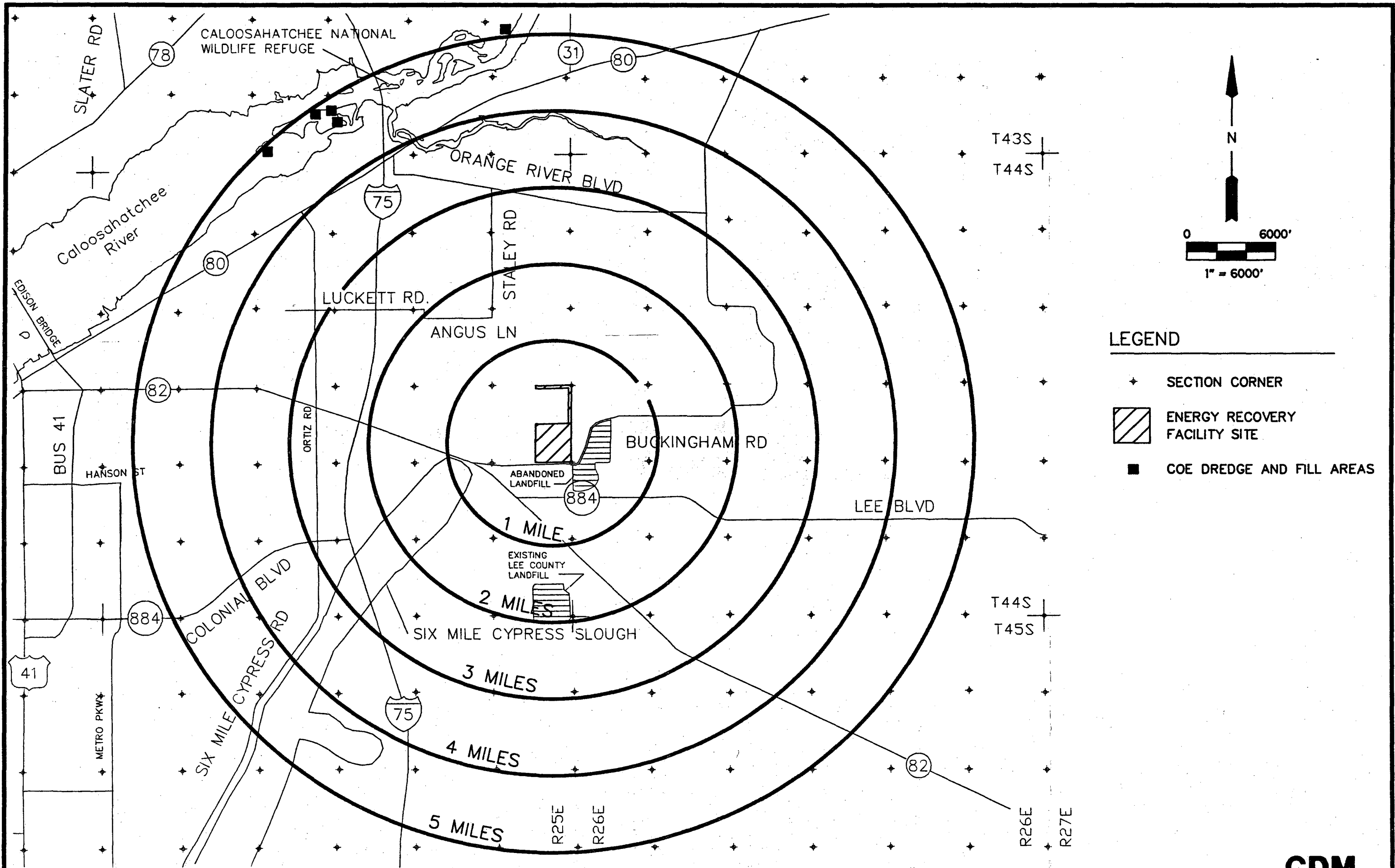


State Governmental Jurisdictions Within a Five-Mile Radius - Lee County Energy Recovery Facility

CDM

FIGURE 2-8b

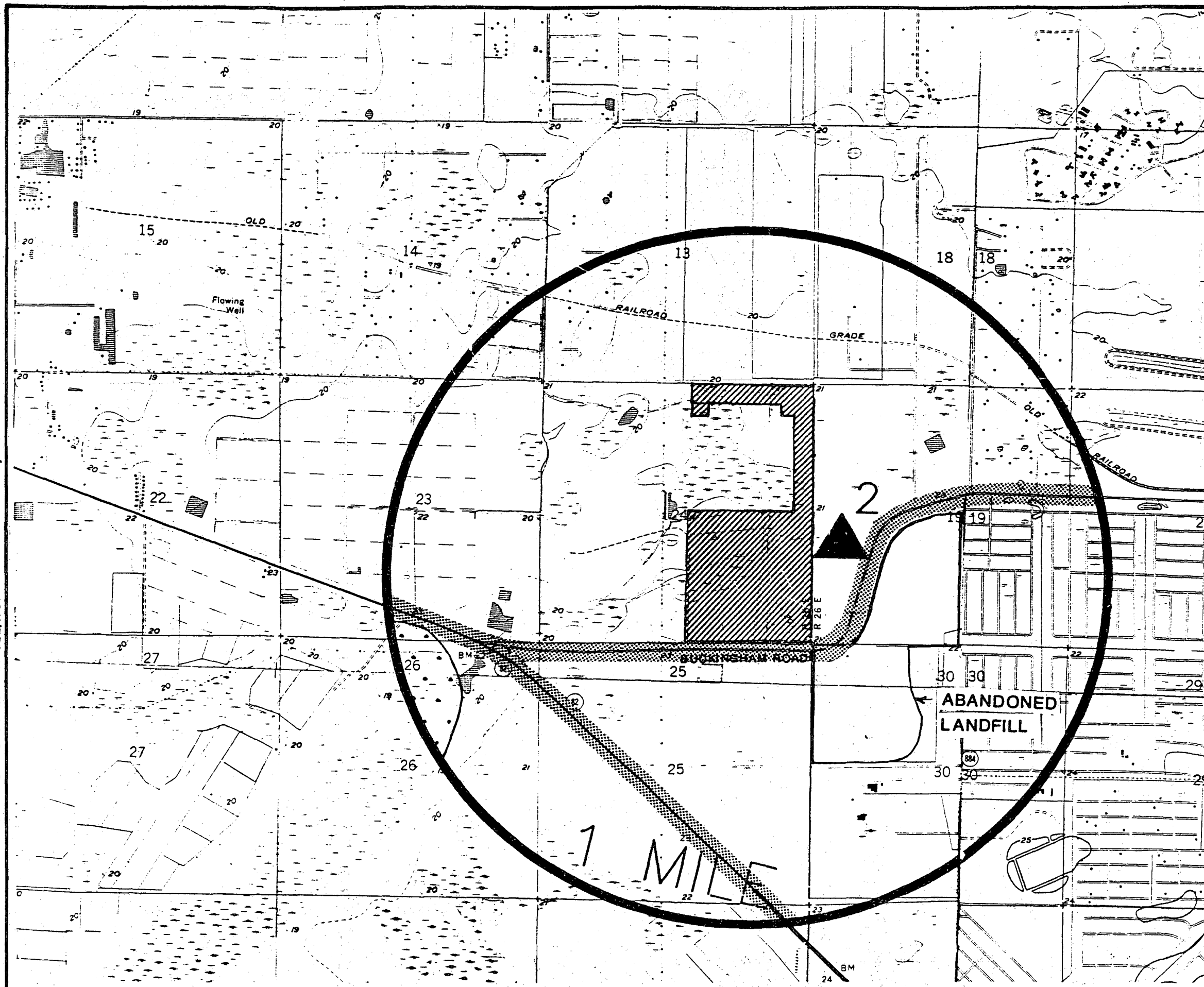
ACAD FILE: CJ5MILE.DWG 06/19/90



Federal Governmental Jurisdictions Within a Five-Mile Radius - Lee County Energy Recovery Facility

CDM

FIGURE 2-8c



LEGEND

-  ENERGY RECOVERY FACILITY SITE
-  SAVE OUR RIVER LANDS
-  COUNTY PARK & REF. NO.
-  S.W. FLORIDA PLANNING COUNCIL-AREAS OF CONCERN

Governmental Jurisdictions Within a One-Mile Radius - Lee County Energy Recovery Facility

TABLE 2-1

PROPOSED LAND USE DIVISIONS OF THE FACILITY

<u>Proposed Use</u>	<u>Proposed Land Use Areas</u>	
	<u>Acres</u>	<u>Percentage of Site</u>
Structures	4.9	3.16
Roadways and Parking	7.4	4.77
Retention Basins	5.0	3.23
Open Areas/Buffer Zones	<u>137.7</u>	<u>88.84</u>
TOTALS	155.0	100.0

GOVERNMENTAL JURISDICTIONS WITHIN A 5-MILE RADIUS

1. Aztec Park

- UNINCORPORATED LEE COUNTY

- MLC19/2
6/27/90

TABLE 2-2
(Continued)

-
2. Buckingham Community Park (Proposed)
Location: West side of Buckingham Road, southwest of Neal Road
and adjacent to the project site
Size: 135 Acres
Description: Community Park to be developed in the Fall of 1991
 3. Buckingham School Community Center
Location: 4940 Buckingham Road
Size: 1 Acre
Description: Community Center
 4. Buckingham Exceptional Student Center
Location: 3200 Buckingham Road
Size: 3 Acres
Description: Exceptional Student Programs (104 students, 44 staff
members)
 5. Clemente Park
Location: 1936 Henderson Avenue
Size: 5 Acres
Description: Neighborhood Park
 6. Dunbar Middle School Park
Location: Indian Street, near Dunbar Middle School
Size: 4 Acres
Description: School Park
 7. East Regional Library (proposed)
Location: Gunnary Road, one-quarter mile north of Lee Boulevard,
west of Able Canal
Size: 12 acres
Description: Regional Library
 8. Gateway Park (proposed)
Location: (Information Pending)
Size: 28 Acres
Description: Currently under development
 9. Highlands East Recreational Center
Location: 3925 Canal Street
Size: 30 Acres
Description: Recreation Building with Auditorium, Meeting Room,
Weight Room, Nature Trails, Recreation Facilities;
Leased from County School Board
 10. Manatee Park
Location: Straddles both banks of Florida Power & Light outfall
(Yankee Ditch) from State Road 80 to Orange River
Size: 12 Acres
Description: Community Park

TABLE 2-2
(Continued)

-
11. Nature Center and Planetarium
Location: 3450 Ortiz Avenue
Size: 105 Acres
Description: Museum, Planetarium, Gift Shop
 12. Orange River Canoe Launch and Trail (Proposed)
Location: East site of Buckingham Road on the south bank of
Orange River
Size: 3 Acres
Description: Canoe Slip, and Trail which will connect the launch with
Manatee Park near the confluence of the Caloosahatchee
and Orange Rivers
 13. Riverdale High School Park
Location: Buckingham Road off State Road 80, at one-quarter mile
outside the 5-mile radius
Size: 15 Acres
Description: Community Park
 14. Royal Palm Neighborhood Park
Location: 299 Royal Palm Park Road
Size: 1 Acre
Description: Wayside Park/Landscaping
 15. Six Mile Cypress Slough Preserve
Location: South of State Road 82, along Six Mile Cypress
Parkway
Size: Approximately 2000 Acres
Description: "Save Our Rivers" Project in conjunction with SFWMD
 16. Shandler Hall Community Park
Location: 419 Florence Avenue
Size: 4 Acres
Description: Community Park
 17. Ten Mile Canal Bike Path
Location: Adjacent to Ten Mile Canal
Size: N/A
Description: Bike Path
 18. Terry Park
Location: 3410 Palm Beach Boulevard
Size: 40 Acres
Description: Baseball Field, Grandstands
 19. Tice Elementary School Park
Location: 4524 Tice Street
Size: 1 Acre
Description: Community Park

TABLE 2-2
(Continued)

FEDERAL FACILITIES

1. Caloosahatchee Natural Wildlife Refuge

Location: North of the Caloosahatchee River, east of I-75, near
the five-mile radius boundary

Size: 40 Acres

Description: Wildlife Refuge

OTHER FACILITIES

1. Golf Course

Location: South of the Gulf Coast Landfill

TABLE 2-3

GOVERNMENTAL JURISDICTIONS INFORMATION SOURCES

Agency/Department Contacted	Information Provided	Areas of Concern Within 5 Miles of Project Site?
<u>LOCAL/REGIONAL</u>		
Lee County Historic Preservation Committee	- List of Historic and Prehistoric Places	No
Lee County Department of Community Services; Division of Planning and Construction	- County Parks - Libraries	Yes
Southwest Florida Regional Planning Council	- Areas of Concern - Indian Reservations	Yes No
City of Fort Myers Recreation Department	- City Parks	Yes
Lee County Division of Environmental Sciences	- Endangered and Threatened Species - Wildlife Management - Specific Plant Communities and and Habitats	(Response Pending)
Lee County Division of Water Resources	- Water Well Inventory	Yes
<u>STATE OF FLORIDA</u>		
Florida Game and Fresh Water Fish Commission	- Game Management Areas	Yes
Department of Natural Resources; Division of Recreation and Parks	- State Parks	No
Department of Agriculture and Consumer Services; Division of Forestry	- State Forests	No
Department of Community Affairs; Bureau of Land and Water Management	- Areas of Critical State Concern	No
Department of Environmental Regulation; Bureau of Surface Water Management	- Outstanding Florida Waters	Yes

TABLE 2-3
(Continued)

Agency/Department Contacted	Information Provided	Areas of Concern Within 5 Miles of Project Site?
Department of Environmental Regulation; Fort Myers Branch Office	- Endangered and Threatened Species - Wildlife Management - Specific Plant Communities and Habitats	Yes
South Florida Water Management District; Fort Myers Branch Office	- Endangered and Threatened Species - Wildlife Management - Specific Plant Communities and Habitats	Yes
South Florida Water Management District, West Palm Beach Office	- Consumptive Use Permits - "Save Our Rivers" Lands	Yes
Department of Natural Resources; Division of Land Resources; Land Acquisition Planning Section	- Conservation and Recreation Lands	No
Department of Natural Resources; Division of State Lands; Fort Myers Office	- Submerged Lands	Yes
Department of Natural Resources; Division of State Lands; Southwest Florida Aquatic Preserves	- Aquatic Preserves	No
Department of State; Division of Historical Resources	- State Archaeological Lands or Landmark Zones	No
Department of Natural Resources; Florida Natural Areas Inventory	- Special Plants and Animals	Yes
<u>FEDERAL</u>		
National Oceanic and Atmospheric Administration (NOAA); National Marine Fisheries Services (NMFS); Environmental Assessment Branch, and Protected Species Management Branch	- Marine Sanctuaries - Estuarine Sanctuaries - National Seashores	(Response Pending)

TABLE 2-3
(Continued)

Agency/Department Contacted	Information Provided	Areas of Concern Within 5 Miles of Project Site?
U.S. Fish and Wildlife Service	- Critical Habitats of Endangered Species - Wildlife Refuges - Wildlife Areas - Memorials NPS - Monuments NPS - Marine Sanctuaries - Estuarine Sanctuaries - Rare Areas - Wild and Scenic Rivers - Military Lands - Endangered and Threatened Species	Yes
U.S. Army Corps of Engineers	- Dredge and Fill Sites	Yes

According to the Lee County Department of Community Service, there are 14 existing recreation areas and one library located within a five-mile radius of the project area. Lee County's Historic Preservation Committee reported no prehistoric sites (Indian mounds or campsites) within the five-mile radius. The City of Fort Myers Recreation Department provided information confirming five city parks, one golf course, and one proposed park in the study area.

Information provided by the Southwest Regional Planning Council indicated concerns related to potential impacts on the following areas.

- o Interstate 75
- o State Roads
- o The Caloosahatchee River
- o The Orange River
- o The Six-Mile Cypress Slough and Preserve Area
- o The Caloosahatchee River National Wildlife Refuge

The Southwest Florida Regional Planning Council confirmed there are no Indian reservations in Lee County. The State of Florida Department of Natural Resources confirmed there are no Conservation and Recreation Lands within the five-mile radius.

According to the Department of Natural Resources, Division of State Lands, there are state owned submerged lands within the five-mile radius of the Facility. These submerged lands are submerged lands associated with the Caloosahatchee and Orange Rivers and any naturally occurring navigable water bodies within the five-mile radius.

The Florida Natural Areas Inventory provided a list of special plants and animals. A special element is any component of the natural environment, such as an animal or plant species, that is limited in abundance, range, or habitat. Known occurrences of special elements have been recorded in the area.

The South Florida Water Management District (SFWMD) has a "Save Our Rivers" project in the study area, in conjunction with Lee County. The Six Mile Cypress Slough Preserve, comprised of approximately 2,000 acres, is located

south of SR 82, adjacent to the Six Mile Cypress Parkway. The northernmost reach of the slough extends to about one mile west-southwest of the energy recovery facility site.

The Department of Environmental Regulation (DER) indicated that there is only one Outstanding Florida Water in the study area. The Caloosahatchee National Wildlife Refuge is located northwest of the site, on the boundary of the five-mile radius. The Florida Department of Natural Resources has confirmed that there are no state parks or aquatic preserves within the five-mile radius. Additionally, the Division of Forestry reports no state forests in the area. The Florida Department of Community Affairs has indicated that there are no areas of critical state concern in Lee County or any adjacent counties.

The U.S. Army Corps of Engineers noted the presence of dredge-and-fill disposal sites on the boundary of the five-mile radius. These spoil sites are located about five miles north and northwest of the project site and are associated with the Caloosahatchee River. The most notable of these is on Beautiful Island, located in the middle of the river.

The Florida Game and Fresh Water Fish Commission and U.S. Fish and Wildlife Service were contacted regarding threatened and endangered species in the study area. A detailed discussion of existing fauna can be found in Section 2.3.6.

2.2.2 ZONING AND LAND USE PLANS

The following section highlights applicable issues regarding the energy recovery facility from regional, county and municipal comprehensive plans with jurisdiction within the study area.

Regional Comprehensive Plans

The Regional Comprehensive Policy Plan For Southwest Florida, adopted by the Southwest Florida Regional Planning Council on May 21, 1987, is the region's policy statement for Charlotte, Collier, Glades, Hendry, Lee, and Sarasota counties. The Regional Comprehensive Policy Plan for Southwest Florida includes a goals and policies section on hazardous and nonhazardous materials and waste. The section goal states:

GOAL: All solid waste, including hazardous waste, wastewater, and all hazardous materials, shall be properly managed, and the use of landfills shall be eventually eliminated.

In addition, there is a section which includes a regional goal and policies (Cluster 51) that apply to the proposed energy recovery facility. For a complete review of the goals and policies section regarding hazardous and nonhazardous materials and waste, refer to Appendix 3.0 in Volume II.

REGIONAL GOAL: By 1991, the per capita amount of solid waste being disposed of in landfills will begin to decline and will continue to decline over previous years.

POLICY 3: The volume of materials disposed of in landfills should be reduced through feasible recycling.

POLICY 4: Programs for research, development, and implementation of waste reduction and resource recovery methods should be established.

The Lee Plan is Lee County's Comprehensive Plan which was adopted on January 31, 1989 and became effective March 1, 1989. Lee County Ordinance 89-02 amended the Lee Plan and adopted the revised format of the Lee Plan. Refer to Appendix 3.0 for a copy of the ordinance. The Lee Plan consists of 12 elements, a glossary, appendices, and two support documents. The 12 elements are:

- 1) Future land use;
- 2) Traffic circulation;
- 3) Community facilities and services;
- 4) Mass transit;
- 5) Parks, recreation and open space;
- 6) Capital improvements;
- 7) Conservation and coastal management;
- 8) Ports, aviation, and related facilities;
- 9) Housing;
- 10) Historic preservation;
- 11) Intergovernmental coordination; and
- 12) Procedures and administration.

Applicable sections of the Lee Plan pertaining to the energy recovery facility include the Future Land Use Element and the Community Facilities and Services Element.

The Future Land Use Element of the County's comprehensive plan outlines goals, objectives, and policies which will provide the proper future land uses for public and private development within Lee County. The element establishes a future land use map and future land use classifications with various allowable utilizations and densities.

Future land uses within the study area include Suburban, Urban Community, Outlying Suburban, Central Urban, Intensive Development, New Community, Rural, Open Lands, Industrial Development, Industrial (Interchange), General Commercial (Interchange), Airport Commerce, Public Facilities, and Resource Protection Areas and Transition Zones. The project site is classified as Rural.

Suburban uses include Fort Myers Shores, located to the north of the project site. Urban Community uses include a portion of Lehigh Acres and an area east of Interstate 75. Outlying Suburban uses are limited within the study area, including a quarter-section adjacent to Orange River Boulevard three miles from the project site and an area next to Six Mile Cypress Slough approximately four miles southwest of the project site. Central Urban uses include a portion of Lehigh Acres to the southeast of the project site and an area to the west of Six Mile Cypress Slough. Intensive Development areas within the study area are adjacent to SR 884 west of Interstate 75. New Community uses are located over two miles to the south of the project site adjacent to SR 82. This area is currently being developed as a mixed use community with commercial, single-family and multi-family housing, school, park, and golf course uses.

Rural uses include the majority of the low density residential uses north of SR 82 and east of Interstate 75. Open Lands are located primarily south of SR 82 and east of Six Mile Cypress Slough. Industrial Development within the area includes the landfill located to the south of the project site and an industrial area located south of Lee Boulevard one mile southeast of the project site. Industrial Interchange areas are located at and north of the

Interstate 75/SR 82 interchange. General Commercial Interchange areas are located at the Interstate 75/SR 80 interchange. Airport Commerce areas are located almost five miles south of the project site adjacent to the Southwest Florida Regional Airport.

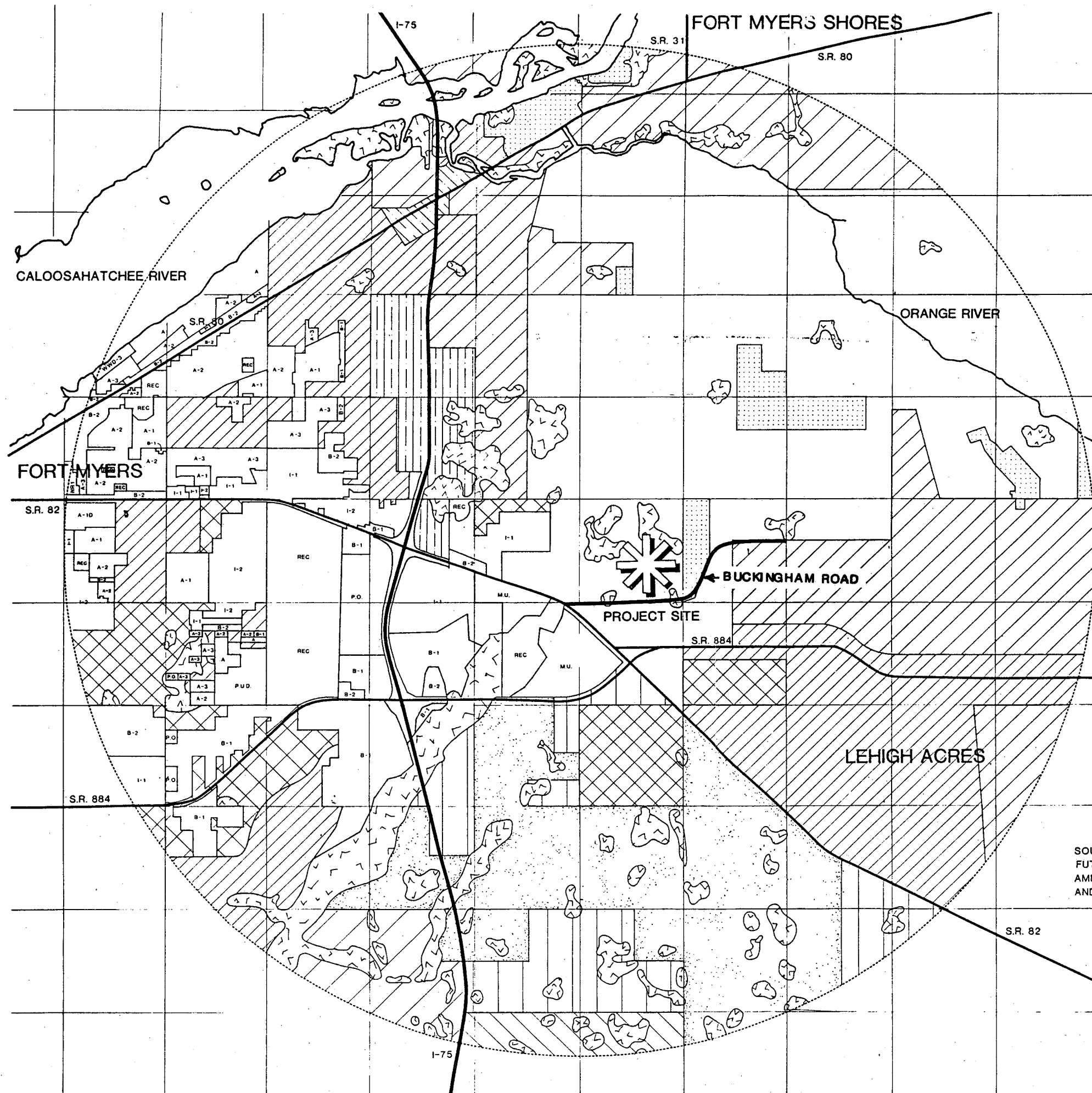
Public Facility uses include Buckingham Community Park located adjacent to the eastern portion of the project site. This park is 135 acres in size and is anticipated to open in the fall of 1991. The Sunland Training Center is located approximately two miles northeast of the project site. Other public facilities in the study area include an airstrip located four miles to the east of the project site and the Florida Power and Light plant over four miles to the north of the site. Resource Protection Areas and Transition Zones are scattered throughout the study area. The future land uses within the study area are illustrated on Figure 2-10. See Appendix 3.0 for the future land use category descriptions.

Pursuant to Objective 1.7 of the Lee Plan, there are overlays on the future land use map that are special treatment areas with allowances or restrictions in addition to the requirements of their underlying categories. The five overlays include Airport Noise Zones, Committed Development, Urban Reserve, Privately Funded Infrastructure, and a Water-Dependent overlay. Refer to Appendix 3.0 for overlay descriptions and locations.

Within the Future Land Use Element, there is a goal, objective and policy relating to the siting of resource/energy recovery facilities which eliminates the need for a comprehensive plan amendment for the future land use classification of the project site. The goal, objective and policy include:

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 shall be promoted through the rezoning process to contain sprawl, minimize energy costs, conserve land, water and natural resources, minimize the cost of services, and reverse



FUTURE LAND USE

LEGEND

THE CITY OF FORT MYERS FUTURE LAND USE DISTRICTS:

- A Low Density Single Family Residential
- A-1 Medium Density Single Family Residential
- A-1D Medium Density Single Family/duplex Residential
- A-2 Medium Density/multi-family Residential
- A-3 High Density/multi-family Residential
- PO Professional Office
- B-1 Intensive Commercial
- I-1 Light Industrial
- I-2 Heavy Industrial
- REC Recreation & Open Space
- MU Mixed Use
- PUD Planned Unit Development District
- NR1 Neighborhood Redevelopment District

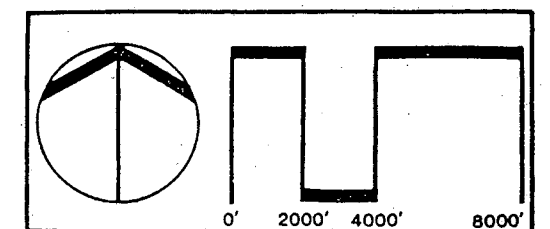
LEE COUNTY FUTURE LAND USE DISTRICTS:

- INTENSIVE DEVELOPMENT
- CENTRAL URBAN
- URBAN COMMUNITY
- SUBURBAN
- OUTLYING SUBURBAN
- INDUSTRIAL DEVELOPMENT
- PUBLIC FACILITIES
- AIRPORT COMMERCE
- INDUSTRIAL
- GENERAL COMMERCIAL
- NEW COMMUNITY
- RURAL
- OPEN LANDS
- RESOURCE PROTECTION AREAS AND TRANSITION ZONES

LEE COUNTY ENERGY RECOVERY FACILITY

Poor Original

NOTE: MAP SCALE IS APPROXIMATE



SOURCE: THE CITY OF FORT MYERS
FUTURE LAND USE MAP
AMENDED DECEMBER 18, 1989
AND THE LEE PLAN FUTURE LAND USE MAP, 1989

FIGURE 2-10

typical development patterns where large tracts of land are by-passed in favor of development more distant from services and existing communities.

POLICY 2.1.3: All land use categories permit the consideration of churches and schools (except in Resource Protection Areas, Transition Zones, 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 and applicable zoning and development regulations.

Solid Waste is a sub-element of the Community Facilities and Services Element of the Lee Plan, and lists goals, objectives, and policies regarding the County's solid waste issues. The complete goals, objectives and policies section from the solid waste sub-element is included in Appendix 3.0 while the goals, objectives, and pertinent policies regarding the proposed energy recovery facility are listed below, including:

GOAL 40: SOLID WASTE. To ensure the health, safety, and general welfare of the citizens of Lee County by protecting the quality of the environment through the proper management and disposal of solid waste.

OBJECTIVE 40.1: SOLID WASTE COLLECTION. Establish during 1989 a program to segregate construction and demolition debris and to separate newspaper, aluminum cans, and glass bottles for recycling.

POLICY 40.1.2: Design and implement resource recovery and recycling programs for glass, paper, plastic, and nonferrous metal containers.

POLICY 40.1.3: Develop programs which will result in a decrease in the volume of materials in the solid waste stream requiring landfilling (i.e., source separation of material which can be reused or disposed of in another manner).

OBJECTIVE 40.2: SOLID WASTE DISPOSAL. By 1994, reduce by 30 percent the anticipated per capita volume of solid waste material which must be disposed of; and by 1990, complete the design plans for a new landfill.

POLICY 40.2.1: The County shall continue to study and implement as appropriate available disposal technologies and volume reduction by recycling to meet Objectives 40.1 and 40.2. Particular attention shall be paid to volume reduction of bulky and potentially recyclable items such as horticultural waste, rubber tires, appliances, etc.

POLICY 40.2.6: The County shall immediately proceed to design and construct a new landfill to serve the entire County including all municipalities.

In addition to the unincorporated portion of Lee County, a portion of the study area is within the City of Fort Myers. The City of Fort Myers Ordinance 2545 was amended and adopted The City of Fort Myers Comprehensive Plan on December 18, 1989. The City of Fort Myers has established concurrent future land use and zoning classifications for lands within city limits. Based on the City of Fort Myers Future Land Use Map, as amended December 18, 1989, the following categories are within the study area.

<u>District</u>	<u>Classification</u>
Residential:	
Low Density Single-Family	A
Medium Density Single-Family	A-1
Medium Density Single-Family/Duplex	A-1D
Medium Density Multi-Family	A-2
High-Density Multi-Family	A-3

<u>District</u>	<u>Classification</u>
Professional Office	PO
General Commercial	B-1
Intensive Commercial	B-2
Light Industrial	I-1
Heavy Industrial	I-2
Recreation and Open Space	REC
Mixed Use	MU
Planned Unit Development	PUD
Neighborhood Redevelopment	NR1
Waterfront Development	WWD-3

The various residential districts are differentiated by the type of housing (single-family/multi-family), densities of use, dimension and area regulations, and permitted uses and conditional uses. Refer to Appendix 3.0 for the future land use classifications and intents.

Zoning

The Lee County Official Zoning Ordinance, established by Ordinance 86-17, adopted by the Lee County Board of County Commissioners on June 25, 1986; effective on August 1, 1986; and amended through August 1, 1987 and January 4, 1989, is the official zoning statement for lands in the unincorporated areas of Lee County.

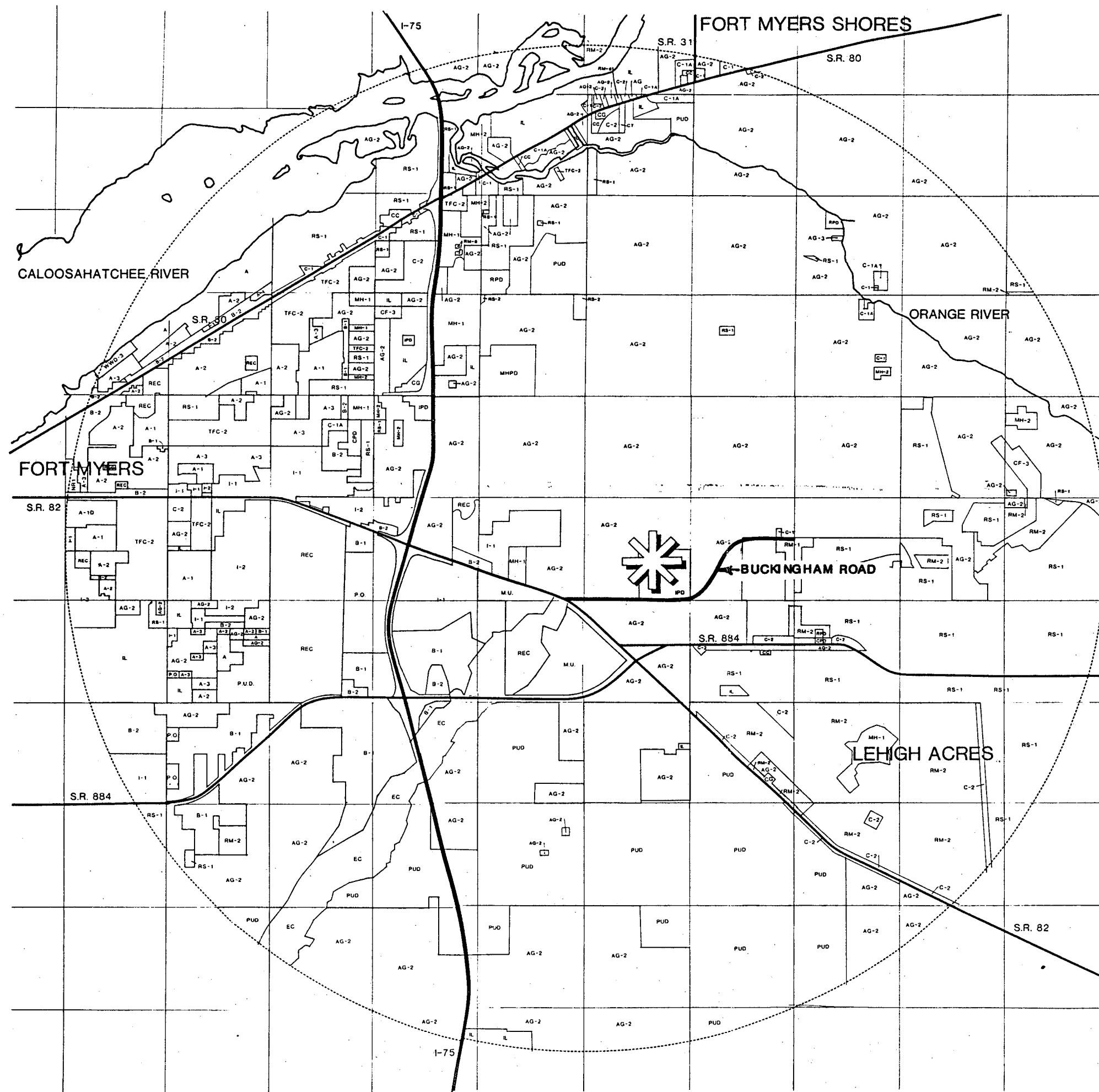
The zoning ordinance includes sections on title, authority, short title, purpose and intent; general information; the Lee Plan; district establishment, designation, and regulations; supplemental regulations; non-conforming uses, lots, buildings, and structures; the official zoning map and interpretation; application procedures and requirements; the local planning agency, hearing examiner, and Board of County Commissioners; definitions and use activity groups; and fees related to zoning matters. A listing of the zoning districts located within the study area, with purpose and intent descriptions, is included in Appendix 3.0.

The project site is in the process of being rezoned from Agricultural (AG-2) to Industrial Planned Development (IPD). 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 (SOURCE: Lee County Zoning Ordinance). The IPD district designation of acceptable uses allows for the development and operation of the energy recovery facility.

Zoning surrounding the project site includes agricultural districts in the rural, low density residential areas north of SR 82. Residential zoning districts characterize Lehigh Acres with commercial districts primarily located adjacent to SR 82 and SR 884. Refer to the zoning map on Figure 2-11 for complete district locations within the study area. The following is a listing of the Lee County zoning districts located within the study area.

- Residential Single Family (RS-1, RS-2, RS-3)
- Residential Multiple Family (RM-2, RM-6, RM-8)
- Mobile Home Residential (MH-1, MH-2)
- Conventional RV (RV-3)
- Residential Two Family-Conservation (TFC-2)
- Two Family (TF-1)
- Agricultural (AG-2, AG-3)
- Community Facilities (CF-2, CF-3)
- Community Facilities Planned (CFPD)
- Planned Unit Development (PUD)
- Mobile Home Planned Development (MHPD)
- Residential Planned Development (RPD)
- Industrial Planned Development (IPD)
- Light Industrial (IL)
- Rural Industrial (RI)
- General Industrial (IG)
- Commercial Planned Development (CPD)
- Commercial (C-1A)
- Commercial (C-1)
- Commercial (C-2)
- Community Commercial (CC)



LEGEND

THE CITY OF FORT MYERS FUTURE LAND USE DISTRICTS:

- A Low Density Single Family Residential
- A-1 Medium Density Single Family Residential
- A-1D Medium Density Single Family/duplex Residential
- A-2 Medium Density/multi-family Residential
- A-3 High Density/multi-family Residential
- PO Professional Office
- B-1 Intensive Commercial
- I-1 Light Industrial
- I-2 Heavy Industrial
- REC Recreation & Open Space
- MU Mixed Use
- PUD Planned Unit Development District
- NR1 Neighborhood Redevelopment District

LEE COUNTY ZONING DISTRICTS:

- RS-1 Residential Single Family Districts
- RS-2 Residential Single Family Districts
- RS-3 Residential Single Family Districts
- RM-1 Residential Multiple Family Districts
- RM-2 Residential Multiple Family Districts
- MH-1 Mobile Home Residential Districts
- MH-2 Mobile Home Residential Districts
- TFC-2 Residential Two Family Conservation Districts
- RV-3 Conventional RV Districts
- AG-2 Agricultural Districts
- AG-3 Agricultural Districts
- CF-2 Community Facilities Districts
- CF-3 Community Facilities Districts
- PUD Planned Unit Development District
- MHPD Mobile Home Planned Development
- RPD Residential Planned Development
- IL Light Industrial District
- IPD Industrial Planned Development
- CPD Commercial Planned Development
- C-1A Commercial District
- C-1 Commercial District
- C-2 Commercial District
- CC Community Commercial District
- CG General Commercial District
- CT Tourist Commercial District
- CS Special Commercial Office District
- CR Rural Commercial District

PROJECT SITE



SOURCES:

- LEE COUNTY LAND INFORMATION SYSTEMS, MAY 1, 1990
- CITY OF FORT MYERS FUTURE LAND USE MAP - DEC. 18, 1989

LEE COUNTY ENERGY RECOVERY FACILITY

Poor Original

NOTE: MAP SCALE IS APPROXIMATE

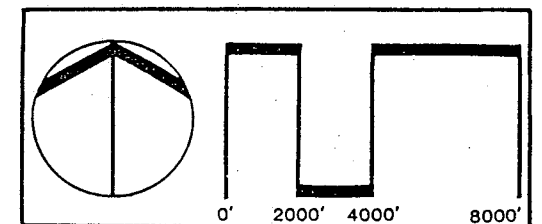


FIGURE 2-11

Poor Original

LETTER OF TRANSMITTAL

RECEIVED
NOV 18 1990
FDER-BAQM

CAMP DRESSER & MCKEE INC.
8191 College Parkway
Suite 206
Fort Myers, Florida 33919

(813) 433-0046

DATE: 11-05-90 JOB NO: 6685-38-PT-PRMF

ATTENTION: Distribution

RE: Lee County Energy Recovery Facility

PPSA Application

FDER File No. PA 90-30

DOAH Case No. 90-3942

Under separate cover via _____ the
following items:

☐ Shop Drawings ☐ Prints ☐ Plans ☐ Samples ☐ Change Order
☐ Copy of Letter ☐ Specifications _____

COPIES	DATE	NO.	DESCRIPTION
1			Errata Sheet - 11/5/90

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for correction ☐ Return _____ corrected prints
☐ For review and comments _____
☐ FOR BIDS DUE _____ 19____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS: _____

cc: M. J. Ihnat

Poor Original

SIGNED

Maie Whitman Mahan

ALL PARTIES

RICHARD DONELAN, Asst. General Counsel
Department of Environmental Regulation
2600 Blair Stone Road., Town Towers Office Bldg.
Tallahassee, FL 32399-2400

STEVE PFEIFFER, General Counsel
L. KATHRYN FUNCHES, Asst. General Counsel
Department of Community Affairs
2740 Centerview Dr., Rhyne Bldg.
Tallahassee, FL 32399

JOHN FUMERO
South Florida Water Management District
Post Office Box 24680
West Palm Beach, FL 33416

KEN PLANTE, General Counsel
MAC MCCLELLAN, Assistant General Counsel
Department of Natural Resources
3900 Commonwealth Blvd., Douglas Bldg.
Tallahassee, FL 32399

JIM ANTISTA, General Counsel
Fla. Game & Fresh Water Fish Commission
620 South Meridan Rd., Ferris Bryant Bldg.
Tallahassee, FL 32399

SUSAN CLARK, General Counsel
MIKE PALECKI, Chief, Bureau of Electric & Gas
Florida Public Service Commission,
101E. Gaines St., Fletcher Bldg.
Tallahassee, FL 32399

WAYNE DALTRY, Executive Director
Southwest Florida Regional Planning Council
Post Office Box 3455
North Fort Myers, FL 33918-3455

HAMILTON S. OVEN, Administrator
Power Plant Siting Section
Department of Environmental Regulation
2600 Blairstone Rd., Twin Towers Office Bldg.
Tallahassee, FL 32399-2400

Poor Original

JIM YAEGER, Lee County Attorney
Post Office Box 398
Fort Myers, FL 33902

MLC22/21

Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

ERRATA SHEET
November 5, 1990

Volume I

Section 2.0

The 5-mile radius from the site was realigned in response to comments to from the Department of Community Affairs.

- o Replace Figure 2-10 with the revised Figure 2-10.
- o Replace Figure 2-11 with the revised Figure 2-11
- o Replace Figure 2-14 with the revised Figure 2-14.

Volume III

Section 6.0

In response to comments from the National Park Service, Table 6-14 has been revised to reflect the actual 24-hour SIL for PM_{10} and the new Florida Air Code citation.

- o Replace Table 6-14 with the revised Table 6-14.

FUTURE LAND USE

LEGEND

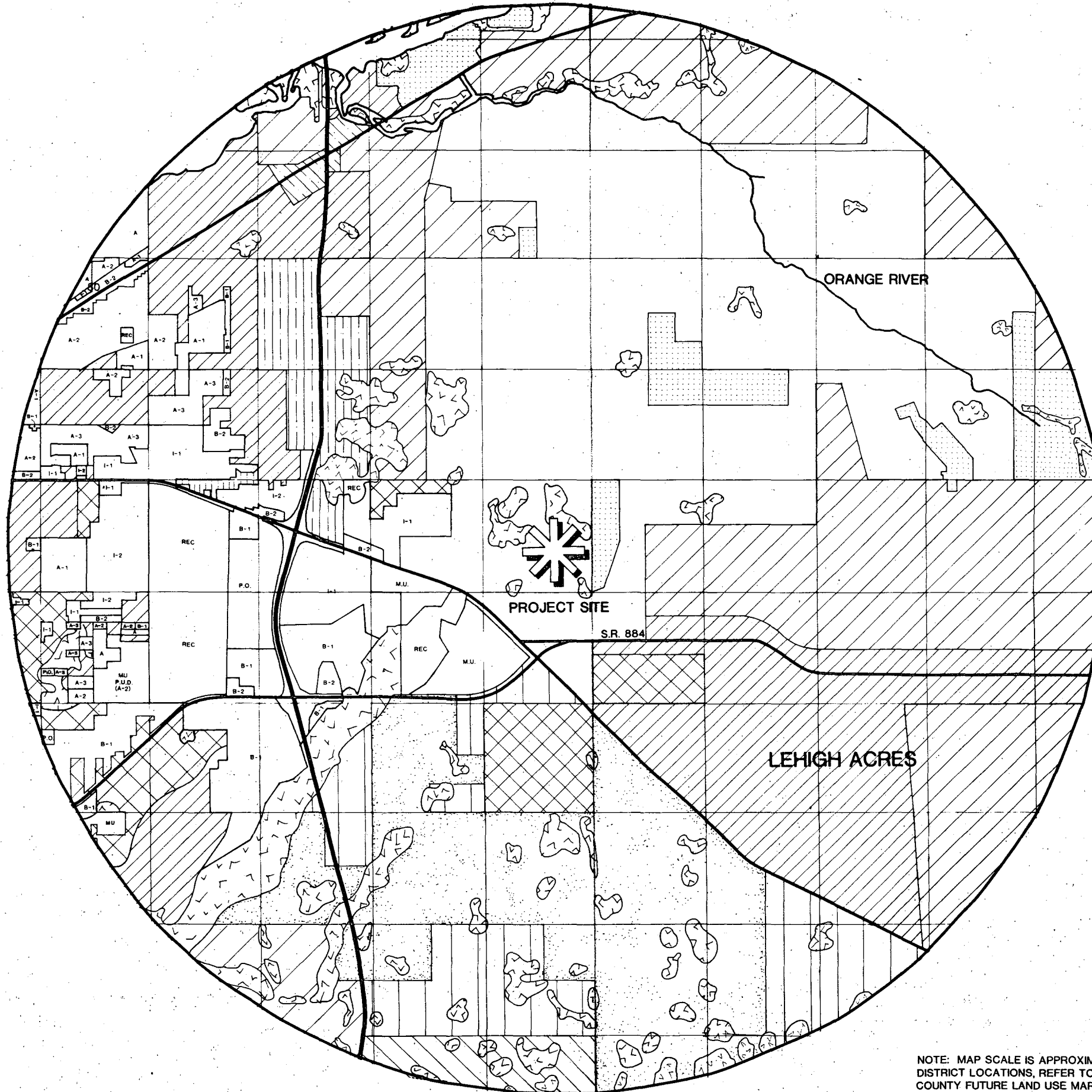
THE CITY OF FORT MYERS FUTURE LAND USE DISTRICTS:

Low Density Single Family Residential	A
Medium Density Single Family Residential	A-1
Medium Density Single Family/Duplex Residential	A-1D
Medium Density/Multi-Family Residential	A-2
High Density/Multi-Family Residential	A-3
Professional Office	PO
General Commercial	B-1
Intensive Commercial	B-2
Light Industrial	I-1
Heavy Industrial	I-2
Recreation and Open Space	REC
Mixed Use	MU
Planned Unit Development	PUD
Neighborhood Redevelopment	NR1
Waterfront Development	WWD-3

LEE COUNTY FUTURE LAND USE DISTRICTS:

INTENSIVE DEVELOPMENT	
CENTRAL URBAN	
URBAN COMMUNITY	
SUBURBAN	
OUTLYING SUBURBAN	
INDUSTRIAL DEVELOPMENT	
PUBLIC FACILITIES	
AIRPORT COMMERCE	
INTERCHANGE INDUSTRIAL	
INTERCHANGE GENERAL COMMERCIAL	
NEW COMMUNITY	
RURAL	
OPEN LANDS	
RESOURCE PROTECTION AREAS AND TRANSITION ZONES	

LEE COUNTY RESOURCE RECOVERY FACILITY



NOTE: MAP SCALE IS APPROXIMATE. FOR EXACT DISTRICT LOCATIONS, REFER TO THE CITY AND COUNTY FUTURE LAND USE MAPS.

SOURCE: THE CITY OF FORT MYERS FUTURE LAND USE MAP AMENDED DECEMBER 18, 1989 AND THE LEE PLAN FUTURE LAND USE MAP, 1989.

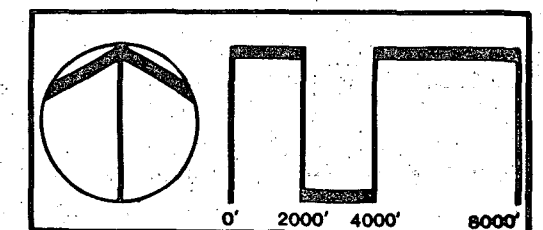


FIGURE 2-10

ZONING

LEGEND

THE CITY OF FORT MYERS ZONING DISTRICTS:

Low Density Single Family Residential	A
Medium Density Single Family Residential	A-1D
Medium Density Single Family/Duplex Residential	A-2
Medium Density/Multi-Family Residential	A-3
High Density/Multi-Family Residential	PO
Professional Office	B-1
General Commercial	I-1
Intensive Commercial	I-2
Light Industrial	REC
Heavy Industrial	MU
Recreation and Open Space	PUD
Mixed Use	NR1
Planned Unit Development	WWD-3
Neighborhood Redevelopment	
Waterfront Development	

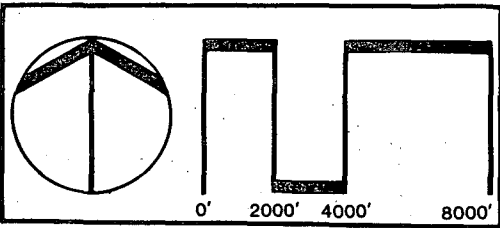
LEE COUNTY ZONING DISTRICTS:

Residential Single Family	RS-1
Residential Single Family	RS-2
Residential Single Family	RS-3
Residential Multiple Family	RM-1
Residential Multiple Family	RM-2
Residential Multiple Family	RM-3
Residential Multiple Family	RM-4
Residential Multiple Family	RM-5
Mobile Home Residential	MH-1
Mobile Home Residential	MH-2
Residential Two Family Conservation	TF-1
Two-Family	TF-2
Conventional RV	RV-1
Agricultural	AG-1
Agricultural	AG-2
Community Facilities	CF-1
Community Facilities	CF-2
Community Facilities Planned	CF-3
Planned Unit Development	CPD
Mobile Home Planned Development	PUD
Residential Planned Development	MHPD
Light Industrial	IL
Rural Industrial	RI
General Industrial	IG
Industrial Planned Development	IPD
Commercial Planned Development	CPD
Commercial	C-1
Commercial	C-2
Community Commercial	CC
General Commercial	CG
Tourist Commercial	CT
Special Commercial Office	CS
Rural Commercial	CR
Environmentally Critical	EC

PROJECT SITE



LEE COUNTY RESOURCE RECOVERY FACILITY

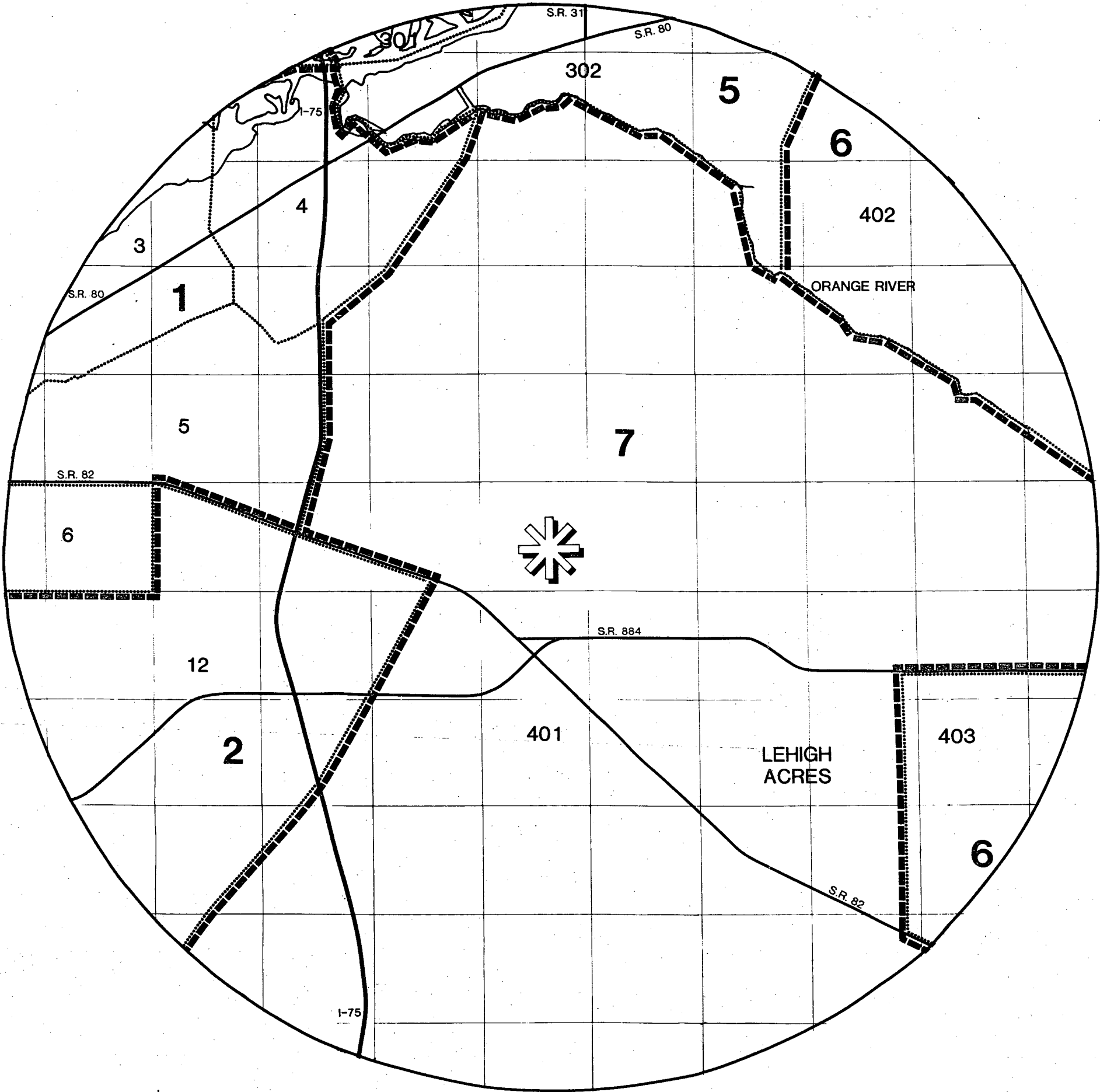


NOTE: MAP SCALE IS APPROXIMATE. FOR EXACT DISTRICT LOCATIONS, REFER TO THE CITY AND COUNTY ZONING MAPS.

SOURCE: LEE COUNTY LAND INFORMATION SYSTEMS, MAY 1, 1990
AND THE CITY OF FORT MYERS FUTURE LAND USE MAP, DECEMBER 18, 1989.

FIGURE 2-11

PLANNING DISTRICTS
AND CENSUS TRACTS



- PLANNING DISTRICT 5
- CENSUS TRACT 404
- PLANNING DISTRICT BOUNDARY LINE
- CENSUS TRACT BOUNDARY LINE
- PROJECT SITE

SOURCE: REVISED 1980 CENSUS TRACT/ED MAP
AND THE LEE PLAN, 1989, LEE COUNTY, FLORIDA

LEE COUNTY
RESOURCE
RECOVERY
FACILITY

NOTE: MAP SCALE IS APPROXIMATE

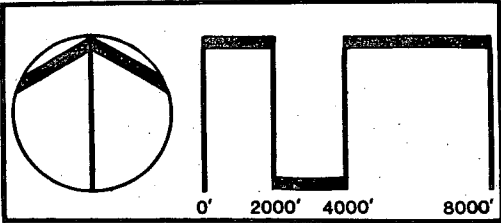


FIGURE 2-14

TABLE 6-14

COMPARISON OF MAXIMUM CONCENTRATIONS
AT SPECIAL RECEPTOR LOCATIONS
TO CLASS I (SIL)S AND PSD INCREMENTS
(concentrations in $\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Time	Maximum Predicted Concentration		Class I Significant Impact Level ^c	PSD Class I Increments	Impact as % of PSD Increment	
		Everglades ^a	Big Cypress ^b			Everglades	Big Cypress
SO ₂	Annual	0.008	0.011	(1) ^d	2	0.4	0.6
	24-hour	0.164	0.245	1	5	3.3	4.9
	3-hour	1.137	1.458	(25) ^d	25	4.5	5.8
TSP	Annual	0.001	0.001	(1) ^d	5	0.02	0.02
	24-hour	0.021	0.032	1	10	0.2	0.3
PM ₁₀	Annual	0.001	0.001	(1) ^d	4 ^e	0.03	0.03
	24-hour	0.021	0.032	1	8 ^e	0.3	0.4
NO ₂	Annual	0.018	0.024	(1) ^d	2.5	0.7	1.0

SOURCE: CDM, 1990.

^aEverglades National Park, Class I area.

^bBig Cypress National Preserve, Class II area.

^cFAC 17-2.100(180); revised September 21, 1990.

^dClass II value is given. Class I value is not available.

^eProposed EPA Standard (54 FR 41218; October 5, 1989).

NOTE: No Class I Significant Impact Level is exceeded.

ERRATA SHEET
November 5, 1990

Volume I

Section 2.0

The 5-mile radius from the site was realigned in response to comments to from the Department of Community Affairs.

- o Replace Figure 2-10 with the revised Figure 2-10.
- o Replace Figure 2-11 with the revised Figure 2-11
- o Replace Figure 2-14 with the revised Figure 2-14.

Volume III

Section 6.0

In response to comments from the National Park Service, Table 6-14 has been revised to reflect the actual 24-hour SIL for PM_{10} and the new Florida Air Code citation.

- o Replace Table 6-14 with the revised Table 6-14.

FUTURE LAND USE

LEGEND

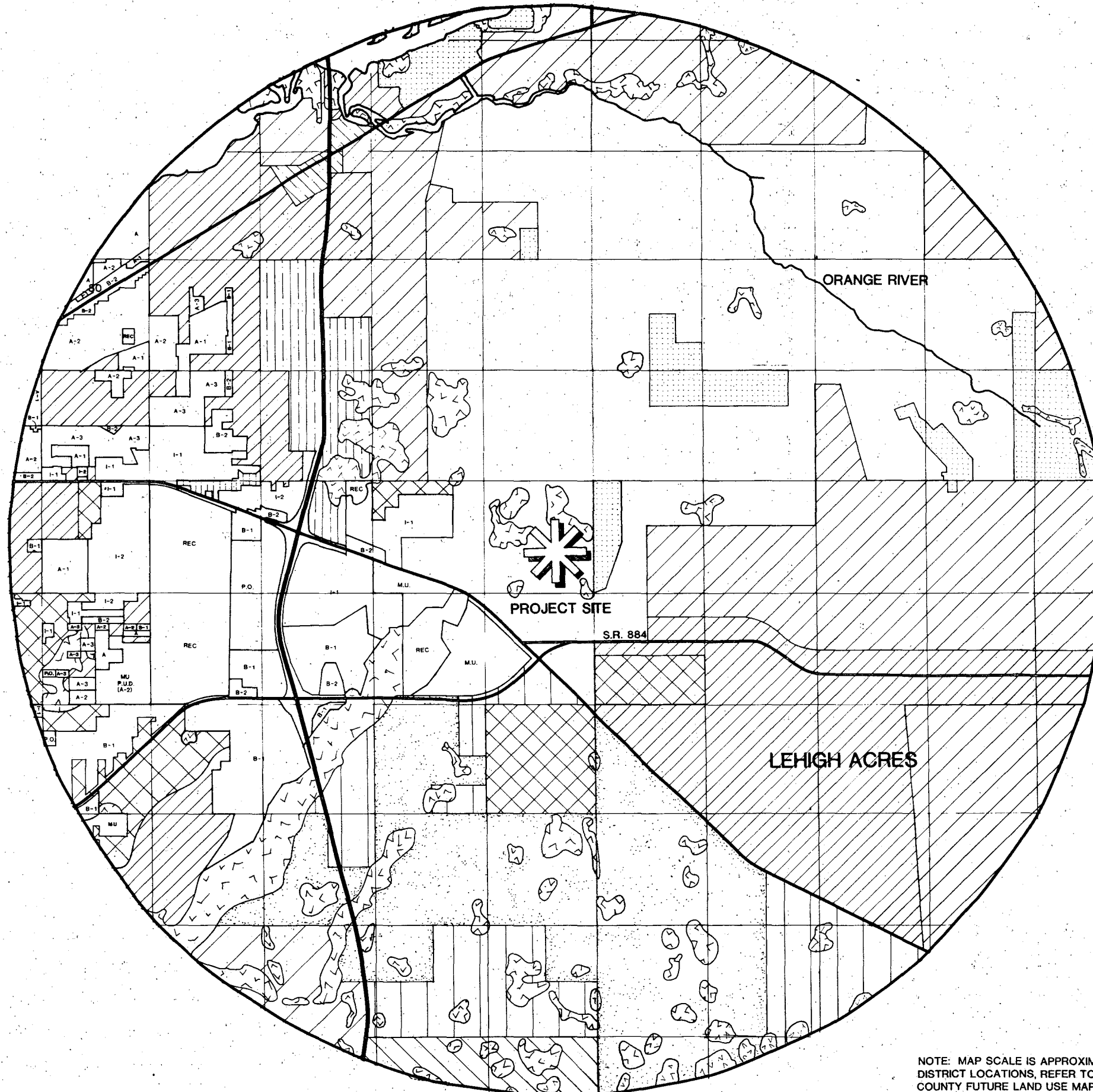
THE CITY OF FORT MYERS FUTURE LAND USE DISTRICTS:

Low Density Single Family Residential	A
Medium Density Single Family Residential	A-1
Medium Density Single Family/Duplex Residential	A-1D
Medium Density/Multi-Family Residential	A-2
High Density/Multi-Family Residential	A-3
Professional Office	PO
General Commercial	B-1
Intensive Commercial	B-2
Light Industrial	I-1
Heavy Industrial	I-2
Recreation and Open Space	REC
Mixed Use	MU
Planned Unit Development	PUD
Neighborhood Redevelopment	NR1
Waterfront Development	WWD-3

LEE COUNTY FUTURE LAND USE DISTRICTS:

INTENSIVE DEVELOPMENT	
CENTRAL URBAN	
URBAN COMMUNITY	
SUBURBAN	
OUTLYING SUBURBAN	
INDUSTRIAL DEVELOPMENT	
PUBLIC FACILITIES	
AIRPORT COMMERCE	
INTERCHANGE INDUSTRIAL	
INTERCHANGE GENERAL COMMERCIAL	
NEW COMMUNITY	
RURAL	
OPEN LANDS	
RESOURCE PROTECTION AREAS AND TRANSITION ZONES	

LEE COUNTY RESOURCE RECOVERY FACILITY



NOTE: MAP SCALE IS APPROXIMATE. FOR EXACT DISTRICT LOCATIONS, REFER TO THE CITY AND COUNTY FUTURE LAND USE MAPS.

SOURCE: THE CITY OF FORT MYERS FUTURE LAND USE MAP AMENDED DECEMBER 18, 1989 AND THE LEE PLAN FUTURE LAND USE MAP, 1989.

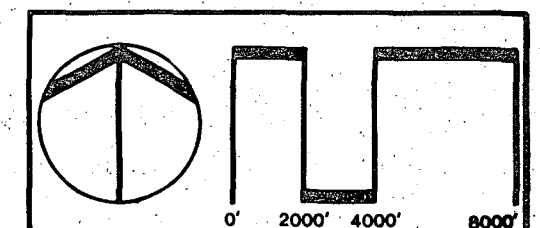


FIGURE 2-10

ZONING

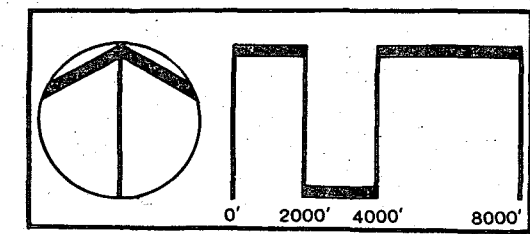
LEGEND

- THE CITY OF FORT MYERS ZONING DISTRICTS:
- | | |
|---|-------|
| Low Density Single Family Residential | A |
| Medium Density Single Family Residential | A-1D |
| Medium Density Single Family/Duplex Residential | A-2 |
| High Density/Multi-Family Residential | A-3 |
| Professional Office | PO |
| General Commercial | B-1 |
| Intensive Commercial | B-2 |
| Light Industrial | I-1 |
| Heavy Industrial | I-2 |
| Recreation and Open Space | REC |
| Mixed Use | MU |
| Planned Unit Development | PUD |
| Neighborhood Redevelopment | NR1 |
| Waterfront Development | WWD-3 |

- LEE COUNTY ZONING DISTRICTS:
- | | |
|-------------------------------------|-------|
| Residential Single Family | RS-1 |
| Residential Single Family | RS-2 |
| Residential Single Family | RS-3 |
| Residential Multiple Family | RM-1 |
| Residential Multiple Family | RM-2 |
| Residential Multiple Family | RM-6 |
| Residential Multiple Family | RM-8 |
| Mobile Home Residential | MH-1 |
| Mobile Home Residential | MH-2 |
| Residential Two Family Conservation | TFC-2 |
| Two-Family | TF-1 |
| Conventional RV | RV-3 |
| Agricultural | AG-2 |
| Agricultural | AG-3 |
| Community Facilities | CF-2 |
| Community Facilities | CF-3 |
| Community Facilities Planned | CFPD |
| Planned Unit Development | PUD |
| Mobile Home Planned Development | MHPD |
| Residential Planned Development | RPD |
| Light Industrial | IL |
| Rural Industrial | RI |
| General Industrial | IG |
| Industrial Planned Development | IPD |
| Commercial Planned Development | CPD |
| Commercial | C-1A |
| Commercial | C-1 |
| Commercial | C-2 |
| Community Commercial | CC |
| General Commercial | CG |
| Tourist Commercial | CT |
| Special Commercial Office | CS |
| Rural Commercial | CR |
| Environmentally Critical | EC |

PROJECT SITE 

LEE COUNTY RESOURCE RECOVERY FACILITY



NOTE: MAP SCALE IS APPROXIMATE. FOR EXACT DISTRICT LOCATIONS, REFER TO THE CITY AND COUNTY ZONING MAPS.

SOURCE: LEE COUNTY LAND INFORMATION SYSTEMS, MAY 1, 1990
AND THE CITY OF FORT MYERS FUTURE LAND USE MAP, DECEMBER 18, 1989.

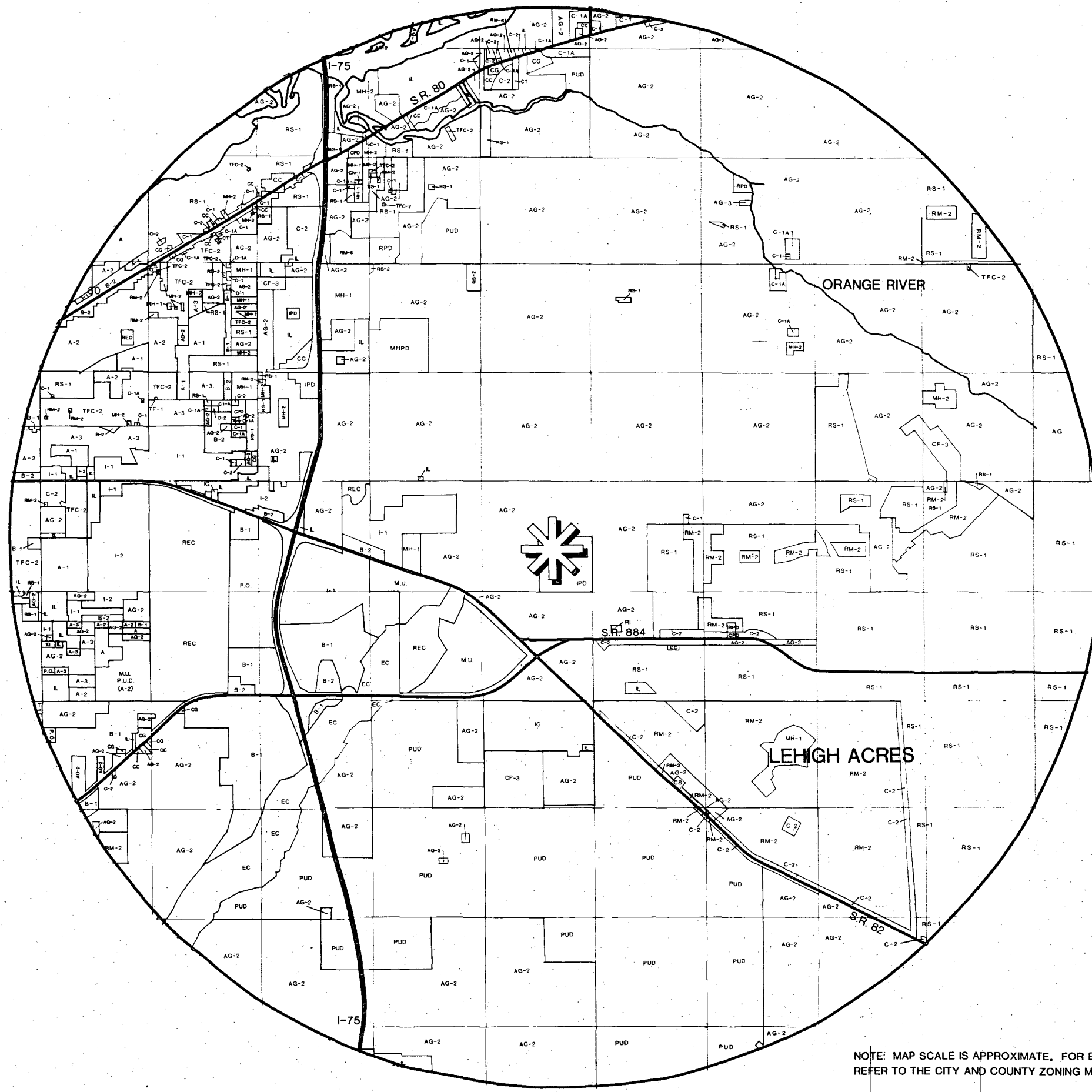
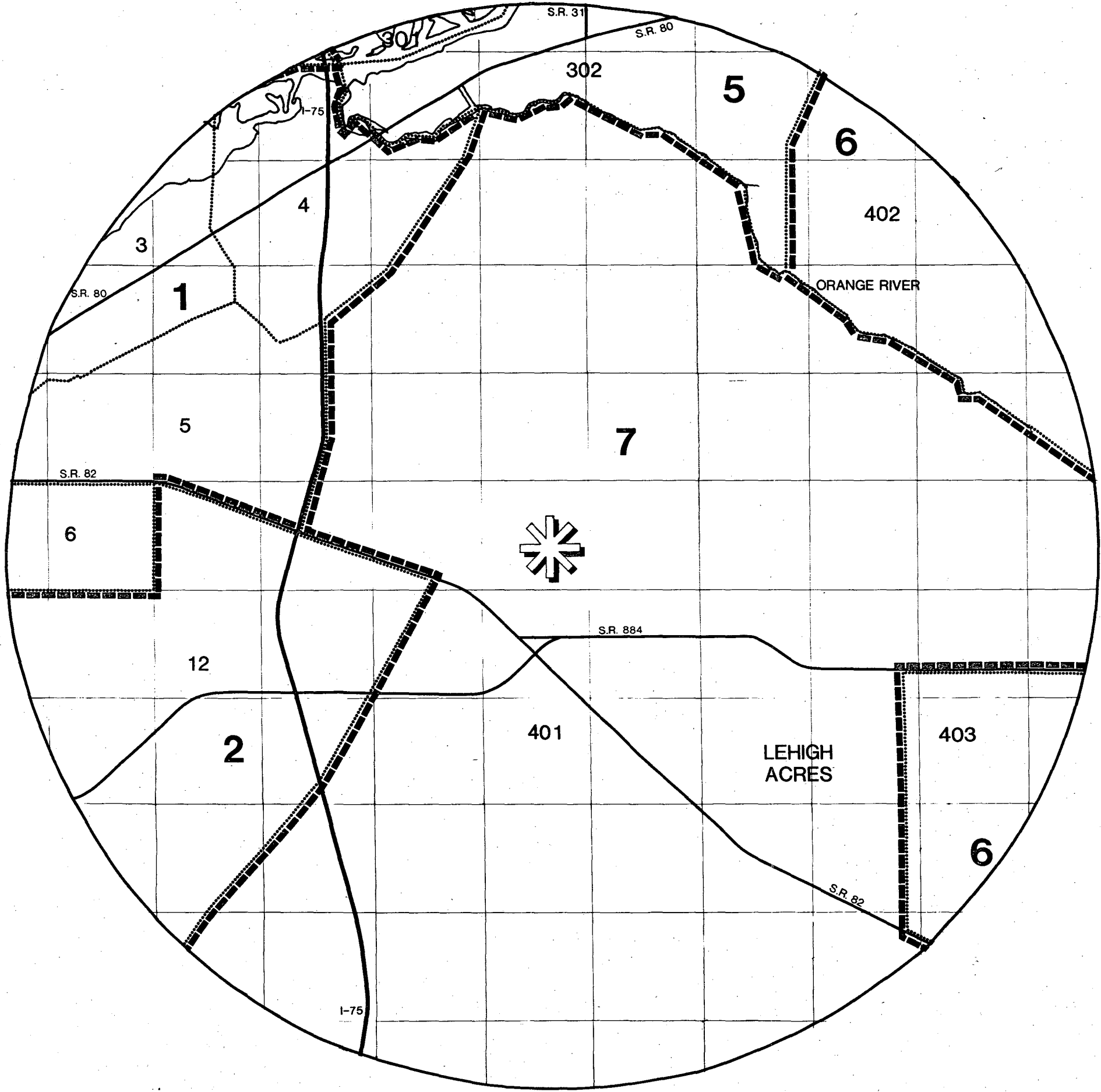


FIGURE 2-11

PLANNING DISTRICTS
AND CENSUS TRACTS



- PLANNING DISTRICT 5
- CENSUS TRACT 404
- PLANNING DISTRICT BOUNDARY LINE
- CENSUS TRACT BOUNDARY LINE
- PROJECT SITE

SOURCE: REVISED 1980 CENSUS TRACT/ED MAP
AND THE LEE PLAN, 1989, LEE COUNTY, FLORIDA

LEE COUNTY
RESOURCE
RECOVERY
FACILITY

NOTE: MAP SCALE IS APPROXIMATE

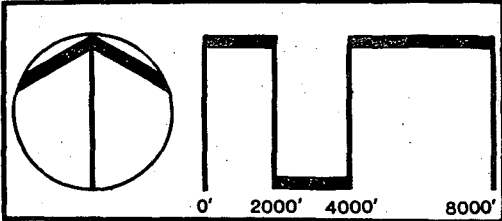


FIGURE 2-14

TABLE 6-14

COMPARISON OF MAXIMUM CONCENTRATIONS
AT SPECIAL RECEPTOR LOCATIONS
TO CLASS I (SIL)S AND PSD INCREMENTS³
(concentrations in $\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Time	Maximum Predicted Concentration		Class I Significant Impact Level ^c	PSD Class I Increments	Impact as % of PSD Increment	
		Everglades ^a	Big Cypress ^b			Everglades	Big Cypress
SO ₂	Annual	0.008	0.011	(1) ^d	2	0.4	0.6
	24-hour	0.164	0.245	1	5	3.3	4.9
	3-hour	1.137	1.458	(25) ^d	25	4.5	5.8
TSP	Annual	0.001	0.001	(1) ^d	5	0.02	0.02
	24-hour	0.021	0.032	1	10	0.2	0.3
PM ₁₀	Annual	0.001	0.001	(1) ^d	4 ^e	0.03	0.03
	24-hour	0.021	0.032	1	8 ^e	0.3	0.4
NO ₂	Annual	0.018	0.024	(1) ^d	2.5	0.7	1.0

SOURCE: CDM, 1990.

^aEverglades National Park, Class I area.

^bBig Cypress National Preserve, Class II area.

^cFAC 17-2.100(180); revised September 21, 1990.

^dClass II value is given. Class I value is not available.

^eProposed EPA Standard (54 FR 41218; October 5, 1989).

NOTE: No Class I Significant Impact Level is exceeded.

General Commercial (CG)
Tourist Commercial (CT)
Special Commercial Office (CS)
Rural Commercial (CR)
Environmentally Critical (EC)

The following City of Fort Myers zoning districts are located within the study area.

Single Family Residential (A)
Single Family Residential (A-1)
Single Family/Duplex Residential (A-1D)
Medium Density Multi-Family Residential (A-2)
High Density Multi-Family Residential (A-3)
General Commercial (B-1)
Intensive Commercial (B-2)
Professional Office (PO)
Light Industrial (I-1)
Heavy Industrial (I-2)
Recreation and Open Space (REC)
Mixed Use (MU)
Planned Unit Development (PUD)
Neighborhood Redevelopment (NR1)
Waterfront Development (WWD-3)

2.2.3 DEMOGRAPHY AND ONGOING LAND USE

Existing Population

Table 2-4 illustrates 1970, 1980, and approximate 1988 populations for major cities and the unincorporated sections of Lee County. Lee County's population grew 95 percent between 1970 and 1980 as compared with the state population growth rate of 44 percent during the same time period. Lee County's population grew 50 percent from 1980 to 1988 compared with the state growth rate of 27 percent. The City of Cape Coral had the largest population increase in the

TABLE 2-4

POPULATION: LEE COUNTY 1970 - 1988

Area	1970	1980	1988
Cape Coral	10,193	32,103	57,773
Fort Myers	27,351	36,638	43,766
Sanibel	1,106	3,363	5,475
Unincorporated Areas	<u>66,566</u>	<u>133,162</u>	<u>200,512</u>
TOTAL	105,216	205,266	307,526

SOURCE: 1989 Florida Statistical Abstract and U.S. Census Bureau

County from 1970 to 1988 with 47,580 new residents. Lee County's unincorporated population has also grown from over 66,000 in 1970 to over 200,000 as of 1988.

The majority of the study area is within the unincorporated section of Lee County. A portion of the City of Fort Myers, primarily west of Interstate 75, is within the western part of study area.

Existing Land Use Within a Five-Mile Radius of the Project Site

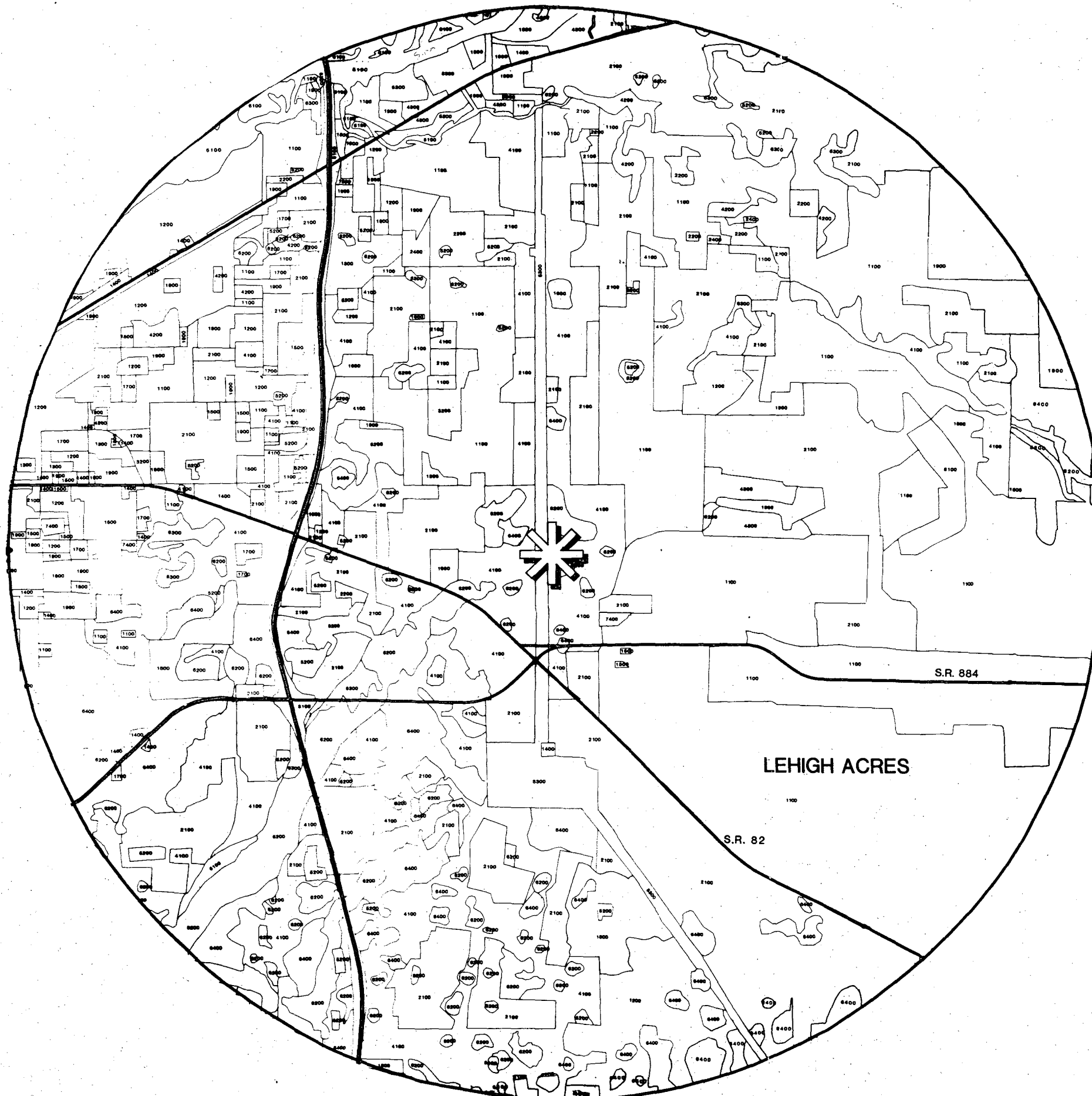
The study area is comprised of many urban and non-urban land uses. Urban uses include residential, commercial, industrial, extractive, institutional, recreation, and open lands. Non-urban land uses include croplands, pastureland, forested uplands, shrub and brushland, two rivers, several small lakes, and numerous wetlands. There also are transportation and utility uses in addition to a few small disturbed lands.

The Facility site is comprised of uplands and surrounding wetlands. Existing land uses within the study area are illustrated on Figure 2-12. Refer to the Appendix 3.0 for existing land use definitions.

There are three urban areas in the study area including the City of Fort Myers, Lehigh Acres, and the unincorporated area east of Interstate 75. Fort Myers, the most developed urban region in the study area, contains low [less than two dwelling units per acre (du/a)] and medium (2-5 du/a) density residential uses. The city boundary is one mile to the west of the site, with residential uses approximately three and a half miles to the northwest of the project site.

The Lehigh Acres boundary is located approximately one mile to the southeast of the site. The area contains low density residential areas in addition to many predominantly vacant areas. The third residential area is located primarily north of SR 884, south of SR 80, and east of Interstate 75. This low density rural area is scattered between croplands, pastureland, uplands, wetlands, and other non-urban uses.

EXISTING LAND USE



LEGEND

FLORIDA LAND USE COVER AND FORMS CLASSIFICATION SYSTEM (LEVEL II):

1100	LOW DENSITY RESIDENTIAL
1200	MEDIUM DENSITY RESIDENTIAL
1300	HIGH DENSITY RESIDENTIAL
1400	COMMERCIAL AND SERVICES
1500	INDUSTRIAL
1600	EXTRACTIVE
1700	INSTITUTIONAL
1800	RECREATION
1900	OPEN LANDS
2100	CROPLAND AND PASTURELAND
2200	TREE CROPS
2400	NURSERIES AND VINEYARDS
3200	SHRUB AND BRUSHLAND
4100	UPLAND CONIFEROUS FORESTS
4200	UPLAND HARDWOOD FORESTS
4300	UPLAND HARDWOOD FORESTS (CONT.)
5100	STREAMS AND WATERWAYS
5200	LAKES
6100	WETLAND HARDWOOD FORESTS
6200	WETLAND CONIFEROUS FORESTS
6300	WETLAND FORESTED MIXED
6400	VEGETATED NON-FORESTED WETLANDS
7400	DISTURBED LAND
8100	TRANSPORTATION
8300	UTILITIES

PROJECT SITE

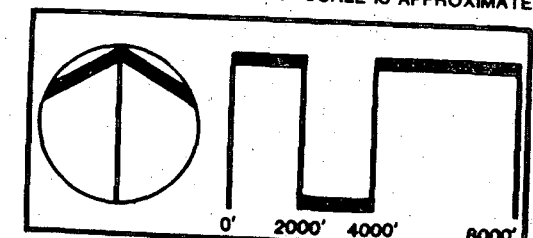


SOURCE: SOUTH FLORIDA WATER MANAGEMENT DISTRICT/
THE LEE PLAN, FLUCCS LAND CLASSIFICATION CONVERSION
CHART-LEE COUNTY DIVISION OF PLANNING, FLORIDA
DEPARTMENT OF TRANSPORTATION AERIAL PHOTOGRAPHS-
FEBRUARY 24, 1990.

LEE COUNTY RESOURCE RECOVERY FACILITY

FIGURE 2-12

DATE: FEBRUARY 24, 1990.
NOTE: MAP SCALE IS APPROXIMATE



Commercial uses within the study area are primarily located adjacent to roads, including SR 82 and SR 884 west of Interstate 75, and SR 80. Industrial uses are located primarily to the west of Interstate 75 or adjacent to SR 82 west of Interstate 75. Extractive uses are located east of Interstate 75 between SR 80 and SR 82. A mining site is located one mile to the west of the project site.

Institutional uses are located in the urbanized area west of Interstate 75. Recreation areas are located primarily in Fort Myers. Two golf courses are within the study area. One, Eastwood Golf Course, is located northwest of the SR 884/Interstate 75 interchange three miles from the project site. The other golf course is a private facility located south of the Gulf Coast landfill three miles south of the project site.

Open lands are those inactive or undeveloped areas within or adjacent to urban areas. The majority of the open lands in the study area are undeveloped lots within Fort Myers.

Cropland, pastureland, tree crops, nurseries, and vineyards are scattered throughout the study area, with the majority of these areas east of Interstate 75. Shrub and brushland and forested uplands are located throughout the study area.

The Caloosahatchee River and Orange River are located over three miles to the north of the project site. Billy Creek, canals, and other small waterways are not graphically represented on the existing Land Use Map. Numerous small lakes and wetlands are found in the study area, primarily south of SR 82 adjacent to Six Mile Cypress Slough.

Transportation uses include roadways and airstrips in the areas. Interstate 75 is located over two miles to the west of the project site. The interstate is the only roadway that is graphically represented on the existing land use map (Figure 2-12). An airstrip is located almost four miles to the east of the project site.

Utility uses in the study area include a landfill, a power plant, and a power transmission line. The Gulf Coast landfill is located three miles south of the project site. A Florida Power and Light (FP&L) plant is located over five

miles north of the project site to the northeast of the Interstate 75/SR 80 interchange. A transmission power line and associated easement traverse the entire study area. The power line is adjacent to the project site.

2.2.4 EASEMENTS, TITLE, AGENCY WORKS

Construction of the Facility will not require additional easements or titles from government agencies. Power generated by the Facility will be transmitted to FP&L's Buckingham Substation within a corridor on the property to be purchased by Lee County. Water and wastewater lines will be constructed within existing City and County rights-of-way. See Section 6.0 for a complete discussion of power and utility transmission routes.

2.2.5 REGIONAL SCENIC, CULTURAL AND NATURAL LANDMARKS

Recreational facilities within a five-mile radius of the project site are listed in Table 2-2.

2.2.6 ARCHAEOLOGICAL AND HISTORIC SITES

Piper Archaeological Research, Inc. of St. Petersburg was retained to conduct an investigation of archaeological and historic remains within the vicinity of the site boundary. A cultural resource assessment survey was performed, beginning with a literature review. The document search consisted of a review of the State of Florida Master Site File (FMSF), and examination of historical and archaeological literature and historic records. The document search revealed no recorded sites on the FMSF within the Facility site.

Following the literature search, a field survey was conducted. The field survey focused on areas of high archaeological site potential, as identified by Piper Research using environmental variables known to be associated with prehistoric and early historic period sites. Such variables include soil drainage, proximity to water or wetlands, vegetation, and relative elevation. Subsurface shovel tests, with each dig measuring approximately 40 centimeters in diameter, were conducted to a depth of at least one meter in areas of high site potential. All excavated

soil was screened through 1/4-inch wire mesh. In areas of minimal vegetation and/or upturned soil, a careful surface inspection was performed.

One prehistoric site and one historic structure were identified during the field survey of study area (Figure 2-13); however, neither of these is located on the Facility site. The prehistoric site (8L1 1441) consists of a single chert waste flake from the manufacture or resharpening of a stone tool. The historic structure (8L1 1442) is of board and batten construction, typical of the early 20th century. The structure is in poor condition and has been highly modified. Neither of these sites is considered to be a regionally significant cultural resource. Since no significant prehistoric or historic archaeological sites were discovered during the survey, it is concluded that no cultural resources eligible for nomination in the National Register of Historic Places will be impacted by the proposed development.

2.2.7 SOCIOECONOMICS AND PUBLIC SERVICES

Social and Economic Characteristics

Current Population. The following census tracts and planning districts are located, at least in part, within the study area. Census tract delineations are based on the 1980 census count. Planning districts were established in the Lee Plan and utilize census tract boundaries. The map on Figure 2-14 illustrates the census tract and planning district boundaries in relation to the study area.

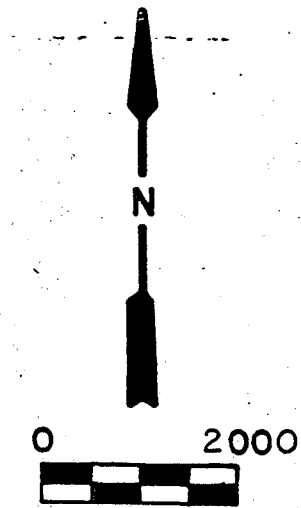
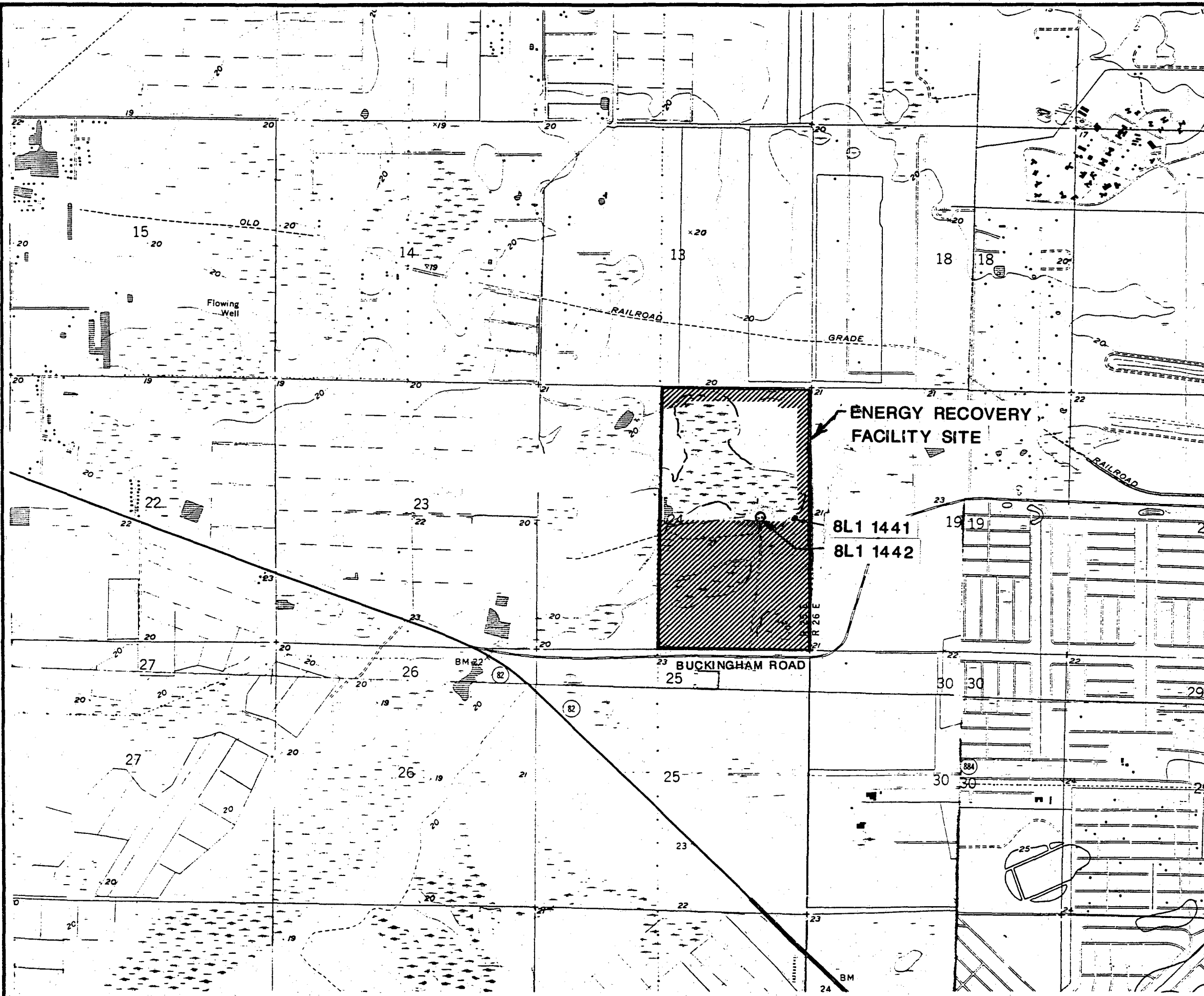
Census Tracts

2	204
3	301
4	302
5	401
6	402
12	403

Planning Districts

1
2
4
5
6
7

SOURCE MAP BASED ON 7.5 MINUTE USGS QUADRANGLE, 1987



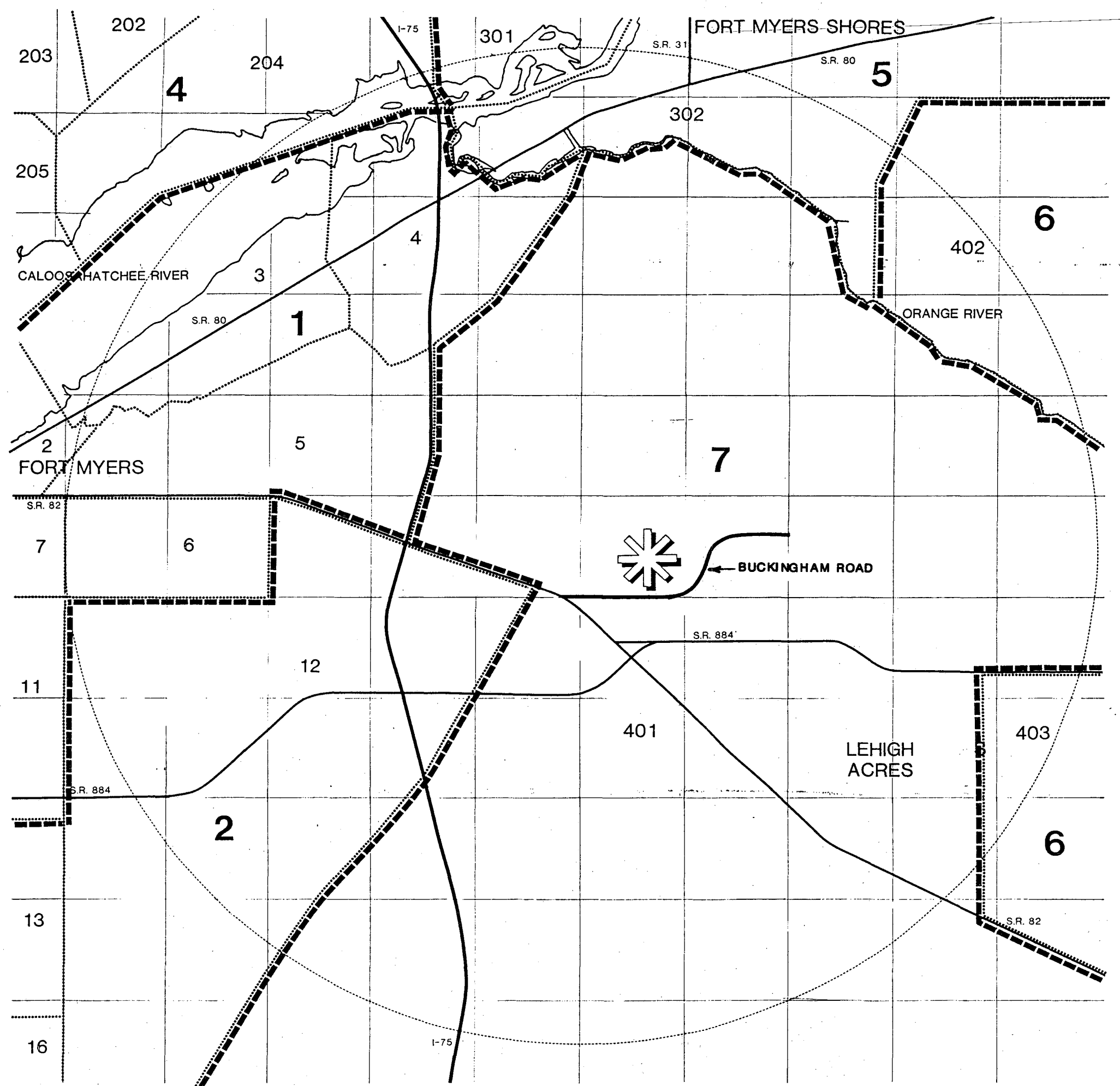
SCALE : 1" = 2000'

LEGEND

- 8L1-1441 PREHISTORIC CAMPSITE
- 8L1-1442 HISTORIC SITE: EARLY
20th CENTURY BOARD
-AND-BATTEN STRUCTURE

Archaeological And Historic Sites - Lee County Energy Recovery Facility

PLANNING DISTRICTS AND CENSUS TRACTS



- PLANNING DISTRICT **5**
- CENSUS TRACT 404
- PLANNING DISTRICT BOUNDARY LINE
- CENSUS TRACT BOUNDARY LINE
- PROJECT SITE

SOURCE: REVISED 1980 CENSUS TRACT/ED MAP AND THE LEE PLAN, 1989, LEE COUNTY, FLORIDA

LEE COUNTY ENERGY RECOVERY FACILITY

NOTE: MAP SCALE IS APPROXIMATE

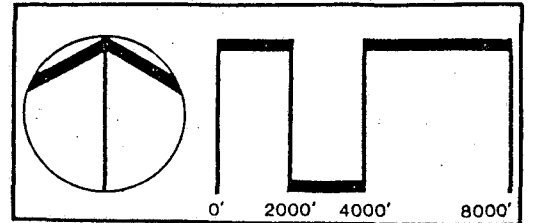


FIGURE 2-14

Table 2-5 illustrates the 1980 census counts for the census tracts listed above that are partially or wholly within the study area. The project site is located within census tract 401. The majority of the urbanized part of census tract 401 is within the study area. The 1980 census population count for tract 401 is 3,726.

Projected Population. Table 2-6 lists the low, medium and high population projections for Lee County from 1990 to 2020. The table indicates a significant difference in population projections utilizing the low, medium or high figures. The Lee Plan projects a 2010 permanent population at over 637,000 residents, approximately comparable to the "medium" population projections. The medium set of population projections indicates an increase of over 214,000 persons or 64 percent for Lee County between 1990 and 2010.

Table 2-7 illustrates the 1990 through 2010 permanent population projections for the six planning districts that are partially or wholly within the study area. The project site is located within Planning District 7. Table 2-7 indicates a population increase during 1990 through 2010 of almost 150,000 persons or over 73 percent for the six planning districts within the study area. Planning District 7 is predicted to increase from under 14,000 residents in 1990 to over 60,000 by 2010.

Labor Force. Table 2-8 lists the labor force, employed and unemployed persons in Lee County between 1980 and 1988. The table illustrates a 71.5 percent increase in the labor force during this period from over 82,000 persons in 1980 to over 140,000 by 1988. A similar 73.5 percent increase in employment also occurred, from over 78,000 employed in 1980 to over 135,000 by 1988. The number of unemployed grew to over 5,000 by 1988, an increase of over 1,000 persons in 1980, while the unemployment rate for the County dropped 23.4 percent from 4.7 percent in 1980 to 3.6 percent in 1988.

TABLE 2-5

CENSUS TRACT POPULATION: 1980

Census Tract	1980 Population
002	1,712
003	7,609
004	4,282
005	12,775
006	5,849
012	461
204	1,419
301	1,510
302	5,571
401	3,726
402	3,806
403	<u>8,040</u>
TOTAL	56,760

SOURCE: U.S. Census Bureau, 1980.

TABLE 2-6

POPULATION PROJECTIONS: LEE COUNTY 1990 - 2020

Lee County	1990	1995	2000	2010	2020
Low	321.9	369.6	383.9	385.0	335.2
Medium	335.3	399.6	451.7	550.0	609.5
High	348.7	429.5	519.4	715.1	883.7

SOURCE: Florida Statistical Abstract, 1989.

NOTE: Population figures are expressed in thousands and have been rounded to hundreds. County projections are based on an average of projections derived from nine different techniques. The sum of the medium County projections equals the state projection for that year, while the low and high projections have more pessimistic and more optimistic criteria.

TABLE 2-7

PLANNING DISTRICT PERMANENT POPULATION: 1990 - 2010

Planning District	1990 Pop.	1995 Pop.	2000 Pop.	2010 Pop.
1	71,410	78,344	82,195	83,193
2	39,812	48,482	57,174	73,366
4	38,809	43,245	46,248	47,093
5	11,241	12,214	12,658	11,741
6	27,824	37,434	48,347	72,877
7	<u>13,682</u>	<u>22,831</u>	<u>34,224</u>	<u>62,743</u>
TOTALS	202,778	242,550	280,846	351,013

SOURCE: The Lee Plan, 1989.

TABLE 2-8
LABOR FORCE FIGURES: LEE COUNTY 1980 - 1988

Annual Averages	Labor Force	Employment	Unemployment	Unemployment Rate	State Unemployment Rate
1980	82,040	78,187	3,853	4.7%	5.9%
1981	90,652	85,837	4,815	5.3%	6.8%
1982	97,464	89,789	7,675	7.9%	8.2%
1983	102,567	94,291	8,276	8.1%	8.6%
1984	110,009	104,170	5,839	5.3%	6.3%
1985	116,166	110,641	5,525	4.8%	6.0%
1986	121,999	116,834	5,166	4.2%	5.7%
1987	130,764	125,781	4,983	3.8%	5.3%
1988	140,725	135,669	5,056	3.6%	5.0%

SOURCE: Florida Department of Labor and Employment Security, Bureau of Labor Market Information, Tallahassee, Florida; Labor Force Summary, Annual Average, Lee County.

Table 2-9 illustrates the major private sector employers in Lee County. Three of the ten largest (and two of the top three) employers in the County are in the health care profession.

Employment By Occupation. Employment figures by occupation are not available for Lee County.

Employment By Industrial Sector. Table 2-10 lists the average monthly employment by industrial sector for Lee County from 1980 through 1988. The County's employment by industry increased 67.1 percent during the 1980 to 1988 time period with the service sector increasing 119.9 percent. Table 2-11 provides the most current monthly employment information based on first and second quarter 1989 reports.

Employment Projections. Table 2-12 illustrates the projected employment in Fort Myers and Cape Coral from 1995 through 2035. The table indicates an anticipated 43.7 percent increase in total Fort Myers and Cape Coral employment between 1995 and 2035. The largest employment increases during this period are anticipated to be in the retail trade and service sectors, which are projected to increase by 27,100 (65.8 percent) and 20,500 (47.8 percent) jobs respectively. Farming is the only employment sector anticipated to decline in County jobs, with a 14.3 percent reduction from 1995 to 2035 (400 jobs). Mining and federal military jobs are anticipated to remain constant throughout the time period.

General Income Characteristics. Table 2-13 illustrates payroll by industrial sector for Lee County from 1980 through 1988. The table indicates a 157 percent increase in annual payroll during this time to over \$2 billion, with private industry increasing 158 percent and government industry increasing 152 percent. The largest payroll sector in 1988 was the service industry with a County payroll of over \$534,000,000. Service sector payroll increased over 275 percent during the eight-year study period.

TABLE 2-9

MAJOR PRIVATE SECTOR EMPLOYERS: LEE COUNTY

EMPLOYER	PRODUCT/ SERVICE	TOTAL EMPLOYEES
1. Lee Memorial Hospital	Health Care	1,951
2. The Mariner Group	Holding Company	1,380
3. SW FL Reg. Medical Center	Health Care	1,310
4. United Telephone Co.	Telephone Service	973
5. Yoder Brothers	Foliage Product	700
6. Lehigh Corp.	Developer	685
7. Cape Coral Hospital	Health Care	673
8. Ft. Myers News-Press	Newspaper	500
9. Prathers Inc.	Laundry/Dry Cleaners	500
10. Florida Power & Light	Electric Power	375

SOURCE: Florida Department of Commerce, Division of Economic Development, Florida County Profile 1988.

TABLE 2-10

AVERAGE MONTHLY EMPLOYMENT: LEE COUNTY 1980-1988

Industry	1980 Average Monthly Employment	1981 Average Monthly Employment	1982 Average Monthly Employment
<u>PRIVATE</u>			
Agriculture, Forestry, Fishing	2,865	2,544	2,477
Mining	268	226	148
Construction	8,371	9,268	8,024
Manufacturing	3,517	4,053	4,025
Transportation, Communications, and Public Utilities	3,805	3,938	3,977
Wholesale Trade	3,244	3,283	3,097
Retail Trade	16,473	17,693	18,403
Finance, Insurance, Real Estate	5,882	6,662	6,606
Services	12,762	14,487	15,593
Non-classifiable and Other	57	40	9
SUBTOTALS	57,244	62,194	62,359
<u>GOVERNMENT</u>			
Federal	798	761	821
State	1,919	1,965	2,083
Local	8,006	8,456	8,755
SUBTOTALS	10,723	11,182	11,659
TOTALS	67,967	73,376	74,018

SOURCE: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County.

NOTE: Due to rounding and non-disclosure editing, subtotals may not equal totals. NR denotes "no report."

TABLE 2-10
(continued)

AVERAGE MONTHLY EMPLOYMENT: LEE COUNTY 1980-1988

Industry	1983 Average Monthly Employment	1984 Average Monthly Employment	1985 Average Monthly Employment
<u>PRIVATE</u>			
Agriculture, Forestry, Fishing	2,645	2,972	3,013
Mining	129	55	167
Construction	8,701	10,297	10,908
Manufacturing	4,126	4,393	4,574
Transportation, Communications, and Public Utilities	4,103	4,118	4,197
Wholesale Trade	3,109	3,337	3,599
Retail Trade	19,965	22,026	24,629
Finance, Insurance, Real Estate	6,800	6,645	6,828
Services	17,020	19,667	21,721
Non-classifiable and Other	11	132	51
SUBTOTALS	66,609	73,642	79,687
<u>GOVERNMENT</u>			
Federal	861	912	973
State	2,084	2,166	2,242
Local	9,155	9,760	10,332
SUBTOTALS	12,100	12,838	13,547
TOTALS	78,709	86,480	93,234

SOURCE: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County.

NOTE: Due to rounding and non-disclosure editing, subtotals may not equal totals. NR denotes "no report."

TABLE 2-10
(continued)

AVERAGE MONTHLY EMPLOYMENT: LEE COUNTY 1980-1988

Industry	1986 Average Monthly Employment	1987 Average Monthly Employment	1988 Average Monthly Employment
<u>PRIVATE</u>			
Agriculture, Forestry, Fishing	2,995	3,062	3,498
Mining	144	129	NR
Construction	11,294	11,936	12,560
Manufacturing	5,090	5,295	5,824
Transportation, Communications, and Public Utilities	4,609	4,683	4,985
Wholesale Trade	3,722	3,898	4,078
Retail Trade	35,499	27,820	29,986
Finance, Insurance, Real Estate	7,430	7,861	8,131
Services	23,620	26,190	28,065
Non-classifiable and Other	18	8	NR
SUBTOTALS	84,421	90,882	97,127
<u>GOVERNMENT</u>			
Federal	1,045	1,110	1,263
State	2,335	2,481	2,697
Local	10,657	11,465	12,481
SUBTOTALS	14,037	15,056	16,441
TOTALS	98,458	105,938	113,568

SOURCE: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County.

NOTE: Due to rounding and non-disclosure editing, subtotals may not equal totals. NR denotes "no report."

TABLE 2-11

MONTHLY EMPLOYMENT: LEE COUNTY JANUARY - JUNE 1989

INDUSTRY	1/89	2/89	3/89	4/89	5/89	6/89
<u>PRIVATE</u>						
Agriculture	4,176	4,140	4,060	3,803	3,476	2,934
Mining	121	127	125	124	126	125
Construction	13,004	12,993	13,420	12,882	12,951	13,247
Manufacturing	6,069	6,108	6,130	6,049	6,106	6,153
Transportation	4,982	5,027	5,110	5,006	5,067	5,126
Wholesale	4,302	4,338	4,395	4,437	4,436	4,513
Retail	32,501	33,034	33,289	31,825	31,488	30,965
Finance	8,610	8,677	8,827	8,677	8,723	8,953
Services	<u>30,034</u>	<u>30,692</u>	<u>31,100</u>	<u>30,629</u>	<u>30,202</u>	<u>30,482</u>
SUBTOTAL	103,799	105,136	106,456	103,432	102,575	102,498
<u>GOVERNMENT</u>						
Federal	1,283	1,340	1,350	1,355	1,352	1,338
State	2,770	2,757	2,748	2,772	2,828	2,883
Local	13,631	13,739	13,774	13,830	13,817	13,837
SUBTOTAL	17,684	17,836	17,872	17,957	17,997	18,058
TOTAL	121,483	122,972	124,328	121,389	120,572	120,556

NOTE: The agriculture totals include agriculture, forestry and fishing; the transportation totals include transportation, communications and public utilities; the finance totals include finance, insurance and real estate.

SOURCE: Florida Department of Labor and Employment Security, Bureau of Labor Market Information, ES202 Program, Edited ES-202, Quarterly County Report on Employment and Wages Covered Under The Florida Unemployment Compensation Law and Unemployment Compensation For Federal Employees, First Quarter and Second Quarter, 1989.

TABLE 2-12

PROJECTED EMPLOYMENT: FORT MYERS AND CAPE CORAL 1995 - 2035

Employment	1995	2000	2015	2035
<u>TOTAL EMPLOYMENT</u>	162.7	184.2	218.7	233.8
Farm	2.8	2.7	2.6	2.4
Nonfarm	159.9	181.5	216.1	231.4
<u>PRIVATE</u>	140.4	160.1	191.7	206.0
Agriculture	3.2	3.5	3.8	3.7
Mining	.2	.2	.2	.2
Construction	15.8	16.9	18.4	18.5
Manufacturing	6.8	7.3	8.2	8.4
Transportation	7.9	9.0	10.7	11.4
Wholesale Trade	7.6	8.7	10.7	11.7
Retail Trade	41.2	48.3	61.1	68.3
Finance	14.9	16.8	19.5	20.5
Services	42.9	49.4	59.2	63.4
<u>GOVERNMENT</u>	19.5	21.4	24.4	25.4
Federal, Civilian	1.4	1.6	1.8	1.9
Federal, Military	.6	.6	.6	.6
State and Local	17.5	19.3	22.0	23.0

NOTE: Jobs are expressed in thousands. Agricultural employment totals include agricultural services, forestry, fisheries, and other. Manufacturing totals include nondurable and durable goods. Transportation totals include transportation and public utilities. Finance totals include finance, insurance, and real estate.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, 1985 OBERS BEA Regional Projections, Volume 2 - Metropolitan Statistical Area Projections to 2035.

TABLE 2-13

ANNUAL PAYROLL BY INDUSTRIAL SECTOR
LEE COUNTY 1980-1988

Industry	1980 Average Payroll	1981 Average Payroll	1982 Average Payroll
<u>PRIVATE</u>			
Agriculture, Forestry, Fishing	24,232.5	23,943.7	25,036.9
Mining	4,824.1	4,854.7	3,031.8
Construction	115,631.0	136,082.3	122,473.0
Manufacturing	41,420.0	53,280.7	56,389.6
Transportation, Communications and Public Utilities	59,388.4	67,707.0	73,510.5
Wholesale Trade	50,491.7	50,159.7	49,461.1
Retail Trade	141,100.8	161,313.6	169,880.3
Finance, Insurance, Real Estate	71,935.0	89,328.2	94,702.0
Services	142,407.5	176,902.7	208,819.3
Non-classifiable and Other	484.1	460.6	80.7
SUBTOTALS	651,915.1	764,033.2	803,385.2
<u>GOVERNMENT</u>			
Federal	15,531.8	18,070.3	19,391.6
State	20,000.3	22,206.7	25,880.5
Local	95,878.2	108,406.1	126,906.8
SUBTOTALS	131,410.3	148,683.1	172,178.9
TOTALS	783,325.4	912,716.3	975,564.1

SOURCE: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County.

NOTE: Due to rounding and non-disclosure editing, subtotals may not equal totals. NR denotes "no report."

TABLE 2-13
(continued)ANNUAL PAYROLL BY INDUSTRIAL SECTOR
LEE COUNTY 1980-1988

Industry	1983 Average Payroll	1984 Average Payroll	1985 Average Payroll
<u>PRIVATE</u>			
Agriculture, Forestry, Fishing	26,279.2	36,032.2	31,622.8
Mining	2,431.0	1,308.1	4,459.6
Construction	134,041.1	163,800.5	179,484.1
Manufacturing	60,410.5	71,280.4	77,505.7
Transportation, Communications and Public Utilities	81,398.3	85,818.4	93,000.5
Wholesale Trade	51,622.9	58,665.9	65,614.3
Retail Trade	193,486.2	221,616.1	257,853.7
Finance, Insurance, Real Estate	103,453.0	108,176.3	121,365.2
Services	237,654.1	280,859.3	321,334.0
Non-classifiable and Other	346.7	2,666.0	695.5
SUBTOTALS	891,123.0	1,024,895.2	1,152,935.4
<u>GOVERNMENT</u>			
Federal	21,812.9	23,867.7	26,958.9
State	27,536.9	28,810.9	30,534.4
Local	142,564.7	158,928.6	173,627.8
SUBTOTALS	191,914.5	211,607.2	231,121.1
TOTALS	1,083,037.5	1,236,502.4	1,384,056.5

SOURCE: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County.

NOTE: Due to rounding and non-disclosure editing, subtotals may not equal totals. NR denotes "no report."

TABLE 2-13
(continued)ANNUAL PAYROLL BY INDUSTRIAL SECTOR
LEE COUNTY 1980-1988

Industry	1986 Average Payroll	1987 Average Payroll	1988 Average Payroll
<u>PRIVATE</u>			
Agriculture, Forestry, Fishing	33,424.4	34,121.8	40,466.5
Mining	3,494.5	3,461.7	NR
Construction	193,677.9	218,491.3	243,755.7
Manufacturing	90,881.0	97,816.1	113,981.2
Transportation, Communications and Public Utilities	100,905.0	108,242.5	118,138.5
Wholesale Trade	70,383.2	78,262.1	88,398.7
Retail Trade	287,039.3	327,858.9	370,139.6
Finance, Insurance, Real Estate	143,543.8	161,673.0	173,854.1
Services	371,615.9	459,096.0	534,285.5
Non-classifiable and Other	313.7	156.7	NR
SUBTOTALS	1,295,278.7	1,489,180.1	1,683,019.8
<u>GOVERNMENT</u>			
Federal	28,364.9	31,256.8	35,803.7
State	34,498.9	42,212.5	46,615.3
Local	196,567.1	224,618.8	248,964.2
SUBTOTALS	259,431.9	298,088.1	331,383.2
TOTALS	1,554,710.6	1,787,268.2	2,014,403.0

SOURCE: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County.

NOTE: Due to rounding and non-disclosure editing, subtotals may not equal totals. NR denotes "no report."

Average Wages and Salaries. Table 2-14 illustrates the average annual salary by industrial sector for Lee County from 1980 to 1988. The table indicates a county-wide average increase of 54 percent during this time, from \$11,525 in 1980 to \$17,737 in 1988. By 1988, the largest average annual salary by sector was the federal government at \$28,348 while the lowest annual salary was the agricultural, forestry, and fishing sector.

Table 2-15 illustrates the mean household income and income distribution for the census tracts wholly or partially within the study area. The range of incomes within the study area is from \$10,797 in census tract 5 to \$22,222 in census tract 12. The mean household income for census tract 401, which contains the project site, is \$18,695.

Income Projections. Income projections are not available for Lee County.

Existing Housing Stock. Table 2-16 illustrates the total number of year-round housing units and number of units per structure in the census tracts that are, at least in part, located within the study area. The table indicates that 69.7 percent of housing within the study area census tracts are one-unit dwellings, 10.3 percent of housing are mobile homes and trailers and 9.3 percent are two- to four-unit structures. The remainder of housing are structures with ten or more units (7.3 percent) and five- to nine-unit structures (3.4 percent).

Table 2-17 illustrates the age of the housing stock within the census tracts that are located, at least in part, within the study area. The table indicates that 45.2 percent of the units were built between 1970 and 1980, 31.1 percent were built between 1960 and 1969, 12.6 percent were built between 1950 and 1959, 6.7 percent were built before 1940, and 4.5 percent were built between 1940 and 1949.

IMAGE QUALITY

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

TABLE 2-14

ANNUAL PAYROLL BY INDUSTRIAL SECTOR
LEE COUNTY 1980-1988

INDUSTRY	1980			1981			1982		
	AVERAGE MONTHLY EMPLOYMENT	TOTAL ANNUAL PAYROLL	AVERAGE ANNUAL SALARY	AVERAGE MONTHLY EMPLOYMENT	TOTAL ANNUAL PAYROLL	AVERAGE ANNUAL SALARY	AVERAGE MONTHLY EMPLOYMENT	TOTAL ANNUAL PAYROLL	AVERAGE ANNUAL SALARY
PRIVATE									
Agriculture, Forestry, Fishing	2865	24233000	8458	2544	23944000	9412	2477	25037000	10108
Mining	268	4824000	18000	226	4855000	21482	148	3032000	20486
Construction	8371	115631000	13813	9268	136082000	14683	8024	122473000	15263
Manufacturing	3517	41420000	11777	4053	53281000	13146	4025	56390000	14010
Transportation, Communications and Public Utilities	3805	59388000	15608	3938	67707000	17193	3977	73511000	18484
Wholesale Trade	3244	50492000	15565	3283	50160000	15279	3097	49461000	15971
Retail Trade	16473	141101000	8566	17693	161314000	9117	18403	169880000	9231
Finance, Insurance and Real Estate	5882	71935000	12230	6662	89328000	13409	6606	94702000	14336
Services	12762	142408000	11159	14487	176903000	12211	15593	208819000	13392
Nonclassifiable and Other	57	484000	8491	40	461000	11525	9	81000	9000
SUBTOTAL	57244	651916000	11388	62194	764035000	12285	62359	803386000	140281
GOVERNMENT									
Federal	798	15532000	19464	761	18070000	23745	821	19392000	23620
State	1919	20000000	10422	1965	22207000	11301	2083	25881000	12425
Local	8006	95878000	11976	8456	108406000	12820	8755	126907000	14495
SUBTOTAL	10723	131410000	12255	11182	148683000	13297	11659	172180000	14768
TOTAL	67967	783326000	11525	73376	912718000	12439	74018	975566000	13180

Note: Due to rounding and nondisclosure editing, subtotals may not equal totals. NR denotes 'no report'.

Source: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County

TABLE 2-14 Continued

ANNUAL PAYROLL BY INDUSTRIAL SECTOR
LEE COUNTY 1980-1988

INDUSTRY	1983			1984			1985		
	AVERAGE MONTHLY EMPLOYMENT	TOTAL ANNUAL PAYROLL	AVERAGE ANNUAL SALARY	AVERAGE MONTHLY EMPLOYMENT	TOTAL ANNUAL PAYROLL	AVERAGE ANNUAL SALARY	AVERAGE MONTHLY EMPLOYMENT	TOTAL ANNUAL PAYROLL	AVERAGE ANNUAL SALARY
PRIVATE									
Agriculture, Forestry, Fishing	2645	26279000	9935	2972	30632000	10307	3013	31623000	10496
Mining	129	2431000	18845	55	1380000	25091	167	4460000	26707
Construction	8701	134041000	15405	10297	163801000	15908	10908	179484000	16454
Manufacturing	4126	60411000	14642	4393	71280000	16226	4574	77506000	16945
Transportation, Communications and Public Utilities	4103	81398000	19839	4118	85818000	20840	4197	93001000	22159
Wholesale Trade	3109	51623000	16604	3337	58666000	17580	3599	65614000	18231
Retail Trade	19965	193486000	9691	22026	221616000	10062	24629	257854000	10470
Finance, Insurance and Real Estate	6800	103453000	15214	6645	108176000	16279	6828	121365000	17775
Services	17020	237654000	13963	19667	280859000	14281	21721	321334000	14794
Nonclassifiable and Other	11	347000	31545	132	2666000	20197	51	696000	13647
SUBTOTAL	66609	891123000	13378	73642	1024894000	13917	79687	1152937000	167676
GOVERNMENT									
Federal	861	21813000	25334	912	23868000	26171	973	26959000	27707
State	2084	27537000	13214	2166	28811000	13301	2242	30534000	13619
Local	9155	142565000	15572	9760	158929000	16284	10332	173628000	16805
SUBTOTAL	12100	191915000	15861	12838	211608000	16483	13547	231121000	17061
TOTAL	78709	1083038000	13760	86480	1236502000	14298	93234	1384058000	14845

Note: Due to rounding and nondisclosure editing, subtotals may not equal totals. NR denotes 'no report'.

Source: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County

TABLE 2-14 Continued

ANNUAL PAYROLL BY INDUSTRIAL SECTOR
LEE COUNTY 1980-1988

INDUSTRY	1986			1987			1988		
	AVERAGE MONTHLY EMPLOYMENT	TOTAL ANNUAL PAYROLL	AVERAGE ANNUAL SALARY	AVERAGE MONTHLY EMPLOYMENT	TOTAL ANNUAL PAYROLL	AVERAGE ANNUAL SALARY	AVERAGE MONTHLY EMPLOYMENT	TOTAL ANNUAL PAYROLL	AVERAGE ANNUAL SALARY
PRIVATE									
Agriculture, Forestry, Fishing	2995	33424000	11160	3062	34122000	11144	3498	40467000	11569
Mining	144	3495000	24271	129	3462000	26837	NR	0	0
Construction	11294	193678000	17149	11936	218491000	18305	12560	243756000	19407
Manufacturing	7430	90881000	12232	5295	97816000	18473	5824	113981000	19571
Transportation, Communications and Public Utilities	4609	100905000	21893	4683	108243000	23114	4985	118139000	23699
Wholesale Trade	3722	70383000	18910	3898	78262000	20077	4078	88399000	21677
Retail Trade	25499	287039000	11257	27820	327859000	11785	29986	370140000	12344
Finance, Insurance and Real Estate	7430	143544000	19320	7861	161673000	20566	8131	173854000	21382
Services	23620	371616000	15733	26190	459096000	17529	28065	534286000	19037
Nonclassifiable and Other	18	314000	17444	8	157000	19625	NR	0	0
SUBTOTAL	86761	1295279000	14929	90882	1489181000	16386	97127	1683022000	17328
GOVERNMENT									
Federal	1045	28365000	27144	1110	31257000	28159	1263	35804000	28348
State	2335	34499000	14775	2481	42213000	17015	2697	46615000	17284
Local	10657	196568000	18445	11465	224619000	19592	12481	248964000	19947
SUBTOTAL	14037	259432000	18482	15056	298089000	19799	16441	331383000	20156
TOTAL	100798	1554711000	15424	105938	1787270000	16871	113568	2014405000	17737

Note: Due to rounding and nondisclosure editing, subtotals may not equal totals. NR denotes 'no report'.

Source: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County

**TABLE 2 - 14A
ANNUAL PAYROLL**

STATE OF FLORIDA: 1980 - 1988

	Average Annual Salary
1980	\$12,624
1981	13,794
1982	14,775
1983	15,542
1984	16,186
1985	17,013
1986	17,683
1987	18,677
1988	19,526

Source: Florida Department of Labor & Employment Security, Bureau of Labor
Market Information, ES202 Program, 1980-1988 Annual Edited Es-202.

TABLE 2-15

INCOME BY HOUSEHOLD: LEE COUNTY 1980

Census Tracts	Mean Household Income(\$)	Percentage of Households %			
		Under \$10,000	\$10,000- \$19,999	\$20,000- \$34,999	\$35,000 and over
2	11,508	59.0	25.5	8.7	6.8
3	15,492	38.4	38.6	16.6	6.4
4	14,846	36.8	37.2	22.1	3.9
5	10,797	55.2	29.5	13.0	2.2
6	13,660	50.3	34.8	12.3	2.7
12	22,222	27.0	27.8	28.7	16.5
204	21,913	25.6	23.8	39.9	10.7
301	20,967	30.5	31.9	26.0	11.6
302	18,695	23.9	41.1	28.6	6.4
401	21,801	27.5	25.5	33.3	13.6
402	18,596	21.7	41.6	27.2	9.4
403	14,838	38.9	38.0	17.9	5.2

NOTE: Due to rounding, figures may not total 100 percent.

SOURCE: U.S. Census Bureau, 1980.

TABLE 2 - 15 A

INCOME BY HOUSEHOLD: STATE OF FLORIDA 1980

Mean Household Income (\$)	Percentage of Households			
	Under \$10,000	\$10,000 - 19,999	\$20,000 - 34,999	\$35,000 And Over
\$18,696	33.3	32.1	23.9	10.7

Source: U.S. Census Bureau, 1980

Mean Household Income For Lee County: \$18,628

Source: U.S. Census Bureau, 1980

TABLE 2-16

HOUSING UNITS: 1980

Census Tract	Year-Round Housing Units	Units In The Structure				
		one	2-4	5-9	10+	MH
2	867	374	215	45	233	0
3	3,417	2,190	502	270	277	178
4	1,951	1,250	116	4	27	554
5	4,276	2,500	448	183	715	430
6	1,665	1,105	288	123	129	20
12	121	115	0	0	0	6
204	584	481	19	0	23	61
301	602	308	30	0	0	264
302	2,539	1,708	201	25	21	584
401	913	622	7	6	13	265
402	2,036	1,687	144	82	75	48
403	4,442	3,976	201	54	200	11
TOTALS	23,413	16,316	2,171	792	1,713	2,421

SOURCE: U.S. Census Bureau, 1980.

NOTE: MH represents mobile homes or trailers.

TABLE 2-17
AGE OF HOUSING STOCK: 1980

Census Tract	Total Number of Units in Tract	Age				
		1970-1980	1960-1969	1950-1959	1940-1949	1939 or earlier
2	867	115	130	127	139	356
3	3,417	1,164	778	738	279	458
4	1,951	638	678	404	164	67
5	4,276	1,457	1,590	628	238	363
6	1,665	260	662	432	157	154
12	121	78	37	0	0	6
204	584	323	188	50	0	23
301	602	331	176	45	26	24
302	2,539	1,869	488	132	12	38
401	913	623	167	41	31	51
402	2,036	1,560	415	36	7	18
403	4,442	2,160	1,961	308	7	6
TOTALS	23,413	10,578	7,270	2,941	1,060	1,564

SOURCE: U.S. Census Bureau, 1980.

Housing Costs. Table 2-18 illustrates the housing values for units in census tracts partially or wholly within the study area. The table indicates that the majority of housing units within the study area are in the \$20,000 to \$79,999 range (1980 figures).

Table 2-19 illustrates the median value of specified owner-occupied housing units for the census tracts wholly or partially within the study area.

Table 2-20 illustrates the 1989 building permit activity for Lee County. The table indicates that almost 40 percent of the building permit value was for single-family home construction. The 2,405 building permits for single-family homes had an average building permit value of just over \$80,000.

Public Service and Utilities

Transportation. The energy recovery facility site is located adjacent to Buckingham Road approximately one mile east of the SR 82/Buckingham Road intersection and two and one-half miles east of the Interstate 75/SR 82 interchange. Major roads in the area include Interstate 75, SR 82/Anderson Avenue/Immokalee Road, SR 80/Palm Beach Boulevard, SR 884/Colonial Boulevard, SR 884/Lee Boulevard, and Buckingham Road. Interstate 75, a four-lane freeway, is a north-south route which traverses the eastern United States from Sault Ste. Marie, Michigan to near Miami. SR 82/ Anderson Avenue/Immokalee Road, a two-lane minor arterial, is an east-west road running from Fort Myers to SR 29, located approximately five miles north of Immokalee. SR 80/Palm Beach Boulevard, a two-lane principal arterial with some four lane segments located approximately four miles to the north of the project site, is an east-west route from Fort Myers to its intersection with U.S. Highway 27 near Clewiston. Colonial Boulevard/SR 884, a four-lane minor arterial located to the southwest of the project site, is an east-west road running from Fort Myers to Interstate 75. A roadway linking Colonial Boulevard with Lee Boulevard is under construction. Lee Boulevard/SR 884, a two-lane minor arterial located to the southeast of the project site, is an east-west road running from Leeland Heights Boulevard to SR 82 one mile southeast of the site. Buckingham Road runs from

TABLE 2-18

HOUSING VALUES: 1980

Census Tract	Percent of Units Within Specified Value Range %				
	<\$20000	\$20000-39999	\$40000-79999	\$80000-149,999	>\$150,000
2	22.9	49.2	20.3	6.8	0.8
3	14.4	49.0	32.6	3.6	0.4
4	13.5	43.0	39.6	3.8	0.1
5	22.4	57.3	19.7	0.6	0.1
6	42.6	44.8	12.2	0.3	0.1
12	9.6	39.4	29.8	18.1	3.2
204	4.0	16.8	55.9	21.5	1.9
301	3.7	22.5	56.4	12.8	4.6
302	1.7	30.3	57.5	9.4	1.1
401	8.4	23.0	41.9	21.4	5.3
402	0.8	18.1	67.5	13.1	0.4
403	2.4	37.2	56.6	3.8	0.1

NOTE: Figures are the percent of housing within the value category based on specified owner-occupied housing units. Figure totals may not equal 100% due to rounding.

SOURCE: U.S. Census Bureau, 1980.

TABLE 2-19
MEDIAN HOUSING VALUES: 1980

CENSUS TRACT	MEDIAN VALUE
2	\$32,400
3	\$34,900
4	\$37,200
5	\$30,600
6	\$21,600
12	\$41,700
204	\$61,300
301	\$53,100
302	\$47,600
401	\$54,200
402	\$56,400
403	\$44,100

SOURCE: U.S. Census Bureau, 1980.

MLC16/5
6/26/90

TABLE 2-20

BUILDING PERMITS: LEE COUNTY 1989

Type	Number of Building Permits Issued	Total Value
Single-Family	2,405	\$192,447,722
Duplexes	106	11,330,419
Motels	2	1,700,000
Apartments (3-4 units/permit)	66 (248 units total)	13,766,840
Apartments (5+ units/permit)	138 (1730 units total)	86,622,965
Churches	5	1,101,000
Industrial	17	4,089,422
Commercial	92	19,599,923
Service Stations	3	1,513,360
Office and Professional	10	31,198,000
Schools	3	702,000
Moved Building	7	71,000
Temporary Trailers	306	2,843,141
Permanent Trailers	1,382	29,472,000
Seawalls, Docks, Pools, Spas	2,006	19,292,308
Recreation Buildings	32	3,148,279
Miscellaneous	2,072	8,112,771
Land Excavating	2	19,000
Completion of Buildings	429	10,200,279
Residential Additions/ Remodeling	3,837	25,394,461
Commercial Addition/Remodeling	733	23,895,703
Demolition	104	428,000
TOTAL	13,757	\$485,960,961

SOURCE: Lee County Division of Codes and Building Services.

SR 82 northeast to SR 80. Table 2-21 lists the existing roadway classifications and the number of lanes for each roadway segment. Table 2-22 lists traffic volumes for various segments of these roadways.

Table 2-23 lists the performance standards for roadways. Performance standards include capacity volumes and levels of service (LOS) for roadway segments. No roadway segment has a lower existing volume level of service than its performance capacity.

Medical Facilities. Hospitals in the area include:

- o East Point Hospital, which has 88 beds and is located at 1500 Lee Boulevard, Lehigh Acres.
- o Lee Memorial Hospital, which has 608 beds and is located at 2776 Cleveland Avenue, Fort Myers.
- o Southwest Florida Regional Medical Center, which has 400 beds and is located at 3785 Evans Avenue, Fort Myers.
- o Cape Coral Hospital, which has 194 beds and is located at 636 Del Prado Boulevard, Cape Coral.

Police Protection. The project site is within the East District of the Lee County Sheriff's Department. The East District Substation is located at 14002 Palm Beach Boulevard. The Sheriff's Department Headquarters is located at 1700 Monroe Street, Fort Myers.

Fire Protection. The project site is within the Tice Fire Protection Fire District. The fire district, chartered in 1976, covers 44 square miles, has an average response time of three minutes, and received 2,288 calls in 1987. The fire district includes three fire stations located at 5170 Tice Street, 3705 Edison Avenue, and 5850 Buckingham Road. Fire district personnel include 25 paid staff, 15 volunteers, three certified fire

- Healthpark Florida will be located on Bass Road at the Bass Road/Summerlin Road intersection in Fort Myers. The facility will be built in two phases with approximately 1,031 new beds. Beginning in 1991, the hospital will have approximately 509 new beds available. Phase II improvements will include approximately 522 additional beds.
- Gulf Coast Osteopathic Hospital will be located at 13681 Doctor's Way near the Metro Parkway/Daniels Road intersection in Fort Myers. The facility will have approximately 120 beds.

TABLE 2-21

EXISTING ROADWAYS

Roadway	Segment	Roadway Classification	Number of Lanes
Anderson Avenue	Ortiz Ave. to I-75	Minor Arterial	4LD
Anderson Avenue	I-75 to Buckingham Rd.	Minor Arterial	2LU
Anderson Avenue	Buckingham Rd. to Lee Blvd.	Minor Arterial	2LU
Anderson Avenue	Lee Blvd. to County Line	Minor Arterial	2LU
Buckingham Road	SR 80 to SR 82	Major/Minor Collector	2LU
Colonial Boulevard	Six Mile Parkway to Metro Parkway	Minor Arterial	4LD
Lee Boulevard	SR 82 to Leeland Heights Blvd.	Minor Arterial	2LU
Palm Beach Boulevard	Ortiz Ave. to I-75	Principal Arterial	2LD
Palm Beach Boulevard	I-75 to SR 31	Principal Arterial	2LU
Palm Beach Boulevard	SR 31 to Buckingham Rd.	Principal Arterial	4LD
Palm Beach Boulevard	Buckingham Rd. to County Line	Principal Arterial	2LU
Interstate 75	SR 80 to Bayshore Rd.	Freeway	4LD
Interstate 75	SR 82 to SR 80	Freeway	4LD
Interstate 75	Colonial Blvd. to SR 82	Freeway	4LD
Interstate 75	Daniels Rd. to Colonial Blvd.	Freeway	4LD

SOURCE: Transportation Element, Lee Plan, 1989.

NOTE: 2L represents a two-lane road, 4L represents a four-lane road,
U represents an undivided road, and D represents a divided road.

TABLE 2-22

EXISTING TRAFFIC VOLUMES

ROADWAY	SEGMENT	VOLUME	LOS
Anderson Avenue	Ortiz Ave. to I-75	1,093	A
Anderson Avenue	I-75 to Buckingham Rd.	1,223	D
Anderson Avenue	Buckingham Rd. to Lee Blvd.	1,313	D
Anderson Avenue	Lee Blvd. to County Line	1,315	D
Buckingham Road	SR 80 to SR 82	466	A
Colonial Boulevard	Six Mile Parkway to Metro Parkway	2,545	C
Lee Boulevard	SR 82 to Leeland Heights Blvd.	1,061	B
Palm Beach Boulevard	Ortiz Ave. to I-75	2,026	E
Palm Beach Boulevard	I-75 to SR 31	1,540	E
Palm Beach Boulevard	SR 31 to Buckingham Rd.	1,821	A
Palm Beach Boulevard	Buckingham Rd. to County Line	903	B
Interstate 75	SR 80 to Bayshore Rd.	2,833	A
Interstate 75	SR 82 to SR 80	3,106	A
Interstate 75	Colonial Blvd. to SR 82	3,433	A
Interstate 75	Daniels Rd. to Colonial Blvd.	2,181	A

SOURCE: Master Roadway Link Listing, December 12, 1989, Concurrency Management Division, Lee County.

NOTE: Existing roadway volumes are as of December 12, 1989, LOS represents level of service.

TABLE 2-23

PERFORMANCE STANDARDS

ROADWAY	SEGMENT	CAPACITY	LOS
Anderson Avenue	Ortiz Ave. to I-75	3,600	E
Anderson Avenue	I-75 to Buckingham Rd.	1,570	E
Anderson Avenue	Buckingham Rd. to Lee Blvd.	1,570	E
Anderson Avenue	Lee Blvd. to County Line	1,570	E
Buckingham Road	SR 80 to SR 82	1,120	E
Colonial Boulevard	Six Mile Parkway to Metro Parkway	3,600	E
Lee Boulevard	SR 82 to Leeland Heights Blvd.	1,570	E
Palm Beach Boulevard	Ortiz Ave. to I-75	2,220	E
Palm Beach Boulevard	I-75 to SR 31	1,570	E
Palm Beach Boulevard	SR 31 to Buckingham Rd.	3,600	E
Palm Beach Boulevard	Buckingham Rd. to County Line	1,570	E
Interstate 75	SR 80 to Bayshore Rd.	7,590	E
Interstate 75	SR 82 to SR 80	7,590	E
Interstate 75	Colonial Blvd. to SR 82	7,590	E
Interstate 75	Daniels Rd. to Colonial Blvd.	7,590	E

SOURCE: Master Roadway Link Listing, December 12, 1989, Concurrency Management Division, Lee County.

NOTE: LOS represents "level of service".

inspectors, five certified EMTs (emergency medical technicians), two certified divers, and a cumulative 100 years of fire-fighting experience. Fire district hardware includes a 6,550-gallon capacity of mobile water and 8,800 feet of four-inch hose, three quick attack trucks, nine class "A" pumpers, one ladder truck, two brush trucks, one special unit, four generators, and two dive sets (SOURCE: Lee Plan, 1989).

Education. There are five public elementary schools located within the study area: Orange River Elementary School, Tice Elementary School, Edgewood Elementary School, Franklin Park Elementary School, and Michigan Elementary School. There are two public middle schools located within the study area: Dunbar Middle School and Lee Middle School.

Orange River Elementary, located at 4501 Underwood Drive, has an enrollment of 677 students and a staff of 66. Tice Elementary School, located at 4524 Tice Street, has an enrollment of 719 students and a staff of 73. Edgewood Elementary School, located at 3464 Edgewood Avenue, has an enrollment of 334 students and a staff of 29. Franklin Park Elementary School, located at 2323 Ford Street, has an enrollment of 373 students and a staff of 43. Michigan Elementary School, located at 4312 East Michigan Avenue, has an enrollment of 512 students and a staff of 54. Emergency shelters are located at Orange River, Tice, Edgewood, and Franklin Park elementary schools.

Dunbar Middle School, located at 3800 E. Edison Avenue, has an enrollment of 403 students and a staff of 45. Lee Middle School, located at 4203 Ballard Road, has an enrollment of 643 and a staff of 63.

There are three exceptional student programs within the study area: Buckingham Exceptional Student Center, Riverside School, and Royal Palm Exceptional Center. Buckingham Exceptional Center, located at 3200 Buckingham Road, has an enrollment of 104 students and a staff of 44. Riverside School, located at 1634 Manchester Boulevard, has an enrollment of 92 students and a staff of 38. Royal Palm Exceptional Student Center, located in Dunbar Community School at 1857 High Street, has an enrollment of 33 students and a staff of 15.

inspectors, five certified EMTs (emergency medical technicians), two certified divers, and a cumulative 100 years of fire-fighting experience. Fire district hardware includes a 6,550-gallon capacity of mobile water and 8,800 feet of four-inch hose, three quick attack trucks, nine class "A" pumpers, one ladder truck, two brush trucks, one special unit, four generators, and two dive sets (SOURCE: Lee Plan, 1989).

Education. There are five public elementary schools located within the study area: Orange River Elementary School, Tice Elementary School, Edgewood Elementary School, Franklin Park Elementary School, and Michigan Elementary School. There are two public middle schools located within the study area: Dunbar Middle School and Lee Middle School.

Orange River Elementary, located at 4501 Underwood Drive, has an enrollment of 677 students and a staff of 66. Tice Elementary School, located at 4524 Tice Street, has an enrollment of 719 students and a staff of 73. Edgewood Elementary School, located at 3464 Edgewood Avenue, has an enrollment of 334 students and a staff of 29. Franklin Park Elementary School, located at 2323 Ford Street, has an enrollment of 373 students and a staff of 43. Michigan Elementary School, located at 4312 East Michigan Avenue, has an enrollment of 512 students and a staff of 54. Emergency shelters are located at Orange River, Tice, Edgewood, and Franklin Park elementary schools.

Dunbar Middle School, located at 3800 E. Edison Avenue, has an enrollment of 403 students and a staff of 45. Lee Middle School, located at 4203 Ballard Road, has an enrollment of 643 and a staff of 63.

There are three exceptional student programs within the study area: Buckingham Exceptional Student Center, Riverside School, and Royal Palm Exceptional Center. Buckingham Exceptional Center, located at 3200 Buckingham Road, has an enrollment of 104 students and a staff of 44. Riverside School, located at 1634 Manchester Boulevard, has an enrollment of 92 students and a staff of 38. Royal Palm Exceptional Student Center, located in Dunbar Community School at 1857 High Street, has an enrollment of 33 students and a staff of 15.

All enrollment and staffing figures are based on second quarter, 1987-1988 academic year numbers (SOURCE: Lee Plan, 1989; Fort Myers, Florida 7.5 Minute Series Map, Photorevised 1987, United States Geologic Survey).

Recreation Facilities. There are over 20 recreation facilities located within the study area. Refer to Section 2.2.1 for additional information regarding recreation facilities.

Water Supply Facilities. Potable water service to the site will be provided by tapping into the distribution system for the County's Corkscrew Water Treatment Plant. The location of the Corkscrew Plant is shown in Figure 2-15. A pipeline with a minimum diameter of eight inches will tie into the existing system near the intersection of Ortiz Avenue and Highcotton Lane. Typical water pressure in the line will be 40 to 60 psi. Water quality is in compliance with FDER potable water system permit requirements. Typical characteristics of the potable water are a pH range of 7.5 to 9.0, a total hardness between 100 and 200 mg/l as CaCO_3 , color between 2 and 15 color units, turbidity less than 1.0 Nephelometric Turbidity Units, and chloride concentrations up to 250 mg/l.

Cooling Water Supply. Reclaimed water from the City of Fort Myers Central Advanced Wastewater Treatment Plant (Central WWTP) will be used as cooling water for the Facility. The Central WWTP location is shown on Figure 2-15. A 1.5-mgd firm capacity pump station will be constructed at the Central WWTP (firm capacity refers to the capacity of the station with the largest pump out of service). A pipeline will be constructed to convey the reclaimed water to the site, as well as to serve other future reuse needs, as discussed in Section 6.0. The pipeline will have a minimum diameter of 12 inches. It is also planned that on-site groundwater wells will be installed to provide a source of back-up cooling water supply in the unlikely event that the primary source is interrupted. This is discussed further in Section 3.5.1 and Appendix 7.2.

OVERSIZE
DOCUMENT WAS
REMOVED AND
INSERTED INTO
OCULUS
SEPARATELY.

Sewage Treatment Facilities. The City of Fort Myers Central WWTP will receive the wastewater generated by the energy recovery facility. The wastewater discharge will consist of a maximum of approximately 150,000 gpd of sanitary, process wastewater, and cooling tower blowdown wastewater. Process wastewater will be reused at the Facility to the greatest extent practicable.

Wastewater will be pumped into a pipeline with a minimum diameter of six inches, which will tie into an existing pump station near the corner of Flagler Street and SR 82. This pump station is part of the influent transmission facilities of the City of Fort Myers Central WWTP. Prior to discharge to the sewer, the wastewater shall meet city pretreatment requirements.

The current pretreatment requirements prohibit slugs of pollutants, excessive grease and oils, taste or odor-causing substances, radioactive wastes, corrosive wastes, or other wastes which would interfere with treatment operations. They also limit average concentrations of heavy metals and other contaminants in the sewage as it arrives at the wastewater treatment plant to the concentrations shown in Table 2-24. At no time shall the hourly concentration at the wastewater treatment plant exceed three times the average concentration.

The city is in the process of revising its pretreatment ordinance. A draft ordinance is currently being reviewed by both the city and Lee County. Upon receipt of comments from the County, the new ordinance will be forwarded to the U.S. Environmental Protection Agency (EPA) for approval. This ordinance strengthens the intent of the existing ordinance by providing more specific regulations. Permitting, sampling, monitoring, and enforcement procedures are presented in detail. The maximum pollutant concentrations allowed under the new ordinance are summarized in Table 2-25.

It is anticipated that a new pretreatment ordinance will be in effect for the city's Central WWTP when the energy recovery facility becomes operational. The Contractor who designs, builds, and operates the Facility will be required to meet all city pretreatment requirements. The County will continue to coordinate with the city on this matter until a new pretreatment ordinance is adopted.

TABLE 2-24

EXISTING WASTEWATER CONSTITUENT CONCENTRATION LIMITS
Fort Myers Pretreatment Ordinance
(City Ordinance 2201)

	Maximum 24-Hour Flow Proportional Average Concentration, ppm
Arsenic	0.05
Barium	2.0
Cadmium	1.0
Chromium (total)	1.0
Chromium (hexavalent)	0.05
Copper	1.0
Cyanide	1.0
Iron	2.0
Lead	1.5
Mercury	0.05
Nickel	2.0
Selenium	1.0
Silver	1.0
Raw Sewage Chlorine Demand	12.0
Zinc	2.0
Oil & Grease (petroleum and/or mineral)	100.0
Total Sulfides	0.5

TABLE 2-25

PROPOSED MAXIMUM WASTEWATER DISCHARGE LIMITATIONS
City of Fort Myers Draft Pretreatment Ordinance
May 1990

Parameter	Maximum Concentration (mg/l) (24-hour Flow Proportional Composite Sample)	Maximum Instantaneous Concentration (mg/l) (Grab Sample)
Aluminum, dissolved (Al)	15.00	30.00
Antimony (Sb)	0.50	1.00
Arsenic (As)	0.50	0.10
Barium (Ba)	2.50	5.00
Boron (B)	1.00	2.00
Cadmium (Cd)	0.01	0.02
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	3,750.00
BOD	300.00*	—
COD	600.00*	—
TSS	300.00*	—
Total Nitrogen (TKN)	30.00*	—
Total Phosphorus	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 City of Ft. Myers high strength wastewater control charge schedule and other rate resolutions and ordinances that may apply.

Solid Waste Collection and Disposal. Lee County enacted its Mandatory Garbage and Solid Waste Collection Ordinance (No. 86-38) in April 1987. This ordinance provides for County control over solid waste collection and disposal within its jurisdiction. The County is currently divided into eight major service areas for collection purposes, as summarized in Table 2-26.

The incorporated cities of Fort Myers, Cape Coral, and Sanibel are not regulated under the County's mandatory collection ordinance; they either have or are formulating their own ordinances. The City of Fort Myers provides its own collection services. Long-term franchise agreements are in effect for all other service areas.

All solid waste collected in Lee County, by both private haulers and the City of Fort Myers, is transported to the Gulf Coast landfill for disposal under contract with Lee County. The landfill is owned and operated by Waste Management, Inc. The landfill location is depicted in Figure 2-16. The figure also shows the location of a future landfill/ashfill to be constructed in Hendry County in conjunction with the proposed energy recovery facility. The new landfill/ashfill will be permitted separately from the Facility described in this application.

The Lee County Solid Waste Disposal System Policy Issues Memorandum (December, 1989) projected solid waste quantities to be generated within Lee and Hendry Counties through the year 2030. The results of this analysis indicate an increase in waste generation from 920 tons per day (Lee County only) in 1987 to approximately 4,000 tons per day in 2030. This anticipated increase has sparked interest in the concepts of recycling and energy recovery. In addition to providing power from the combustion of refuse, an energy recovery system in conjunction with recycling reduces the volume of material to be landfilled, enhances protection of groundwater and surface water resources, and provides a long-term means of solid waste processing and disposal.

TABLE 2-26
SUMMARY OF COLLECTION PRACTICES

Franchise/Service Area	Customer Base ^a		VEHICLE TYPES						Transfer Stations	
	Residential	Commercial	Rear Load		Front Load		Roll Off	Number In Crew		
			Number	Capacity ^b	Number	Capacity ^b	Number	Residential		Commercial
Gulf Disposal ^c	25,217	1,800	10 (2)	25 (27)	5	40	4	2	1	None
Cape Coral/Pine Island	15,647/3,848	1,026/118	11	25	2	40	15	2	1	None
Turner Disposal	9,266	550	10	10	3	25	None	1	1	1
Lehigh Utilities	8,479	260	7	25	2	25	None	1 or 2	1	None
Beach Disposal ^d	8,305	801								
Sanibel Disposal ^d	2,505	319	10	13 to 25	5	40	2	1 or 2	1	1
Captiva Disposal ^d	359	53								
City of Ft. Myers ^e	8,072	1,906	8 (3)	25 (32)	5	32	None	3 (1)	1 or 2	None

SOURCE: Conversations with franchise/service area haulers and Lee County Solid Waste Department personnel.

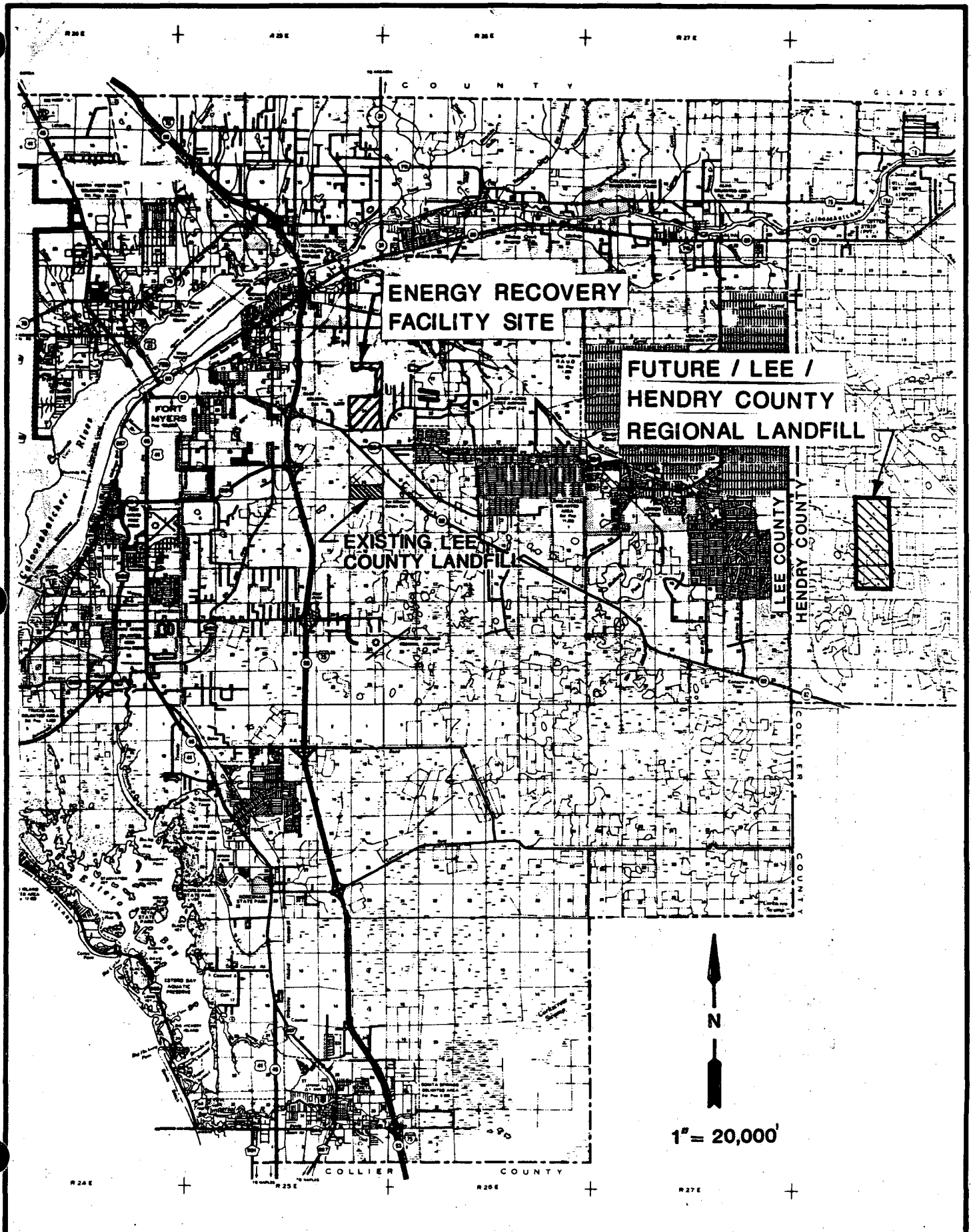
^aThe numbers shown here are for the period ending July 1987 for areas under mandatory collection ordinance, or the period ending January 1987 for remaining areas.

^bCapacity is indicated in cubic yards.

^cThe values shown in parentheses are for side load vehicles which are used for the rural routes.

^dBrowning Ferris Industries (BFI) handles these areas. The numbers shown are for the combined areas since an individual breakdown is not available.

^eThe City of Fort Myers is gradually converting to a totally automated system. The numbers shown in parentheses represent the number of automated trucks in use at this time.



Proposed Landfill Location
Lee County Energy Recovery Facility

FIGURE 2-16

2.3 BIOPHYSICAL ENVIRONMENT

2.3.1 GEOLOGY AND SOILS

The subsections under this topic describe the soils and geology of the site. Information from existing documents, the results of a site-specific geotechnical investigation, and further details of the site-specific geotechnical investigation, together with regional geological information, are presented below.

Site Soils 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. Figure 2-17 depicts the major individual soil units on and near the site. 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, depressional
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.

The Malabar series consists of deep, sandy soils that are poorly drained. The soils have a moderately low permeability ranging from about 6 to 20 inches per hour but have a zone of much lower permeability (less than 0.2 inches per hour) at depths from about 40 to 60 inches below land surface. The soils have less than 25 percent clay, one to two percent organic matter, and have a low shrink/swell potential. They were formed as thick beds of sandy and loamy marine sediments.

Soils of the Valkaria and Pompano series are deep, poorly drained siliceous sands and fine sands that were formed in thick beds of sandy marine sediments. They have a high permeability of 6 to 20 inches per hour. The soils are found in sloughs and depressional areas and are usually level or sloping up to one percent. The soils have less than five percent clay, one to five percent organic matter, and a low shrink/swell potential.

In areas where the Malabar, Valkaria, or Pompano soils are present, the water table in the uppermost aquifer rises to within 10 inches of the ground surface for one to four months of the year, is 10 to 40 inches below ground surface for about six months a year, and falls beyond 40 inches deep for about three months during dry periods. Where these soils are present in depressions, water ponds on the soil for three to six months per year. In sloughs, these soils are covered by slowly moving, shallow water for seven days to one month or more during and following periods of heavy rain.

The Boca series consists of deep, poorly drained fine sand and fine sandy loam soils. The soils have a moderate permeability of 6 to 20 inches per hour in the upper two to three feet of soil where the clay content is less

This is a topographic map of the Energy Recovery Facility Site area. The map features contour lines with numerical values such as 13, 33, 34, 39, 44, 49, 50, 53, 55, 63, 69, 73, 74, 75, and 77. A prominent road, labeled 'BUCKINGHAM ROAD', runs horizontally across the lower portion of the map. A rectangular area in the center is outlined with a thick black border and contains diagonal hatching, indicating a specific site or boundary. To the right of this area, two regions are labeled 'SANITARY LANDFILL (ABANDONED)'. A north arrow is located in the upper right corner, and a scale bar below it indicates 'APPROX. SCALE 1" = 1650\''. The map is heavily textured with black and white speckling, characteristic of a photocopy or a high-contrast scan.

FIGURE 2-17

**Facility Soils Map
Lee County Energy Recovery Facility**

than two percent and 0.6 to 2 inches/hour below that depth because the clay content increases to about 10 to 30 percent. The soils were formed in moderately thick beds of marine sediment over limestone. The soils have one to three percent organic matter and a low shrink/swell capacity. Fractured limestone was encountered at a depth of 30 inches in a typical sample representative of the series (a pedon). The fractured limestone was reported to have solution cavities filled with sandy clay loam soil. These soils are usually found in nearly level areas with zero to two percent slope in flatwoods, depressional areas, and sloughs. In the flatwoods, the water table level of the uppermost aquifer is usually within 10 inches below the ground surface for two to four months per year, and recedes below the limestone (beyond 25 to 40 inches) for about six months. In depressional areas, water ponds on the soil for three to six months, and slowly moving water covers the soil in sloughs for seven days to one month or more during and following periods of high rainfall.

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).

Regional Geology

The sequence of geologic sediments that underlie Lee County, Florida, from land surface to a depth of approximately 1,000 feet NGVD, contains three major aquifer systems separated by low permeability confining zones. Figure 2-18 indicates the generalized geologic stratigraphy, which includes the surficial, intermediate, and Floridan aquifer systems.

Surficial Aquifer System. The surficial aquifer system is composed of the water table aquifer and, in the southern part of the County, the lower Tamiami aquifer. The leaky Tamiami confining bed pinches out northwest of Bonita Springs and along a southwest-northeast trending zero isopach line

	SOUTH FLORIDA WATER MANAGEMENT DISTRICT & UNITED STATES GEOLOGICAL SURVEY (1986)	FLORIDA BUREAU OF GEOLOGY (1986)
FRESH WATER	WATER TABLE AQUIFER *	SURFICIAL AQUIFER SYSTEM
	LOWER TAMIAMI CONFINING ZONE **	
	LOWER TAMIAMI AQUIFER **	
	UPPER HAWTHORN CONFINING ZONE	
DETERIORATING WATER QUALITY	SANDSTONE AQUIFER	INTERMEDIATE AQUIFER SYSTEM
	MID-HAWTHORN CONFINING ZONE	
	MID-HAWTHORN AQUIFER	
	LOWER HAWTHORN CONFINING ZONE	
	LOWER HAWTHORN/TAMPA PRODUCING ZONE	FLORIDAN AQUIFER SYSTEM
	CONFINING ZONE	
	SUWANNEE AQUIFER	

* INCLUDES LOWER TAMIAMI AQUIFER NORTH OF BONITA SPRINGS AREA

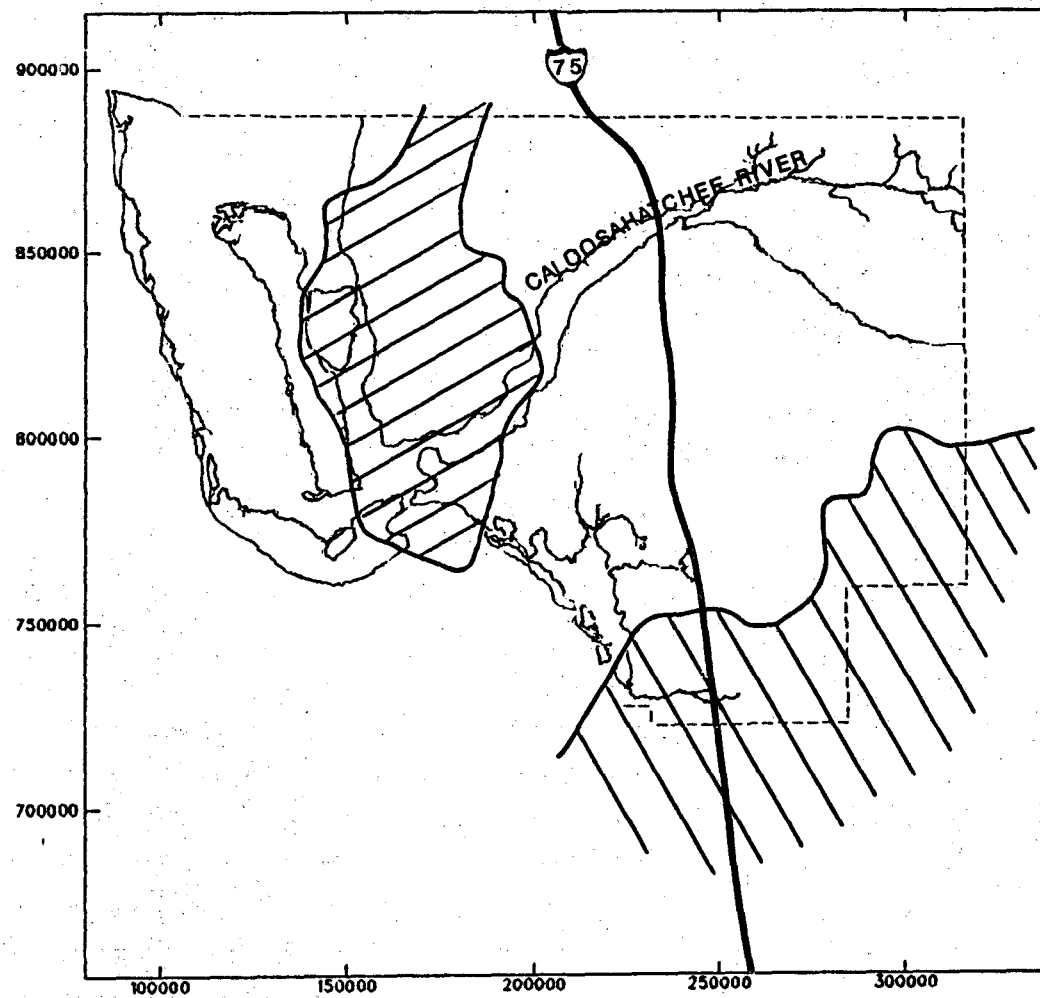
** ONLY PRESENT IN BONITA SPRINGS AREA

NOT TO SCALE

SOURCE: CDM, 1987

CDM

-  SANDSTONE AQUIFER NOT PRESENT
-  LOWER TAMIAMI CONFINING UNIT PRESENT




 APPROX. SCALE
 1" = 50,000'

Geologic Unit Pinchout Boundaries - Lee County Energy Recovery Facility

from the Gulf Coast at the Lee-Collier County line to the intersection of Townships 44 and 45 at the Lee-Hendry County line (see Figure 2-19). To the north and west of this zero isopach line, where the proposed energy recovery facility site lies, 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 five principal sources: 1) direct infiltration of precipitation, 2) inflow from surface water bodies, 3) subsurface flow from adjacent areas, 4) upward leakage from semi-confined aquifers, and 5) infiltration from free-flowing artesian wells at the ground surface. Direct infiltration from precipitation is the major source of recharge to the aquifer. Surface water bodies (Caloosahatchee River, canals, lakes, and rock quarries) may act as recharge sources when their water levels exceed the groundwater levels. The generally high groundwater levels compared to the elevations of surface water bodies suggest that the groundwater may frequently recharge surface water bodies (Wedderburn et al., 1982).

Discharge from the water table aquifer occurs as flow into streams and wetlands, evapotranspiration, downward leakage into underlying semi-confined aquifers, surface outflow to adjacent areas, and pumping from wells. Evapotranspiration is the major source of natural water loss from the water table aquifer (Wedderburn et al., 1982).

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 2-19). Although the term "sandstone" has been applied to the aquifer, in reality this aquifer is composed of two distinct lithofacies: a classic (sandstone) and a subordinate carbonate (limestone), both 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 (Wedderburn 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.

Floridan Aquifer System. The Floridan aquifer system lies hydrostratigraphically below the intermediate aquifer system. In the upper portions of the 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 zones is brackish to saline. Most of the recharge to the lower Hawthorn/Tampa producing zone originates from outside the 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 separate 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.

Site-Specific Lithographic Description

A geotechnical firm, Mortensen Engineering, Inc. of Tampa, Florida, was contracted to perform a site-specific investigation during April 1990. Their scope of work 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 firm also made recommendations regarding potential subsurface capabilities and limitations to support facility structures. The geotechnical report that presents the field work results and findings is included in Appendix 10.1. The following paragraphs summarize some of the findings.

On-site Borings. The borings were sited in locations to provide geotechnical information about Facility structures. Figure 2-20 shows the locations of the borings on the proposed Facility layout plan. Boring B-1 was sited in the vicinity of the proposed tipping floor area, borings B-4 and B-5 were drilled at either end of the proposed refuse pit area, boring B-2 was placed west of the refuse pit, and boring B-3 was drilled at the proposed site of an exhaust or venting stack.

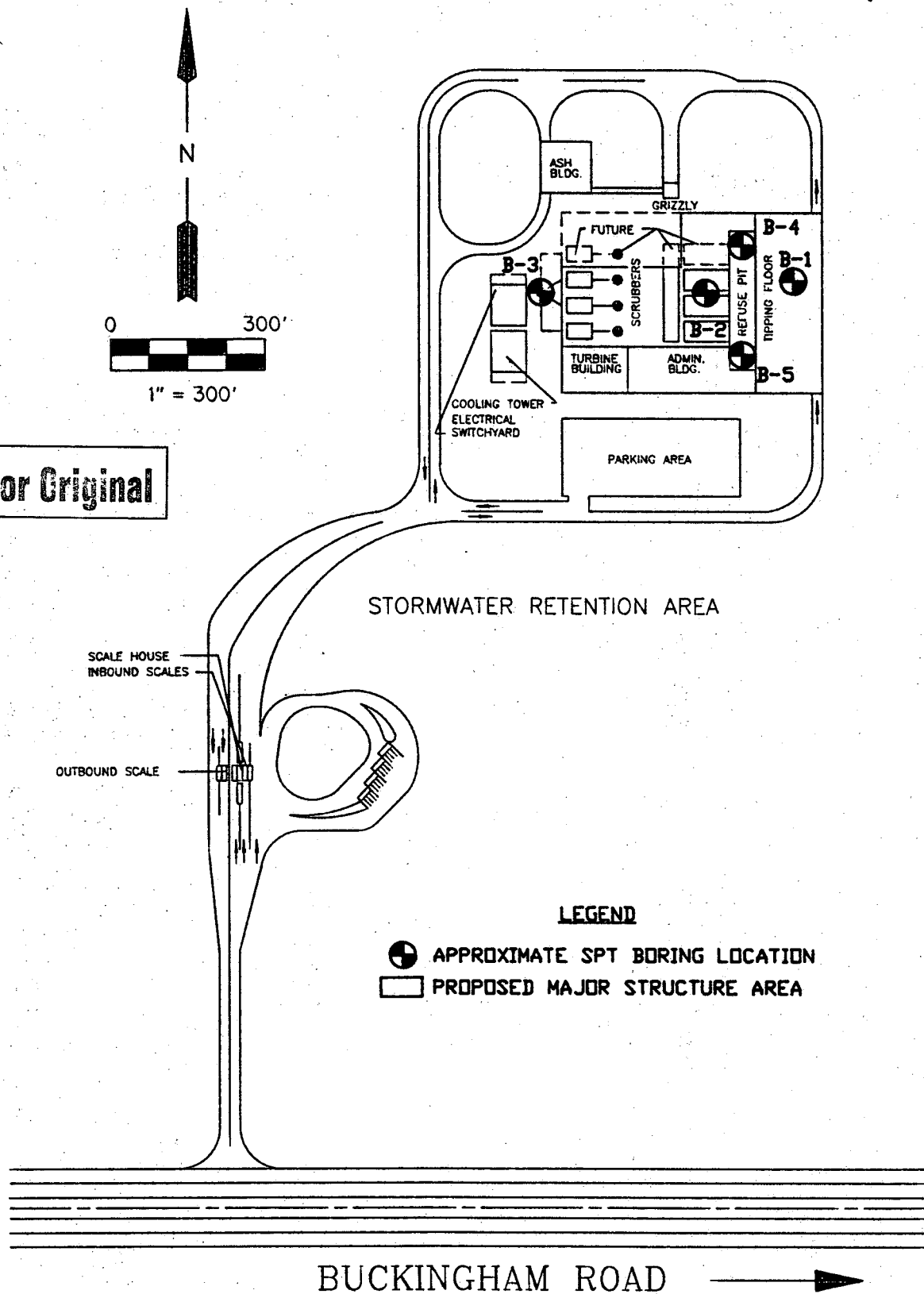
All five borings were installed to a depth of 80 feet below land surface following an SPT boring procedure consistent with the ASTM D-1586 method. A 2-15/16-inch diameter tri-cone roller bit and rotary wash drilling technique was used. Soil samples were collected using a split-barrel (split-spoon) sampler. Two or three soil samples were collected from the upper 10 feet of each boring, then samples were collected every 5 or 10 feet depending upon the lithology. The blow counts to advance the sampler one foot, called "N"-values, were recorded.

The boring logs are included as Plates 2, 3, and 4 in Appendix 10.1. The logs depict the geologic stratigraphy with depth, the N-values or blow counts (which also indicates collection of a soil sample), the percent of fines passing a 200 sieve (using ASTM D-1140), and the depth to groundwater during the drilling activities. The ground surface elevations of the borings are similar. The elevations of borings B-1, B-2, and B-3 are at 21.2 feet above National Geodetic Vertical Datum (NGVD), boring B-4 is at 21.4 feet, and boring B-5 is at 21.3 feet.

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 2-27. The sands, sandy silt, and clayey silt of the upper three strata make up the soils of the uppermost water table (or

ACAD FILE: RRSITEF2.DWG 05/29/90

Poor Original



Site Boring Locations
Lee County Energy Recovery Facility

TABLE 2-27
SUMMARY OF SOIL BORINGS

Approximate Depth	Stratum No.	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)

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 comprised 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 the geotechnical field investigation. Circulation of drilling mud was lost at about the 76-foot depth in borings B-2 and B-3. The 100 percent circulation loss occurred in the weathered sandstone formation and may be attributable to the poorly cemented sandstone which is highly porous. Loss of drilling mud circulation in the sandstone formation occurs about 70 percent of the time when drilling in that formation in southwestern Florida; it is not indicative of sinkhole activity and does not pose a reason for concern (personal communication, R. Mortensen, Mortensen Engineering, Inc., May 2, 1990). After completion of the borings, each was grouted to ground surface with Portland cement.

Soil Sample Data. Ten of the soil samples were sent to the laboratory for limited physical testing to determine the percentage of materials in the soil samples that have a diameter less than 75 microns, referred to as fines. The results of the tests, and information about the location of each sample, are summarized in Table 2-28. The percentage of fines in the samples ranges from 8 to 27 percent. No analyses for vertical and horizontal hydraulic conductivity were performed because the information was not needed for a structural evaluation.

TABLE 2-28

SUMMARY OF SIEVE DATA FOR SOIL SAMPLES

BORING	DEPTH OF SAMPLE	FORMATION	% MATERIAL PASSING
	(feet)	(Stratum)	Sieve 200
B-1	29	5	26
B-1	49	5	13
B-2	39	5	10
B-3	29	5	11
B-3	49	5	11
B-4	29	5	14
B-4	39	6	8
B-4	59	5	30
B-5	24	5	27
B-5	44	5	12

Formation Strata:

5 = Gray-green to gray silty to slightly clayey fine sand, trace phosphates.

6 = Gray-green to gray slightly silty to silty fine sand, trace phosphates.

Geologic Mapping

The significant geologic formations for the proposed Facility structures, and for the evaluation of hydrogeology and contaminant transport, are the water table aquifer, the Hawthorn confining unit, and the sandstone aquifer. Isopach maps of the tops of the confining unit and the sandstone aquifer were presented in a publication by the South Florida Water Management District (SFWMD)(1982). They show that the elevation of the top of the upper Hawthorn confining unit is nearly 0 feet NGVD, which is generally consistent with the site-specific boring logs which place the top of the upper Hawthorn confining unit (stratum 4 or 5) between +4 to -4 feet NGVD (17 to 25 feet below ground surface). The thickness of the confining unit may be 75 feet thick in the vicinity of the site (SFWMD) but the site-specific borings indicate confining unit (including strata 4, 5 and 6) to be about 40 to 50 feet thick.

A recent regional summary of Lee County water resources data was prepared by J. M. Montgomery & Associates (JMM, 1988). That report included an isopach map of the top of the sandstone aquifer which indicated that its elevation ranged between -4 to -60 feet NGVD in the vicinity of the site. That isopach map is included here as Figure 2-21. It shows that the proposed site is located in an area of the County where the sandstone aquifer formation is located closest to the ground surface. The site-specific borings indicate that the top of the sandstone aquifer (stratum 7) lies between -45 to -48 feet NGVD (66 to 69 feet below ground surface).

The Facility does not present sources of concern for groundwater degradation. However, for completeness of the permit document, a later section of this document, Section 4.3, addresses the potential impact the Facility may have on groundwater flow and quality. The clayey and silty clay soils of the upper Hawthorn confining unit (stratum 4 and to some extent stratum 5) will provide an effective barrier to downward movement of contaminants. Therefore, the potential for contaminant transport from the site will focus on the uppermost water table aquifer as the principal formation of concern in the unlikely event of releases to groundwater.

Soil Bearing Strength

The geotechnical subconsultant expressed a concern about the soft and/or loose unconsolidated soils to depths of nearly 70 feet. They also identified a potential for total and differential settlement in the soft to very soft clayey silt soils of stratum 3, the soft highly plastic silty clay soils of stratum 4, and the loose silty to clayey fine sand soils of strata 5 and 6. The geotechnical subconsultant offers two reasonable options for site improvement to support the Facility structures:

1. Improve the subsurface conditions using an in situ vibroreplacement technique, install stone columns in areas of major structures, and use a shallow foundation system for structure support; OR
2. Install deep end-bearing and/or friction piling foundation systems.

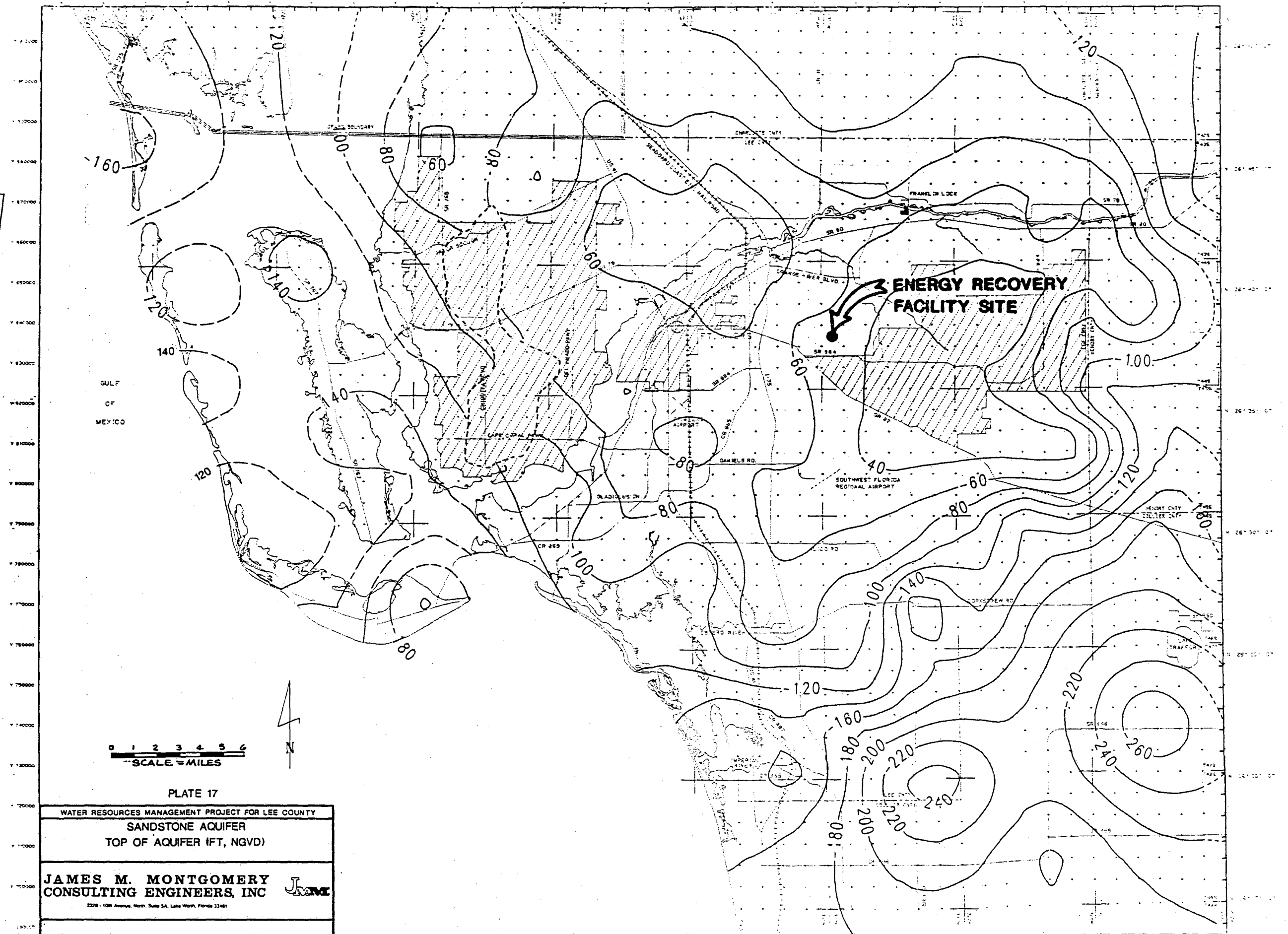
Each option is discussed below.

Vibroreplacement Option. Vibroreplacement has proven effective in improving silty sands, silts and soft clays. It uses gravel or stone as backfill along the vibrating probe to form stone columns about two feet in diameter. A cylindrical vibratory probe is used to form holes to a selected depth by displacing and compacting the soft silts, clays, or loose sands present. The gravel or stone backfill is compacted into the hole to create stone columns. The backfill is pushed laterally by the probe into the formation which reduces compressibility potential, and improves shear strength and bearing capacity. Stone columns at the proposed site may be 35 to 70 feet deep and spaced about 8 to 12 feet apart on centers. A field load test using 2 to 3 stone columns would have to be performed to establish the proper foundation design criteria and settlement analyses. Conventional strip and pad shallow foundations could be used to support the structures over a properly designed and installed improved soil/stone column system. The vibroreplacement and stone column technique should only be installed by qualified specialty foundation contractors.

Poor Original

Poor Original

SOURCE: LEE COUNTY WATER RESOURCES MANAGEMENT PROJECT OCTOBER 5, 1988



Piling Option. The geotechnical subconsultant believes that pilings would need to be driven at least 80 to 100 feet below ground surface and into the sandstone layer (stratum 7). Deeper test borings, NX-diamond coring and strength testing of the sandstone formation would be needed to evaluate the deep piling foundation option. Piling foundations that could be considered include square prestressed, precast concrete piles, closed or open-ended concrete filled steel pipe piles; steel H-piles; and cast-in-place (such as auger cast) piles. The County has decided to direct the selected vendor to incorporate a friction piling foundation system for facility design and construction.

2.3.2 GROUNDWATER HYDROLOGY

The subsections under this topic summarize regional and site-specific data on the water table aquifer, the upper Hawthorn confining unit, the sandstone aquifer, and water quality.

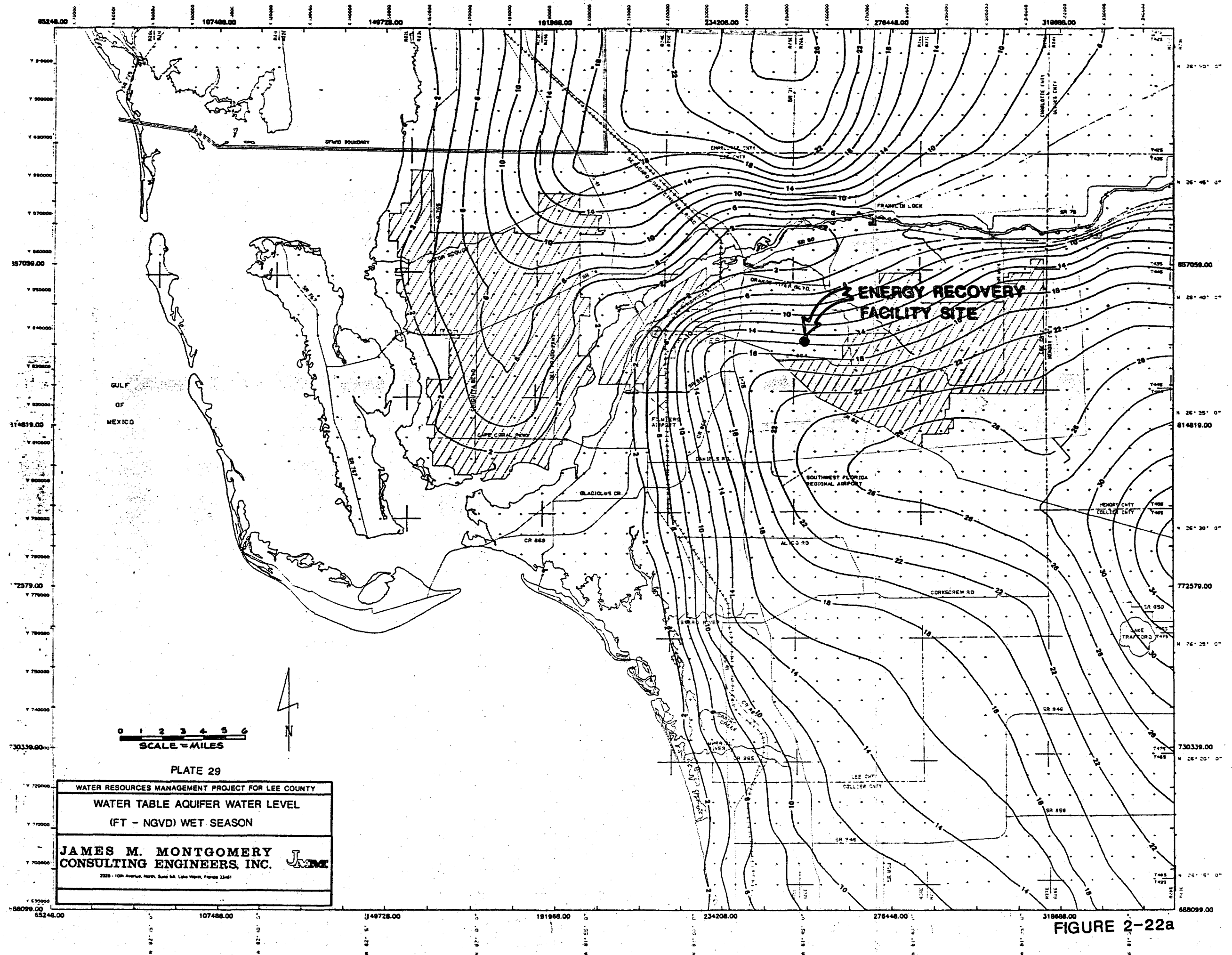
Water Table Aquifer

The near surface hydrogeology is characterized by a close interrelationship between surface water and groundwater in the water table aquifer. The wetlands on-site are formed by overland flow of surface water in sloughs during rainy periods, and by groundwater discharge when the water table elevation is higher than the ground surface elevation in the wetlands. The seasonal groundwater elevations may vary on the order of three feet (USDA, 1984). The Lee County Water Resources Management Project (JMM, 1988) included maps of the dry and wet season water elevations for major aquifers. Figures 2-22a and 2-22b 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 proposed site is about two feet (from about 16 feet NGVD during the wet season to 14 feet NGVD during the dry season). The diagrams also clearly show the regional groundwater 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.

IMAGE QUALITY

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

SOURCE: LEE COUNTY WATER RESOURCES MANAGEMENT PROJECT OCTOBER 5, 1988



SOURCE: LEE COUNTY WATER RESOURCES MANAGEMENT PROJECT OCTOBER 5, 1988

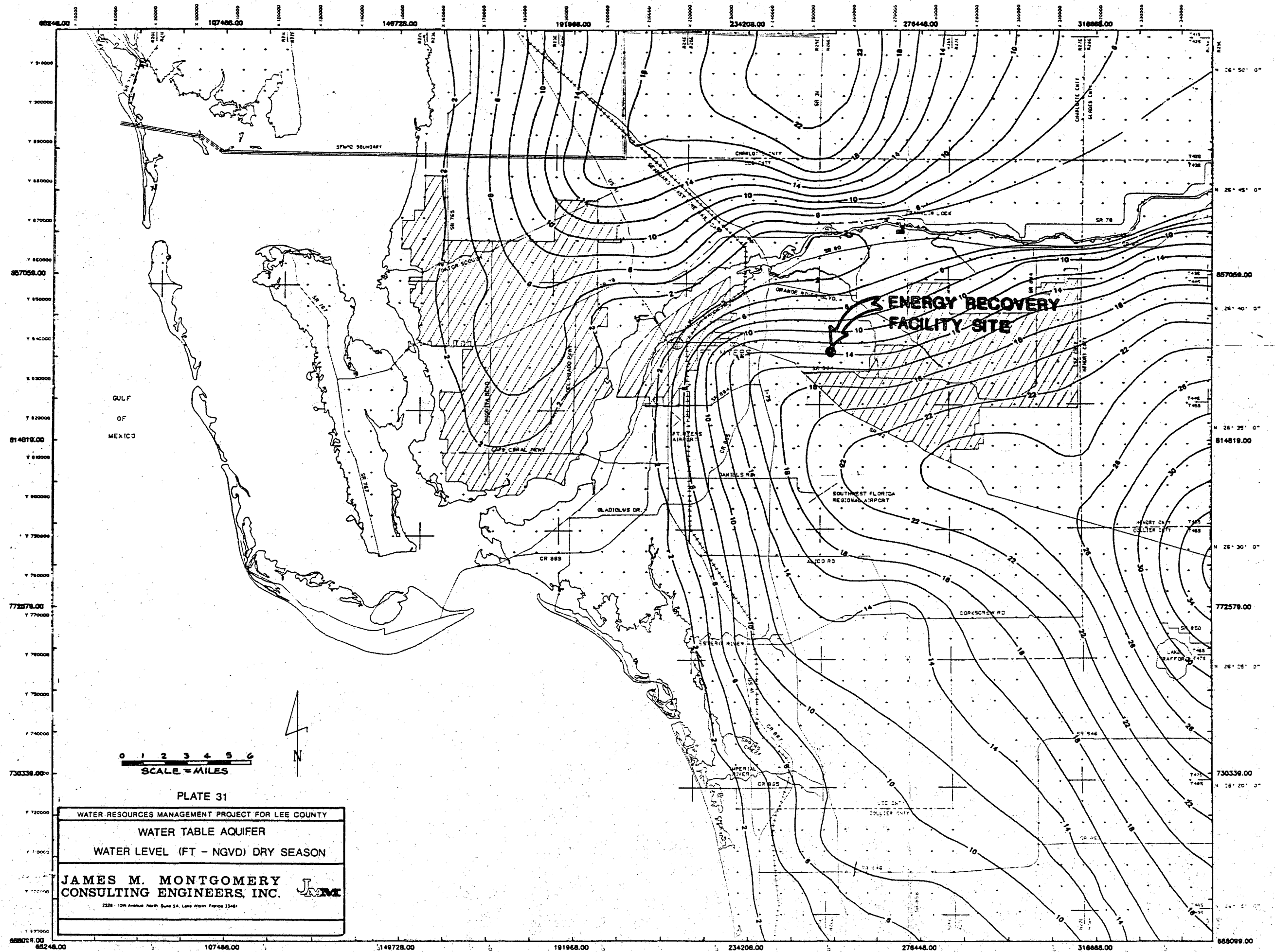


FIGURE 2-22b

The site-specific groundwater elevation data collected during the geotechnical investigation are higher than the regional data, and indicate that there is an overall southeasterly flow direction on-site. The on-site groundwater elevations measured during the field geotechnical investigation ranged from 17.2 to 19.2 feet NGVD. These data are summarized in Table 2-29. The wells are relatively closely spaced, and the water level data probably reflect local effects that are not evident in regional flow. The regional gradient should govern in cases of evaluating groundwater impacts.

It should also be noted that the groundwater data may not have been measured all in one day during the geotechnical investigation so that the information may not reflect similar hydrologic conditions at each boring location. However, there were no rainfall events during the field work.

The water table aquifer based on the site borings, is about 17- to 25-feet thick (if the transitional stratum 3 is included with the aquifer material). Reviews of regional data report that the water table aquifer thickness near the site ranges from less than 25 feet (SFWMD, 1982) to between 20 and 30 feet (JMM, 1988). An overall aquifer thickness for the proposed site, that can be used for estimation, is 20 feet.

The hydraulic transmissivity of the water table aquifer may be about 80,000 gallons per day/foot (gpd/ft) (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 proposed 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 specific yield within four miles south of in the site area have been given as 150,000 gpd/ft and 0.15 (unitless) (Westinghouse Gateway Communities, 1984).

TABLE 2-29

ON-SITE GROUNDWATER ELEVATION DATA

BORING	GROUND SURFACE ELEVATION (feet NGVD)	DEPTH TO GROUNDWATER (feet)	ELEVATION OF GROUNDWATER (feet NGVD)
B-1	21.2	3.5	17.7
B-2	21.2	4	17.2
B-3	21.2	2	19.2
B-4	21.4	3	18.4
B-5	21.3	3.5	17.8

SOURCE: CDM, 1990 and Agnoli, Barber and Brundage, Inc. (Registered Land Surveyor).

NOTE: Depth to groundwater measured during field work on April 4 to 6, 1990.

The water table aquifer is used as a public water supply and agricultural irrigation aquifer. The public water supplies closest to the proposed site that are permitted to withdraw from the water table aquifer are the Gulf Utilites Green Meadows well field located about eight to ten miles southeast of this site, and the proposed Westinghouse Gateway well field about four miles southeast of the site.

Upper Hawthorn 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 4 ranges in thickness from about three to eight feet. However, it is likely that at least portions of strata 5 and 6 are part of the confining unit and when they are included, the thickness ranges from about 42 feet in boring B-3 to about 52 to 58 feet in boring B-5.

The upper Hawthorn confining unit does, as all confining units do, allow some groundwater to be transmitted through the formation, but the water travels at a much slower rate. Groundwater 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 assumption of vertical flow through the confining unit is a reasonable one, plus it simplifies the mathematics describing the interrelationship of adjacent aquifers. The vertical flow, or potential for flow, through an aquitard (confining unit) is often expressed in terms of a leakance value. In the vicinity of the site, this value is about 0.003 gpd/ft^3 (JMM, 1988). This value is not significant by itself, but can be used in equations of flow for the aquifer system. Another value for leakance within four miles south of the site area has been given as 0.001 gpd/ft^3 (Westinghouse Gateway Communities, 1984). The vertical hydraulic conductivity of the confining unit is on the order of 0.0005 feet/day (CDM, 1987).

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 2-23a and 2-23b depict the groundwater potentiometric surface of the sandstone aquifer during the wet and dry seasons. The

SOURCE: LEE COUNTY WATER RESOURCES MANAGEMENT PROJECT OCTOBER 5, 1988

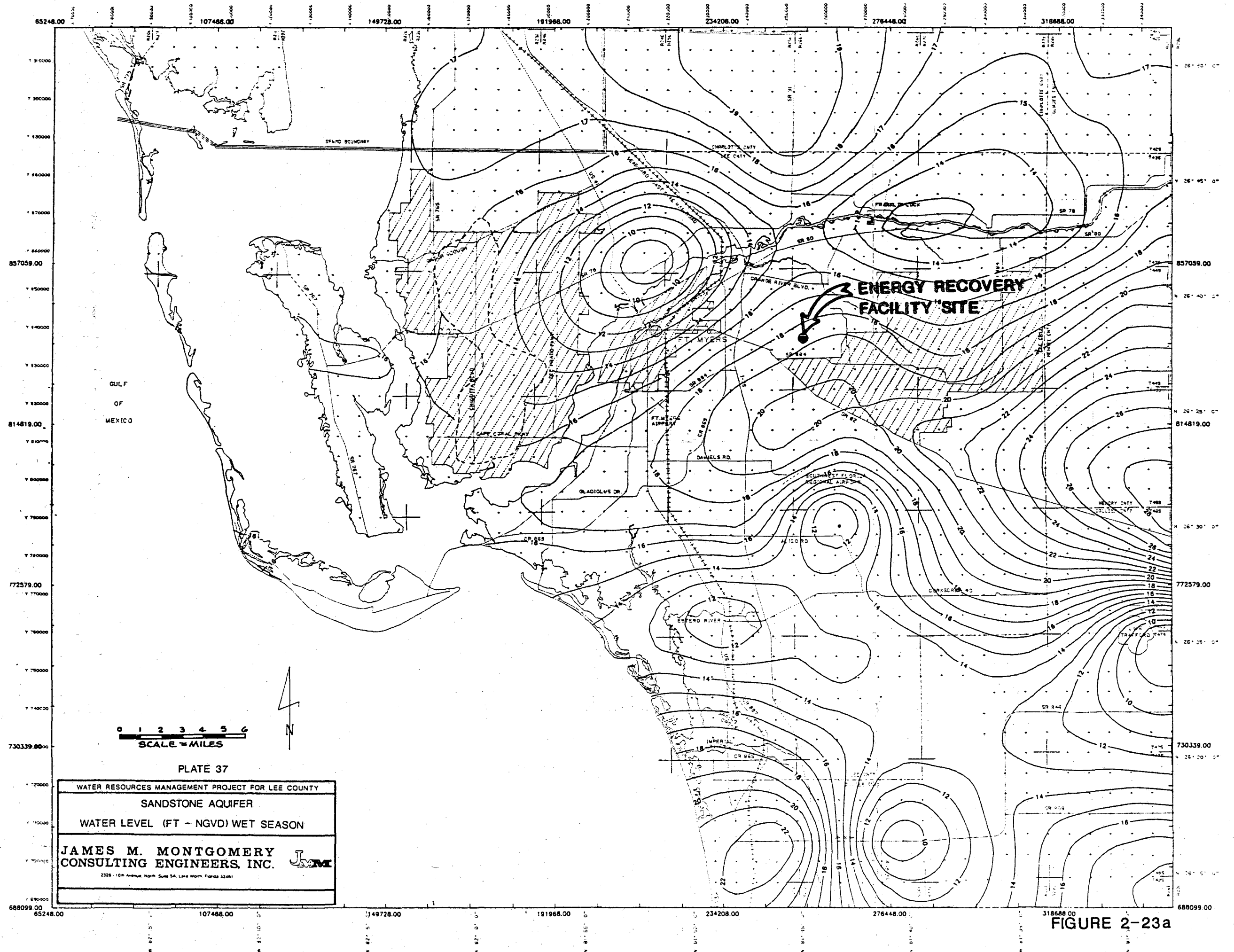
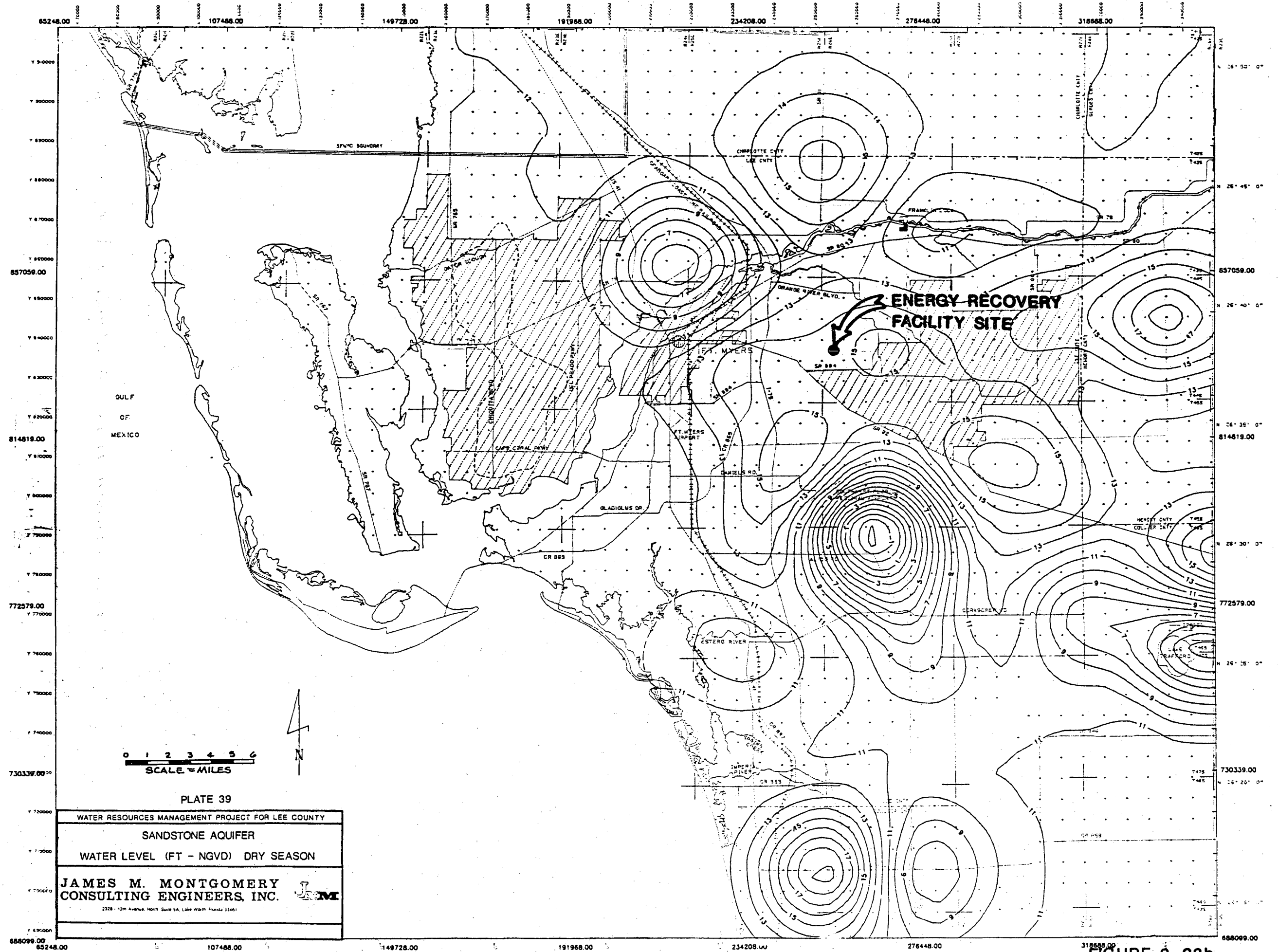


FIGURE 2-23a

SOURCE: LEE COUNTY WATER RESOURCES MANAGEMENT PROJECT OCTOBER 5, 1988



groundwater 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 groundwater 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 thickness of the sandstone aquifer is 50 feet at the site. None of the on-site borings were designed to penetrate the entire thickness of the sandstone aquifer so they can not be used to confirm the sandstone aquifer thickness.

The hydraulic transmissivity of the sandstone aquifer is about 10,000 gpd/ft (JMM, 1988), which for a 50-foot thick aquifer, equates to a value of hydraulic conductivity of about 30 feet/day. The proposed site lies in an area where the hydraulic conductivity of the sandstone aquifer was estimated to be about 50 feet/day in a county-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/ft (Westinghouse Gateway Communities, 1984).

The sandstone aquifer is used as a public water supply and agricultural irrigation aquifer. The public water supplies closest to the proposed site that are permitted to withdraw from the sandstone aquifer are the Lehigh Acres well field, located about eight to ten miles east and southeast of the site, Gulf Utilities Green Meadows well field, about eight to ten miles southeast of the site, and the proposed Westinghouse Gateway well field, about four miles southeast of the site.

A map that shows locations of permitted groundwater withdrawals (greater than 500,000 gallons/month) within a five-mile radius of the Facility site is provided as Figure 2-24. A groundwater well inventory lists the wells that have consumptive use permits (included as Appendix 9.2) and the smaller wells not permitted by SFWMD (Appendix 9.3).

Water Quality

There are several USGS-monitored groundwater quality monitor wells located near the proposed site (Boggess and Watkins, 1986). Some of the closest monitor wells include:

<u>Well No.</u>	<u>Open Depth</u>	<u>Unit Monitored</u>	<u>Approximate Distance from Site</u>
L-234	70 to 100 feet	Sandstone Aquifer	1 mile west
L-1981	75 to 106 feet	Sandstone Aquifer	1/2 mile east
L-728	30 to 32 feet	Water Table Aquifer	1/2 mile south

Water levels and water samples from these wells are collected periodically. A water sample for chemical analysis was collected from monitor well L-1981 in 1976. The results of the laboratory analyses are included in Table 2-30 along with general water quality ranges for the water table and sandstone aquifers.

Additional monitor wells have been installed to monitor the abandoned landfill located southeast of the site. A USGS-sponsored study was performed to evaluate the impact the landfill had had on groundwater quality (Boggess, 1975). The County continues to monitor groundwater quality in monitor wells installed around the abandoned landfill.

The geologic deposits that make up the aquifer system in southwest Florida, principally limestone, dolomite and carbonate materials, contribute dissolved solids to the groundwater. The dissolved solids in the sandstone aquifer range from about 236 to 2,360 mg/L in the eastern part of the

TABLE 2-30

SUMMARY OF GROUNDWATER QUALITY DATA
(Adapted from Boggess and Watkins, 1986)
(Concentrations in mg/L except as noted)

Parameters	Water Table and Lower Tamiami Aquifer ^a	Sandstone Aquifer	Well L-1981 ^b
<u>Primary Drinking Water^c</u>			
Arsenic	0 to 0.001	0 to 0.001	NM ^d
Cadmium	0 to 0.002	0 to 0.002	NM
Chromium	0	0 to 0.001	NM
Lead	0.003 to 0.016	0 to 0.0022	NM
Mercury	0	0 to 0.005	NM
Sodium	20 to 100	26 to 520	100
<u>Secondary Drinking Water</u>			
Chloride	26 to 120	45 to 1,000	180
Copper	0 to 0.001	0 to 0.002	NM
Iron	0.01 to 0.21	0.01 to 0.74	0.08
Manganese	0	0 to 0.017	NM
Sulfate	5 to 71	2.0 to 410	82
Zinc	0.006 to 0.010	0 to 0.020	NM
Color (Pt-Co units)	10 to 100	0 to 8.6	10
pH	7.0 to 8.4	6.9 to 8.6	7.2
Total Dissolved Solids	137 to 570	328 to 2,350	785
<u>Others</u>			
Silica			33
Calcium			100
Magnesium			32
Strontium			1.0
Potassium			8
Fluoride			0.5
Bicarbonate			344
Alkalinity (as CaCO ₃)			282
Hardness as CaCO ₃ : Calcium/Magnesium			380
Hardness as CaCO ₃ : Noncarbonate			98

^a The lower Tamiami aquifer is not present near proposed site but the source document did not distinguish the lower Tamiami aquifer as being separate from the water table aquifer.

^b Samples collected for well L-1981 on April 6, 1976.

^c Concentrations of Barium, Nitrate, Selenium and Silver were not analyzed or not reported so these parameters are deleted from the table.

^d NM means not analyzed (measured).

County (Bogges 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 (Bogges and Watkins, 1986). Saltwater from the Caloosahatchee River and underlying brackish aquifers can influence local chloride concentrations.

2.3.3 SITE WATER BUDGET AND AREA USES

The general hydrologic conditions of the Facility site are outlined in Table 2-31. This table includes information on rainfall, temperature, estimated evapotranspiration, groundwater recharge, and surface runoff. The climatic data presented is for the Fort Myers weather station, as reported in the South Florida Water Management District's "Management of Water Use Permit Information Manual" (SFWMD, 1985). The Fort Myers station is reported as having 98 years of records for the rainfall and temperature data. The soils data used for this water balance are from the Soil Conservation Service's Soil Survey of Lee County, Florida (SCS, 1984).

The monthly evapotranspiration was estimated using the modified Blaney-Criddle formula which describes a linear relationship between evapotranspiration and mean air temperature. The general equation used for calculation of evapotranspiration (ET) is given as follows.

$$ET = (Kt * Kc)p t/100$$

where: ET = Evapotranspiration potential

Kt = $0.0173t - 0.314$

Kc = Growth factor for crop or vegetation

p = Percentage of daylight hours

t = Mean temperature in degrees fahrenheit

The monthly groundwater recharge was estimated based on the available water capacity for the soil types found on the Facility site. In Table 2-31, the evaporation potential and the groundwater recharge potential are subtracted

from the average monthly precipitation, resulting in estimates of runoff in the last two columns. Runoff quantities are presented for groundwater recharge rates of 0.25 and 0.56 inches per month.

Table 2-31 indicates that, 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. The results shown in Table 2-31 are similar to those found in the Lee County Water Resources Management Project (JMM, 1988). In that report, the estimated surface water runoff was 9.17 inches per year for their nine-square-mile study area which includes the location of the proposed energy recovery facility site.

Major water users in the area may be categorized as domestic, industrial, irrigation, and public water supply. A search of the SFWMD records has been conducted to locate all permitted wells within a five-mile radius of the Facility site. The wells may be permitted with a construction permit and/or a water use permit. A complete list of these permitted wells is provided in Appendix 9.1. Appendix 9.2 provides data for smaller wells not permitted by SFWMD which fall within the five-mile radius. Data for the smaller wells were provided by Lee County.

2.3.4 SURFICIAL HYDROLOGY

Hydrologic Characterization

The proposed Facility site has no surface water bodies within its boundary. DER 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 (see Section 2.3.5). 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.

TABLE 2-31

HYDROLOGICAL DATA REPRESENTATIVE OF THE PROJECT SITE
LEE COUNTY ENERGY RECOVERY FACILITY

MONTH	MONTHLY MEAN PRECIPITATION FORT MYERS	MONTHLY MEAN TEMPERATURE (Degrees F) (INCHES) ^(a)	MONTHLY MEAN PERCENTAGE OF DAYLIGHT HOURS	MONTHLY EVAPORATION POTENTIAL (INCHES) ^(b)	RUNOFF POTENTIAL IN/MONTH, AT STATED GROUNDWATER RECHARGE 0.25 IN/ MONTH ^(c) 0.56 IN/ MONTH ^(c)	
JANUARY	1.90	64.32	7.46	1.03	0.62	0.31
FEBRUARY	2.16	65.36	7.11	1.59	0.32	0.01
MARCH	2.21	68.62	8.38	2.91	0.00	0.00
APRIL	2.37	73.07	8.65	4.20	0.00	0.00
MAY	3.90	77.34	9.40	5.81	0.00	0.00
JUNE	9.09	80.60	9.32	6.57	2.27	1.96
JULY	8.47	81.99	9.52	6.64	1.58	1.27
AUGUST	8.00	82.41	9.13	5.94	1.81	1.50
SEPTEMBER	8.13	81.15	8.32	4.64	3.24	2.93
OCTOBER	3.88	76.26	8.05	3.33	0.30	0.00
NOVEMBER	1.37	69.44	7.33	1.94	0.00	0.00
DECEMBER	1.51	65.50	7.34	1.18	0.08	0.00
	52.99 (INCH/ YEAR)	73.84 (ANNUAL MEAN)			10.21 (INCH/ YEAR)	7.97 (INCH/ YEAR)

(a) Climatological data is based on the data provided for the Fort Myers Weather Station included in the South Florida Water Management District's Management of Water Use Permit Information Manual. The weather station is reported as having 98 years of record (SFWMD, 1985).

(b) The evapotranspiration potential was estimated using the Modified Blaney-Criddle Equation.

(c) The soils data is based on the SCS Soil Survey of Lee County, Florida. Two groundwater recharge rates, 0.25 and 0.56 inch/month, are assumed based on available soils data to present minimum and maximum runoff scenarios.

The Six Mile Cypress Slough is classified in the Lee County Comprehensive Plan as an "Environmentally Critical Area" and a "Resource Protection Area." Historic drainage patterns on-site have been altered, in part, by an entrance road which acts as a drainage basin divide for small rain events. An existing 18-inch diameter culvert, located under the entrance road, connects a small depressional flow-way in the eastern portion of the site to the wetlands in the west (see Figure 2-25).

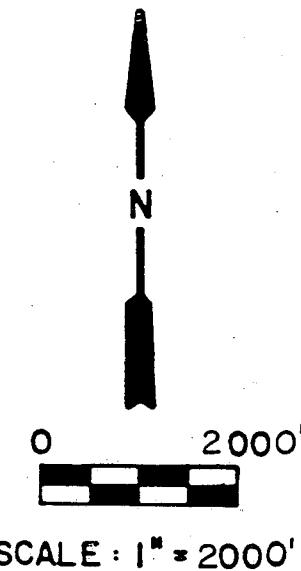
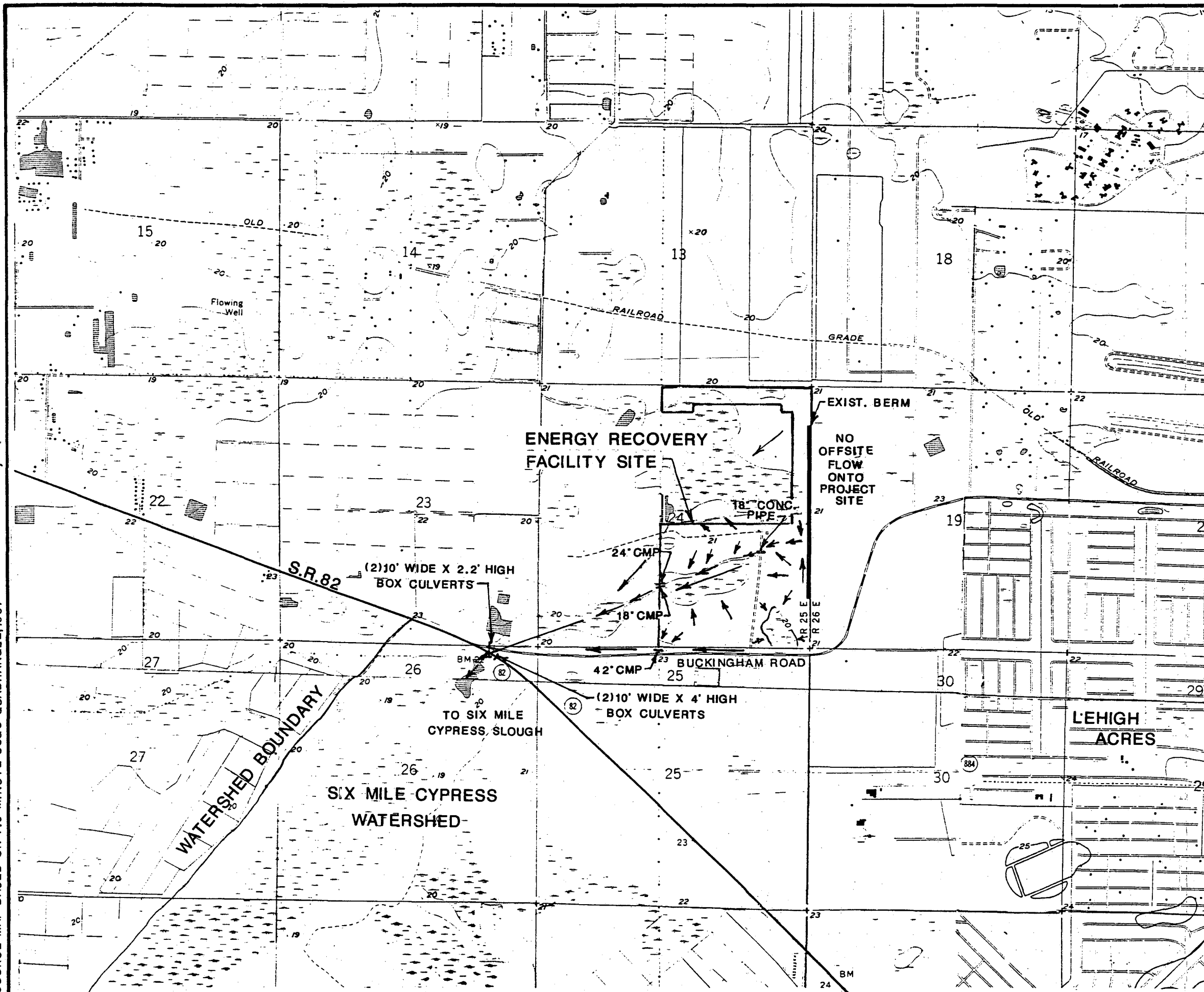
2.3.5 VEGETATION/LAND USE

Seventeen land use and vegetation types have been identified on the Lee County energy recovery facility site, as illustrated on Figure 2-26. These types have been classified to Levels III and IV of the Florida Land, Use and Cover Forms Classification System (FLUCFCS). The vegetation types for the site include farm pasture (210), low pasture (212), palmetto prairie (321), palmetto prairie invaded by exotics (3219), pine flatwoods (411), pine flatwoods invaded by exotics (4119), wet pine flatwoods (415), wet pine flatwoods invaded by exotics (4159), Brazilian pepper (422), mesic oak (425), wax-myrtle (429), Australian pine (437), drainage canal (514), cypress (621), cypress/pine (624), cypress/pine invaded by exotics (6249), and wet prairie (643).

The acreage quantities for the various vegetation types are based upon a Facility site acreage of 154.1 acres as determined by unrectified aerial photographs. The percentage of wetlands is based on the unrectified areal acreage. The boundary survey (see Figure 2-3) indicates a total Facility site size of 155 acres.

This site has been severely impacted from drainage practices, as well as overgrazing by cattle. As a result of these agricultural practices, most of the habitats on the site are in poor condition. Some of the habitats such as wax-myrtle (429), pine flatwoods (411), and wet pine flatwoods (415) have been logged in the past.

SOURCE MAP BASED ON 7.5 MINUTE USGS QUADRANGLE, 1987



- LEGEND**
- DIRECTION OF FLOW
 - CMP CORRUGATED METAL PIPE

Predevelopment Surface Water Flow Patterns - Lee County Energy Recovery Facility

OVERSIZE
DOCUMENT WAS
REMOVED AND
INSERTED INTO
OCULUS
SEPARATELY.

Farm Pasture (210) occupies 51.0 acres or 33.1 percent of the property. Vegetation of this upland habitat is dominated by pasture grasses that have been severely grazed by cattle. Common species include thin paspalum (Paspalum setaceum), marsh-pinks (Sabatia grandiflora), stinkweeds (Pluchea spp.), and frog-fruit (Lippia nodiflora). Species scattered throughout this habitat include cabbage palm (Sabal palmetto), wax-myrtle (Myrica cerifera), saw palmetto (Serenoa repens), live oak (Quercus virginiana), laurel oak (Quercus laurifolia), slash pine (Pinus elliottii), wiregrass (Aristida spp.), pawpaw (Asimina reticulata), and bluestem (Andropogon spp.). This habitat has been severely impacted from overgrazing and drainage practices.

Low Pasture (212) occupies 1.3 acres or 0.8 percent of the property. Vegetation of this habitat is dominated by pasture grasses and wood sorrel (Oxalis spp.). Other common species include coinwort (Centella asiatica), frog-fruit, wax-myrtle, Brazilian pepper (Schinus terebinthifolius), dog fennel (Eupatorium spp.), and scattered small slash pine. This area has been severely impacted by overgrazing as evidenced by the pasture grasses being only at ground level.

Palmetto Prairie (321) occupies 3.8 acres or 2.5 percent of the property. Vegetation of this upland habitat is dominated by saw palmetto from dense thickets more than five feet tall to scattered clumps with an open intermittent ground cover of wiregrass. Common ground cover vegetation consists of wiregrass, dwarf wax-myrtle, and stinkweed. Scattered species include the problematic Brazilian pepper and melaleuca (Melaleuca quinquenervia). Other scattered species include black-root (Pterocaulon pycnostachyum), thistle (Cirsium spp.), umbrella-grass (Fuirena spp.), grape (Vitis spp.), greenbriar (Smilax spp.), slash pine, cabbage palm, laurel oak, live oak, and buckthorn (Bumelia reclinata). Golden polypody (Phelebodium aureum), listed as a threatened plant by the Florida Department of Agriculture (Wood, 1989), is found on scattered cabbage palm throughout this habitat.

Palmetto Prairie Invaded by Exotics (3219) occupies 0.3 acres or 0.2 percent of the property. The overstory vegetation of this upland habitat is dominated by saw palmetto and the problematic melaleuca. Common ground cover vegetation species include wiregrass, stinkweed, and dwarf wax-myrtle. Also present are scattered slash pine and tickseed (Coreopsis leavenworthii).

Pine Flatwoods (411) occupies 17.9 acres or 11.6 percent of the property. Vegetation of this upland habitat is dominated by an overstory of slash pine with scattered melaleuca. Midstory species include saw palmetto, melaleuca, wax-myrtle, and scattered cabbage palm, buckthorn, Brazilian pepper, and slash pine. Ground cover species include wiregrass and dwarf wax-myrtle. Scattered ground cover species include heliotrope (Heliotropium polyphyllum), bluestem, stinkweed, black-root, tickseed, dog fennel, grape, Virginia creeper, Black-eyed Susan (Rudbeckia hirta), and thistle. This habitat has been disturbed by logging, grazing, and drainage activities. Several age classes of pine were observed with most of the pine being immature. Very few mature pine were observed in this habitat.

Pine Flatwoods Invaded by Exotics (4119) occupy 2.6 acres or 1.7 percent of the property. The dominant vegetation of the overstory of this upland habitat is slash pine. The midstory is dominated by Brazilian pepper with scattered cabbage palm and melaleuca. The ground cover is non-existent under the dominant midstory Brazilian pepper, however, where Brazilian pepper is not present, the ground cover is dominated by wiregrass.

Wet Pine Flatwoods (415) occupies 4.7 acres or 3.0 percent of the property. The overstory of this wetland habitat is dominated by slash pine with a midstory of wax-myrtle, ± 6-foot cypress (Taxodium distichum), scattered Brazilian pepper, and cabbage palm. Ground cover vegetation includes wiregrass, coinwort, stinkweed, and scattered yellow-eyed grass (Xyris spp.), rush (Juncus spp.), and Tracy's beakrush (Rhynchospora tracyi). This wetland habitat has been disturbed by heavy grazing, drainage, and logging activities. Several age classes of pine were observed with most of the pine being immature.

Wet Pine Flatwoods Invaded by Exotics (4159) occupies 3.1 acres or 2.0 percent of the property. Dominant vegetation of the overstory includes slash pine and melaleuca. Midstory species includes $\pm$ 6-foot cypress, melaleuca, Brazilian pepper, cabbage palm, wax-myrtle, and slash pine. Ground cover species include wiregrass, dwarf wax-myrtle, scattered small pine, heliotrope, stinkweed, grape, Tracy's beakrush, rushes, and yellow-eyed grass. This wetland habitat has been heavily disturbed by grazing, drainage, and logging activities. Some areas of this habitat are heavily infested by the problematic melaleuca and Brazilian pepper as a result of excessive agricultural practices. Several age classes of pine were observed with most of the pine being immature. A very small percentage of the pine observed in this area was mature.

Brazilian Pepper (422) occupies 2.9 acres or 1.9 percent of the property. Vegetation of the overstory of this upland habitat is dominated by Brazilian pepper. The ground cover ranges from very little vegetation to scattered vegetation that consists of stinkweed, different grasses, Boston fern (Nephrolepis exaltata), coinwort, grape, greenbriar, Virginia creeper, common rag weed (Ambrosia artemisiifolia), thistle, and very small slash pine. This highly disturbed habitat has been impacted by overgrazing and drainage practices.

Mesic Oak (425) occupies 0.7 acres or 0.5 percent of the property. Vegetation of the overstory of this upland habitat is dominated by laurel oak with some scattered live oak. The oaks range in height from 15 feet to 30 feet tall. The midstory consists of widely scattered wax-myrtle and cabbage palm. The ground cover vegetation consists of wiregrass, stinkweed, coinwort, yellow-eyed grass, and Boston fern. This upland habitat has been impacted by overgrazing and drainage practices.

Wax-myrtle (429) occupies 40.10 acres or 26.0 percent of the property. Dominant overstory vegetation of this upland habitat includes wax-myrtle, Brazilian pepper, scattered cabbage palm, and slash pine. A few scattered laurel and live oak also make up the overstory of this habitat. Midstory vegetation includes wax-myrtle, saw palmetto, scattered cabbage palm, and melaleuca. A wide variety of ground cover vegetation exists in this

habitat. Species include wiregrass, stinkweed, greenbriar, grape, Virginia creeper, coinwort, pepper-vine (Ampelopsis arborea), black-root, yellow-eyed grass, aster (Aster spp.), tickseed, frog-fruit, purple thistle (Cirsium horridulum), dog fennel, hat pin (Eriocaulon spp.), bluestem, Boston fern, common rag weed, beauty-berry (Callicarpa americana), lantana (Lantana spp.), and poison ivy (Toxicodendron radicans). This highly disturbed habitat has been severely impacted by overgrazing, drainage practices, and logging.

Australian Pine (437) occupies 0.8 acres or 0.5 percent of the property. Vegetation of the overstory of this upland habitat is dominated by Australian pine (Casuarina litorea). No midstory or ground cover species exist. The Australian pine are approximately 40 to 50 feet tall.

Drainage Canal (514) occupies 0.6 acres or 0.4 percent of the property. This wetland habitat contains no standing water and is vegetated by coinwort and various grasses. The drainage canal habitat has been impacted by overgrazing and lack of water.

Cypress (621) occupies approximately 13.7 acres or 8.9 percent of the property. Dominant overstory vegetation includes cypress. Midstory species include wax-myrtle, cypress, cabbage palm, myrsine (Myrsine guianensis), and the problematic melaleuca and Brazilian pepper. Ground cover vegetation includes smartweed, southern blue flag (Iris virginica), swamp fern (Blechnum serrulatum), dwarf arrowhead (Sagittaria subulata), panicum (Panicum spp.), thistle, groundsel (Senecio glabellus), and mock bishop's weed (Ptilimnium capillaceum). This wetland habitat has been severely impacted from overgrazing and drainage practices.

Cypress/Pine (624) occupies 2.8 acres or 1.8 percent of the property. Dominant overstory vegetation includes cypress and slash pine. Midstory vegetation consists of wax-myrtle, cabbage palm, myrsine, and scattered problematic Brazilian pepper and melaleuca. Ground cover vegetation includes swamp fern, wiregrass, yellow-eyed grass, rush, ludwigia (Ludwigia spp.), thistle, stinkweed, coinwort, Virginia creeper, and scattered sawgrass (Cladium jamaicense). This wetland habitat has been severely impacted by cattle grazing, logging, and drainage activities.

Cypress/Pine Invaded by Exotics (6249) occupies 3.2 acres or 2.1 percent of the property. Dominant overstory vegetation includes cypress, slash pine, and melaleuca. Midstory vegetation includes cypress, slash pine, the problematic melaleuca and Brazilian pepper, wax-myrtle, scattered cabbage palm and myrsine. Ground cover vegetation includes small slash pine, frog-fruit, panicum, tickseed, bluestem, wood sorrel, dog fennel, wiregrass, stinkweed, scattered swamp fern, yellow-eyed grass, rush, and ludwigia. This wetland habitat has been impacted by drainage practices.

Wet Prairie (643) occupies 4.6 acres or 3.0 percent of the property. Dominant overstory vegetation includes wax-myrtle and sand cordgrass (Spartina bakeri). Common ground cover vegetation includes wiregrass, stinkweed, yellow-eyed grass, milkwort (Polygala spp.), rush, different sedges, and tickseed. Vegetation scattered throughout this wetland habitat is saw palmetto, cabbage palm, slash pine, heliotrope, frog-fruit, coinwort, umbrella-grass, marsh-pinks, small cypress, and bitter mint (Hyptis alata). The problematic melaleuca and Brazilian pepper are also present throughout this wetland habitat. This habitat has been impacted by cattle grazing and drainage activities.

In summary, eight of the 17 vegetation types are wetland habitats. Wetland vegetation types include low pasture (212), wet pine flatwoods (415), wet pine flatwoods invaded by exotics (4159), drainage canal (514), cypress (621), cypress/pine (624), cypress/pine invaded by exotics (6249), and wet prairie (643). The total of these wetland vegetation types equaled 34.0 acres or 22.0 percent of the property. The remainder of the property was upland habitat which included 120.1 acres or 78.0 percent of the property. The ecological value of all the wetlands and uplands on site have been greatly reduced by farm practices such as cattle grazing logging, and drainage practices. These impacts have been compounded by the infestation of the problematic exotics melaleuca and Brazilian pepper. The vegetation types that have particularly been impacted by these exotics are palmetto prairie, pine flatwoods, wet pine flatwoods, and cypress/pine.

TABLE 2-32
WILDLIFE OBSERVED OR EXPECTED^a TO OCCUR
ON LEE THE COUNTY ENERGY RECOVERY SITE

SCIENTIFIC NAME	COMMON NAME
FISH	
<u>Lepisosteus platyrhincus</u>	Florida Gar ^b
<u>Jordanella floridae</u>	Flagfish
<u>Gambusia affinis</u>	Mosquitofish ^b
AMPHIBIANS	
<u>Bufo quercicus</u>	Oak toad
<u>Bufo terrestris</u>	Southern toad
<u>Acris gryllus dorsalis</u>	Southern cricket frog
<u>Pseudacris nigrita verrucosa</u>	Southern chorus frog
<u>Hyla cinerea cinerea</u>	Green tree frog
<u>Rana areolata aesopus</u>	Gopher frog ^d
<u>Rana sphenoccephala</u>	Southern leopard frog
REPTILES	
<u>Terrapene carolina</u>	Eastern box turtle ^b
<u>Gopherus polyphemus</u>	Gopher tortoise ^d
<u>Eumeces egregius onocrepis</u>	Mole skink
<u>Anolis carolinensis</u>	Green anole
<u>Thamnophis sauritis sackeni</u>	Eastern ribbon snake
<u>Thamnophis sirtalis sirtalis</u>	Eastern garter snake
<u>Diadophis punctatus punctatus</u>	Eastern ringneck snake ^b
<u>Heterodon platyrhinos</u>	Eastern hognose snake
<u>Elaphe guttata guttata</u>	Corn snake
<u>Elaphe obsoleta quadrivittata</u>	Rat snake
<u>Opheodrys aestivus</u>	Rough green snake
<u>Drymarchon corais couperi</u>	Eastern indigo snake ^{e, f}
<u>Coluber constrictor priapus</u>	Southern black racer ^b
<u>Masticophis flagellum flagellum</u>	Eastern coachship snake
<u>Sistrurus miliarius</u>	Pigmy rattlesnake
<u>Crotalus adamanteus</u>	Eastern diamondback
rattlesnake	
BIRDS	
<u>Podilymbus podiceps</u>	Pied-billed grebe
<u>Anhinga anhinga</u>	Anhinga
<u>Nycticorax nycticorax</u>	Black-crowned night heron
<u>Nycticorax violaceus</u>	Yellow-crowned night heron
<u>Butorides striatus</u>	Green-backed heron ^b
<u>Egretta tricolor</u>	Tricolored heron ^{b, d}
<u>Egretta caerulea</u>	Little blue heron ^{b, d}
<u>Bubulcus ibis</u>	Cattle egret ^b
<u>Egretta thula</u>	Snowy egret ^{b, d}

TABLE 2-32
(Continued)

SCIENTIFIC NAME	COMMON NAME
BIRDS	
<u>Casmerodius albus</u>	Great egret ^b
<u>Ardea herodias</u>	Great blue heron ^b
<u>Mycteria americana</u>	Wood stork ^{g, h}
<u>Grus canadensis pratensis</u>	Florida sandhill crane ^f
<u>Anas platyrhynchos</u>	Mallard ^c
<u>Anas strepera</u>	Gadwall ^c
<u>Anas crecca</u>	Green-winged teal ^c
<u>Anas discors</u>	Blue-winged teal ^c
<u>Aix sponsa</u>	Wood duck
<u>Lophodytes cucullatus</u>	Hooded merganser ^c
<u>Aramus guarauna</u>	Limpkin ^d
<u>Gallinula chloropus</u>	Common moorhen
<u>Charadrius vociferus</u>	Killdeer
<u>Gallinago gallinago</u>	Common snipe ^c
<u>Cathartes aura</u>	Turkey vulture ^b
<u>Coragyps atratus</u>	Black vulture
<u>Haliaeetus leucocephalus</u>	Bald eagle ^{f, g}
<u>Elanoides forficatus</u>	American swallow-tailed kite ^{b, c}
<u>Rostrhamus isoclabilis</u>	Snail kite ^{g, h}
<u>Circus cyaneus</u>	Northern harrier ^c
<u>Accipiter striatus</u>	Sharp-shinned hawk ^c
<u>Accipiter cooperii</u>	Cooper's hawk
<u>Buteo lineatus</u>	Red-shouldered hawk
<u>Buteo jamaicensis</u>	Red-tailed hawk
<u>Pandion haliaetus</u>	Osprey
<u>Polyborus plancus audubonii</u>	Audubon's crested caracara ^{e, f}
<u>Falco sparverius</u>	American kestrel
<u>Colinus virginianus</u>	Northern bobwhite ^b
<u>Meleagris gallopavo</u>	Wild turkey ^b
<u>Zenaidura macroura</u>	Mourning dove ^b
<u>Columbina passerina</u>	Common ground-dove ^b
<u>Bubo virginianus</u>	Great horned owl
<u>Strix varia</u>	Barred owl
<u>Otus asio</u>	Eastern screech-owl
<u>Caprimulgus carolinensis</u>	Chuck-will's-widow ^b
<u>Chordeiles minor</u>	Common nighthawk ^{b, c}
<u>Ceryle alcyon</u>	Belted kingfisher
<u>Melanerpes carolinus</u>	Red-bellied woodpecker ^b
<u>Colaptes auratus</u>	Northern flicker ^b
<u>Sphyrapicus varius</u>	Yellow-bellied sapsucker ^c
<u>Picoides pubescens</u>	Downy woodpecker
<u>Dryocopus pileatus</u>	Pileated woodpecker ^b
<u>Tyrannus dominicensis</u>	Grey kingbird ^c
<u>Myiarchus crinitus</u>	Great crested flycatcher ^{b, c}
<u>Tachycineta bicolor</u>	Tree swallow ^c
<u>Cyanocitta cristata</u>	Blue jay
<u>Corvus brachyrhynchos</u>	American crow
<u>Corvus ossifragus</u>	Fish crow ^b

TABLE 2-32
(Continued)

SCIENTIFIC NAME	COMMON NAME
BIRDS	
<u>Parus bicolor</u>	Tufted titmouse
<u>Thryothorus ludovicianus</u>	Carolina wren
<u>Polioptila caerulea</u>	Blue-gray gnatcatcher
<u>Sialia sialis</u>	Eastern bluebird
<u>Turdus migratorius</u>	American robin ^c
<u>Lanius ludovicianus</u>	Loggerhead shrike
<u>Dumetella carolinensis</u>	Gray catbird ^{b, c}
<u>Mimus polyglottos</u>	Northern mockingbird ^b
<u>Toxostoma rufum</u>	Brown thrasher
<u>Bombycilla cedrorum</u>	Cedar waxwing ^c
<u>Sturnus vulgaris</u>	European starling ^b
<u>Vireo griseus</u>	White-eyed vireo ^b
<u>Vireo solitarius</u>	Solitary vireo
<u>Dendroica coronata</u>	Yellow-rumped warbler ^{b, c}
<u>Dendroica pinus</u>	Pine warbler
<u>Dendroica discolor</u>	Prairie warbler
<u>Dendroica palmarum</u>	Palm warbler ^c
<u>Geothlypis trichas</u>	Common yellowthroat
<u>Setophaga ruticilla</u>	American redstart ^{b, c}
<u>Cardinalis cardinalis</u>	Northern cardinal ^b
<u>Pipilo erythrophthalmus</u>	Rufous-sided towhee ^b
<u>Zonotrichia albicollis</u>	White-throated sparrow ^c
<u>Sturnella magna</u>	Eastern meadowlark ^b
<u>Agelaius phoeniceus</u>	Red-winged blackbird ^b
<u>Quiscalus quiscula</u>	Common grackle
<u>Quiscalus major</u>	Boat-tailed grackle
<u>Carduelis tristis</u>	American goldfinch ^c
MAMMALS	
<u>Didelphis marsupialis</u>	Opossum
<u>Dasypus novemcinctus</u>	Nine-banded armadillo ^b
<u>Sylvilagus palustris</u>	Marsh rabbit
<u>Sylvilagus floridanus</u>	Eastern cottontail ^b
<u>Sciurus niger avicennia</u>	Big cypress fox squirrel ^{b, f}
<u>Sciurus niger shermani</u>	Sherman's fox squirrel ^d
<u>Oryzomys palustris</u>	Rice rat
<u>Reithrodontomys humulis</u>	Eastern harvest mouse
<u>Peromyscus gossypinus</u>	Cotton mouse
<u>Sigmodon hispidus</u>	Hispid cotton rat
<u>Procyon lotor</u>	Raccoon ^b
<u>Mephitis mephitis</u>	Striped skunk
<u>Felis concolor coryi</u>	Florida panther ^{g, h}
<u>Lynx rufus</u>	Bobcat
<u>Sus scrofa</u>	Pig
<u>Odocoileus virginianus</u>	White-tailed deer

TABLE 2-32
(Continued)

- ^a Based on distribution maps and range charts, as well as habitat types found on the property.
- ^b Direct sighting of the animal or their sign (tracts, feces, vocalizations, burrow spoils, snake skins, etc.).
- ^c Migratory species that possibly could use the site seasonally or on a stop-over basis.
- ^d Species of Special concern - Florida Game and Fresh Water Fish Commission (FGFWFC)
- ^e Threatened - U.S. Fish and Wildlife Service (USFWS)
- ^f Threatened - FGFWFC
- ^g Endangered - USFWS
- ^h Endangered - FGFWFC

2.3.6 ECOLOGY

Table 2-32 lists the wildlife species observed or expected to occur within the land purchase boundary. The wildlife list sequence is in phylogenetic order from the animals that evolved first to the more complex and advanced animals. This list includes fish, amphibians, reptiles, birds, and mammals. Wildlife species listed as observed were observed by direct sighting of the animal or their sign, such as tracks, feces, vocalizations, burrow spoils, snake skins, etc. Wildlife species listed as expected were based on distribution maps or range charts and habitat types found on the property. Wildlife species were also listed as species of special concern, threatened, or endangered as listed by the U.S. Fish and Wildlife Service (USFWS) or Florida Game and Fresh Water Fish Commission (FGFWFC) (Wood 1989). Other important species such as those listed as game, fur bearers, or freshwater game fish in Florida Administrative Code Rule 39-1 are discussed in the text below.

A total of 126 wildlife species were listed for the site. Only 39 species or 31.0 percent of the total list were observed on the site. Of the total species listed for the site there were 3, 7, 16, 82, and 16 species of fish, amphibians, reptiles, birds, and mammals, respectively. Only 2 fish, 0 amphibians, 3 reptiles, 30 birds, and 4 mammals were observed on the site. This is extremely low when one considers the variety of habitats (see Section 2.3.5, Vegetation/Land Use) and number of hours of wildlife observation on the site. For example, there were 17 different vegetation types mapped for the site that included forested, shrub, and herbaceous vegetation, as well as uplands and wetlands. Also, more than 100 hours of observations were made between four ecologists on the site for wildlife species during March and April 1990. These observations were made either during actual wildlife surveys or vegetation mapping. The low number of observed species (low species richness) is most likely due to the poor condition of the habitats on the site caused by previous overgrazing by cattle, logging, and drainage practices. Furthermore, the wetlands on the site, such as the cypress habitats, were dry due to the existing drought conditions and the dry season during the time of wildlife surveys. Also, no nocturnal wildlife surveys were made. However, despite the low species

richness, there were moderate numbers of game birds such as wild turkey (Melagris gallopavo), mourning dove (Zenaida macroura), and northern bobwhite (Colinus virginianus). These game birds were observed on or adjacent to the site along the north-south power line easement.

Important wildlife species observed on the site were limited. Several wildlife surveys were conducted for the purpose of locating listed and other important wildlife species. Only one sighting was made of the tricolored heron (Egretta tricolor), little blue heron (Egretta caerulea), and snowy egret (Egretta thula). All three of these species are listed as species of special concern by the FGFWFC (Wood, 1989). The species of special concern status indicates a species that is not in immediate danger of extinction, but which could eventually become threatened or endangered. The Florida sandhill crane (Grus canadensis pratensis) and wood stork (Mycteria americana) are listed as threatened and endangered, respectively, by the FGFWFC. The wood stork is also listed as endangered by the USFWS (Wood, 1989). These species have been observed feeding in suitable habitats within a five-mile radius of the site. It is possible that these species may occasionally be observed on the site.

The bald eagle (Haliaeetus leucocephalus) is listed as endangered by both the FGFWFC and the USFWS (Wood 1989). It has not been observed on the site, but occasionally has been observed flying over the site (Higginbotham 1990). All suitable habitats for eagle nesting and roosting were extensively groundtruthed for eagle nests and eagles, and none were found. There are two eagle nests located within five miles of the site (Erwin 1990, Dryden 1990, and Mraz 1990) (see Figure 2-27). These eagle nests are located in Section 26, Township 44S, Range 25E (eagle nest LE37) and Section 2, Township 45S, Range 25E (eagle nest LE31), Lee County, Florida. Eagle nest LE37 was active in 1989 and not active in 1990, while eagle nest LE31 was active in 1990 and not active in 1989 (Mraz, 1990). Rick Mraz of Lee County thinks that the eagle pair from LE37 has relocated to LE31. The energy recovery facility site is well out of potential primary zones (750 feet) and secondary zones (1,500 feet) for these eagle nests. According to Kim Dryden (FGFWFC), eagle management plans have not been developed for

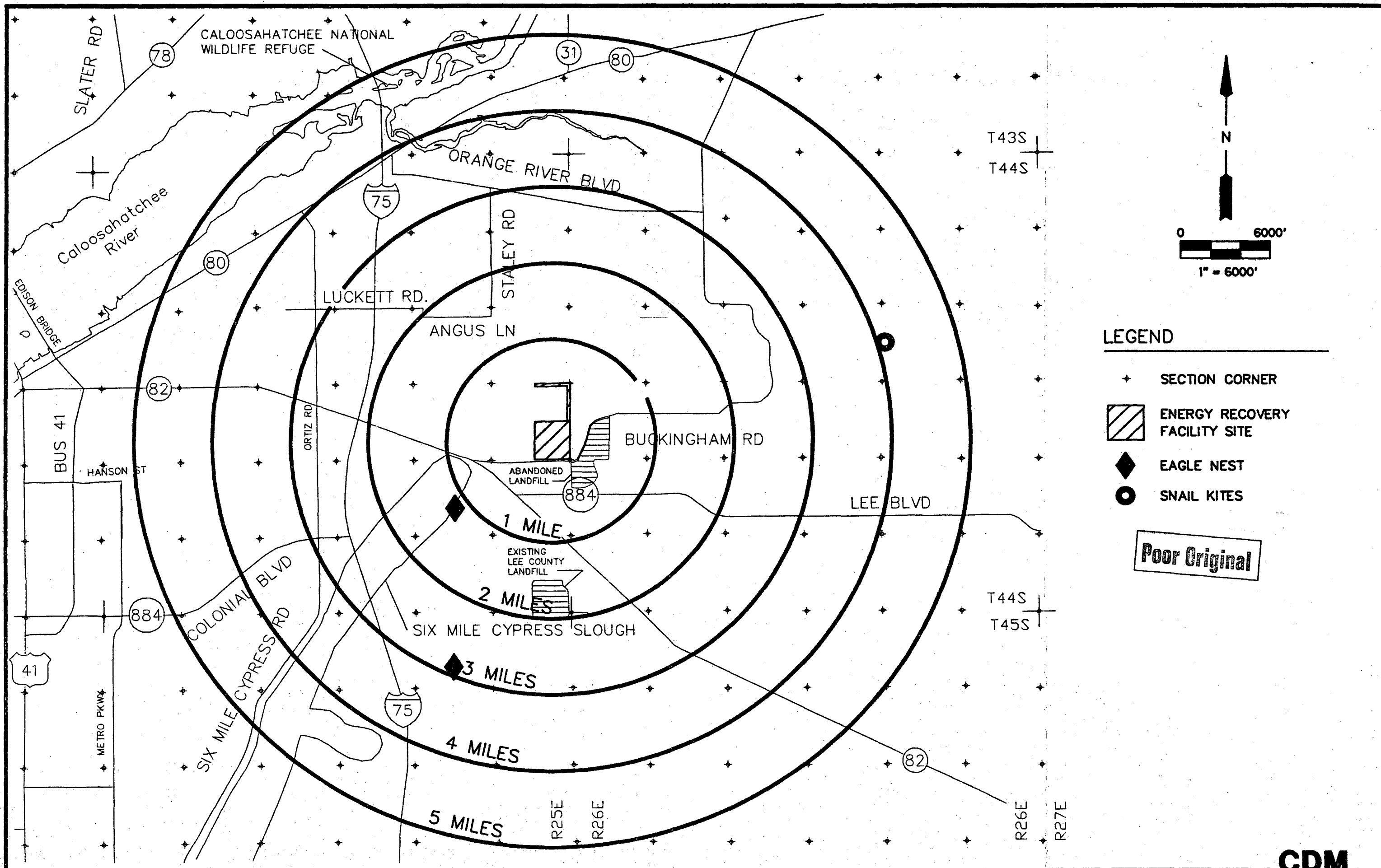
these eagle nests. Furthermore, the feeding flight paths for the eagle nests are toward the existing sanitary landfill, away from the Lee County Facility site; the landfill is several miles to the south of the site.

Audubon's crested caracara (Polyborus plancus audubonii) is listed as threatened by both the FGFWFC and USFWS (Wood, 1989). Four Audubon's crested caracara's were observed within a five-mile radius of the site on February 13, 1990 (Monfort, 1990). Old (15 years ago) sitings of these birds were made in the vicinity of Colonial Boulevard when favorable habitat existed (Dryman, 1990). However, this habitat has slowly degraded due to the invasion of melaleuca. The Audubon's crested caracara prefers large cabbage palm and open space habitats. These type of habitats do not exist on the site. There is a large open area to the west associated with the north-south power line easement, and this species could occasionally use this area as a stop-over. However, the Audubon's crested caracara is not expected to use the site.

Burrowing owls (Athene cunicularia) are listed as species of special concern by the FGFWFC (Wood, 1990). The Florida scrub jay (Aphelocoma coerulescens coerulescens) is listed as threatened by the FGFWFC and the USFWS (Wood, 1990). The results of the wildlife survey indicate that burrowing owls and scrub jays do not exist on the site due to the lack of suitable habitat. According to Kim Dryden of the FGFWFC (1990), scrub jay habitat (oak scrub) does exist along Buckingham Road; however, oak scrub habitat does not exist on the site. She also has had reports of burrowing owls and scrub jays in Lehigh Acres, but she has not confirmed these reports. These species and their favored habitats were not observed on the site.

Red-cockaded woodpeckers (Picoides borealis) are listed as threatened and endangered by the FGFWFC and USFWS, respectively (Wood, 1990). Suitable red-cockaded woodpecker habitat does not exist on the site. The pine flatwood (411) and transitional pine (415) have been heavily logged over the last $\pm$ 20 years removing most of the mature pine favored by these birds for nesting, cavities, and foraging. Also, these habitats have been invaded by the problematic melaleuca with many of these trees being greater than 15 feet tall. This also makes these habitats unsuitable for the

ACAD FILE: CJ5MILE.DWG 06/19/90



Endangered Species Habitat Within a Five-Mile Radius - Lee County Energy Recovery Facility

red-cockaded woodpecker. Several clans of red-cockaded woodpeckers exist within a five-mile radius of the site, however, due to the lack of suitable habitat on the site for foraging and nesting, the birds will most likely remain to the south of the project site.

The gopher tortoise (Gopherus polyphemus) is listed as a species of special concern by the FGFWFC (Wood, 1989). Habitat for the gopher tortoise does exist on the site; however, surveys for the gopher tortoise revealed no burrows or other signs of the gopher tortoise. Commensal species of the gopher tortoise are the gopher frog (Rana aerolata aesopus) and eastern indigo snake (Drymarchon corais couperi). The gopher frog is listed as a species of special concern by the FGFWFC (Wood, 1990). The eastern indigo snake is listed as threatened by both the FGFWFC and USFWS (Wood, 1990). These two listed species most likely do not occupy the site due to the lack of habitat (i.e., gopher tortoise burrows). Kim Dryden has reports of gopher tortoises along the Orange and Caloosahatchee River corridors, but they have not been mapped. She also has reports of gopher tortoises in Lehigh Acres area.

The snail kite (Roskhamus sociabilis) is listed as endangered by both FGFWFC and USFWS. Although no snail kites have been observed on site, this species has been observed within a five-mile radius. A resident population of snail kite has been reported by Catherine Hultgren of Lee County, approximately four miles east of the project site. Available habitat for this species on-site, however, is small (less than 40 acres and of poor quality) (Figure 2-27).

The big cypress fox squirrel (Sciurus niger avicennia) is listed as threatened by the FGFWFC (Wood, 1990). Two big cypress fox squirrels may have been observed on the site: one in March 1990 and one in April 1990. It is very difficult to differentiate between the phenotypes of the big cypress fox squirrel and Sherman's fox squirrel (Sciurus niger shermani). According to Kim Dryden of the FGFWFC (1990), the big cypress fox squirrel is found on the south side of the Caloosahatchee River, while the Sherman's fox squirrel is found on the north side of the Caloosahatchee River. Since

the land purchase is on the south side of the Caloosahatchee River, the fox squirrels observed are most likely the big cypress fox squirrel. A positive identification, however, could not be made on either observation.

The Florida panther (Felis concolor coryi) is listed as endangered by both the FGFWFC and USFWS (Wood 1990). Kim Dryden, of the Florida Game and Freshwater Fish Commission, has stated that the proposed land to be purchased is presently in the travel corridor of a young Florida panther (see map provided with Kim Dryden's letter, Appendix 8.0). Available habitat of pine flatwoods (411) on the site for the Florida panther is small, about 17.9 acres or 11.6 percent of the property, and these areas will not be disturbed by the energy recovery facility location.

Observed mammals on this site which can be considered game animals or fur bearers (Julie Hovis, 1990) are the eastern cottontail (Sylvilagus floridanus), and raccoon (Procyon lotor). Other species that may also be found on the site are white-tailed deer (Odocoileus virginianus), pig (Sus serofa), bobcat (Lynx rufus), striped skunk (Mephitis mephitis), opossum (Didelphis marsupialis), and marsh rabbit (Sylvilagus palustris).

Species-Environmental Relationships

There are no species present within the boundary of the Facility site that are endemic or unique to this site. The species and habitats on the site are common to the Lee County and southwest Florida areas.

Based upon an extensive evaluation during various field surveys, the site appears to have been heavily impacted by drainage, logging, and cattle grazing, and offers few areas of prime habitat for wildlife. The site has also been extensively invaded by exotic tree species, reducing vegetation diversity and offering few habitat niches for feeding and reproduction.

Of the species observed on the site, four species of wildlife are listed as species of special concern with FGFWFC including the tricolored heron (Egrett tricolor), the snowy egret (Egretta thula), the little blue heron (Egretta caerulea) and perhaps the big cypress fox squirrel (Sciurus niger avicennia). The snowy egret, tricolored heron, and the little blue heron

primarily utilize wetland areas on the site. These areas are of low quality due to hydrologic changes caused by on-site drainage and the recent drought. The proposed Facility would have a minimal affect on these wetland areas; in fact, protection of the buffer areas surrounding the site would probably improve these wetland areas for the feeding and reproduction of these birds.

The big cypress fox squirrel prefers areas of open pinelands, dry cypress strands, and coastal broad leaf tropical evergreen hammocks (Brown, 1973). This squirrel is rarely found in areas of thick understory and is most abundant in areas of mature pines. This species feeds on seeds, nuts, fruits and buds of many natural south Florida plants (Brown, 1973). Development of the Facility site by Lee County may provide an improved habitat for the big cypress fox squirrel by protecting upland and wetland habitats from overgrazing by cattle and logging practices.

Pre-Existing Stresses

Pre-existing environmental stresses within the Lee County Facility site boundary are evident. During the past 20 years the site has been extensively grazed by cattle. This grazing activity has stressed vegetation and plant communities in the area.

Prior to grazing, the site was logged and drained. These logging activities removed the majority of mature pine trees and associated pine habitat, making this area unsuitable for some species of wildlife such as the red-cockaded woodpecker (Picoides borealis) which is listed as threatened and endangered by the FGFWFC and USFWS, respectively.

Environmental stresses due to drainage are also evident. Changes in the area's hydrology have stressed and reduced areas of wetlands. In addition, exotic plant species, such as Brazilian pepper (Schinus terebinthifolius) and melaleuca, are abundant on the site as a result of these drainage practices.

Measurement Programs

All major upland and wetland vegetation associations on-site were delineated on recent 1" = 200' aerial photographs and groundtruthed. Groundtruthing was conducted by a trained ecologist to ensure the accuracy and completeness of the mapping effort. Habitats were categorized using the Florida Land Use, Cover and Forms Classification System (FLUCFCS), Levels III and IV. The acreage of each individual FLUCFCS mapping unit is calculated and depicted on the vegetation map (Figure 2-26).

Wildlife surveys were conducted by three trained ecologists walking parallel, overlapping belt transects which were approximately 50 feet apart, through all the suitable habitat to ensure 100 percent visual coverage. Observer hours for this survey totaled more than 100 hours, with species identified by direct observation, song or call, scats, tracks, burrows or nest sites, and skeletal remains. Individual habitat types were extensively surveyed in this manner for all species listed as species of special concern, and threatened or endangered species. The manuals used as ecological or taxonomic guides are listed in the reference section of this document. All methods used in this study are in agreement with Lee County Ordinance No. 89-34 as amended by KLECE, 1990. Study methodologies are detailed in Appendix 12.0.

2.3.7 METEOROLOGY AND AMBIENT AIR QUALITY

Meteorology

The Lee County energy recovery facility will be located in Lee County which is on the west coast of southern Florida. The climate of this region is influenced by the surrounding waters, since no part of Florida is more than 70 miles from salt water. Interior topography ranges from 100 to 200 feet above mean sea level. Summers are long, warm, and relatively humid. Summer temperatures are similar throughout the state. Winters are mild, punctuated by periods of cool to cold air. Temperatures in the northern part of the state average 13°F cooler than in the south. The prevailing winds are from the east, particularly in the southern portion of the state.

Elsewhere land/sea breeze effects and convectional forces inland make prevailing winds erratic. Rainfall is distributed throughout the year with the four-month period from June to September receiving slightly more rain. Precipitation is usually in the form of local showers and thundershowers. Occasionally, tropical storms produce substantial amounts of rain over large areas. Climatological data from Page Field Airport in Fort Myers is presented in Table 2-33.

Atmospheric Dispersion

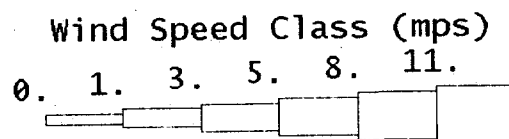
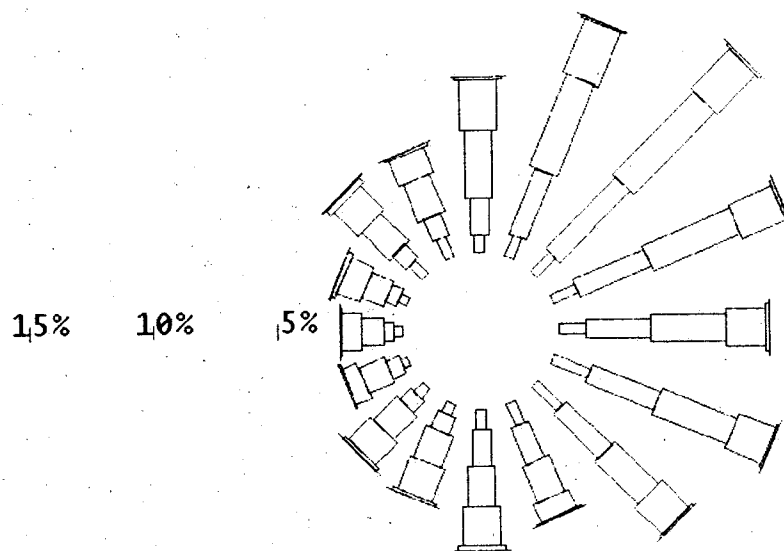
Atmospheric factors that aggravate pollution rarely occur at any specific location in Florida. Air is usually sufficiently unstable to disperse pollutants, as demonstrated by the frequent convective development. The easterly winds sweep across the peninsula, particularly in the south. Five years of sequential meteorological data were used (1982 to 1986) for the air quality dispersion modeling analysis contained in the Prevention of Significant Deterioration (PSD) permit application (see Volume III - Air Quality). The principal parameters which affect stack plume dispersion are wind speed, wind direction, atmospheric stability, temperature, and mixing heights.

Wind speed data for the five-year period have been organized into six wind speed categories, distributed over the 16 wind direction sectors, and displayed in a wind rose plot showing annual average, seasonal, and diurnal variations. The frequency of occurrence of a particular wind speed class in a particular wind direction as plotted on the wind rose is proportional to the size of the telescope segment. As shown in Figure 2-28, the prevailing wind direction is from the northeast. Wind speeds of one to five meters per second (2 to 11 miles per hour) occur most frequently from this direction. Other wind direction maxima are the north/northeast and the east/northeast. Wind speeds in the one to five meters per second (2 to 11 miles per hour) class most frequently prevail from these directions. Figure 2-29 shows the location of the site and prevailing wind direction relative to surrounding communities.

Seasonal wind patterns are displayed on Figure 2-30. Winter winds are predominantly from the north/northeast through north/northwest directions,

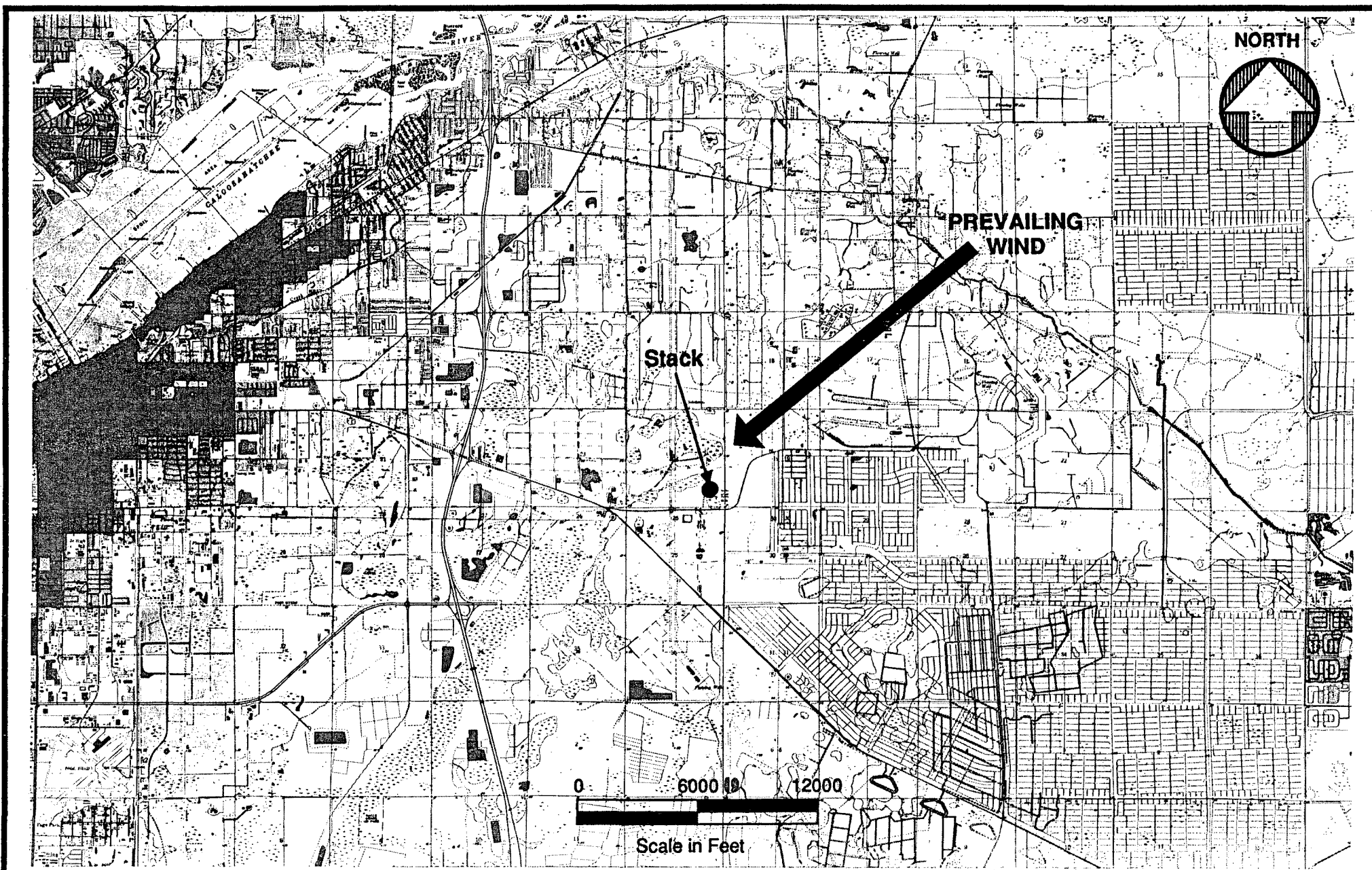
**WIND SPEED AND DIRECTION ROSE
FIVE-YEAR AVERAGE
LEE COUNTY ENERGY RECOVERY FACILITY**

SITE 01 FROM 01/01/82 TO 12/31/86



Poor Original

Readings taken at Page Field Airport, Fort Myers, Florida.



LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Certification
Camp Dresser & McKee Inc.

Poor Original

FIGURE 2-29

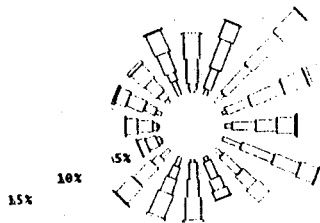
AREA MAP WITH PREVAILING WIND DIRECTION (1982-1986)

SEASONAL WIND SPEED AND DIRECTION ROSES^a (1982-1986) LEE COUNTY ENERGY RECOVERY FACILITY

WINTER SEASON:

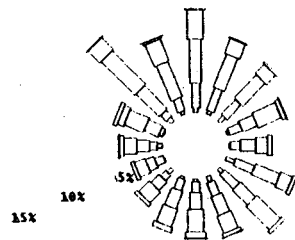
SITE 01 FROM 01/02/82 TO 03/31/82

WIND SPEED AND DIRECTION ROSE



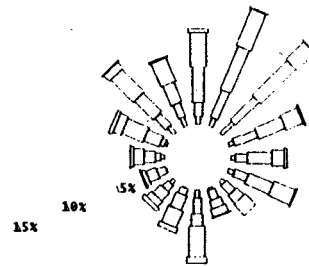
SITE 01 FROM 01/01/83 TO 03/31/83

WIND SPEED AND DIRECTION ROSE



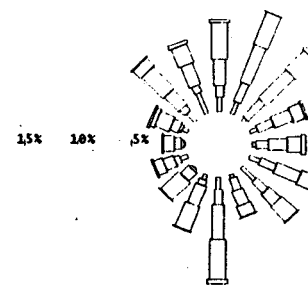
SITE 01 FROM 01/01/84 TO 03/31/84

WIND SPEED AND DIRECTION ROSE



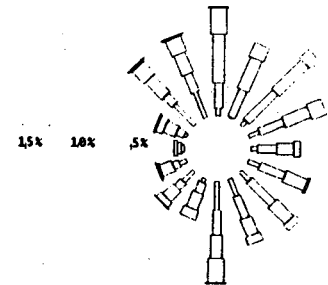
SITE 01 FROM 01/01/85 TO 03/31/85

WIND SPEED AND DIRECTION ROSE



SITE 01 FROM 01/01/86 TO 03/31/86

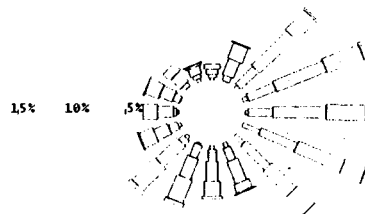
WIND SPEED AND DIRECTION ROSE



SPRING SEASON:

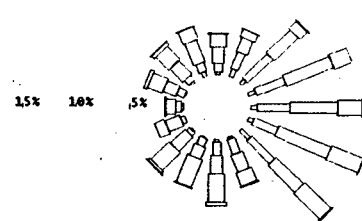
SITE 01 FROM 04/01/82 TO 06/30/82

WIND SPEED AND DIRECTION ROSE



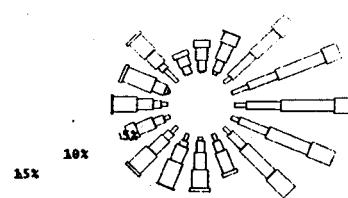
SITE 01 FROM 04/01/83 TO 06/30/83

WIND SPEED AND DIRECTION ROSE



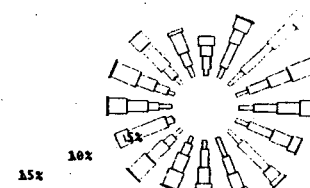
SITE 01 FROM 04/01/84 TO 06/30/84

WIND SPEED AND DIRECTION ROSE



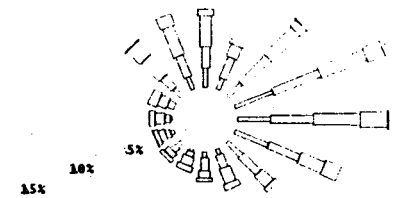
SITE 01 FROM 04/01/85 TO 06/30/85

WIND SPEED AND DIRECTION ROSE

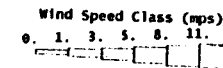
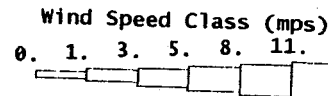


SITE 01 FROM 04/01/86 TO 06/30/86

WIND SPEED AND DIRECTION ROSE



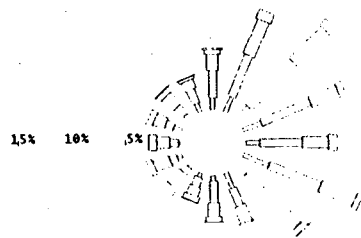
Poor Original



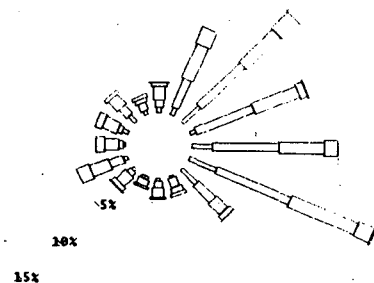
SEASONAL WIND SPEED AND DIRECTION ROSES^a (1982-1986) LEE COUNTY ENERGY RECOVERY FACILITY (continued)

SUMMER SEASON:

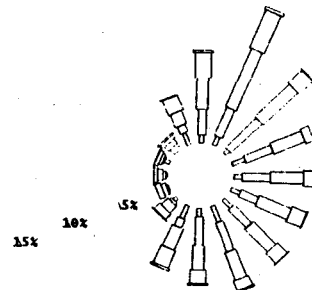
SITE 01 FROM 07/01/82 TO 09/30/82
WIND SPEED AND DIRECTION ROSE



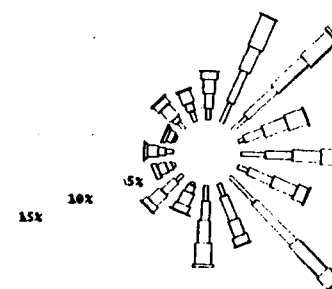
SITE 01 FROM 07/02/83 TO 09/30/83
WIND SPEED AND DIRECTION ROSE



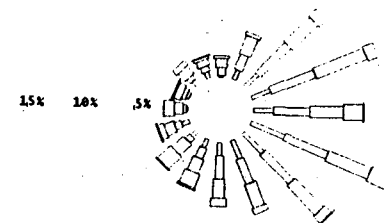
SITE 01 FROM 07/01/84 TO 09/30/84
WIND SPEED AND DIRECTION ROSE



SITE 01 FROM 07/05/85 TO 09/30/85
WIND SPEED AND DIRECTION ROSE

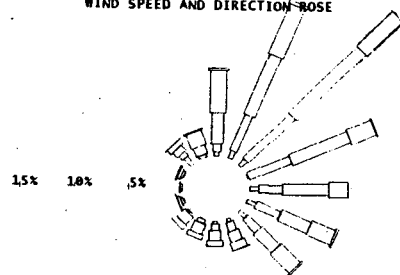


SITE 01 FROM 07/01/86 TO 09/30/86
WIND SPEED AND DIRECTION ROSE

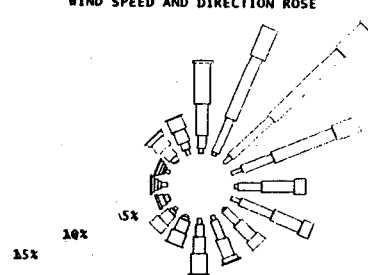


FALL SEASON:

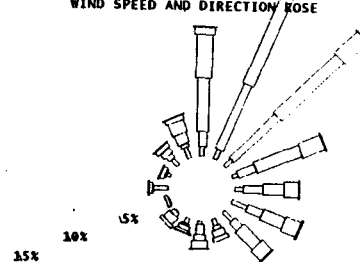
SITE 01 FROM 10/01/82 TO 12/31/82
WIND SPEED AND DIRECTION ROSE



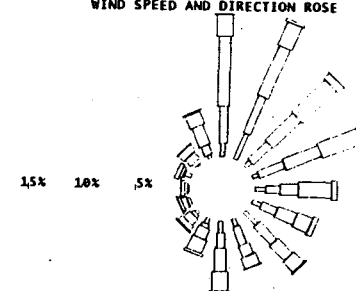
SITE 01 FROM 10/01/83 TO 12/31/83
WIND SPEED AND DIRECTION ROSE



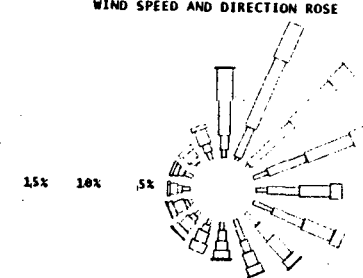
SITE 01 FROM 10/02/84 TO 12/31/84
WIND SPEED AND DIRECTION ROSE



SITE 01 FROM 10/01/85 TO 12/31/85
WIND SPEED AND DIRECTION ROSE



SITE 01 FROM 10/01/86 TO 12/31/86
WIND SPEED AND DIRECTION ROSE



Poor Original

Wind Speed Class (mps)
0 1 3 5 8 11

^a Readings taken at Page Field Airport, Fort Myers, Florida.

primarily utilize wetland areas on the site. These areas are of low quality due to hydrologic changes caused by on-site drainage and the recent drought. The proposed Facility would have a minimal affect on these wetland areas; in fact, protection of the buffer areas surrounding the site would probably improve these wetland areas for the feeding and reproduction of these birds.

The big cypress fox squirrel prefers areas of open pinelands, dry cypress strands, and coastal broad leaf tropical evergreen hammocks (Brown, 1973). This squirrel is rarely found in areas of thick understory and is most abundant in areas of mature pines. This species feeds on seeds, nuts, fruits and buds of many natural south Florida plants (Brown, 1973). Development of the Facility site by Lee County may provide an improved habitat for the big cypress fox squirrel by protecting upland and wetland habitats from overgrazing by cattle and logging practices.

Pre-Existing Stresses

Pre-existing environmental stresses within the Lee County Facility site boundary are evident. During the past 20 years the site has been extensively grazed by cattle. This grazing activity has stressed vegetation and plant communities in the area.

Prior to grazing, the site was logged and drained. These logging activities removed the majority of mature pine trees and associated pine habitat, making this area unsuitable for some species of wildlife such as the red-cockaded woodpecker (Picoides borealis) which is listed as threatened and endangered by the FGFWFC and USFWS, respectively.

Environmental stresses due to drainage are also evident. Changes in the area's hydrology have stressed and reduced areas of wetlands. In addition, exotic plant species, such as Brazilian pepper (Schinus terebinthifolius) and melaleuca, are abundant on the site as a result of these drainage practices.

richness, there were moderate numbers of game birds such as wild turkey (Melagris gallopavo), mourning dove (Zenaida macroura), and northern bobwhite (Colinus virginianus). These game birds were observed on or adjacent to the site along the north-south power line easement.

Important wildlife species observed on the site were limited. Several wildlife surveys were conducted for the purpose of locating listed and other important wildlife species. Only one sighting was made of the tricolored heron (Egretta tricolor), little blue heron (Egretta caerulea), and snowy egret (Egretta thula). All three of these species are listed as species of special concern by the FGFWFC (Wood, 1989). The species of special concern status indicates a species that is not in immediate danger of extinction, but which could eventually become threatened or endangered. The Florida sandhill crane (Grus canadensis pratensis) and wood stork (Mycteria americana) are listed as threatened and endangered, respectively, by the FGFWFC. The wood stork is also listed as endangered by the USFWS (Wood, 1989). These species have been observed feeding in suitable habitats within a five-mile radius of the site. It is possible that these species may occasionally be observed on the site.

The bald eagle (Haliaeetus leucocephalus) is listed as endangered by both the FGFWFC and the USFWS (Wood 1989). It has not been observed on the site, but occasionally has been observed flying over the site (Higginbotham 1990). All suitable habitats for eagle nesting and roosting were extensively groundtruthed for eagle nests and eagles, and none were found. There are two eagle nests located within five miles of the site (Erwin 1990, Dryden 1990, and Mraz 1990) (see Figure 2-27). These eagle nests are located in Section 26, Township 44S, Range 25E (eagle nest LE37) and Section 2, Township 45S, Range 25E (eagle nest LE31), Lee County, Florida. Eagle nest LE37 was active in 1989 and not active in 1990, while eagle nest LE31 was active in 1990 and not active in 1989 (Mraz, 1990). Rick Mraz of Lee County thinks that the eagle pair from LE37 has relocated to LE31. The energy recovery facility site is well out of potential primary zones (750 feet) and secondary zones (1,500 feet) for these eagle nests. According to Kim Dryden (FGFWFC), eagle management plans have not been developed for

Measurement Programs

All major upland and wetland vegetation associations on-site were delineated on recent 1" = 200' aerial photographs and groundtruthed. Groundtruthing was conducted by a trained ecologist to ensure the accuracy and completeness of the mapping effort. Habitats were categorized using the Florida Land Use, Cover and Forms Classification System (FLUCFCS), Levels III and IV. The acreage of each individual FLUCFCS mapping unit is calculated and depicted on the vegetation map (Figure 2-26).

Wildlife surveys were conducted by three trained ecologists walking parallel, overlapping belt transects which were approximately 50 feet apart, through all the suitable habitat to ensure 100 percent visual coverage. Observer hours for this survey totaled more than 100 hours, with species identified by direct observation, song or call, scats, tracks, burrows or nest sites, and skeletal remains. Individual habitat types were extensively surveyed in this manner for all species listed as species of special concern, and threatened or endangered species. The manuals used as ecological or taxonomic guides are listed in the reference section of this document. All methods used in this study are in agreement with Lee County Ordinance No. 89-34 as amended by KLECE, 1990. Study methodologies are detailed in Appendix 12.0.

2.3.7 METEOROLOGY AND AMBIENT AIR QUALITY

Meteorology

The Lee County energy recovery facility will be located in Lee County which is on the west coast of southern Florida. The climate of this region is influenced by the surrounding waters, since no part of Florida is more than 70 miles from salt water. Interior topography ranges from 100 to 200 feet above mean sea level. Summers are long, warm, and relatively humid. Summer temperatures are similar throughout the state. Winters are mild, punctuated by periods of cool to cold air. Temperatures in the northern part of the state average 13°F cooler than in the south. The prevailing winds are from the east, particularly in the southern portion of the state.

Elsewhere land/sea breeze effects and convectional forces inland make prevailing winds erratic. Rainfall is distributed throughout the year with the four-month period from June to September receiving slightly more rain. Precipitation is usually in the form of local showers and thundershowers. Occasionally, tropical storms produce substantial amounts of rain over large areas. Climatological data from Page Field Airport in Fort Myers is presented in Table 2-33.

Atmospheric Dispersion

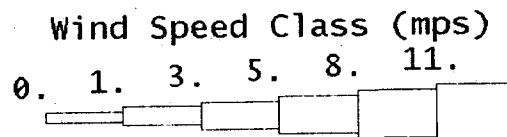
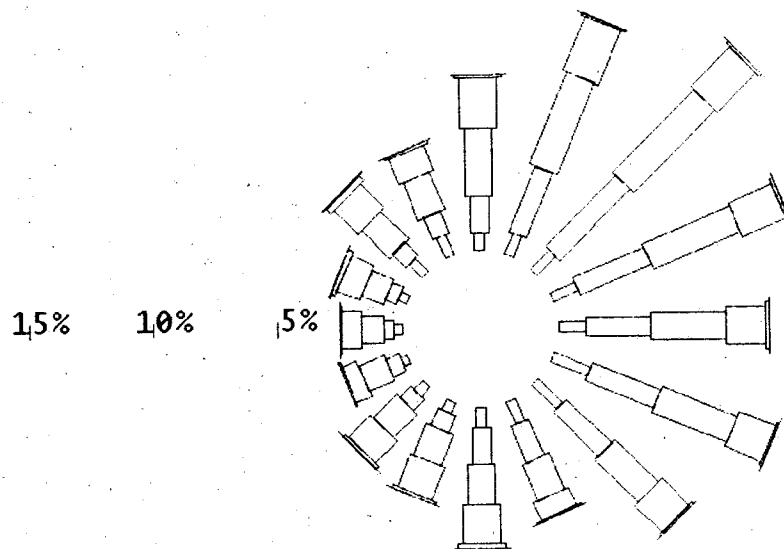
Atmospheric factors that aggravate pollution rarely occur at any specific location in Florida. Air is usually sufficiently unstable to disperse pollutants, as demonstrated by the frequent convective development. The easterly winds sweep across the peninsula, particularly in the south. Five years of sequential meteorological data were used (1982 to 1986) for the air quality dispersion modeling analysis contained in the Prevention of Significant Deterioration (PSD) permit application (see Volume III - Air Quality). The principal parameters which affect stack plume dispersion are wind speed, wind direction, atmospheric stability, temperature, and mixing heights.

Wind speed data for the five-year period have been organized into six wind speed categories, distributed over the 16 wind direction sectors, and displayed in a wind rose plot showing annual average, seasonal, and diurnal variations. The frequency of occurrence of a particular wind speed class in a particular wind direction as plotted on the wind rose is proportional to the size of the telescope segment. As shown in Figure 2-28, the prevailing wind direction is from the northeast. Wind speeds of one to five meters per second (2 to 11 miles per hour) occur most frequently from this direction. Other wind direction maxima are the north/northeast and the east/northeast. Wind speeds in the one to five meters per second (2 to 11 miles per hour) class most frequently prevail from these directions. Figure 2-29 shows the location of the site and prevailing wind direction relative to surrounding communities.

Seasonal wind patterns are displayed on Figure 2-30. Winter winds are predominantly from the north/northeast through north/northwest directions,

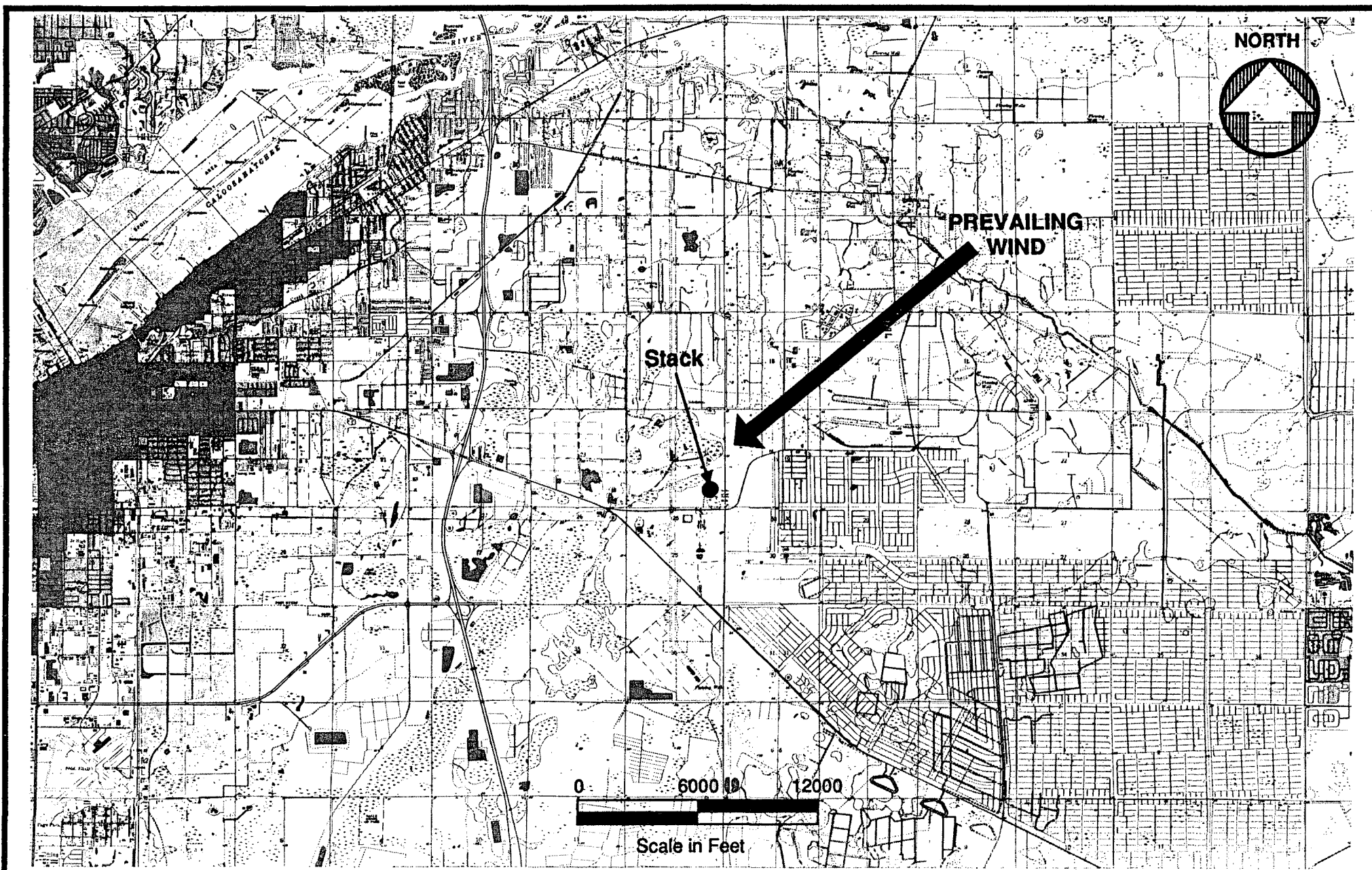
**WIND SPEED AND DIRECTION ROSE
FIVE-YEAR AVERAGE
LEE COUNTY ENERGY RECOVERY FACILITY**

SITE 01 FROM 01/01/82 TO 12/31/86



Poor Original

Readings taken at Page Field Airport, Fort Myers, Florida.



LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Certification
Camp Dresser & McKee Inc.

Poor Original

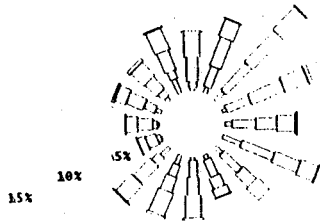
FIGURE 2-29

AREA MAP WITH PREVAILING WIND DIRECTION (1982-1986)

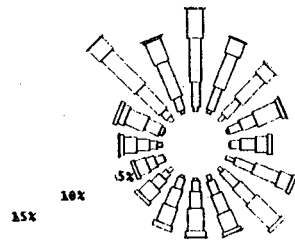
SEASONAL WIND SPEED AND DIRECTION ROSES^a (1982-1986) LEE COUNTY ENERGY RECOVERY FACILITY

WINTER SEASON:

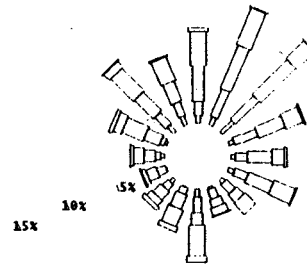
SITE 01 FROM 01/02/82 TO 03/31/82
WIND SPEED AND DIRECTION ROSE



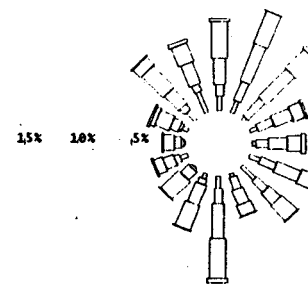
SITE 01 FROM 01/01/83 TO 03/31/83
WIND SPEED AND DIRECTION ROSE



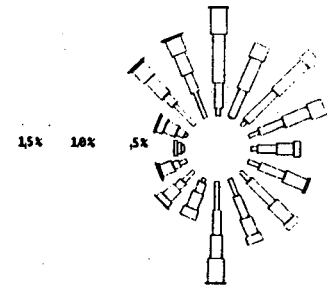
SITE 01 FROM 01/01/84 TO 03/31/84
WIND SPEED AND DIRECTION ROSE



SITE 01 FROM 01/01/85 TO 03/31/85
WIND SPEED AND DIRECTION ROSE

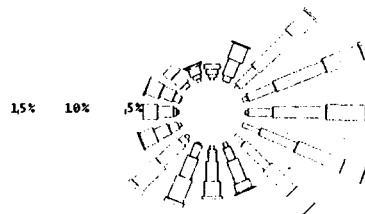


SITE 01 FROM 01/01/86 TO 03/31/86
WIND SPEED AND DIRECTION ROSE

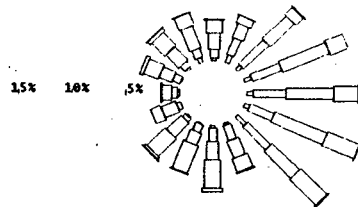


SPRING SEASON:

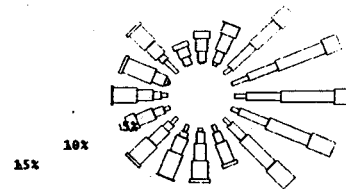
SITE 01 FROM 04/01/82 TO 06/30/82
WIND SPEED AND DIRECTION ROSE



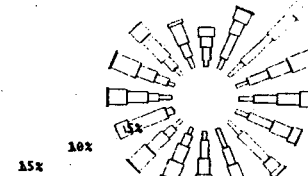
SITE 01 FROM 04/01/83 TO 06/30/83
WIND SPEED AND DIRECTION ROSE



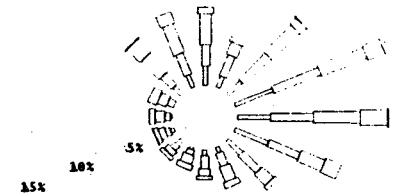
SITE 01 FROM 04/01/84 TO 06/30/84
WIND SPEED AND DIRECTION ROSE



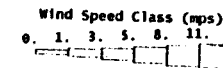
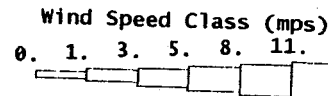
SITE 01 FROM 04/01/85 TO 06/30/85
WIND SPEED AND DIRECTION ROSE



SITE 01 FROM 04/01/86 TO 06/30/86
WIND SPEED AND DIRECTION ROSE



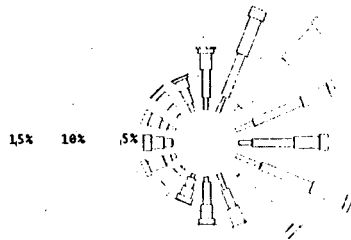
Poor Original



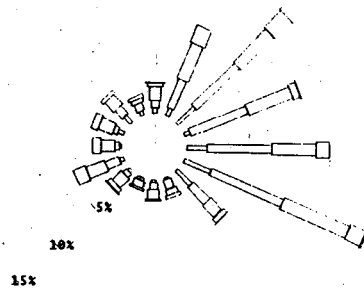
SEASONAL WIND SPEED AND DIRECTION ROSES^a (1982-1986) LEE COUNTY ENERGY RECOVERY FACILITY (continued)

SUMMER SEASON:

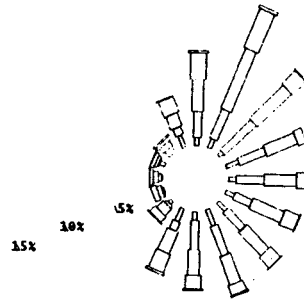
SITE 01 FROM 07/01/82 TO 09/30/82
WIND SPEED AND DIRECTION ROSE



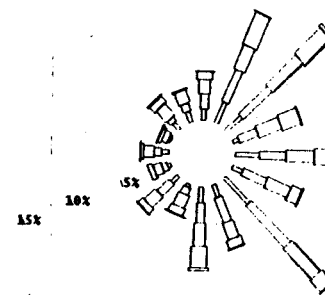
SITE 01 FROM 07/02/83 TO 09/30/83
WIND SPEED AND DIRECTION ROSE



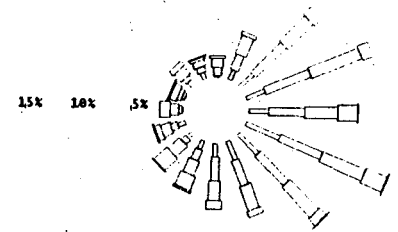
SITE 01 FROM 07/01/84 TO 09/30/84
WIND SPEED AND DIRECTION ROSE



SITE 01 FROM 07/05/85 TO 09/30/85
WIND SPEED AND DIRECTION ROSE

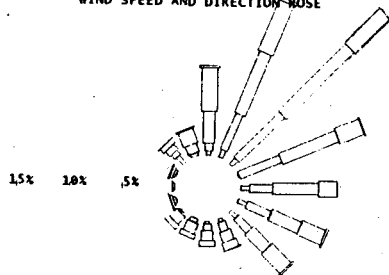


SITE 01 FROM 07/01/86 TO 09/30/86
WIND SPEED AND DIRECTION ROSE

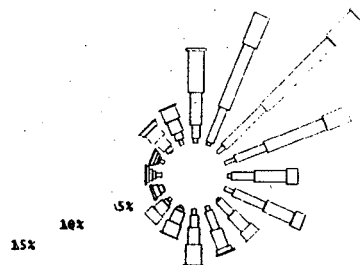


FALL SEASON:

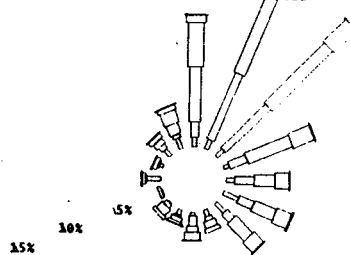
SITE 01 FROM 10/01/82 TO 12/31/82
WIND SPEED AND DIRECTION ROSE



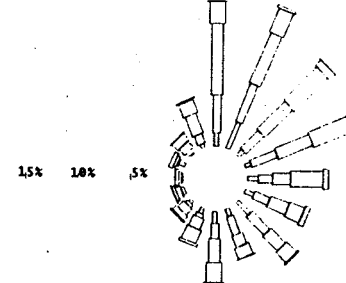
SITE 01 FROM 10/01/83 TO 12/31/83
WIND SPEED AND DIRECTION ROSE



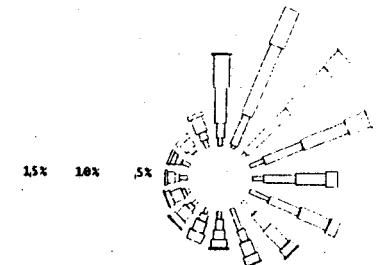
SITE 01 FROM 10/02/84 TO 12/31/84
WIND SPEED AND DIRECTION ROSE



SITE 01 FROM 10/01/85 TO 12/31/85
WIND SPEED AND DIRECTION ROSE



SITE 01 FROM 10/01/86 TO 12/31/86
WIND SPEED AND DIRECTION ROSE



Poor Original

Wind Speed Class (mps)
0. 1. 3. 5. 8. 11.

^a Readings taken at Page Field Airport, Fort Myers, Florida.

TABLE 2 -33

NORMALS, MEANS, AND EXTREMES PAGE FIELD AIRPORT, FORT MYERS

FORT MYERS, FL

PAGE FIELD

EASTERN

26° 35' N

81° 52' W

15 FT

Month	Temperatures °F							Normal Degree days Base 65 °F		Precipitation in inches										Relative humidity pct.				Wind				Pct. of possible sunshine	Mean sky cover, tenths, average to sunset	Mean number of days										Average station pressure mb.																																																																																																																																																																																																																																																																																																																																																					
	Normal			Extremes						Water equivalent					Snow, ice pellets					Hour	Hour	Hour	Hour	Mean speed m.p.h.	Prevailing direction	Fastest mile				Survive to sunset	Precipitation Precipitation .01 inch or more	Snow, ice pellets 1.0 inch or more	Thunderstorms	Heavy fog, visibility 1/2 mile or less	Temperatures °F																																																																																																																																																																																																																																																																																																																																																										
	Daily maximum	Daily minimum	Monthly	Record highest	Year	Record lowest	Year	Normal	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Maximum monthly	Year	Maximum in 24 hrs.	Year	Speed m.p.h.							Direction	Year								Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy	Cloudy	Clear	Partly cloudy</

with a smaller component from the southeast. Westerly winds are slight. The average winter wind speed is at its strongest at three to eight meters per second (7 to 18 miles per hour). The westerly wind peaks in the spring, but its frequency is still small compared to winds from other directions. The largest wind component is from the east. Average easterly wind speed tends to be lighter than the westerly winds. Summer winds are predominantly at one to five meters per second (2 to 11 miles per hour) in the eastern quadrant. Westerly winds diminish. In the fall, winds are likely from the northeast and, to a lesser degree, from the east through the southeast. Westerly winds are at a minimum.

Diurnal wind direction roses are presented in Attachment B of Volume III - Air Quality. In the five-year average diurnal wind direction distribution, the south/southwest through west/southwest directions and the northwest show a diurnal pattern. This pattern shows a maximum frequency of occurrence of these directions during the mid-afternoon and a minimum frequency during the early morning hours. The southwest sector is influenced by the Gulf of Mexico although the airport is several kilometers inland. The northwest pattern may indicate the influence of the Caloosahatchee River to some degree. Since the magnitude of the southwestern sector is much larger than the northwest sector, the Gulf of Mexico influence has the greater effect on the regional wind pattern.

The spring and summer diurnal wind roses show the daily land/sea breeze effects. Virtually no land/sea breeze pattern is evident during the fall, and only a slight pattern is seen during the winter. The fall is strongly influenced by winds coming from the northeast as cool air begins to move southward.

The wind speeds and directions for the five years of meteorological data are stratified by the stability Classes A through F in Attachment B of Volume III - Air Quality, where Class A stability is unstable, and Class F is stable. Classes A and B represent the most unstable categories. Class A occurs less than one percent of the time, and Class B occurs approximately five percent of the time. Class A stability occurs during the day when skies are clear and the incoming solar radiation is strong--

conditions which are more likely during the summer. Fort Myers meteorological data show that Class A stability is strongly associated with light east/northeasterly winds. Class B stability occurs during the day when the incoming solar radiation is moderate, conditions typical of partly cloudy days, or during the fall when sunlight is less direct. Class B conditions are frequently associated with light easterly winds. During the day when the cloud cover is more complete or the incoming solar radiation is slight, Class C—slightly unstable—conditions occur. Winds associated with this case are most likely light to moderate east/southeasterly winds. Neutral stability Class D occurs during overcast conditions during the day or night, or when speeds are strong and the stability category is most likely to occur. These conditions are most frequently associated with northeasterly winds. Classes E and F represent the slightly stable and stable conditions. These conditions occur at night when the sky is partly cloudy or clear. The slightly stable case is associated with light northeasterly winds. The stable case is associated with somewhat lighter northeasterly winds.

Mixing height is the height above the surface through which vigorous vertical mixing occurs. Although the mixing height varies throughout the day, typical morning and afternoon values presented in Table 2-34 represent the average daily minimum and maximum heights, respectively. These climatological mixing heights were derived using data from the nearest upper air monitoring station, Tampa International Airport. Atmospheric conditions such as periods of marked cold air advection, significant precipitation, and missing wind speed or temperature data were not included in the calculation of the average mixing heights presented.

Ambient Air Quality

In the absence of representative background air quality data, pollutants subject to Prevention of Significant Deterioration (PSD) review and emitted at "significant levels" may be subject to ambient air quality monitoring [FAC 17-2.500(5)(f)] to define background concentrations. These ambient levels are then used as a basis for establishing whether the proposed Facility emissions could contribute to a violation of ambient air quality

TABLE 2-34

HOLTZWORTH MIXING HEIGHTS FOR THE FORT MYERS AREA

Period	Morning (meters)	Afternoon (meters)
Annual	493	1,359
Spring	503	1,523
Summer	656	1,460
Fall	419	1,401
Winter	394	1,052

SOURCE: Holtzworth, G.C. January 1972. Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States. U.S Environmental Protection Agency AP-101.

standards. The pollutants subject to this monitoring provision are the criteria pollutants for which ambient standards have been set by the Florida Department of Environmental Regulation (FDER), and other noncriteria pollutants subject to PSD. The significant emission levels and proposed emission levels for these pollutants are listed in Table 2-35.

Sources may be exempt from air quality monitoring if the impact of a given pollutant falls below the de minimis monitoring concentration [FAC 17-2.500(3)(e)]. The air quality impact analysis was performed using sequential meteorological data. From this analysis, the highest concentrations were compared to the appropriate de minimis concentration in Table 2-36. Less than de minimis levels were predicted for each of the PSD regulated pollutants emitted from the Facility. Therefore, the Facility should be exempted from pre-construction monitoring requirements. In light of the modeling results shown in Table 2-36, the Applicant requests FDER to concur in this determination that pre-construction monitoring is not required.

Available Florida ambient air monitoring reports for 1986 through 1988 were used to develop background concentrations of PSD criteria pollutants in the vicinity of the proposed Facility. This period represents the most recent three-year period for which complete ambient monitoring data is available. Limited data are available for 1989. Because there are few monitoring stations within Lee County, monitors outside of the County, shown in Table 2-37, are also considered for determining background concentrations for some pollutants, and may be shown for comparison even when a local Ft. Myers monitor exists, as in the case of SO_2 . However, if local monitoring data does exist, it has been chosen in lieu of more distant monitoring data.

Most available monitoring sites in southern Florida are located in areas of heavy urban or industrial growth, such as Broward, Dade, and Hillsborough counties. Therefore, many sites in the Florida monitoring network will be very conservative when used to estimate background levels at the Facility site which is more rural. The proposed background concentrations for criteria pollutants emitted by the Facility are presented in Table 2-38.

TABLE 2-35

COMPARISON OF SIGNIFICANT EMISSION RATES AND
LEE COUNTY ENERGY RECOVERY FACILITY
MAXIMUM EXPECTED CONTROLLED EMISSIONS

Pollutants	Significant ^a Emission Rates (tons/year)	Potential ^b to Emit (tons/year)
Particulate matter (total suspended particulate)	25	85
(inhalable particulate, PM ₁₀)	15	85
Carbon monoxide	100	648*
Nitrogen oxides	40	1,419*
Sulfur dioxide	40	653
Ozone (VOCs)	40	178*
Lead	0.6	2.6
Beryllium	0.0004	0.00059
Mercury	0.1	3.5
Fluorides	3	15.3
Sulfuric acid mist	7	157
Vinyl chloride	1	— ^c
Asbestos	0.007	— ^c
Total reduced sulfur (including H ₂ S)	10	— ^c
Reduced sulfur (including H ₂ S)	10	— ^c
Hydrogen sulfide	10	— ^c
Hydrogen chloride	—	282
Dioxins and Furans (as 2,3,7,8 TCDD toxic equivalent)	—	6.9x10 ⁻⁶
Inorganic arsenic	AER ^d	0.04
Radionuclides	AER ^d	— ^c
Radon 222	AER ^d	— ^c
Benzene	AER ^d	— ^c

SOURCE: Camp Dresser McKee, Inc., 1990.

*Higher emission rate of either the rotary waterwall or stoker waterwall mass-burn combustor designs under consideration.

^a FAC 17.2 Part V Table 500.2 or 40 CFR 52.21 (b)(23)(i).

^b Based on continuous operation at design capacity (2,400 tons per day) with 100 percent Facility availability. See Volume III, Section 4.0 for BACT emission rates.

^c Emission rates for these pollutants are negligible because these emissions are not expected from an MSW combustion environment or are not considered to be part of an MSW stream (e.g., asbestos).

^d Any emission rate (AER). Pollutant is regulated by the Clean Air Act under NESHAPS, and any emission is considered a significant emission rate.

TABLE 2-36

LEE COUNTY ENERGY RECOVERY FACILITY
COMPARISON OF MAXIMUM PREDICTED CONCENTRATIONS OF
REGULATED POLLUTANTS TO SIGNIFICANT IMPACT AND
DE MINIMIS MONITORING LEVELS
(concentrations in $\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Period	Rank ^a	Maximum Predicted Concentration ^b	Significant Impact Level	PSD De Minimis Monitoring Level
Sulfur Dioxide (SO_2)	Annual	H	0.25	1	—
	24-hour	H	4.19	—	13
		HSB	3.46	5	—
	3-hour	H	21.0	—	—
		HSB	14.7	25	—
	Annual	H	0.54	1	14
Nitrogen Dioxide (NO_2)	Annual	H	0.54	1	—
	24-hour	H	0.54	—	10
		HSB	0.45	5	—
Particulate Matter (as TSP or PM_{10})	Annual	H	0.032	1	—
	24-hour	H	0.54	—	10
		HSB	0.45	5	—
	8-hour	H	10.2	—	575
Carbon Monoxide (CO)	8-hour	HSB	8.2	500	—
		H	96.0	—	—
	1-hour	HSB	63.0	2,000	—
Lead (Pb)	3-month	H	0.017 ^c	—	0.1
Mercury (Hg)	24-hour	H	0.023	—	0.25
Beryllium (Be)	24-hour	H	3.8×10^{-6}	—	1×10^{-3}
Fluorides (as HF)	24-hour	H	0.098	—	0.25

SOURCE: Camp Dresser & McKee Inc., 1990.

^aAbbreviations: H = Highest concentration
HSB = Highest, second-highest concentration

^bLocation and time-of-occurrence for maximum impacts (by rank) are provided in Table 6-7.

^cThe de minimis monitoring level for lead is a quarterly-averaged value. The 24-hour highest average concentration was substituted as a conservative estimate of the quarterly value.

NOTE: No significance guideline level is exceeded.

TABLE 2-37

AMBIENT MONITORING DATA USED TO DERIVE
BACKGROUND CONCENTRATIONS FOR THE LEE COUNTY
ENERGY RECOVERY FACILITY

Pollutant	Monitoring Site	Averaging Time	Maximum Measured Concentration		
			1986	1987	1988
CO	Hillsborough County/ Davis Island	1-hr High (ppm)	5	4	4
		2nd High (ppm)	4	3	4
		8-hr High (ppm)	2	3	2
		2nd High (ppm)	2	2	2
	Pinellas County/ Largo	1-hr High (ppm)	16	7	6
		2nd High (ppm)	6	6	5
		8-hr High (ppm)	3	3	4
		2nd High (ppm)	3	3	3
	Broward County/ Pompano Beach	1-hr High (ppm)	7	6	6
		2nd High (ppm)	7*	6	5
		8-hr High (ppm)	5	5	3
		2nd High (ppm)	5*	5*	2
Pb	Hillsborough County/ Plant City	Max Qtr (ug/m ³)	0.0	—	—
	Dade County/ Thompson Park	Max Qtr (ug/m ³)	0.0	0.1 ^a *	—
NO ₂	Hillsborough County/ Ybor City	Annual Arithmetic Mean (ug/m ³)	39	— ^b	40*
TSP	Lee County/Fort Myers Water Storage Tank, Princeton Street	24-hr High (ug/m ³)	81	63	55
		2nd High (ug/m ³)	67	59	49
		Annual Arithmetic Mean	33*	31	30
		Annual Geometric Mean	30*	28	29
	Lee County/Fort Myers Backup Monitor, Water Storage Tank, Princeton Street	24-hr High (ug/m ³)	79	70	63
		2nd High (ug/m ³)	70*	54	60
		Annual Arithmetic Mean	32	30	31
		Annual Geometric Mean	30*	28	29

TABLE 2-37
(continued)

Pollutant	Monitoring Site	Averaging Time	Maximum Measured Concentration		
			1986	1987	1988
SO ₂	Lee County/Fort Myers Water Storage Tank, Princeton Street	3-hr High (ug/m ³)	113	210	86 ^a
		2nd High (ug/m ³)	111	136 ^a	75 ^a
		24-hr High (ug/m ³)	65	53	24 ^a
		2nd High (ug/m ³)	65 ^a	27	24 ^a
		Annual Mean (ug/m ³)	5	6 ^a	5 ^a
	Manatee County/County Dam	3-hr High (ug/m ³)	—	—	—
		2nd High (ug/m ³)	—	—	—
		24-hr High (ug/m ³)	22	44	54
		2nd High (ug/m ³)	9	34	42
		Annual Mean (ug/m ³)	3	8	9
	Sarasota County/Verna Well Field	3-hr High (ug/m ³)	273	148	396
		2nd High (ug/m ³)	151	126	199
		24-hr High (ug/m ³)	64	54	68
		2nd High (ug/m ³)	35	50	54
		Annual Mean (ug/m ³)	5	6	8
O ₃	Lee County/Fort Myers Water Storage Tank, Princeton Street	1-hr High (ppm)	.101	.101	.102 ^c
		2nd High (ppm)	.095	.090	.101 ^a
PM ₁₀	Hillsborough County/Davis Island	24-hr High (ug/m ³)	—	—	64
		2nd High (ug/m ³)	—	—	58
		Annual Arithmetic Mean	—	—	30 ^a
		Annual Geometric Mean	—	—	28
	Broward County/500 SW 14th Court #12 Ft. Lauderdale	24-hr High (ug/m ³)	72	85 ^d	—
		2nd High (ug/m ³)	67	73 ^{d*}	—
		Annual Arithmetic Mean	26	27 ^d	—
		Annual Geometric Mean	24	24 ^d	—

SOURCE: "Comparison of Air Quality Data with National Ambient Air Quality Standards," Florida Department of Environmental Regulation, 1986-1988.

^a Discontinued during the year.

^b Data not applicable; fewer than 75 percent of expected observations taken.

^c Ozone monitoring site relocated from the water storage tank to Cape Coral about October/November 1988.

^d Not run for a continuous year.

* Represents maximum long-term or maximum second-highest short-term concentration to be used as background in modeling analyses.

TABLE 2-38

PROPOSED BACKGROUND CONCENTRATIONS FOR CRITERIA POLLUTANTS

Pollutant	Averaging Period	Monitor Site	Background Concentration ($\mu\text{g}/\text{m}^3$)	AAQS ^a ($\mu\text{g}/\text{m}^3$)	Background Concentration as Percent of NAAQS
TSP ^c	24-Hour	Water Storage Tank, Lee Co.	70	— ^b	— ^b
	Annual	Water Treatment Plant, Lee Co.	33	— ^b	— ^b
PM ₁₀	24-Hour	500 SW 14th Court #12 Ft. Lauderdale, Broward	73	150	48.7
	Annual	Davis Island, Hillsborough	30	50	60.0
SO ₂	3-Hour	Water Treatment Plant, Lee Co.	136	1,300	10.5
	24-Hour	Water Treatment Plant, Lee Co.	65	260	25.0
	Annual	Water Treatment Plant, Lee Co.	6	60	10.0
NO ₂	Annual	Ybor City, Hillsborough Co.	45	100	45.0
CO (ppm)	1-Hour	Davis Island, Hillsborough Co.	7	35	20.0
	8-Hour	Davis Island, Hillsborough Co.	5	9	55.6
Pb	3-Month	Thompson Park, Dade Co.	0.10	1.5	6.7

SOURCE: "Comparison of Air Quality Data with National Ambient Air Quality Standards," Florida Department of Environmental Regulation, 1986-1988.

^aMore stringent of federal or state standard (see Volume III, Table 5-1).

^bTSP standard has been replaced with PM₁₀ standard (52 FR 24634, July 1987). The State of Florida adopted these PM₁₀ standards in May 1988 (FAC 17-2.300).

^cTSP has been retained in this analysis to supplement PM₁₀ data, if necessary.

Additional information about the development of the background concentrations is presented in Section 5.0 of the PSD permit application (see Volume III - Air Quality).

Measurement Programs

Florida has been monitoring air quality since 1962 when the Department of Health began monitoring total suspended particulates (TSP) at Miami International Airport. In January 1972, Florida submitted a plan to the U.S. Environmental Protection Agency (EPA) for establishing an air quality surveillance system in accordance with EPA regulations published in Section 420.17 of 42 CFR Part 420. The surveillance system established as a result of that plan consists of 204 stations.

Most particulate monitoring up to this time has been measured as TSP. Effective July 1987, the TSP standard has been replaced with the standard for particulate matter having an equivalent aerodynamic diameter of less than 10 microns (PM_{10}). The State of Florida adopted these PM_{10} standards in May 1988. Florida started PM_{10} monitoring at three stations in 1986, increased the network to 15 stations in 1988, and currently has a network of 31 stations.

Sampler location is determined by the monitoring objectives and siting criteria contained in 40 CFR 58 Appendix D, Network Design for State and Local Air Monitoring Stations. Continuous samplers run 24 hours per day. Manual samplers run for 24 hours every sixth day. Missing values are carefully documented, and make-up days may be required in manual networks to ensure that reporting requirements are met. The measurement method for each pollutant is listed in Table 2-39. Each sampler is calibrated on a regular basis. Calibration standards are referenced to the National Bureau of Standards - Standard Reference Materials (NBS-SRM). Calibrations are performed at least once each quarter to test the instrument over its full operating range. Final unadjusted calibrations are performed prior to maintenance, before instrument shut-down, when biweekly span checks exceed ± 15 percent error, and after an air quality exceedance. Confidence limits

TABLE 2-39

AIR POLLUTION MEASUREMENT METHODS

Parameter	Method or Reference
Carbon Monoxide	Title 40 Code of Federal Regulations (40 CFR), Part 50, Appendix C Beckman Model 866; EPA No. RFCA-0876-12
Dust (Microscopy) Microscope	Exposed Place Collection - Nikon Polarization
Dustfall	Journal of Air Pollution Control Association July 66, Vol. 16, No. 7
Nitrogen Dioxide: Bubbler	EPA No. EON-1277-026 page 62971 Federal Registry Vol. 42
Continuous	40 CFR, Part 50, Appendix F 1. Monitor Labs Model 8440; EPA No. RFNA-0677-021 2. Bendix Model 8101-B Analyzer
Ozone	40 CFR, Part 50 Appendix D 1. Bendix Model 30002; EPA No. RFOA-0176-007 2. Dasibi Model 1003 AH; EPA No. EQQA-0577-019
Sulfur Dioxide: Bubbler	40 CFR, Part 50, Appendix A
Continuous	1. Thermo Electron Model 43; EPA No. QSA-0276-009 2. Philips Model, FW9755; EPA No. EQSA-0676-010
Suspended Particulate: Total	40 CFR, Part 50, Appendix B
Sulfates	Exposed Plate Collection - Turbidimetric Method
Lead	40 CFR, Part 50, Appendix G
As PM ₁₀	40 CFR, Part 50, Appendix J

SOURCE: Florida Department of Environmental Regulation, 1984. Florida national air monitoring stations, and state and local air monitoring station network description.

of precision and accuracy are assigned to all measurements with federally approved references or equivalent methods/monitors. EPA's audit covers facilities, equipment, procedures, documentation, and personnel.

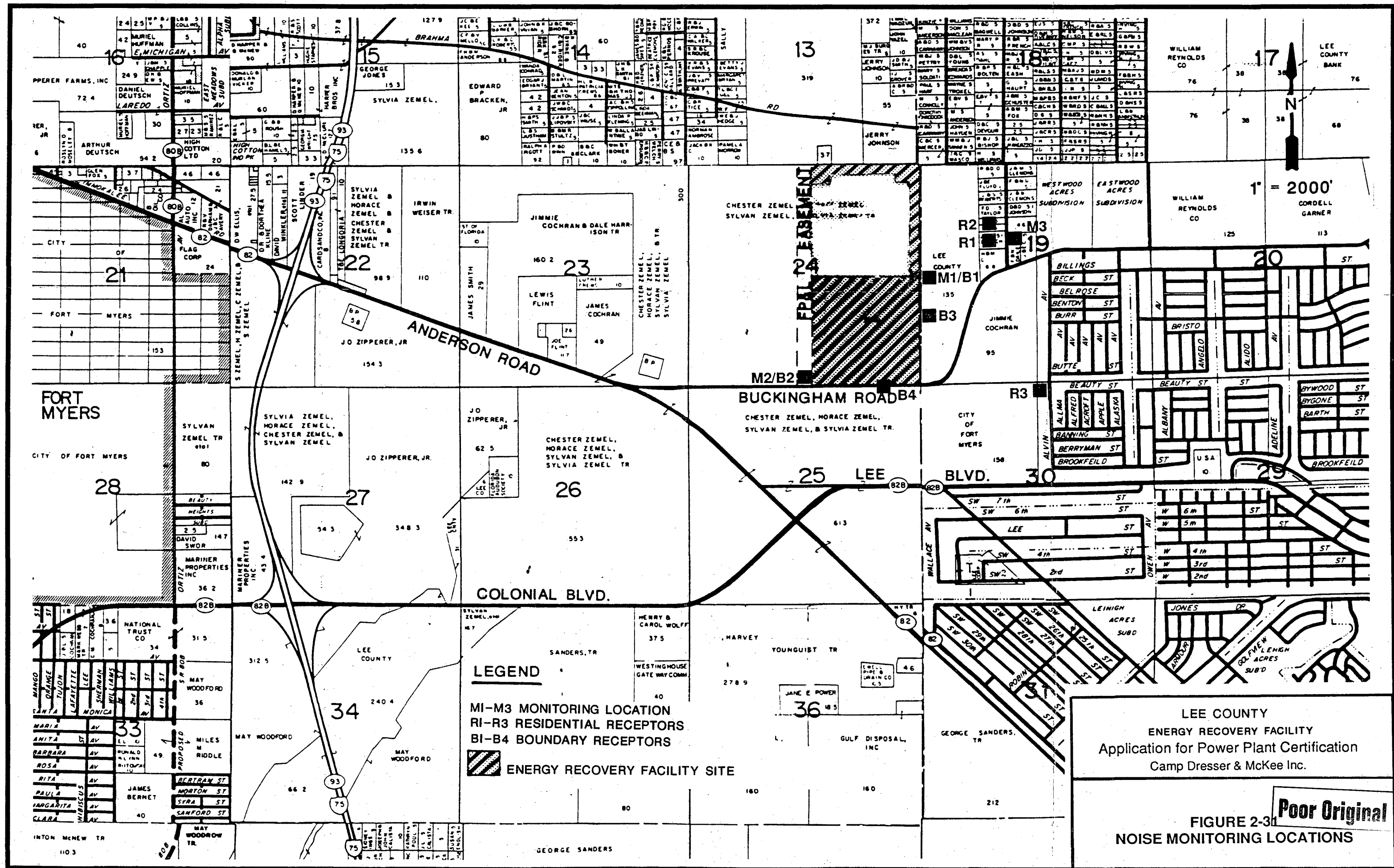
2.3.8 NOISE

A noise analysis was performed for the proposed Facility. The noise study is contained in Appendix 11. The study explains the methodologies used in estimating the operational impacts of the Facility and the results of the analysis. Ambient noise levels were measured at three locations in the site vicinity to establish baseline conditions during day and night periods. The selection of the monitoring locations was based on the following criteria.

- o Land use or zoning—specifically, an area with a significant residential population or commercial use;
- o Local noise ordinances—governmental agencies have established local noise levels which may not be exceeded; and
- o Sensitive receptors—concentrations of individuals who may be sensitive to an increase in noise level (e.g., hospitals, schools, nursing homes, etc.).

Based on the criteria detailed above, monitoring stations were placed around the site as shown in Figure 2-31. In some cases, a monitoring station was used to assess ambient sound levels at more than one sensitive receptor. Table 2-40 lists the sensitive receptors selected.

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 12:00 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.



- 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.

Noise impacts for the proposed Facility were estimated using typical sound levels from other energy recovery facility operations and truck traffic. These predicted impacts were combined with existing noise levels to estimate total cumulative impact.

Lee County has a noise ordinance (Lee County Ordinance No. 88-47). The ordinance 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).

Section 5.7 compares predicted energy recovery facility noise impacts and existing background noise to County standards.

TABLE 2-40

LEE COUNTY RESOURCE RECOVERY FACILITY
AMBIENT NOISE MONITORING LOCATIONS

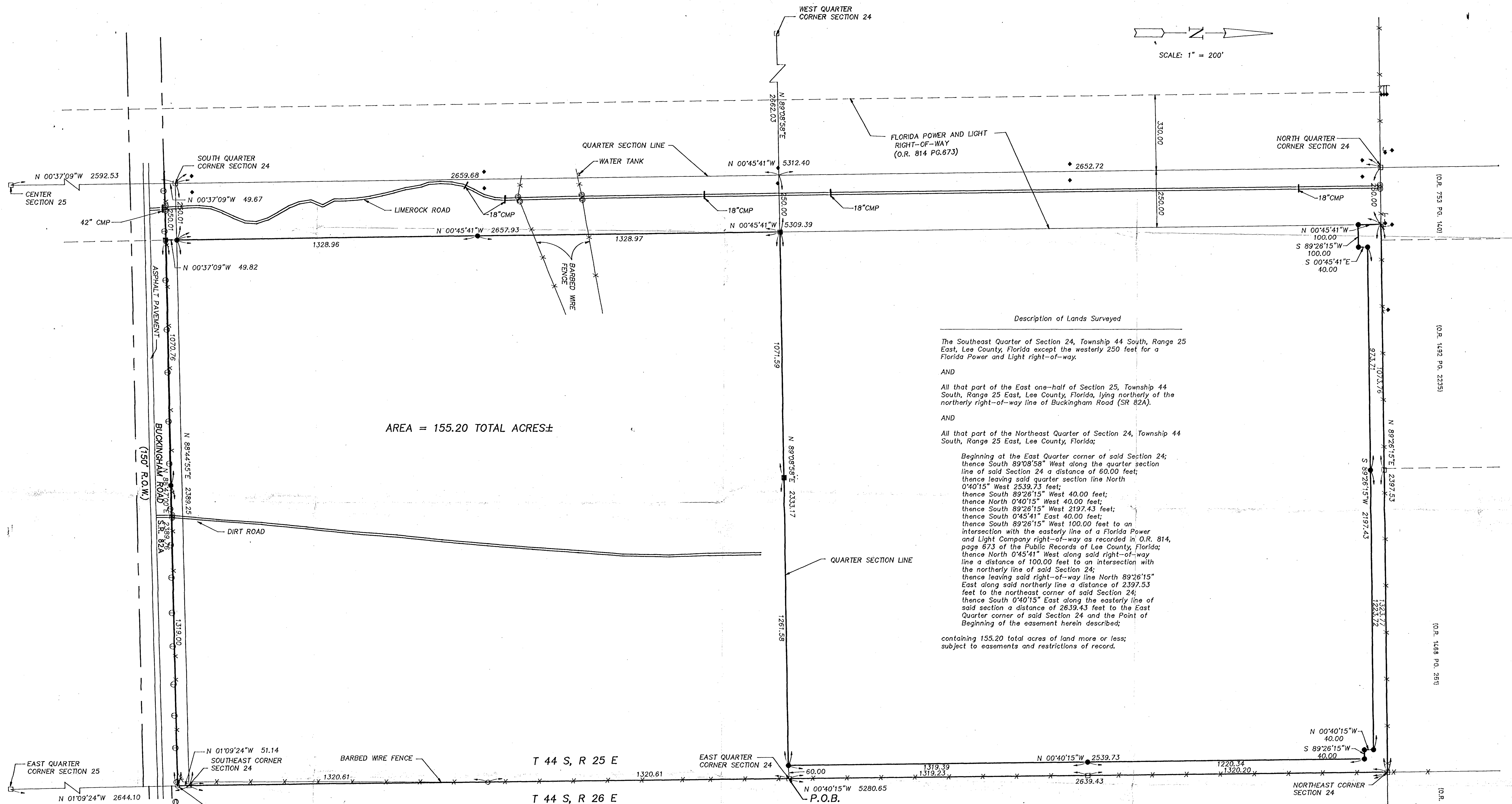
Monitoring Site Identifier	Location	Rationale For Selection
M1	Eastern Property Boundary Nearest Facility	Eastern site boundary conditions; closest point of adjacent park to Facility noise sources.
M2	Southwestern Property Boundary	Southern and western site boundaries; existing traffic noise levels along route likely to be used by Facility traffic; measurements should be about 100 feet back from the road.
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.

TABLE 2-41

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	Undifferentiated background noise No dominant source
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). 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 L₉₀ measurements were 50 discrete readings every 10 seconds for a duration of 8 minutes 20 seconds.



CERTIFICATE:

WE HEREBY CERTIFY to LEE COUNTY BOARD OF COUNTY COMMISSIONERS, that a BOUNDARY SURVEY of a part of Section 24 and 25, Township 44 South, Range 25 East, Lee County, Florida, was completed under our direction on June 28, 1990.

This BOUNDARY SURVEY meets the minimum technical standards set forth by the Florida Board of Land Surveyors in Chapter 21HH-6 Florida Administrative Code, pursuant to Section 472.027, Florida Statutes.

AGNOLI, BARBER & BRUNDAGE, INC.
Professional Engineers, Planners & Land Surveyors

By Gay F. Adams, P.L.S. No. 4390

NOTE:

This certification is only for the lands as described. It is not a certification of title, zoning, easements or freedom of encumbrances. This Certification is not valid unless signed by the surveyor and sealed with the surveyor's embossed seal.

ABSTRACT NOT REVIEWED.

GENERAL NOTES:

- Dimensions are in feet and decimals thereof.
- R.O.W. = Right-of-Way.
- Bearings are based on the plat of Buckingham Park Entrance Roads as recorded in Plat Book 9, page 98, Lee County Public Records, Lee County, Florida.

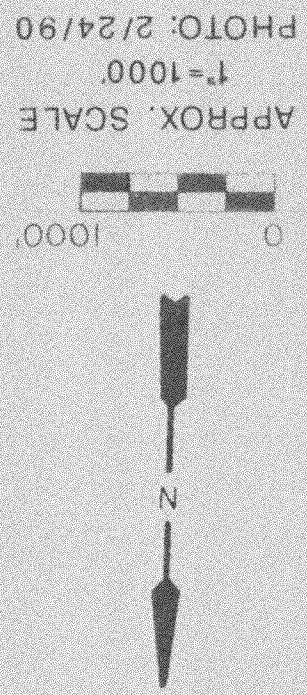
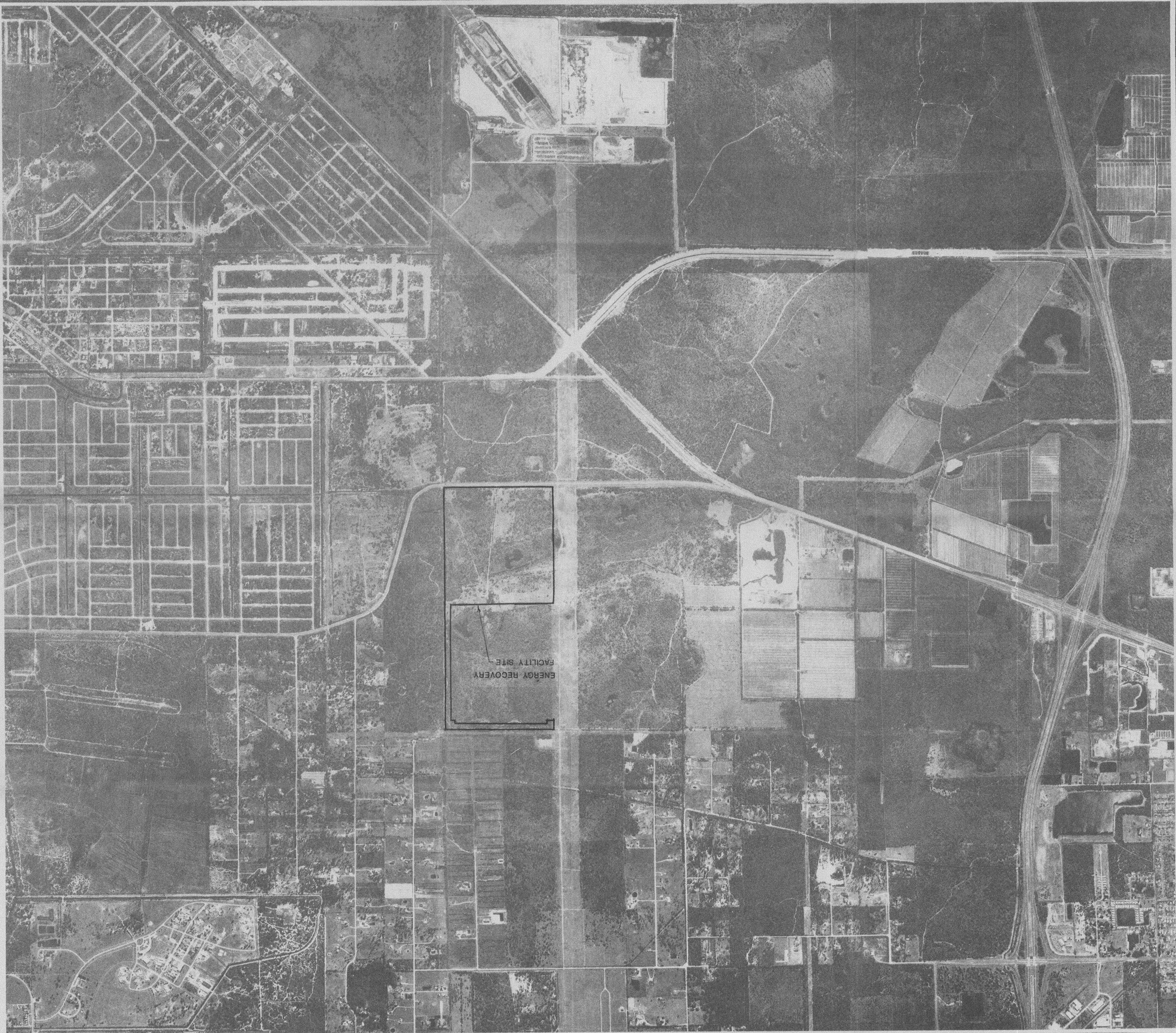
SURVEYOR'S NOTE

Interior improvements not located under the scope of this survey.

LEGEND

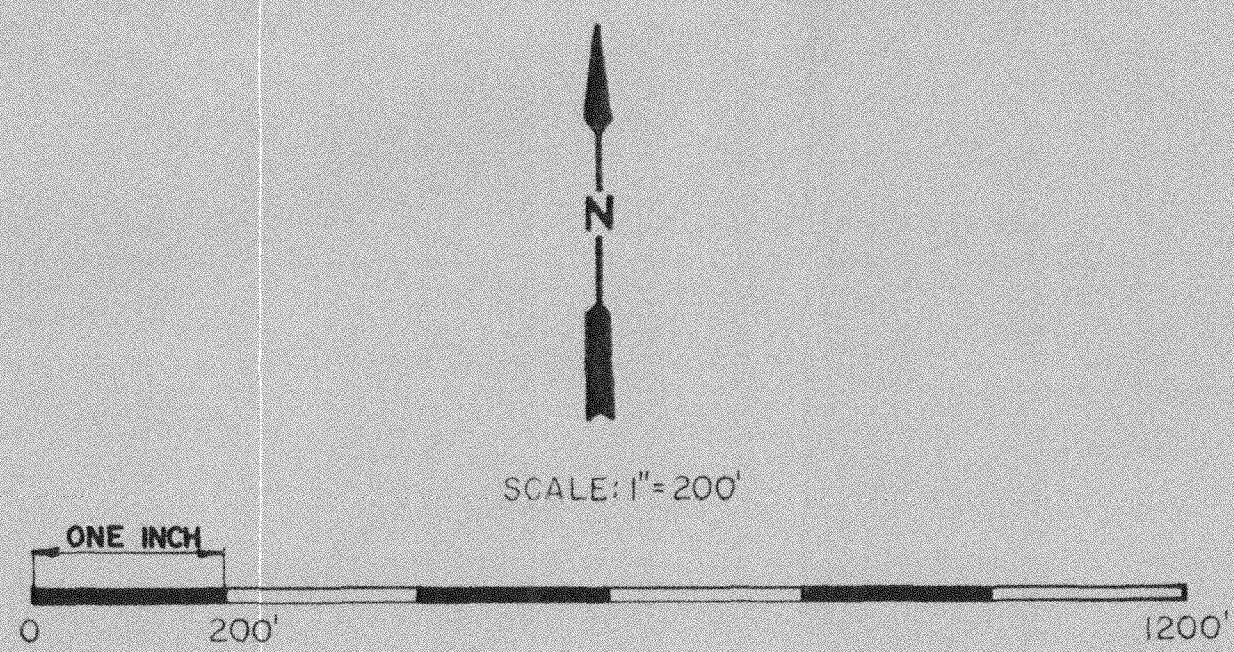
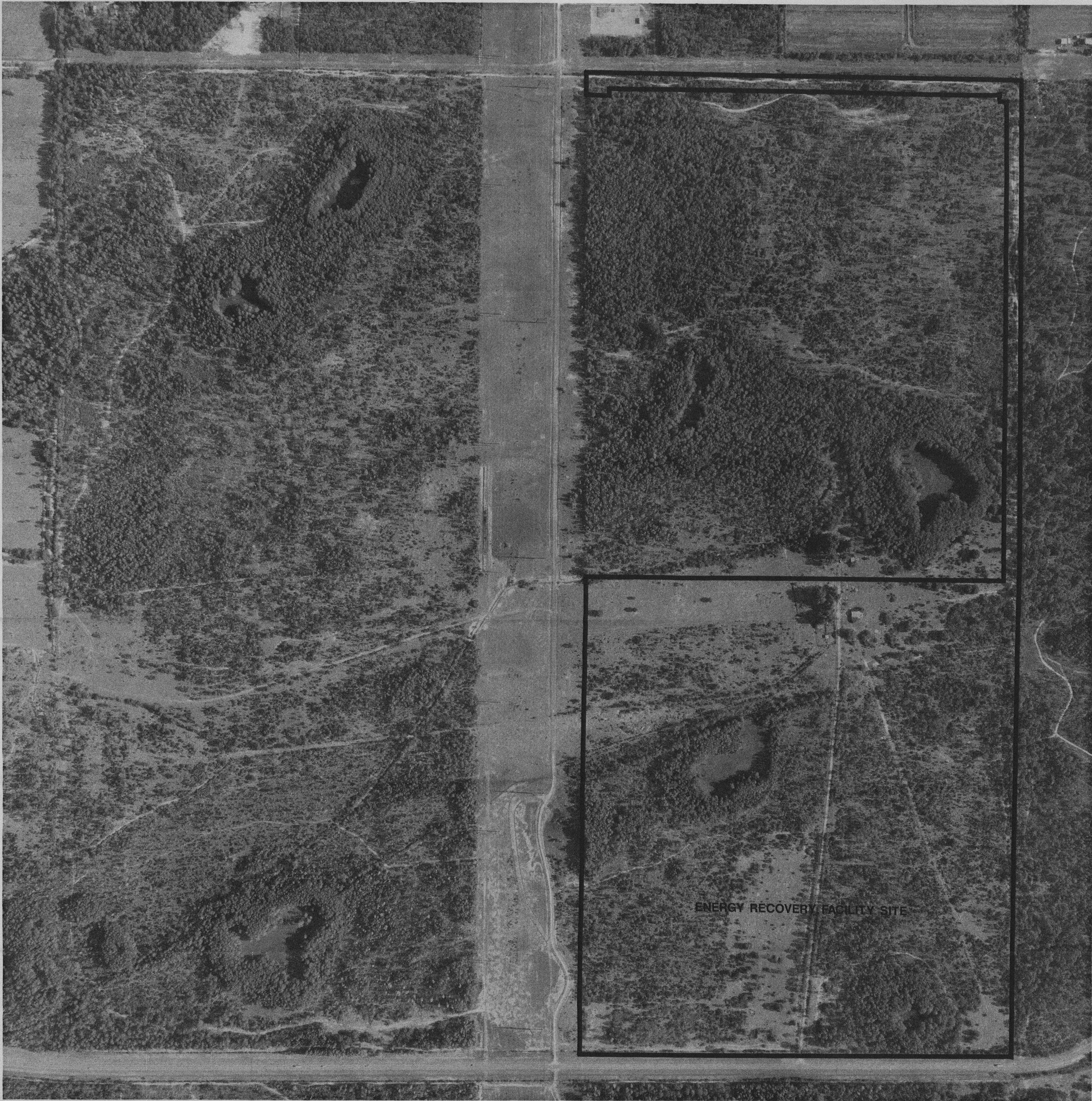
- = SET IRON ROD W/CAP #LB 3664
- = RECOVERED IRON ROD #LB 3664
- = SET CONCRETE MONUMENT #3664
- = FOUND CONCRETE MONUMENT
- ⊕ = TELEPHONE POLE
- Ⓢ = U.T.S. RISER
- Ⓢ = GATE POST
- ◆ = POWER POLE
- = ANCHOR
- CMP = CORRUGATED METAL PIPE

design:	date:	for:
drawn:	scale:	title:
checked:	1" = 200'	MAP OF BOUNDARY SURVEY OF
revision:	book: 272, 273	PART OF SECTIONS 24 & 25, T44S, R25E
	page: 32 6	LEE COUNTY, FLORIDA
		agnoli, barber & brundage, inc.
		professional engineers, planners, & land surveyors
		7400 tamiami trail, n. naples, florida 33963 (813) 597-3111
		2077 bayside parkway, fort myers, florida 33901 (813) 337-3111
project no.:	4657	sheet no.:
	tech: 3308	2838



SHEET NO.		PROJECT NO.		SITE LOCATION: AERIAL SURVEY										CAMP DRESSER & MCKEE INC.																	
6685-38														DESIGNED BY: _____ DRAWN BY: _____ CHECKED BY: _____ APPROVED BY: _____ DATE: _____																	
AUTOMATED ENGINEERS, SCIENTISTS, PLANNERS, & MANAGEMENT CONSULTANTS CDM														REV		DATE		DRAWN		CHECKED		REMARKS									

FIGURE 2-5a



NO.	DATE	REMARKS	BY
		REVISIONS	

APPROVED BY			
	NAME	DATE	
DRAWN BY			SCALE
TRACED BY			FIELD WORK
CHECKED BY			
NOTEBOOK NO.			SHEET OF SHEETS

CAMP DRESSER & McKEE INC.

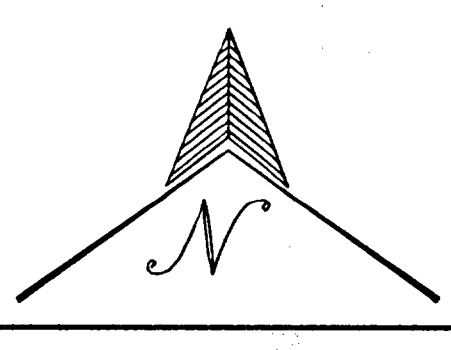
environmental engineers, scientists,
planners, & management consultants

CDM

FIGURE 2-5b

SITE LOCATION:
AERIAL SURVEY

FIGURE 2-26
VEGETATIONAL COMMUNITIES AND LAND USE



Kevin L. Erwin
Consulting Ecologist, Inc.

2077 Bayside Parkway Fort Myers Florida 33901 (813) 337-1505

Project No. CDMR105	CAD Date 6-15-90	Source Media LEE COUNTY	Approved W. R. Corp	Client Camp, Dresser & McKee
Drawn BC	Scale 1"=200'	Type AERIAL	Date 6/19/90	
Verified BC	Sheet 1 OF 1	Date FEB. 1986	SUBJECT TO CHANGE WITH FIELD VERIFICATION	Title Lee County Energy Recovery Facility Site
CAD Tech BCB	CAD File CDMRREV4	Scale 1"=200'		

SECTION 24 TWP 44S RANGE 25E

NOTE: NOT BASED ON GROUND SURVEY OR
RECTIFIED AERIAL PHOTOGRAPH.

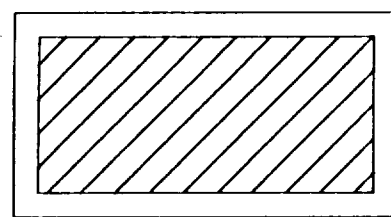
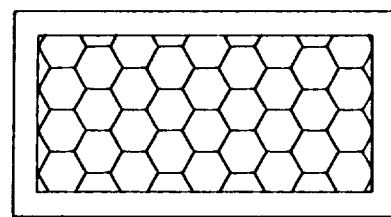
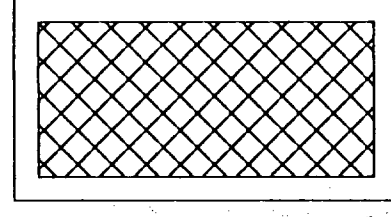
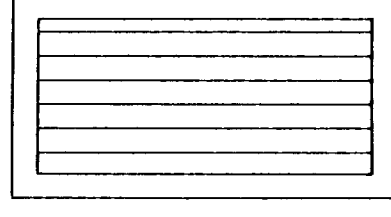
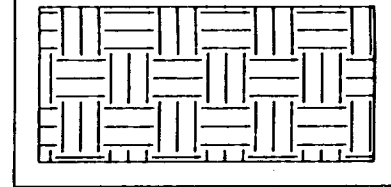
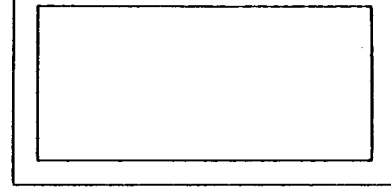
COVER TYPE SUMMARY

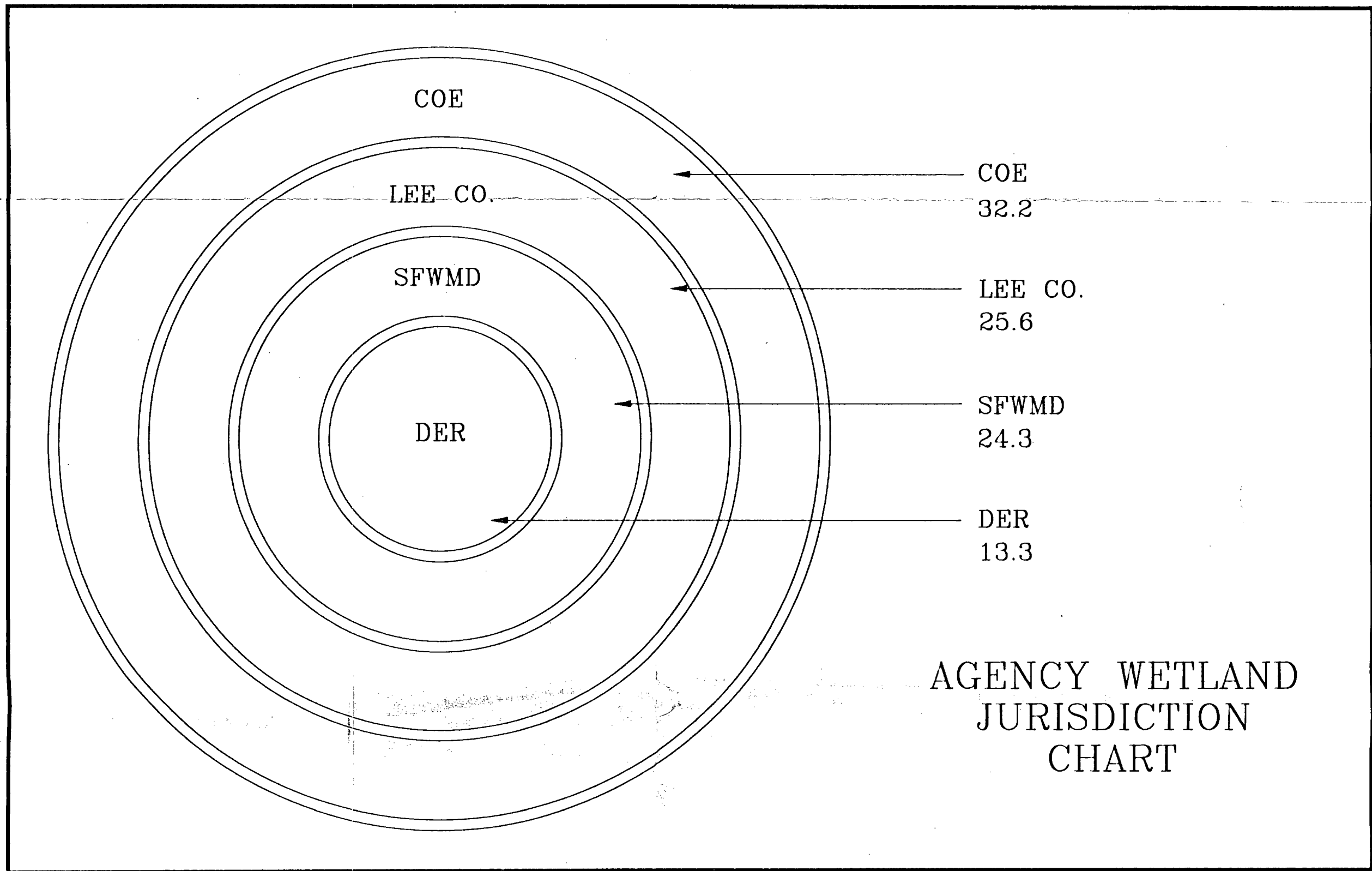
COVER TYPE	HABITAT	ACRES	% OF TOTAL
210	FARM PASTURE	51.0	33.1%
212	LOW PASTURE	1.3	0.8%
321	PALMETTO PRAIRIE	3.8	2.5%
3219	PALMETTO PRAIRIE INVADED BY EXOTICS	0.3	0.2%
411	PINE FLATWOODS	17.9	11.6%
4119	PINE FLATWOODS INVADED BY EXOTICS	2.6	1.7%
415	WET PINE FLATWOODS	4.7	3.0%
4159	WET PINE FLATWOODS INVADED BY EXOTICS	3.1	2.0%
422	BRAZILLIAN PEPPER	2.9	1.9%
425	MESIC OAK	0.7	0.5%
429	WAX-MYRTLE	40.1	26.0%
437	AUSTRALIAN PINE	0.8	0.5%
514	DRAINAGE CANAL	0.6	0.4%
621	CYPRESS	13.7	8.9%
624	CYPRESS/PINE	2.8	1.8%
6249	CYPRESS/PINE INVADED BY EXOTICS	3.2	2.1%
643	WET PRAIRIE	4.6	3.0%
TOTAL PROJECT ACREAGE		154.1	100%

WETLAND JURISDICTIONAL SUMMARY

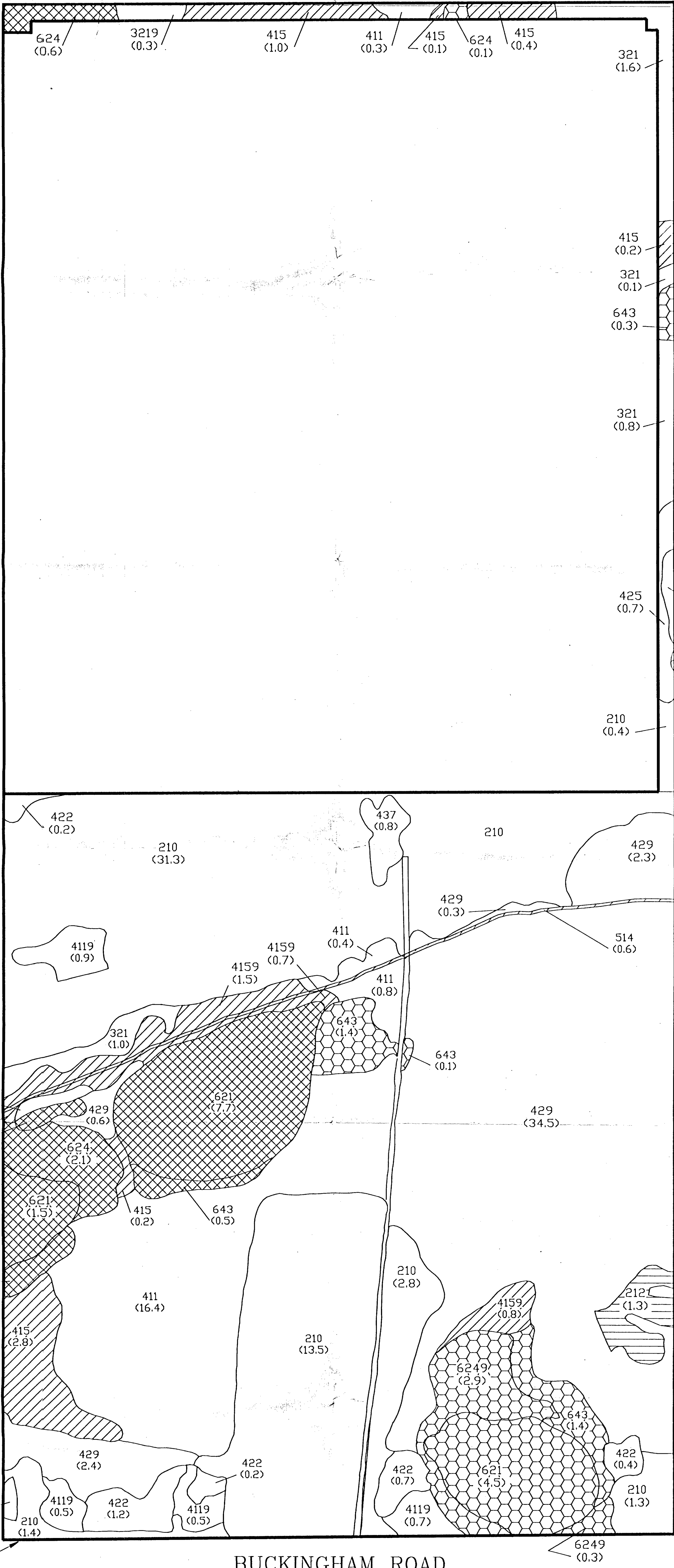
COVER TYPE	COE		SFWMD		LEE CO.		DER	
	ACREAGE	%	ACREAGE	%	ACREAGE	%	ACREAGE	%
212	0.0	0.0%	0.0	0.0%	1.3	0.8%	0.0	0.0%
415	4.7	3.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
4159	2.6	2.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
514	0.6	0.4%	0.0	0.0%	0.0	0.0%	0.0	0.0%
621	13.7	8.9%	13.7	8.9%	13.7	8.9%	9.2	6.0%
624	2.8	1.8%	2.8	1.8%	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	32.2	21.2%	24.3	15.8%	25.6	16.6%	13.3	8.7%

LEGEND

	COE		COE/LEE CO./SFWMD
	COE/DER/LEE CO./SFWMD		LEE CO.
	COE/DER/SFWMD		UPLAND



POWER LINE EASEMENT



PROPERTY LINE

BUCKINGHAM ROAD

Section 3

SECTION 3.0
THE FACILITY
AND
DIRECTLY ASSOCIATED FACILITIES

3.0 THE FACILITY AND DIRECTLY ASSOCIATED FACILITIES

3.1 BACKGROUND

Commercial-scale energy recovery began in the United States in the late 1960s, but European countries have been recovering energy from solid waste for more than 30 years. Denmark converts 70 percent of its solid waste to energy, Switzerland converts 40 percent, and Sweden converts 30 percent. Currently, the United States converts less than 2 percent of its solid waste to energy, but this quantity is expected to increase to 10 percent during the early 1990s. More and more communities in the United States are building energy recovery facilities as the technology is tested and proven effective.

Lee County wishes to construct its own energy recovery facility to serve its solid waste processing and disposal needs for the waste which remains after recycling. Interest in the concept of energy recovery has been stimulated by an increased awareness of the environmental and siting problems associated with landfill disposal methods.

A Solid Waste Master Plan completed for Lee County by Camp Dresser & McKee Inc. (CDM) in August 1989 recommended the development of a mass-burn energy recovery facility. On November 29, 1989, the Lee County Board of County Commissioners executed an agreement with CDM for implementing an energy recovery-based solid waste management system. Shortly after the contract was approved, a management team was organized to guide this project to completion. The management team includes the consultant team (engineers, legal and financial advisors) and Lee County staff and decision-makers.

On October 17, 1989, Hendry County entered into an agreement with Lee County which states that:

Lee County shall acquire, own, permit, develop, operate, and maintain land within Hendry County as the combined solid waste disposal site for both Lee and Hendry counties.

Lee County shall obtain all necessary permits for, construct and operate the following solid waste facilities to serve the needs of both Counties:

1. A Class I solid waste disposal facility;
 2. An ash landfill for bottom ash, fly ash and siftings from the energy recovery facility;
 3. A Class III solid waste disposal facility for waste generated in both Counties;
 4. An energy recovery facility;
 5. Materials recycling facilities;
 6. Sludge disposal and composting facilities;
 7. Used tire and white goods disposal facilities;
 8. Not more than two transfer stations within Hendry County for the transfer of waste; and
 9. Ancillary property and facilities necessary for the efficient and proper operation of a complete solid waste disposal system for both counties.
-

The ash landfill and Class I and Class III solid waste disposal facilities shall be located at a common disposal site in Hendry County. The energy recovery facility shall be located in Lee County. Transfer stations shall be located at sites designated by Hendry County. Other facilities may be located at the Hendry County common disposal site or at sites designated by agreement of both counties.

A copy of the interlocal agreement between Lee County and Hendry County is provided in Appendix 5.1. It should be noted that the volume of solid waste currently generated in Hendry County is less than one-tenth that generated in Lee County.

3.1.1 SOLID WASTE COLLECTION

Lee County has strong control over collection and disposal activities within the County through its Mandatory Garbage and Solid Waste Collection Ordinance No. 86-38 (effective April 1987). The incorporated cities of Fort Myers, Cape Coral, and Sanibel Island are not regulated under the County's ordinance, but they each have or are formulating their own ordinances. The City of Fort Myers provides its own collection services and the remaining areas are under private contract for waste collection.

In general, the private contract franchises of Lee County operate under similar terms with respect to the various aspects of collection. For example, a weight limitation for typical residential pick-up is 40 pounds per container. All non-containerized or unbagged garbage or waste must be bundled, with a maximum length not to exceed four feet. Other collection rules and regulations, together with well-defined franchise boundaries, are clearly delineated in formal agreements with the County; therefore, the flow of waste within Lee County is tightly controlled through legislation. All franchise and the City of Fort Myers collection operations are closely monitored by the County's solid waste department. User fees are paid ~~directly to the County, by franchise and non-franchise haulers~~ (hauling more than one ton), for disposing of collected wastes at the existing privately-owned landfill. Lee County, in turn, pays the landfill owner/contract operator.

Hendry County has two franchise haulers servicing the county. The southern end of the county is exclusively serviced by Immokalee Disposal. The northern unincorporated area of the county is exclusively serviced by Holland Disposal, which also serves the incorporated areas of LaBelle and Clewiston. All solid waste is currently being hauled to the Hendry County landfill.

Hendry County has a mandatory collection ordinance in place. Residences are billed by the county quarterly through the tax collector. There is a flat rate which is set through an annual rate resolution process every year. The county pays the hauler, less the tipping fee. Commercial collection and disposal is handled separately.

Collection strategies will not require a great amount of modification in Lee County to accommodate the energy recovery facility. Agreements will have to be amended to reflect delivery to the energy recovery facility site, and the disposal cost will change. Collection and hauling of refuse from Hendry County will be significantly altered in that transfer stations may be constructed for the cities of Clewiston and LaBelle and the waste thence hauled to the energy recovery facility in Lee County. Ash will be transported from the energy recovery facility in Lee County to the ash landfill in the western portion of Hendry County in covered water-tight transfer trucks. The location of the energy recovery facility in Lee County minimizes overall haul costs because most of the solid wastes are generated in Lee County.

3.1.2 FACILITY SITING

The site selection process for the energy recovery facility began with a detailed study prepared by the County's consulting engineers (CDM, August 1989). A specific siting methodology was used to evaluate the suitability of all potential sites. The initial steps of this 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 sites was developed.

Subsequent to the August 1989 study, six candidate sites meeting positive siting criteria were identified and shortlisted in a workshop with Lee County staff.

A site analysis completed by CDM 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 Florida Power and Light (FP&L) or the Lee County Electrical 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 preferred energy recovery facility site was selected based on these criteria and additional information received at a public hearing before the Board of Lee County Commissioners. A copy of the February 1990 siting report is included in Appendix 4.0.

The ash landfill site had previously been selected and is located in the western portion of Hendry County. It is not intended that this document serve as the application for a permit for the landfill/ashfill. Discussions about the landfill/ashfill contained herein are for reference only as needed to permit the energy recovery facility. The landfill/ashfill will be the subject of separate permit applications.

3.1.3 PROPOSED FACILITIES

After evaluating several technologies, the County has found that its current and foreseeable needs would be best served by a facility which uses the mass-burn technology for combustion of solid waste. This process recovers heat energy in the form of steam, and converts that steam energy into electricity which can be sold. The primary facility proposed for the Lee County site is a mass-burn energy recovery facility (the Facility). Ancillary facilities will include truck scales and a scale house for weighing refuse, an ash handling building, cooling tower, and switch yard.

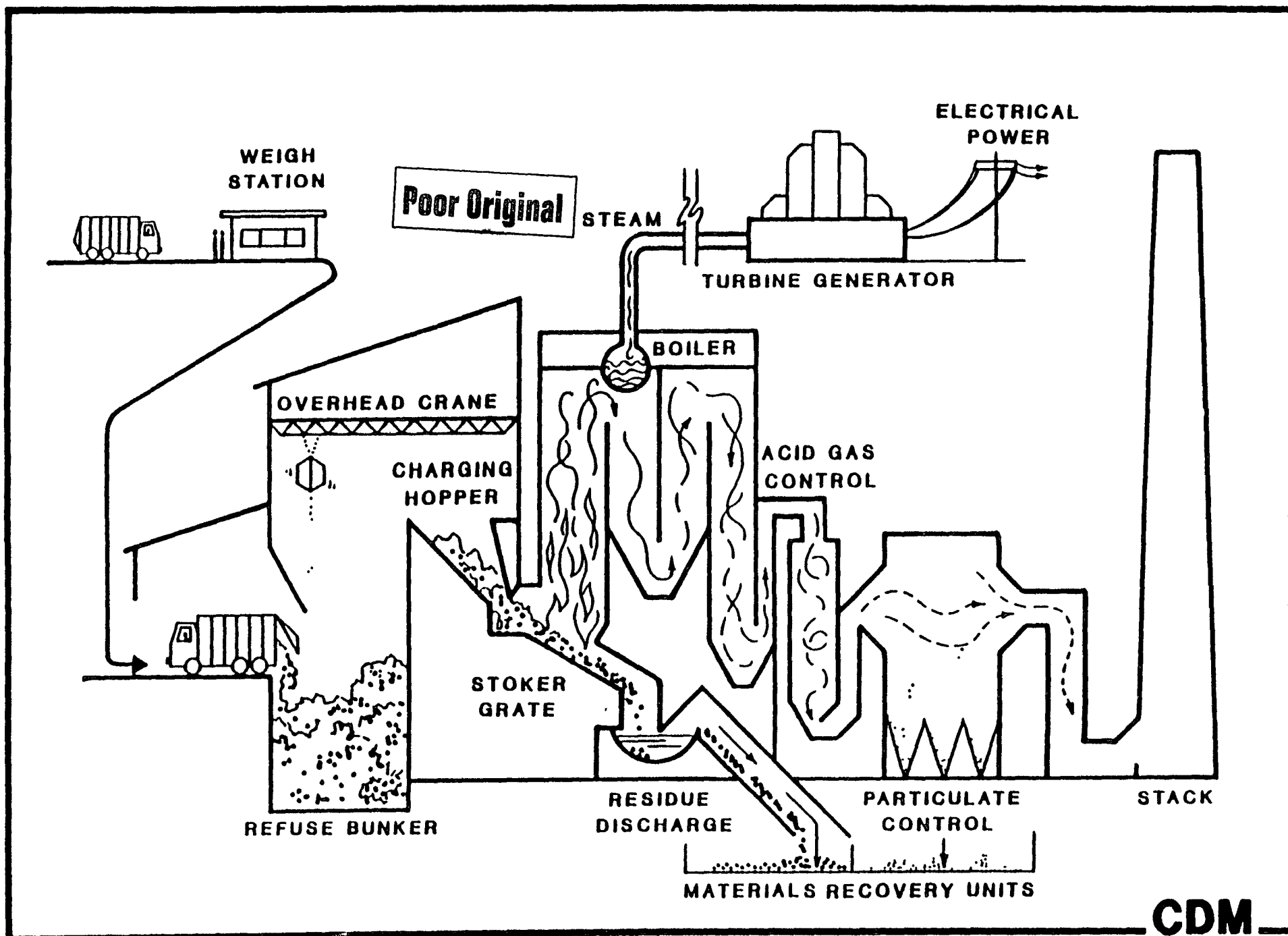
The Facility will be owned by Lee County, and operated by a full-service vendor/contractor under contract to the County. This full-service vendor/contractor will provide design, construction, start-up, and acceptance testing services, and 20 years of continuous operation and maintenance. Lee County will select an appropriate vendor/contractor through the Request for Qualifications/Request for Proposals (simultaneous negotiation competitive) procurement process.

Energy Recovery Facility

The proposed energy recovery facility will have an ultimate design-rated capacity of 1,800 tons per day (tpd). However, its initial continuous design-rated capacity will be 1,200 tpd, using three stoker waterwall combustion/steam generation units with a continuous design-rated capacity of 600 tpd each. Each boiler unit will operate independently; therefore, it will be possible to shut down one unit at a time for maintenance and inspection. An additional boiler unit of the selected technology type will be added to expand the Facility to its ultimate capacity as needed.

Initial project construction will include a tipping area and refuse storage pit sized to handle 1,800 tpd (continuous design-rated capacity). The emissions stack will be equipped with four or five flues, depending on the type of combustion/steam generation unit employed. The project will have one steam turbine generator which will generate approximately 60 megawatts at 1,800 tpd. Power lines from the project's electrical switch yard will connect with the FP&L Buckingham substation near the Facility. Revenues from energy sales will be shared (90/10) by the County and vendor/contractor during the life of the operating contract.

Since the proposed Facility will use mass-burn technology, there will be no significant pre-processing of wastes at the Facility prior to combustion; however, separation of recyclables will occur at the waste generation sites. A schematic diagram of a typical stoker mass-burn facility 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 in the refuse bunker directly from transfer trailers and packer trucks inside the bunker housing. All waste will be stored inside the bunker housing so that no waste is visible from the outside. Two overhead cranes will mix the waste in the bunker and load the charging hoppers.



Energy Recovery Schematic - Lee County Energy Recovery Facility

Municipal solid wastes will be reduced to 10 percent of their original volume and about 30 percent of their 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 mixed before removal from the Facility.

The Facility will be equipped with fabric filters (baghouses) for particulate removal. Acid gas dry scrubbers will also be used. A dry scrubber and baghouse will be furnished for each combustion train.

3.2 SITE LAYOUT

The general site development plan (Figure 2-6) shows the conceptual building layout on the site. The Facility structures will be set back about 200 feet from the eastern property boundary and about 1,500 feet from Buckingham Road, which will meet the requirements of local set-back ordinances. An access road will loop 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 energy recovery facility will include landscaping as necessary to comply with local development standards.

Roadway grades on Facility access roads will 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 shall be concrete all-weather construction for heavy traffic and shall comply with FDOT design standards and requirements. Traffic patterns will be 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 will be separated from truck circulation to minimize potential conflicts.

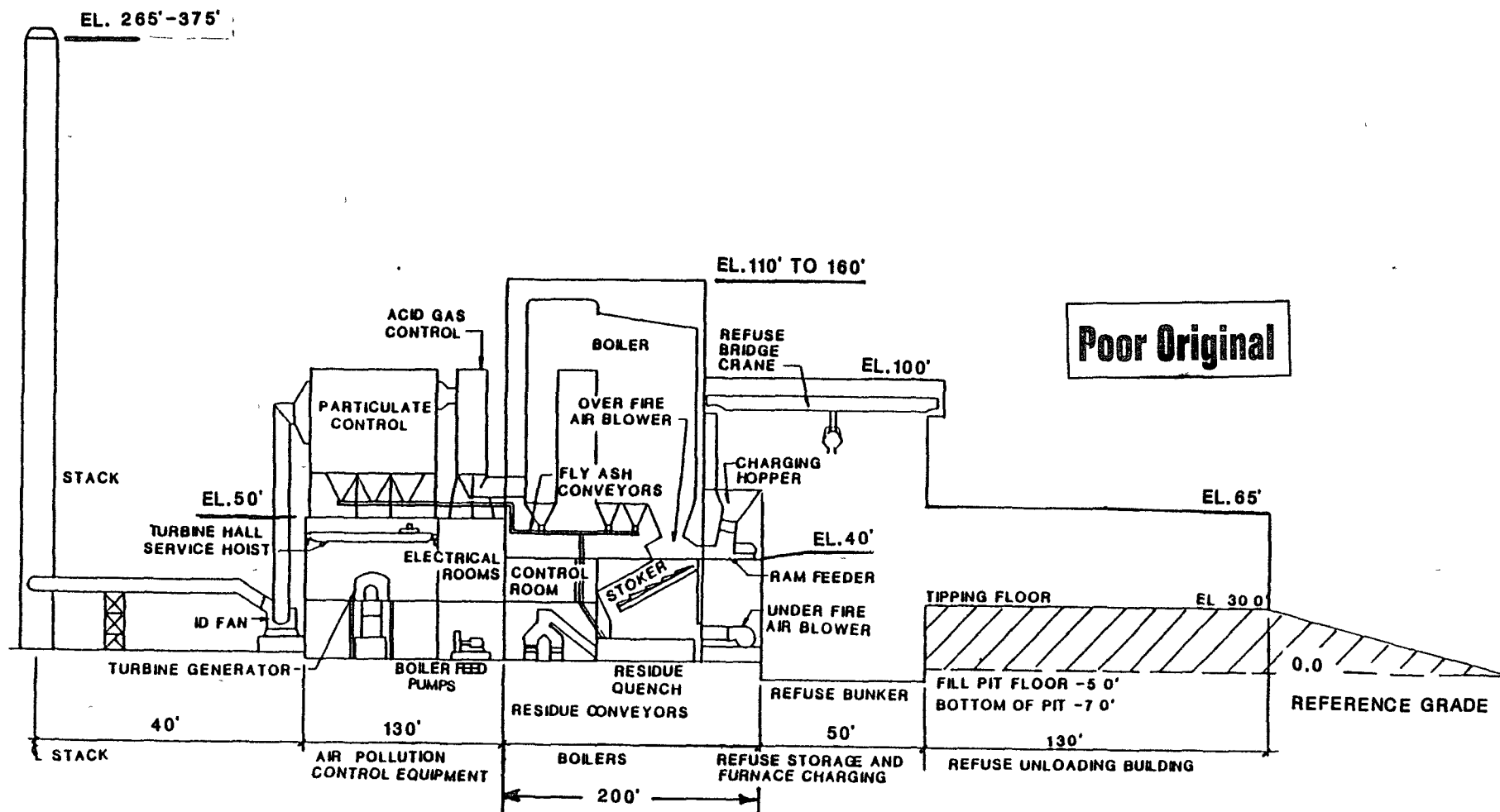
3.2.1 BUILDING DIMENSIONS

The proposed Facility will consist of several contiguous buildings as shown in Figure 2-6. A profile with approximate dimensions is given in Figures 3-2a and 3-2b. The exact Facility dimensions will be determined by the vendor/contractor selected to design, construct, and operate the Facility.

The administration building will be approximately 40 feet high, 250 feet long, and 90 feet wide. It will be bordered on three sides by the centrally-located processing facilities, with the fourth side facing the parking area. Offices will be located along the inner side of the administration building.

The processing facility will vary in height and area depending on the processing function housed in that portion of the building. On the tipping floor side, the building will be about 65 feet high, and 130 feet by 350 feet in surface area to accommodate refuse unloading activities. The maximum height of fill at the tipping floor will be about 30 feet above existing grade. This portion of the Facility must be elevated to allow waste collection trucks to drop refuse into the storage pit. The pit itself will be 70 feet by 235 feet in surface area with its bottom about 20 feet below existing grade.

The three stoker waterwall or four rotary waterwall combustion/steam generation units, with appurtenances, will occupy a surface area of about 200 feet by 260 feet at the Facility's ultimate capacity. 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, soot cleaning system, boiler support steel, water quenching residue discharge/conveyor, combustion air blowers, auxiliary fuel burners, controls, and economizer. The height of the building over the boiler units will be about 110 to 160 feet. The turbine building, about 130 feet long by 90 feet wide, will adjoin the air pollution equipment area and the administration building.

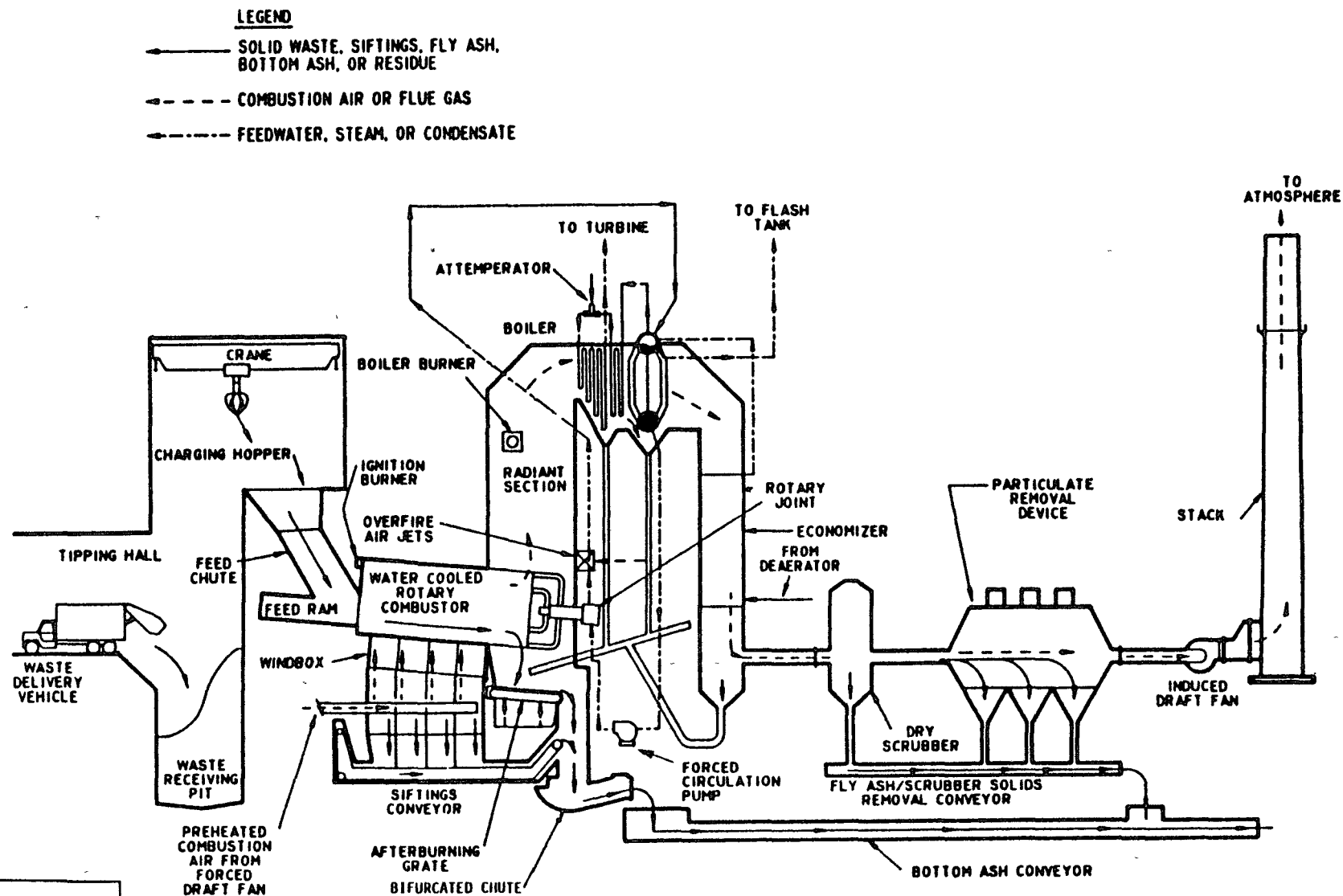


NOTE

O.O. REFERENCE GRADE IS 20 TO 25 FEET ABOVE MSL. ALL DIMENSIONS ARE APPROXIMATE.
NOT TO SCALE.

CDM

Typical Facility Cross-Section (Stoker Water Wall Design) - Lee County Energy Recovery Facility



Poor Original

LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Certification
Camp Dresser & McKee Inc

FIGURE 3-2b
TYPICAL FACILITY CROSS-SECTION
(Rotary Waterwall Design)

The air pollution control equipment housing will have an approximate 130-foot by 260-foot surface area at the expanded capacity of 2,400 tpd. The Facility stack, located about 40 feet west of the air pollution equipment, will have a maximum height of about 375 feet above existing grade or about 400 feet above mean sea level. A Federal Aviation Administration (FAA) stack height application has been submitted to FAA, and is included in Appendix 6.4. The FAA permit will be forwarded to DER upon receipt by the County. Direct communication with the FAA staff in reviewing of the proposed maximum height indicates that the stack will not pose a hazard to air navigation but must be obstruction marked and lighted. Note that the height of the stack may only be about 265 feet, depending on the vendor/contractor selected. In any case, the stack height will be established in accordance with good engineering practice (GEP).

The cooling tower and electrical switch yard will be located west of the Facility proper. The ash building, to the north, will be about 100 feet wide by 100 feet long.

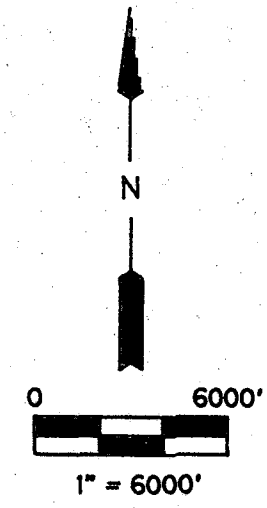
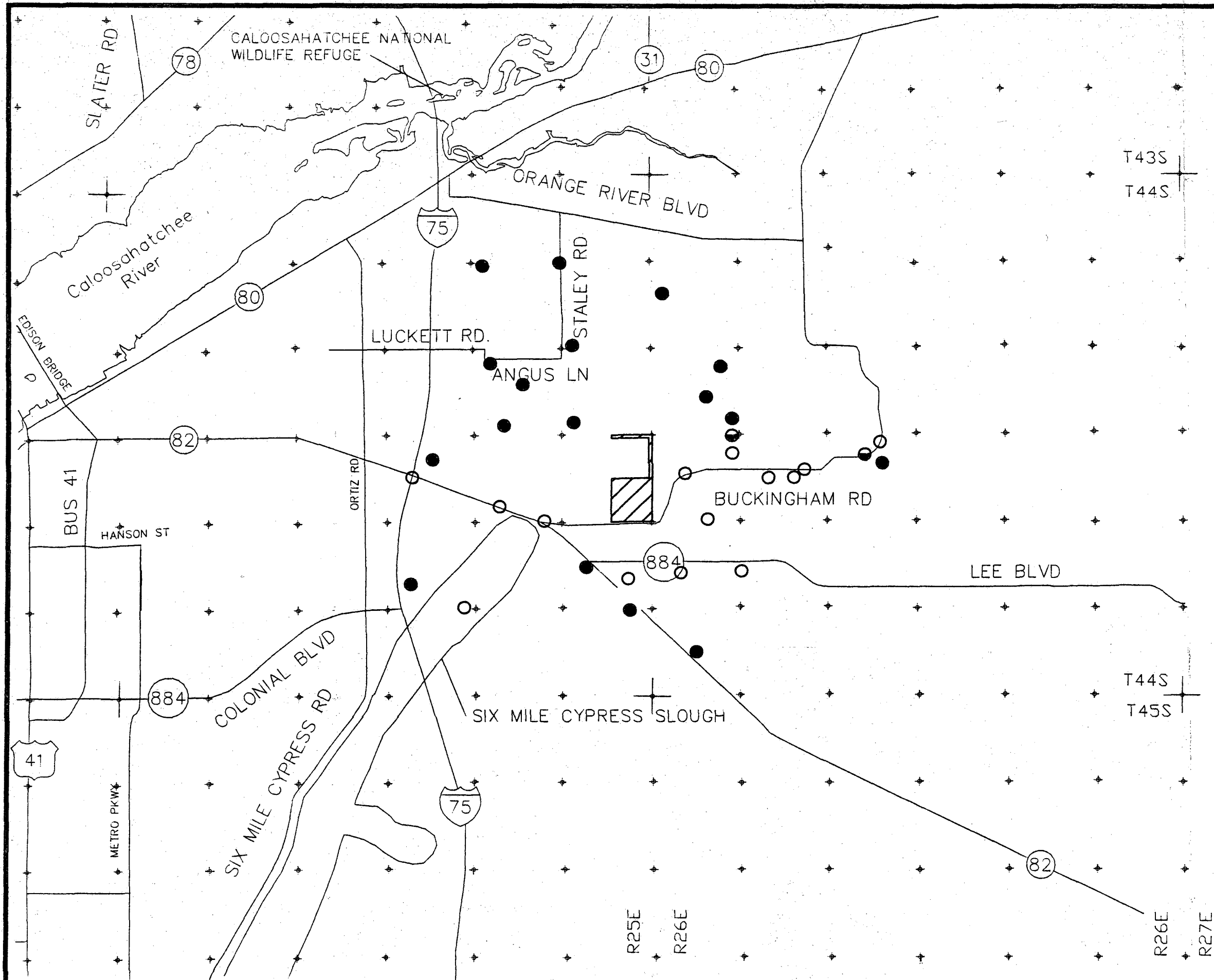
3.2.2 VISUAL IMPACT

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 maximum height of 400 feet above MSL was chosen for study purposes.

To simulate the emissions stack, a helicopter was flown over the site at a height of about 400 feet MSL. The helicopter was unable to hover over the exact stack location; instead, it circled the location in as narrow a radius as possible. Observations were made from four different directions from the Facility site. Visibility of the helicopter was dependent upon distance from the site, and the proximity of obstructions which consisted primarily of trees.

The results of the visual impact study are shown in Figure 3-3. At each observation point, the figure indicates whether the helicopter was clearly visible, visible only part of the time (it was circling the site and came

ACAD FILE: GJ5MILE.DWG 06/19/90



LEGEND

- + SECTION CORNER
-  ENERGY RECOVERY FACILITY SITE
- HELICOPTER CLEARLY VISIBLE
- ◐ HELICOPTER PARTIALLY OBSCURED
- HELICOPTER NOT VISIBLE

Poor Original

Visual Impact Study – Lee County Energy Recovery Facility

into and out of view at some locations), or not visible. Because the location of the helicopter was not constant, the results of this study err on the conservative side. Where the helicopter was visible only part of the time, it is assumed that the stack will be partially or fully obscured and will not cause a major impact to area aesthetics.

Based on the results of the study, the visibility of the proposed stack is as follows.

- o To the northwest, a residential/rural area, the helicopter was not visible, even as close as one-half mile from the site.
- o To the northeast, the helicopter was not visible from most locations. The furthest visibility point was about one and one-half miles.
- o To the southwest, the helicopter was visible up to about two miles from the site.
- o To the southeast, the visibility extended to about one mile from the site.

Again, it must be emphasized that the methodology employed here represents a worse-case scenario and may tend to over-exaggerate the visual impact of the emissions stack. Its full height may be less than 400 feet MSL.

Visual impacts cannot be completely avoided given the stack height needed to meet GEP requirements. The stack may be visible up to about two miles away from the site, depending on the direction, and vegetation and other obstructions. However, it is felt that the Facility will not produce major aesthetic impacts in the area. Furthermore, buffers will be provided to minimize the Facility's visibility. Existing on-site vegetation will be left intact as much as possible. Removal of trees in excess of ten feet in height or with diameters of three inches or greater at breast height shall be minimized to the greatest extent possible, except in areas where structures are to be placed or landscape plantings are to be provided.

The Facility landscaping plan is intended to provide a natural appearance and limit the visibility of the Facility buildings. In addition to the buffer requirements of local zoning and development ordinances, the plan shall incorporate primary, secondary, and minor trees and shrubbery. Primary trees shall be at least 10 to 12 feet in height, secondary trees at least 6 to 10 feet, and minor shrubs less than 6 feet. Landscaping shall be provided along the entrance road and adjacent to the administration building and parking area. Plants species shall be native wherever possible.

3.3 FUEL

3.3.1 FUEL SUPPLY

The energy recovery facility will obtain its fuel supply from municipal solid waste collected in Lee and Hendry counties. The term "municipal solid waste" applies to all of the non-recycled solid waste generated within the two counties, excluding hazardous and pathogenic wastes and sewage sludges. Since this waste is heterogeneous, characteristics such as heating value, moisture content, and ash content of the waste will vary. However, the solid waste may be classified according to the following general characteristics and sources of generation.

- o Residential Wastes - Mixed domestic household wastes (including non-composted yard wastes) generated by individuals or families in single-family or multiple-family dwellings (comprises approximately 46 percent of the waste stream).
- o Commercial/Institutional Wastes - Wastes generated by the commercial and retail sector of the counties, including wastes from hospitals, schools, and churches. The physical characteristics of these wastes are similar to residential wastes, consisting primarily of combustible materials in the form of paper and food wastes from offices, restaurants, and retail establishments (comprises approximately 40 percent of the waste stream).

- o Special Wastes - Wastes generated by the construction industry, including construction and demolition debris and white goods. Any wastes classified as infectious by federal and state regulations will be excluded (comprises approximately 11 percent of the waste stream).
- o Industrial Wastes - Wastes generated by industrial process and manufacturing operations, excluding any wastes classified as hazardous or infectious by federal and state regulations. These wastes also include general housekeeping and support activity wastes associated with industry (comprises approximately 3 percent of the waste stream).

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

3.3.2 FUEL STORAGE

The energy recovery facility will be equipped with an automatic weighing station to weigh and record the quantity of solid waste delivered. The waste will be delivered in standard municipal-type packer vehicles, open-bodied dump trucks, and transfer trailers with capacities up to 110 cubic yards. The Facility will receive solid waste deliveries 6 days per week, 52 weeks per year. The fuel storage design capacity is based on the ultimate expanded Facility capacity of 1,800 tpd.

The energy recovery facility will include a totally enclosed tipping floor with 13 tipping bays, each 15 feet wide and 1 bay, 24 feet wide (inside dimension). Back-up barriers will be provided at each tipping bay to prevent vehicles from backing into the solid waste storage pit. Solid waste will be stored in a completely enclosed pit with a floor elevation below that of the tipping floor. The pit will be 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.

TABLE 3-1

REFERENCE SOLID WASTE COMPOSITION

Waste Category	Nominal Percentage By Weight
Combustibles	58.4
Moisture	20.7
Non-Combustibles	<u>20.9</u>
TOTAL	100.0

TABLE 3-2
REFERENCE SOLID WASTE ULTIMATE ANALYSIS

Component	Nominal Percentage By Weight
Moisture	20.7
Total Inert	20.9
Carbon	28.5
Hydrogen	3.8
Oxygen	25.1
Nitrogen	0.5
Chlorine	0.4
Sulfur	<u>0.1</u>
TOTAL	100.0
Higher Heat Value (HHV)	5,000 Btu/lb

The primary purpose of three-day pit capacity is to ensure adequate on-site storage for refuse over a three-day weekend. However, the pit capacity could also be 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 the landfill is minimized.

Three examples have been prepared to illustrate the waste processing capabilities of the Facility with one or more units out of operation. The examples are based on the following assumptions, with the Facility operating at its ultimate capacity.

- o The Facility combusts wastes continuously: 24 hours per day, seven days per week.
- o The Facility receives an average of 1,800 tpd or 12,600 tons per week. However, the Facility will actually be open to receive wastes only six days a week (Monday through Saturday). Based on current trends within the County, approximately half as much waste is received on Saturday as during the week. Therefore, under this example the Facility will receive 2,291 tpd on Monday through Friday and 1,145 tpd on Saturday.
- o The Facility will have three processing trains, each with a design capacity of 600 tpd.
- o The refuse pit will have a storage capacity of approximately 19,600 cubic yards to the elevation of the tipping floor. An additional 9,800 cubic yards of storage above the tipping floor elevation is available when waste is stored against the pit sidewalls. The ultimate capacity of the pit is 29,400 cubic yards. (Based on a density of 550 pounds per cubic yard, the pit will store 5,390 tons (if filled to the elevation of the tipping floor) to 8,085 tons (if waste is stored against the pit sidewalls) of waste.)

Example One - Three Unit Operation

One unit shuts down due to mechanical failure at 6:00 a.m. on Monday. The remaining two units are capable of operating at 100 percent of their total combined capacity of 1,200 tpd. At the time of breakdown, the pit contains 900 tons (normal minimum half-day storage reserve).

<u>Time/Day</u>	<u>Received (tons)</u>	<u>Processed (tons)</u>	<u>Waste in Pit (tons)</u>
6:00 a.m., Mon. (Week 1)	2,291	1,200	900
			<u>+1,091</u>
6:00 a.m., Tues.	2,291	1,200	1,991
			<u>+1,091</u>
6:00 a.m., Wed.	2,291	1,200	3,082
			<u>+1,091</u>
6:00 a.m., Thurs.	2,291	1,200	4,173
			<u>+1,091</u>
6:00 a.m., Fri.	2,291	1,200	5,264
			<u>+1,091</u>
6:00 a.m., Sat.	1,145	1,200	6,355
			<u>- 55</u>
6:00 a.m., Sun.	0	1,200	6,300
			<u>-1,200</u>
6:00 a.m., Mon. (Week 2)	2,291	1,200	5,100
			<u>+1,091</u>
6:00 a.m., Tues.	2,291	1,200	6,191
			<u>+1,091</u>
6:00 a.m., Wed.	2,291	1,200	7,282
			<u>+1,091</u>
6:00 a.m., Thurs.	2,291	1,200	8,373
			<u>+1,091</u>
6:00 a.m., Fri.	2,291	1,200	9,464

The pit will be filled to capacity in the late evening of the second Wednesday. The total reserve time for this situation is 10 days.

Example Two - Two Unit Operation

At 6:00 a.m. on Monday, two units shut down due to mechanical failure. The remaining unit continues to process waste at 100 percent of its capacity, for a total capacity of 600 tpd.

<u>Time/Day</u>	<u>Received (tons)</u>	<u>Processed (tons)</u>	<u>Waste in Pit (tons)</u>
6:00 a.m., Mon.	2,291	600	900
			<u>+1,691</u>
6:00 a.m., Tues.	2,291	600	2,591
			<u>+1,691</u>
6:00 a.m., Wed.	2,291	600	4,282
			<u>+1,691</u>
6:00 a.m., Thurs.	2,291	600	5,973
			<u>+1,691</u>
6:00 a.m., Fri.	2,291	600	7,664
			<u>+1,691</u>
6:00 a.m., Sat.	1,145	600	9,355

The pit will be filled to capacity at some time during the early afternoon on Friday. The total reserve time in this example is 4.5 days.

Example Three - Alternative to Example One

At 6:00 a.m. on Saturday of week 1 in example one, a second unit shuts down due to mechanical failure. The remaining unit continues to process waste at 100 percent of its nameplate capacity.

<u>Time/Day</u>	<u>Received (tons)</u>	<u>Processed (tons)</u>	<u>Waste in Pit (tons)</u>
6:00 a.m., Sat. (Week 1)	1,145	600	6,355
			+ 545
6:00 a.m., Sun.	0	600	6,900
			- 600
6:00 a.m., Mon. (Week 2)	2,291	600	6,300
			+1,691
6:00 a.m., Tues.	2,291	600	7,991
			+1,691
6:00 a.m., Wed.	2,291	600	9,682

The pit will be filled to capacity early Tuesday morning of week 2. The total reserve time in this situation is 8 days.

These three scenarios show that the Facility will continue to receive the entire waste stream without any bypass to the landfill or another Facility for 10 days in Example One; for 4.5 days when two units fail simultaneously (Example Two); or for 8 days when two units fail in a staggered manner (Example Three). Incoming refuse need not be diverted to the landfill/ashfill during these periods.

3.4 AIR EMISSIONS AND CONTROLS

3.4.1 AIR EMISSION TYPES AND SOURCES

The proposed energy recovery facility is a new facility that will be located in Lee County. At ultimate size, the Facility will contain: three mass-burn stoker waterwall combustor boilers each with a rated capacity of 600 tpd of municipal solid waste, for a total of 1,800 tpd. The flues from all of the combustor trains will be encased in a single stack shell.

The refuse bunker will be enclosed and under negative pressure, which is achieved by drawing combustion air during normal operations from this area. There will be no on-site storage of either refuse or residue except within controlled, enclosed areas. Loading and unloading of trucks will take place inside the residue storage building and enclosed tipping floor building, respectively. Provisions for loading containers or trucks outside using a redundant conveyor during main ash conveyor outages will be designed featuring impervious surface areas and controlled stormwater runoff. Trucks entering and leaving the site will be covered and will travel on paved roads.

The ash handling area may be a minor source of particulate emissions, but a fabric filter device will be used to ensure that virtually no emissions will be released from this area. Thus, the common boiler stack will be the only major source of emissions from the Facility.

A complete description of stack emissions is contained in Section 3.0 of the Prevention of Significant Deterioration (PSD) permit application (see Volume III - Air Quality). Maximum expected emission rates for the proposed Facility are contained in Table 3-2, Section 3.0 of the PSD permit application in Volume III (see Section 7.6 in Volume III). A complete FDER Form 17-1.202 (1), "Application to Operate/Construct Air Pollution Sources," may also be found in the front of Volume III.

3.4.2 AIR EMISSION CONTROLS

A number of air pollution control technologies are available to control different classes of pollutants which include particulate matter, trace metals and organic compound emissions, SO₂ and acid gases, NO_x and products of incomplete combustion such as CO and VOCs. 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 PSD permit application (see Volume III - Air Quality).

3.4.3 BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

The BACT analysis is presented in Section 4.0 of the Prevention of Significant Deterioration permit application (Volume III - Air Quality). The analysis evaluates the 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 pollution control alternatives, a dry scrubber and baghouse are proposed as BACT for the Lee County energy recovery facility for all pollutants subject to PSD review. The dry scrubber will be designed to achieve an emission limit of 30 parts per million on a dry volume basis (ppmdv) at 7 percent O_2 , or 80 percent reduction, 24-hour block geometric average for SO_2 ; and 25 ppmdv at 7 percent O_2 , or 95 percent reduction, for HCl. The baghouse will be designed to achieve an outlet grain loading of 0.010 grains per dry standard cubic foot corrected to 7 percent O_2 (gr/dscf @ 7% O_2). Combustion control techniques will be employed to minimize emissions of VOC and CO. Selective non-catalytic reduction (SNCR) will be used to control NO_x emissions.

3.4.4 DESIGN DATA FOR CONTROL EQUIPMENT

Design data for control equipment are not available because a furnace/boiler supplier has not been selected yet. Design parameters for the mass-burn energy recovery facilities under consideration, used in the BACT analysis, are presented in Section 4.0 of Volume III - Air Quality.

3.4.5 DESIGN PHILOSOPHY

The proposed control technologies, including dry scrubber and baghouse, are designed to neutralize acid gas emissions and capture particulate matter entrained in the flue gas from the furnace/boiler. The particulate matter is collected in a dry form to avoid wastewater disposal, corrosion, and stack gas reheat problems.

3.5 PLANT WATER USE

During normal operation of the energy recovery facility, all process cooling water will be treated wastewater effluent (reclaimed water) drawn from the City of Fort Myers Central Advanced Wastewater Treatment Plant (Central WWTP). The Central WWTP is located approximately four miles west of the site. The cooling tower blowdown water will be internally used in the Facility, to the greatest practicable extent, for ash quenching, lime slaking, and the like. Potable water provided by the Lee County Utilities will be used for process and potable purposes. An on-site well will be used for back-up cooling water needs. No process or sanitary wastewater will be 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 3-4. The quantities of water presented in this figure are approximate and will be more accurately determined when a vendor/contractor is selected to design and build the Facility.

3.5.1 HEAT DISSIPATION SYSTEM

System Design

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

The cooling tower system has adequate capacity to dissipate the heat from steam generated by firing 1,200 tpd of solid waste. If the steam turbine generator is out of service at any time when the boilers are producing high pressure steam, a separate bypass condenser will be used to accept the full rated design capacity of high pressure steam from the plant 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.

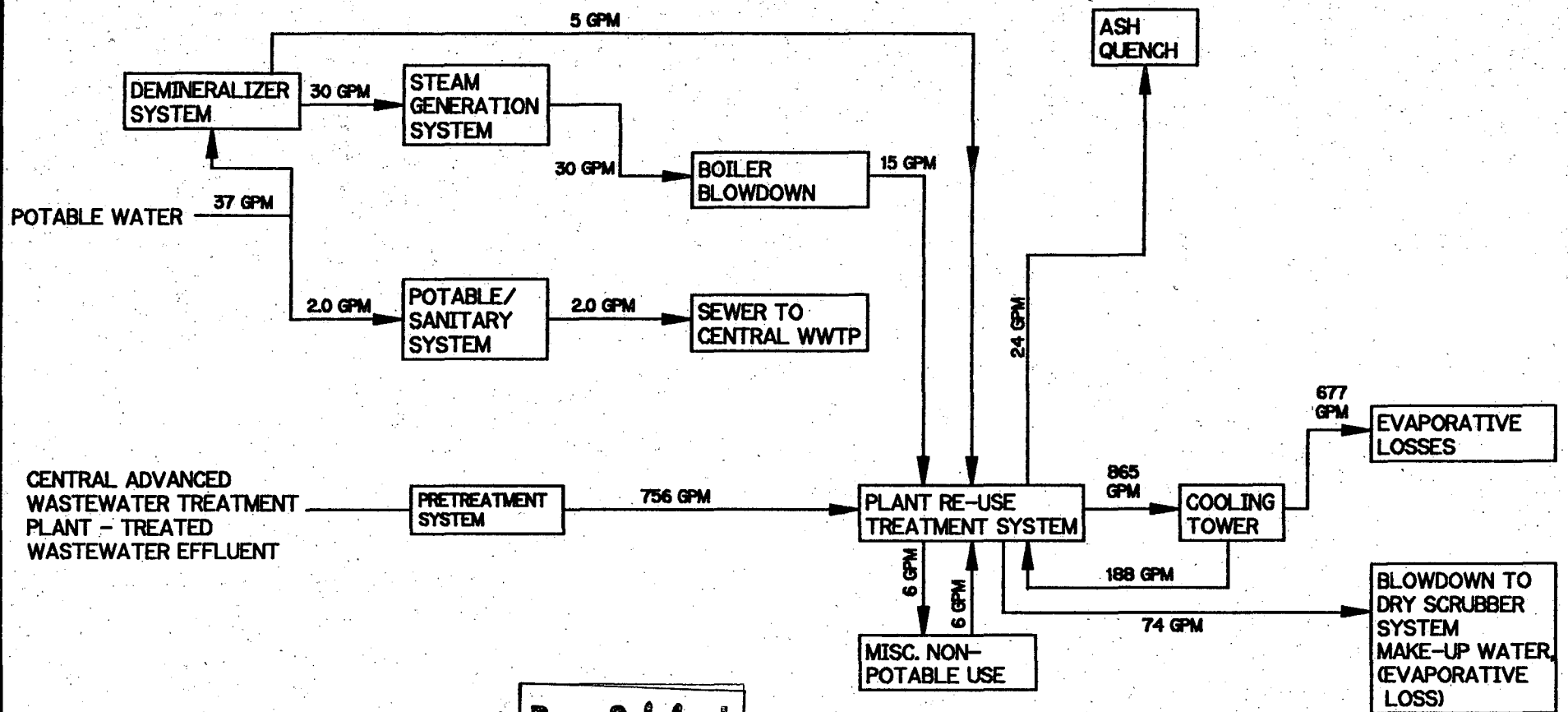
Consumptive (non-potable) water use will primarily be losses from the cooling tower system in the form of evaporation and drift. The average water loss due to evaporation will be 0.70 mgd at 1,200 tpd. Other water uses (losses) include water consumed in ash quenching operations and the operation of the dry scrubber system.

No conventional water intake structure will be needed in the energy recovery facility system, since all cooling water will be taken by pipeline from the Central WWTP. Similarly, no water will be discharged from the energy recovery facility system, except for approximately 0.15 mgd of combined sanitary and process wastewater which will be routed to the Central WWTP for treatment and reuse. Cooling ponds will not be used in the system.

Source of Cooling Water

All cooling tower makeup water will be obtained through a direct pipeline link with the Central WWTP. Approximately 0.80 mgd of reclaimed water will be needed for cooling tower makeup when the Facility is operating at 1,200 tpd. This will increase to 1.1 mgd at the Facility's ultimate capacity of 1,800 tpd. The WWTP has a capacity of 11 mgd, which is ample to supply the reclaimed water needed by the energy recovery facility even during low wastewater flow periods. Table 3-3 lists the current effluent permit limits for the Central WWTP. Table 3-4 contains the results of a recent comprehensive analysis of the reclaimed water. A letter of commitment from the City to furnish the reclaimed water can be found in Appendix 5.2.

The back-up cooling water supply for the Facility will be an on-site well. Information on the proposed well can be found in the water use permit application in Appendix 7.2.



Poor Original

NOTE: WATER USE QUANTITIES BASED ON 1800 - TPD FACILITY

CDM

TABLE 3-3
CURRENT EFFLUENT LIMITS FOR THE
FORT MYERS CENTRAL ADVANCED WASTEWATER TREATMENT PLANT

Parameter	Concentration (mg/L)*
Annual Average BOD & TSS	20
Monthly Average BOD & TSS	30
Daily Sample BOD & TSS	60
Total Nitrogen	3.0 at 11 mgd (300 lb/day)
Total Phosphorus	0.5 at 11 mgd (50 lb/day)
Residual Chlorine	0.01 Daily Maximum
pH	Between 6.0 & 8.5 pH units
Annual Fecal Coliforms	200 per 100 ml
Individual Sample Fecal Coliforms	800 per 100 ml

*Unless Otherwise Noted.

TABLE 3-4

APRIL 19, 1990 EFFLUENT SAMPLE ANALYSIS RESULTS
FOR THE
FORT MYERS CENTRAL ADVANCED WASTEWATER TREATMENT PLANT

Parameter	Concentration, mg/L (unless otherwise noted)
Calcium	53
Magnesium	20
Manganese	0.010
Sodium	200
Potassium	14
Iron	0.11
Iron, dissolved	0.11
Silica	10
Hydroxide	<0.50
Carbonate Alkalinity (as CaCO_3)	<1.0
Bicarbonate Alkalinity (as CaCO_3)	98
Sulfate (as SO_4)	120
Sulfite	<0.10
Chloride	250
Fluoride	0.85
Nitrite-N	<0.050
Nitrate-N	<0.050
Ortho-Phosphate-P	0.12
Total Kjeldahl Nitrogen-N	1.4
Ammonia-N	0.041
Carbon Dioxide	100
Total Organic Carbon	22
Chemical Oxygen Demand	17
Biochemical Oxygen Demand (5 day)	1.2
Suspended Solids	8.0
Total Dissolved Solids	850
Alkalinity (to pH 8.3)	<1.0
Hydroxide Alkalinity (as CaCO_3)	<1.0
Specific Conductance, umhos/cm	1100
pH, units	7.2
Turbidity, NTU	1.7
Color, PCU	20
Sulfide, EPA 600-376.1	<0.10
Arsenic	<0.0010
Aluminum	0.32
Barium	<0.010
Cadmium	<0.0050
Chromium	<0.010

TABLE 3-4
(continued)

Parameter	Concentration, mg/L (unless otherwise noted)
Copper	<0.010
Lead	<0.0050
Mercury	<0.00020
Selenium	<0.0020
Silver	<0.010
Zinc	0.022
Endrin ketone, ug/L	<0.10
Gamma-BHC, ug/L	0.027
Methoxychlor, ug/L	<0.50
Toxaphene, ug/L	<1.0
2,4-D, ug/L	<0.10
2,4,5-TP Silvex, ug/L	<0.010
Surfactants (MBAS-EPA 425.1)	<0.10
Total Coliform MF, colonies/100 ml	130
Gross Alpha, pCi/L	6.6+/-4.2
Gross Beta, pCi/L	56.8+/-6.7
Benzene, ug/L	<1.0
Carbon Tetrachloride, ug/L	<1.0
1,2-Dichloroethane, ug/L	<1.0
1,1-Dichloroethylene, ug/L	<1.0
Trichloroethylene	6.4
1,1,1-Trichloroethane, ug/L	<1.0
Vinyl Chloride, ug/L	<1.0
1,2-Dichlorobenzene, ug/L	<1.0
Tetrachloroethylene, ug/L	<1.0

Dilution System

Process water will be treated and reused internally within the Facility to the greatest extent practical. A maximum wastewater discharge of 150,000 gpd will consist of a combination of sanitary wastewater and process water. No Facility outfall will be required.

Blowdown

Liquid flows from blowdown systems will come from the boiler drums, the cooling towers, and the boiler feedwater demineralizers (BFDS). Blowdown flows from BFDS and boilers will be collected in the blowdown tank and either discharged to the residue quench tank or treated and reused in for the Facility. Cooling tower blowdown will be used in the lime slaking dry scrubber system and other Facility uses to the extent necessary and will achieve a maximum sewer discharge of 0.15 mgd. Since no intake structures are required, no intake structure trash disposal will be required.

Injection Wells

No injection wells will be used at this Facility.

3.5.2 DOMESTIC/SANITARY WASTEWATER

Sanitary wastewater flows will be generated within the Facility only in the personnel service areas (e.g., showers and washrooms). The Facility will employ approximately 50 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 will be made to accommodate up to 30 visitors at the Facility at any one time.

Wastewater discharged from the Facility will be limited to 0.15 mgd and will consist of sanitary sewage, and other waste process water. Wastewater discharges will be treated as necessary to comply with the City of Fort Myers pretreatment requirements, detailed in Section 2.2.7, prior to discharge. Wastewater will be discharged via sewer to the Central WWTP for treatment.

3.5.3 POTABLE WATER SYSTEMS

Potable water requirements (up to 0.075 mgd) will be supplied by tapping into the Lee County Corkscrew Water Treatment Plant's distribution system. The proposed potable water transmission route is described in Section 6.2.

3.5.4 PROCESS WATER SYSTEMS

To meet its process water needs at the initial design capacity of 1,200 tpd, the Facility will use approximately 0.80 mgd of advanced-treated effluent from the Fort Myers Central WWTP. The energy recovery facility 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 wastewater treatment plant.

3.6 CHEMICAL AND BIOCIDES WASTE

Both anti-corrosion and anti-fouling agents will be used at the Facility in the boilers and cooling tower. Blowdown will be treated and reused at the Facility. The exact flow diagram of the chemical waste system will be developed by the selected contractor. There will be no discharges from chemical processing, spent process water treatment, or waste piles as a result of plant operation that may enter the local environment.

3.7 SOLID AND HAZARDOUS WASTES

3.7.1 SOLID WASTES (INCLUDING ASH)

The residues of combustion will consist of noncombustible by-products, fly ash, spent lime, and bottom ash 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 and subsequently dewatered. Conveyers will also be supplied to transport fly ash and spent lime from the boilers, dry scrubbers, and bag house to the residue system.

The residue handling system will consist of totally enclosed conveyors and an enclosed building with a truck loading area and residue storage bunkers. Residue will be hauled from the Facility in covered trucks to the landfill/ashfill in Hendry County. The residue to be disposed of at the landfill/ashfill will meet all local, state, and federal regulations which govern such disposal. The residue will contain no more than four percent noncombustible material by dry weight content. Ferrous materials will be recovered from the residue prior to final disposal.

The only other solid wastes to be produced under normal operating conditions will be minute amounts of solid waste, primarily office and lunchroom trash. Since the Facility is specifically designed for the processing of solid waste, the Facility will dispose of its own trash.

Ash Management Plan

The residue of combustion will consist of non-combustible by-products fly ash, bottom ash, and siftings. The residue removal systems will be designed to remove these materials from the combustion and air pollution control systems for disposal. Ash will fall from the bottom of each combustion unit directly into a water-filled quench tank. The quench tank will be fully enclosed to prevent ash siftings from becoming airborne. The quenched ash will then be allowed to drain 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) to transport fly ash from the boilers, dry scrubbers, and bag house to the residue water system will be used for the bottom ash. The

combined ash is quenched and taken to the ash storage building. The floor of the ash building will be watertight. It will have a sealed concrete floor. Any free liquid which is generated by the storage piles will be collected and treated as required. The ash storage building will be covered 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 energy recovery facility in covered watertight trucks, to the proposed landfill/ashfill located approximately 15 miles from the Facility.

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 wetted 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.

Depending on the amount of waste recycled and the amount of processable waste, the facility may begin operating at or near its 1200 tpd capacity. Ash quantities are expected to be approximately 306 tons per day or 112,000 tons per year for the 1200 tpd facility. In the future when the Facility is expanded to 1,800 tons per day, the maximum annual quantity of residue requiring disposal will reach approximately 168,000 tons per year or 459 tons per day. It is not possible to accurately estimate the quantities of fly ash separate from total ash to be produced. Most facilities currently in operation in the United States combine fly and bottom ash in the total ash quench system. Thus, there is little information for calculating the precise amounts of fly vs. bottom ash.

TABLE 3-5

DELETED

As part of the ash handling system, a ferrous metal removal system will be installed to recover ferrous material. Experience at other energy recovery facilities has indicated that from six to eight percent of the total ash residue (wet condition) is comprised of recoverable ferrous metal. For the Lee County energy recovery facility, it can be estimated that between 6,500 and 8,500 tons of ferrous materials can be recovered during the first full year of Facility operation. It is not clear whether these quantities will decrease during the life of the Facility because the County's aggressive recycling program will become fully implemented. The development and implementation of the comprehensive recycling program will benefit the operations of the Facility by reducing the noncombustible recyclable materials entering the Facility for processing. A complete description of the Lee County recycling program, including a general implementation plan, can be found in Section 5.4.1.

The ash materials will be managed in compliance with Chapter 17-702, FAC, 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 assure compliance with all 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 operations, in enclosed combined systems when possible with the employee safety program will minimize the potential for inhalation, ingestion or body contact with the material.

Ash disposal will be at the regional Lee/Hendry County landfill located in Hendry County. The design of the landfill conforms with the design and performance standards set forth in Chapter 17-701, FAC. As currently proposed, the liner system includes (from bottom to top) a 12-inch low

permeability base layer (1×10^{-5} cm/sec) overlain by a 60-mil high density polyethylene (HDPE) liner, a composite polynet geotextile drainage material, overlain by a primary 60-mil HDPE liner and a 24-inch drainage layer. Both a primary and secondary leachate collection system are included. This double synthetic liner system will provide assurance of total containment of ash and solid waste materials, while reducing the potential for contamination of soils, and ground and surface waters. Separate disposal cells (monofills) will be used for the disposal of ash and municipal solid waste. At this time, Lee County plans to employ monofill disposal areas for ash and municipal solid waste. However, Chapter 17-702, FAC, allows codisposal and the use of ash as cover material. Lee County may utilize these disposal options in the future if they are deemed appropriate. The method of disposal at the landfill will not change the County's operations at the energy recovery facility.

It is anticipated that leachate generated by the landfill will be sampled quarterly, at a minimum, to establish baseline leachate quality characteristics. In addition, the ash will be analyzed quarterly for the following parameters using "Test Methods for Evaluation; Solid Waste Physical/Chemical Methods" EPA Publication SW-846 (3rd Edition as amended, Update #1, December 1987) or other test methods as appropriate.

Parameters for Ash Testing

pH	TDS	Dc	Pb	Ag
BOC	TSS	Cr	Hg	N
COD	As	Cu	N	Se

In addition, quarterly testing will be performed using EPA Method 3050, "Acid Digestion of Sediments; Sludges and Soils For All Priority Pollutants."

As part of the total ash management program, the County will be alert to potential uses of ash. Currently, various pilot projects are underway in Florida and other states to study the possibility of reusing the ash. For example, several communities are studying the effects of incorporating ash

materials into asphalt and concrete aggregate materials used in roadway pavements. This work is still in the development and research stages however, and will require additional study regarding mixing ratios, leachability, and encapsulation techniques for the material. If these programs are successful, Lee County may pursue ash reuse programs of its own. At this time, however, Lee County has no plans to use ash in any other process or product.

3.7.2 HAZARDOUS WASTES

No hazardous wastes will be generated on-site, nor will any be accepted for processing with the solid waste; therefore, there will be no hazardous waste disposal. Section 5.4.2 describes the procedures that will be followed if any apparently hazardous materials are identified by the crane operators or scale house personnel.

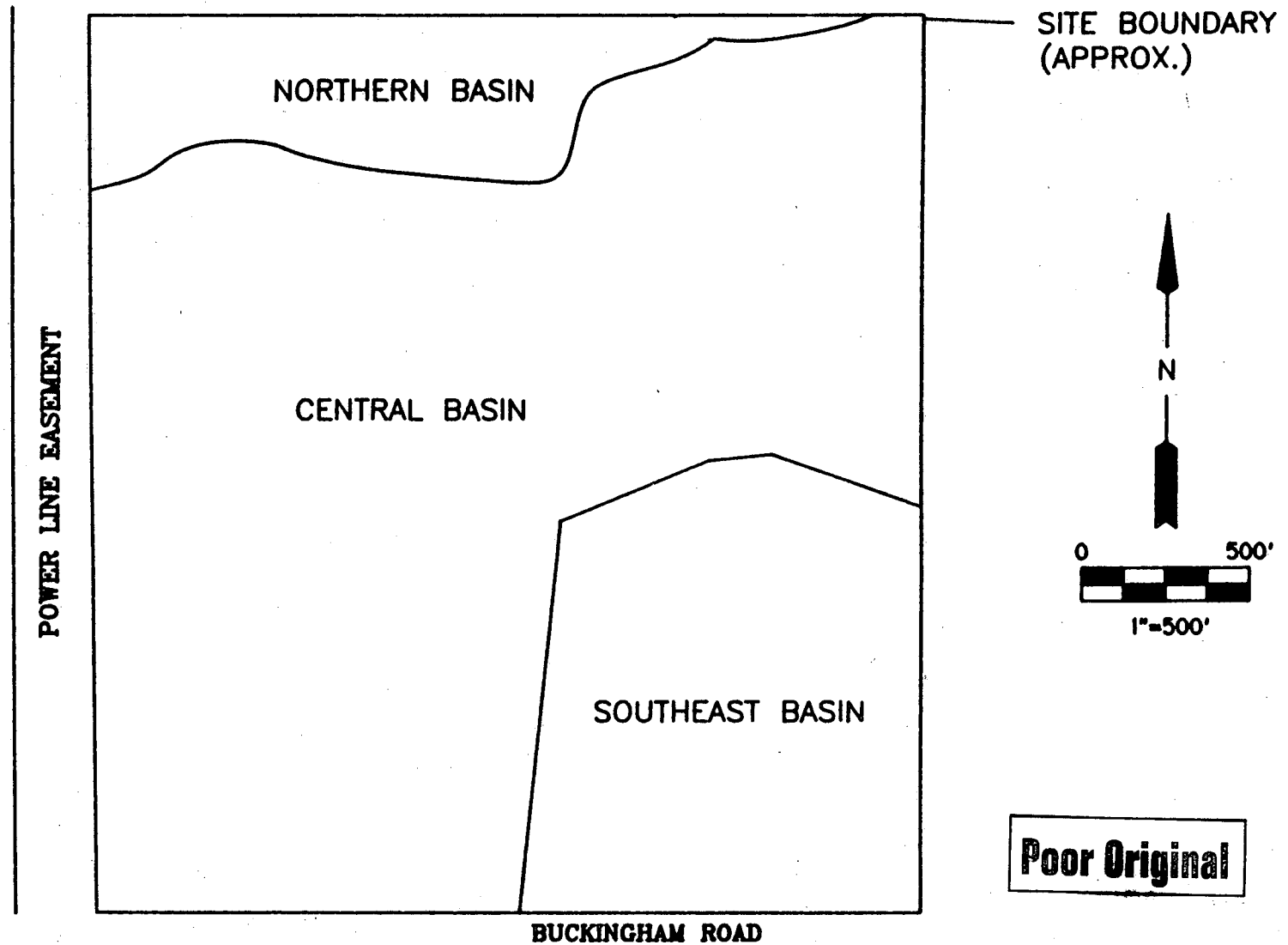
3.8 ONSITE DRAINAGE SYSTEM

The stormwater management system for the energy recovery facility is designed to use as much of the natural drainage pattern as possible while protecting the existing wetlands on-site. The natural drainage basins have been delineated on Figure 3-5.

The north basin includes approximately 21 acres within the site that contribute runoff to wetlands located north of the site. The central basin consists of 93 acres of uplands and wetlands. The southeast basin includes 34 acres. Runoff from the southeast basin is stored in isolated wetlands which make up approximately 9 acres of the basin.

During large rain events, stormwater runoff from each of the existing basins discharges to the southwest (through a series of wetlands) and west (along Buckingham Road) where it eventually flows under Buckingham Road (two 10' x 2.2' box culverts) and SR 82 (two 10' x 4' box culverts) into the Six Mile Cypress Slough (see Figure 2-25).

A five-acre wet retention pond is proposed to provide treatment and storage



Poor Original

Figure 3-5

CDM

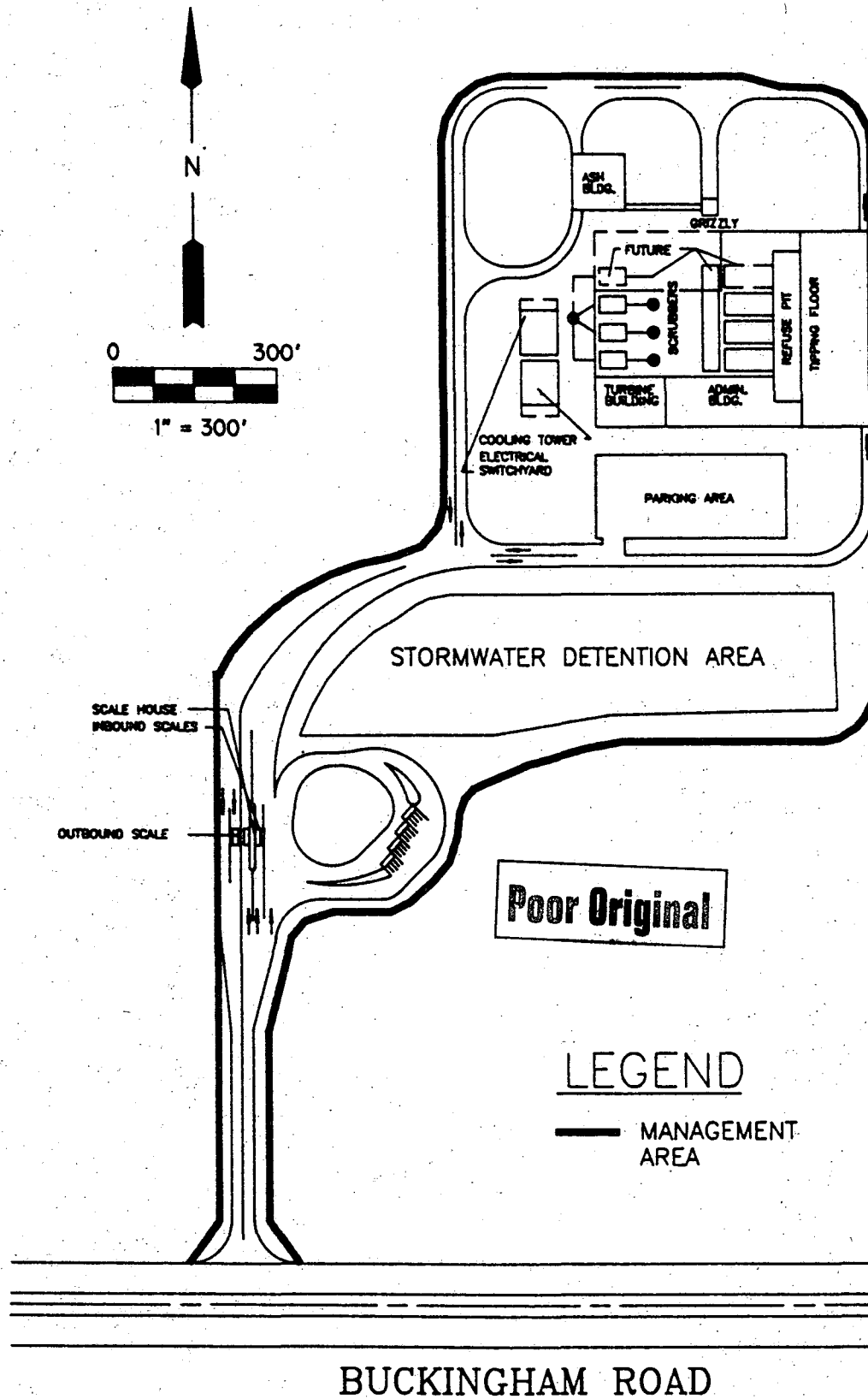
of runoff from the developed portion of the site. In accordance with SFWMD criteria, peak discharge from the developed site will be limited to 37 cubic feet per second per square mile for a 25-year, 72-hour, storm event (10.33 inches of rainfall). The 37-csm criteria imposed by SFWMD is based on the Six Mile Cypress Watershed allowable discharge limit and equates to 1.7 cfs for the developed site. Discharge will be directed south to Buckingham Road after passing through isolated wetlands which will provide additional treatment. It is proposed that the wet retention pond be included in the early stages of construction to ensure storage and treatment of runoff and dewatering from the construction site.

The on-site drainage (Figure 3-6) system is designed to meet both surface water runoff quality (Chapter 17-25, Florida Administrative Code), and quantity Chapter 40E-4 (SFWMD) criteria. Water quality criteria require that wet retention systems provide storage for the first inch of runoff from the developed project, or the total runoff of 2.5 inches times the percentage of imperviousness, whichever is greater. Commercial or industrial projects are also required to provide at least one-half inch of dry retention pretreatment. There are also water quantity regulations regarding peak flow from the site. Generally, SFWMD criteria are based upon: (1) historic discharges (post development peak discharge rates from the 25-year, 72-hour storm event must not exceed the predevelopment runoff rate from the same storm); (2) amounts determined in previous District permit actions; or (3) amounts specified in District criteria (basin-specific limits). As stated above, the energy recovery facility site is restricted to 37 csm based on basin specific limits (see Appendix 7.3).

3.9 MATERIALS HANDLING

The energy recovery facility will have two or three independent process trains. Common elements, such as the waste feed crane, ash conveyers, and boiler feedwater systems, will have redundant capabilities. Initially, two 600-tpd stoker waterwall combustion/steam generation units will be constructed.

ACAD FILE: RRSITEF2.DWG 06/21/90



Surface Water Management Area
Lee County Energy Recovery Facility

CDM

FIGURE 3-6

A third stoker waterwall train, rated at 600 tpd, will later be added to reach the ultimate capacity of 1,800 tpd as the demand on the Facility increases. The facility may begin operating at capacity, or will reach capacity within 18 to 24 months of opening. The independent processing trains will 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. Lee County will defer some capital expenditure by not constructing the final 600-tpd train until it is needed.

The refuse bunker and tipping floor area will be 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 will draw all the necessary air from the refuse bunker and tipping floor area. Vents installed on the walls opposite the air intakes will induce a cross-flow ventilation. The dust particles and odors generated in the area will be 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 will be installed to charge the combustion units and maintain the solid waste storage area. The cranes will be of the traveling bridge type, employing a polyp-type grapple. Each crane will be capable of meeting the solid waste handling requirements of the entire Facility.

No heavy equipment such as large cranes, or plant components such as boilers, will be transported to the site, unloaded, stored, or moved around the site during normal operation or maintenance of the Facility. The room in which the steam turbine generator is housed will have an overhead crane for maintenance of the generator. The Facility's dump condenser will be capable of condensing all steam if the generator is inoperable or being serviced.

Lime for the acid gas dry scrubber will be delivered weekly and will be pneumatically transferred to an on-site storage silo. The lime will be

slaked and pumped in a slurry form to the scrubber unit; approximately 24 tons will be used each day. Ash residue (which includes the spent lime) will be hauled on a six-day per week basis to the landfill/ashfill in Hendry County, except for holidays.

3.10 ASSOCIATED FACILITIES

In conjunction with the energy recovery facility, a landfill/ashfill will be constructed in Hendry County. The location of the proposed landfill/ashfill is shown in Figure 2-16. A separate permit is under preparation for this proposed facility; excerpts from the draft permit, including the transmittal letter, table of contents, and FDER form 17-7.130(1), are presented in Appendix 7.1.

The proposed landfill/ashfill will serve the disposal needs of both Lee and Hendry counties. The landfill site consists of approximately 1,720 acres, of which 400 acres will be used for waste disposal. Approximately 260 acres have been designated for a Class I bypass and ash landfill. Approximately 40 acres will be used for the disposal of construction and demolition wastes. About 60 acres have been designated as a sludge composting/dry trash area. The sludge composting facility will be permitted separately at a later date. No hazardous wastes will be accepted at the facility. The anticipated life of the landfill is 40 years.

The proposed liner system for the Class I and ash fill areas is a double flexible membrane liner with primary and secondary leachate collection systems. A single synthetic liner with a leachate collection system is proposed for the Class III disposal area for construction and demolition debris. A minimum of 14 groundwater monitoring wells, 18 piezometric wells, and two surface water monitoring stations will be installed to assess any potential environmental impacts.

Section 4

SECTION 4.0

ENVIRONMENTAL EFFECTS

OF SITE PREPARATION,

AND

FACILITY AND ASSOCIATED

FACILITIES CONSTRUCTION

4.0 ENVIRONMENTAL EFFECTS OF SITE PREPARATION, AND FACILITY AND ASSOCIATED FACILITIES CONSTRUCTION

An overview of anticipated construction activities is provided as a preface to the discussion of the effects of site preparation and construction.

The duration of field construction for the Lee County energy recovery facility will be approximately 28 months. 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 36 months, from notice to proceed award to full plant operation.

The principal construction phases will include site preparation (site clearing and preparation, excavation, pile construction and backfilling), construction 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. The estimated time required to complete field construction activities is shown on Figure 4-1.

The initial phase of construction will involve the clearing of trees and stumps, and stabilization of the site access road. This activity will be followed by construction of the retention basin and topsoil removal.

Upon completion of the retention basin, dewatering procedures for refuse bunker excavation will begin, if necessary. Refuse bunker excavation will commence when the groundwater has dropped to an appropriate level. After initial excavation, sheet pile driving, if required, will begin for further excavation of the refuse bunker. Dewatering will continue until the concrete walls for the refuse bunker have been placed and cured to an elevation above the existing groundwater level. Construction of the refuse bunker, and the associated dewatering is planned to occur during the dry season.

CONSTRUCTION PHASES AND ACTIVITIES

MONTHS

SITE PREPARATION

- Site Clearing and Access Road
- Topsoil Removal
- Retention Basin
- Site Grading

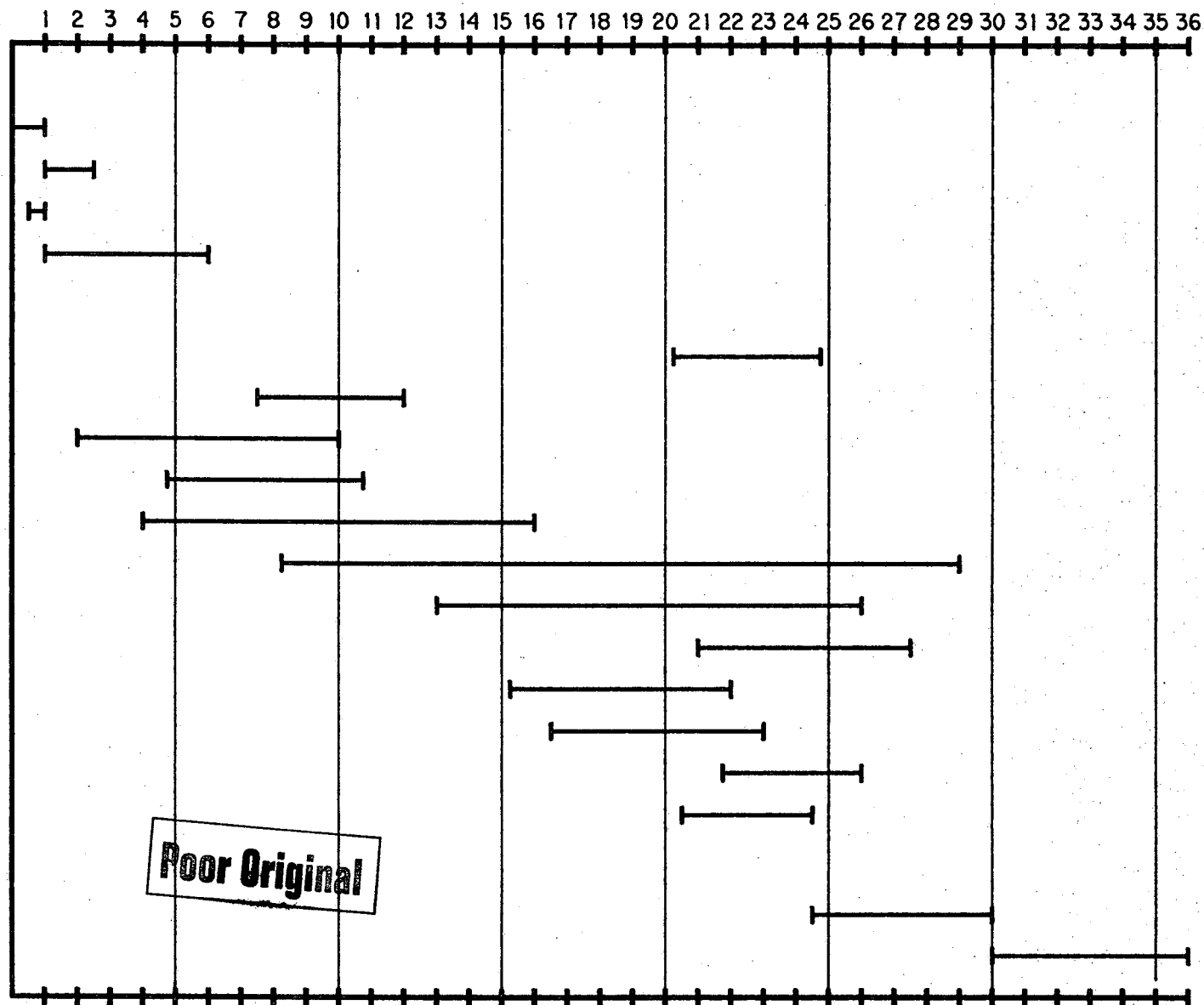
FACILITY CONSTRUCTION

- Scale House Installation
- Fill for Tipping Floor
- Dewatering for Bunker ^I
- Foundation
- Refuse Bunker
- Boiler House
- Power House
- Administration and Residue Building
- Switch Yard
- Stack
- Cooling Tower
- Tipping Room

FINALIZATION

- Landscaping and Access Road
- Start-up and Acceptance Testing

^I If necessary



Poor Original

CDM

If the dewatering activities associated with facility construction must occur during the wet season and active growing season, additional measures will be taken to ameliorate the impacts to the on-site wetlands. These measures may include: the maintenance of water levels as close as practical to normal wet season elevations through the use of a rotating schedule of wetland inundation; development of a system of wetland discharge which encourages sheet flow discharge into the wetlands and prevent the formation of channel flow; or spray irrigation over a large area comprised of wetlands and uplands for dewatering discharge. All these alternative measures will conform with applicable state standards for turbidity and other water quality parameters. Dewatering is not expected to continue for more than six months. An NPDES permit application is being filed with EPA to allow discharge of this water to an on-site retention pond (Appendix 6.1).

Permanent and temporary drainage structures will be built during various phases of construction to control surface water runoff. The surface runoff collected in drainage ditches will be directed to a retention pond constructed in the early stage of construction. Water from the retention pond will be used for dust control, when necessary.

There will be no discharge of process water or wastewater to any surface water bodies, other than typical stormwater runoff and dewatering discharges during construction. This Facility is not classified under the NPDES Stormwater with Industrial Activity permitting category. It is anticipated that a general NPDES for non-point stormwater runoff will be necessary in the future. At this time, there is not an application process in place for the general NPDES stormwater runoff.

Only SFWMD permits are currently required for stormwater runoff (see Appendix 7.3). The contractor will be responsible for obtaining any required dewatering permits other than the NPDES permit (see Appendix 6.1) and SFWMD dewatering permit (see Appendix 7.4).

Erosion will be controlled by various methods depending on the extent and type of excavation and grading. During construction, exposed areas will be left bare for as little time as practical. Due to the flat topography of the site, minimal erosion is anticipated during construction. The greatest

MLC19/2
6/28/90

potential for erosion will be on the side slopes of the elevated tipping floor area. When erosion control is necessary, typical methods will be used, such as sodding, netting, or mulch seeding.

Backfill will be placed concurrent with excavation activities. Backfill will be required for elevation of the tipping floor and its associated access ramps. Some backfill material may be obtained from suitable material excavated for the building foundations and refuse storage pit.

On-site borrow material from the retention pond will be used to the extent possible if found to be suitable. Off-site material will be imported for additional fill as required.

The Facility foundation will be constructed, or by installing deep end-bearing and/or friction pilings. A detailed discussion of Facility support can be found in Section 2.3.1. Construction of the foundation will require about six to nine months.

The erection of steel superstructures for on-site facilities is expected to commence during the 50th week of construction and continue for a period of approximately 20 weeks. These steel superstructures will range in height from about 50 to 160 feet above existing ground elevation, and will cover an estimated area of four acres.

As shown on Figure 4-1, the longest construction time will be required for installation of major equipment such as: boilers, grate or rotary combustion system, air pollution control devices, turbine generators, cooling towers, and steam and process piping. In most cases, the installation of this equipment will begin as the steel superstructure of each building nears completion. Major equipment installation is expected to span a period of 65 weeks. This activity will begin in approximately the 58th week and will continue until the end of the Facility construction.

Completion of construction will involve such activities as paving of the access road, painting, and general landscaping. Non-critical activities such as painting and landscaping are expected to continue into the start-up period.

The final construction activity is Facility start-up and acceptance testing. The Facility will be tested under various operating conditions and monitored to determine compliance with environmental, capacity, and energy standards. Start-up and acceptance testing will be performed by the Facility's operating staff and various specialists and regulatory personnel.

During routine construction activities, it is anticipated that six to ten pieces of major equipment will be operating on the site. This average equipment requirement will vary with the phases of construction. The very early and final stages of construction will typically have reduced equipment requirements. The largest quantity of equipment will be operating during the peak construction period from the 12th to the 56th week.

Specific equipment used during construction will depend on the vendor/contractor chosen to construct the energy recovery facility. The vendor/contractor may choose to rent specialized equipment during various phases of construction. When rented equipment is used for a particular phase of construction, the vendor/contractor typically will complete all activities requiring this rented equipment in one stage, rather than staggering the work.

Table 4-1 lists typical equipment that will be used during construction of the energy recovery facility. This equipment list does not include the vehicles needed to haul concrete or the general traffic associated with the work force entering and leaving the site.

4.1 LAND IMPACT

4.1.1 GENERAL CONSTRUCTION IMPACTS

Impact on Solid Waste Generation and Disposal

During construction of the energy recovery facility, a variety of solid wastes will be generated, including vegetation matter, wood, paper products, concrete, scrap metal and lumber, and miscellaneous oils and

TABLE 4-1

ESTIMATE OF
CONSTRUCTION EQUIPMENT REQUIREMENTS

Estimated Equipment	Quantity
<u>EARTHMOVING</u>	
Dozers	2
Front End Loader	2
Backhoe	2
Scraper	1
Trucks	7
Grader	1
Paver	1
<u>MATERIAL HANDLING</u>	
Cranes	4
Derrick	1
Pile Driver	1
Concrete Pump	1
Fork Lift	1
<u>IMPACT</u>	
Pneumatic Tools	10
Jack Hammers	2
<u>MISCELLANEOUS</u>	
Vibrators	3
Pumps	6
Compressors	2
Generators	2
Welders	4
Saw	3

fluids required for equipment operation. These will be disposed of periodically using a licensed waste hauler to transport to the wastes to properly permitted disposal facilities.

Site clearing procedures will generate debris such as vegetation matter and wood. Approximately 20 acres of vegetative ground cover will be removed before facility construction begins. Any non-marketable wood debris generated by the removal of trees will go to the Class III landfill in Hendry County or burned on-site.

Small quantities of waste oils and solvents may be generated on-site during equipment maintenance and various construction activities. Waste oil will be generated at a rate of about one drum (55-gallon barrel) every two to three months. Typically, fewer waste solvents would be generated than waste oils, except during certain phases of equipment installation. For example, installation of piping and electrical systems could generate twice as much solvent as oil. Drums of waste oils and solvents will be stored on pallets within a bermed area. They will be properly labeled and covered with a weatherproof canvas or plastic drop cloth. Neither waste oils nor solvents will be stored on-site for longer than 90 days. Transport and disposal of these wastes will be handled by properly licensed contractors.

It is estimated that approximately 120 tons of solid waste will be generated by the Facility construction (see Figure 4-2). 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 non-recyclable materials to the Lee County landfill. The pattern of waste generation will correspond to the types and levels of activity occurring on the construction site. An initial peak is associated with site preparation and clearing. After site preparation activities, waste generation will drop until building construction and equipment installation begin. 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 must be assigned to locations where construction activities are minimal. Areas

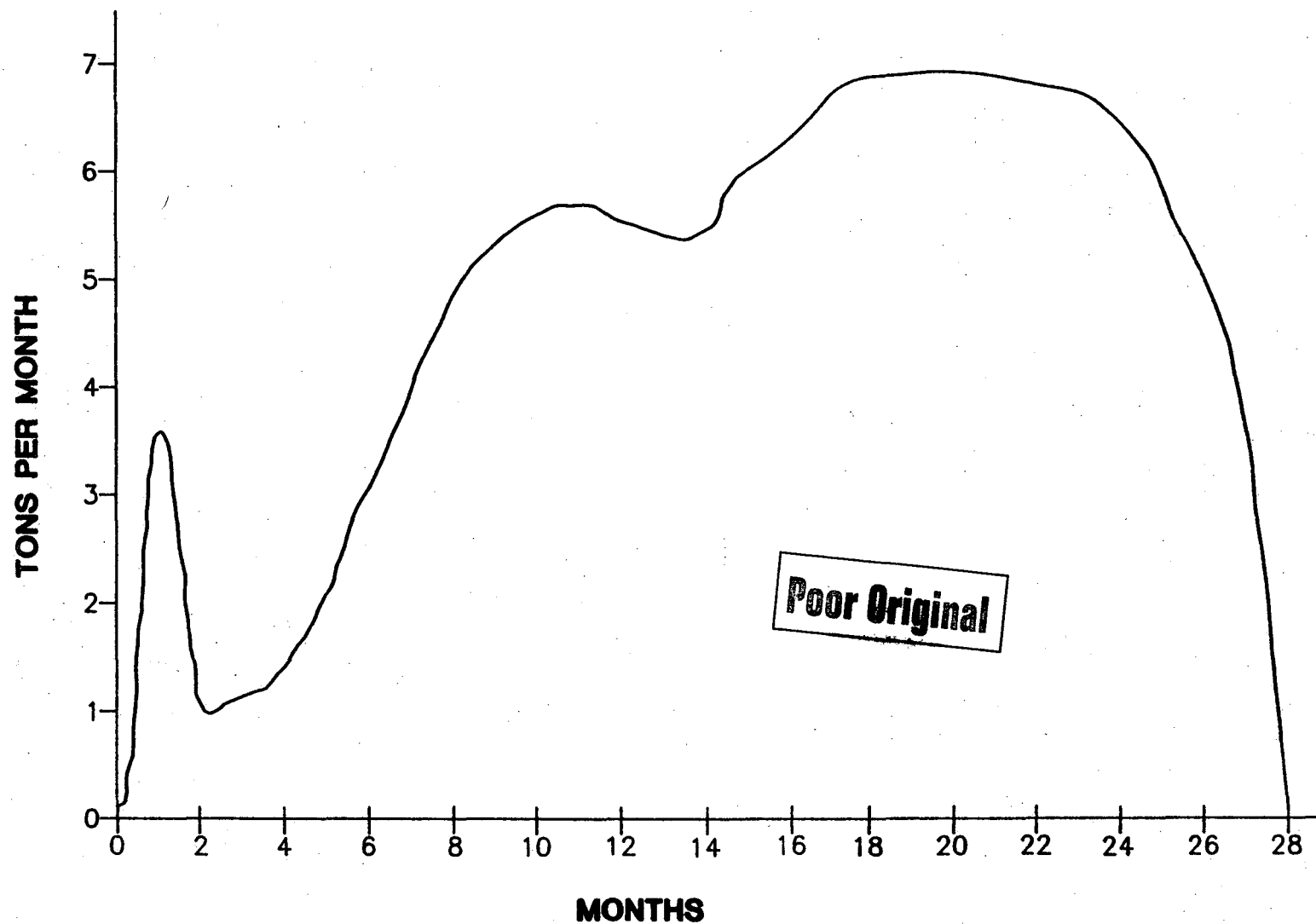


FIGURE 4-2

CDM

north and east of the Facility site proper are suited as material laydown areas, since 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, most likely to the east. General work force parking and a construction office will be located near the material laydown area.

Land Disturbance

A detailed discussion of construction activities that disturb existing terrain was presented in the introduction to Section 4.0. These activities are listed below.

1. Initial site clearing and stabilization of the access road.
2. Construction of the stormwater retention pond.
3. Excavation for the refuse bunker.
4. Fill placement for the tipping floor and other structures.

It should be noted that all of these activities are typical for this type of construction project.

4.1.2 ROADS

The project site will be accessed from Buckingham Road. An access road to the Facility will be constructed as shown in Figure 2-6. Other than this access road, there will be no other paved roads on-site. An existing, unimproved road in the proposed powerline corridor may be stabilized (but not paved) to provide access to electrical transmission lines.

4.1.3 FLOOD ZONES

The Facility site is not within the 100-year flood plain designated by

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 site topography will be altered by the proposed Facility. As construction progresses, a portion of the site area will be covered with impervious surfaces such as roads and buildings. When initial construction is complete, the site will have 12.3 acres of impervious surface. The remaining acres will be covered by the stormwater retention pond and buffer areas.

The creation of impervious surfaces will change the site drainage features and percolation rates. The hydrologic analysis is summarized in the SFWMD stormwater permit application (Appendix 7.3). One retention basin will be constructed between the Facility and a cypress dome wetland located on the southern property boundary. It will cover a total of five acres and will have an average depth of four feet. The stormwater retention basin will be one of the first site improvements constructed so that runoff generated during construction of the remaining facilities can be diverted to the basin.

Modification to near ground surface soil conditions will result from construction of the proposed foundation and building support (installation of piles). Building support can be accomplished using load-bearing piles installed underneath areas of the main structure which will bear the heaviest loads (e.g., the boiler and the stack). A discussion of site improvement techniques is provided in Section 2.3.1.

The following measures will be taken by the vendor/contractor to control soil erosion and air pollutants during construction.

- o On-site traffic will be limited to stabilized access roads as much as possible.

- o All dirt roads will be watered as needed to minimize dust.
- o Use of siltation barriers (i.e., haybales, sedimentation fencing) will be employed during any dewatering activities.
- o Selective clearing will be used whenever possible to allow natural seeding to stabilize the disturbed soil and berms, and to minimize wind erosion.

A buffer zone will be maintained along the site border to limit visual impacts during construction.

4.2 IMPACT ON SURFACE WATER BODIES AND USES

4.2.1 IMPACT ASSESSMENT

Minimal impact to surface water bodies and uses is anticipated due to site preparation and construction activities. There are no proposed intake or discharge structures for cooling water or other process waters; therefore, an NPDES Discharge Application is not applicable, except for the dewatering activities.

There are site preparation and construction activities which will have temporary impacts. Dewatering of the uppermost aquifer to construct the refuse bunker will be necessary. Water from the dewatering effort will be discharged to the stormwater retention pond, and to a temporary retention basin created specifically for the temporary dewatering. The construction of the refuse bunker is scheduled to occur during the dry season which should minimize the quantity of water that must be removed. The construction of the refuse bunker should be completed within six months, of which dewatering may be necessary for four months. Surface water may be discharged from the stormwater retention pond, and the temporary dewatering retention pond to on-site wetlands or drainage ditches after the suspended solids have settled from the dewatering discharge. An NPDES General

Discharge Permit is being submitted to EPA and is included in Appendix 6.1. An application permit for dewatering is being submitted to SFWMD and is included in Appendix 7-4.

On December 7, 1988, EPA proposed rules for the NPDES Permit Application Regulation for Stormwater Discharges. These proposed rules are compiled in the December 7, 1988 Federal Register, Volume 53, Number 235, Environmental Protection Agency, Part III. A review of these proposed regulations has been made in order to provide the best possible information regarding the need for compliance for this Facility. Based on this information, as well as communications with EPA, the energy recovery facility will not be classified as industrial activity (Appendix 6.2). Therefore, an NPDES Industrial Activity Stormwater permit application is not anticipated to be needed. A written supporting statement from EPA regarding this information has been requested by Lee County.

It is anticipated that general NPDES stormwater runoff inventories, rules, and applications will be forthcoming by 1992. This information will be tracked accordingly, and submittals will be made as needed to comply with applicable requirements.

4.2.2 MEASURING AND MONITORING PROGRAMS

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

Stormwater runoff will not directly discharge to wetlands within the project site. Furthermore, since the energy recovery facility is fully enclosed and roofed, no significant impacts to the quality of surface waters in the vicinity are expected.

As described in Section 3.8, stormwater runoff from the developed site will be directed to a five-acre 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 basin. The discharge structure for the retention basin will include 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 depth, appreciable discharge from the site will occur infrequently.

To confirm the operational efficiency of the surface water management system, the County proposes to conduct periodic samplings of stormwater discharges from the site (four to six storm events). Sampling will be performed to ensure compliance with Class III water quality standards as described in FAC 17-3. Sampling is also proposed before construction to establish ambient conditions.

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).

The refuse pit is the only proposed structure that will require extensive excavation and dewatering. It will be necessary to dewater the surficial aquifer during construction of the refuse pit. The maximum proposed depth of the refuse pit is less than 20 feet below ground surface. A wellpoint system or a system of drains and pumps may be used during the dewatering. Regional data indicates that the water table aquifer has a transmissivity

of 80,000 gpd/ft in spite of its relative thinness of 20 feet (see Section 2.3.2). A large amount of water must be pumped to establish local drawdown in an aquifer of high transmissivity, and the effects of the drawdown cone will extend outward to a large radius. A proposed dewatering scheme to construct the ~~80-foot x 300-foot~~ ^{APPROXIMATELY 70 FOOT BY 235 FOOT} refuse bunker less than 20 feet below ground surface may require removal of about 1 mgd average daily withdrawal to keep the excavation dry. Such a withdrawal may generate a water table drawdown of three feet at a distance of about 1,000 feet from the refuse bunker, and one foot at a distance of about 2,500 feet. Because of the proximity of the refuse bunker and the abandoned landfills on Buckingham Road, a water use permit will be required for the dewatering (see Appendix 7.4). The withdrawals for dewatering will have no affect on any permitted water supply wells.

No adverse impact on wetlands is anticipated because the dewatering will be temporary and is currently planned to occur during the dry season. Some of the dewatered water may return to wetlands via the surface water retention pond (see Section 4.2).

Construction of the reuse bunker is scheduled as six months during the dry season. Dewatering during construction will be scheduled for approximately four out of the six months.

4.3.2 MEASURING AND MONITORING PROGRAMS

A groundwater monitoring program will be established to monitor water elevations of the water table aquifer during dewatering. Monitor wells or piezometers will be installed before the initiation of construction so that they can be used to measure the decline and subsequent recovery of water levels during and following dewatering procedures for construction.

A groundwater water quality monitoring program will be established for Facility operation. This program should will be initiated before Facility construction begins to establish background water quality data.

4.4 ECOLOGICAL IMPACTS

4.4.1 IMPACT ASSESSMENT

Impacts to fish and wildlife populations caused by construction of the proposed Facility are expected to be minimal. The Facility will occupy 17.3 acres of the property. The Facility will be located in a disturbed upland area predominated by wax-myrtle.

Limited low-quality wetlands do exist on the site. Impacts to these wetlands have been avoided as much as possible. The following impacts are anticipated.

- (1) The power transmission lines will be routed along the eastern and northern sides of the northeast quarter of Section 24. To minimize impacts to jurisdictional wetlands, the power lines will be run along an existing, unimproved road which can be seen on Figure 2-5b. The road will be improved and stabilized (but not paved) to provide access for maintenance of the transmission lines. The road will have a maximum width of 25 feet. Culverts will be installed as needed to allow contiguous flow through wetland areas. Approximately 2.7 acres of fill will be needed to construct the road (see Figure 2-6). The total area of wetlands impacted by the transmission line is 2.7 acres. This includes 0.7 acres of cypress/pine (624), 0.3 acres of wet prairie (643), and 1.7 acres of wet pine flatwoods (415) (Figure 2-26). The cypress/pine (624) area impacted is on the fringe of this vegetation habitat type and is dominated by pines with cypress scattered throughout the fringe. Therefore, the impacts to this habitat type are anticipated to be minimal due to the low number of cypress.
- (2) Impacts caused during the construction phase of this proposed project for the Facility are anticipated to be minimal. The construction area will be isolated to the highly disturbed wax-myrtle (429)

vegetation habitat. It is proposed that Facility construction will be initiated in August 1991. During the first six-months of construction, a stormwater retention pond and refuse pit will be constructed. These on-site wetlands will not be drained by construction of the stormwater retention pond. Construction of the stormwater retention pond will be complete prior to the construction and dewatering of the refuse pit. It is currently planned that the stormwater retention pond and refuse pit be constructed during the dry season of the year. The stormwater retention pond will be constructed so that sediment in runoff settles out before the overflow discharges to wetlands in the southeast quarter of the proposed site.

Construction of the refuse pit will require dewatering. No impacts from dewatering of the refuse pit are anticipated to surrounding wetlands from sedimentation or dewatering (drying) of wetlands. The water table within the immediate area of the refuse pit will be lowered to keep the excavation dry during construction only. Dewatering of the refuse pit will take approximately four months. Dewatering water from the refuse pit will be discharged to the stormwater retention pond and a temporary retention pond. The temporary retention pond will be constructed in the farm pasture (210) vegetation habitat in the northwest quarter of the project site. Excess water will be drained to existing ditches and surrounding wetlands by a bleeder system. Therefore, some wetlands most likely to be affected by a drawdown during the dewatering period may be inundated thus increasing their hydroperiod and overall functionality. See Section 4.3.1 and Appendix 7.4 for details of the groundwater hydrology for the dewatering of the refuse pit.

Appendix 6.5 contains the COE/DER "Joint Application for Activities in the Waters of the State of Florida," which addresses ecological impacts in detail.

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, and grazing activities over the course of 20 years. Species diversity and composition on-site should not undergo any major alterations as a result of Facility construction. When construction of the energy recovery facility begins, the resident wildlife population will relocate to non-impacted areas adjacent to the site. The present diversity of on-site habitats should not be impacted by significantly impacted by the Facility.

The results of the wildlife survey indicate 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 of the proposed site.

The Florida panther (Felis concolor coryi) may use part of the area as a corridor of movement according to information supplied by the FGFWFC. 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 energy recovery facility construction.

Wetland bird fauna, the tricolored heron, snowy egret, and little blue heron, will not be impacted. Limited, if any, wetland habitat will be disturbed.

The big cypress fox squirrel may also be on-site. No negative impacts on this species are anticipated.

4.4.2 MEASURING AND MONITORING PROGRAMS

No wildlife monitoring programs are proposed since impacts will be minimal during the construction phase of this proposed project. Wetland monitoring will be conducted on affected wetlands during pre- and post-construction of the Facility (see Appendix 7.3). The wetland monitoring program conducted on affected wetlands is described in the mitigation plan for the stormwater permit application (see Exhibit A, Appendix 7.3).

The measurement program used to determine ecological conditions is discussed in Section 2.3.6.

4.5 AIR IMPACT

4.5.1 EMISSION RATES

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

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

Because neither a vendor nor a construction contractor have yet been selected for this project, a detailed construction schedule and plan have not yet been developed. It is anticipated that Facility construction will take a total of approximately 28 months.

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 likely be great enough to cause any local excesses of any ambient air quality standards.

Fugitive dust will be generated throughout the construction period by land clearing, fill placement, excavation, grading, travel on unpaved surfaces, and wind erosion of unvegetated areas. Studies performed for EPA (Cowherd and Grelinger, 1988; Williams et al., 1988) show that generation of PM_{10} at construction sites is dependent on soil silt content and moisture, and that the dominant source is travel on unpaved surfaces.

Trucks carrying fill and concrete may travel on temporary on-site dirt access roads during construction. Several mitigating measures may be used to reduce particulate emissions from these roads. Routine watering would reduce roadway emissions by approximately 50 percent. A watering truck will be on-site for various other activities. This truck could be partially dedicated to roadway watering, or an additional truck could be provided for this purpose. Surface treatment with penetrating wetting agents could provide up to a 50 percent reduction in particulate emissions, depending on the frequency of application. The application of penetrating wetting agents is more costly than routine watering, but fewer applications are required when wetting agents are used. The costs of reducing roadway particulate emissions using these methods would include the expense of purchasing and mixing wetting agents, and the expense of using a watering truck or other vehicle.

Soil stabilization may also be used to reduce roadway particulate emissions. Soil stabilization is performed when the roadway is developed, and can achieve a 50 percent emission reduction by binding up surface soil. The advantage of soil stabilization is that the roadway becomes more driveable. Paving can reduce roadway particulate emissions by nearly 85 percent. Road paving can be accomplished by soil compaction and the addition of base coarse material, or by soil stabilization with an asphalt cap.

Good construction practice requires a developed access road when extensive truck traffic is necessary. Because the access road must eventually be able to handle heavy trucks on this site, it should be built at least to base coarse level or it will require improvement during construction. Thus, paving of this roadway would be cost-effective and is typically a recommended method for reducing particulate emissions.

General site emissions--particulate emissions across open and active construction areas--are best controlled by a comprehensive watering program which can reduce emissions by 50 percent. Other methods used to control

emissions are not practical because soil is usually in a state of transition during construction. An excessive amount of wetting agents would be required, and binding agents would be continually broken up. Since a watering truck is available on-site for other construction activities, use of this truck for site watering should not impose a significant cost.

Particulate emissions in completed cut and fill areas can be reduced by 65 to 80 percent by using vegetation or binding agents. Since these areas are not active and would not receive traffic, vegetation can grow undisturbed and binding agents need only infrequent applications. Embankments brought up to grade and no longer subject to construction activity should be immediately landscaped or vegetated. Till piles or embankments requiring future activity should be treated with a binder.

Good site maintenance will be practiced. Most site maintenance practices are not costly, and the extra effort they require is usually outweighed by the benefits they offer. As part of the construction agreement with Lee County, the vendor/contractor will be required to employ proper dust control techniques to minimize fugitive emissions.

4.6 IMPACT ON HUMAN POPULATIONS

The construction of the energy recovery facility may create both positive and negative impacts on the local and regional populations. Positive impacts are anticipated to 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 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 report, the predominant land uses on the Facility site's periphery include a Florida Power and Light power transmission line and associated easement, 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. This area and the undeveloped forested future county park on the east side of the Facility site buffers the developed residential area of Lehigh Acres from the Facility site. In addition, wetlands, forested uplands, cropland, and pastureland are located between the Facility site and this primarily vacant 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 area is buffered from the Facility site by wetlands, forested uplands, cropland, and pastureland which surround the site.

No effect on sensitive receptors is anticipated. The distance from the Facility site to the residential areas, and the presence of the buffer areas are the reasons for this determination.

4.6.2 WORK FORCE

During construction of the energy recovery facility, the daily work force is expected to average between 145 and 300 people. The initial phase of construction, including site clearing, access road development, and excavation of retention basins, will require a work force of approximately

100 people while peak phases will require approximately 325 persons. The work force, from the eighth to the twenty-second month of the construction schedule, should average from 275 to 290 people. Throughout the course of the Facility construction a total of approximately 1,200 people will be employed. Figure 4-3 illustrates the estimated work force requirements during Facility construction.

Work Shifts

The majority of activities required for the construction of the energy recovery facility will take place on an eight-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, (over 40-hour per week schedules) may be implemented. Dewatering of the refuse bunker excavation which will not exceed a period of six months is expected to require 24-hour per day operation of the dewatering pumps. The placement of concrete for the refuse bunker will require a period of continuous pour. The requirements for 24-hour per day concrete placement will be determined based on final design and the method of construction to be used. All the remaining construction activities outlined on Figure 4-3 will be conducted during eight- to ten-hour per day shifts.

Work Force Revenues

Operation of the energy recovery facility and associated landfill/ashfill will require approximately five administrative staff, 40 operations personnel, and nine maintenance personnel. Based on the assumption that most Lee County positions are filled by individuals from within the County labor pool whenever possible, the newly created payroll generated from the energy recovery staff will be a major long-term benefit to the region. Additional staff to meet Facility needs are anticipated to be procured in proximity to Lee County.

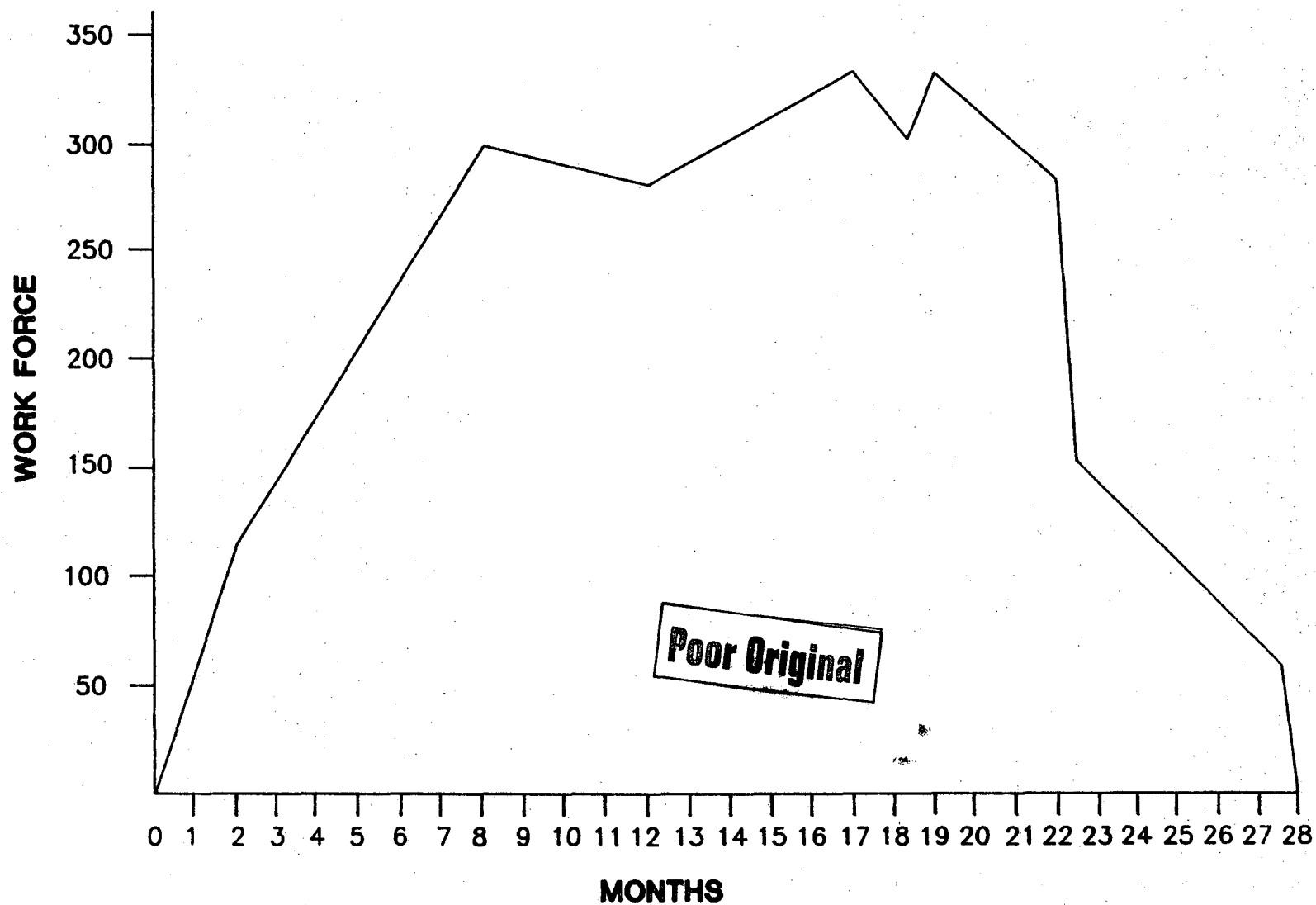


Figure 4-3

CDM

On a short-term basis, the energy recovery facility construction phase will supply the region with benefits associated with a construction project in the range of a ~~\$155 to \$170~~ ^{125 70 140} 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.

Work Force Availability

The majority of the work force for the energy recovery 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

A traffic impact study, performed to assess the impacts associated with Facility construction and operation, indicates that the energy recovery facility will have no adverse impact on the surrounding roadway network (the study is provided in Appendix 11.2, Volume II).

The 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. 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. Since Buckingham Road is currently posted at 50 mph, a left-turn lane for east-bound traffic will need to be constructed to service the vehicles accessing the site. No other roadway improvements should be required to accommodate development traffic from the Facility.

4.7 IMPACT ON LANDMARKS AND SENSITIVE AREAS

The energy recovery facility construction may impact Buckingham Community Park, a 135-acre park located adjacent to the eastern boundary of the project site. The park is scheduled to be developed in the fall of 1991. The park is still in the planning stage and, while impacts to the park are difficult to ascertain without knowing the park program and layout, the park is anticipated to include active-based recreation. The active-based recreation, usually 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 not expected to be significant. The energy recovery facility is not anticipated to significantly impact other parks in the study area based on the distance from the project site 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. As discussed in Section 2.5, an archaeological survey of the Eastern half section of Section 24 which includes the energy recovery facility site, uncovered only two archaeological/historic sites, neither of which is considered to be a regionally significant cultural resource. Data on these two sites will be recorded prior to initiating construction, but they are not considered eligible for nomination to the National Register of Historic Places. If a potential archaeological site should be unearthed during 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. These features may include the generation of solid and liquid waste as a result of construction activities.

During construction, solid and liquid wastes will be generated. This waste may consist of discarded packaging materials, refuse produced by construction workers, earth spoils, sanitary wastes, or waste oils and other wastes associated with this type of construction activity. Earth spoils will be transferred to the Class III landfill. Sanitary wastes and waste oils will be handled by the appropriate licensed haulers. The aesthetic and ecological integrity of the site will be maintained.

4.10 SUMMARY OF IMPACTS AND BENEFITS FROM CONSTRUCTION

Benefits from construction of the energy recovery facility include:

- o The employment of construction laborers throughout the course of construction, approximately 1,200 workers will be employed.
- o Additional income to the area generated by the construction work force retail and service oriented businesses will benefit from increased sales to the construction laborers.
- o 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.

In addition to these benefits during construction, long-term benefits associated with the energy recovery 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 conservation of oil and gas, and increased employment associated with a permanent work force at the Facility.

Impacts from construction of the energy recovery facility include:

- o An increase in solid waste generated due to construction activities.

- o The disturbance of existing terrain.
- o The alteration of site topography.
- o Minimal, temporary aquifer drawdown due to dewatering during construction of the refuse pit.
- o Minimal impacts to low-quality wetlands due to fill areas.
- o Localized, short-term air quality impacts from fugitive dust and fuel combustion emissions.
- o Short-term visual and noise nuisances, and traffic congestion during construction.

4.11 VARIANCES

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

Section 5

SECTION 5.0

EFFECTS OF FACILITY OPERATION

5.0 EFFECTS OF PLANT OPERATION

This section describes (1) the interaction of the energy recovery Facility with the environment, and (2) Lee County's plans for monitoring the environmental impacts during operation of the Facility. In the discussion which follows, irreversible or unavoidable environmental effects are distinguished from those which 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 3.0, cooling towers will be used on-site. 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 since there will be no discharge to surface waters from the Facility. Cooling water will be treated and reused as much as possible. A limited volume of spent cooling process and sanitary wastewater (maximum 150,000 gpd) will be discharged to a sewer. 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 energy recovery facility will use reclaimed water supplied by pipeline from the Fort Myers Central WWTP. No surface water intake structure will be required.

5.1.4 EFFECTS OF OFFSTREAM COOLING

The cooling towers of the proposed Facility will use about 1,500,000 gallons per day (gpd) of reclaimed water from the Central WWTP to "make up" for water lost to evaporation at its ultimate capacity of 2,400 tpd. Chlorine or other equivalent compounds will be used for disinfection of the reclaimed water in conformance with Chapter 17-6 of the Florida Administrative Code. High-level disinfection (HLDI) will provide 1.0 mg/L total chlorine residual after 15 minutes contact time at maximum daily flow or after 30 minutes contact time at average daily flow, whichever provides a higher level of public health protection for the proposed Facility in accordance with Chapter 17-610.460, 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.

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. Aerosol particles or droplets larger than 600 microns in diameter (approximately 70 percent of the drift mass) would settle within 400 feet of the tower. Smaller particles would be carried farther (Furlong, 1974). At the

proposed energy recovery facility, the nearest residential area will be about one mile away from the tower, with trees in between as buffer. Thus, all particles or droplets should settle out, or dissipate, before reaching a residential area.

To determine if viruses and bacteria could be emitted from the cooling tower, a computerized literature search was conducted to identify all data available on this topic. Two data bases were searched and a combined total of more than 7,500 journals, books, reports, conference proceedings and research papers were accessed—a total of approximately 100,000 records. Only a small number of articles and reports were found that specifically address the use of treated wastewater as cooling tower makeup water, and these studies were conducted at large power plants rather than energy recovery facilities. The results of these studies are discussed below.

Levels of total bacteria have been measured directly at the exit vent from a cooling tower which uses secondary effluent by Adams, et al. (1980). These results are not representative of the proposed Facility because a lower level of wastewater treatment was provided, and effluent was held in a basin prior to use which can allow the regrowth of organisms. Both of these factors could result in higher counts of bacteria than would be expected at the proposed Lee County Facility. As measured by Adams, et al. (1980), total bacteria counts exiting the vent of a cooling tower on four occasions ranged from 299 to 1,220 particles/m³.

Rogozen, et al. (1981) sampled emissions from two cooling towers ("Olive 1" and "Magnolia 4") which used municipal effluent from the Burbank Water Reclamation Plant as makeup water. This plant treats wastewater to a level of treatment similar to that of the Fort Myers Central WWTP. Rogozen attempted to sample stack emissions isokinetically (air enters the sampler at the same velocity as it leaves the stack). At the Olive 1 tower, the exit velocity was 10.4 meters per second and the total volume of air sampled was 770 cubic meters. No fecal coliform or fecal streptococci bacteria were detected. Total coliform bacteria were greater than or equal to 1.6 most probable number (MPN) of organisms/m³. E. coliphage were enumerated at 0.07 plaque forming units (PFU)/m³. At the Magnolia 4 tower, no bacteria or viruses were detected during isokinetic sampling.

In addition to literature on the use of effluent as cooling tower makeup, the results of virological studies at treatment plants similar to the Fort Myers Central WWTP were examined. Findings are summarized below.

Studies of virus inactivation using chlorine have shown almost complete inactivation of viruses in advanced wastewater treatment (AWT) effluents. Dryden et al. (1979) found that suitable combinations of AWT processes could achieve overall reductions of up to 99.6 percent of viruses. Dryden also studied the use of chlorine for inactivation of AWT effluents seeded with poliovirus type 1. After two hours of contact with a final combined chlorine residual of 4.9 to 5.4 mg/L, an inactivation rate of 99.90 to 99.99 percent was achieved. Many field tests and pilot plant studies substantiate these results.

Virus testing was conducted during a three-day period at the Sand Lake Road pilot wastewater treatment Facility located in Orange County, Florida (Wellings, 1983a). The pilot plant employed a shallow bed dual media filter with pre- and post-chlorination, alum, and alum plus polymer. While the influent wastewater contained from 262 to 397 PFU/l, chlorinated effluent (free chlorine residuals from trace to 1.7 parts per million) contained no detectable virus.

At the McCleod Road wastewater treatment plant in Sarasota County, Florida, sampling was conducted from June 21 to June 27, 1983 (Wellings, 1983b). Influent densities of viruses ranged from greater than 383 PFU/liter to greater than 593 PFU/liter. Again, no viruses were detected in the chlorinated effluent.

The City of St. Petersburg, Florida provides sand media filtration and disinfection prior to urban reuse of its reclaimed water. Virological testing was conducted at the three plants currently employing urban reuse in 1985 and 1986. As shown in Table 5-1, resulting virus levels ranged from non-detectable to 0.0070 PFU/liter.

TABLE 5-1
RESULTS OF VIROLOGICAL TESTING
CITY OF ST. PETERSBURG
(PLAQUE FORMING UNITS PER LITER)

	Wastewater Treatment Plants		
	Northeast	Northwest	Southwest
<u>1985</u>			
August	0	0	0.0027
September	0	0	0
October	0	0	0
November	0	0	0.0027
December	0	0	0.0070
<u>1986</u>			
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0

SOURCE: Department of Public Utilities, City of St. Petersburg, June 2, 1987.

The City of Fort Myers uses the Bardenpho process to provide AWT. This process provides an excellent source of reuse water for the Facility cooling water processes in that it produces a high quality effluent low in suspended solids, nitrogen, and phosphorus. Based on the results from similar facilities, the drift emanating from the proposed Lee County Facility will not present a virological health hazard to residents of nearby areas if reclaimed water from the Central WWTP is used as cooling tower makeup. The Pinellas and Hillsborough energy recovery facilities are using a similar cooling system, and there have been no reported problems. As discussed previously in this section, high-level disinfection of the Facility's cooling water will be implemented in accordance with Chapter 17-610.460, FAC. To assure the absence of viruses in the makeup water of the proposed Facility, a monitoring program will be instituted as described in the following section.

5.1.5 MEASUREMENT PROGRAM

Samples of influent and chlorinated effluent will be collected daily at the Central WWTP for one week during compliance testing. Sufficient sample volumes will be collected to allow accurate analysis and identification of microorganisms. Samples will be analyzed for total bacteria, total and fecal coliform bacteria, fecal streptococci, and total virus particles (as plaque forming units). Analysis techniques specified in Standard Methods for the Examination of Water and Wastewater, and required by the U.S. Environmental Protection Agency, will be followed.

The discharge system will include continuous on-line monitoring for turbidity prior to disinfection and total chlorine residual (or other disinfectants) at the compliance monitoring point. Prior to Facility start-up, an operating protocol, designed to ensure that the high-level disinfection criteria will be met, will be submitted to DER for review and approval in compliance with 17-610.463, 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 will be treated and reused; a maximum of 150,000 gpd of sanitary wastewater and spent process water will be routed to the Central WWTP following pretreatment as required to meet Fort Myers sewer use requirements. 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, will be satisfied.

Water quality data for the reclaimed water is provided in Table 3-4. This data has been provided to the various vendors who are currently negotiating for the energy recovery facility contract. The vendor/contractor selected to build and operate the Facility will design facilities 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. At a minimum, dual media filtration will be provided.

5.2.2 COOLING TOWER BLOWDOWN

Reclaimed water from the Central WWTP will be used as cooling water for the Facility. The capacity of the Central WWTP is currently 11 mgd and is much greater than the total water demand of the energy recovery facility (1.1 mgd at build-out). Consequently, there is ample wastewater effluent available for cooling water usage at the energy recovery facility. When a pipeline is constructed to supply the reclaimed water, other potential reuse projects in the area will be analyzed, and the pipe will be sized to serve these needs as well as those of the proposed Facility. Cooling tower blowdown will be treated and reused at the energy recovery facility to the greatest extent possible. Cooling tower blowdown not reused at the Facility will be blended with sanitary wastewater and discharged to the Central WWTP via sewer.

5.2.3 MEASUREMENT PROGRAMS

There will be periodic monitoring of the energy recovery facility treatment operations and wastewater discharge to the sewer. The frequency of monitoring of wastewater discharge will be 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 long-term impacts to surface water associated with the operation of the proposed energy recovery Facility. A stormwater pond designed to contain the Facility's runoff during a 25-year storm event will be constructed between the Facility and a cypress dome located on the property's southern boundary. An overflow conveyance will be constructed to direct excess stormwater through the isolated cypress dome to maintain its historical flooding cycle.

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

5.3.2 GROUNDWATER

The primary source of cooling water and potable water will be the City of Fort Myers and Lee County, respectively. The proposed principal source to meet the estimated 1.1 mgd demand for cooling water is treated reclaimed water from the Central WWTP in Fort Myers. The site's administrative building and other on-site facilities requiring potable water will be tied into the County's potable water distribution network. It is necessary to establish a back-up supply of cooling water. It is proposed that groundwater wells in the sandstone aquifer be installed to provide a back-up supply of water for cooling.

These proposed wells would only be used as an emergency supply for back-up cooling water. The wells would not be used during normal operation or normal conditions. The anticipated annual withdrawal from the wells is expected to be very small because the primary source of cooling water, treated reclaimed water from the Central WWTP, is rated at Class I Reliability--the highest reliability rating.

No impact of the emergency back-up wells on other legal users is anticipated because of the infrequent use of the wells. Figure 5-1 illustrates locations of permitted withdrawals within a five-mile radius of the site. The potential off-site drawdown for a hypothetical pumping scheme is shown on Figure 5-1. The drawdown contour within the sandstone aquifer after 10 days of pumping is shown for illustration only. It is unlikely that the emergency wells will be used at all, and the period of time for their use would be short. No impact on surface waters or wetlands are anticipated due to pumping from the sandstone aquifer because of the low leakance rate through the upper Hawthorn confining unit. In any case, impacts would be negligible because they would be of very short duration on an emergency basis.

There is one existing groundwater 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.

No sources of groundwater contamination from the Facility structures or site operations are anticipated. All solid waste and ash will be stored in enclosed buildings to prevent contact with stormwater runoff. The storage structures for the solid waste and ash will be constructed of concrete and constructed watertight to eliminate the potential for any releases to groundwater or surface waters.

The bottom of the concrete refuse storage bunker (which will be four to five feet and hydrostatically stable) will be completely sealed to prevent groundwater from seeping into the bunker. Any moisture or liquids inherent

to the municipal solid waste will be bound to the waste materials and incorporated into the main storage mass and combusted with the solid wastes. Thus, there will not be any free leachate in the refuse bunker.

There are some potential sources of off-site upgradient contamination including the current site of the County landfill located three miles south of the ERF site, and the former Buckingham Road landfill(s) located one-half mile east and southeast of the ERF site. There are active groundwater quality monitoring programs at these locations.

The surficial groundwater system and the confining unit that underlies the site have a high clay content. Clays have a large adsorptive capacity for organic and inorganic (including metal) contaminants in groundwater. The subsurface clayey materials will tend to bind up or adsorb a high proportion of contaminants and thus retard their migration within the groundwater matrix.

5.3.3 DRINKING WATER

Drinking water and potable water supply needs on-site will be met by distribution from the Lee County system. All municipal water supply systems in the area are approximately 2.5 miles away. The closest supply well fields that produce more than 1 mgd are located upgradient and withdraw primarily from the sandstone aquifer. No impacts on drinking water sources are anticipated.

5.3.4 LEACHATE AND RUNOFF

Runoff collected in the stormwater retention/detention basins following start-up of the Facility operations will be collected 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. Groundwater and surface water quality is thereby protected from unprocessed waste and residue.

The proposed landfill to be located in Hendry County will be used to dispose of the noncombustible material from the energy recovery facility. The ashfill/landfill has been designed in accordance with applicable DER regulations using state-of-the-art construction methods which include double synthetic liners, leachate collection and treatment, and groundwater monitoring. Ash and Class I wastes will be disposed in separate areas (monofilling).

5.3.5 GROUNDWATER MODELING AND MONITORING

A groundwater monitoring program will be established. Some groundwater monitoring wells should be installed before Facility construction and operation to establish site-specific background water quality data.

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 are imposed by the processing of solid wastes on the site. This section also describes the potential benefits to be gained from the combustion of solid wastes.

Section 2.2.7 described the existing Lee County solid waste management system. Existing and future quantities of solid waste generated in the County were also presented.

The proposed energy recovery facility will have 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 5-2. If these quantities of solid waste were to be landfilled rather than combusted, they would require about 888,000 cubic yards of landfill space (including cover) in 1993, increasing annually to about 1,850,000 cubic yards of landfill space in 2016. Instead, by achieving a 90 percent volume reduction through combustion, the ash residue to be landfilled would require only about

89,000 cubic yards of landfill space in 1993, ultimately increasing to about 185,000 cubic yards of landfill space in 2016. Therefore, the potential savings in landfill capacity is considerable. The prolonged life of the landfill will decelerate the need for future landfill sites in Lee and Hendry counties (landfill volume calculations based on 1,000 lb/cy³).

A ferrous materials recovery system will be incorporated in the Facility. A magnetic belt for ferrous removal, associated conveying systems, enclosed ferrous storage area, and enclosed loading area will be provided. However, landfill disposal capacity has been calculated assuming no ferrous material recovery.

In addition to ferrous metal recovery at the proposed Facility, Lee County is incorporating an aggressive recycling program as an integral component of its total solid waste management system. This program is expected to include the curbside collection of recyclables from county residences; a materials recovery facility (MRF) for the initial processing of materials required by end-use markets (e.g., sorting, crushing, baling, shredding, etc.); drop-off/buy-back centers for the collection of recyclables from condominium developments, apartment complexes, and mobile home parks; a commercial recycling program for the recovery of cardboard, glass, aluminum, and high-grade paper from shopping centers, restaurants, and office complexes; and an institutional waste recovery program for the collection of newspaper and aluminum from county schools and hospitals. Additionally, separate areas will be designated at the landfill for the separation, processing, or disposal of special wastes (e.g., batteries, used oil, construction/demolition debris, and used tires) and yard wastes. These activities are currently being phased in over a five-year planning period; the entire recycling/materials recovery program will be fully implemented by 1994 to meet the state's 30 percent reduction goal set in the 1988 Solid Waste Management Act.

TABLE 5-2

PROJECTED SOLID WASTE QUANTITIES
LEE & HENDRY COUNTIES 1995-2030

TARGET YEAR	TONS PER YEAR	TONS PER DAY
<u>LEE COUNTY</u>		
1995	591,492	1,620
2000	759,238	2,080
2005	913,346	2,502
2010	1,010,924	2,770
2015	1,106,402	3,031
2020	1,211,059	3,318
2025	1,322,686	3,624
2030	1,445,861	3,961
<u>HENDRY COUNTY</u>		
1995	31,226	86
2000	33,554	92
2005	35,883	98
2010	38,212	105
2015	40,541	111
2020	42,869	117
2025	46,922	124
2030	51,357	130

5.4.2 HAZARDOUS WASTE

This section is not applicable to the proposed Facility, since there will be no handling or disposal of hazardous wastes at this Facility. The Facility will accept only municipal solid waste which includes residential, commercial, and non-hazardous industrial wastes (e.g., office and packing wastes). Public and private users of the Facility will be informed of these limitations. Signs will be posted at the weigh station to indicate what wastes are accepted at the Facility. Routine visual inspections by weigh station personnel will monitor the types of wastes received upon arrival at the Facility gates. The crane operator will be trained to visually inspect waste in the bunker. Additionally, spotters will be 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 selected vendor will stipulate shared responsibilities in the prevention of hazardous materials entering the Facility. If hazardous materials are discovered to have entered the Facility, the materials will be isolated or temporarily stored. A licensed hazardous materials contractor will be notified to collect and transport these materials to a proper treatment or disposal Facility.

A chemical and toxicity analysis of the combined ash residue (including both combustion residue and air pollution control device residues) will be conducted during acceptance testing and quarterly thereafter, to verify that the ash is not toxic or hazardous. Test methods will be in conformance with Rule 17-702, FAC, Solid Waste Combustor Ash Management.

It is expected, based upon tests at similar facilities, that the ash residue will be non-hazardous according to the regulations of the U.S. Environmental Protection Agency (EPA) and the Florida Department of Environmental Regulation (FDER). This waste material will be suitable for disposal in a Class I permitted sanitary landfill.

5.5 SANITARY AND OTHER WASTE DISCHARGES

Solid waste generated by Facility operations (employee refuse, packing material, etc.) will be 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 will be 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 wastewater will be collected and discharged to the Central WWTP. Therefore, no impacts associated with waste discharges are anticipated during the operations of the Facility.

5.6 AIR QUALITY IMPACTS

5.6.1 IMPACT ASSESSMENT

The air quality modeling analysis was conducted in three phases:

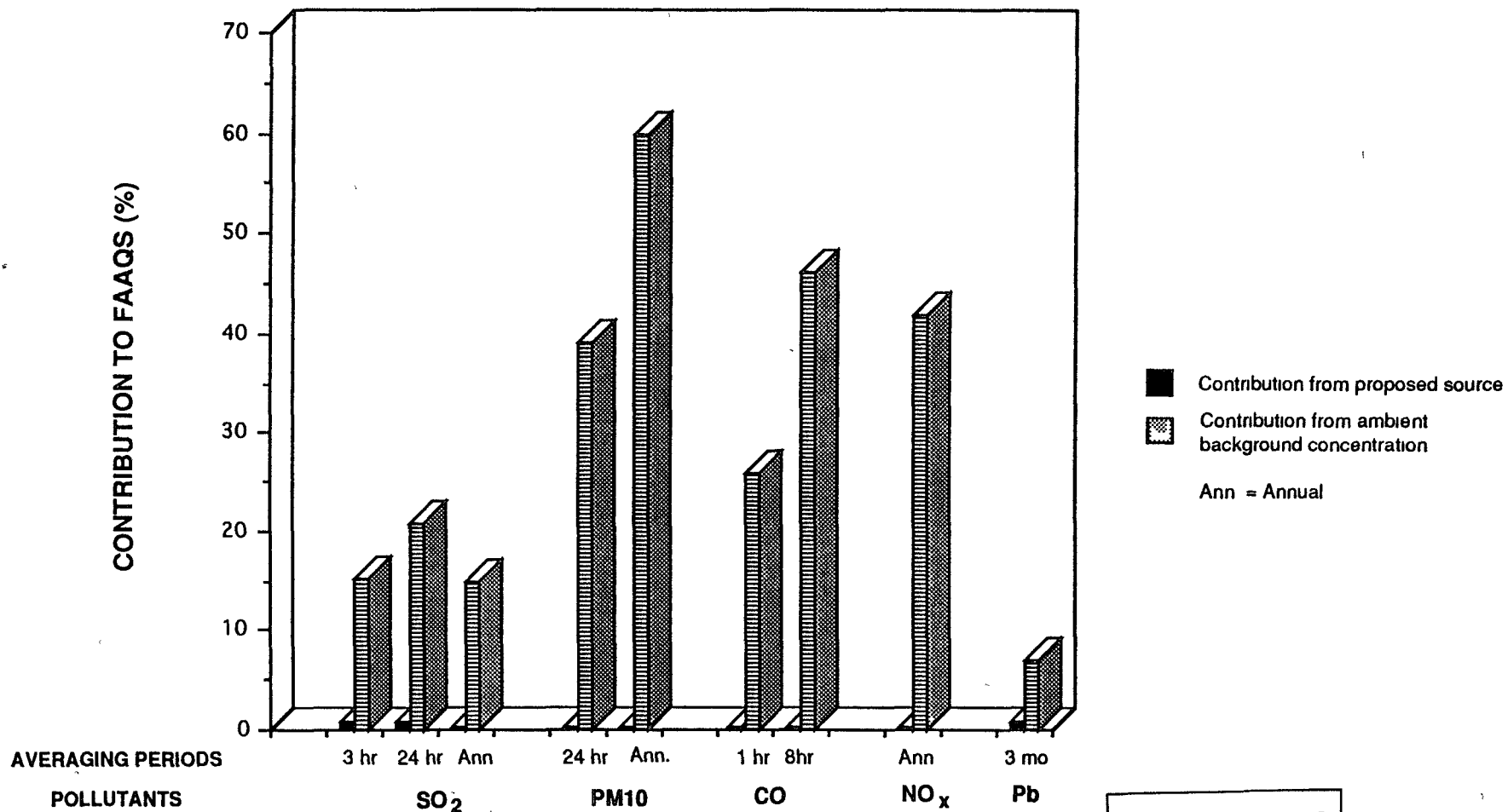
1. Screening analysis - This analysis identified the combustor type and operating condition (based on waste throughput and heat content) which would have the greatest calculated air quality impact. The screening model runs were made using the Industrial Source Complex-Short Term (ISCST) dispersion model and 48 worst case meteorological conditions.
2. Refined Modeling Analysis - The refined modeling analysis was conducted using two postulated worst-case combustor operating conditions for a stoker waterwall design, and a receptor grid, was selected on the basis of the outcome of the screening analysis. The refined modeling analysis identified the maximum ground-level impacts for pollutants emitted from the Facility. The refined modeling was completed using the ISCST model, and five years (1982 to 1986) of surface meteorological data from Page Field Airport in Fort Myers and upper air data from Tampa International Airport.

3. Additional Class I Area Impact Analysis - This analysis modeled concentrations of regulated pollutants with Prevention of Significant Deterioration (PSD) increments, and modeled the affects of the Facility's plume on visibility at Class I and air-quality-sensitive areas. A detailed discussion of the air impacts is contained in Section 6.8, Comparison with PSD Increments and in Section 7.2, Visibility (Volume III - Air Quality).

Under the applicable regulations, a short-term average air quality standard (24 hours or less) is not violated until a receptor exceeds the standard twice in any given year. The highest value of the second highest concentrations (HSH) is chosen from the potential impacts, and the ambient background monitoring data to allow for a single short-term violation. Since a single annual average is calculated for each receptor, the highest annual concentrations were used for comparison.

SO₂, NO₂, CO, PM₁₀, lead, and ozone are regulated federally through the National Ambient Air Quality Standards (NAAQS), and by the State of Florida through the Florida Ambient Air Quality Standards (FAAQS). The predicted Facility impacts for all these pollutants, except ozone, are compared in Table 5-5 and Figure 5-2 to the more stringent of the NAAQS or FAAQS. Ozone is not directly emitted from the Facility, but is formed in the atmosphere as a secondary pollutant. Non-methane hydrocarbons, considered a precursor to ozone formation, are regulated under PSD, and will be minimized by employment of combustion control techniques which represent BACT (see Section 4.0 of Volume III - Air Quality).

As Figure 5-2 shows, the modeled impacts of the proposed Facility are very small in comparison with the existing background concentrations. As shown in Table 5-3 and Figure 5-2, the greatest ground-level pollutant concentration due to the Facility is estimated to be no less than one percent of the applicable NAAQS/FAAQS standards. The 24-hour SO₂ concentration would be 0.97 percent of the standard. The three-hour SO₂ predicted concentration would be 0.96 percent of the FAAQS. The 24-hour average concentration for lead was used as a conservative estimate of the



Poor Original

LEE COUNTY, FLORIDA
Energy Recovery Project
 Application for Power Plant Certification
 Camp Dresser & McKee Inc

FIGURE 5-2
AIR QUALITY IMPACT COMPARED TO FAAQS

TABLE 5-3

COMPARISON OF PREDICTED IMPACTS FROM THE LEE COUNTY ENERGY RECOVERY FACILITY
AND AMBIENT BACKGROUND CONCENTRATIONS TO THE NAAQS/FAAQs
(concentration in $\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Time	Rank ^a	NAAQS/FAAQs ^b	Facility Impact	Facility Impact as Percent of Standard	Ambient Background Concentration	Total Impact	Total Impact as Percent of Standard
Sulfur Dioxide	3-Hour	HSH	1,300 (1,300)	12.5	0.96	199	211.5	16.3
	24-Hour	HSH	260	2.52	0.97	54	56.52	21.7
	Annual	H	60	0.19	0.3	9	8.2	15.3
Nitrogen Dioxide	Annual	H	100 (100)	0.36	0.4	42	42.4	42.4
Particulate Matter (as PM_{10})	24-Hour	HSH	150 (150)	0.33	0.2	58	58.3	38.9
	Annual	H	50 (50)	0.024	0.05	30	30.0	60.0
Carbon Monoxide	1-Hour	HSH	40,000	47.0	0.12	9200	9247	23.1
	8-Hour	HSH	10,000	4.0	0.04	4600	4604	46.0
Lead	3-Month	H	1.5 (1.5)	0.012 ^c	0.8	0.1	0.11	7

SOURCE: Camp Dresser & McKee Inc., 1991

^aAbbreviations: H = Highest
HSH = Highest, Second-Highest

^bThe more stringent of federal or state standard is given. Secondary standards are shown in parentheses.

^cHighest 24-Hour average concentration used to conservatively estimate 30-day or 3-month average concentration.

three-month average lead concentration. The lead concentration would be 0.8 percent of the quarterly standard. All other pollutants contribute much less than one percent of the applicable NAAQS/FAAQS.

Since the proposed Lee County Facility is considered a major source of SO_2 , TSP, PM_{10} , and NO_2 , the impacts of these pollutants are compared to the applicable Class II PSD increment for each specified averaging period. As shown in Table 5-4, the Facility is expected to consume less than three percent of any allowable increment. Cumulative modeling of any other PSD-consuming background source was not required because the pollutant impacts did not exceed any of the Significant Impact Levels (see Section 6.5 in Volume III).

The impact of the proposed Facility was also evaluated for visibility, soils, and vegetation. Visibility modeling of the plume was performed for the Everglades National Park, a PSD Class I Area, and for the Big Cypress National Preserve, an air-quality-sensitive area, to determine whether the Facility would have an effect on the clarity of the air in these pristine areas. Discrete receptors for both areas were placed along the boundaries closest to the Facility. Using a worst-case screening analysis (the EPA-approved VISCREEN model), no visibility degradation is predicted. The predicted maximum annual concentrations are well below the thresholds which are considered harmful to soils and plants. Detailed analyses of these air quality issues are presented in Section 7.0, Additional Impact Analyses (Volume III - Air Quality).

5.6.2 MONITORING PROGRAM

No post-construction ambient air monitoring plan is proposed for the Lee County energy recovery Facility. The monitoring network operated by DER is sufficient to monitor ambient air quality levels in the vicinity of the site. However, a continuous in-stack monitoring program will be operated for opacity, and oxygen or carbon dioxide concentrations. The equipment will be installed, calibrated and maintained in accordance with Chapter 17-2.710, FAC and 40 CFR 51, Appendix P. Compliance testing will also be conducted for pollutants with emission limiting standards in accordance with Chapter 17-2.700, FAC and 40 CFR 60 as applicable. This testing will include, but will not be limited to, testing for particulate emissions, SO_2 , NO_x , CO, Pb, and non-methane VOC.

TABLE 5-4

COMPARISON OF IMPACTS FROM THE LEE COUNTY ENERGY RECOVERY Facility
TO PSD CLASS II INCREMENTS

Pollutant	Averaging Period	Rank ^a	Maximum Impacts from Facility (ug/m ³)	PSD Class II Increment	Total Impact as a Percent of Increment
Sulfur Dioxide (SO ₂)	Annual	H	0.19	20	1.0
	24-hour	HSH	2.52	91	2.8
	3-hour	HSH	12.5	512	2.4
Total Suspended Particulate Matter (TSP)	Annual	H	0.024	19	0.13
	24-hour	HSH	0.33	37	0.9
Particulate ^b Matter (PM ₁₀)	Annual	H	0.024	17 ^c	0.14
	24-hour	HSH	0.33	30 ^c	1.1
Nitrogen Dioxide (NO ₂)	Annual	H	0.36	25	1.4

SOURCE: Camp Dresser & McKee Inc., 1991.

^aAbbreviations: H = Highest
HSH = Highest, Second-Highest

^bConservative estimate assuming all TSP is in the form of PM₁₀.

^cProposed EPA standard (54 FR 41218, October 5, 1989).

Dispersion modeling of maximum Facility pollutant emissions has demonstrated that the estimated highest ground-level concentrations are below the PSD de minimis monitoring levels shown in Table 2-24. Therefore, in accordance with 40 CFR 52.21(i)(8), the Facility should be exempted from pre-construction monitoring requirements. In light of the modeling results presented in Table 2-24 and in Section 6.5 of Volume III, the Applicant requests the Florida DER to concur in this determination that pre-construction monitoring is not required.

5.7 NOISE

A technical noise analysis was performed for the proposed Facility. This noise study is contained in Appendix 11 of Volume II. The study explains the methodologies used in estimating the operational impacts of the Facility and the results of the analysis. Ambient noise levels were measured at three locations in the site vicinity to establish baseline conditions during day and night periods. Impacts were modeled at seven locations at the property boundary and in the vicinity.

Equipment noise levels were attenuated and combined with the ambient noise levels at each monitoring site. The results show that Facility noise levels will not cause a discernible impact (an increase of more than three dBA) at any sensitive receptor (see Table 5-5).

Table 5-5 compares the expected Facility noise level at each monitoring station to the County standards. The Facility noise levels are predicted to be lower than both the day-time standard and the night-time standard at all property boundary locations during Facility operations.

Traffic noise was determined using the noise prediction model, STAMINA 2.0 (FHWA, 1982). Using this model, traffic noise levels were compared with and without Facility traffic. Modeling showed that Facility truck traffic would not be audible at any of the nearest residences.

TABLE 5-5

LEE COUNTY ENERGY RECOVERY FACILITY
FACILITY NOISE LEVELS (DBA)

Receptor Location	Distance (FEET)	Period	Background Noise Level (L_{eq})	Projected Noise Level (L_{eq})	County Standard	Increase in Noise Level (L_{eq})
Boundary B1	850	Day	48.0	50.4	66	2.4
		Night	35.0	42.2	55	9.2
Boundary B2	2,200	Day	52.0	52.5	66	0.5
		Night	50.0	50.2	55	0.2
Boundary B3	200	Day	48.0	57.1	66	9.1
		Night	42.0	50.1	55	8.1
Boundary B4	1,500	Day	52.0	53.0	66	1.0
		Night	50.0	50.4	55	0.4
Residence R1	2,400	Day	55.0	55.1	66	0.1
		Night	42.0	42.9	55	0.9
Residence R2	2,850	Day	55.0	55.1	66	0.1
		Night	42.0	42.7	55	0.7
Residence R3	3,000	Day	55.0	55.1	66	0.1
		Night	42.0	42.6	55	0.6

SOURCE: Camp Dresser & McKee Inc., 1990.

5.8 CHANGES IN NON-AQUATIC SPECIES POPULATIONS

5.8.1 IMPACT

Minimal impacts on species populations and long-term species diversity are expected. Limited wetland areas will be impacted by construction, as described in Appendix 6.5 (Dredge and Fill Permit) and Section 4.4.1 (Ecological Impact Assessment). Given the disturbed nature of the present site, development of the Facility site may actually cause a net positive effect on species diversity, abundance, and composition.

No adverse impacts to wetlands are anticipated from the long-term operation of the proposed energy recovery Facility. The stormwater management pond will be designed for a 25-year, 72-hour stormwater event. During design rainfall events, the stormwater pond design will provide a maximum discharge of 1.7 cubic feet per second (cfs) and an average discharge of ≤ 0.5 cfs (see Volume II, Section 7.3). This discharge will flow to the wetlands in the southeast quarter of the property site which should enhance these wetlands and not adversely impact them. Groundwater seepage from the stormwater pond should also be toward these same wetlands. Therefore, these wetlands should have enhanced hydroperiods and thus greater wildlife utilization during the operational phase of the proposed project.

5.8.2 MONITORING

Minimal impacts on species populations are anticipated; therefore, no long-term wildlife monitoring is necessary. Post-construction wetland monitoring of wetlands will be conducted until the agencies' success criteria for the wetlands have been satisfied.

5.9 OTHER FACILITY OPERATION EFFECTS

Florida Transportation Engineering (FTE) was contracted to perform an analysis of the traffic impacts of the proposed Facility. FTE has performed many similar studies in Lee County, and is familiar with the project area. Based on the results of their study, the energy recovery

facility will have no adverse impact on the surrounding roadway network. Existing Level of Service (LOS) for those roadway sections to be affected by the project are currently established at LOS A. 1992 peak season traffic with development of the project remain at LOS A. However, the study does recommend that a left-turn lane for eastbound traffic be constructed to service vehicles accessing the site due to the fact that Buckingham Road is currently posted at 50 miles per hour. The complete FTE report can be found in Appendix 11.2 (Volume II).

5.10 ARCHAEOLOGICAL SITES

An archaeological and historic survey was conducted by Piper Archaeological Research, Inc. for the Facility site (see 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 are not located on the Facility site. 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 energy recovery facility.

5.11 RESOURCES COMMITTED

Numerous natural and human resources will be consumed, converted or made unavailable for future use if the proposed Facility 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 construction of the energy recovery 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 could not be retrieved. However, this type of commitment of resources is typical for major capital intensive projects. 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. Many of the heat releasing reactions, practically speaking, are irreversible. Therefore the materials consumed in the combustion process are permanently lost. This, however, is considered a positive reuse of a material for the generation of energy which otherwise would have been buried in a landfill. The Facility will generate over 4.28 billion kilowatt hours of electricity during a 20-year life (assuming no expansion takes place). In addition to the revenue earned on the electricity sold to the power company, the energy production translates into a \$5.58 million reduction on oil expenditures over 20 years and the reduction in consumption of over 7 million barrels of oil. The alternative processing of 1,200 tons per day of municipal solid waste by the Facility will conserve approximately 162,000 tons per year of coal which would otherwise be consumed for power production. It also offers the potential for recovery of reusable materials (ferrous metals).

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

5.12 VARIANCES

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

Section 6

SECTION 6.0

TRANSMISSION LINES

AND

OTHER LINEAR FACILITIES

6.0 TRANSMISSION LINES AND OTHER LINEAR FACILITIES

Linear facilities are those which must be routed over land, including transmission lines and pipelines. This section discusses the proposed routes for power transmission, water, wastewater, and reclaimed water for the Lee County energy recovery facility.

6.1 TRANSMISSION LINES

The Facility site is bounded on the west by a Florida Power and Light easement, through which FP&L transmission lines run. 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. Power generated at the energy recovery facility will be routed to this substation.

The power line transmission will be routed north along the eastern border of Section 24, then west along its northern border to tie in with the substation. The corridor will be 60 feet in width with 10,000-square foot corners in the northeast and northwest corners of the northeast quarter of Section 24 as shown in Figure 6-1. These corners will accommodate guy wires for the transmission lines.

Along this route, approximately 2.7 acres of wetlands would be impacted. These impacts are described in detail in Appendix 6.5 (Dredge and Fill Permit) and Section 4.4.1 (Ecological Impact Assessment).

Electric and Magnetic Fields

As part of construction of the Facility, an electrical transmission corridor will be constructed to establish the electrical interconnection between the energy recovery facility and the Florida Power and Light (FP&L) transmission grid. The interconnect transmission line will traverse 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 will have a specified capacity of 138 kV. The conceptual design

elements of the interconnect transmission line have been addressed in relation to power line geometry, pole spacing, height, ground clearance, current, and voltage. These elements combined with other design variables will be used as input into the Bonneville Power Administrative Corona and Field Effects Model to determine compliance with Chapter ~~17-244~~ FAC, 17-274 Electric and Magnetic Fields. In any case, compliance will be demonstrated for the requirements of Chapter 17-274.450(3)(b) and (d) in regard to a maximum electric field of 8 kV/M beneath the line and 150 milliGauss at the edge of the transmission line right-of-way. Additional consideration will be given to any cumulative effects of the existing FP&L transmission corridor, the existing substation, and an adjacent residential service line corridor. This information is included in Appendix 7.5, Volume II of this application.

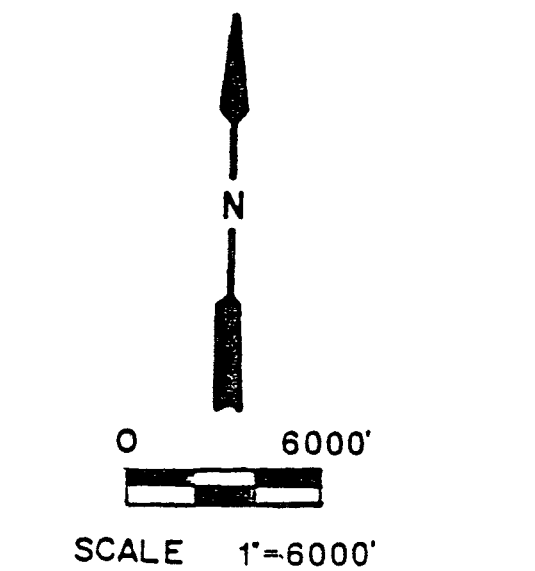
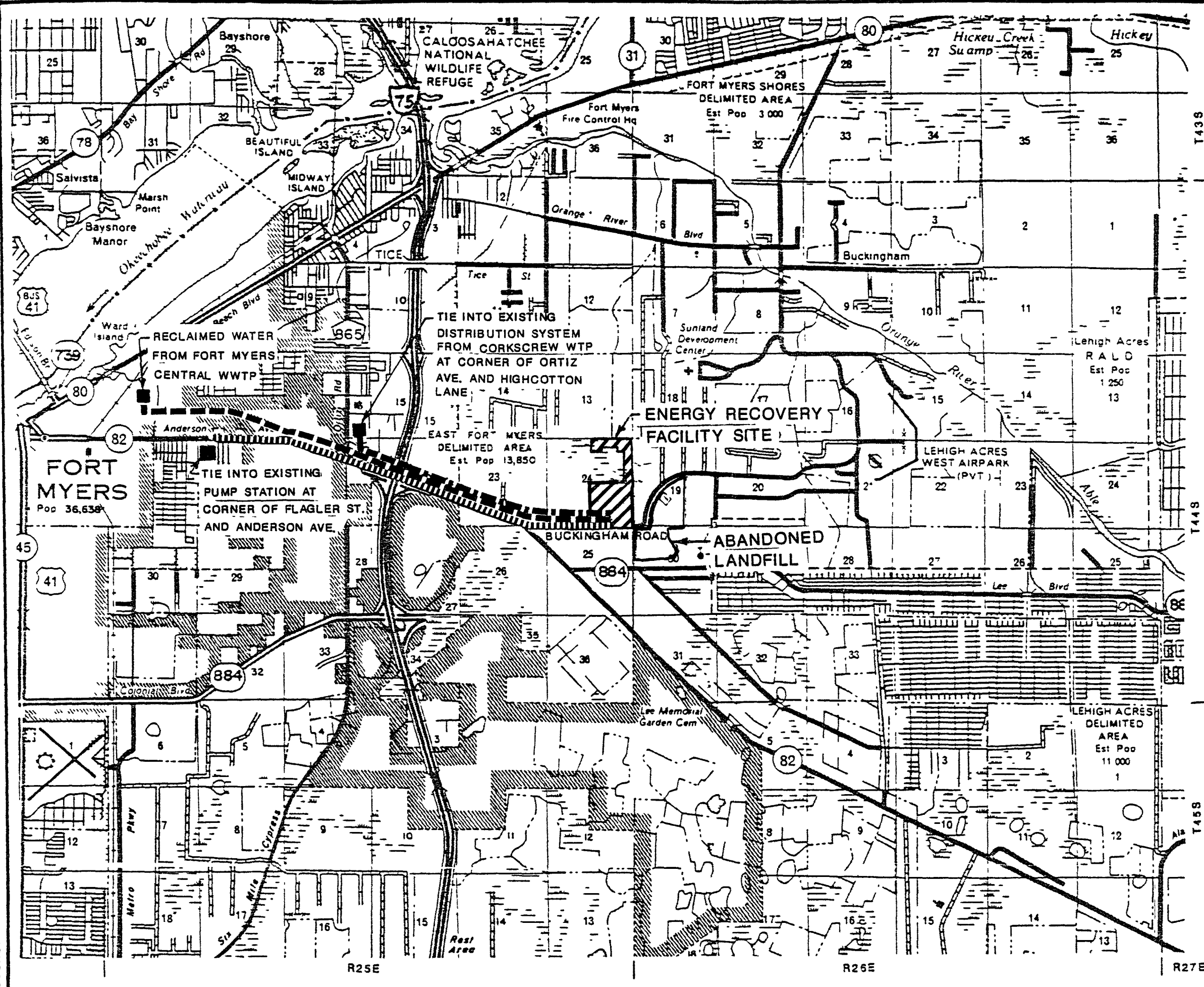
6.2 ASSOCIATED LINEAR FACILITIES

Currently, there are no municipal water and wastewater utilities serving the project area. Surrounding residences use private wells and septic tanks. In order to service the proposed energy recovery facility, three transmission pipelines must be constructed, as shown in Figure 6-2.

Pipelines will be needed to convey potable water and reclaimed water to the site, and wastewater from it. The reclaimed water and wastewater lines will lay side by side along SR 82 (Anderson Avenue), from the site westward under Interstate 75 to the intersection of Ortiz Avenue. The potable water line will lay in a separate trench in accordance with guidelines for the proper separation of water and wastewater pipelines.

The potable water line will be routed north along Ortiz Avenue, and will tie into an existing distribution system near the intersection of Highcotton Lane. Water will be supplied by the County's Corkscrew Water Treatment Plant. A minimum pipe size of eight inches will be used; this pipe size may be increased to serve other County needs when the line is constructed. Potable water use at the project site will be about 75,000 gallons per day (gpd).

SOURCE MAP BASED ON LEE COUNTY DOT GENERAL HIGHWAY MAP, JAN 1978



- LEGEND**
- - WASTEWATER
 - - POTABLE WATER
 - - RECLAIMED WATER

Poor Original

Proposed Utility Transmission Routes - Lee County Energy Recovery Facility

Reclaimed water will be supplied by the City of Fort Myers Central Wastewater Treatment Plant. The supply line will be routed from the Central WWTP eastward along Michigan Avenue, turning south along Michigan Link Avenue, then traveling west again along SR 82 to the common junction at the intersection of Ortiz Avenue. To convey the 1.5 million gallons per day (mgd) of reclaimed water needed, a minimum pipe size of 12 inches will be used. Again, this may be up-sized in the future to serve other reuse areas.

The energy recovery facility will generate a maximum of approximately 150,000 gpd of wastewater, which will be treated at the Central WWTP. West of Ortiz Avenue, the wastewater transmission line will be routed to travel along SR 82 to the intersection of Flagler Street, where it will tie into an existing pump station. A minimum pipe size of six inches will be used for the sewer force main.

The proposed water, reclaimed water, and wastewater transmission lines are roughly three and one-third, six, and five miles in length, respectively. These lines will all be constructed in existing city and County rights-of-way. The proposed routes avoid major intersections and congested areas to the greatest extent possible. No environmental impacts are anticipated beyond those normally associated with this type of construction.

The Facility will also use an on-site well to provide back-up water for the cooling tower. Complete information on the well can be found in Appendix 7.2.

Section 7

SECTION 7.0

ECONOMIC AND SOCIAL EFFECTS

OF

FACILITY CONSTRUCTION & OPERATION

7.0 ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION AND OPERATIONS

Construction and operation of the energy recovery facility will provide a number of benefits. Specifically, the Facility will:

- o Meet the intent of the state Legislature [Section 377.709(1), Florida Statutes to encourage energy conservation, to dispose of solid refuse in a proper manner, and to use an environmentally preferred alternative to conventional solid waste disposal.
- o Provide an improved process for the disposal of solid waste which remains after recycling that minimizes ecological impacts;
- o Provide a long-term economic method of solid waste disposal for those materials which remain after recycling.
- o Decrease the amount of land required to be committed for sanitary landfilling purposes;
- o Recover energy from the combustion of solid waste;
- o Generate revenues from the sale of energy;
- o Reduce the demand for auxiliary energy sources;
- o Stabilize or reduce future disposal cost increases; and
- o Become an integral component of the total solid waste management program.

Quantifying the economic and social ramifications of the construction and operation of the energy recovery facility is a difficult 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 energy recovery facility.

7.1 SOCIOECONOMIC BENEFITS

Land disposal of solid waste is becoming more difficult in most areas. 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 landfill operations, increased concerns about sanitary landfills and the protection of limited groundwater resources for an expanding population. These issues have created increased popularity in the energy recovery process as the best current method of solid waste disposal for the waste which remains after recycling.

The investments in energy recovery are initially higher than sanitary landfilling, but long term costs and benefits create a situation where energy recovery is preferable. The costs of acquiring and committing large tracts of land for landfill purposes, permitting and operations costs of landfilling and probable increased energy costs counterbalance the start-up costs associated with the energy recovery facility.

After expansion, the energy recovery facility will have a continuous design-rated capacity of 2,400 tons per day (tpd). Some noncombustible materials will be transported directly to the landfill/ashfill in Hendry County. However, of the 2,400 tpd to be processed by the energy recovery facility, less than 40 percent (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. Because of this, a related 90 percent reduction in the annual space requirements for landfilling should be expected. The energy recovery process will increase the landfill/ashfill lifespan to over forty years.

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. 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 is the generation of a minimum of ~~321~~ ^{4,28} million kilowatt hours (kWh) of electricity ~~per year~~ ^{372,300} or ~~642~~ ^{4,28} billion kWh over the life of the facility (based on an average ~~550,500~~ ^{372,300} tons per year over a 20-year period, and 575 kWh/ton net output). This production corresponds to a decrease in the use of crude oil by ~~550,500~~ ^{372,300} barrels per year (or a minimum of ~~11~~ ⁷ million barrels over the life of the Facility). At 1990 oil prices (\$15/barrel), the decreased demand for crude oil translates into a reduction of about ~~\$8.25~~ ^{5.58} million per year in spending or ~~\$165~~ ¹¹² million over the 20-year life of the Facility. These figures do not address expected inflation, which will increase the savings related to reduced crude oil demands.

Local economic benefits from energy recovery operations includes the full-time employment of approximately 54 personnel, including 5 administrative, 40 operations and 9 maintenance positions. The annual payroll for the personnel is expected to be about \$2.5 million which will contribute over \$33.3 million into the local economy over a 20-year period. Increased retail sales from energy recovery personnel will contribute \$0.62 million or approximately twenty-five percent of their annual income to local establishments. An estimated additional \$0.83 million in personal income will be generated by local residents. The total of \$35 million in estimated annual economic gains for the region is anticipated as a result of the energy recovery facility.

There are additional anticipated beneficial economic impacts related to facility construction. The local economy and labor market will benefit from the \$165 million construction project ^{ESTIMATED} ~~estimated~~ in the range of \$155-170 million. 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, landscape material, etc. is 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. There will be over 325 construction workers employed during the peak of construction activities, with a total of over 1,200 workers employed throughout the construction process.

The regional economic impact of the project construction can be estimated utilizing a regional multiplier with regard to industries involved in the construction process. The multiplier measures the increased monies generated into an industry and the changes in household income and related expenditures. The applicable industry sectors include:

Contractors: General Building, Heavy and Special Trade
Stone and Glass Products
Fabricated Metal Products
Machinery
Electrical Equipment and Supplies
Services

Each of the industries receives a portion of the construction costs. The product of the industry's percentage of construction costs and the regional multiplier provides an estimate of the change in total gross output in the region for the applicable industry. Table 7-1 shows the total gross output for the project and the estimated economic impact for each industrial sector.

7.2 SOCIOECONOMIC COSTS

This section is an overview of the costs related to the construction and operation of the energy recovery facility over a 20-year period.

Construction of the Facility will require approximately 20 acres of the 155 acre project site. Because land represents a long-term resource commitment, the cost of obtaining the land for the Facility is included in the total Facility costs.

Total bonded debt for Facility development is estimated to range between ~~\$205 - 225~~ ~~\$220-240~~ million. The County will finance these costs by system revenue bonds and user fees which will be levied to service the debt. The following is an approximation of costs related to the energy recovery facility.

TABLE 7-1

REGIONAL ECONOMIC IMPACT

Industry Sector	Regional Multiplier	Input	Gross Output
Contractors	2.79	26.0	72.54
Stone and Glass Products	3.00	19.5	58.50
Fabricated Metal Products	2.25	13.0	84.04
Machinery	2.38	32.5	77.35
Electrical Equipment/ Supplies	2.59	26.0	67.34
Services	3.00	13.0	39.00
	TOTAL	130.0	398.77

NOTE: Input and gross output are expressed in millions of dollars. The regional multiplier is from the United States Water Resources Council, January 1977, Guideline 5 Regional Multiplier, Washington, D.C.

— \$125-150 —

Contractor Cost	\$155 170 million
Permits and Fees	2
Additional County Costs	3
TOTAL ESTIMATED CAPITAL COSTS	\$160 175 million
	— \$125-140 —

The operator of the Facility will receive an annual operating and maintenance fee of approximately ~~\$8-9.5~~ ^{36,700} million from Lee County (based on ~~550,500~~ ^{372,300} tons/year). Operation and maintenance costs are fixed but subject to escalation indices over the life of the service agreement.

There are several land use, comprehensive plan and zoning components which will minimize the long-term land use impacts on the project site's immediate area. The following land use configurations and future land use and zoning regulations will serve in this function:

As Lehigh Acres develops toward the west and the energy recovery facility, residential uses may be eventually within one mile of the project site. Buckingham Park, a 135-acre parcel of land, will be immediately adjacent to the project's eastern boundary. The presence of this large park combined with the FP&L transmission corridor between the project site and the future residential area will maintain a permanent green space buffer to this future residential population. The park will be owned by Lee County.

The energy recovery facility will become an extension of the industrial and utility uses that exist or are foreseen in the area by zoning and/or future land use regulations. 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 project site. The energy recovery 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 Land Use Plan as rural land use although currently zoned agricultural (AG-2). The rural future land use category limits residential development in this area to approximately one dwelling unit per acre. The zoning classification limits residential uses in this area. These regulations will limit future residential development and prevent land use incompatibilities near the proposed facility.

The wetlands and associated resource protection areas located adjacent to and north of the site will have limited development potential and will further buffer the site from existing and potential residential development to the north.

Section 8

SECTION 8.0
SITE AND FACILITY DESIGN ALTERNATIVES

8.0 SITE AND FACILITY DESIGN ALTERNATIVES

Many factors were evaluated during the planning of the Lee County energy recovery project, including alternative sites, solid waste management methods, ownership and financing options, and Facility size and boiler configuration. The energy recovery facility is as an integral component of the County's total solid waste management system currently being implemented. This system also incorporates an aggressive recycling/materials recovery program which includes the curbside collection of recyclables from county residences; a materials recovery facility (MRF) for the initial processing of materials required by end-use markets (e.g., sorting, crushing, baling, shredding, etc.); drop-off/buy-back centers for the collection of recyclables from condominium developments, apartment complexes, and mobile home parks; a commercial recycling program for the recovery of cardboard, glass, aluminum, and high-grade paper from shopping centers, restaurants, and office complexes; and an institutional waste recovery program for the collection of newspaper and aluminum from County schools and hospitals. Additionally, separate areas will be designated at the landfill for the separation, processing, or disposal of special wastes (e.g., batteries, used oil, construction/demolition debris, and used tires) and yard wastes. These activities are currently being phased in over a five-year planning period; the entire recycling/materials recovery program will be fully implemented by 1994 in order to meet the state's goal of 30 percent reduction (1988 Solid Waste Management Act).

8.1 SITE ALTERNATIVES

In March 1990, following discussion and review at a public hearing, the Lee County Board of County Commissioners approved the selected site location. The site is located in east-central Lee County, fairly close to the county's waste generation centroid. The site offers a good access road, a large area of land, and buffer zones.

The present site was selected after a number of in-depth analyses. The first was performed by Camp Dresser & McKee Inc. (CDM) in August 1989 to review potential sites throughout Lee and Hendry counties. A specific siting methodology was used to eliminate unsuitable sites on the basis of flood potential, well field impacts, airport proximity, urban development,

environmental sensitivity, and proximity to surface water bodies. The result of this study was the identification of several viable candidate sites.

In February 1990, CDM prepared a more detailed analysis of six candidate sites. This analysis compared the sites in terms of availability of water and wastewater services, proximity to existing electrical transmission facilities, 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 results of the February 1990 study are presented in Appendix 4.0. The preferred energy recovery facility site was selected based on these criteria and additional information received during Board of County Commissioners meetings.

8.2 ALTERNATIVE WATER SOURCES

Reclaimed water from the City of Fort Myers Central WWTP will be used for cooling purposes at the proposed 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 ultimate cooling water demand of 1.5 mgd, the Facility will drastically reduce the burden on fresh water resources in Lee County. In addition, valuable use will be made of an as yet untapped resource. The Central WWTP produces a consistently high quality effluent, meeting 5-5-3-1 or better, yet this reclaimed water is currently being discharged to the Caloosahatchee River. Reuse at the energy recovery facility, along with other city and County reuse projects currently in the planning stages, will help eliminate this discharge to surface waters.

Alternative sources of cooling water include city and County water supplies, and an on-site well. These sources were rejected as a primary cooling water supply because of the availability of reclaimed water and the need to preserve potable water resources in the area. However, a back-up cooling water supply will be needed in the event that reclaimed water

becomes unavailable; this is expected to occur only for short periods of time, if at all. After an evaluation of potential back-up supplies, it was determined that an on-site well installed in the sandstone aquifer would best meet emergency cooling water needs. A permit application for the emergency supply well is included in Appendix 7.2.

Potable water for the Facility will be supplied by the County. An eight inch diameter line (minimum pipe size) will be constructed from an existing force main, as discussed in Section 6. Wastewater from the Facility will be pumped to the Fort Myers Central WWTP for treatment. The city and County utilities are considered reliable sources of potable water and wastewater treatment, such that no back-up systems are needed for these Facility services.

Section 9

SECTION 9.0

COORDINATION

9.0 COORDINATION

Development of the Lee County energy recovery project has required coordination with numerous federal, state, regional, county, and local government agencies. Information was obtained through meetings, telephone calls, and correspondence between Camp Dresser & McKee Inc. 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.

TABLE 9-1
CONTACTS AND CORRESPONDENCE

Agency	Contact	Date	Subject
Department of Lee County Utilities	George E. Reilly	3/13/90	Letter: Environmental Power Corp information
		3/13/90	Meeting: Site Layout
		3/20/90	Meeting: Zoning and Land- Use Issues
		4/9/90	Letter: Cost Impacts of a "Zero" versus "Limited" Discharge Facility
		4/11/90	Letter: PPSA Fees and FERC Applications
		4/17/90	Meeting: Site Utilities Issues
		4/19/90	Transmittal: Site Preliminary Foundation and Soil Study
		4/20/90	Letter: Three Proposed Layouts for Transmission Facilities
		4/24/90	Meeting: Ecological Scoping Meeting
	Jesslyn Arnold	5/7/90	Letter: Federal Energy Regulatory Commission

6/27/90
MLCL18/3

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
Department of Lee County Utilities (Continued)	Neal Haslett	4/2/90	Letter: Acreage Requirements
Office of County Lands	Karen Forsyth	4/12/90	Transmittal: To CDM, 9 Section Tax Map with Owners Key
Department of Environmental Regulation	Patrick Kenny	4/5/90	Meeting: Field Visit to Review Lines of Jurisdiction
	Ron Blackburn Phil Barbaccia	4/24/90	Meeting: Ecological Scoping
South Florida Water Management District (SFWMD)	Peter Comeau	12/18/89	Telephone: Dewatering Permit Requirements
	Karen Johnson	4/5/90	Meeting: Field Visit to Review Lines of Jurisdiction
	Vern Kaiser	4/9/90	Telephone: Request Consump- tive Use Permits
	Vern Kaiser	4/12/90	Letter: Request Consump- tive Use Permits
	Edward Lopez	4/25/90	Telephone: Surface Water Dry Pretreatment Requirements
	Vern Kaiser	5/1/90	Telephone: Status of Consumptive Use Permit Inventory
	Clyde Dabbs	5/16/90	Telephone: Surface Water 37 csm Discharge Limit

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
SFWMD (continued)	Karen Johnson	5/17/90	Telephone: Surface Water Wetlands
	Bill Haight	5/17/90	Telephone: CUP Clarifications
	Bill Kirk	5/29/90	Telephone: Fire Protection Needs for CUP and Cooling System Requirements
Suncoast Experimental Station (IFAS)	Gary Clark	5/11/90	Telephone: Estimating ET Potential of Native Habitats
Florida Game and Fresh Water Fish Commission	Kim Drysen	4/24/90	Meeting: Ecological Scoping
Federal Aviation Administration	James Walter	4/2/90	Letter: New Site Location
		4/10/90	Letter: Revised "Notice of Proposed Construction or Alteration"
Department of Environmental Regulation; Bureau of Air Quality (DER)	Steve Smallwood	3/26/90	Meeting: DER's Draft Air Toxics Policy to Energy Recovery Facilities
	John Glunn	4/6/90	Telephone: Request Copy of DER's Draft Air Toxics Policy Document

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
DER (continued)	John Glunn	4/6/90	Transmittal: To CDM, Draft Air Toxics Policy Document
	Tom Rogers	4/13/90	Telephone: Notification of Project, Guidance on Air Quality Issues
		5/9/90	Letter: Site Location
National Park Service; Air Quality Division; Denver Service Center	Bud Rolofson	4/19/90	Telephone: Visibility and ISC Modeling for Class I Areas
National Park Service South East Region	Julie Thomas	4/20/90	Telephone: National Park, Class I Area, Sensitive Area Boundaries for Prevention of Signification
		4/25/90	
Lee County Environmental Division	Rick Mraz	4/5/90	Meeting: Field Visit to Review Lines of Jurisdiction
US Army Corps of Engineers (COE)	Skip Bergman	4/5/90	Meeting: Field Visit to Review Lines and Jurisdiction
		4/18/90	Telephone: Dredge and Fill Spoil Areas
		4/24/90	Meeting: Ecological Scoping Meeting
	Mr. Powell	4/18/90	Telephone: Request Dredge and Fill Spoil Areas Information

6/27/90
MLCL18/3

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
COE (continued)	Walter Jones	4/18/90	Letter: Request Dredge and Fill Spoil Areas Information
	Diane Grace	4/23/90	Telephone: Identified Dredge and Fill Spoil Areas
		4/26/90	Transmittal: Dredge abd Fill Spoil Areas Information Received Lee County
Lee County Division of Water Resources	Roland Banks	4/9/90	Telephone: Request Water Well Information
		4/12/90	Letter: Request Water Well Information
	Roland Ottolini	4/30/90	Telephone: Information for the 5-Mile radius to be Provided
		5/25/90	Telephone: Surface Water Discharge Location
Department of Environmental Regulation; Office of Coastal Management (DER)	David Worley	5/29/90	Telephone: Coastal Zone Zone Management
		5/29/90	Letter: Coastal Zone Management

IMAGE QUALITY

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

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
DER (continued)	Ted Hoehn	5/30/90	Telephone: Coastal Zone Management Consistency
	Lynn Griffin	5/31/90	Telephone: Coastal Zone Management Consistency
		6/4/90	Letter: Coastal Zone Management Consistency Received
Lee County Department of Community Services; Division of Planning and Construction	Al Whitworth	4/5/90	Telephone: Request County Parks Information
		4/12/90	Letter: Request County Parks Information
		4/23/90	Letter: County Parks Information Received
<i>west</i> South Florida Regional Planning Council (SFRPC)	<i>wayne</i> Walter Daltry	4/9/90	Telephone: Request Areas of Concern and Indian Reservations Information
		4/12/90	Letter: Request Areas of Concern and Indian Reservations Information

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
SWFAPC SFRPC (Continued)	Glenn Heath	4/25/90	Letter: Areas of Concern and Indian Reservations Information Received
City of Fort Myers Recreational Department	Nancy Campbell	4/6/90	Telephone: Request City Parks Information
		4/12/90	Letter: Request City Parks Information
	Irene Rensing	4/19/90	Letter: City Parks Information Received
Department of Natural Resources; Division of Recreation and Parks	Robert Dye	4/6/90	Telephone: Request State Parks Information
		4/12/90	Letter: Request State Parks Information
		4/20/90	Letter: State Parks Information Received
Department of Agriculture and Consumer Services	Ty Alexander	4/6/90	Telephone: Request State Forest Information
		4/12/90	Letter: Request State Forest Information
	Kevin Moore	4/19/90	Letter: State Forest Information Received

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
Department of Community Affairs; Bureau of Land and Water Management	Jim Quinn	4/20/90	Telephone: Request Areas of Critical State Concern
		4/23/90	Letter: Request Areas of Critical State Concern
		5/2/90	Letter: Areas of Critical State Concern Information Received
South Florida Water Management District; Save Our Rivers Division	Fred Davis	4/9/90	Telephone: Request Save Our Rivers Lands Information
		4/12/90	Letter: Request Save Our Rivers Lands Information
	Lee Henderson	4/20/90	Transmittal: Save Our Rivers Lands Information Received
Department of Environmental Regulation; Bureau of Surface Water Management (DER)	Eric Shaw	4/11/90	Telephone: Request Outstand- ing Florida Waters Information
		4/12/90	Letter: Request Outstanding Florida Waters Information

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
DER (Continued)	Eric Shaw	4/19/90	Letter: Outstanding Florida Waters Information Received
Department of Natural Resources; Division of State Lands; Southwest Florida Aquatic Preserves	Bob Repenning	4/12/90	Telephone: Request Aquatic Preserves Information
		4/12/90	Letter: Request Aquatic Preserves Information
		4/17/90	Letter: Aquatic Preserves Information Received
Department of Natural Resources; Florida Natural Areas Inventory (DNR)	Steve Friedman	4/9/90	Telephone: Request Special Plants and Animals Information
		4/12/90	Letter: Request Special Plants and Animals Information
		4/20/90	Letter: Special Plants and Animal Information Received for Previous Site
		5/1/90	Telephone: Status of Special Plants and Animals Information Request

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
DNR (Continued)	Steve Friedman	5/25/90	Telephone: Status of Special Plants and Animals Information Request
		5/30/90	Telephone: Use of Special Plants and Animals Information from 4/20/90
		5/30/90	Letter: Confirmation of Special Plants and Animals Information Use From 4/20/90
Department of Natural Resources; Division of State Lands	Linda Sumarlidason	4/6/90	Telephone: Request Submerged Lands Information
	Leonard Niro	4/12/90	Letter: Request Submerged Lands Information
	Elaine Richardson	5/1/90	Telephone: Status Submerged Lands Information
		5/25/90	Telephone: Status Submerged Lands Information
		5/31/90	Telephone: Status Submerged Lands Information
		6/8/90	Letter: Submerged Lands Information Received

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
Department of Natural Resources; Division of Land Resources	Gary Knight	4/9/90	Telephone: Request Conservation and Recreation Lands Information
	Greg Brock	4/12/90	Letter: Request Conservation and Recreation Lands Information
		5/1/90	Telephone: Status Conservation and Recreation Lands Information
		5/25/90	Telephone: Status Conservation and Recreation Information
		5/25/90	Letter: Faxed 4/12/90 Letter to Greg Brock
		5/31/90	Letter: Conservation and Recreation Information Received
Lee County Department of Community Development; Division of Zoning	B. Spikowski P. Camilia	3/20/90	Meeting: Rezoning Facility Site
	Brian Kilner	4/10/90	Meeting: Rezoning Facility Site
Lee County Division of Zoning	Kay Deselum	5/2/90	Telephone: Pre-Application Conference

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
Lee County Division of Zoning (Continued)	Hal McNemar	5/3/90	Telephone: Pre-Application Conference
	Mike Pavese	5/25/90	Telephone: Zoning Application
	Mary Gibbs	5/10/90	Meeting: Rezoning
Environmental Protection Agency	Marshall Hyatt	12/18/89	Telephone: NPDES Dewatering and Surface Water Discharge Permit
		1/31/90	Telephone: NPDES Dewatering Permit
		5/15/90	Telephone: NPDES Dewatering Permit
		5/17/90	Telephone: NPDES Dewatering Permit
	Tammy Bradley	5/15/90	Telephone: NPDES Stormwater Discharge Permit
	Chris Thomas	12/18/89	Telephone: NPDES Stormwater Discharge Permit
		12/19/89	Telephone: NPDES Stormwater Discharge Permit
		4/12/90	Telephone: NPDES Stormwater Discharge Permit

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
Lee County Mapping Department United States Geological Survey	_____	4/23/90	Telephone: Topography Maps
	Henry La Rose	5/2/90	Telephone: USGS Wells
United States Environmental Protection Agency/ Region IV Atlanta	Lew Nagler	5/21/90	Telephone: Air Toxics Contact People at State Agencies in Region IV
North Carolina Division of Environmental Management	Kevin Eldridge Tom Allen	5/22/90	Telephone: North Carolina Toxic Air Pollutant Regulations and Applicability
South Carolina Department of Health and Environmental Control; Bureau of Air Quality Control	John Hursey	5/22/90	Telephone: South Carolina Toxic Air Pollutant Regulations (proposed) and Applicability
Kentucky Department of Environmental Protection; Division for Air Quality	Marjorie Mullen	5/22/90	Telephone: Kentucky Toxic Air Pollutant Regulations
Tennessee Division of Air Pollution Control; Department of Health and Environment	Ron Redus	5/22/90	Telephone: Tennessee Guidelines to Assess Air Toxics Ground-level Impacts

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
Alabama Department of Environmental Management; Air Division	Bob Cowne	5/25/90	Telephone: Georgia Guidelines for Air Toxics Ground-level Concentrations and Proposed Regulations
Georgia Department of Natural Resources	Jean Drew	5/25/90	Telephone: Georgia Guidelines for Air Toxics Predicted Pollutant Impacts
Mississippi Department of Natural Resources; Bureau of Pollutant Control	Connie Simmons	5/29/90	Telephone: Mississippi Guidelines for Air Toxics Presicted Ground-level Effects
Florida Department of Environmental Regulation; Bureau of Air Monitoring and Assessment	Brian Kerckhoff	6/18/90	Telephone: Air Quality Monitoring Information
National Marine Fisheries Service Habitat Conservation	Mark Thompson	6/21/90	Telephone: Request Marine Sanctuaries Estuarine Sanctuaries National Seashores Information
		6/21/90	Letter: Request Marine Sanctuaries Estuarine Sanctuaries National Seashores Information

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
Department of Interior Fish and Wildlife Service	David Ferrell	6/21/90	Telephone: Request Marine Sanctuaries Estuarine Sanctuaries National Seashores Information
		6/21/90	Letter: Request Marine Sanctuaries Estuarine Sanctuaries National Seashores Information

Section 10

SECTION 10.0

REFERENCES

10.0 REFERENCES

- Adams, A.P., M. Garbett, and H.B. Rees. 1980 Bacterial Aerosols Produced from a Cooling Tower Using Wastewater Effluent as Makeup Water. In: Journal WPCF. Vol. 52 No 3.
- American Concrete Pipe Association. 1985. Concrete Pipe Design Manual. Vienna, Virginia.
- Bell, C.R. and B.J. Taylor. 1982. Florida Wild Flowers and Roadside Plants. Laurel Hill Press. Chapel Hill, N.C. 308 pages.
- Blair, W.F., A.P. Blair, P. Brodkorb, F.R. Coogle, G.A. Moore. 1968. Vertebrates of the United States. McGraw-Hill, New York, New York. 616 pages.
- Boggess, D.H. 1975. Effects of a Landfill on Groundwater Quality. U.S. Geological Survey Open-File Report 75-594.
- Boggess, D.H. and F.A. Watkins Jr. 1986. Surficial Aquifer System in Eastern Lee County, Florida. U.S. Geological Survey Water Resources Investigation Report 85-4161.
- Brown, L.N. 1973. The Everglades Fox Squirrel (*Sciurus niger avicennia*). Pages 222-223 in Threatened Wildlife of the United States. Resource Publication 114, U.S. Fish and Wildlife Serv.
- Burt, W.H. and R.P. Grossenheider, 1976. A Field Guide to the Mammals. Houghton Mifflin Company, Boston, Massachusetts. 289 pages.
- Camp Dresser & McKee Inc. August 1989. Lee County Solid Waste Master Plan. Fort Myers, Florida.
- Camp Dresser & McKee Inc. 1990. Non point Source Evaluation. Six Mile Cypress Watershed: Lee County, Florida. Fort Myers, Florida.
- Camp Dresser & McKee Inc. November 1987. Wellfield Protection Zone Modeling for Lee County, Florida. Fort Myers, Florida.
- Conant, R. 1975. A Field Guide to Reptiles and Amphibians of Eastern and Central North America. Houghton Mifflin Company, Boston, Massachusetts. 429 pages.
- Dryden, F.D., C. Chen, and M.W. Selna. 1979. Virus Removal in Advanced Wastewater Treatment Systems. In: Journal WPCF 51, 2098.
- Dryden, K. May 17, 1990. Personal Communication. Florida Game and Fresh Water Fish Commission.
- Erwin, K.L. 1990a. Personal Communication. Kevin L. Erwin Consulting Ecologist, Inc. Fort Myers, FL.

- Erwin, K.L. 1990b. Amended Lee County Protected Species Ordinance, 89-34. Kevin L. Erwin Consulting Ecologist, Inc. Fort Myers, FL.
- Florida Department of Transportation. 1986. Section 24, Township 44 South, Range 25E, Sheet Number 169D. Lee County, Florida. (1" = 200' aerial photograph.)
- Florida Power and Light Inc. FP&L Ten Year Power Plant Site Plan 1990-1999. April 1, 1990.
- Furlong, D. 1974. The Cooling Tower Business Today. In: Environmental Science and Technology. 8(8), pp. 712-716.
- Gallagher, J. May 18, 1990. Personal Communication. U.S. Fish and Wildlife Service.
- Godfrey, R.K. and J.W. Wooten. 1979. Aquatic and Wetland Plants of Southeastern United States, Monocotyledons. University of Georgia Press, Athens, Georgia. 712 pages.
- Godfrey, R.K. and J.W. Wooten. 1981. Aquatic and Wetland Plants of Southeastern United States, Dicotyledons. University of Georgia Press. Athens, Georgia. 933 pages.
- Harrison, H.H., 1975. A Field Guide to Bird's Nest in the United States East of the Mississippi River. Houghton Mifflin Company, Boston, Massachusetts. 257 pages.
- Higginbotham, A. March-April 1990. Personal Communication. Leases Land, Site F.
- Hovis, J. May 16, 1990. Personal Communication. Florida Game and Fresh Water Fish Commission.
- Hultgren, K. May 22, 1990. Personal Communication. Lee County.
- James M. Montgomery Inc. October 1988. Lee County Water Resources Management Project.
- Johnson, K. May 15, 1990. Personal Communication. South Florida Water Management District.
- Knapp, M.S., W. S. Burns, and T. S. Sharp. 1986. Preliminary Assessment of the Groundwater Resources of Western Collier County, Florida. South Florida Water Management District Technical Publication 86-1, 142p.
- Lee County, Florida. 1989. Protected Species Ordinance, 89-34. Department of Community Development, Lee County, Florida.
- Lee County. 1988. Six Mile Cypress Slough Pressure Land & Water Management Plan.

- Leithead, H.L., L.L. Yarlett, and T.N. Shiflet. 1971. 100 Native Forage Grasses in 11 Southern States. Agriculture Handbook No. 389. Soil Conservation Services. U.S. Department of Agriculture. Washington, D.C. 216 pages.
- Maurie, O.J. 1974. Animal Tracks. Houghton Mifflin Company. Boston, Massachusetts. 375 pages.
- Monfert, J.W. February 6, 1990. Personal Communication. Area Resident.
- Mortensen, R.A., May 2, 1990. Personal Communication. Mortensen Engineering, Inc.
- Mraz, R. May 15, 1990. Personal Communication. Lee County.
- Peterson, R.T. 1980. A Field Guide to the Birds East of the Rockies. Houghton Mifflin Company. Boston, Massachusetts. 384 pages.
- Radford, A.E., H.E. Ahles, C.R. Bell. 1968. Manual of the Vascular Flora of the Carolinas. University of North Carolina Press. Chapel Hill, North Carolina. 1,183 pages.
- Reed, P.B. 1988. National List of Plant Species That Occur in Wetlands: Southeast (Region 2). U.S. Department of the Interior, Fish and Wildlife Service. Biological Report 88(26.2), Washington, D.C. 124 pages.
- Roberson, J.A. and C.T. Crowe. 1985. Engineering Fluid Mechanics. Houghton Mifflin Company. Boston, Massachusetts.
- Rogozen, M.B. 1981. Emissions Characteristics of Cooling Towers Using Reclaimed Wastewater in California. Prepared for State of California Air Resources Board. Sacramento, California.
- Smith, H.M. 1978. A Guide to Field Identification Amphibians of North America. Golden Press. New York, New York. 160 pages.
- Smith, H.M. and E.D. Brodie. 1982. A Guide to Field Identification Reptiles of North America. Golden Press. New York, New York. 240 pages.
- South Florida Water Management District. January 1982. Hydrogeologic Reconnaissance of Lee County, Florida.
- South Florida Water Management District. 1985. Management of Water Use, Permit Information Manual, Volume III. West Palm Beach, Florida.
- South Florida Water Management District. 1987. Management and Storage of Surface Waters. Volume IV - Basis of Review. West Palm Beach, Florida.

- South Florida Water Management District. 1988. User's Guide for Multi-Basin Routing Model. West Palm Beach, Florida.
- Stevenson, H.M. 1976. Vertebrates of Florida. University Presses of Florida, Gainesville, Florida. 607 pages.
- United States Department of Agriculture, Soil Conservation Service. December 1984. Soil Survey of Lee County, Florida.
- United States Geological Survey. 1972. Fort Myers, Florida. (7.5-Minute Series topographic map).
- University of Central Florida. Department of Civil Engineering and Environmental Science. 1981. Stormwater Management Manual. Orlando, Florida.
- Wanielista, M.P. 1990. Hydrology and Water Quantity Control. John Wiley & Sons, Inc. New York.
- Wedderburn, L.A., M.S. Knapp and W.S. Burns. 1982. Hydrogeologic Reconnaissance of Lee County, Florida. South Florida Water Management District Technical Publication 82-1, Parts 1-3.
- Wellings, F.M. 1983a. ABW Filter Virological Test, Sand Lake Road Wastewater Treatment Facility, Orange County Public Utilities Division. State of Florida, Department of Health and Rehabilitative Services. Epidemiology Research Center. Tampa, Florida.
- Wellings, F.M. 1983b. Virological Testing at the McCleod Road Wastewater Treatment Facility. State of Florida, Department of Health and Rehabilitative Services, Epidemiology Research Center. Tampa, Florida.
- Westinghouse Gateway Communities. 1984. Application for Development Approval, Volume I. Gateway, the Planned Community for Fort Myers, Florida.
- Wood, D.A. 1989. Official Lists of Endangered and Potentially Endangered Fauna and Flora in Florida. Florida Game and Fresh Water Fish Commission. Tallahassee, Florida.
- Wunderlin, R.P. 1982. Guide to the Vascular Plants of Central Florida. University Presses of Florida. Gainesville, Florida. 472 pages.

**LEE COUNTY, FLORIDA
SOLID WASTE ENERGY RECOVERY FACILITY
APPLICATION FOR
POWER PLANT CERTIFICATION**

VOLUME II - APPENDICES

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



JUNE 1990

CDM

**LEE COUNTY, FLORIDA
SOLID WASTE ENERGY RECOVERY FACILITY
APPLICATION FOR
POWER PLANT CERTIFICATION**

VOLUME II - APPENDICES



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

JUNE 1990

**PREPARED BY
CAMP DRESSER & MCKEE INC.**

THIS DOCUMENT IS PRINTED ON RECYCLED PAPER.

*environmental engineers, scientists,
planners, & management consultants*

CDM

Poor Original

VOLUME II - APPENDICES

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 SITE AND ABUTTING PROPERTY OWNERSHIP	1-1
1.1 Deed for Property and Legal Description	1-1
1.2 Abutting Property Owners	1-3
2.0 REZONING PROCEDURES	2-1
3.0 ZONING AND LAND USE PLANS	3-1
4.0 ALTERNATIVE ENERGY RECOVERY FACILITY SITE ANALYSIS	4-1
5.0 INTERLOCAL AGREEMENTS	5-1
5.1 Lee County/Hendry County Interlocal Agreement	5-1
5.2 Request for Commitment from City of Fort Myers for Reclaimed Water	5-25
6.0 FEDERAL PERMIT APPLICATIONS AND APPROVALS	6-1
6.1 NPDES Permit Application for Construction Dewatering	6-1
6.2 NPDES Permitting for Stormwater Discharge	6-8
6.3 Federal Energy Regulatory Commission Order; Public Service Commission Order	6-9
6.4 Federal Aviation Administration Coordination	6-14
6.5 Joint Application for Activities in the Waters of the State of Florida (COE/DER)	6-16
6.6 Coastal Zone Management Coordination	6-22
7.0 STATE PERMIT APPLICATIONS AND APPROVALS	7-1
7.1 Landfill Permit Application Form	7-1
7.2 SFWMD Water Use Permit Application for Emergency Supply Groundwater Wells	7-12
7.3 SFWMD 40E-4 (Stormwater) Permit Application	7-33
7.4 SFWMD Notice of Intent to Short-Term Dewater	7-111
7.5 Electric and Magnetic Field Compliance DER 17-274	7-114
8.0 CORRESPONDENCE FROM FEDERAL, STATE, AND LOCAL AGENCIES	8-1

TABLE OF CONTENTS
(Continued)

<u>Section</u>	<u>Page</u>
9.0 GROUNDWATER WELL INVENTORY	9-1
9.1 Consumptive Use Permits	9-1
9.2 Private Wells	9-38
10.0 GEOTECHNICAL REPORT AND ARCHAEOLOGICAL REPORT	10-1
10.1 Geotechnical Report	10-1
10.2 Archaeological Report	10-19
11.0 NOISE IMPACT STUDY AND TRAFFIC IMPACT STUDY	11-1
11.1 Noise Impact Study	11-1
11.2 Traffic Impact Study	11-81
12.0 ECOLOGICAL STUDIES METHODOLOGY	12-1

Poor Original

TABLE OF CONTENTS

Section 1

SECTION 1.0
SITE AND ABUTTING PROPERTY OWNERSHIP

1.1 DEED FOR PROPERTY AND LEGAL DESCRIPTION

APPENDIX 1.1

- o Deed for Property (to be provided upon receipt)
- o Legal Description

APPENDIX 1.1

LEGAL DESCRIPTION

Poor Original

Description of Lands Surveyed

The Southeast Quarter 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).

AND

All that part of the Northeast Quarter of Section 24, Township 44 South, Range 25 East, Lee County, Florida;

Beginning at the East Quarter corner of said Section 24;
thence South $89^{\circ}08'58''$ West along the quarter section
line of said Section 24 a distance of 60.00 feet;
thence leaving said quarter section line North $0^{\circ}40'15''$
West 2539.73 feet;
thence South $89^{\circ}26'15''$ West 40.00 feet;
thence North $0^{\circ}40'15''$ West 40.00 feet;
thence South $89^{\circ}26'15''$ West 2197.43 feet;
thence South $0^{\circ}45'41''$ East 40.00 feet;
thence South $89^{\circ}26'15''$ West 100.00 feet to an
intersection with the easterly line of a Florida Power
and Light Company right-of-way as recorded in O.R. 814,
page 673 of the Public Records of Lee County, Florida;
thence North $0^{\circ}45'41''$ West along said right-of-way line
a distance of 100.00 feet to an intersection with the
northerly line of said Section 24;
thence leaving said right-of-way line North $89^{\circ}26'15''$
East along said northerly line a distance of 2397.53
feet to the northeast corner of said Section 24;
thence South $0^{\circ}40'15''$ East along the easterly line of
said section a distance of 2639.43 feet to the East
Quarter corner of said Section 24 and the Point of
Beginning of the easement herein described;

containing 155.20 total acres of land more or less;
subject to easements and restrictions of record.

1.2 ABUTTING PROPERTY OWNERS

APPENDIX 1.2
ABUTTING PROPERTY OWNERS

The owners of property abutting the Facility site are as follows:

- 1) Michael Abdalla, Tr.
1009 Bal Isle Drive
Fort Myers, FL 33919
- 2) Taylorcrest, NV
Attn: Gloria Lerma
6508 NW 82nd Avenue
Miami, FL 33166
- 3) Florida Power & Light Company
Attn: W. H. Bonham - JLM
P.O. Box 14000
Juno Beach, FL 33408
- 4) Jerry Johnson
12810 River Road, SE
Fort Myers, FL 33905
- 5) C. L. & Carolyn M. Mercer
6970 Pangola Drive
Fort Myers, FL 33905
- 6) Lee County
- 7) City of Fort Myers
- 8) Frank P. DiPlacido, Tr.
R.Q. Richards, III, Tr.
P.O. Box 7243
Fort Myers, FL 33911
- 9) Bernard J. DeWolfe, Tr.
Allen H. Johnson, Tr.
6140 Winkler Road
Fort Myers, FL 33919

These properties are delineated on Figure 2-4 in Volume I.

Section 2

SECTION 2.0
REZONING PROCEDURES

APPENDIX 2.0

REZONING PROCEDURES

This appendix presents copies of the applications to rezone the southeast quarter of Section 24 of the energy recovery facility site from Agricultural (AG-2) to an Industrial Planned Development (IPD) as submitted to the Department of Community Development, Division of Zoning. The rezoning package consists of the following:

- o Pre-application Conference form;
- o County-Initiated Application for Public Hearing form;
- o Developments of County Impact (DCI) form (a supplement to the County-Initiated Application for Public Hearing).

Exhibits to the County-Initiated Application for Public Hearing form and the DCI form are included in Section 2.0, Volume I (see Figures 2-6 and 2-26). The boundary survey used for the applications was based on a boundary survey conducted by Johnson Engineering, Inc., Project Number 17607, File No. 23-44-25. The Traffic Impact Statement included in the DCI form can be found in Section 11.2.

Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**



BOARD OF COUNTY COMMISSIONERS

PO Box 398
Fort Myers, Florida 33902-0398
(813) 334-2166

335-2276

Writer's Direct Dial Number
L-124-90

John E. Manning
District One

Douglas R. St. Cerny
District Two

Ray Judah
District Three

Bill Fussell
District Four

Donald Slisher
District Five

Marsha Segal George
County Administrator

James G. Yeager
County Attorney

R. Scott Barker
County Hearing
Examiner

April 18, 1990

RECEIVED
APR 18 1990

Pauline Camelia
Department of Community Development
Division of Zoning
1831 Hendry Street
Fort Myers, FL 33902

RE: LEE COUNTY ENERGY RECOVERY FACILITY RECOVERY

CAMP DRESSER & MCKEE
FORT MYERS, FLORIDA

Dear Ms. Camelia:

As part of the pre-application process, Lee County is submitting this letter of intent briefly describing the Lee County Energy Recovery Facility Project. Currently the land to be rezoned (Strap Number 24-44-25-00-00001.0000) is classified as agricultural (AG-2). Lee County is requesting the land be rezoned as an Industrial Planned Development (IPD). The land use category is rural and designated as a resource protection area. The land will serve as the site to construct an Energy Recovery Facility which will utilize solid wastes to produce energy in the form of electricity.

Contact me if there are any further questions or comments regarding the pre-application for rezoning for the Lee County Energy Recovery Facility. Please advise me of the Pre-application Conference time and place. I understand the Conference will be scheduled within two weeks.

Sincerely,

George E. Reilly, P.E.
Administrative Director
DEPARTMENT OF LEE COUNTY UTILITIES

DEC 11 1990
DIVISION OF ZONING (original)
CLASS-35-PT
LEE COUNTY Energy Recovery
Rezoning

cc: David Owen, Assistant County Attorney
Neil Haslett, Lee County Land
Michael Ihnat, CDM
Dan Strobbridge, CDM
Bob Tietz, CDM

(2420A)

PRE-APPLICATION BACKGROUND INFORMATION SHEET

Applicant's Name/Project Name: Lee County/Lee County Energy Recovery Facility, Camp Dresser & McKee

Request Rezoning from AG-2 to IPD

Project Location 24-44-25-00-00001.0000 (strap)
The property is located off Buckingham Road approximately 1.0 miles east of the junction of SR82 and Buckingham Road

Size of Property The size of the property is 151.9 acres

Present Use Present Zoning is AG-2 and is vacant land.

Proposed Use: The proposed use of the property is for an Industrial Planned Development, the Lee County Energy Recovery Facility.

Adjoining Zoning: North: AG-2
East: AG-2
South: AG-2
West: AG-2

Adjoining Uses: Rural

Land Use Category: Rural/RPA

Density (if residential) Not Applicable

Water Potable water servicing this project will be supplied by either the City of Fort Myers or Lee County

Sewer: Only sanitary sewage will be serviced by tapping into sewer lines to be connected to the Central Plant Wastewater Facility

Additional Comments:

MEMORANDUM

DEPARTMENT OF LEE COUNTY UTILITIES

TO: Pauline Camelia DATE: May 29, 1990
Zoning M-175-90

RE: LEE CO. ENERGY RECOVERY FROM: George E. Reilly 
FACILITY REZONING APPLIC. Administrative Director

As discussed in the Pre-application Conference held May 10, 1990 at the Division of Zoning, it is anticipated that the Public hearing before the Hearing Examiner will be scheduled as soon as possible in order to coordinate the rezoning efforts with the Power Plant Site Act Permit Application to be submitted to the Department of Environmental Regulation July 1, 1990. Please note that three (3) copies of the Traffic Impact Statement are provided as part of the DCI submittal. Maps designating resource protection and transition zones are not included. We are waiting for final maps from Lee County Environmental Services.

cc: D. Owen, Assistant County Attorney
N. VanHorne, DLCU
D. Dee, Environmental Council
R. Tietz, CDM
R. Matthews, CDM, w/o attachments
J. Calise, CDM
M. Ihnat, CDM
R. Hawfield, CDM, w/o attachments
D. Strobridge, CDM, w/o attachments

2-4

(COUNTY-INITIATED REQUESTS ONLY)

APPLICATION FOR PUBLIC HEARING
LEE COUNTY, FLORIDA

DEPARTMENT OF COMMUNITY DEVELOPMENT
DIVISION OF ZONING
1831 HENDRY STREET, P. O. BOX 398
FORT MYERS, FLORIDA 33902
(813) 335-2235

APPLICANT Department of Lee County Utilities

DEVELOPMENT NAME (IF ANY) Lee County Energy Recovery Facility

LOCATION (COMMON DESCRIPTION) The property is located off of Buckingham Road It can be
accessed by taking Exit 23 off of Interstate 75 travel east on Immokalee Road (SR 82)
for 1 5 miles to Buckingham Road then travel east approximately 1 0 miles to the site

NATURE OF REQUEST Rezoning from Agricultural (AG-2) to Industrial Planned Development(IPD)

COMMISSION DISTRICT 5 FIRE DISTRICT Tice

SUPPLIER OF SEWER SERVICE City of Fort Myers Central Wastewater Treatment Plant

WATER SUPPLIER Lee County

DESCRIPTION OF ROAD ACCESS FROM SITE TO NEAREST ARTERIAL ROAD _____
See Location (Common Description)

LEE PLAN LAND USE CATEGORY Rural/ Resource Protection Area (RPA)

THIS SECTION IS FOR INTAKE STAFF USE ONLY

RECEIPT NUMBER _____ HEARING NUMBER _____

AMOUNT OF FEE _____ DATE FEE PAID _____

FORMAL WORDING OF REQUEST _____

SECTION ONE APPLICANT DATA

A Name of applicant LEE COUNTY BOARD OF COUNTY COMMISSIONERS
c/o George F. Reilly, P.E., (title) Administrative Director Department of
Lee County Utilities
Mailing Address. P O Box 398
Fort Myers, Fl 33902-0398
Phone (813) 335-2276 Ext _____
B This action was initiated by the Board on: _____

SECTION TWO: SUBJECT PROPERTY DATA

A Lee Plan land use classification: Rural/ Resource Protection Area (RPA)

B Legal description of subject property. Answer only 1 or 2, as applicable.

1 Within platted subdivision, recorded in official Plat Books of Lee County:

Subdivision Name Not Applicable (N/A)

Plat Book N/A Page N/A Unit N/A Block N/A Lot N/A

Section N/A Township N/A Range N/A

Note Attach actual copy of the plat book page (obtainable from Clerk's Office) with subject property clearly marked. Label as "Exhibit One."

2. If not in platted subdivision, a complete legal description must be attached (label as "Exhibit Two") which is sufficiently detailed so as to locate said property on county maps or aerial photographs. The legal description must include the Section, Township, and Range. If the application includes multiple contiguous parcels, the legal description may describe the perimeter boundary of the total area, and need not describe each individual parcel, except where different zoning requests are made on individual parcels.

C. S-T-R-A-P Number(s): 24-44-25-00-00001.0000

Note If additional space is needed, attach a separate sheet and label as "Exhibit Three."

D Street address of subject property (if unknown, obtain from Lee County E-911 Addressing Division): (813) 335-2462, 10500 Buckingham Road

E Common description of property location (sufficiently detailed so as to locate property from known major roadways): The property is located off of Buckingham Road. It can be accessed by taking Exit 23 off of Interstate 75, travel east for 1.5 miles on Immokalee Road (SR 82) to Buckingham Road then travel approximately 1.0 miles to the site.

F Property dimensions:

Area 6,432,831 square feet, or 148 acres

Width along roadway: 2389 3 feet

Depth 2692 35 feet

Typical Lot Size N/A

G Present use(s) of property (be specific): vacant land with cattle grazing

H Present zoning classification(s): AG-2

I Present Lee Plan land use map category: Rural/RPA

Lee County Energy Recovery Facility

Application for Public Hearing

"Exhibit Two"

Description

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 corner of said Section 24, thence run S.00°41'53"E. along said east line for 2641.21 feet to the southeast corner of said Section 24, thence run S.01°10'57"E. along the east line of said Section 25 for 51.14 feet to an intersection with the north line of Buckingham Road (150 feet wide); thence run S.88°45'25"W. along said North line for 2389.3 feet; thence run N.00°47'09"W. along a line parallel with and 250.00 feet East of the quarter section line of the east half (E-1/2) of said Section 24 to an intersection with the North quarter section line of the southeast quarter section of said Section 24; thence run east along the North quarter section line to the Point of Beginning.

LCL2/30
5/24/90

SECTION THREE REQUESTED ACTION/REQUIRED SUBMITTALS

A Is Rezoning being requested to a new district? yes

1 If so, what is the existing zoning? AG-2

What is the proposed zoning? IPD

B Is a Special Exception being requested? no

If so, please specify: N/A

C Is a Variance being requested? no

Variance from the required N/A

To _____

D Is a Special Permit being requested? no

If so, please specify N/A

E Other required submittals:

All applications, regardless of request, must be supplemented with the following documents

1. Property owners list

A complete list of all property owners, and their mailing addresses, for all properties within the area described. Names and addresses must be those appearing on the latest tax rolls of Lee County. Label as "Exhibit Four "

2. Area location map

A map, at suitable scale, indicating the property described in the legal description. This map shall be sufficiently referenced to known major streets or other physical boundaries so as to be clearly identifiable to the general public. Label as "Exhibit Five "

SECTION FOUR CERTIFICATION

A All information submitted with the application or submitted at the public hearing becomes a part of the public record and shall be a permanent part of the file

B All attachments and exhibits submitted shall be of a size that will fit or conveniently fold to fit into a legal size (8 1/2" x 14") folder.

C Affidavit:

I, _____, being first duly sworn, depose and say that I am authorized pursuant to Section 800 A 2, Lee County Zoning Ordinance, to apply for the request(s) made herein, and that all answers, attachments, and exhibits include herewith as a part of this application, are accurate and true to the best of my knowledge and belief. The filing of this request was approved by the Board of County Commissioners on _____, 198__.

Signature

Printed Name and Title

Sworn and subscribed before me
this _____ day of _____, 198__.

My Commission Expires _____

Notary Public

LEE COUNTY ENERGY RECOVERY FACILITY
APPLICATION FOR PUBLIC HEARING

"EXHIBIT FOUR"

PROPERTY OWNERS LIST

Mr. Michael Abdalla
1009 Bal Isle Drive
Fort Myers, Fl. 33919

PLANNED DEVELOPMENTS - DEVELOPMENTS OF COUNTY IMPACT

SUPPLEMENT TO APPLICATION FOR PUBLIC HEARING

EXHIBIT THREE A 1

NAME OF APPLICANT(S) Department of Lee County Utilities

NAME OF PROJECT (IF ANY) Lee County Energy Recovery Facility

DATE THIS SUPPLEMENT WAS COMPLETED May 25, 1990

HAS THE CASE HAD A PRE-APPLICATION CONFERENCE? Yes X No
If Yes, please provide date(s) of conference May 10 1990

If this form does not provide enough space for a complete and sufficient response to any item, please insert additional pages with clear indication of continuity or relation to the item(s) in question

I TYPE OF PROJECT PROPOSED (Multiple requests permissible, check as many items as applicable)

- RESIDENTIAL PLANNED DEVELOPMENT (431) (Complete Page III-A)
 MOBILE HOME PLANNED DEVELOPMENT (431) (Complete Page III-A)
 RECREATION VEHICLE PLANNED DEVELOPMENT (441) (Complete page III-A)
 COMMUNITY FACILITIES PLANNED DEVELOPMENT (451) (Complete page III-B)
 COMMERCIAL PLANNED DEVELOPMENT (461) (Complete Page III-B)
 X INDUSTRIAL PLANNED DEVELOPMENT (471) (Complete Page III-C)
 GENERAL EXCAVATION PERMIT (508) (Complete Page III-C)
 AIRPORT OPERATIONS PLANNED DEVELOPMENT (482) (Complete Page III-C)

PROPERTY IS PRESENTLY ZONED AG-2

LEE PLAN LAND USE CATEGORY Rural/RPA

LEE PLAN AMENDMENTS Are there amendments pending or proposed that may affect the subject property? Yes No X
If Yes, please submit a letter providing a discussion as to how the changes will affect the property including all pertinent information relating to case number, and dates of approvals or scheduled public hearings

II CHARACTER OF PROPERTY

- A Total land area within the boundary lines of the planned development 148 acres
- B Dimensions
- 1 Width (average if irregular parcel) 2389 3 feet
- 2 Depth (average if irregular parcel) 2692 35 feet
- 3 Frontage (on road or street) 2389 3 feet
- C Area available for development.
- 1 Total land area (A above) (1) 148
- 2 LESS area designated "Resource Protection Area" (RPA)* (2)
- 3 LESS area designated Transition Zone (TZ)** (3)

- 4 LESS area of any submerged land subject to tidal influence (4) Not applicable
- 5 LESS area of land to be dedicated to the public for roads, parks, or other similar facilities (5) Not applicable
- 6 Remaining developable land (6) _____

*RESOURCE PROTECTION AREA (RPA) - Lands that exhibit soil types and hydrologic and vegetative characteristics diagnostic of freshwater and saltwater wetlands

**TRANSITION ZONE (TZ) - Lands that may be seasonally inundated from one to three months as indicated by water marks, do not have depressional soils, and are characterized by a mixture of plant species typical of uplands and wetlands

- D Describe the range of surface elevations of the property 21 2'-21 4'
- E If the property is within a flood prone or backwash area in accordance with adopted flood insurance program maps, specify the minimum elevation required for the first habitable floor
- Not applicable NGVD (MSL)
- F Identify any environmentally sensitive lands including but not limited to wetlands, soils subject to saltwater inundation or freshwater ponding, flow-ways, creek beds, sand dunes, coastal or interior hammocks, old growth pine flatwoods, or endangered species habitat

See Attachment 1

If environmentally sensitive areas do exist on the site, an environmental assessment must be prepared that examines the existing conditions, addresses the environmental problems, and proposes means and mechanisms to protect, conserve, or preserve the environmental and natural resources (see Section 202 11 B 1). The maps or aerial photographs required by Section 804.03 C 1.a 3 should also delineate areas of encroachment by undesirable exotic (floral) species, the line of mean high water, any jurisdictional boundaries of state and federal agencies, and Coastal Construction Setback Line(s). If the site contains unique landforms or biological areas such as creek beds, sand dunes, coastal or interior hammocks, or old growth pine flatwoods, additional information may be required including wildlife and plant inventories and hydrologic details, in order to identify the highest quality biological communities and develop suitable conservation measures. Please contact the Lee County Division of Planning's environmental section at 335-2200 with any questions concerning this environmental assessment.

- G List all natural features to be preserved or conserved, together with their function, if any, in the completed project

The wetlands on site will be preserved

- H If the project is located adjacent to navigable natural waters, what method of shoreline stabilization, if any, is proposed?

Not applicable

EXHIBIT THREE A 1

Attachment 1

Lee County Energy Recovery Facility

Planned Developments - Developments of County Impacts

II-F Character of Property

Seventeen land use and vegetation types have been identified on the Lee County Energy Recovery Facility, as illustrated on the attached wetlands map. These types have been classified to Levels III and IV of the Florida Land, Use, and Cover Classification System (FLUCFCS). The vegetation types for the site include farm pasture (210), low pasture (212), palmetto prairie (321), palmetto prairie invaded by exotics (3219), pine flatwoods (411), pine flatwoods invaded by exotics (4119), wet pine flatwoods (415), wax-myrtle (429), Australian pine (437), drainage canal (514), cypress (621), cypress/pine (624), cypress/pine invaded by exotics (6249), and wet prairie (643).

LCL2/28
5/24/90

III-C CHECK APPLICABLE CATEGORY, OR DISCARD III-C

INDUSTRIAL PLANNED DEVELOPMENT, IPD, Section 471 X

GENERAL EXCAVATION PERMIT, Section 508 _____

AIRPORT OPERATIONS PLANNED DEVELOPMENT, AOPD, Section 482 _____

1 TYPE OF DEVELOPMENT, GENERALLY (specify maximums)

COMMERCIAL USES Gross floor area Not applicable

LIGHT INDUSTRIAL USES Gross floor area Not applicable

HEAVY INDUSTRIAL USES, Gross floor area (if appropriate) Approximately 166,000 sq ft
or areas of use not under roof Cooling Tower & Electrical Switchyard approximately
(see additional requirements for mines, quarries or other 14,000 S F
general excavation, at #4 below)

HOTEL/MOTEL number of rooms Not applicable
Gross floor area of accessory uses, by use Not applicable

OFFICES Gross floor area Administrative Building approx 22,500 S F
(if medical or related offices are included, enter gross
floor area to be devoted to that specific use)

OTHER number of units or area of use as appropriate
Not applicable

2 Maximum height of buildings (both items must be completed)

Number of habitable floors 4

Maximum height above average elevation of abutting streets
(refer to section 202 18 A for definitions)

380'

3 A proposed schedule of uses must be also be submitted. Select the uses from the list of permissible uses in Section 471 A or 482 B as appropriate, or by reference to those uses permitted in a more restrictive zoning district. If uses from another district are selected, specific uses can be deleted or added from the list of permissible uses. When adding or deleting uses, utilize the precise terminology from the Lee County Zoning Ordinance whenever possible. This schedule of uses may be placed directly on the Master Concept Plan, or on a separate sheet no larger than 8 1/2" by 14" and containing the applicant's name, date of preparation of the schedule, and project name (if any). See Attachment 2

4 If a General Excavation Permit is being requested as part of an Industrial Planned Development, additional application requirements apply. Please refer to Section 508 H 2 for a full list of these requirements. Generally, the information required on the "proposed mining plan" should be incorporated onto the Master Concept Plan. Not applicable

EXHIBIT THREE A 1

Attachment 2

Lee County Energy Recovery Facility

Planned Developments - Developments of County Impacts

III-C #3 Proposed Schedule of Uses

Applicant's name: Department of Lee County Utilities

Date of Preparation of the schedule. May 25, 1990

Project name: Lee County Energy Recovery Facility

According to section 471.B.3, the permissible use in the Industrial Planned Development (I.P.D.) district for this project is for heavy industrial uses. Under a heavy industrial use, the project is categorized as salvage and disposal of materials which includes refuse disposal and processing plant, incinerators and materials recovery.

Under normal operation, the site will be used for energy recovery. An Administration Building will be on the site to provide offices for clerical and administrative use. Parking on site will comply with Section 202.16.J.5.0 of the zoning ordinance.

Proposed future uses may include but is not limited to recycling facilities and a park access road.

LCL1/20

IV DRAINAGE & WATER CONTROL

- A Describe the runoff characteristics of the property in its existing state

The runoff will drain to ditch which will inturn drain to the existing wetlands The runoff will continue off site through a culvert in SR 82 which drains to the 6-mile Cypress swamp area.

- B Describe in general terms the drainage concept proposed, including the outfall to canals or natural water bodies

The proposed drainage concept will consist of a detention pond with outlet structure to control discharge rates into the ditch The runoff will continue from the ditch through a culvert in SR 82 which drains to the Cypress swamp area

- C Describe how drainage flow from adjacent properties will be maintained

The drainage flow from the adjacent properties will not be impacted except for the drainage of the property just east of the subject property.

The adjacent properties have their own wetlands and discharge areas The drainage flow of the property east of the subject property will be directed Describe retention features that will be incorporated into the drainage to the system and the legal mechanism which would guarantee their maintenance. detention pond.

- D

The retention features that will be incorporated into the drainage system are slide gates on discharge structures. S F W.M D mandates

responsibility of operation and maintenance for drainage facilities

built by Lee County S F.W M.D acts as a verifier

- E Describe any existing natural features that will be incorporated into the drainage system and how these features will be preserved Include an estimate of the range(s) of existing and post development water table elevations, where appropriate:

See Attachment 3

- F. If this property is subject to seasonal inundation, or subject to inundation by a stream swollen by the rains of a 10-year storm event, indicate the measures that will be taken to mitigate the effects of expectable flooding.

The property is not subject to seasonal inundation or inundation by a stream

- G Describe the requirements for fill material posed by this development for other than building pads (use, volume, etc):

The estimated volume requirements for fill materials posed by this development for driveways, road access and the tipping floor area are 53,250 cy

EXHIBIT THREE A 1

Attachment 3

Lee County Energy Recovery Facility

Planned Developments - Developments of County Impacts

IV-E Drainage and Water Control

The project including surface water management facilities will be located wholly in upland areas. The control elevation will be placed at or above the wet season water table to maintain the integrity of the wetland systems. Except for construction, the project should have no effect on the water table elevations. Seasonal water table elevations should continue to fluctuate from 3-4 feet below ground surface in the dry season to 6-inches to 2 feet below ground surface in the wet season in upland areas. The groundwater flow gradient should continue to flow Northward to the Caloosahatchee River.

LCL2/29
5/24/90

V TRANSPORTATION

- A Unless otherwise excepted, any application for a Planned Development must file a Traffic Impact Statement (see separate form attached to this document)
- B Describe the provision of private transit or shuttle, the relation of this project to public transit, or any other strategy proposed for reducing the number of vehicular trips attracted/generated by this development

Not applicable

VI WATER SUPPLY

- A Please estimate the daily consumption of potable water by the proposed project (please show all calculations and source of consumption rates utilized)

The estimated daily consumption of potable water by the proposed project
is 75,000 gpd

- B If this property lies wholly or partly in the certificated or franchised service area of an established water utility, name the utility Lee County and specify the distance to the existing point of service The water supply will be connected to the existing water distribution (shortest distance via public right-of-way or established easement) system approximately 3.5 miles west of the site via an 8" (minimum) main along SR 82 to the point of connection at High Cotton Lane.
- C If connection to the system named above is contemplated, please furnish a letter from the general manager or other responsible official of the utility acknowledging the utility's capacity to provide the water at a reasonable pressure and flow rate to the project.
- D If a private, one-site, potable water system is proposed, please provide a description of the system, specify the water resource to be exploited, and any appropriate quality and quantity data

Not applicable

- E If a separate system is proposed for non-potable (irrigation) water uses, please specify the source and give details of proposed system, including the resource to be used, and any appropriate water quality and quantity data

Non-potable water used for the cooling tower and fire protection will be
supplied by utilizing the treated effluent from the Central Wastewater
Treatment Plant The quantity supplied will be 1.5 mgd A permit for a
proposed back up water well supply is currently being applied for The
water will be used for the cooling tower and fire protection

EXHIBIT THREE A 1

VII SANITARY SEWER OR WASTEWATER

- A Please estimate the daily production of wastewater by the proposed project (please show all calculations and source of consumption rates utilized)

The daily production of wastewater by the proposed project is 150,000 gpd
which will be sent to the Central Wastewater Treatment Plant

- B If any special types of effluents can be anticipated, please specify these and state what strategies will be used to deal with their special characteristics

The 150,000 gpd wastewater produced consists of 75,000 gpd of domestic
wastewater and 75,000 spent cooling water from the process The
wastewater will meet the Central Treatment Plant pretreatment standards

- C If this property lies wholly or partly in the certificated or franchised service area of an established sanitary district or sewer utility, name the utility City of Fort Myers and specify the distance to the nearest existing point of service The sewer connection will tie into an existing pump station at (shortest distance via public rights-of-way or established easements)

- D If connection to the system named above is contemplated, please furnish a letter from the general manager or other responsible official of the utility, acknowledging the utility's capacity to receive, treat, and dispose of your project's effluents or otherwise provide the necessary service(s)

- E If a private on-site wastewater treatment and disposal facility is proposed, please provide a detailed description of the system including the method and degree of treatment, the quality of effluent, and the expected life of the facility Who will operate and maintain the internal collection and treatment facilities? Specify receiving bodies or other means of effluent disposal. If spray irrigation will be used, specify location and approximate area of spray fields, current water table conditions, proposed rate of application and back-up system capacity Will the location or operation of such treatment plant as proposed require deviation from the Development Standards Ordinance?

An onsite wastewater pretreatment system will be provided to meet the
City of Fort Myers Central Treatment Plant pretreatment standards

- F Is the use of individual sewage disposal systems proposed? _____
If so, will this proposal require deviation from any county or state regulations? _____
Please detail _____

Not applicable

EXHIBIT THREE A 1

VIII MISCELLANEOUS IMPACTS OR NEEDS

A FIRE PROTECTION

- 1 Name of independent fire district which will provide fire protection for this development

Tice

- 2 Identify the nearest existing fire station, its distance from your project in miles measured over the shortest public road route, and the existing response time to your location

5170 Tice Street (location of station),

6 (miles), @ 6 - 7 (minutes)

- 3 What is the maximum height of building that can be extinguished or evacuated with this district's existing equipment or apparatus?

8 stories above grade
100' aerial

B EMERGENCY MEDICAL SERVICES

- 1 Identify the nearest existing emergency medical station (ambulance with certified paramedics), its distance from your project in miles measured over the shortest public road route, and the existing response time to your location Fort Myers Shores

1226 Palm Beach Blvd. (location of station),

7 (miles), 8 (minutes)

C CULTURAL RESOURCES

- 1 Identify any existing and serviceable buildings or structures on the property built prior to 1945

There are not any serviceable building or structures on the property built prior to 1945.

- 2 Identify any feature of the site listed on the Florida Master Site File or National Register of Historic Places

There are not any features of the site listed on the Florida Master Site File or National Register of Historic Places

- 3 What measures are proposed to preserve, integrate or adaptively reuse any building or feature noted in 1 or 2 above in the proposed development?

Not applicable

D AVIATION HAZARD

If your project is near any commercial or general aviation facility, describe any proposed structures, lighting, or other feature that might effect safe flight conditions

The Energy Resource Facility will be located approximately 3.5 miles from the Lehigh Acres Airfield Strobe lights will be provided on the stacks A separate permit has been applied for to the Federal Aviation Administration (FAA)

EXHIBIT THREE A 1

CHECKLIST FOR
SCHEDULE OF DEVIATIONS
(804 02 E, Lee County Zoning Ordinance)

If the proposed Planned Development will deviate from any regulation in order to accomplish the purpose and intent of the planned Development districts, please indicate the proposed deviation below, typical deviations are listed here, but deviations from other regulations may also be requested

After completing this checklist, prepare a schedule of deviations specifying the existing standard, the different standard proposed, and the rationale or justification for the difference. Also, illustrate the difference graphically on the Master Concept Plan, or in an illustrative detail thereto

- _____ Minimum setback from a structure to a water body of 25 feet (202 18 B), to _____ feet,
- _____ Maximum excavation depth for water retention areas of 12 feet, or less if needed to avoid penetration of impervious soil (509 B), to _____ feet,
- _____ Minimum water retention excavation setbacks to a section line of 75 feet (509 C 1), to _____ feet between Sections _____ and _____,
- _____ Minimum water retention excavation setbacks to a quarter section line of 60 feet (509 C 2), to _____ feet for the _____ line in Section _____,
- _____ Minimum water retention excavation setbacks to a street right-of-way of 150 feet (509 C 4), to _____ feet,
- _____ Minimum water retention excavation setbacks to a private property line of 50 feet (509 C 4), to _____ feet,
- _____ Maximum slope of excavation banks of 6:1 ratio to a water depth of 4 feet below dry season water table (509 D), to _____ ratio,
- _____ Minimum setback between structures and a section line of 75 feet (202 18 B 3), to _____ feet between Sections _____ and _____,
- _____ Minimum setback between structures and a quarter section line of 60 feet (202 18 B 3), to _____ feet for the _____ line in Section _____,
- _____ Maximum number, type, size, or location of signs (Ordinance No 85-26, as amended), to allow _____,
- _____ Requirement that parking lots must be designed to permit vehicles to enter the street in a forward motion (202 16.C.1), to _____,
- _____ Other deviations from General Provisions of the Zoning Ordinance (specify here and on plan) _____,
- _____ No drainage, filling, or other alterations of soils subject to saltwater inundation or freshwater ponding shall be permitted without specific approval (DSR C 1 b 4),
- _____ General Provisions of the Development Standards Ordinance (specify here and on plans) _____
- _____ Development Design Standards of the Development Standards Ordinance (specify here and on plans) _____
- _____ Development Improvement Standards of the Development Standards Ordinance (specify here and on plans) _____

EXHIBIT THREE A 1

IF DEVELOPMENT IS A SECTION 484 "PLANNED UNIT DEVELOPMENT" (discard otherwise)

- _____ Minimum PUD area of 10 acres (484 E 1), to _____ acres.
- _____ Minimum setback from a structure to the PUD boundary of 1/2 the structure height, or at least 20 feet (484 E 3), to _____ feet.
- _____ Minimum lot dimensions and setbacks if subdivision lots are planned (484 E 4), (specify here and on plans) _____.
- _____ Minimum distance between buildings of 1/2 the sum of the heights, or at least 20 feet (484 E 5), to _____ feet.
- _____ Maximum lot coverage of 40 percent (484 E 6), to _____ percent.
- _____ Minimum open space of 35 percent, with no more than half as water bodies (484 E 7), to _____ percent.
- _____ Minimum off-street parking requirements as set forth for comparable uses in all zones (484 E 8), to allow _____.

EXHIBIT THREE A 1

Revised 2/8/89
Page 12 of 13
0298U

901 BOARD OF COUNTY COMMISSIONERS

901.01 GENERAL

A. APPOINTMENTS

The Board of County Commissioners shall appoint the members of the Local Planning Agency.

B. INITIATION OF ZONING ACTIONS (See Section 800.A)

The Board of County Commissioners, or its designee, may initiate Rezoning, Special Exceptions, Variances, Special Permits, Developments of Regional Impact, and Zoning Ordinance amendments.

901.02 FUNCTIONS, CONSIDERATIONS, DECISIONS AND AUTHORITY

A. LAND USE ORDINANCE AMENDMENTS OR ADOPTION

1. Function

The Board of County Commissioners shall hold public hearings on all proposed land use ordinance amendments or adoptions.

2. Considerations

When deciding whether to adopt a proposed land use ordinance or amendment, the Board of County Commissioners shall consider the same criteria, recommendations and issues as set forth in Section 900.01.B.1., as well as the recommendation of the Local Planning Agency.

3. Decisions and Authority

The decision of the Board of County Commissioners on any proposed land use ordinance amendment or adoption is final.

4. Appeals

Appeals of any decision concerning land use ordinance amendments or adoption shall be taken in accordance with applicable State law.

B. ZONING ACTIONS

1. Function

The Board of County Commissioners shall hold public hearings (Section 903) on the following applications:

Section 901.02.B.1., cont.

- a. Rezoning, the Special Exceptions that meet the criteria for Developments of County Impact, Developments of Regional Impact, and any other action in conjunction with same.
- b. All requests for Variances, Special Exceptions and Special Permits which are part of an application for a Rezoning shall be considered by the Board of County Commissioners with the application for Rezoning and heard together with, and at the same time as, the Rezoning.

2. Considerations

In rendering its decision, the Board of County Commissioners shall consider the following:

- a. The criteria set forth in Section 900.02.C.2.
- b. The substantive recommendation of the Hearing Examiner when applicable.

3. Decisions and Authority

- a. In exercising its authority, the Board of County Commissioners shall consider the recommendation of the Hearing Examiner, but may, in conformity with the provisions of this ordinance, reverse, affirm, or modify the recommendation of the Hearing Examiner.
- b. The Board of County Commissioners shall not approve any Rezoning other than the Rezoning published in the newspaper unless such change is more restrictive than the proposed Rezoning published.
- c. The Board of County Commissioners shall have the authority to attach such conditions and requirements to any approval of a request for a Special Permit, Special Exception, Development of Regional Impact, or Variance within their purview, as deemed necessary for the protection of the health, safety, comfort, convenience, or welfare of the general public. Said conditions or requirements shall be reasonably related to the action requested.

Section 901.02.B.3., cont.

- d. The decision of the Board of County Commissioners on any matter listed in Section 901.02.B. is final. In the event that a decision of approval is not obtained, or in the event that a tie vote results from a motion to grant a request or from a motion to deny a request, then the matter being considered shall be deemed to have been denied, unless a majority of the members present and voting agree by motion, before the next agenda item is called, to take some other action in lieu of denial. Such other action may be moved or seconded by any member regardless of his or her vote on any earlier motion.
- e. Any denial by the Board of County Commissioners is denial with prejudice unless otherwise specified by said Board (Section 902.01.).

4. Appeals

Any decision of the Board of County Commissioners may be appealed to Circuit Court (Section 902.02.).

C. APPEALS OF HEARING EXAMINER DECISIONS

1. Functions

The Board of County Commissioners shall take jurisdiction of any matter decided by the Hearing Examiner, which decision otherwise would be final, and render its collective judgment thereon, if two or more Commissioners file written notice of their intention to do so, with the Hearing Examiner, within the time period described in Sections 900.02.A.4.a., 900.02.B.5.a., 900.02.C.5.a., or 900.02.E.5.a. Upon receipt of filing by two or more Commissioners of an intention to take jurisdiction of a case decided by the Hearing Examiner, the Hearing Examiner shall provide parties of record notice of such fact and schedule the appeal and provide such notices relating thereto, as may be required by an appropriate Administrative Code.

2. Considerations

a. Relevant Matters

If the Board of County Commissioners takes jurisdiction of a matter pursuant to Section 901.02.C.1., it shall confine its review of the matter exclusively to the written record prepared by the Hearing Examiner and such oral arguments and discussion as may be permitted to identify errors of fact or law or to allege the discovery of new evidence. The Board shall conduct its review as an appellate proceeding, and not as a trial de novo.

Any party of record to the hearing before the Hearing Examiner who has filed a Request For Appearance in accordance with the appropriate Lee County Administrative Code has the right to address the Board of County Commissioners, but only as to the correctness of findings of fact or conclusions of law contained in the record, or to allege the discovery of relevant new evidence which was not known by the speaker at the time of the hearing before the Hearing Examiner and not otherwise disclosed in the record. Additionally, the Board of County Commissioners may orally question its staff, its attorneys, and any party of record who is present about matters contained in the written record and points of law or procedure.

b. Irrelevant Matters

The Board of County Commissioners shall not take testimony from any person or accept into evidence any document which is not in the record provided by the Hearing Examiner.

3. Standard of Review

The Board of County Commissioners shall uphold the decision of the Hearing Examiner unless it finds that it is not supported by the record, is incorrect as a matter of law as to any conclusions of law made by the Hearing Examiner, or if it involves a matter of discretion and is so inconsistent with the facts found by the Hearing Examiner in the record as to constitute an abuse of discretion.

4. Decisions and Authority

The Board of County Commissioners may affirm or reverse, in whole or in part, the decision of the Hearing Examiner, modify it, and/or remand it to the Hearing Examiner for further fact-finding proceedings. A decision to remand a matter to the Hearing Examiner is not a final action which can be appealed to the Circuit Court.

5. Appeals

Any aggrieved persons may, within thirty (30) calendar days after the Board of County Commissioners' decision to affirm or reverse or modify the decision of the Hearing Examiner, whichever is applicable, apply to the Circuit Court for relief, but not thereafter, except pursuant to Rule 9.100(c) of the Florida Rules of Appellate Procedure. For purposes of computation of the thirty (30) day period, the date of the decision shall be the date of the public hearing at which the Board of County Commissioners made such decision by oral motion.

902 DENIALS, RESUBMISSION, AND JUDICIAL REVIEW

902.01 DENIALS AND RESUBMISSION OF APPLICATION

A. DENIAL WITH PREJUDICE

Except when specifically stated otherwise, a denial by the Hearing Examiner or Board of County Commissioners is a "denial with prejudice".

If an application is denied, no similar application for rezoning, special exception, variance, or special permit covering the same property (or portion of said property) shall be resubmitted or initiated for a period of twelve (12) months from the date of denial. However, this shall not preclude the application for a different rezoning, special exception, variance or special permit which, in the opinion of the administrative official is substantially different from the request originally denied.

B. DENIAL WITHOUT PREJUDICE

When the Hearing Examiner or Board of County Commissioners "denies without prejudice" any application, it is an indication that, although the specifically requested action is denied, the Hearing Examiner or Board is willing to consider the same request after modifications have been made, or an application for other action, without the applicant having to wait twelve (12) months before applying for consideration of the modified request or other action.

Any resubmitted application shall clearly state the modifications which have been made to the original request or other changes made in the application.

902.02 REHEARINGS AND JUDICIAL REVIEW

A. ZONING ACTIONS BY BOARD OF COUNTY COMMISSIONERS.

1. Any person who may be aggrieved by any decision of the Board of County Commissioners made pursuant to an application for Rezoning, Development of Regional Impact, Special Exception that meets the criteria of a DCI, or Special Exceptions, Variances or Special Permits heard as part of a rezoning may, within thirty (30) calendar days after such decision, but not thereafter shall file with the County Administrator or his designee a request in writing a public rehearing by said Board for a modification or rescission thereof. For purposes of computation of this thirty (30) day period, the date of the decision shall be the date of the public hearing at which the Board of County Commissioners made such decision by oral motion.

Section 902.02.A., cont.

2. All requests for a public rehearing shall state with particularity any new evidence and/or the points of law or fact which the aggrieved person argues the Board of County Commissioners has overlooked or misunderstood and must include all documentation offered to support the request for a rehearing. The Board shall decide whether to grant or deny the request for a rehearing based exclusively upon the aggrieved person's written request and supporting documentation and the Administrator's written analysis thereof. In addition, if the request is made by one other than the original applicant, the County shall notify the applicant of the filing of the request for a rehearing and the applicant shall be allowed to submit his independent written analysis. The deliberations of the Board with respect to the question of whether to grant a rehearing do not constitute a public hearing, and no oral testimony shall be allowed or considered by the Board in the course of these deliberation. An aggrieved person need not request a rehearing in order to exhaust his administrative remedies as a condition precedent to filing an appeal to the Circuit Court.
3. If a rehearing request is refused, or if the request is granted but modification or rescission of the original Board motion is denied, any aggrieved person may, within thirty (30) calendar days after such refusal or denial, whichever is applicable, apply to the Circuit Court for relief, but not thereafter, except pursuant to Rule 9.100(c) of the Florida Rules of Appellate Procedure. For purposes of computation of the thirty (30) day period, the date of the decision shall be the date of the public hearing at which the Board of County Commissioners made such decision by oral motion.
4. There shall be no right to apply to Court for relief on account of any determination or recommendation of the Hearing Examiner in those actions listed in Section 901.02.B.1. which require public hearing before the Board of County Commissioners.

B. ACTIONS BY THE HEARING EXAMINER

1. The decision of the Hearing Examiner shall be final on applications for administrative appeals and variances, special exceptions and special permits, when such variances, special exceptions and/or special permits are not part of a rezoning or DCI request which requires final decision by the Board of County Commissioners. Appeal of a final decision of the Hearing Examiner concerning an aforesaid administrative appeal, variance, special exception or special permit shall be made to the Circuit Court.

Section 902.02.B., cont.

2. Any aggrieved person may apply to the Circuit Court for relief within thirty (30) calendar days after the Hearing Examiner decision is final, but not thereafter, except pursuant to Rule 9.100(c) of the Florida Rules of Appellate Procedure.
3. A decision of the Hearing Examiner is final on the fifteenth (15th) calendar day after the decision is rendered in writing by the Hearing Examiner, unless the Board of County Commissioners assumes jurisdiction of the matter decided, pursuant to Section 901.02.C.

903 PUBLIC HEARINGS

903.01 DEFINITIONS

For purposes of this section only, certain terms are defined as follows:

CONTINUANCE: An action initiated by the applicant, staff, or Hearing Examiner or Board of County Commissioners to postpone to a later time or date, a Public Hearing after the notice of said Public Hearing has been submitted to the newspaper for publication as required in Section 904.

DEFERRAL: An action initiated by the applicant or staff to postpone to a later time or date, a Public Hearing prior to the notice of said Public Hearing being submitted to the newspaper for publication.

903.02 HEARINGS REQUIRED

A. LAND USE ORDINANCES - AMENDMENTS OR ADOPTION

Any proposed amendment to this Zoning Ordinance or to any Land Use Ordinance or adoption of any new Land Use Ordinance shall be enacted pursuant to the requirements set forth in Section 125.66(5), Florida Statutes. (Amended by Ordinance 89-06, Section FIVE; adopted 3-15-89, effective 3-27-89.)

Prior to a final required hearing by the Board of County Commissioners, the Local Planning Agency shall review said amendment at a public hearing.

B. REZONING, D.R.I.s, AND SPECIAL EXCEPTIONS, SPECIAL PERMITS AND VARIANCES

1. Any application requesting a rezoning, D.R.I., or a special exception that meets the criteria for a DCI, and any special exception, variance or special permit submitted for simultaneous review with a DRI or rezoning on less than five percent (5%) (26,726 acres) of the total land area of the County, shall require a minimum of one (1) public hearing before the Hearing Examiner and one (1) public hearing before the Board of County Commissioners.
2. Any application listed above, which affects five percent (5%) (26,726 acres) or more of the total land area of the County shall require a minimum of one (1) public hearing before the Hearing Examiner and two (2) public hearings before the Board of County Commissioners. Both hearings by the Board of County Commissioners shall be held after 5:00 P.M. on a weekday.

Section 903.02., cont.

C. SPECIAL EXCEPTIONS, VARIANCES, ADMINISTRATIVE APPEALS AND SPECIAL PERMITS

Except for those special exceptions, special permits and variances included in subsection B above, any application for a special exception, variance, administrative appeal or special permit shall require a minimum of one (1) public hearing before the Hearing Examiner.

903.03 PRELIMINARY REVIEW AND NOTICE CERTIFICATION

A. STAFF REVIEW

No application for a Land Use Ordinance Amendment, Rezoning, Special Exception, Development of Regional Impact, Special Permit, or Variance, Appeal or any other action required by this Ordinance to proceed through the Public Hearing process, shall be heard by Hearing Examiner or Board of County Commissioners, as applicable, until after the Department Staff has reviewed and prepared written comments on the requested action.

All staff comments shall be forwarded to the Hearing Examiner or Board of County Commissioners, as applicable, prior to the scheduled Public Hearing.

B. OTHER REVIEWS

No application or proposed land use ordinance amendment, required under the provisions of this Ordinance to be reviewed by the Local Planning Agency prior to review by the Board of County Commissioners, shall be heard for final consideration by said Board of County Commissioners prior to receiving a substantive recommendation of the Local Planning Agency. As used herein, a motion to continue a matter by the Local Planning Agency shall not be considered a substantive recommendation.

C. NOTICE CERTIFICATION AND AFFIDAVITS

No Public Hearing shall be commenced by the Hearing Examiner, Local Planning Agency or Board of County Commissioners unless affidavit proof of required notice publication, posting, and mailing (if applicable) is presented to the Hearing Examiner, Local Planning Agency or Board of County Commissioners for review and submitted to the records keeper for filing with the minutes of the meeting.

903.04 PUBLIC PARTICIPATION

A. BEFORE THE HEARING EXAMINER OR LOCAL PLANNING AGENCY

At the Public Hearing, all persons shall be heard. However, the Hearing Examiner or Local Planning Agency shall have the right to refuse to hear testimony which is irrelevant, repetitive, defamatory, or spurious.

B. BEFORE THE BOARD OF COUNTY COMMISSIONERS

1. Land Use Ordinance Amendments or Adoption Hearings.

At the public hearing all persons shall be heard. However, the Board of County Commissioners shall have the right to refuse to hear testimony which is irrelevant, repetitive, defamatory or spurious.

2. Zoning Matters

At public hearings of zoning matters, only a party of record, or his representative, to the proceeding before the Hearing Examiner, who has filed a Request for Appearance in accordance with the appropriate Lee County Administrative Code, shall be afforded the right to address the Board of County Commissioners, but only as to the correctness of findings of fact or conclusions of law contained in the record, or to allege the discovery of relevant new evidence which was not known by the speaker at the time of the hearing before the Hearing Examiner and not otherwise disclosed in the record. Additionally, the Board of County Commissioners may orally question its staff, its attorneys, and any party of record who is present about matters contained in the written record and points of law or procedure. Zoning matters shall include those functions described in Section 900.02.D.1. and those matters over which the Board of County Commissioners assumes jurisdiction pursuant to Section 901.02.C.

903.05 DEFERRAL OR CONTINUANCE OF PUBLIC HEARING

The following procedures and regulations for deferring or continuing a Public Hearing shall apply for the Hearing Examiner, Local Planning Agency and Board of County Commissioners.

A. DEFERRAL

A scheduled, but not yet advertised Public Hearing, may be deferred by the Department Staff or by the applicant as follows:

1. County Initiated

Department Staff or the Hearing Examiner may initiate a deferral of a scheduled Public Hearing prior to advertising, if additional or corrected information is required to permit staff to properly or adequately review a requested application, provided that notice is mailed to the applicant, or his authorized agent, stating the reason for the deferral and what additional information is required.

2. Applicant Initiated

An applicant, or his duly authorized agent, may request a deferral of the Public Hearing provided that:

- a. Said request is in writing and received by the appropriate Department prior to that Department's submitting notice of the hearing to the newspaper for publication; and
- b. The applicant agrees to have his application rescheduled in accordance with the scheduling procedures in effect at that time.

3. Fees

There shall be no additional fee for either a staff-initiated or applicant-initiated deferral.

B. CONTINUANCE

A scheduled, advertised Public Hearing may be continued by the County or by the applicant as follows:

1. County Initiated

- a. The Hearing Examiner, Local Planning Agency or Board of County Commissioners, upon staff request or upon its own initiative, may continue a Public Hearing when it is deemed necessary to require additional information, public testimony, or time in order to render an appropriate recommendation.
- b. The County-initiated hearing shall be continued to a date certain and the Hearing Examiner, Local Planning Agency or Board of County Commissioners shall continue its consideration on the hearing matter on that date certain.
- c. There shall be no limitations on the number of County-initiated continuances.
- d. The County shall bear all renotification costs of any County-initiated continuance.

2. Applicant Initiated

- a. The applicant, or his duly authorized agent, shall submit the request in writing to, and said request shall be received by, the appropriate Department prior to the advertised hearing date, OR the applicant or his duly authorized agent shall appear before the

Section 903.05.B.2.a., cont.

Hearing Examiner, Local Planning Agency or Board of County Commissioners at the beginning of its scheduled agenda, and orally request the continuance.

- b The Hearing Examiner, Local Planning Agency or Board of County Commissioners may either deny or grant the request for continuance.
 - 1) If the request for continuance is denied, the hearing shall proceed in accordance with the published agenda.
 - 2) If the request for continuance is approved, the Hearing Examiner, Local Planning Agency or Board of County Commissioners may set a date certain, for hearing the application.
- c. Not more than one (1) applicant initiated continuance shall be granted on the same application by either the Hearing Examiner, Local Planning Agency or Board of County Commissioners.
- d. A fee, in accordance with a duly adopted fee schedule, shall be charged for any applicant initiated continuance to over the costs of renotification.

PUBLIC NOTICE

No Public Hearing required by this Ordinance shall be held by the Hearing Examiner, Local Planning Agency, or Board of County Commissioners, until notice of the Public Hearing has been provided in accordance with the requirements set forth herein.

904.01 MINIMUM REQUIRED NOTICE INFORMATION

A. ACTION PROPOSED

1. Land Use Ordinance Amendments or Adoption

The notice shall describe the chapter or section of the Land Use Ordinance to be amended or the subject of a new Ordinance with sufficient clarity, so as to advise the public of the subject to be amended or adopted; but, need not describe the exact wording or change.

2. Rezoning and D.R.I.s

All required notices shall indicate the existing zoning of the property, the proposed zoning, and the general location of the property (by reference to common street names and addresses) covered by the application with sufficient certainty so as to advise the public; but, need not describe the proposed plans or details thereof, or the specific legal description of the property.

3. Special Exceptions, Special Permits, and Variances

All required notices shall indicate the existing zoning of the property; the proposed use by special exception, special permit or the requirement from which the variance is being requested and the actual degree of variance being requested; and the location of the property (by reference to common street names and addresses) with sufficient certainty so as to advise the public; but, need not describe the proposed plans or details thereof, or the specific legal description of the property.

4. Appeals

The notice shall summarize the decision or action upon which the appeal is based with sufficient clarity so as to advise the public of the subject matter.

B. TIME AND PLACE OF HEARING

The notice shall specify the date, time and place that the public hearing will be held by the Hearing Examiner, Local Planning Agency or the Board of County Commissioners, as applicable.

Section 904.01., cont.

C. PUBLIC REVIEW

The notice shall indicate where copies of the proposed amendment may be obtained or reviewed, or where the application for public hearing may be reviewed.

D. RECORD OF NOTICE

A copy of such notice shall be kept available for public inspection during the regular business hours of the Department of Community Development or Hearing Examiner, as appropriate, and indicated in the notice.

904.02 NOTICES

Notices of hearings before the Board of County Commissioners, Hearing Examiner and the Local Planning Agency shall be provided in accordance with applicable statutes and as may be set forth from time to time in the County's Administrative Code, subject to the requirements of Section 904.01 above.

CHAPTER VIII - APPLICATION PROCEDURES AND REQUIREMENTS

800 APPLICATION PROCEDURES FOR ALL APPLICATIONS REQUIRING A PUBLIC HEARING BEFORE THE LOCAL PLANNING AGENCY, HEARING EXAMINER, OR BOARD OF COUNTY COMMISSIONERS

A. INITIATION OF APPLICATION

An application for a Rezoning, Special Exception, Special Permit, or Variance, may be initiated by:

1. A landowner, or his authorized agent, for his own property, provided however that:
 - a. Where the fee owner has entered into a contract for the sale of the property, whether it be an Agreement for Deed, Sales Contract, or otherwise, then the purchaser must join with the owner to initiate the application.
 - b. Except as provided in subsection 800.A.1.c. and d. below, where there is more than one owner, either legal or equitable, then all such owners must jointly initiate the application or petition.
 - 1.) This shall not be construed to require that both a husband and wife must initiate the application on private real property which is owned by them.
 - 2.) Where the property is subject to a land trust agreement, the trustee may initiate the application.
 - 3.) Where the fee owner is a corporation or partnership then the president or general partner may initiate the application.
 - 4.) Where the fee owner is an association, the association or its governing body may appoint an agent to initiate the application on behalf of the association.
 - c. Where the property is a condominium or a time-share condominium, as defined and regulated in Chapter 718 and 721, Florida Statutes, respectively, an application or petition may be initiated by both the condominium association and no less than eighty percent (80%) of the total number of condominium unit owners or by both the owner's association and no less than eighty percent (80%) of time-share condominium unit owners

Section 800.A.1.c., cont.

- 1.) For purposes of this subsection, each individually owned condominium unit within the condominium complex and each individually owned time-share unit as defined by Chapter 721 counts as one unit regardless of the number of individuals who jointly own the unit.
 - 2.) In order to verify ownership, the applicants shall furnish Lee County, as part of their application, a complete list of all unit owners, identified by unit number and/or time-share period, as applicable, along with proof that all unit owners who did not join in the application were given actual, written notice thereof by the applicants, who shall verify said list and fact of notice by sworn affidavit.
 - 3.) So as to protect the legal rights of non-participating unit owners, the application shall be accompanied by a letter of opinion from a licensed Florida attorney who shall attest that he has examined the Declaration of Condominium, by-laws of the condominium association, and all other relevant legal documents or time-share documents, as applicable, and concluded that the act of applying or petitioning to Lee County violates none of the provisions therein, or any Federal or Florida law regulating condominiums or time-share plans, or the rights of any of the non-participating unit owners, as derived from said documents and laws, and that approval of the requested act by Lee County would violate no such rights.
- d. Where the property is a subdivision, an application or petition may be initiated by no less than eighty percent (80%) of the total number of lot or parcel owners and the homeowners association, if applicable.
- 1.) For purposes of this subsection, a subdivision is an area of property defined by a specific boundary in which lot divisions have been established on a plat that has been recorded in either a plat book or official records book whereby legal descriptions are referred to by lot or parcel number. This term may include any unit or phase of the subdivision and not the entire subdivision.

2.) In order to verify ownership, the applicants shall furnish Lee county, as part of their application, a complete list of all lot owners, identified by lot number, along with proof that all lot owners who did not join in the application were given actual, written notice thereof by the applicants, who shall verify said list and fact of notice by sworn affidavit. (Amended by Ordinance 88-64, Section ONE; adopted 12-21-88, effective 1-3-89.)

2 The County which for purposes of this Section shall mean:

a. The Board of County Commissioners.

b Hearing Examiner, subject to approval by the Board of County Commissioners.

B. APPLICATION SUBMITTAL AND OFFICIAL RECEIPT PROCEDURE

The application procedure and requirements in this section shall apply to all applications for rezoning special exceptions, special permits and variances.

1. All properties within a single application must be contiguous. The Director may, at his discretion, allow a single application to cover non-contiguous properties where it is in the public interest due to the size or scope and nature of the request, and there is a rational continuity to the properties in question.
2. No application shall be accepted unless it is presented on the official forms provided by the Department.
3. Before an application may be accepted, it must fully comply with all information requirements enumerated in Sections 800.01 and 800.02 (as applicable) unless specifically stated otherwise in subsequent sections.
4. The applicant shall ensure that an application is accurate and complete. Any additional expenses necessitated because of any inaccurate or incomplete information submitted shall be borne by the applicant.
5. Upon receipt of the application, the Department will review it for compliance with all requirements.
6. After review, the Department will notify the applicant if any deficiencies are apparent. If the application is satisfactory, the Department will notify the applicant of the appropriate filing fee (see Chapter XI).
7. Upon receipt of the completed application form, all required documents, and the filing fee, the Department will place the request on the appropriate agenda and inform the applicant of the hearing dates.

800.01 GENERAL INFORMATION REQUIREMENTS FOR ALL APPLICATIONS REQUIRING A PUBLIC HEARING

A. COUNTY INITIATED APPLICATIONS

Every County initiated request shall include the following:

1. Legal Description

A legal description of the property(ies) upon which the action is to be initiated, sufficiently detailed so as to locate said property on county maps or aerial photographs. The legal description shall include a copy of the plat, if any, and the County STRAP number.

2. Area Location Map

A map, at suitable scale, indicating the property described in the legal description. Said map shall be sufficiently referenced to known major streets or other physical boundaries so as to be clearly identifiable to the general public.

3. Property Owners List

A complete list of all property owners, and their mailing addresses, for all property within the area described. For the purpose of this section, names and addresses shall be deemed to be those appearing on the latest tax rolls of the County.

4. The Lee Plan land use classification for the property in question.

5. Filing Fee

All fees for County initiated applications shall be paid to the Department in accordance with the duly adopted fee schedule (see Chapter XI).

B. OWNER-INITIATED APPLICATIONS

Every application involving changes in zoning district boundaries, or a request for special exception, variance, or special permit, initiated by a landowner or his authorized agent for his own property, shall include the following:

1. Authority

The name of all parties having interest in the subject property, to include the names of stockholders owning ten percent (10%) or more of outstanding stock, and the names of beneficiaries of trusts and a certification that the applicant is authorized pursuant to Section 800.A.1. to apply for a rezoning.

2. Legal Description

A legal description of the subject property sufficiently detailed so as to locate said property on county maps or aerial photographs shall be submitted. The legal description shall include a copy of the plat, if any, and the County STRAP number. A boundary sketch shall also be required.

If the application includes multiple contiguous parcels, the legal description shall describe the perimeter boundary of the total area, but need not describe each individual parcel. However, the STRAP number for each parcel must be included.

The Director shall have the right to reject any legal description, which is not sufficiently detailed so as to locate said property on section aerial maps and the director may require that a certified survey boundary sketch be submitted.

3. Area Location Map

The location of the subject property indicated on a copy of the Official Zoning Map or an aerial photograph furnished by the Department. This map shall indicate each parcel of land within three hundred seventy five (375) feet of the perimeter of the parcel to be zoned, and shall reference known major streets and geographic features with sufficient clarity as to be recognizable by the general public.

4. Property Owners List

A complete list of all property owners, and their mailing addresses, for all property within three hundred seventy five (375) feet of the perimeter of the subject parcel. For the purpose of the requirements, names and addresses of property owners shall be deemed to be those appearing on the latest tax rolls of the County. The applicant shall be responsible for the accuracy of such list.

5. Property Owners Map

A map displaying all of the parcels of property within three hundred seventy five (375) feet of the perimeter of the subject parcel, referenced by number or other symbol to the names on the property owners list. The applicant shall be responsible for the accuracy of the map.

Section 800.01.B., cont.

6. Existing State of the Parcel

A map or visual display that depicts all existing structures, easements, rights-of-way, platted roads, rights of ingress and egress, drainage easements, drainage swales, etc, and any other special features existing on the land in question.

7 Deed Restrictions

A copy of the deed restrictions on the subject parcel, if any, along with a statement as to how the deed restrictions may affect the requested action.

8. The Lee Plan Land Use Classification for the subject property.

9. If buildings or structures exist on the property, the applicant shall submit an affidavit that the buildings and structures will be removed or that the proposed use of the building, structures and land is, or will be, in compliance with all applicable requirements of the Land Development Code and this Ordinance.

10. Any applicant seeking a rezoning for a private port facility shall be required to submit a Hazardous Materials Emergency Plan which shall be subject to the approval of the Lee County Divisions of Emergency Management, Water Resources, and Planning, and of the appropriate Fire District. The plan shall also provide for annual monitoring for capacity and effectiveness of implementation. At the minimum, the plan shall comply with the Spill Prevention Control and Countermeasure Plan (SPCC) as called for in the federal oil pollution prevention regulations: 40 CRF 112, as amended. (Amended by Ordinance 89-31, Section THIRTY-NINE; adopted 8-23-89, effective 9-1-89.)

11. Additional material, depending on the specific type of action requested shall be required as set forth in Section 800.02.A. thru 800.02.F.

C. MODIFICATIONS TO SUBMITTAL REQUIREMENTS

Upon written request, the Director may modify the herein contained submittal requirements where it can be clearly demonstrated that the submission will have no bearing on the review and processing of the application. The request and the Director's written response must accompany the application submitted and will become a part of the permanent file.

**800.02 ADDITIONAL SPECIFIC INFORMATIONAL REQUIREMENTS OR PROCEDURES FOR
OWNER INITIATED APPLICATIONS FOR PUBLIC HEARING**

A. DEVELOPMENT OF REGIONAL IMPACT (DRI)

All Developments of Regional Impact (DRI) shall comply with the information submittal and procedural requirements of Chapter 380, F.S. as administered through the Southwest Florida Regional Planning Council. If the DRI requires specific zoning actions (i.e., rezoning), the intent of the procedures and requirements of Sections 800.01, 800.02, and 804 shall be met. Additionally, even if the DRI does not require any specific zoning action, a Traffic Impact Statement as described in Section 804.03 C.1.b.5 (below) and detailed in Section B.4.d.(3)(c) of Ordinance 82-42, as amended, shall be submitted. Thresholds for DRI's can be found in FAC, Chapter 27F2. (Amended by Ordinance 89-31, Section FORTY; adopted 8-23-89, effective 9-1-89.)

B. DEVELOPMENT OF COUNTY IMPACT (PLANNED DEVELOPMENT)

1. Thresholds

A Development of County Impact (DCI) shall be any owner-initiated request for a rezoning or Special Exception that could result in:

- a. a residential development of 100 or more dwellings at a density less than 5 dwelling units per gross acre; or
- b. a residential development of 50 or more dwellings at a density of 5 or more dwelling units per gross acre; or
- c. a residential development of 25 or more dwellings at a density of 8 or more dwelling units per gross acre; or
- d. any residential development proposing a density above the standard density range when located in areas designed as Rural or Open Lands by the Lee Plan; or
- e. a commercial development or activity on 5 or more acres; or
- f. an industrial development or activity, including mining or solid mineral extraction on 5 or more acres of land; or
- g. an institutional, public or quasi-public development or activity (not including health care facilities or a place of worship [df]) on five (5) or more acres of land; or
- h. a health care facility or group home, not a part of a residential or commercial planned development, of 50 or more beds; or

Section 800.02.B.1., cont.

- i. any other development required to apply for Planned Development Zoning as set forth in Sections 431 (RPD and MHPD); 441 (RVPD); 451 (CFPD); 461 (CPD); 471 (IPD); 482 (AOPD); and 484 (PUD)
 - j. any development on land falling within a General, General Commercial, Industrial or Industrial Commercial Interchange Area as specified by the Lee Plan and its attendant Land Use Plan Map; or
 - k. any combination of residential, commercial, institutional, or industrial land uses on ten (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
 - l. any Development of Regional Impact (DRI) not included in a. through h. above; or
 - m. at the Director's discretion, any development that may
 - 1.) exceed eighty percent (80%) of the thresholds set forth in a. through h. above; or
 - 2.) exceed ten percent (10%) of the thresholds set forth in Chapters 27F-2, FAC, for DRI's, except where another specific threshold is set forth herein.
 - n. any development proposed under the New Community section of the Land Use Element of the Lee Plan.
2. Determination of DCI (Planned Development Status)
- a. Any owner or agent wishing a determination of the DCI status of his/her property shall apply to the Director and pay a fee to cover administrative costs.
 - b. For the purpose of determining whether a parcel is a DCI, all contiguous parcels, and all parcels separated from the subject property only by a right-of-way or easement of one hundred (100) feet or less in width, which are in common ownership or control shall be identified and taken into account in both determining DCI status and estimating the impacts of any proposed development.
 - c. Developments of County Impact shall be zoned only to a Planned Development classification in accordance with Section 804.

C. REZONING - CONVENTIONAL DISTRICTS

1. All requests for rezonings, other than those determined to be a DRI or a DCI shall include a statement of the basis or reason for the rezoning. Said statement to be directed, at a minimum, to the guidelines for decision making embodied in Section 900.02.D.2. This statement may be utilized by the Board and staff in establishing a factual basis for the granting or denial of the rezoning.
2. Applications for rezonings are required to comply with Section 800.01.B.

D. SPECIAL EXCEPTIONS

Except as preempted under paragraph 800.02.B.2.c., every owner initiated application for a Special Exception shall, in addition to the requirements of Section 800.01.B, include the following:

1. A statement as to how the property qualifies for the Special Exception requested and what impact granting the request would have on surrounding properties. Said statement shall be directed, at a minimum, to the guidelines for decision making embodied in Section 900.01.B. This statement may be utilized by the Board and staff in establishing a factual basis for granting or denial of the Special Exception.
2. A site development plan detailing the proposed use, including, where applicable, the following
 - a. The location and current use of all existing structures on the site, as well as those on adjacent properties within one hundred (100) feet of the perimeter boundaries of the site.
 - b. All proposed structures and uses to be developed on the site.
 - c. Any existing public streets, easements or land reservations within the site and the proposed means of vehicular access to and from the site.
 - d. A traffic impact analysis of projected trip generation for the development.
 - e. Proposed fencing and screening, if any.
 - f. Any other reasonable information which may be required by the Director which is commensurate with the intent and purpose of this Zoning Ordinance.

Section 800.02., cont.

E. VARIANCES

Every owner-initiated application for a variance from the terms of this Zoning Ordinance shall in addition to the requirements of Section 800.01.B, include the following:

1. A document describing:
 - a. The Section number, and the particular regulation of this Ordinance, from which relief (variance) is requested; and
 - b. The reason(s) why the variance is needed; and
 - c. What effect (if any) granting of the variance would have on adjacent properties; and
 - d. The nature of the hardship which is used to justify the request for relief.
2. A site plan describing:
 - a. Existing public streets, easements or other reservations of land within the site;
 - b. All existing and proposed structures on the site;
 - c. All existing structures within one hundred (100) feet of the perimeter boundary of the site;
 - d. The proposed deviation from the adopted standards.
3. All other information required by the official forms provided by the Department, and any other reasonable information which may be required by the Department which is commensurate with the intent and purpose of this ordinance.
- 4 It is hereby noted that Use Variances are not legally permissible, and no application for a Use Variance will be processed. Department staff will notify the applicant when a more appropriate procedure (e.g. rezoning, Special Exception, Special Permit) is required.

F. SPECIAL PERMITS

Except as specifically stated otherwise herein, all owner-initiated applications for Special Permits shall contain the information required by Section 800.01.B as well as the following information:

Section 800.02.F., cont.

1. Section Line or Street Setbacks

- a. The property owners list and property owners map (Section 800.01.B.4 and 5) may be modified to show only the names and locations of property owners which abut the perimeter of the subject property.
- b. Site Development Plan (11 sets)
 - 1.) The "Existing State of the Parcel" map (Section 800.01.B.6) shall be expanded to include all structures, easements, rights-of-way etc. within one hundred (100) feet of the peripheral boundary of the subject property.
 - 2.) A site plan showing the location of all proposed structures, easements, rights-of-way, and vehicular access onto the property, including entrance gates or gatehouses.
 - 3.) All section lines and quarter section lines within or abutting the subject property.
 - 4.) Extent of modification from street, section or quarter section line setbacks being requested.

2. Temporary Parking Lots

- a. In addition to the requirements of 800.01.B. the applicant shall submit a site plan showing all existing and proposed parking spaces and drives, both paved and unpaved, vehicle access points, and lighting (if any).
- b. An analysis indicating the need for the temporary parking lot as well as the anticipated frequency of use.
- c. If the temporary parking lot is off the premises of the principal use, provisions for traffic control and pedestrian safety shall be provided.

3. Consumption on Premises

- a. The property owners list and map (Section 800.02.B.4 and 5) shall be modified to include all property within five hundred (500) feet of the perimeter of the subject property.
- b. A site plan of the property including a detailed parking plan shall be submitted.

Section 800.02.F.3., cont.

- c. A written statement shall be submitted which describes the type of state liquor license to be acquired (e.g. 2 COP, SRX, 11C, etc.) and the anticipated hours of operation for the business.
- 4. Activities within coastal zones requiring a special permit (Section 202.11.C.2.a.8).
 - a. A map, drawn to suitable scale, showing the location and extent of the proposed dredging, filling, excavation or alteration;
 - b. Steps which will be taken to assure that the proposed activity will not have an adverse affect on the environmental sensitivity of the area.
- 5. Joint Parking
 - a. The following shall be submitted with the application:
 - 1.) A notarized statement from all property owners involved indicating the use of each property and that the activities of each separate building or use which create a demand for parking shall occur at different times.
 - 2.) Written agreements, covenants, contracts and the like, acceptable to the County which assures that the parking area is to be used jointly, and establishes the responsibility for maintenance.
 - 3.) A back-up plan to provide sufficient parking in the event the joint agreement is violated by either party.
 - b. Violation of the agreement for joint use of off-street parking shall be sufficient grounds for revocation by the County of the Special Permit.
- 6. Solar or Wind Energy Modifications
 - a. Evidence that the proposed modifications are the minimum necessary to provide for the solar or wind energy proposal; and,
 - b. The proposed modifications will not adversely affect adjacent properties.
- 7. Aircraft Landing Facilities - Private
 - a. The applicant shall indicate in the application the type of facility (as set forth in Florida Administrative Code Chapter 14-60) being proposed.

Section 800.02.F.7., cont.

- b. A site plan drawn to scale shall be submitted showing the proposed location and length of the "Effective Landing Length" as well as the area included in the "approach zone".
- c. A certified list of all airports and municipalities within fifteen (15) miles of the proposed site and all property owners within one thousand (1000) feet of the property or within the minimum required approach zone, whichever is greater.
- d. The Department of Community Development will forward a copy of said application to the Department of Airports for comment prior to any public hearings.

No proposed airport shall be granted a Special Permit if the Department of Airports finds that the proposed site would interfere with any other lawfully existing aircraft landing facility, airport or heliport.

- e. All property owners listed in c., above, shall be sent written notice by certified mail, return receipt requested, of the date, time and place of any public hearing. The applicant shall bear the cost of said notification.

APPLICATION PROCEDURES - OTHER

A. APPLICATION FOR DEVELOPMENT APPROVAL

All applications for development shall be in accordance with the procedures and regulations set forth in the Lee County Land Development Code.

B. APPLICATIONS FOR BUILDING PERMITS

1. All applications for building permits shall be in compliance with this Ordinance as well as:

- a. The Lee County Land Development Code; and
- b. The Lee County Building Code; and
- c. All other applicable County or State regulations.

2. An application for a Building Permit for property subject to a Deed of Restrictions recorded in the office of the Clerk of Court of Lee County shall contain a statement signed by the applicant that such application complies with the applicable Deed of Restrictions.

C. GRADING PERMITS

All grading and/or contouring of property including alteration of drainage, shall be done in compliance with the procedures and regulations set forth in the Lee County Land Development Code, or other Lee County development regulation.

D. EXCAVATION/WATER RETENTION

1. Applicability

This section shall apply to any grading or excavation activities which are intended primarily to provide for the retention/detention of storm water run-off in which the excavated material is retained and used for grading of the premises.

If any of the natural materials or deposits are removed or are to be removed from the subject property, the Excavation Permit shall be issued only in conformance with Sections 202.13 and 508.

2. Excavation Permit - Water Retention

An Excavation Permit for water retention/detention shall be issued in accordance with the procedures set forth in the Lee County Land Development Code or other Lee County development regulations.

IPD - INDUSTRIAL PLANNED DEVELOPMENT**A. PURPOSE AND INTENT**

The intent of the IPD 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).

B. USES PERMISSIBLE IN THE IPD DISTRICT

All uses below may be permissible in an IPD 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

AUTOMATIC TELLER MACHINE (ATM)

BUSINESS SERVICES - All Groups (Section 1001.05)

HOTELS/HOTELS, TRANSIENT: only where clearly related to highway interchange, airports, sea or river ports or wholesale marts (Section 514)

CLEANING AND MAINTENANCE SERVICES (Section 1001.07)

LAUNDRY OR DRY CLEANING - Group II (Section 1001.24)

Section 471.B.1., cont.

MARINA - (Section 517) (Amended by Ordinance 89-31, Section TWENTY-FOUR, adopted 8-23-89, effective 9-1-89.)

OFFICES, MEDICAL (df)

PERSONAL SERVICES - Group I (Section 1001.33)

RECREATION, COMMERCIAL - Group III (Section 1001.38)

RENTAL ESTABLISHMENTS - Groups III and IV (Section 1001.39)

REPAIR SHOPS - Groups III, IV and V (Section 1001.40)

RETAIL SALES OF CONSUMER GOODS AND SERVICES, limited however, to the following:

Free standing:

automobile service station (def);

building material sales (Section 1001.04);

convenience food and beverage stores (df);

factory outlets (point of manufacture only);

health care facilities - Group III (Sections 202.12 and 1001.20);

self service fuel pumps (df);

vehicle and equipment dealers - all groups (Section 1001.55).

Only when accessory to an airport or other transportation facility, hotel or motel or an office complex of 50,000 or more square feet:

bar or cocktail lounge (Section 202.03);

consumption on premises (Section 202.03);

food stores - Groups I and II (Section 1001.16) excluding supermarkets;

restaurant - standard all groups (Section 1001.44);

specialty retail shop - Group I (Section 1001.47)

Retail and Wholesale Sales when clearly incidental and subordinate to a permitted principal use on the same premises

SOCIAL SERVICES - Group II (Section 1001.46)

2. LIGHT INDUSTRIAL USES

(To be considered a "light" industrial use, the use(s) and activities related to it must conform to the standards set forth at 461.E.)

FREIGHT AND CARGO HANDLING ESTABLISHMENTS (Section 1001.17)

MANUFACTURING (note conditions, above)

PRINTING AND PUBLISHING (Section 1001.36)

PROCESSING AND PACKAGING OF AGRICULTURAL AND FISHERIES PRODUCE (note conditions, above)

SELECT SERVICES which may not be appropriately located in other areas (note conditions, above)

TRANSPORTATION SERVICES - Groups III and IV (not to include airports, heliports, or seaplane facilities) (Section 1001.53)

WAREHOUSING - Private (df); Warehousing - Public (df)

WHOLESALE ESTABLISHMENT - Groups III, IV, V and VI (Section 1001.56)

3. HEAVY INDUSTRIAL USES

MANUFACTURING

PROCESSING AND PACKAGING OF AGRICULTURAL AND FISHERIES PRODUCE

MINING AND PROCESSING OF MINERALS including limerock, sand, gravel, and commercial fill dirt, but not liquid petroleum or natural gas; (Sections 202.13, 508 and 509)

BOATYARD

OPEN STORAGE of construction equipment and material

LARGE SCALE STORAGE OF NOXIOUS OR HAZARDOUS (flammable, toxic, explosive, corrosive, etc.) MATERIALS, including liquid petroleum, fractions and distillates thereof and fuel gases (subject to licenses and permits granted by sub-state, state and federal authorities) (Section 527)

SALVAGE AND DISPOSAL OF MATERIALS including auto junkyards, refuse disposal and processing plants, incinerators, land fills, and similar uses (subject to licenses and permits granted by sub-state, state and federal authorities) (Section 515)

SELECT SERVICES which, due to their potential for air and water pollution, number of employees or vehicles required, or requirements for open storage, or other possible negative impacts, cannot be accommodated in other areas

PHOTO FINISHING LABORATORIES

4 OTHER USES.

ADMINISTRATIVE OFFICES (df)

AGRICULTURAL USES AND AGRICULTURAL ACCESSORY USES

AIRCRAFT LANDING FACILITIES, PRIVATE* (Section 503)

CARETAKER OR WATCHMAN'S RESIDENCE (Section 505)

DAY CARE CENTER, CHILD or ADULT (Section 506)

DRIVE THRU FACILITIES

ENTRANCE GATES AND GATEHOUSES (Section 202.14)

ESSENTIAL SERVICES (def) (Section 202.12)

ESSENTIAL SERVICE FACILITIES, ALL GROUPS (Sections 202.12 and 1001.13)

EXCAVATION, WATER RETENTION (Section 509)

GARAGE, PUBLIC (df)

GASOLINE DISPENSING SYSTEM - Special (df)

GOVERNMENT SERVICES (Section 1001.19)

MODIFICATION OF SECTION LINE OR STREET SETBACKS (Sections 202.18 B.2.a. and 202.18.B 3.)

PARKS - GROUP II (Section 1001.32)

PLACE OF WORSHIP (df) (Section 521)

SIGNS, IN CONFORMANCE WITH THE LEE COUNTY SIGN ORDINANCE

STORAGE, INDOOR (df), ENCLOSED (df), OPEN (df) (Section 527)

TOWERS, COMMUNICATION (Section 530)

ANY OTHER SIMILAR OR RELATED COMMERCIAL OR INDUSTRIAL USE OF LAND OR WATER APPROVED IN THE MASTER CONCEPT PLAN.

*Note Subject to noise and navigational hazard restrictions, found elsewhere.

C MINIMUM AREAS AND DIMENSIONS

Minimum area and dimensions are not specified for tracts or parcels of land for which Industrial Planned Developments are proposed. However, the net developable land remaining, after deleting any environmentally sensitive lands and waters, shall be of such size, configuration and dimension as to adequately accommodate the proposed structures, parking, access, on-site utilities including wet or dry runoff retention, all required open space, including buffers, and similar spatial requirements. This principal shall apply also to any parcels or lots cut out of or subdivided from the development tract.

D. MINIMUM SETBACKS OF STRUCTURES AND BUILDINGS

1. Setbacks from project boundaries or development perimeter shall be determined as follows:

a. Where the proposed Industrial Planned Development is adjacent to land which is either:

- 1.) developed in a manner and for uses compatible with the uses proposed for the IPD; or
- 2.) vacant, but zoned for uses compatible with the uses proposed for the IPD; or
- 3.) vacant and, regardless of zoning, controlled by the applicant,

all structures and pavements shall be set back from the development perimeter a distance equal to the width of a minimum buffer area (where required), or twenty (20) feet, whichever is the greater.

- b. Where the proposed Industrial Planned Development is adjacent to land which is either:

- 1.) developed in a manner or for uses not compatible with the uses proposed for the IPD; or
- 2.) vacant and neither zoned for compatible uses nor controlled by the applicant;

all buildings shall be set back from the development perimeter a distance equal to the minimum required buffer area, or twenty five (25) feet, or one-half (½) the height of the building, whichever is greater. Structures and pavements permitted in the setback area shall be limited to sidewalks, street furniture, internal and perimeter roads and landscaping features. Where the setback exceeds twenty five (25) feet, automobile parking may be permitted in that portion lying beyond the first 25 feet so long as the parking is visually screened from adjacent land uses.

- c. Where the proposed Industrial Planned Development is within the Greater Pine Island area (defined) and is adjoining state-designated aquatic preserves or associated natural tributaries, a fifty (50) foot wide vegetated buffer area between any structure or buildings and the mean high water line of the waterbody shall be provided. No deviation from this requirement shall be permitted except under extreme circumstances in which the requirement would have the effect of prohibiting all reasonable use of the property. (Amended by Ordinance 89-31, Section THIRTY-ONE; adopted 8-23-89, effective 9-1-89.)
- d. Where the development perimeter bounds a dedicated public right-of-way, the setbacks from roads, streets, and drives shall be substituted.
- e. Setbacks shall be established after all required rights-of-way are designated (consistent with the Official Trafficways Plan).
- f. The foregoing notwithstanding, all buildings, parking areas, and shipping and receiving areas, and open storage areas of industrial land uses within the Industrial Planned Development shall be set back from the development perimeter: (Amended by Ordinance 89-31, Section THIRTY-ONE, adopted 8-23-89, effective 9-1-89.)

- 1.) 100 feet for Light Industrial Uses, and
- 2.) 660 feet for Heavy Industrial uses;

Where the planned development abuts a residential land use or land zoned exclusively for residential uses.

2. Setback from lot-line and separation of buildings shall be determined as follows:
 - a. If the development contains a conventional subdivision for development tracts to be sold or leased as improved land for further development for commercial or industrial purposes, side and rear setbacks for all lots shall be scheduled on the Master Concept Plan, except where a lot line is congruent with the development perimeter and the setback defined at 471.C.1.b. shall have priority.
 - b. If the development consists of or contains a conventional subdivision as described in 471.C.2.a., the setbacks from internal streets shall be determined by the functional classification of said streets as set forth in 202.18.B.2.
 - c. Unless otherwise specified, where there are two or more principal buildings in a planned development or on a development tract, the minimum separation of buildings shall be $1/2$ of the sum of their heights, or 20 feet, whichever is greater.

E HEIGHT OF BUILDINGS

Height of buildings in an Industrial Planned Development will vary in accordance with the land use classification of the subject property according to the Lee Plan Land Use Plan Map as follows:

1. In the Intensive Development and Central Urban Land Use Categories, buildings may be as tall as 135 feet above minimum flood elevation with no more than twelve (12) habitable stories;
2. In the Urban Community, Airport and Airport Commerce Land Use Categories, buildings may be as tall as 95 feet above minimum flood elevation with no more than eight (8) habitable stories,
3. In the Industrial Interchange and Industrial Commercial Interchange Land Use Categories, buildings may be as tall as 75 feet above minimum flood elevation with no more than six (6) habitable stories;

4. In the Outlying Suburban and Rural Land Use Categories and in any other Land Use Category in which an Industrial Planned Development is appropriate, buildings in an Industrial Planned Development may be as tall as forty five (45) feet above minimum flood elevation with no more than three (3) habitable stories, except that said buildings may be as tall as seventy five (75) feet above minimum flood elevation, with no more than six (6) habitable stories when the applicant demonstrates that the additional height is required to increase common open space for the purposes of preserving environmentally sensitive land, securing areas of native vegetation and wildlife habitat, or preserving historical, archaeological or scenic resources.

F. OPEN SPACE

1. In the Industrial Planned Development District, not less than twenty percent (20%) of the total area of the project shall be common open space. Additional land or water may be reserved as open space at the developer's discretion.
2. In the IPD District, common open space may be used for landscaping and buffering, for surface water management, and for unpaved overflow parking.
3. In IPD districts, where the principle uses are open, area extensive, or productive of various noxious spillovers such as dust, odors, glare, noise and vibration, and visual blight, the open space requirement shall be concentrated at the perimeter and used mainly for buffering, screening and landscaping.
4. Artificial bodies of water (retention ponds or lakes) may not exceed twenty-five percent (25%) of the minimum required open space

G. GENERAL CONDITIONS FOR ALL LAND USES

1. Signs - Section 461.D.1.
2. Parking - Section 202.16
3. Lighting - Section 461.D.3.
4. Alcoholic beverages - Section 202.03
5. Display of goods - setback - Section 461.D.5.
6. Open storage - buffer - Section 461.D.6.

Section 3

SECTION 3.0
ZONING AND LAND USE PLANS

APPENDIX 3.0
ZONING AND LAND USE PLANS

3.1 ZONING

3.1.1 LEE COUNTY

The following are the Lee County zoning districts that are within the study area and summaries of the zoning requirements for each district. The zoning districts within a five-mile radius of the Facility site are shown on Figure 2-1 of Volume I. The source of this information is the Lee County Official Zoning Ordinance, adopted by the Lee County Board of County Commissioners on June 25, 1986, effective August 1, 1986, amended through January 4, 1989.

Tables 3-1 and 3-2 show a summary of the zoning designations and their spatial requirements (i.e., minimum dimensions, minimum setbacks, maximum height, and maximum lot coverage).

Residential Single Family (RS) Districts

The purpose and intent of the RS Districts is to provide opportunities for the suitable location of detached, conventionally built single-family dwelling units and for facilitation of the proper development and protection of the subsequent use and enjoyment thereof. Existing residential single family districts within the study area include:

RS-1

RS-2

RS-3

Residential Multiple Family (RM) Districts

The purpose and intent of the RM Districts is the designation of suitable locations for residential occupancy of multiple-family residential buildings for projects which are not already approved Planned Unit Developments and/or which fall below the criteria for Residential Planned

TABLE 3-1

LEE COUNTY ZONING DESIGNATIONS
AND SPATIAL REQUIREMENTS

Zoning Code	Minimum Dimensions			Minimum Setbacks			Maximum Height (ft)	Maximum Lot Coverage (ft)
	Area (sq ft)	Width (ft)	Depth (ft)	Side (ft)	Rear (ft)	Water (ft)		
RS-1	7,500	75	100	7.5	20	25	35	40% Total Area
RS-2	12,500	100	100	10.0	20	25	35	40% Total Area
RS-3	20,000	100	100	12.0	20	25	35	40% Total Area
MH-1	7,500	75	100	7.5	20	25	35	40% Total Area
MH-2	5,000	50	100	7.0	15	25	35	40% Total Area
AG-2								
Interior lot	39,500	100	130	15.0	25	25	35	25% Total Area
Corner lot	33,600	100	130	15.0	25	25	35	25% Total Area
AG-3	20,000	100	130	15.0	20	25	35	25% Total Area
RM-2								
Residential	7,500	75	100	7.0 ^a	20	25	35	45% Total Area
Non-residential	10,000	75	100	20.0	20	25	35	45% Total Area
RM-6								
Single-family	7,500	75	100	7.0 ^a	20	25	35	45% Total Area
Duplex, 2-family	7,000	50	100	7.0	20	25	35	45% Total Area
Multi-family	14,000	100	120	20.0	20	25	35	45% Total Area
Non-residential	10,000	75	100	20.0	20	25	35	45% Total Area

TABLE 3-1
(continued)

Zoning Code	Minimum Dimensions			Minimum Setbacks			Maximum Height (ft)	Maximum	
	Area (sq ft)	Width (ft)	Depth (ft)	Side (ft)	Rear (ft)	Water (ft)		Lot	Coverage (ft)
RM-8									
Single-family	6,500	65	100	7.0 ^a	20	25	35	45%	Total Area
Duplex, 2-family	10,000	40 ^b	100	7.0	20	25	35	45%	Total Area
Multi-family	15,000	100	120	20.0	20	25	35	45%	Total Area
Non-residential	10,000	100	100	20.0	20	25	35	45%	Total Area
CF-2 ^{c, e}				15.0	25	25 ^d	35	35%	Total Area
CF-3 ^{c, e}				15.0	25	25 ^d	35	35%	Total Area

^aUse 7 feet for single-family, duplex, townhouse, and two-family dwellings; others use 20 feet.

^bPer dwelling unit.

^cSee Table 3-2 (next page).

^dNot applicable to parks.

^eNo minimum areas or dimensions.

TABLE 3-2
PERMITTED USES FOR CF-2 AND CF-3 DISTRICTS

District	Permitted Uses
CF-2	Country Clubs Fraternal Clubs Cultural Facilities Day Care Center, Adult Entrance Gate or Gatehouse Health Care Facilities Parks, Public and Private Place of Worship Religious Facilities Schools, Non-Commercial Caretakers Residence* Day Care Center, Child* Food and Beverage Service* Essential Service Facility, II* Restaurant, Standard, II* Specialty Retail Shop, I*
CF-3	Entrance Gate or Gatehouse Essential Service Facility, III Government Service Parks, Public and Private Sanitary Landfills Caretakers Residence* Essential Services, II*

*Special exemption permit required.

Developments, and for facilitating the proper development and protecting the subsequent use and enjoyment thereof. Except for the RM-3 District which may be permitted in non-urban areas, the RM districts are intended for use only within the Urban Services Area and the Fringe Land Use category as designated in the Lee Plan, and are subject to the range of densities for each land use category accommodating residential uses. It is intended that the RM-2 district be retained until such time as the County rezones existing RM-2 properties into one of the other RM district classifications or other appropriate district, in compliance with the Lee Plan. The intent of the Lee County Official Zoning Ordinance is that after December 22, 1982 no land shall be rezoned to the RM-2 classification. Existing residential multiple family districts within the study area include:

RM-2

RM-6

RM-8

Mobile Home Residential (MH) Districts

The purpose and intent of the MH Districts is to accommodate the housing needs of those residents who prefer mobile home living and those who desire an alternative to conventional dwellings and to provide for properly located, equipped, and designed Mobile Home Residential developments within the Urban Service Area. Existing mobile home residential districts within the study area include:

MH-1

MH-2

Conventional RV (RV) Districts

It is the purpose and intent of the Conventional RV Districts to accommodate existing developed or phased recreational parks which were lawfully constructed in compliance with State and/or County laws prevailing at the time of development.

The conventional RV districts include, and are limited to, four subdistricts based upon the minimum required lot size (recreational vehicle site) at the time of development. Each of the four subdistricts are further categorized as Transient, Non-transient, or a combination of both.

It is the intent of the zoning ordinance that all existing developed and/or phased parks be rezoned into one or more of the three subdistricts where possible. Any park which does not fall within one or more of the four subdistricts shall be required to apply for an RVPD zoning or remain as a non-conforming park subject to the provisions for nonconformities.

Existing RV districts within the study area include:

RV-3

Residential Two Family-Conservation (TFC) Districts

The purpose and intent of the TFC Districts is to recognize and protect existing two-family residential developments, lots, structures, and uses previously permitted but not conformable to the regulations for the other two-family residential districts as set forth in the zoning ordinance. It is further intended that these districts accommodate, insofar as possible, residential use of lawfully existing lots which were non-conforming under previous zoning regulations. This district may be applied to any land use category allowing residential uses set forth under the Lee Plan. This district is not available to land owners through normal procedures, but shall be used only by the Board of County Commissioners upon its own initiative or upon petition of land owners of existing developments to achieve the aforementioned purpose. Existing residential two family-conservation districts in the study area include:

TFC-2

Two Family (TF) Districts

The purpose of the TF (Residential, Two Family) District is the designation of suitable locations for residential occupancy of conventionally built two-family and single-family dwelling units and for facilitating the proper development and protecting the subsequent use and enjoyment thereof. The TF District is intended for use only within the Urban Services Area as designated by the Lee Plan, and is subject to the range of densities for each land use category accommodating residential uses.

TF-1

Agricultural (AG) Districts

It is the purpose of the Agricultural Districts to provide areas for the establishment and/or continuation of agricultural operations with residential uses being permitted only as ancillary to agricultural uses, or to accommodate those individuals who understand and desire to live in an agricultural environment. All lands currently zoned RE shall be reclassified to AG-1, all lands currently zoned AG shall be reclassified to AG-2, and all land zoned AGR shall be reclassified to AG-3, until and unless the property owner or the County initiates a rezoning to a different zoning classification. Existing agricultural districts in the study area include:

AG-2

AG-3

Community Facilities (CF) Districts

The primary purpose and intent of the Community Facilities Districts is to provide for those community facilities existing prior to August 1, 1986 which were permitted by right or by special exception and which are not part of an approved Planned Development. It is further the intent of the CF Districts to accommodate and provide opportunities for the suitable

location of community services and facilities developed subsequent to August 1, 1986 and which are not approved as part of a Planned Development. Existing community facilities districts in the study area include:

CF-2

CF-3

Community Facilities Planned (CFPD) District

The primary purpose of the CFPD District is to accommodate those governmental, religious, and community service activities which frequently compliment and are necessary to the types of activities permitted in other zoning districts; but, due to the size, intensity, or nature of the use and the potential impact on adjacent land uses, roads, or infrastructure, should not be permitted as a use by right in those districts. All uses permitted within the CFPD District are subject to general or special conditions, related to the uses and the unique features or location of the subject property.

Planned Unit Development (PUD) District

It is the intent to establish Planned Unit Development Districts which:

1. Encourage developers to exercise greater ingenuity and imagination in the planning and development or redevelopment of tracts of land under unified control that are generally possible under the zoning regulations.
2. Allow a diversification of uses, structures, and open areas in a manner compatible with both the surrounding existing and approved development of land surrounding and abutting the PUD site.
3. Provide a means for land to be used more efficiently, and for utilization of smaller networks of utilities and streets.
4. Retain the natural amenities of land by encouraging scenic and functional open space within the PUD.

5. Give the developer reasonable assurance of approval of a PUD application before he expends complete design monies, while providing the County with assurances that the PUD will be developed according to approved specifications.

Residential Planned Development (RPD) and Mobile Home Planned Development (MHPD)

The intent of the RPD and MHPD districts is to further the general purpose of planned developments as they relate to residential areas.

It is also the intent of the Planned Development District to provide a property owner or land developer with a development technique that can increase residential density and its ancillary development in areas outside the Urban Service Area, designated by the Lee Plan as being in the Rural or Open Land categories only, provided that the proposed development shall be completely independent of County subsidized facilities and services, and that the project will not have an adverse economic, environmental, fiscal, or social impact to its surrounding environs or to Lee County.

Light Industrial (IL) District

The purpose and intent of the IL District is to permit the designation of suitable locations for and to facilitate the proper development and use of areas devoted to various light industrial and quasi-industrial commercial uses in an environment less restrictive than that required in the IS District. While it is presumed that most industrial processes will take place within enclosed buildings, any activity not taking place within a building shall take place within a yard enclosed by an opaque wall or fence. Further, it is not intended that the IL District be located adjacent to any land used principally for or intended to be used principally for (i.e., zoned but vacant) residential purposes.

Rural Industrial (RI) District

The purpose and intent of the RI District is to designate and to facilitate the proper development and use of land of suitable character for limited industrial purposes in the non-urban area of Lee County. In the RI District, the uses of land are limited to industrial uses having a close or organic relation to the production of agricultural commodities and products, or which produce goods or provide services essential to agricultural activities.

General Industrial (IG) District

The purpose and intent of the IG District is to permit the designation of suitable locations for and to facilitate the proper development and use of areas devoted to various heavy industrial uses which have the potential of producing extensive adverse impacts on surrounding land uses or resources. Such uses include those which produce noise odors, noxious or toxic by-products, increased hazards of fire or explosion, or are generally incompatible with lower intensity land uses. In certain cases, such uses may be permitted specifically only as a special exception.

Industrial Planned (IPD) Development District

The intent of the IPD 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 District 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 principally serve 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 in either the zoning regulations 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, and identifying said uses by citing the enumerated uses of one or more conventional zoning districts, or Use Activity Groups (Section 1001).

Commercial Planned Development (CPD) District

The intent of the CPD District is to further the general purpose of planned developments. The principal uses of any Commercial Planned Development are generally the retail sale and distribution of consumer goods and services, and/or the provision of standard office space for various purposes including the delivery of professional or financial services, or for the administration of business and general business purposes.

C-1A - Commercial District

The purpose and intent of the C-1A District is to regulate the continuance of commercial land uses and structures lawfully existing as of August 1, 1986 and as originally permitted by the Lee County Zoning Regulations of 1962 (as amended) and 1978 (as amended), respectively. Subsequent to February 4, 1978, no land or water shall be rezoned into the C-1A District. It is further the intent of the Board of County Commissioners that all land zoned C-1A shall be rezoned to more appropriate districts as soon and as expeditiously as possible. In no case shall new development not consistent with the Lee Plan be permitted regardless of zoning.

C-1 - Commercial District

The purpose and intent of the C-1 District is to regulate the continuance of commercial and select residential land uses and structures lawfully existing on August 1, 1986, and as originally permitted by the Lee County Zoning Regulations of 1962 (as amended) and 1978 (as amended), respectively. Subsequent to February 4, 1978, no land or water shall be

rezoned into the C-1 District. It is further the intent of the Board of County Commissioners that all land zoned C-1 shall be rezoned to more appropriate districts, as appropriate, as soon as expeditiously as possible. In no case shall development not consistent with the Lee Plan be permitted regardless of zoning.

C-2 - Commercial District

The purpose and intent of the C-2 District is to regulate the continuance of commercial and select residential land uses and structures lawfully existing on August 1, 1986, and as originally permitted by the Lee County Zoning Regulations of 1962 (as amended) and 1978 (as amended), respectively. Subsequent to February 4, 1978, no land or water shall be rezoned into the C-2 District. It is further the intent of the Board of County Commissioners that all land zoned C-1 shall be rezoned to more appropriate districts, as appropriate, as soon as expeditiously as possible. In no case shall development not consistent with the Lee Plan be permitted regardless of zoning.

CC - Community Commercial District

The purpose and intent of the CC District is to permit the designation of suitable locations for medium to large scale consumer oriented commercial facilities, particularly for multiple occupancy complexes known as "community" or "regional" shopping centers, and to facilitate their proper development and use. In addition to the retail sale of consumer goods, this district is intended to permit a wide range of services, financial and other, including business and professional offices, all arranged in discrete commercial centers or evolving business districts. Such centers or districts differ from neighborhood commercial facilities in concentrating a greater floor area or use and a broader mix of goods and services in order to serve a wider market or service area and a larger population. This is expected to create greater impact on surrounding land uses and therefore require buffering and designed gradients of intensity adjacent to less intense uses.

CG - General Commercial Districts

The purpose and intent of the CG District is to permit the designation of suitable locations for and to facilitate the proper development and use of consumer oriented commercial facilities which are of a type or scale which are not suited for and do not generally seek locations in neighborhood, community, or regional shopping centers. Such uses frequently consist of a single principal building containing sales, administration, repair services and/or manufacture; often rely on large ground areas for the storage or display of goods; and are relatively insensitive to the impacts of adjacent land uses, while generating substantial impacts on their neighbors. High visual exposure and easy accessibility, usually from arterial roads or suburban highways, are important.

CS - Special Commercial Office District

The purpose and intent of the CS District is to permit the designation of suitable locations for and to facilitate the proper development and use of land for standard office space for various purposes, and a minimum level of retail sales and personal services required to provide convenient access to goods and services for the workforce and clientage. While it is recognized that such uses will demand easy access from arterial or high volume collector roads, this district is intended to be used to separate and buffer residential and other low or medium intensity land uses, such as schools or parks, from higher intensity commercial and light industrial land uses.

CT - Tourist Commercial District

The purpose and intent of the CT District is to permit the designation of suitable locations for and to facilitate the proper development and use of land for the commercial provision of accommodations and services for tourists and other visitors and short-term or seasonal residents. The term "accommodations" is here intended to include housing, various amenities including recreational facilities, and local retail trade in goods and

service, both general and specific to the locality/attractor or principal activities. Areas designated Tourist Commercial are expected to be located near or adjacent to an attractor of tourism such as gulf beach frontage, theme parks, major public or private parks, and other recreational or scenic resources.

CR - Rural Commercial District

The purpose and intent of the CR District is to designate and to facilitate the proper development and use of land for limited commercial purposes in the non-urban areas of Lee County. In addition to the neighborhood scale provision of basic goods and services, it is the intent that the Rural Commercial District be used to provide other goods and services, specific to rural productive activities, such as farming or ranching, and for the rural lifestyle in general. The standard of physical development shall be or shall closely approximate that of "minor commercial place" as set forth in Standard III.C.2 of the Lee Plan.

EC - Environmentally Critical District

The purpose and intent of the EC District is to preserve and protect certain land and water areas in unincorporated Lee County which have overriding ecological, hydrological, and/or physiographic importance to the public at large.

The application of the EC District is intended to prevent a public harm by precluding the use of land for purposes for which is is unsuited in its natural state and which injures the rights of others or otherwise adversely affects a defined public interest. The EC District shall be applied to an area of land and/or water only upon a finding by the Planning and Zoning Commission and the Board of County Commissioners in their respective public hearings that the use or conversion of the property may create a public harm or a public need.

Lands or waters to which this district shall be applied include those areas that would fit the criteria of, or that have been designated on the Lee Plan Land Use Map, as Resource Protection Areas and/or Transition Zones.

3.1.2 THE CITY OF FORT MYERS

The following are City of Fort Myers future land use and zoning classifications and intents located within the study area.

The Professional Office District is intended to be as generous as possible in permitted uses while, at the same time, maintaining a clean attractive community to provide for certain professional office, multi-family, and related uses contiguous to each other, adjoining businesses, and/or residential areas, and located in proximity to major arterial roadways. The Professional Office District is established in order to:

- (a) Protect the present development pattern, and
- (b) Provide for the orderly development or redevelopment of such land according to its best usage by providing adequate minimum zoning standards for such usage.

By virtue of its location in the Comprehensive Plan, it is the express intent of the Mixed Use Districts in newly developing areas to be as generous as possible in permitted uses while at the same time maintaining a clean, attractive community; therefore, anyone proposing to develop in a Mixed Use District shall follow the PUD (Planned Unit Development) district requirements to assure well-planned, quality developments with compatible uses and at the same time provide measures to mitigate negative impacts to the surrounding area. A plan amendment may be applied for when a PUD is inappropriate or not applicable to a particular piece of land designated as Mixed Use.

The intent of the Business District One (B-1/General Commercial District) is to be as generous as possible in permitted uses while at the same time maintaining a clean and attractive community; therefore, the conduct of business and the display or storage of merchandise, wares, or goods shall be wholly and completely within the enclosing walls of buildings.

The intent of the Business District Two (B-2/Intensive Commercial District) is to be as generous as possible in permitted uses while at the same time maintaining a clean and attractive community; therefore, with the exception of the display for rent or sale of new or used autos, trucks, tractors, mobile homes, boats, and other similar and large products or merchandise, all products, merchandise, equipment, or any other material stored outside of buildings, whether new or used, shall be hidden from view on all sides, except for necessary openings and gates, by a fence, wall, or vegetative hedge, not less than six feet high, as approved by the building official.

The Industrial District One (I-1/Ind. "1"/Light Industrial District) is established in order to:

- (a) Protect light industrial uses.
- (b) Promote and protect future development of the district in light industrial.
- (c) Exclude incompatible uses, such as residences, heavy industry, and commercial enterprises not directly serving the light industrial uses, which would preempt land which is intended to be preserved for industrial uses in order to achieve a favorable balance of land uses within the city.
- (D) Ensure the ultimate stabilization of the district in light industrial usage.
- (e) Encourage further development within the district similar in character and appearance to the planned modern industrial district.

The principal uses permitted in any Industrial District Two (I-2/Ind. "2"/Heavy Industrial District) shall be limited basically but not to the degree as required in the Ind. "1" District, and would therefore permit the general manufacturing or processing of raw materials and goods and the conduct of business or storage of materials, products, and equipment

outside of buildings without being enclosed with fences or walls except as otherwise specifically required.

The Planned Unit Development District is created to provide an alternative method of land development not available within the framework of the other land use districts. The standards and procedures of this district are intended to promote flexibility of design and to allow for planned diversification and integration of uses and structures while at the same time retaining in the City Council the absolute authority to establish such limitation and regulations as it deems necessary to protect the public health, safety, and general welfare. In doing so, the PUD district is designed to achieve the following objectives:

- (a) To accommodate a mixture of uses on a single parcel of land which is compatible both internally and externally through the limitations, sign control, building orientation, buffering, or other techniques which may be appropriate to a particular development proposal.
- (b) Provide flexibility to meet changing needs, technologies, economic, and consumer preferences.
- (c) Permit the combining and coordinating of architectural styles, building forms, and building relationships within a planned unit development.

The Recreation and Open Space District is created to reserve land areas for parks, open space, and active and passive recreation purposes.

The Waterfront Development Districts have special attributes due to the proximity to and views of the Caloosahatchee River. In order to protect and preserve these attributes, supplementary regulations shall apply to all properties within the Waterfront Development Districts I and II. All other applicable city codes shall apply as well.

SOURCE: Growth Management Code, Section .008 Land Use, City of Fort Myers, 1989.

3.2 EXISTING LAND USE CLASSIFICATIONS

3.2.1 LEE COUNTY

1000 URBAN AND BUILT-UP

Urban and built-up land consists of areas of intensive use with much of the land occupied by man-made structures. Included in this category are cities, towns, villages, strip developments along highways, and such areas as those occupied by mills, shopping centers, industrial, and commercial complexes and institutions that may, in some instances, be isolated from urban areas. This definition is for topographic and descriptive purposes and differs from the AASHTO (American Association of State Highway Officials) definition.

As urban expansion progresses, small blocks of land of less intensive or non-conforming use may become isolated in the midst of built-up regions. Such occurrences will generally be incorporated into this land use category. However, agricultural, forest, or water areas fringing upon urban and built-up areas will not be included in the Urban and Built-Up class except where they are an integral component of low-density urban development.

The Urban and Built-Up category takes precedence over other categories when the criteria for more than one land use/cover class are met. For example, residential areas that have sufficient tree canopy cover to satisfy the Upland Forest (Class 4200) criteria will still be classified as Residential in the Urban or Built-Up category. Lastly, any land use classification that is confirmed as abandoned or not in use will be preceded, in the numerical identifier, by a zero "0"(i.e., 0175).

1100-1300 Residential

Residential land uses range from high-density urban housing developments to low-density rural areas characterized by a relatively small number of homes per acre. The variation extends from the multi-family apartment complexes

generally located in larger urban centers to those single-family houses sometimes having lot sizes of more than one acre.

Areas of low intensity residential land use (generally less than one dwelling unit per five acres, such as farmsteads, will be incorporated in other categories to which they relate. However, rural residential and recreational type subdivisions will be included in the Residential category since this land is almost entirely committed to residential use even though it may include forest or range types.

In most instances, the boundary will be clear when new housing developments abut clearly defined agricultural areas. Conversely, the residential boundary may be vague and difficult to discern when residential development is sporadic and occurs in smaller isolated units developed over an extended period of time in areas with mixed or less intensive land uses. A careful evaluation of density and the overall relationship of these areas to the total urban complex must be made.

1400 Commercial and Services

Commercial areas are predominantly associated with the distribution of products and services. This category comprises a large number of individual types of commercial land uses which often occur in complex mixtures.

The Commercial and Services category includes all secondary structures associated with an enterprise in addition to the main building and integral areas assigned to support the base unit. Included are sheds, warehouses, office buildings, driveways, parking lots, and landscaped areas.

Other types of commercial areas include shopping centers and commercial strip developments. These areas have distinctive patterns which are readily identifiable on aerial photographs. Frequently, individual houses and other classes of urban land use may be found within commercial areas. Such uses normally are not delineated unless they can be plotted into polygons of at least one acre size at Level III. Otherwise, the Mixed category should be used.

Lastly, a commercial use which cannot be easily identified on aerial photography is the commercial resort. These businesses cater to vacationing patrons and often contain associated recreational facilities such as swimming pools and ball courts.

1500 Industrial

The Industrial category embraces those land uses where the manufacturing, assembly or processing of materials and products are accomplished. Industrial areas include a wide array of industry types ranging from light manufacturing and industrial parks to heavy manufacturing plants. Also included are those facilities for administration and research, assembly, storage and warehousing, shipping and associated parking lots and grounds.

Typical examples of industrial types found in Florida are pulp and lumber mills, oil refineries with tank farms, chemical plants, and brick-making plants. Stockpiles of raw materials, large power sources and solid waste product disposal areas are visible industrial features and are easily identified on conventional aerial photography.

1600 Extractive

Extractive areas encompass both surface and subsurface mining operations. Included are sand, gravel and clay pits, phosphate mines, limestone quarries, and oil and gas wells. Industrial complexes where the extracted material is refined, packaged, or further processed are also included in this category. The recognizable impacts of these activities on the landscape will vary from the unmistakable giant pit mines covering vast acreages to oil wells which cover only a few square feet. Obviously, consistent identification of all of these diverse extractive uses with their varied degrees of photographic expression can be difficult from remote sensing data alone.

Flooded pits and quarries, which may be part of a mining operation, will be included in this category. The presence of water bodies does not

necessarily imply inactive or unused extractive areas; ponds or lakes are often an integral part of an extractive operation.

Abandoned or inactive mining operations are a part of the extractive category until natural revegetation occurs. Areas of tailings and abandoned pits and quarries may remain recognizable for a long time. These areas may be barren for decades after deposition. During the interval from discontinued use until revegetation occurs, the parcel will be retained in the Extractive category.

1700 Institutional

Educational, religious, health, and military facilities are typical components of this category. Included within a particular institutional unit are all buildings, grounds, and parking lots that compose the facility. Those areas not specifically related to the purposes of the institution should be excluded. For example, agricultural areas not specifically associated with correctional, educational, or religious institutions are placed in the appropriate Agricultural categories.

Educational institutions encompass all levels of public and private schools, colleges, universities, training centers, etc. The entire area including buildings, campus open space, dormitories, recreational facilities and parking lots are included in this category when they are identifiable.

Military facilities are characterized by a wide variety of features including training camps, missile sites, etc. Administration, storage, repair, security, and other functional military buildings, plus the practice ranges, storage areas, equipment storage lots, and buffer zones compose the institutional military facilities. Auxiliary land uses, particularly residential, commercial and other supporting uses located on a military base, are included in the Institutional category.

1800 Recreational

Recreational areas are those areas whose physical structure indicates that active user-oriented recreation is or could be occurring within the given physical area. This category would include golf courses, parks, swimming beaches and shores, marinas, fairgrounds, etc. (Note: Swimming beaches are identifiable by such features as bath houses, picnic areas, service stands and large parking lots adjacent to the beach area. In order to make this recreational determination, supplemental information may often be required.

1900 Open Land

This category includes undeveloped land within urban areas and inactive land with street patterns but without structures. Open Land normally does not exhibit any structures or any indication of intended use. Often, urban inactive land may be in a transitional state and will ultimately be developed into one of the typical urban land uses, although at the time of the inventory, the intended use may be impossible to determine from aerial photo interpretation alone.

2000 AGRICULTURE

In a broad sense, agricultural lands may be defined as those lands which are cultivated to produce food crops and livestock. The sub-categories of Agriculture are: Cropland, Pastureland, Orchards, Groves (except citrus), Vineyards, Nurseries, Ornamental Horticulture Areas, Citrus Groves, Confined Feeding Operations, and Specialty Farms and Other Agriculture.

2100 Cropland and Pastureland

This includes agricultural land which is managed for the production of row or field crops and improved, unimproved, and woodland pastures.

Cropland and Pastureland include:

1. Cropland harvested or land from which crops are harvested other than tree and bush crops and horticultural crops,
2. Lands on which crops and pasture grasses are grown in rotation with one another, and
3. Pastureland used more or less permanently for livestock grazing.

Numerous variables must be recognized in identifying crop and pasture uses of land in different parts of Florida. Field size and shape are highly variable depending upon topographic conditions as well as soil types, size of farms, kind of crops and pastures, capital investments, labor availability, and other conditions.

In Florida, supplemental irrigation of cropland and pastureland by use of overhead rotary sprinklers can be detected from photography where distinctive circular patterns are created. Drainage or water control on land used for cropland and pastureland sometimes creates a recognizable pattern that may be helpful in identifying this type of land use from photography.

The duration of crop growth in the field may be rather limited. A false impression of non-agricultural use in a field may result if the conditions of temporary inactivity are not recognized. However, this can be substantiated by field checking those areas in question.

Pastures may be drained and/or irrigated lands. Where the management objective is to establish or maintain strands of grasses, such as bahia, pangola, or bermuda grass, either along or in mixtures with wild clover or other legumes, land is categorized as pastureland regardless of treatments. Much of the "permanent" pastures occur on land which usually is not tilled or used as cropland. Topographically rough land, stream floodplains, wooded areas, and wetlands may often be used for pasture more or less permanently.

2200 Tree Crops

Orchards and groves generally occur in areas possessing a specific combination of soil qualities and climatological factors. Water bodies, which moderate the effects of short duration temperature fluctuations, often are in proximity to this type of agriculture. Site selection for air drainage on sloping land may also be important.

2400 Nurseries and Vineyards

This category comprises nurseries, floricultural areas and seed-and-sod areas used perennially, and generally not rotated with other uses.

3000 RANGELAND

Historically, rangeland has been defined as land where the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs, and is capable of being grazed. Management practices may include brush control, regulation or grazing intensity, and season of use. If revegetated to improve the forage cover, it is managed like native vegetation. Generally, this land is not fertilized, cultivated or irrigated.

The definition of Rangeland used in the Conservation Needs Inventory by the U.S. Departments of Agriculture and Interior is used in this classification scheme, and describes the natural potential (climax) plant cover as being composed of principally native grasses, forbs, and shrubs valuable for forage. This category includes Grassland, Shrub and Brushland, and Mixed Rangeland. In some cases, it is necessary to deviate from this definition of rangeland. When large-scale imagery is employed in a land use/cover inventory, small areas of herbaceous or shrubland become evident and significant. Although these small areas cannot support cattle, they are nevertheless included in this category. However, such areas may be used extensively as wildlife forage areas.

3200 Shrub and Brushland

This category includes saw palmettos, gallberry, wax myrtle, coastal shrub and other shrubs and brush. Generally, saw palmetto is the most prevalent plant cover intermixed with a wide variety of other woody shrub plant species as well as various types of short herbs and grasses. Coastal shrub vegetation would include pioneer herbs and shrubs composed of such typical plants as sea purslane, sea grapes, and sea oats without any one of these types being dominant.

4000 UPLAND FORESTS

This category of land cover is reserved for those upland areas which support a tree canopy closure of 10 percent or more. The Upland Forest includes both the xeric (dry site) and mesic (moderately moist site) forest communities. Wetland, or hydric, forest communities fall under the broad wetland category. Also included in the Upland Forest category are areas in which timber harvesting has occurred but which exhibit no evidence of being developed for other intended uses (clear-cuts in an area in which rotation forest management is practiced is a prime example of such a case).

Florida's forests serve as a vital resource from not only a commercial view point, but also from an aesthetic and recreational view point. In Florida, slightly less than 50 percent of the land base (17 million acres) is identified by the United State Forest Service as forest land.

Approximately 40 percent is commercial timber land. A very significant portion of this land is allocated to pine plantation monoculture. Based on the 1980 Forest Service inventory, there are approximately six and one-half million acres of pure natural and planted longleaf and slash pine strands in Florida. There are also many strands of pure hardwood species groups occurring in Florida. However, the majority of forest lands occur as mixed communities of tree species and species groups. For purposes of classification, a given forest strand is assigned to a particular species or species group only if 66 percent or more of the total canopy can be

assigned as such. Otherwise, the mixed categories (4340 and 4380) are used. Note here that the classification of forests is based upon the species composition of the tree canopy as viewed and interpreted from aerial imagery.

4100 Upland Coniferous Forests

Any natural forest strand whose canopy is at least 66 percent dominated by coniferous species is classified as a Coniferous Forest. However, pine plantation monocultures will fall under the Tree Plantation category (the 4400 class). The similar morphology of the pine species occurring in Florida makes them difficult to distinguish from one another on aerial photography.

4200 Upland Hardwood Forest

This classification of upland forest lands has a crown canopy with at least a 66 percent dominance by hardwood tree species. This class, like the Upland Conifer class, is reserved for naturally generated strands. Hardwood plantations, where they occur, fall under the 4400 class.

5000 WATER

The delineation of water areas depends upon the scale and resolution characteristics of the remote sensor imagery used for interpretation. One definition of water bodies, provided by the Bureau of Census, includes all areas within the land mass of the United States that are predominantly or persistently water covered provided that, if linear, they are at least 1/8 mile (660 feet or 200 meters) wide or, if extended, cover at least 40 acres (16 hectares). When defining water bodies at Level III, linear water bodies less than 1/8 mile wide and extensive water bodies less than the 40 acres in size are classified. In some instances, water bodies of one acre will be identified and plotted. Those portions of the water body having emergent vegetation or observable submerged vegetation are placed in the Wetlands category (6000).

5100 Streams and Waterways

This category includes rivers, creeks, canals and other linear water bodies. Where the water course is interrupted by a control structure, the impounded water area will be placed in the Reservoirs category (5300).

The boundary between streams and lakes, reservoirs or the ocean is the straight line across the mouth of the stream unless the mouth is more than one mile (1.85 kilometers) wide. In that case, the rules given under Bays and Estuaries (5400) are followed.

5200 Lakes

The Lakes category includes extensive inland water bodies, excluding reservoirs. Islands within lakes that are too small to delineate will be included in the water area. The delineation of a lake will be based on the size of the water body at the time the remote sensor data was acquired.

6000 WETLANDS

Wetlands are those areas where the water table is at, near or, above the land surface for a significant portion of most years. The hydrologic regime is such that aquatic or hydrophytic vegetation is usually established, although alluvial and tidal flats may not be nonvegetated. Wetlands are frequently associated with topographic low lying areas. Examples of wetlands include marshes, mudflats, emergent vegetation areas, and swamps. Shallow water areas with submerged aquatic vegetation are usually, but not always, classed as water and not included in the Wetland category.

Extensive parts of some river floodplains qualify as wetlands. These do not include agriculture land where seasonal wetness or short-term flooding may provide an important component of the total annual soil moisture necessary for crop production, but uncultivated wetlands yielding products such as wood or which are grazed by livestock are retained in the Wetlands category. Wetlands drained for any purpose belong to other land use

categories whether they be Agriculture, Rangeland, Forested Uplands or Urban and Built-Up. When the drainage is discontinued and such use ceases, classification reverts to Wetlands after characteristic vegetation is re-established. Wetlands managed for wildlife purposes may show short-term changes in vegetation type and wetness conditions as different management practices are prescribed but they are properly classified as Wetlands.

It should be noted that the above definition of a wetland is tailored to the limitations imposed upon image analysis which must classify wetlands according to evidence recorded by remotely sensed images. In absence of direct contact, imposing a more definitive definition of wetlands proves to be infeasible. The official definition of a wetland as adopted by the state of Florida is discussed in detail under Florida Session Law 84-79 (HB 1187). Strict adherence to this definition using remotely sensed images, however, cannot be achieved.

6100 Wetland Hardwood Forests

Wetland Hardwood Forests are those wetland areas which meet the crown closure requirements for forestland as outlined under the Upland Forest Classification (4000) (minimum 10 percent closure). To be included in the Wetland Hardwood Forest category, the strand must be 66 percent or more dominated by wetland hardwood species, either salt or freshwater.

6200 Wetland Coniferous Forests

Wetland coniferous forests are wetlands which meet the crown closure requirements for coniferous forests (see 4000 and 4100) and are the result of natural generation. These communities are commonly found in the interior wetlands in such places as river flood plains, bogs, bayheads, and sloughs.

6300 Wetland Forested Mixed

This category includes mixed wetland forest communities in which neither hardwoods or conifers achieve a 66 percent dominance of the crown canopy composition.

6400 Vegetated Non-Forested Wetlands

Vegetated, non-forested wetlands include marshes and seasonably flooded basins and meadows. These communities are usually confined to relatively level, low-lying areas. This category does not include areas with tree cover that meets the crown closure threshold for the forested categories. When the forest crown cover is less than the threshold for wetland forest or is non-woody, it will be included in this category. Sawgrass and cattail are the predominant species in freshwater marshes, while spartina and needlebrush are the predominant species in the saltwater marsh communities.

7000 BARREN LAND

Barren land has very little or no vegetation, and limited potential to support vegetative communities. In general, it is an area of bare soil or rock. Vegetation, when present, is very sparse and scrubby. However, caution should be exercised since barren land may temporarily exist due to human activity. Generally, such land is incorporated in another land use/cover category. For example, vast areas of agricultural land are temporarily void of vegetation cover due to tillage practices and areas of extractive and industrial land use have dump sites for tailings and waste materials. Barren land categories include Beaches exhibiting little or no evidence of human encroachment, Sand Other than Beaches, Exposed Rock, and Disturbed Lands.

7400 Disturbed Lands

Disturbed lands are those areas which have been changed due primarily to human activities other than mining. In Florida, these areas may be rather extensive and often appear outside of urban areas.

8000 TRANSPORTATION, COMMUNICATIONS AND UTILITIES

8100 Transportation

Transportation facilities are used for the movement of people and goods; therefore, they are major influences on land and many land use boundaries are outlined by them.

Highways are easily identifiable on medium altitude photography. Highways include areas used for interchanges, limited access right-of-ways, and service facilities. The center median, pavement, and sizable buffer zone should be included even if exact boundaries cannot be detected.

The transportation category encompasses rail-oriented facilities including stations, round-houses, repair and switching yards, and related areas. Airport facilities include runways, intervening land, terminals, service buildings, navigational aids, fuel storage, parking lots, and a limited buffer zone, and fall within the Transportation category.

Transportation areas also embrace ports, docks, shipyards, dry docks, locks and water course control structures designed for transportation purposes. The docks and ports include buildings, piers, parking lots, and adjacent water utilized by ships in the loading and unloading of cargo or passengers. Locks, in addition to the actual structure, include the control buildings, power supply buildings, docks, and surrounding supporting land use (e.g. parking lots and green areas).

8300 Utilities

Utilities usually include power generating facilities and water treatment plants including their related facilities such as transmission lines for electric generation plants and aeration fields for sewage treatment sites. Small facilities or those associated with an industrial, commercial, or extractive land use are included within these larger respective categories.

SOURCE: Florida Land Use, Cover and Forms Classification System; Florida Department of Transportation, State Topographic Bureau, Thematic Mapping Section, September 1985, Second Edition; Level II.

REGIONAL COMPREHENSIVE PLAN

The following are the pertinent goals, issues, and policies from topic 13 of the Regional Goals Issues and Policies, Part Two of the Regional Comprehensive Policy Plan for Southwest Florida, adopted by the Southwest Florida Regional Planning Council on May 21, 1987.

13. HAZARDOUS AND NONHAZARDOUS MATERIALS AND WASTE

GOAL: All solid waste, including hazardous waste, wastewater, and all hazardous materials, shall be properly managed, and the use of landfills shall be eventually eliminated.

A. Regional Issue: Reducing hazardous waste and materials (cluster 50)

Regional Goal: By 1988, the percentage of special and hazardous waste improperly disposed of will begin and continue to decline over previous years.

Policies:

1. Regulatory and land use agencies should have a coordinated system to identify the location, type, and quantity of hazardous materials.
2. A coordinated program among regulatory agencies should be established regarding the effective regulation of the generation, storage, treatment, disposal, and transportation of hazardous materials and waste.

3. A region-wide hazardous waste program should be established which:
 - a. increases on-site treatment of appropriate wastes;
 - b. recycles reusable wastes;
 - c. develops a pick-up system for households, small businesses, and other small quantity generators of hazardous waste;
 - d. develops environmentally safe treatment, storage, and disposal facilities;
 - e. provides training and certification for appropriate personnel;
 - f. implements the plan for siting hazardous waste storage and transfer facilities, previously adopted; and
 - g. provides public education about hazardous and special waste treatment, disposal, and recycling.
4. Improper hazardous waste disposal sites should be effectively treated.
5. Enforcement of hazardous waste laws should include swift prosecution of violators.
6. Oil spill prevention and containment systems and related plans should be developed before actual exploration, development, or production operations begin.
7. Identify and clean up sites of leaking underground storage tanks.

B. Regional Issue: Solid Waste Treatment and Disposal (cluster 51)

Regional Goal: By 1991, the per capita amount of solid waste being disposed of in landfills will begin to decline and will continue to decline over previous years.

Policies:

1. Future land use plans should identify solid waste disposal sites in areas where the contamination of groundwater resources will not occur.
2. Future land use plans should examine the feasibility of multi-jurisdictional facilities.
3. The volume of materials disposed of in landfills should be reduced through feasible recycling.
4. Programs for the research, development, and implementation of waste reduction and resource recovery methods should be established.
5. Solid waste programs should include mandatory collection.
6. Local governments should adopt regulations to ensure that solid waste is collected and properly disposed of or recycled.
7. Educational programs which promote and encourage home separation of glass, aluminum, newsprint, and organic matter should be developed and implemented.

COUNTY COMPREHENSIVE PLAN:

The following are the future land use classifications and descriptions within the study area from the Lee County Comprehensive Plan.

Intensive Development

The Intensive Development areas are clustered near the center of the map—in and around Fort Myers, North Fort Myers, and Cape Coral. By virtue of their central 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, 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 eight dwelling units per acre (8 du/acre) to fourteen dwelling units per acre (14 du/acre). Maximum density is twenty-two dwelling units per acre (22 du/acre).(Policy 1.1.2).

Central Urban

The Central Urban areas can best be characterized as the 'urban core' of the county (the City of Fort Myers, the southerly portion of the city of Cape Coral, central portions of Bonita Springs, Iona/McGregor, Lehigh Acres, etc.). These parts of the county have the highest settlement levels, and have or will have the greatest range and levels of urban service — water, sewer, roads, schools, etc. Residential, commercial, public and quasi-public, and limited light industrial land uses will predominate in the Central Urban area. The standard density range is from five dwelling units per acre (du/a) to ten du/a with a maximum density of fifteen du/a (Policy 1.1.3).

Urban Community

Most Urban Community areas are free standing settlements that are somewhat removed from the Central Urban area. Predominant land uses in the Urban Community will be residential, commercial, public and quasi-public, and limited light industrial. The Urban Community areas will be developed with lower densities than the Central Urban areas. Standard density ranges from one du/a to six du/a with a maximum of ten du/a (Policy 1.1.4).

Suburban

The Suburban areas are or will be predominantly residential areas that are either on the fringe of the Central Urban area 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. Standard residential densities are the same as the Urban Community category. Higher densities, commercial development greater than neighborhood centers, and industrial land uses will not be permitted. Bonus densities are not allowed (Policy 1.1.5).

Outlying Suburban

The Outlying Suburban areas are characterized by their peripheral location in relation to established urban areas. These areas are generally rural in nature or contain low-density development. It is intended that these areas will develop at lower residential densities than other Future Urban Areas. Higher densities, commercial development greater than neighborhood centers, and industrial land uses are not permitted. The standard density range is from one du/a to three du/a. Bonus densities are not allowed. In the Outlying Suburban area in North Fort Myers east of Interstate 75, the maximum density permitted is two du/a (Policy 1.1.6).

Industrial Development

Expanded job opportunities, investments and production opportunities, and a balanced and sufficient tax base will be located in the Industrial Development areas of the county. These areas have special locational requirements including transportation needs; industrial levels of water, sewer, fire protection, and other urban services; and locations that are convenient for employees to reach. Industrial development areas are 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, and office complexes. Ancillary minor retail commercial uses designed to support the surrounding industrial land uses may be allowed at a ratio of one square foot of commercial use to 20 square feet of industrial use in association with an Industrial Planned

Development (IPD). Ancillary minor retail commercial uses not part of an IPD may not exceed 30,000 square feet (Policy 1.1.7).

Public Facilities

Public Facility areas include major publicly owned lands within the County including schools, parks, airports, and other governmental facilities. Only facilities over 20 acres are designated on the Future Land Use Map. The allowable uses within these areas are determined by the entity owning each parcel and the local government having zoning and permitting jurisdiction (Policy 1.1.8).

Public Facilities are developed for the health, safety, and welfare of the residents of Lee County. Based on the overriding value and benefit of these public facilities to County residents, the Lee County Comprehensive Plan allows for flexible siting requirements for these facilities. Goal 2 in the Future Land Use Element provides for the provision of infrastructure by government agencies, private utilities, and other sources. Pursuant to Policy 2.1.3, land use categories permit the development of certain public facilities for the benefit of the area including resource recovery facilities, public utilities, public recreational uses, churches, and schools. The policy eliminates the need for a comprehensive plan amendment relating to the siting of the resource/energy recovery facility based on its function and worth to the County.

Airport Commerce

The Airport Commerce areas are commercial and industrial lands adjacent to the airport needed to accommodate projected growth through the year 2010. These areas may include mixed-use developments consisting of light manufacturing or assembly, warehousing, and distribution facilities; offices; ground transportation and airport-related terminals or transfer facilities; hotels/motels, meeting facilities, and other hospitality services; and ancillary commercial uses. 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 (Policy 1.2.2).

Industrial Interchange

The Industrial Interchange areas allow essentially the same uses as those permitted in the Industrial Development areas — combinations of light industry, research, and offices. In addition, certain visitor-serving uses such as restaurants and hotels will be appropriate if they are part of an integrated office park or industrial center (Policy 1.3.1).

General Commercial Interchange

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

Rural

The Rural areas are to remain predominantly rural — 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, except as may be permitted under the Planned Development District Option (Policy 1.4.1).

Open Lands

The Open Lands are very sparsely settled, have minimal existing or planned infrastructure, and are generally quite 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 the Lee Plan and, as such, can anticipate a continued level of public services below that of other land use categories. The Open Lands contain most of Lee County's viable agricultural activities—grazing, cultivation, groves, and other farming; this category is also used to designate most islands. The continuation of the Open Lands essentially in their present character is

intended to protect and encourage such agricultural opportunities, 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), except as may be permitted under the Planned Development District Option (Policy 1.4.2).

Resource Protection

Resource Protection Areas include lands that exhibit soil types, hydrology, and vegetation characteristic of freshwater and saltwater wetlands. They are areas in which it is necessary to protect, conserve, restore, or preserve water resource systems and the biological functions attendant thereto. These areas are unsuitable for all but extremely low-density development for one or more of the following reasons:

1. To prevent degradation of water quality.
2. To prevent degradation of freshwater storage capabilities.
3. To prevent the degradation of biological productivity.
4. To prevent damage to property and loss of life due to flooding.
5. To prevent degradation of the viability and diversity of native plants and animals and their habitats.
6. To assure the conservation of irretrievable or irreversible resources.

Permitted land uses in the Resource Protection Areas consist of very low density residential uses and uses of a recreational, open space, or conservation nature that will not adversely affect the area's critical environmental character. The construction of ditches, canals, dikes, or additional drainage is prohibited.

Roads above grade may be permitted under specific limited conditions as outlined in the Lee County Wetlands Protection Ordinance, as the same may

from time to time be amended. Maximum density is one dwelling unit per 40 acres except as otherwise provided in the table on residential densities (Policy 1.5.1).

Transition Zones

The Transition Zones include lands that may be seasonally inundated from one to three months as indicated by water marks, do not have depressional soils, and are characterized by a mixture of plant species typical of uplands and wetlands. These areas consist of important water resource areas such as seasonal wet prairies, ephemeral ponds, and/or natural flow-ways and are associated with freshwater and saltwater wetlands. Transition Zones provide a hydrological connection between wetlands and uplands, and provide protection and buffering of wetlands from fire, water pollutants, and exotic vegetation. Permitted land uses in the Transition Zones consist of very low density residential use, and uses of a recreational, open space, or conservation nature that will not adversely affect the area's critical environmental character. The construction of ditches, canals, dikes, roads above grade, or additional drainage is prohibited unless it is demonstrated that such proposed construction will not: (1) cause higher rates of runoff or degradation of water quality or retention capacity; (2) increase the possibility of flooding; or (3) otherwise alter the existing wetland systems. Maximum density is one dwelling unit per 20 acres except as otherwise provided in the table on residential densities (Policy 1.5.2).

New Community

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 shall not exceed a residential density of six dwelling units per gross acre and shall 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 shall be developed in such a manner as to protect environmentally sensitive areas;
- 5) The land shall 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 shall be mitigated; and
- 7) On-site levels of service shall meet the county-wide standards contained in the Lee Plan.

Table A-1 summarizes the general allowable residential densities in each applicable future land use category. Certain specific areas may have allowable density variations to the table.

TABLE A-1

FUTURE LAND USE RESIDENTIAL DENSITIES: LEE COUNTY

Future Land Category	Standard Density Range	Maximum Bonus Density
Intensive Development	8-14 du/acre	22 du/acre
Central Urban	5-10 du/acre	15 du/acre
Urban Community	1-6 du/acre	10 du/acre
Suburban	1-6 du/acre	No Bonus
Outlying Suburban	1-3 du/acre	No Bonus
Rural	1 du/acre	No Bonus
Open Lands	1 du/acre	No Bonus
Transition Zone	1 du/20 acres	No Bonus
Resource Protection Area	1 du/40 acres	No Bonus
Planned Development	1-6 du/acre	No Bonus
District Option		
New Community	1-6 du/acre	No Bonus

NOTE: Minimum densities should not be construed as mandatory, but are recommended and desirable in order to promote compact development. The Water Resource Zone densities are preliminary.

SOURCE: The Lee Plan, Future Land Use Element, 1989.

In addition to the future land use classifications, there are special treatment areas or overlays within the Lee Plan, including:

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. In addition to meeting the requirements of the underlying Future Land Use Map categories, Airport Noise Zone 2 does not permit mobile homes; and Airport Noise Zone 3 does not permit any residential units, churches, libraries, schools, hospitals, correctional institutions, or nursing homes. Prior to the issuance of all building permits and development orders in both zones, noise and navigation easements must be dedicated to Lee County (Policy 1.7.1). Airport Noise Zones 2 and 3 are located primarily to the northeast of the Southwest Florida Regional Airport.

POLICY 1.7.2: The Committed Development overlay indicates areas where past governmental commitments currently allow development at densities or intensities greater than those permitted by the underlying categories (Policy 1.7.2). There are three committed development areas within the study area, including an approximate 180-acre tract to the southwest of the Orange River Boulevard/Staley Road intersection, an approximate 24-acre tract to the northwest of the Orange River Boulevard/Sunkist Way intersection, and land within the "New Community" future land use category south of S.R. 82.

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 1.7.3). The

Urban Reserve areas within the study area are adjacent to the City of Fort Myers city limits and are generally located west of Interstate 75.

POLICY 1.7.4: The Privately Funded Infrastructure overlay addresses lands designated as Future Urban Areas because of arrangements for privately funded infrastructure. Development in these areas may occur following the establishment of a taxing/benefit district to finance a full range of urban infrastructure (Policy 1.7.4). The areas within the study area that are located on the Privately Funded Infrastructure overlay generally include Lehigh Acres and the "New Community" future land use area to the south of S.R. 82.

POLICY 1.7.5: The Water Dependent overlay designates shoreline areas where priority shall be granted to water-dependent land uses (Policy 1.7.5). Within the study area there are five water-dependent overlays, including three at Orange Harbor near the confluence of the Caloosahatchee and Orange Rivers and two along the Caloosahatchee River. The five overlay areas include:

1. Hans Marine Ways
(strap number 34-43-25-00-00006.0000)
2. Coastal Marine Mart
(34-43-25-00-00008.0010)
3. Marina 31
(25-43-25-00-00002-0030)
4. Future Port Site
(35-43-25-00-00001-0000)
5. Future Port Site
(25-43-25-00-00005-0000)

The following are the goals, objectives, and policies from the Solid Waste sub-element of the Lee Plan.

GOAL 40: SOLID WASTE. To ensure the health, safety, and general welfare of the citizens of Lee County by protecting the quality of the environment through the proper management and disposal of solid waste.

OBJECTIVE 40.1: SOLID WASTE COLLECTION. Establish during 1989 a program to segregate construction and demolition debris and to separate newspaper, aluminum cans, and glass bottles for recycling.

POLICY 40.1.1: Continue to monitor and enforce the County's mandatory garbage and solid waste collection ordinance (Ordinance No. 86-14) and subsequent amending ordinance (Ordinance No. 86-38).

POLICY 40.1.2: Design and implement resource recovery and recycling programs for glass, paper, plastic, and nonferrous metal containers.

POLICY 40.1.3: Develop programs which will result in a decrease in the volume of materials in the solid waste stream requiring landfilling (i.e., source separation of materials which can be reused or disposed of in another manner).

POLICY 40.1.4: Develop programs which will reduce the volume of roadside litter and the amount of illegal dumping in the unincorporated county.

POLICY 40.1.5: Consider the feasibility of state legislation which prohibits the direct sale of or use of any non-biodegradable plastic or styrofoam container products (plastic made with the use of any inert organic fluorocarbon compounds or resilient polystyrene plastic) in the sale of any food, beverage, or consumable item to the public.

OBJECTIVE 40.2: SOLID WASTE DISPOSAL

By 1994, reduce by 30 percent the anticipated per capita volume of solid waste material which must be disposed of; by 1990, complete the design plans for a new landfill.

- POLICY 40.2.1: The County shall continue to study and implement as appropriate available disposal technologies and volume reduction by recycling to meet Objectives 40.1 and 40.2. Particular attention shall be paid to volume reduction of bulky and potentially recyclable items such as horticultural waste, rubber tires, appliances, etc.
- POLICY 40.2.2: The County shall continue to pursue a "clean community" campaign of education and information to reduce litter. The County will solicit operational funds from major sources of litter materials such as fast-food franchises and convenience market operators.
- POLICY 40.2.3: The County will pursue efforts to control the disposal of hazardous wastes. The County will continue to identify and monitor the disposal activities of hazardous waste generators through cooperative programs with state agencies.
- POLICY 40.2.4: The County shall initiate a local program to collect (and properly dispose of) small quantities of hazardous materials such as pesticides, paint, used motor oil, etc.
- POLICY 40.2.5: The minimum acceptable level-of-service standard for availability of solid waste disposal facilities shall be 7 pounds per capita per day.
- POLICY 40.2.6: The County shall immediately proceed to design and construct a new landfill to serve the entire County, including all municipalities.

SOURCE: Lee Plan, 1989.

3.2.2 THE CITY OF FORT MYERS

The following are City of Fort Myers future land use and zoning classifications and intents located within the study area.

The Professional Office District is intended to be as generous as possible in permitted uses while, at the same time, maintaining a clean attractive community to provide for certain professional office, multi-family, and related uses contiguous to each other, adjoining businesses, and/or residential areas, and located in proximity to major arterial roadways.

The Professional Office District is established in order to:

- (a) Protect the present development pattern, and
- (b) Provide for the orderly development or redevelopment of such land according to its best usage by providing adequate minimum zoning standards for such usage.

By virtue of its location in the Comprehensive Plan, it is the express intent of the Mixed Use Districts in newly developing areas to be as generous as possible in permitted uses while at the same time maintaining a clean, attractive community; therefore, anyone proposing to develop in a Mixed Use District shall follow the PUD (Planned Unit Development) district requirements to assure well-planned, quality developments with compatible uses and at the same time provide measures to mitigate negative impacts to the surrounding area. A plan amendment may be applied for when a PUD is inappropriate or not applicable to a particular piece of land designated as Mixed Use.

The intent of the Business District One (B-1/General Commercial District) is to be as generous as possible in permitted uses while at the same time maintaining a clean and attractive community; therefore, the conduct of business and the display or storage of merchandise, wares, or goods shall be wholly and completely within the enclosed walls of buildings. The intent of the Business District Two (B-2/Intensive Commercial District) is to be as generous as possible in permitted uses while at the same time maintaining a clean and attractive community; therefore, with the exception of the display for rent or sale of new or used autos, trucks, tractors, mobile homes, boats, and other similar and large products or merchandise, all products, merchandise,

equipment, or any other material stored outside of buildings, whether new or used, shall be hidden from view on all sides, except for necessary openings and gates, by a fence, wall, or vegetative hedge, not less than six feet high, as approved by the building official.

The Industrial District One (I-1/Ind. "1"/Light Industrial District) is established in order to:

- (a) Protect light industrial uses.
- (b) Promote and protect future development of the district in light industrial.
- (c) Exclude incompatible uses, such as residences, heavy industry, and commercial enterprises not directly serving the light industrial uses, which would preempt land which is intended to be preserved for industrial uses in order to achieve a favorable balance of land uses within the city.
- (d) Ensure the ultimate stabilization of the district in light industrial usage.
- (e) Encourage further development within the district similar in character and appearance to the planned modern industrial district.

The principal uses permitted in any Industrial District Two (I-2/Ind. "2"/Heavy Industrial District) shall be limited basically but not to the degree as required in the Ind. "1" District, and therefore would permit the general manufacturing or processing of raw materials and goods, and the conduct of business or storage of materials, products, and equipment outside of buildings without being enclosed with fences or walls except as otherwise specifically required.

The Planned Unit Development District is created to provide an alternative method of land development not available within the framework of the other land use districts. The standards and procedures of this district are intended to

promote flexibility of design and allow for planned diversification and integration of uses and structures, while at the same time retaining in the City Council the absolute authority to establish such limitation and regulations as it deems necessary to protect the public health, safety, and general welfare.

In doing so, the PUD district is designed to achieve the following objectives:

- o To accommodate a mixture of uses on a single parcel of land which is compatible both internally and externally through the limitations, sign control, building orientation, buffering, or other techniques which may be appropriate to a particular development proposal.
- o Provide flexibility to meet changing needs, technologies, economic, and consumer preferences.
- o Permit the combining and coordinating of architectural styles, building forms, and building relationships within a planned unit development.

The Recreation and Open Space District is created to reserve land areas for parks, open space, and active and passive recreation purposes.

The Waterfront Development Districts have special attributes due to the proximity to and views of the Caloosahatchee River. In order to protect and preserve these attributes, supplementary regulations shall apply to all properties within the Waterfront Development Districts I and II. All other applicable city codes shall apply as well.

SOURCE: Growth Management Code, Section .008 Land Use, City of Fort Myers, 1989.

TABLE 3-3
CORRESPONDENCE LIST

Agency	Contact	Date	Subject
Lee County Department of Community Development, Division of Planning	Paul O'Connor	4-4-90	Phone: Land use maps
Lee County Department of Community Development, Division of Planning	Jim Nolan	4-4-90	Phone: Zoning maps
Lee County Department of Community Development, Division of Planning	Bob Belushak	1-25-90	In Person: Labor information
Lee County Fire Department/Tice # 1 Station	Chief Bradley	4-9-90	Phone: Fire district information
Lee County Property Appraisor	Ruth	4-9-90	Phone: Lot information
Lee County Division of Codes	Pam Berens	1-25-90	Phone: Building permit information
Lee County Sheriffs Department	Marie	5-15-90	Phone: Department information
Florida Department of Labor & Employment Security		1-25-90	Phone: Department information
Lee County Department of Community Services, Division of Planning and Construction	Alan Whitworth	5-8-90	In person: Department information
Lee Memorial Hospital	Bonnie/P.R.	5-10-90	Phone: Hospital information
Cape Coral Hospital	Evelyn Patterson	5-10-90	Phone: Hospital information
East Point Hospital	Kim Burgeson	5-10-90	Phone: Hospital information
Southwest Florida Regional Medical Center	Cheryl/P.R.	5-10-90	Phone: Hospital information
Lee County Zoning Department	Norma Gluck	5-8-90	In person: Rezoning
City of Fort Myers Parks Department	Fran Middleton	5-8-90	In person: Parks information

Section 4

SECTION 4.0

ALTERNATIVE ENERGY RECOVERY FACILITY SITE ANALYSIS

APPENDIX 4.0

ALTERNATIVE ENERGY RECOVERY FACILITY SITE ANALYSIS

This appendix presents a copy of the alternative energy recovery facility site analysis delivered to Lee County on February 6, 1990.

Six sites were identified:

Site F,
Site G,
Site H,
the SR78 Site,
the SR80 and 31 Site, and
the 1,734-Acre Site.

These sites are described in the attached site analysis.

Eight criteria were applied to each of these sites:

- (1) availability of water and wastewater service,
- (2) proximity to electrical interconnection,
- (3) transportation and access,
- (4) zoning and land use,
- (5) haul cost,
- (6) air quality,
- (7) floodplains, and
- (8) wetlands, soils/geology and wildlife.

A cost analysis was also performed for each of the sites.

The advantages and disadvantages of each site are presented with respect to the eight evaluation criteria, and a comparison of each of the sites by approximate annual cost is presented in the following analysis.

Sites H, SR78, and the 1,734-acre site were deemed to be the least attractive sites for further consideration. Sites F, G, and SR80/31 were determined to warrant more detailed analysis.

TLH1/2

CDM

environmental engineers scientists
planners, & management consultants

CAMP DRESSER & McKEE INC

1620 Medical Lane, Suite 221
Ft Myers, Florida 33907
813 939-3775

HAND DELIVERED

February 6, 1990

Poor Original

George E. Reilly, P.E.
Administrative Director
Department of Lee County Utilities
2178 McGregor Boulevard
Fort Myers, Florida 33901

Re: Lee County Energy Recovery Facility
Site Comparison Analysis
CDM Project No. 6685-43-SS

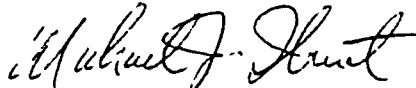
Dear Mr. Reilly:

Pursuant to our meeting yesterday, enclosed please find ten (10) copies of the subject site analysis. Minor modifications and revisions from our meeting have been incorporated into this draft.

We look forward to reviewing this report with you and other County personnel at your direction. In the meantime, should you have any questions or require additional information, please do not hesitate to call.

Sincerely,

CAMP DRESSER & McKEE INC.



Michael J. Ihnat, P.E.

MJI:mjc
MLC10/12

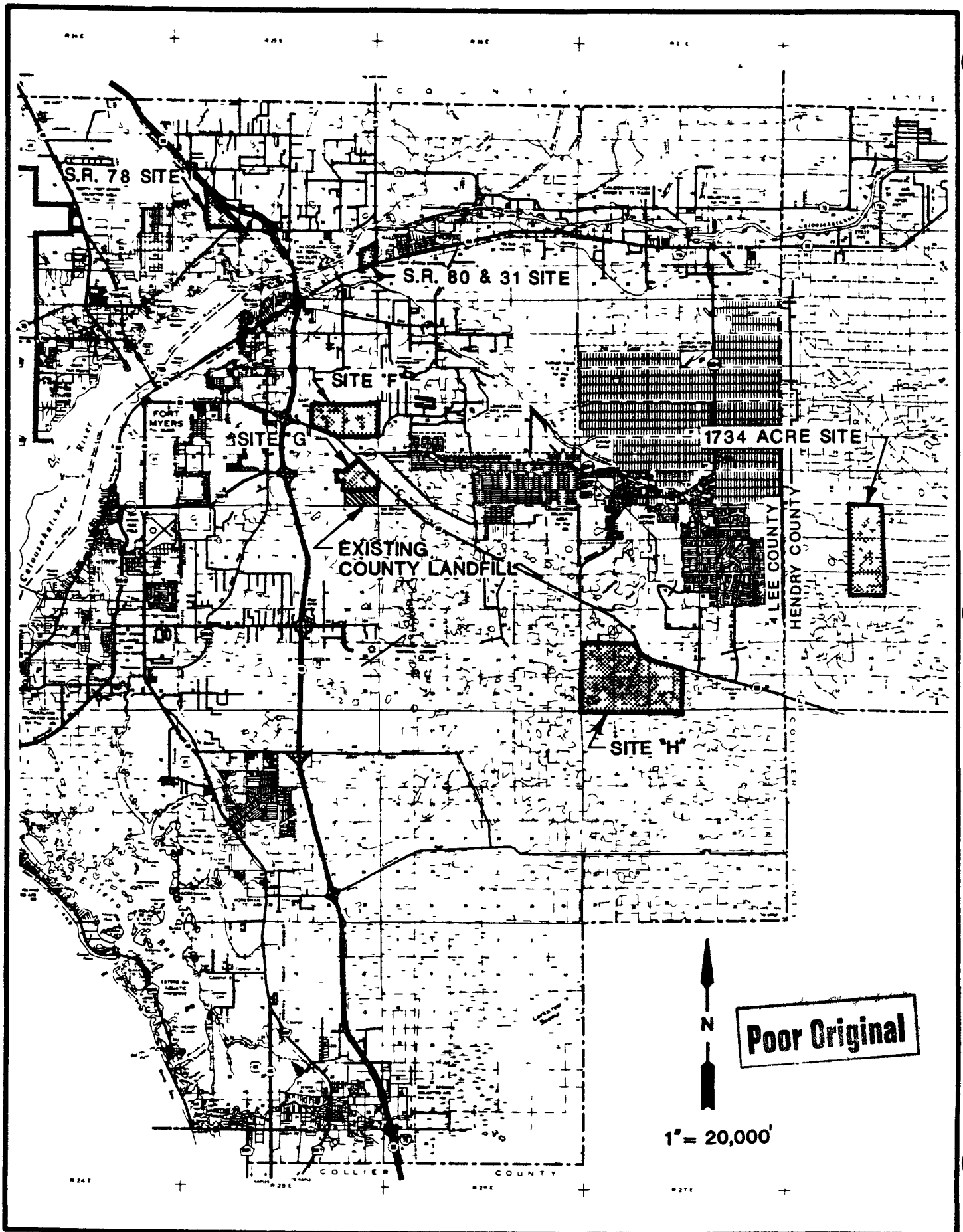
XC: D. Owen, Lee County
N. Van Horne, Lee County
R. L. Matthews
S. J. Calise
R. Hauser
R. A. Hawfield
D. E. Strobridge
D. Dee, Environmental Counsel

ALTERNATIVE ENERGY RECOVERY FACILITY SITE ANALYSIS

BACKGROUND

Energy recovery facility site selection involves consideration of a wide range of issues. In conducting this study, six potential sites were identified and short listed during a meeting with Lee County Staff. The energy recovery facility siting work previously conducted and presented in the Lee County Regional Waste Disposal Facilities Development Plan identified three of these potential sites, Sites F, G, and H. The sites' designation and general locations are identified below and are shown on the attached Figure 1. A minimum useable area of 25 to 50 acres is desirable. Additional acreage may be required depending on site specific conditions needed to assure adequate space for screening, buffer, stormwater facilities, etc. Consequently, only a portion of the potential site areas shown in Figure 1 would be required.

- 1) Site F; located approximately 1 mile East of I-75 near the intersection of SR82 and Buckingham Road.
- 2) Site G; located approximately 2 miles East of I-75 at the intersection of SR82 and the future extension of Colonial Boulevard.
- 3) Site H; located approximately 12 miles East of I-75 on SR82.
- 4) SR78 Site; located approximately 1.5 miles West of I-75 on SR78 near Bayshore industrial park.
- 5) SR80 and 31 Site; located approximately 2.5 miles East of I-75 near the intersection of SR80 and SR31.
- 6) 1734 Acre Site; located in Hendry County approximately 3.5 miles north from the intersection of SR82 and Church Road. This area is the selected Lee/Hendry County Sanitary Landfill site.



Resource Recovery Potential Site Locations

FIGURE 1

The following criteria were considered in the evaluation of these sites:

- o Availability of Water and Wastewater Service: The Energy Recovery Facility requires up to 1.5 mgd of cooling water and 0.07 mgd of potable water and a maximum discharge of up to 0.5 mgd of wastewater. The proximity to both water supplies and wastewater discharge is an important factor for the successful operation of the facility. Regardless, the wastewater discharge will be designed to maximize effluent reuse onsite (zero discharge).

- o Proximity to Electrical Interconnection: The availability of electrical substations and transmission lines in the vicinity of the site is essential for the plant operation and the sale of generated power. It is economically advantageous to situate the facility as close as possible to an existing electrical interconnection to avoid costs of securing right-of-way for transmission corridors and construction of long transmission lines. Additionally, locating the facility within the jurisdiction of FP&L rather than Lee County Electrical Co-op (LCEC) provides further economic benefit because FP&L provides a capacity payment not available from LCEC. If the facility is located within the jurisdiction of LCEC, the sale of electrical power to FP&L could be accomplished by wheeling through the LCEC electrical system. However, a wheeling charge would be imposed by the LCEC which is estimated to be up to 30 percent of the initial capacity payment available from FP&L. Regardless of the site location, the approximate net revenue from the direct sale of generated power to FP&L for the year 1993 would be approximately \$9,890,000 versus \$9,040,000 in net revenue from the sale of power to FP&L wheeled through the LCEC. Connecting to the LCEC system rather than FP&L thus would result in reduction of approximately \$850,000 in net revenues to the County on an annual basis.

- o Transportation and Access: This criteria considers the ease of access and traffic impact of the project on existing roads. Locations near highway interchanges and major state roads are most favorable.
- o Zoning and Land Use: Siting the facility must consider the compatibility of the facility with land use and zoning of the site and adjacent areas. The current Lee County land use map and zoning was used for this evaluation. All the sites must be re-zoned to Industrial Planned Development (IPD) to conform with the Lee County zoning ordinance. However, rezoning a site is more logical and is good landuse management practice if adjacent property is industrially zoned or compatible with such uses. Consequently, sites adjacent to industrial zones are preferred.
- o Haul Cost: Haul costs include the cost to transport municipal solid waste from the centroid of waste generation to the energy recovery facility and the cost to transport ash from the facility to the landfill site located in the Hendry County. A cost analysis was performed which compared haul costs for each site.
- o Air Quality: Stack heights affect to some degree the ambient air quality impacts of the facility. Stack heights are determined using good engineering practice (GEP) considering the width and height of a building. Limits to the GEP height of stacks are regulated by the FAA. Verbal confirmation from the FAA for maximum stack height limitations for each site was used in this evaluation.
- o Floodplains: Sites in the 100-year floodplain (area inundated by water levels reached due to a once per 100-year statistically averaged flood event) require engineering provisions to prevent flooding of the facility thereby increasing site development costs. Sites in the 100-year floodway (area which carries appreciable flow/velocity during the 100-year flood) would be more difficult to permit.

- o Wetlands, Soils/Geology and Wildlife: The quality and quantity of wetlands and presence of threatened or endangered species on a site can limit its use. Soils/geology conditions impact foundation requirements for structures and earthwork requirements.

COMPARISON OF ALTERNATE SITES

WATER, WASTEWATER AND ELECTRICAL UTILITIES

Site F

1. There are no existing water or wastewater lines in the immediate vicinity of Site F. However, there are a variety of options for water supply as follows:
 - o Groundwater: This option should be viable for meeting the 0.07 mgd potable water requirement but might not be viewed favorably by the permitting agencies for the 1.5 mgd cooling water requirement since it is the state policy to encourage the use of non-potable water supply for industrial purposes.
 - o County, City of Fort Myers, or Lehigh Utilities Potable Water Supply: The potable water requirement could be met by extending the distribution system of the County's Olga Water Treatment Plant from where it currently ends near the intersection of SR82 with Ortiz Avenue, or by extending distribution systems of the City of Fort Myers or Lehigh Utilities.
 - o City of Fort Myers Central Advanced Wastewater Treatment Plant (Central WWTP) or Lehigh Utilities WWTP effluent: The treated effluent can be used as cooling water for the energy recovery facility operation and in turn, the generated wastewater not used onsite could be pumped back to the WWTP. This would require two pump stations and two force mains connecting the WWTP to the energy recovery facility. Some groundwater may be required initially to supplement the effluent if the Lehigh Utilities WWTP is the supply source.

Assuming treated effluent is used for cooling water with groundwater wells as a back-up supply, wastewater is returned to the WWTP, and the County supplies potable water, then the construction and operation cost for water and wastewater facilities is estimated to be approximately \$1,050,000 per year plus any fees imposed on the use of the treated wastewater effluent.

2. The site is located in the vicinity of the FP&L Buckingham Substation approximately 1.2 miles to the north which would provide a convenient interconnect to the FP&L grid system.

Site G

1. There are no existing water or wastewater lines in the immediate vicinity of Site G. The options available to Site G are similar to Site F options which are the use of groundwater or the use of treated wastewater effluent for cooling water and groundwater or connection to the distribution system of the County, City of Fort Myers, or Lehigh Utilities for potable water requirements. Assuming WWTP effluent is used for cooling water with groundwater wells as a back-up supply, wastewater is returned to the WWTP, and the County supplies potable water, then the construction and operation cost for water and wastewater facilities is estimated to be approximately \$1,100,000 per year plus any fees imposed on the use of the treated wastewater effluent.
2. The site is located in the vicinity of the FP&L Buckingham substation approximately 2.3 miles to the north which would provide a convenient interconnect to the FP&L grid system.

Site H

1. There are no existing water or wastewater lines in the immediate vicinity of Site H. Groundwater is readily available for potable water use but some treatment would be required. The permitting agencies do

not favor groundwater use for cooling water in order to preserve the groundwater supply for public uses. The other viable option is to construct a pump station and a force main from the Lehigh Utilities or Central WWTP to carry treated effluent to Site H for cooling water supply and also construct another pump station and a force main to pump the generated wastewater back to the Lehigh Utilities or Central WWTP. Assuming effluent from the Lehigh Utilities WWTP is used for cooling water with groundwater wells as a back-up/supplement, wastewater (not used onsite) is returned to the Lehigh Utilities WWTP, and a groundwater supply is developed for potable water, then the construction and operation cost for water and wastewater facilities is approximately \$1,200,000 per year for this option plus any fees imposed on the use of the treated wastewater effluent.

2. Site H is not close to an existing electrical substation and falls within the jurisdiction of LCEC. Therefore, a substation would be required to step up the power to match transmission line voltage and at the same time provide added protection to the LCEC transmission system. Alternatively, interconnection to the FP&L grid system is possible by constructing approximately 8 miles of transmission line to an FP&L substation to avoid the wheeling charges associated with tying into the LCEC system. However, this may require significant time delays and easement acquisition. This analysis assumes an interconnection to the LCEC grid and the payment of wheeling charges.

State Road 78

1. There is a potable water main along SR78 which is part of the distribution system for the County's Olga Water Treatment Plant. This main could be tapped into and the cost for potable water would be the County's current price for treated water from the Olga Plant. Cooling water might be obtained from the City of Fort Myers Central WWTP, the Cape Coral WWTP or the North Fort Myers WWTP. The North Fort Myers WWTP is closest but currently does not have an adequate effluent flow to meet cooling water requirements, though it may in the future.

Assuming effluent from the Central WWTP is used for cooling water, wastewater (not used onsite) is returned to the Central WWTP, and the County distribution system supplies potable water, then the construction and operation cost for water and wastewater facilities is estimated to be approximately \$1,200,000 per year plus any fees charged by the City of Fort Myers for use of their wastewater effluent.

2. Two options exist to interconnect to the grid system: (1) constructing approximately 4 miles of transmission line to an FP&L substation or (2) connecting to the LCEC grid at the site and paying wheeling charges. In order to avoid significant time delays acquiring transmission line easements it was assumed the facility would interconnect with the LCEC.

State Road 80 and 31 Site

1. The SR80 and 31 site has several options as discussed below for water supply and wastewater disposal. The City of Fort Myers owns a raw water line on the south side of SR80 while the County owns a potable water line and a sewer line on the north side of SR80.
 - o Obtain potable water from the County's potable water line and cooling water from the City's raw water line. This option should have the least cost but it appears the South Florida Water Management District would not allow an increase in the consumptive use permit for cooling water purposes.
 - o Construct a pump station and a force main to pump treated effluent from the Central WWTP to the energy recovery facility for cooling water supply.
 - o Construct an intake structure to draw water from the Caloosahatchee River and treat it to suitable quality for cooling purposes. However, this is the least favorable option for water supply since it involves extensive permitting and aquatic study, entails acquiring easements from different land owners, and has a high construction cost.

- o Wastewater discharge can be accomplished by connection to the existing Lee County force main and is the preferred method of discharge in terms of least construction cost and ease of implementation and permitting.

Assuming effluent from the Central WWTP is used for cooling water, wastewater (not used onsite) is returned to the Central WWTP, and the County (Olga Plant) supplies potable water, then the construction and operation cost for water and wastewater facilities is approximately \$900,000 per year plus any fee the City assesses for the use of the wastewater effluent.

2. The site is located adjacent to the FP&L power generation plant which would provide an economical and direct connection to an existing substation.

1734 Acre Site

1. There are no existing water or wastewater lines in the vicinity of the 1734 Acre Site. Groundwater supply for potable and cooling water might be developed along with on-site wastewater treatment facilities. Securing a Consumptive Use Permit (CUP) would be difficult as this use of groundwater would be in direct competition with agricultural uses. Alternately, wastewater effluent from the Lehigh Acres WWTP might be pumped to the 1734 Acre Site and supplemented with groundwater as necessary. Wastewater not used onsite might be pumped to Lehigh Utilities.

The estimated cost for water and wastewater utilities for the 1734 Acre Site is \$1,500,000 per year assuming groundwater can be used for potable water and a back-up/supplement for cooling water and Lehigh Utilities WWTP is used for cooling water supply and wastewater treatment.

2. This site falls within the service area of LCEC rather than FP&L and the closest power transmission main is approximately 3.5 miles south of the site. This analysis assumed the construction of 3.5 miles of transmission line and the payment of wheeling charges to the LCEC.

TRANSPORTATION

Peak hourly traffic counts (volumes) and corresponding peak hour performance standard capacities were obtained from the office of Concurrency Management for the major haul routes of the alternate sites (see Table 1). It is evident from Table 1 that in general the facility will not greatly impact peak hour traffic. This is both because the number of trucks traveling to and from the facility is small in comparison to the roads capacity and because the trips of collection trucks do not have sharp peaks during typical rush hour periods. It is also apparent from Table 1 that the only sites with potential problematic traffic conditions are the SR78 Site and Site H, and the traffic primarily existing with a nominal impact by the facility. Traffic impacts and site access are discussed in more detail below.

Site F

This site is accessed directly from SR82 or from Buckingham Road very close to the intersection of SR82 and Buckingham Road. Buckingham Road's existing traffic volume is well below capacity and the Colonial Boulevard extension from I-75 to SR82 will minimize impacts to traffic on SR82. The current capacity and existing traffic counts for SR82 in this area are 1570 and 1223 respectively. These counts were reported to be high-side estimates (actual counts not taken) and they include current collection truck traffic to the existing landfill. The estimated peak hourly remaining capacity is 347.

Site G

This site is accessible from SR82 near the future intersection of the Colonial Boulevard extension and SR82. The Colonial Boulevard extension from I-75 to SR82 will minimize the traffic impact of this site. The site is accessible by traveling East from I-75 on SR82 or by traveling East from I-75 along Colonial Boulevard to SR82. The current capacity and existing traffic counts for SR82 in this area are 1570 and 1223 respectively. These counts were reported to be high-side estimates (actual counts not taken) and they include current collection truck traffic to the existing landfill. The estimated peak hourly remaining capacity is 347.

Site H

This site is bound on the northeast side by SR82, which allows for easy access to the site. There is currently moderately heavy traffic on SR82. The current capacity and existing traffic counts for SR82 are 1570 and 1223 respectively between I-75 and Buckingham Road, 1570 and 1313 respectively between Buckingham Road and Lee Boulevard, and 1570 and 1315 respectively between Lee Boulevard and the County line. The SR82 counts were reported to be high-side estimates (actual counts not taken) and they should include current collection truck traffic to the existing landfill near the future intersection of SR82 and Colonial Boulevard. Congestion will be relieved somewhat after the completion of the Colonial Boulevard extension between I-75 and SR82. However, actual traffic counts may need to be obtained to verify adequacy for the increased traffic load from the future intersection of SR82 and Colonial Boulevard to the site based on a review of existing traffic counts and discussions with the Director of Concurrency Management. The estimated peak hourly remaining capacity is 276.

State Road 78 Site

This site is accessed directly from SR78 about 1.5 miles west of its intersection with I-75. The existing traffic volume on this link of SR78 (Bayshore Road) is very close to the roads' capacity. The current capacity and existing traffic counts for SR78 from I-75 to Williamsburg Road are 1570 and 1419 respectively. DOT does not have widening of this road in its 5-year work plan. Consequently, the County may participate in funding to widen this portion of road. The estimated peak hourly remaining capacity is 69.

State Road 80 and 31 Site

This site is accessed directly from SR80 about 2.5 miles east of its intersection with I-75. SR80 is currently being widened and the projected traffic volumes are considerably below the design capacity of the widened road. The widened SR80 road capacity and existing traffic volumes are reported to be 3600 and 1540 respectively on SR80 between I-75 and SR31. The estimated peak hourly remaining capacity is 1989.

1734 Acre Site

This site could be accessed either from SR29 or SR82 via Church Road which is to be paved as part of the landfill project. Which access road is used will depend on where the Lee County transfer station is located. If the transfer station were located at Site G the traffic impacts would be similar to an energy recovery facility at Site G as shown in Table 2. The estimated peak hourly remaining capacity is 276.

ZONING AND LAND USE

Site F

This 1,200 Acre site is predominately agricultural with some industrial zoning. The areas north, south, east, and west of the site are agriculturally zoned. The predominant land use designation for this site is rural. It is anticipated that the land east of the site will be used for public facilities while, approximately one third mile west is projected to be used for industrial development.

Site G

This 400 Acre site area is zoned industrial but surrounding areas have mixed zoning. The land abutting to the south is the existing Lee County Landfill facility. Lehigh Acres lies approximately one half mile east on SR 82. South and east of the site, Westinghouse is developing a major residential community (Gateway Community).

Site H

This 1,500 Acre site is zoned agricultural. The area northeast of the site is zoned residential with a commercially zoned strip between the site and the residential area. North of the site there is a mixture of residential, commercial and agricultural zones. The land use in the vicinity of the site is planned as an open lands with some areas designated as resource protection and transition zones. The land south of the site is projected to be public facility and the remaining land around the site designated as open lands.

State Road 78 Site

This 400 Acre site is zoned agricultural. Northeast of the site is Bay Shore Road Industrial Park, which is zoned light industrial. The areas to the east are zoned agricultural, industrial, and commercial. There is a residentially zoned area about one mile south of the site. Areas north and east of the site are designated general and industrial development. The site and areas west of the site were projected to be suburban and areas north and east of the site are planned to be general and industrial development.

State Road 80 and 31 Site

This 60 Acre site is zoned agricultural and commercial with a suburban landuse designation. Land abutting the site north, south, and east is privately owned, fairly undeveloped, and zoned commercial and agricultural. FP&L owns the land directly adjacent to the west, which is zoned industrial. FP&L has a comparable land use (electrical generating station). Approximately a quarter mile east of SR31 is the western edge of the residential community of Fort Myers Shores.

1734 Acre Site

This site and all of the surrounding areas are zoned agricultural. The site is surrounded by orange groves with no residential communities in the vicinity.

HAUL COST

The overall cost to haul municipal solid waste to the energy recovery facility, plus the cost to haul ash and other materials which cannot be incinerated to the landfill, increases with distance of the energy recovery facility from the centroid of solid waste generation. Consequently, the haul cost is fairly similar for Site F, Site G, and the SR80 and 31 Site, then increases slightly for the SR78 Site, more for Site H, and then is highest for the 1734 Acre Site. The estimated annual haul cost for the various sites including transfer stations and class III waste haul, is as follows:

o	Site F	-	\$3,880,000
o	Site G	-	\$3,990,000
o	Site H	-	\$4,731,000
o	SR78 Site	-	\$4,280,000
o	SR80 and 31 Site	-	\$4,130,000
o	1734 Acre Site	-	\$5,590,000

STACK HEIGHT

A higher stack allows more dispersion of emissions before reaching ground level and is hence desirable from an air quality standpoint. However, the FAA limits maximum structure height to avoid possible conflicts with air traffic. Contact with the FAA has revealed that each of the six sites being considered in this analysis can have stack heights adequate to comply with the National Ambient Air Quality Standards. The preliminary determinations of maximum stack height for the six sites are at least 320 feet above mean sea level for each site thus allowing construction of good engineering practice (GEP) stacks. Based upon preliminary modeling, ambient air quality standards should not be exceeded at any of the sites. The State Road 80 site may, however, have a slight disadvantage in that it is near the adjacent FP&L facility, but ambient air quality standards would still be met.

FLOODPLAINS

A preliminary engineering assessment of site locations with respect to floodplains mapped by the Federal Emergency Management Agency (FEMA) indicates that none of the six sites will significantly interfere with the flow of the 100-year flood by blocking the floodway, but the SR80 and 31 Site and a portion of the 1734 Acre Site are in the 100-year flood plain and consequently will require engineering provisions to protect against flooding and may require a greater permitting effort.

WETLANDS, SOILS/GEOLOGY, AND WILDLIFE

Onsite investigations had been conducted with respect to wetlands, soils/geology, and wildlife for the SR80 and 31 Site, Site H, Site G and the 1734 Acre Site. Although each site has some wetlands associated with it, they each have enough upland to be adaptable from an engineering standpoint. Site G is close to the "Six Mile Cypress Slough", but there should not be significant adverse impact associated with the energy recovery facility.

The soils and geology for the SR80-31 Site, Site G, Site H, and the 1734 Acre Site would necessitate pile foundations for heavily loaded structures. The pile length may vary from site to site; however, the overall cost differential is minimal. Preliminary investigations indicate no significant wildlife problems with regard to endangered or threatened species for any of these four sites.

There are no preliminary indications that Site F or the SR78 Site would be eliminated from consideration by wetlands, soils/geology, or wildlife concerns assuming enough upland is available for on site mitigation. It is expected that all sites will require pile foundations for heavy structures. However, on-site investigations would be required to confirm these findings for Site F and the SR78 Site.

SUMMARY

This report presented a discussion of the comparative evaluation for the siting of an energy recovery facility, at each of the six sites under consideration by Lee County. The evaluation criteria used in the analysis -- included the availability of water and wastewater service, proximity to electrical interconnection, transportation and access, zoning and land use, haul cost, air quality, floodplains, wetlands, soils/geology and wildlife issues. Conditions at all of the sites were found to be relatively similar under the criteria of soil conditions, wetlands, wildlife and air quality.

The key advantages and disadvantages related to the remaining evaluation criteria and a summary of the estimated facility costs at each site are presented below:

<u>Site</u>	<u>Advantages</u>	<u>Disadvantages</u>
F	- o No reduction in electrical revenues, facility is within the FP&L service area - o Good access from I-75 via SR82 and the Colonial Blvd. Extension - o Portions of the area are zoned for light industrial use	- o A potable water line would have to be extended from either the County or City system - o A treated effluent supply line and wastewater discharge line would have to be extended from the City of Fort Myers or Lehigh Utilities System
G	o No reduction in electrical revenues, facility is within the FP&L service area	o A potable water line would have to be extended from either the County or City system

<u>Site</u>	<u>Advantages</u>	<u>Disadvantages</u>
G (cont.)	- o Good access from I-75 via SR82 and the Colonial Blvd. Extension - o Portions of the area are zoned for light industrial use	o An effluent supply line and a wastewater discharge line would have to be extended from the City of Fort Myers or Lehigh Utilities City system
H	o Large tract of land, allowing development of facility with minimal or no wetlands impacts	- o Greater haul cost - o Potable water, treated effluent supply, and waste water discharge lines would have to be extended from Lehigh Utilities or separate facilities constructed. - o Reduction in Electrical Revenues (wheeling charges) facility is within the LCEC service area
SR78	o Available potable water line owned by the County	o Widening of SR78 from I-75 probably required at the County expense

<u>Site</u>	<u>Advantages</u>	<u>Disadvantages</u>
SR78 (cont.)		- o Close to an elementary school - o Not conveniently located in the proximity of wastewater treatment plant of adequate existing capacity, though future capacity may be adequate - o Reduction in electrical revenues (wheeling charges), facility is within the LCEC service area
SR80&31	- o Convenient interconnection to FP&L - o No reduction in electrical revenue, facility is in FP&L service area - o Available potable water and wastewater lines - o Good access from I-75 via SR80 - o SR80 being widened to four lanes, thereby providing adequate present and future capacity	- o Falls in the 100 year flood plain - o In close proximity to existing air emissions source

<u>Site</u>	<u>Advantages</u>	<u>Disadvantages</u>
1734 Acre	- o No residential population in the vicinity of the site - o One central operation	- o Requires the siting of a solid waste transfer station in Lee County - o Highest haul and total system cost - o Remote from power lines and utilities - o Reduction in electrical revenues (wheeling charges), facility is in LCEC service area - o Much of the area falls in the 100 Year Flood Plain - o No water/wastewater lines close to the site. However, pumping to and from Lehigh Utilities is an option if supplemented with groundwater

CDM performed a cost analysis for each of the sites and the results are presented in table 2. The lowest overall costs are shown for sites F, G, and SR80-31 which reflect the proximity to the centroid of waste generation, convenience of utility connection and location within the FP&L jurisdiction. Higher overall costs are associated with SR78 and Site H with the highest overall cost at the 1734 acre site. These costs reflect the effect of greater distance from the waste centroids, additional costs for connection of utilities and the location within the LCEC jurisdiction.

Access to the SR78 site is poor and involves travel near residential areas while Site H impacts include increased traffic counts on SR82 thereby depleting its capacity. The 1734 Acre site will require the siting of a transfer station in Lee County. Therefore, sites H, SR78 and the 1734 acre site appear least attractive for further consideration.

Sites F, G, and SR80-31 are relatively equal in terms of overall costs, transportation and access, and haul costs. A slight advantage is given to Sites G and F regarding flood plain impacts and the fact that these sites are not close to an existing air emission source. The SR80-31 site has the advantages of existing water/wastewater utilities close to the site, the closest electrical connection, adequate present and future road capacity, and a slight advantage regarding compatible existing adjacent land use (FP&L facility).

TABLE 2

COMPARISON OF ALTERNATE SITES FOR A RESOURCE RECOVERY FACILITY
BY APPROXIMATE ANNUAL COST (IN MILLIONS PER YEAR)

CRITERIA	SITE					
	F	G	H	SR78	SR80-31	1734 ACRE
Base Annual Cost ¹ for the Solid Waste Management System	\$40.72	\$40.73	\$40.86	\$40.83	\$40.65	\$41.34
Electrical Revenue ²	(9.89)	(9.89)	(9.04)	(9.04)	(9.89)	(9.04)
Class III Haul ³	0.77	0.77	0.77	0.77	0.77	0.77
Haul Cost	2.69	2.80	3.54	3.09	2.94	3.22
Transfer Station	0.42	0.42	0.42	0.42	0.42	1.60
Total Cost ⁴ (millions per year)	\$34.71	\$34.83	\$36.55	\$36.07	\$34.89	\$37.89
Cost per Ton ⁵	\$61.87	\$62.09	\$65.15	\$64.30	\$62.19	\$67.54

¹ Does not include collection and recycling costs since these are the same for all options. Costs of water supply for potable water and cooling water and for wastewater disposal are included, plus the costs of treatment where applicable. An allowance for new substations to tie into the LCEC grid was required for Site H and the 1734 Acre Site. Estimated land costs are included assuming an 80 acre requirement in all cases. Potential costs for widening existing roads are not included.

² Assumes Site H, the SR78 site, and the 1734 Acre Site require the wheeling of power to FP&L through the Lee County Electrical Co-op.

³ Haul of Construction and Demolition and Class III totals \$772,280 per year assuming all goes to 1734 Acre Site Landfill.

⁴ Costs are in 1993 dollars and based on 1993 solid waste generation quantities.

⁵ Cost per ton is equal to the annual cost divided by the total tons of solid waste in 1993 (i.e. 561,000 tons).

Section 5

SECTION 5.0
INTERLOCAL AGREEMENTS

**5.1 LEE COUNTY/HENDRY COUNTY
INTERLOCAL AGREEMENT**

IMAGE QUALITY

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

INTERLOCAL AGREEMENT
FOR SOLID WASTE DISPOSAL

Poor Original

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

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. Rubin

Chairman

Approved As To Form:

E. Paul Starnes

County Attorney
for Hendry County

ATTEST:
CHARLIE GREEN,
CLERK OF THE CIRCUIT COURT

By: Mary Ammenthorpe

Deputy Clerk

BOARD OF COUNTY COMMISSIONERS
OF LEE COUNTY, FLORIDA

By: Chip Ingelbrecht

Chairman

Approved As To Form:

James H. Greger

County Attorney for Lee County

(30081)

5.2 REQUEST FOR COMMITMENT
FROM
CITY OF FORT MYERS
FOR RECLAIMED WATER



PO Box 398
Fort Myers, Florida 33902-0398
(813) 334-2166

BOARD OF COUNTY COMMISSIONERS

John E. Manning
District One

Douglas R. St. Cerny
District Two

Ray Judah
District Three

Bill Fussell
District Four

Donald Stisher
District Five

Marsha Segal-George
County Administrator

James G. Yeager
County Attorney

R. Scott Barker
County Hearing Examiner

Don McKenna
Director-Public Works
City of Fort Myers
P.O. Drawer 2717
Fort Myers, FL 33902

Poor Original

May 4, 1990

335-2276
Writer's Direct Dial Number
L-149-90
RECEIVED

MAY 08 1990

CAMP DRESSER & MCKEE
FT MYERS, FLORIDA

RE: WASTEWATER SERVICE FOR THE RESOURCE RECOVERY PLANT

Dear Don:

Per our most recent discussion with you and Jim Williams, please accept this letter as an official request for being able to return 150,000 gpd to the city's central sewer plant from our resource recovery plant. Approximately 75,000 gpd of the 150,000 gpd will be domestic waste water. The remaining 75,000 gpd would be water from the plant itself which will be treated to industrial pretreatment standards. Zero discharge, eliminating the need for 150,000 per day service, is very expensive.

As previously discussed, we will want to utilize treated effluent from the city's sewer plant, approximately 1.5 million gpd. I would appreciate a response to my request as soon as possible so that we can continue in our contract preparation process.

As always your cooperation is appreciated.

Sincerely,

George E. Reilly, P.E.
Administrative Director
DEPARTMENT OF LEE COUNTY UTILITIES

GER/am

cc: M. Ihnat, Camp Dresser & McKee

(2444A)

Reviewed By 7192
XC MTI RTT
DES CAB DEC
File No 6685-38-PT
File Topic Lee Co. ERF
Subtopic UTILITIES



City of Fort Myers, Florida

"City of Palms"

PO DRAWER 2217
FT MYERS FL 33902 2217
TELEPHONE (813) 334 1281

June 14, 1990

RECEIVED

JUN 21 1990

Mr. George E. Reilly, P.E.
Administrative Director
Lee County Utilities
P. O. Box 398
Fort Myers, FL 33902-0398

CAMP DRESSER & MCKEE
FT MYERS, FLORIDA

RE: Resource Recovery Facility -- Reclaimed Water Service

Dear George:

You asked if the City of Fort Myers could provide you with 1.5M GPD of treated effluent for the County's planned resource recovery facility.

The City's Central Advanced Wastewater Treatment Plant is currently treating 6.5M GPD and has a capacity to treat 11M GPD and, pending agreements to use proceeds of your bond issue to finance capital improvements needed to treat effluent to reclaimed water standards, we can commit to supply the service to you.

The details would be worked out in an Interlocal Agreement but we do have the capacity to handle your request.

I know this is rather early in your planning phase and it is hard for a detailed description of the service to be provided but, if there is any further information I can provide at this time, please let me know.

Very truly yours,

D. C. McKenna
Public Works Administrator
Public Works Department

Poor Original

DCM:vjhs

CC: Jim Williams

Reviewed By MDJ
XC MTT RJT RDM
DKS DGC
File No 66-55 92-17
File Topic Lee Co. PWS
Subtopic WWT 24



"City of Palms"

City of Fort Myers, Florida

RECEIVED

JUN 21 1990

PO DRAWER 2217
FT MYERS FL 33902 2217
TELEPHONE (813) 334 1281

June 14, 1990

CAMP DRESSER & MCKEE
FT MYERS, FLORIDA

Mr. George E. Reilly, P.E.
Administrative Director
Lee County Utilities
P. O. Box 398
Fort Myers, FL 33902-0398

RE: Resource Recovery Facility -- Wastewater Service

Dear George:

The City of Fort Myers has a Central Advanced Wastewater Treatment Plant with a capacity of 11M GPD that can treat 150,000 GPD wastewater from your planned resource recovery facility to be located east of Fort Myers.

It is assumed that the wastewater will be within the parameters of the City's Pretreatment Ordinance and will be allocated based on the Interlocal Agreement between Lee County and the City.

I hope this information is satisfactory for your planning needs; but, if further details are needed, don't hesitate to contact me.

Very truly yours,

D. C. McKenna
Public Works Administrator
Public Works Department

Poor Original

DCM:vjhs

CC: Jim Williams

Reviewed By AKJ
XC 1125 KST PD21
DEC DEC
File No 1-1-55-38-17
File Topic LEE Co. RRF
Subject 1-1-55-38

Section 6

SECTION 6.0
FEDERAL PERMIT APPLICATIONS
AND
APPROVALS

6.1 NPDES PERMIT APPLICATION
FOR
CONSTRUCTION DEWATERING

Form
2E
 NPDES

Facilities Which Do Not Discharge Process Wastewater

I Receiving Waters

For this outfall, list the latitude and longitude, and name of the receiving water(s)

Outfall Number (list)	Latitude			Longitude			Receiving Water (name)
	Deg	Min	Sec	Deg	Min	Sec	
001	26	37	38	81	45	49	Six Mile Cypress Slough

II Discharge Date (If a new discharger the date you expect to begin discharging)
 Estimated September, 1990

III Type of Waste

A Check the box(es) indicating the general type(s) of wastes discharged

☐ Sanitary Wastes
 ☐ Restaurant or Cafeteria Wastes
 ☐ Noncontact Cooling Water

☒ Other Nonprocess Wastewater (Identify)

(Groundwater Dewatering Operation)

B If any cooling water additives are used, list them here Briefly describe their composition if this information is available

Not Applicable

Poor Original

IV Effluent Characteristics

A Existing Sources — Provide measurements for the parameters listed in the left-hand column below unless waived by the permitting authority (see instructions) N/A

B New Dischargers — Provide estimates for the parameters listed in the left-hand column below, unless waived by the permitting authority. Instead of the number of measurements taken, provide the source of estimated values (see instructions)

Please reference attached groundwater characteristics sheet.

Pollutant or Parameter	(1) Maximum Daily Value (include units)		(2) Average Daily Value (last year) (include units)		(3) Number of Measurements Taken (last year)	(4) Source of Estimate (if new discharger)
	Mass	Concentration	Mass	Concentration		
Biochemical Oxygen Demand (BOD)	N/A	N/A	N/A	N/A	N/A	N/A
Total Suspended Solids (TSS)	N/A	N/A	N/A	N/A	N/A	N/A
Fecal Coliform (if believed present or if sanitary waste is discharged)	N/A	N/A	N/A	N/A	N/A	N/A
Total Residual Chlorine (if chlorine is used)	N/A	N/A	N/A	N/A	N/A	N/A
Oil and Grease	N/A	N/A	N/A	N/A	N/A	N/A
*Chemical oxygen demand (COD)	N/A	N/A	N/A	N/A	N/A	N/A
*Total organic carbon (TOC)	N/A	N/A	N/A	N/A	N/A	N/A
Ammonia (as N)	N/A	N/A	N/A	N/A	N/A	N/A
Discharge Flow	Value 1,600,000 g/d		1,000,000 g/d		Model Program based on Theis Solution	
pH (give range)	Value 6.9 - 8.6		7.2		Based on groundwater quality data of area.	
Temperature (Winter)	N/A °C		N/A °C		N/A	N/A
Temperature (Summer)	N/A °C		N/A °C		N/A	N/A

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)

A FIRST										B SECOND									
7	4	9	1	1	(specify) Electric Power Services	7				(specify)									
C. THIRD										D. FOURTH									
7					(specify)	7				(specify)									

VIII. OPERATOR INFORMATION

A NAME																									B. Is the name listed in Item VIII-A also the owner?				
N / A																									☐ YES ☒ NO				
C STATUS OF OPERATOR (Enter the appropriate letter into the answer box, if "Other", specify)																									D PHONE (area code & no.)				
F = FEDERAL S = STATE P = PRIVATE										M = PUBLIC (other than federal or state) O = OTHER (specify)										(specify) Not Applicable					N / A N / A N / A				

E. STREET OR P.O. BOX																													
N / A																													
F CITY OR TOWN															G STATE					H ZIP CODE					IX. INDIAN LAND				
N / A															N/A					H/A					Is the facility located on Indian lands? ☐ YES ☒ NO				

X. EXISTING ENVIRONMENTAL PERMITS

A NPDES (Discharges to Surface Water)															D PSD (Air Emissions from Proposed Sources)														
N / A															N / A														
B UIC (Underground Injection of Fluids)															E OTHER (specify)														
N / A															N / A (specify)														
C RCRA (Hazardous Wastes)															E OTHER (specify)														
N / A															N / A (specify)														

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

This is a permit application for short-term discharge from a construction site preparation dewatering operation for the Lee County Energy Recovery Facility. The dewatering flow will be discharged into an on-site stormwater retention basin.

Overflow from the retention basins will enter existing wetlands or onsite ditches. Limited flow offsite will follow existing drainage ways and will eventually enter Six Mile Cypress Slough.

Poor Original

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the 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.

NAME & OFFICIAL TITLE (type or print)															B SIGNATURE															C DATE SIGNED														
George E. Reilly, P.E. Director																														6/25/90														

COMMENTS FOR OFFICIAL USE ONLY

C																								
C																								

FORM 1	EPA	U.S. ENVIRONMENTAL PROTECTION AGENCY GENERAL INFORMATION <i>Consolidated Permits Program</i> (Read the "General Instructions" before starting)	I. EPA I.D. NUMBER																																										
GENERAL			<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:10%;">F</td> <td style="width:10%;">G</td> <td style="width:10%;">H</td> <td style="width:10%;">I</td> <td style="width:10%;">J</td> <td style="width:10%;">K</td> <td style="width:10%;">L</td> <td style="width:10%;">M</td> <td style="width:10%;">N</td> <td style="width:10%;">O</td> <td style="width:10%;">P</td> <td style="width:10%;">Q</td> <td style="width:10%;">R</td> <td style="width:10%;">S</td> <td style="width:10%;">T</td> <td style="width:10%;">U</td> <td style="width:10%;">V</td> <td style="width:10%;">W</td> <td style="width:10%;">X</td> <td style="width:10%;">Y</td> <td style="width:10%;">Z</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z																					
F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z																									
II. POLLUTANT CHARACTERISTICS		GENERAL INSTRUCTIONS																																											
I. EPA I.D. NUMBER III FACILITY NAME V. FACILITY MAILING ADDRESS VI. FACILITY LOCATION		PLEASE PLACE LABEL IN THIS SPACE																																											
INSTRUCTIONS. Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements, see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.		If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent (the area to the left of the label space lists the information that should appear), please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete items I, III, V, and VI (except VI-B which must be completed regardless). Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.																																											

SPECIFIC QUESTIONS	YES	NO	FORM ATTACHED	SPECIFIC QUESTIONS	YES	NO	FORM ATTACHED
A Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X		B. Does or will this facility (either existing or proposed) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)		X		D. Is this a proposed facility (other than those described in A or B above) which will result in a discharge to waters of the U.S.? (FORM 2D)		X	
E Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)		X		F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X		H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may effect or be located in an attainment area? (FORM 5)	X			J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may effect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY	1 SKIP LEE COUNTY ENERGY RECOVERY FACILITY
------------------------------	--

IV FACILITY CONTACT	A NAME & TITLE (last, first, & title) 2 REILLY, GEORGE E., DIRECTOR	B PHONE (area code & no) 813 335 2276
----------------------------	--	--

V FACILITY MAILING ADDRESS	A STREET OR P.O. BOX 3 2178 MCGREGOR BOULEVARD	B CITY OR TOWN 4 FT. MYERS	C STATE FL	D ZIP CODE 33901
-----------------------------------	---	-------------------------------	---------------	---------------------

VI FACILITY LOCATION	A STREET, ROUTE NO OR OTHER SPECIFIC IDENTIFIER 5 BUCKINGHAM RD. & STATE ROUTE 84	B COUNTY NAME LEE COUNTY	C CITY OR TOWN 6 N/A	D STATE FL	E ZIP CODE 33905	F COUNTY CODE (if known) N/A
-----------------------------	--	-----------------------------	-------------------------	---------------	---------------------	---------------------------------

Poor Original

V Except for leaks or spills, will the discharge described in this form be intermittent or seasonal?

If yes, briefly describe the frequency of flow and duration



Yes



No

The flow discharge being applied for in this permit application is associated with dewatering operations of the construction site for the proposed Lee County Energy Recovery Facility. The water quality is not anticipated to vary from the groundwater being pumped to dewater. From modeling data based on Theis Solution, the maximum day flow is estimated to be 1,600,000 g/d for 10 days and an average day flow of 1,000,000 g/d for 110 days.

VI Treatment System (Describe briefly any treatment system(s) used or to be used)

Not Applicable.

Poor Original

VII Other Information (Optional)

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations. Attach additional sheets if necessary.

Attached is groundwater quality data characteristic of the area and aquifers applicable for this site.

This permit application is for a short term discharge from a construction site preparation dewatering operation for the Lee County Energy Recovery Facility. The dewatering flow will be discharged into the on-site surface water management pond which drains into an existing culvert. Eventually, this flow will reach the Six Mile Cypress Slough.

VIII Certification

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.

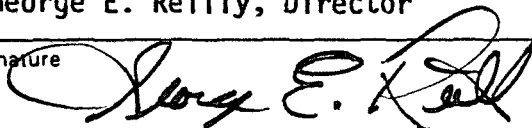
A Name & Official Title

George E. Reilly, Director

B Phone No. (area code & no.)

(813) 335-2276

C Signature



D Date Signed

6/25/90

APPENDIX 4-1. WATER QUALITY DATA, SURFICIAL AQUIFER, LEE COUNTY (1)

WELL NUMBER	LATITUDE	LONGITUDE	TOTAL DEPTH (FT.)	CASING DEPTH (FT.)	DATE	SO ₄ (mg/l)	Cl (mg/l)	Fe (mg/l)	TDS (mg/l)
L-576	26°42'53"N	81°36'54"W	11	-	APR '74	43	240	0.06	686
L-707	26°42'35"N	81°37'53"W	21	18	APR '74	59	87	0.92	543
L-721*	26°41'53"N	82°02'23"W	18	9	OCT '76	52	67	0.84	502
L-726*	26°44'25"N	81°45'40"W	19	14	APR '74	0.0	6.7	0.03	255
L-728*	26°37'12"N	81°46'12"W	19	18	NOV '75	2.1	31	0.00	333
L-730*	26°31'27"N	81°35'16"W	19	19	NOV '75	3.6	4.6	1.00	228
L-739*	26°26'57"N	81°44'35"W	20	18	NOV '75	0.7	23	1.80	326
L-774	26°38'59"N	81°55'04"W	48	-	MAR '75	24	29	0.02	403
L-806	26°19'51"N	81°45'58"W	33	20	NOV '75	36	65	0.24	432
L-1136*	26°35'32"N	81°59'22"W	20	15	NOV '75	110	65	1.00	634
L-1137*	26°39'50"N	81°35'54"W	20	15	JUN '76	140	340	0.03	1,090
L-1171	26°37'14"N	81°45'06"W	18	13	JUN '75	59	8.8	1.00	342
L-1175	26°27'36"N	81°45'33"W	16	-	JAN '74	190	290	8.40	1,460
L-1458	26°26'11"N	82°02'58"W	36	32	APR '77	130	2,200	0.00	4,030
L-1459	26°26'11"N	82°02'58"W	10	-	APR '77	200	460	0.00	1,400
L-1475	26°26'18"N	82°05'38"W	32	32	APR '77	4,000	30,000	0.14	54,600
L-1476	26°26'18"N	82°05'38"W	11.3	9.8	APR '77	1,200	9,100	0.72	17,300
L-1479	26°26'51"N	82°07'12"W	29	29	APR '77	3,300	27,000	0.26	46,000
L-1480	26°26'51"N	82°07'12"W	7.9	5.9	APR '77	570	5,900	0.49	10,900
L-1486	26°28'54"N	82°09'54"W	11.2	9.7	APR '77	2,200	16,000	0.26	29,800
L-1491	26°27'38"N	82°09'10"W	30	29	APR '77	2,400	20,000	0.11	33,600
L-1498	26°25'48"N	82°06'30"W	33	31	APR '77	1,300	13,000	0.02	22,200
L-1576	26°37'43"N	81°45'33"W	12	-	JAN '74	100	78	4.00	586

(1) From: Hydrogeologic Reconnaissance of Lee County, Florida. Technical Publication 82-1, Part 3. South Florida Water Management District January 1982.

APPENDIX 4-1: WATER QUALITY DATA, SURFICIAL AQUIFER, LEE COUNTY (Continued)

WELL NUMBER	LATITUDE	LONGITUDE	TOTAL DEPTH (FT.)	CASING DEPTH (FT.)	DATE	SO ₄ (mg/l)	Cl (mg/l)	Fe (mg/l)	TDS (mg/l)
L-1577	26°37'50"N	81°45'25"W	13	-	OCT '74	45	23	1.80	382
L-1827	26°38'04"N	81°46'05"W	7	4	JUN '75	37	87	0.36	422
L-1829	26°37'57"N	81°46'32"W	8	4	JAN '75	59	56	2.56	524
L-1831	26°38'05"N	81°45'36"W	8	8	JAN '75	30	18	0.08	362
L-1833	26°38'30"N	81°46'04"W	11	10	JAN '75	7.7	13	4.00	204
L-1835	26°38'30"N	81°46'32"W	10	7	MAY '74	100	84	4.80	580
L-1942	26°42'50"N	81°52'03"W	32	-	NOV '75	0.4	52	3.50	524
L-1964*	26°33'44"N	81°36'17"W	24	14	NOV '75	29	4.6	2.30	464
L-1976*	26°43'59"N	81°42'47"W	15	5	OCT '75	280	200	21.60	1,170
L-1978*	26°43'20"N	81°36'57"W	17	7	MAY '75	2.6	7.9	0.01	279
L-1982	26°37'37"N	81°45'33"W	17	7	NOV '75	110	140	2.90	750
L-1985*	26°27'13"N	81°41'47"W	50	43	NOV '75	0.4?	22	1.80	342
L-1995*	26°32'51"N	81°45'28"W	24	14	NOV '75	3	59	0.53	388
L-1997*	26°19'54"N	81°41'01"W	17	10	JAN '75	5	38	0.55	396
L-1999*	26°30'41"N	81°43'31"W	21	16	DEC '74	2.2	150	5.00	618
L-2068	26°41'03"N	81°37'23"W	20.6	-	JUL '76	10	82	3.20	580
L-2069	26°40'40"N	81°37'11"W	21.2	-	JUL '76	11	56	3.00	456
L-2093	26°37'47"N	81°48'55"W	36	-	MAR '75	39	140	1.50	594
L-2095	26°37'37"N	81°49'11"W	43	28	MAR '75	43	170	2.70	614
L-2204*	26°33'29"N	81°39'43"W	26	23	SEP '75	1.3	30	2.50	360
L-2239	26°40'52"N	81°38'08"W	18.4	-	JUL '76	35	23	3.70	428
L-2240	26°40'23"N	81°37'15"W	9.9	-	JUL '76	23	23	2.90	354

APPENDIX 4-1. WATER QUALITY DATA, SURFICIAL AQUIFER, LEE COUNTY (Continued)

<u>WELL NUMBER</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>	<u>TOTAL DEPTH (FT.)</u>	<u>CASING DEPTH (FT.)</u>	<u>DATE</u>	<u>SO₄ (mg/l)</u>	<u>Cl (mg/l)</u>	<u>Fe (mg/l)</u>	<u>TDS (mg/l)</u>
L-2241	26°40'40"N	81°36'49"W	20.0	-	JUN '76	23	180	3.60	718
L-2242	26°40'46"N	81°37'06"W	16.9	-	JUL '76	57	180	4.20	841
L-2243	26°40'27"N	81°38'20"W	18.2	-	JUL '76	4.5	29	3.70	394
L-2277	26°37'19"N	81°52'42"W	26	25	APR '76	130	160	1.20	692

*Water level data also available.

6.2 NPDES PERMITTING FOR STORMWATER DISCHARGE

EPA FORM 2F:

NPDES APPLICATION FOR PERMIT TO DISCHARGE STORMWATER
DISCHARGES ASSOCIATED WITH INDUSTRIAL ACTIVITY

EPA Form 2F is not required for this Facility because the energy recovery facility is fully enclosed, and therefore not an industrial activity.

TLH1/6

**6.3 FEDERAL ENERGY REGULATORY
COMMISSION ORDER;
PUBLIC SERVICE COMMISSION ORDER**

CDM

environmental engineers, scientists
planners & management consultants

CAMP DRESSER & MCKEE INC.

1620 Medical Lane Suite 221
Ft. Myers, Florida 33907
813 939-3775

May 7, 1990

Poor Original

Ms. Jesslyn Arnold
Lee County Utilities
2178 McGregor Boulevard
Ft. Myers, Florida 33901

RE: Federal Energy Regulatory Commission
CDM Project No. 6685-3C-PT-PRMT

RECEIVED
MAY 09 1990
CAMP DRESSER & MCKEE
FT. MYERS, FLORIDA

Dear Ms. Arnold:

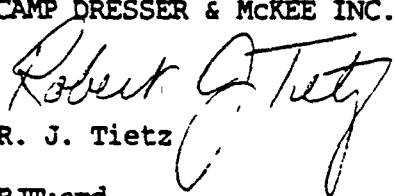
Pursuant to our telephone conversation I am forwarding, under this cover, the Federal Energy Regulatory Commission (FERC) Application Packet. Additionally, the back-up information, including the fee schedule, in justification of the \$5,360 application fee is enclosed.

I would appreciate your assistance in finalizing and forwarding this submittal to the FERC offices to the address on the application cover letter. Please have the cover letter transferred to Lee County stationery, obtain George Reilly's signature and submit the fourteen (14) copies of the application by registered mail. I am providing you with the 14 required submittal copies plus six (6) additional for you and the Utilities Department Files. I would appreciate being advised of the date of mailing from your offices.

Thank you for your assistance. If you have any questions or require further clarification or information in this regard contact me.

Sincerely,

CAMP DRESSER & MCKEE INC.


R. J. Tietz

RJT:emd
LEE9T.12/48

Enclosures

cc: George Reilly, DLCU
~~Mike Thatt, CDM~~
Dan Strobridge, CDM



BOARD OF COUNTY COMMISSIONERS

John E. Manning
District One

Douglas R. St. Cerny
District Two

Ray Judah
District Three

Bill Fussell
District Four

Donald Sisher
District Five

Marsha Segal-George
County Administrator

James G. Yeager
County Attorney

R. Scott Barker
County Hearing
Examiner

Reviewed By 11/19
XC 11/11
11/11
Date 11/11
Initials 11/11
Signature 11/11

PO Box 398
Fort Myers, Florida 33902-0398
(813) 334-2166

335-2276
Writer's Direct Dial Number
L-157-90

Poor Original

May 11, 1990

RECEIVED

JUN 8 1990

CAMP DRESSER & MCKEE
FT MYERS FLORIDA

**RE: APPLICATION FOR COMMISSION CERTIFICATION
AS A SMALL POWER PRODUCTION FACILITY**

Lee County, Florida, seeks the benefit of qualifying status as a certified small power production facility for its proposed energy recovery facility. We hereby submit Application for Certification of Qualifying Status. Also enclosed is a check, made payable to the Treasurer of the United States, in the amount of five thousand three hundred sixty dollars (\$5,360.00) for the filing fee.

Camp Dresser & McKee, Inc. (CDM), as the County's Independent Consulting Engineer, has prepared the enclosed application. Any questions or additional information required will be promptly provided by CDM's Tampa office (Phone: (813) 221-2833).

Sincerely,

George E. Reilly, P.E.
Administrative Director
DEPARTMENT OF LEE COUNTY UTILITIES

GER/am
Enclosures

cc: David Owen, Assistant County Attorney, Lee County
Jesslyn Arnold, Lee County Utilities
David Dee, Carlton, Fields, Ward, Emmanuel & Cutler
John Calise, CDM-Fort Myers
Michael Ihnat, CDM-Fort Myers
Robert Tietz, CDM-Fort Myers
Dan Strobbridge, CDM-Tampa

(2451A)

APPLICATION FOR CERTIFICATION
OF QUALIFYING STATUS

- 1a. Applicant Name & Address Lee County Board of County Commissioners
2178 McGregor Boulevard
Ft. Myers, FL 33902
- b. Location of Facility Buckingham Road (East-West)
approximately 2.0 miles East of I-75 in
the S.E. 1/4 of Section 24, T44S, R25E,
R17E.
2. Facility Description The proposed facility is a solid waste
energy recovery installation utilizing
mass burn waterwall furnace boilers and
turbine generator. The facility will
fire up to 1200 tons per day of
unprepared municipal solid waste and
produce electricity for in-house uses and
export to the local electric utility.
3. Primary Energy Source: Municipal Solid Waste
4. Power Production Capacity: Gross capacity =75 MW
Less in house uses:
- | | |
|---------------------------------|--------------|
| a) Circulating Water Pumps | 2.2 MW |
| b) Underfire Force Draft Fans | 1.9 MW |
| c) Over fire Fans | 1.0 MW |
| d) I.D. Fans | 1.5 MW |
| e) Boiler Feed Pumps | 3.0 |
| f) Lighting, Small Motors, Etc. | .4 |
| Net Capacity: | <u>65 MW</u> |
- Note: Exact power production will depend
upon system vendor.
5. % Ownership by Electric Utility
or Electric Utility Holding
Company: None
6. Federal Register Notice: Lee County Board of County Commissioners

Docket No. QF

NOTICE OF APPLICATION FOR COMMISSION
CERTIFICATION OF QUALIFYING STATUS OF A
SMALL POWER PRODUCTION FACILITY

On (date application was filed), Lee County Board of County Commissioners, 2178 McGregor Blvd., Ft. Myers, FL filed with the Federal Energy Regulatory Commission an application to be certified as a qualifying small power production facility pursuant to 292.207 of the Commission's rules.

The facility, a solid waste energy recovery facility, will utilize mass burning waterwall furnace boilers to fire up to 2,400 tons per day of municipal solid waste. This small power production facility will generate up to 75 MW of electricity for in-plant uses and for export. The facility will be located off Buckingham Road in Section 24, T44S, R25 in Central Lee County.

Any person desiring to be heard or objecting to the granting of qualifying status should file a petition to intervene or protest with the Federal Energy Regulatory Commission, 825 North Capital Street, N.E., Washington, D.C. 20426, in accordance with Sections 1.8 and 1.10 of the Commission's Rules of Practice and Procedure, all such petitions or protests must be filed within 30 days after the date of publication of this notice and must be served on the applicant. Protests will be considered by the Commission in determining the appropriate action to be taken but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a petition to intervene. Copies of this filing are on file with the Commission and are available for public inspection.

7a.

The proposed facility is not within one mile of other small power production facilities owned by the applicant. The applicant owns no other power production facilities.

b.

Natural gas or oil may be used during furnace boiler start up operations. However, no auxiliary fuel will be used during normal operation. Auxiliary fuel use is estimated at less than 1% of the total energy input.

6.4 FEDERAL AVIATION

ADMINISTRATION COORDINATION

IMAGE QUALITY

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

CDM

environmental engineers scientists
planners & management consultants

CAMP DRESSER & MCKEE INC

1620 Medical Lane Suite 221
Ft. Myers, Florida 33907
813 939-3775

April 10, 1990

Mr. James G. Walters
Air Space Section
ASO 532 Air Traffic Division
Federal Aviation Administration
P.O. Box 20636
Atlanta, Georgia 30320

Re: Notice of Proposed Construction or Alteration - Site F
Department of Lee County Utilities
CDM Project No. 6685-38-PT-PRMF

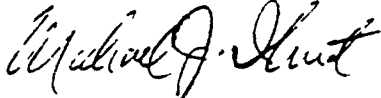
Dear Mr. Walters:

As referenced in our letter of April 2, enclosed is the revised "Notice of Proposed Construction or Alteration" for the Lee County Energy Recovery Facility. The proposed facility, currently being designed, will produce electricity through the incineration of municipal solid wastes. The height of the combustion gases vent stack is estimated to be 400 feet above mean sea level.

The purpose of this notification is to request an FAA determination on the maximum allowable stack height. Your prompt attention to this matter would be appreciated as this information is needed to finalize the facility design. Please call Mr. Bob Tietz of our Tampa office at (813) 221-2833 at your earliest convenience regarding this matter.

Sincerely yours,

CAMP DRESSER & MCKEE INC.



Michael J. Ihnat, P.E.

MJI:lp
LC1/5

Enclosure

cc: George E. Reilly, P.E., Dept. of Lee County Utilities
David Owen, Lee County Attorneys' Office
Bob Tietz, CDM
Dan Strobridge, CDM
David Dee, Environmental Counsel



U.S. Department of Transportation
Federal Aviation Administration

NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION

Aeronautical Study Number

1. Nature of Proposal

- Type
- ☒ New Construction
- ☐ Alteration
- B Class
- ☒ Permanent
- ☐ Temporary (Duration _____ months)

C Work Schedule Dates

Beginning 1990

End 1994

3A. Name and address of individual, company, corporation, etc proposing the construction or alteration (Number Street City State and Zip Code)

(813) 335-2276

area code Telephone Number

Department of Lee County Utilities
2178 McGregor Boulevard
Fort Myers, FL 33901

B Name address and telephone number of proponent's representative if different than 3 above

Mr. George E. Reilly P.E., Administrative Director
2178 McGregor Boulevard
Fort Myers, FL 33901

2 Complete Description of Structure

- A Include effective radiated power and assigned frequency, all existing proposed or modified AM, FM or TV broadcast stations utilizing this structure
- B Include size and configuration of power transmission lines and their supporting towers in the vicinity of FAA facilities and public airports
- C Include information showing site orientation, dimensions, and construction materials of the proposed structure

The proposed site vicinity map and sketch of structure configuration are attached. The only potential impact is associated with the height of facilities stack which vents combustion off-gasses.

(if more space is required continue on a separate sheet)

4 Location of Structure

A Coordinates (To nearest second)	B Nearest City or Town and State	C Name of nearest airport, heliport, flightpark or seaplane base	A Elevation of site above mean sea level
26° 01' 37" N Latitude	Fort Myers, Florida	Lenth Acres West Airfield	25' MSL
81° 01' 45" W Longitude	(1) Distance to 4B Approx. 5 miles Miles	(1) Distance from structure to nearest point of nearest runway approx. 3.5 miles	B Height of Structure including all appurtenances and lighting (if any) above ground or water if so situated 375'
	(2) Direction to 4B WEST	(2) Direction from structure to airport East Northeast	C Overall height above mean sea level: A B) 400' MSL

Description of location of site with respect to highways, streets, airports, prominent terrain features, existing structures, etc. Attach a U.S. Geological Survey quad-angle map or equivalent showing the relationship of construction site to nearest airport(s). (if more space is required continue on a separate sheet of paper and attach to this notice)

See Figures 1, 2 and 3

Notice is required by Part 77 of the Federal Aviation Regulations (14 C.F.R. Part 77) pursuant to Section 1101 of the Federal Aviation Act of 1958 as amended (49 U.S.C. 1101). Persons who knowingly and willingly violate the Notice requirements of Part 77 are subject to a fine (criminal penalty) of not more than \$500 for the first offense and not more than \$2,000 for subsequent offenses pursuant to Section 902(a) of the Federal Aviation Act of 1958 as amended (49 U.S.C. 1472(a)).

I HEREBY CERTIFY that all of the above statements made by me are true, complete, and correct to the best of my knowledge. In addition, I agree to obstruction mark and/or light the structure in accordance with established marking & lighting standards if necessary.

Date 4-10-90 Typed Name/Title of Person Filing Notice Michael J. Thnat, P.E., Project Manager Signature Michael J. Thnat
CAMP DRESSER & MCKEE INC.

FOR FAA USE ONLY representing Lee County FAA will either return this form or issue a separate acknowledgement

The Proposal:

- ☐ Does not require a notice to FAA.
- ☐ Is not identified as an obstruction under any standard of FAR, Part 77, Subpart C, and would not be a hazard to air navigation.
- ☐ Is identified as an obstruction under the standards of FAR, Part 77, Subpart C, but would not be a hazard to air navigation.
- ☐ Should be obstruction ☐ marked, ☐ lighted per FAA Advisory Circular 70/7460-1, Chapter (s) _____
- ☐ Obstruction marking and lighting are not necessary.

Supplemental Notice of Construction FAA Form 7460-2 is required any time the project is abandoned, or

- ☐ At least 48 hours before the start of construction.
- ☐ Within five days after the construction reaches its greatest height.

This determination expires on _____ unless

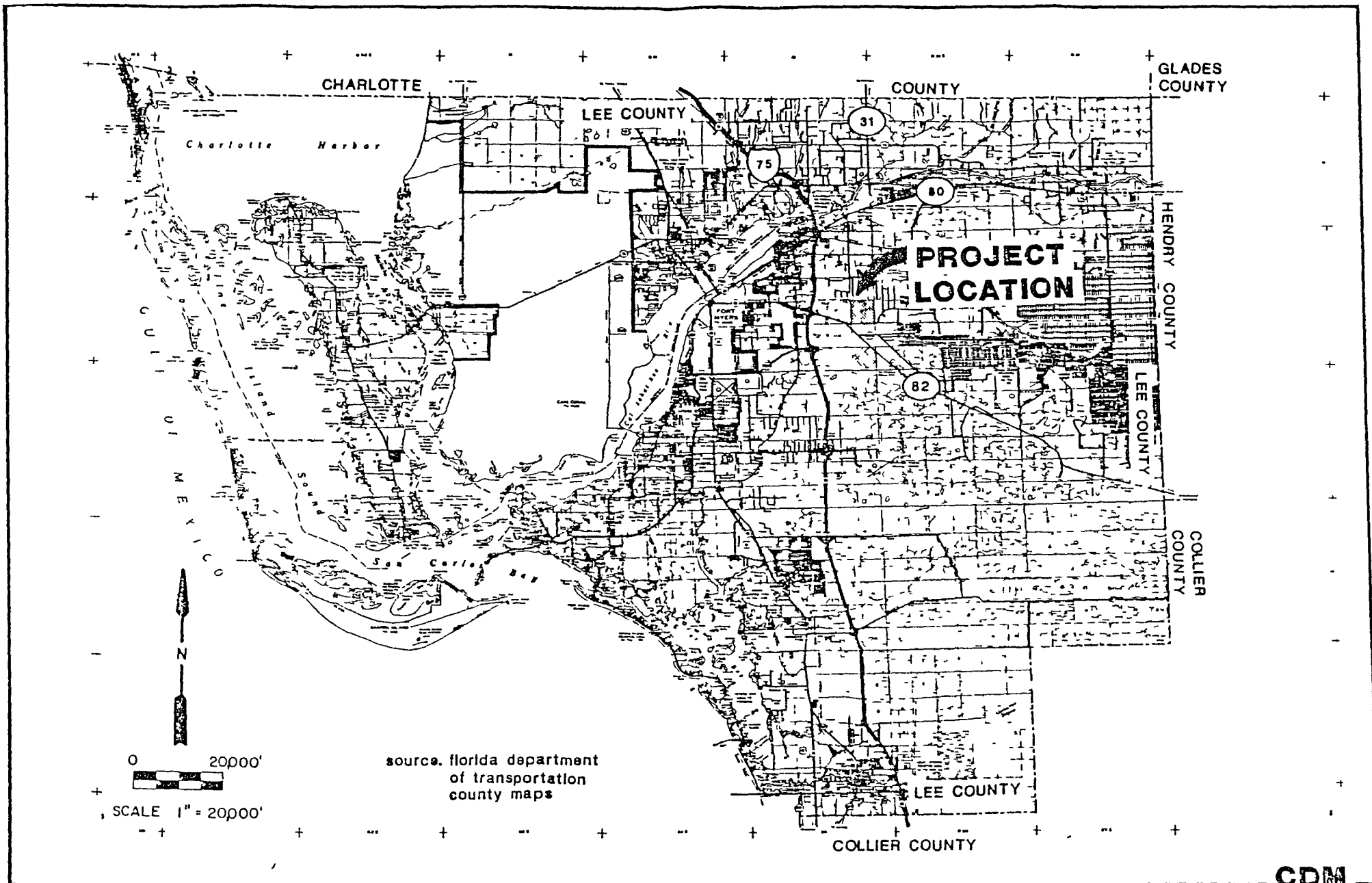
- (a) extended, revised or terminated by the issuing office;
- (b) the construction is subject to the licensing authority of the Federal Communications Commission and an application for a construction permit is made to the FCC on or before the above expiration date. In such case the determination expires on the date prescribed by the FCC for completion of construction, or on the date the FCC denies the application.

NOTE: Request for extension of the effective period of this determination must be postmarked or delivered to the issuing office at least 15 days prior to the expiration date.

If the structure is subject to the licensing authority of the FCC, a copy of this determination will be sent to that Agency.

Remarks:

Issued in _____ Signature _____ Date _____



General Location Map - Lee County Resource Recovery Facility

CDM

FIGURE 1

NOTE: Figure has been reduced from its 11x17 original size. Scale no longer applicable.

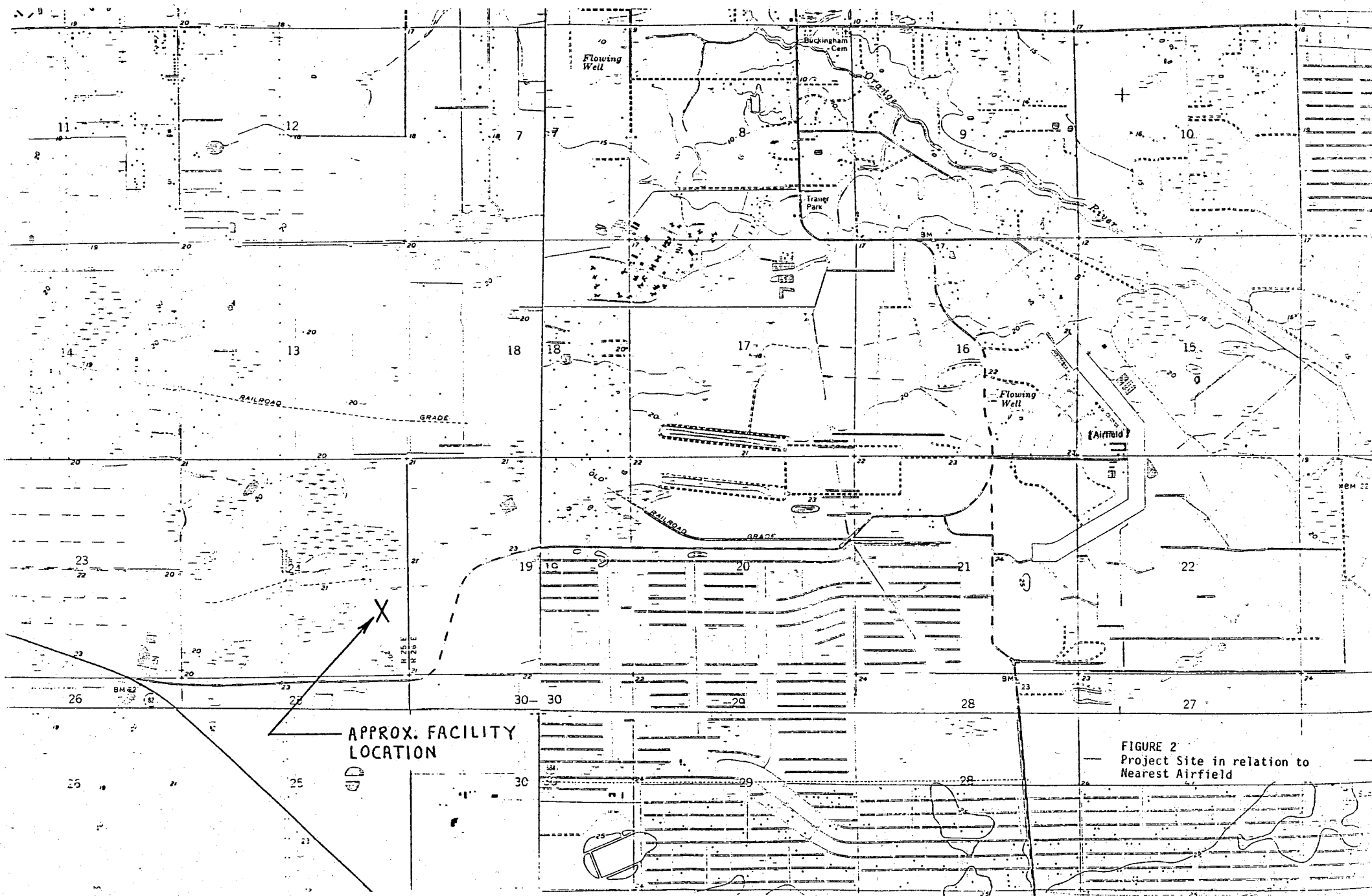
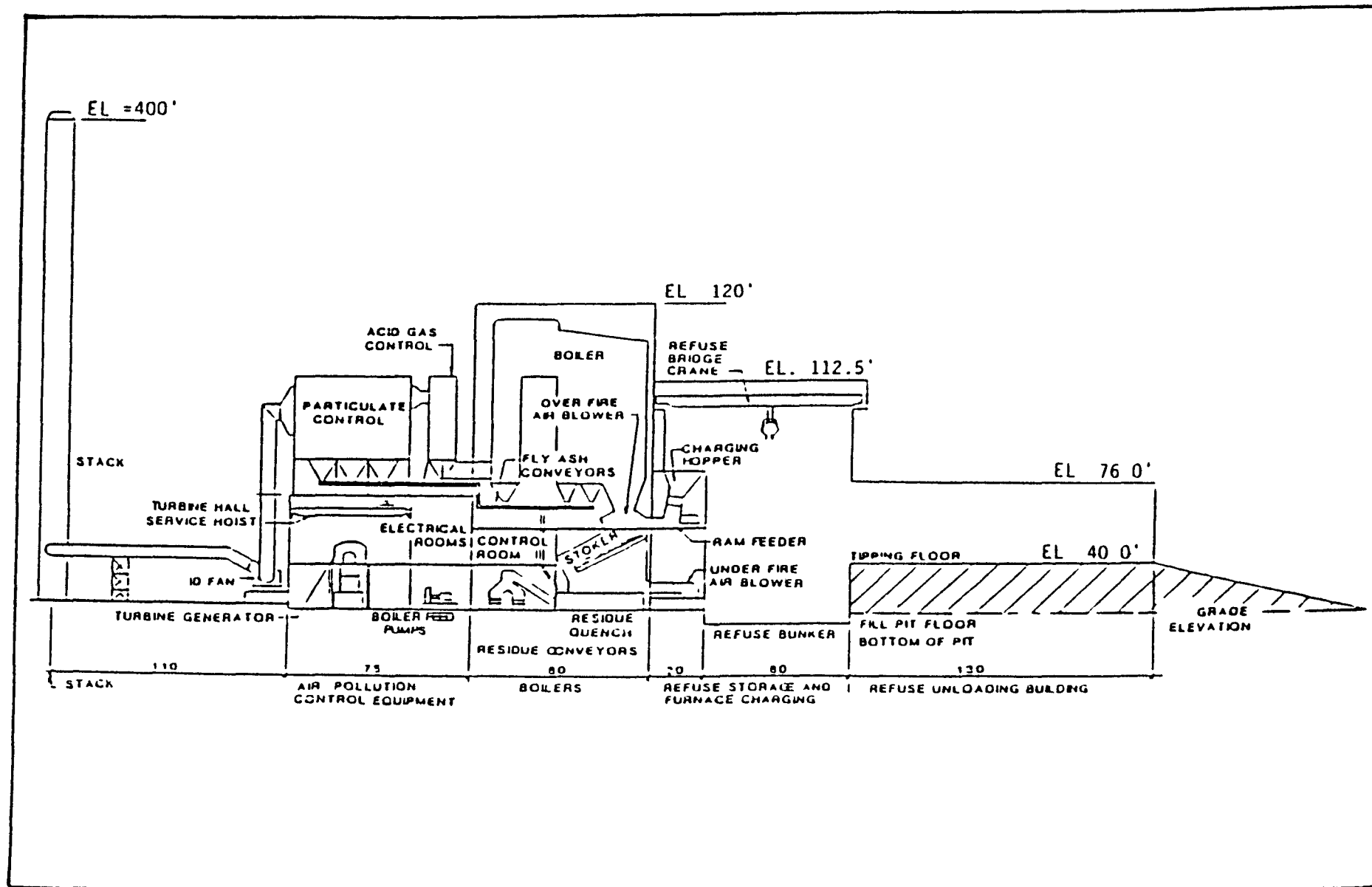


FIGURE 3



SCHEMATIC DIAGRAM OF FACILITY WITH ELEVATIONS RELATIVE TO MEAN SEA LEVEL

6.5 JOINT APPLICATION
FOR
ACTIVITIES IN THE WATERS
OF THE STATE OF FLORIDA (COE/DER)

LEE COUNTY ENERGY RECOVERY FACILITY
JOINT APPLICATION FOR ACTIVITIES IN THE WATERS OF
THE STATE OF FLORIDA

Application Narrative

This application is for anticipated fill activities associated with construction of the Lee County Energy Recovery Facility. The energy recovery facility is a mass-burn facility where municipal solid waste will be incinerated. Heat from this process will be used to produce steam which in turn will be used to generate electrical power. The facility will have an initial capacity of 1,800 tons per day (tpd) of solid waste; it will be expanded to its ultimate capacity of 2,400 tpd as needed. The facility will serve the solid waste disposal needs of both Lee and Hendry Counties and will reduce the volume of landfill space required by up to 70%.

The general project location is shown in Attachment 1. Attachment 2 provides a detailed location map. Lee County will purchase approximately 155 acres comprised mostly of the southeastern quarter of Section 24, Township 44S, Range 25E. The southeastern quarter of Section 24, will constitute the facility site proper. Thus, most of the existing wetlands within the land purchase boundary will be preserved in conjunction with the energy recovery project. Abutting property owners are shown on Attachment 3. Names and addresses of abutting property owners are provided in Attachment 4.

For the proposed facility, numerous studies have been conducted, including an assessment of ecological impacts. Ecological studies were performed by Kevin L. Erwin Consulting Engineers, Inc. (KLECE) of Fort Myers. As part of their work, KLECE contacted all federal, state and local agencies with jurisdiction over wetlands. Wetland boundaries were mapped as presented in Attachment 5. An on-site meeting was held on April 5, 1990 to confirm the jurisdictional boundaries shown in this attachment. Mr. Skip Bergman attended on behalf of the U.S. Army Corps of Engineers (COE), while Mr. Patrick Kenny represented the Florida Department of Environmental Regulation (FDER).

KLECE prepared a report indicating that the on-site wetlands are of low quality, having been disturbed by logging and cattle grazing activities over the past twenty years. Nonetheless, impacts to wetlands as a result of the energy recovery project will be avoided to the greatest extent possible.

Impacts to wetlands could not be completely avoided while still maintaining compliance with local requirements and providing all the appurtenances necessary for a viable project. The project is still in the conceptual stages, but anticipated wetland impacts can be fairly closely delineated. The exact acreage of wetlands impacted will be determined when a vendor/contractor is selected by the County to design, build and operate the facility. Attachment 6 shows the general location of anticipated wetland impacts. A summary of potential impacts to wetlands follows.

LCERF2.20/CAB
6/21/90

Fill Associated with Power Transmission Lines

The route which least impacts the wetlands is to route the lines along an existing unimproved road, which runs within a 60-foot-wide corridor along the property's eastern and northern boundaries in the northeast quarter of Section 24. This road can be seen on the 1:200 scale aerial of the site, Figure 2-5b in Volume I. Fill will be placed only as needed to improve the existing road, to allow for future maintenance of the lines. The road will remain unpaved. Attachments 9 and 10 show the areas which would potentially be impacted. Attachment 11 summarizes these impacts. A maximum total of 2.7 acres would be impacted. Improvements to the existing road are detailed in Attachment 12. The improved road will be approximately 12 feet wide at its crown and 30 feet wide at its base, with 3:1 side slopes. Culverts will be placed under the road to maintain a contiguous flow through the wetlands. Adjacent to the road, power lines will be strung on treated wood poles. Any disturbed areas will be sodded, and sedimentation control measures (hay bales, etc.) will be employed.

A meeting was held with COE staff on May 22, 1990 to discuss the impacts associated with the energy recovery facility, and with an associated landfill/ashfill being permitted under a separate application. At that time, it had been estimated that up to 2.5 acres of wetlands would be impacted by the energy recovery project. The construction and operation of the Facility will disturb no connected wetlands. Revised calculations now show that the total area impacted will be closer to 1.4 acres, but a conservative estimate of 2.7 acres will be used. The final quantity of wetlands to be impacted will be determined prior to completion of construction, and the appropriate revisions will be made. The impacted quantity is expected to be at or near the revised calculation of 1.4 acres. A COE staff member indicated at the time of the meeting that the proposed project would probably qualify for a "nationwide" permit.

JOINT APPLICATION
DEPARTMENT OF THE ARMY/FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION
For Activities in the Waters of the State of Florida

CORPS APPLICATION NUMBER (official use only)

DER APPLICATION NUMBER (official use only)

1. APPLICANT'S NAME AND ADDRESS

D E P T O F L E E C O U N T Y U T I L I T I E S
NAME

2 1 7 8 M C G R E G O R B O U L E V A R D
STREET

F O R T M Y E R S F L 3 3 9 0 1
CITY STATE ZIP

TELEPHONE NUMBER (Day) (813)335-2276

(Night) ()

2. Name, address, zip code and title of applicant's authorized agent for permit application coordination

CAMP DRESSER & McKEE INC.
1620 MEDICAL LANE, SUITE 221
FORT MYERS, FLORIDA 33907

AFTER 6-30-90
8191 College Parkway, Suite 206
Fort Myers, Florida 33919

Telephone Number (813)939-3775

3. NAME OF WATERWAY AT LOCATION OF THE ACTIVITY.

Unnamed Wetlands

DER Code

W/W Code

4. LOCATION WHERE PROPOSED ACTIVITY EXISTS OR WILL OCCUR.

attached

Buckingham Road
Street, road or other descriptive location

24
Section

44S
Township

25E
Range

(Unincorporated Lee County)
Incorporated city or town

26 37'54"
Latitude

81 45'41"
Longitude

Lee
County

Tax Assessors Description: (if known)

Map No.

Subdiv. No.

Lot No.

5. NAME AND ADDRESS INCLUDING ZIP CODE OF ADJOINING PROPERTY OWNERS WHOSE PROPERTY ALSO ADJOINS THE WATERWAY.

See Attachments 3 and 4.

6. PROPOSED USE

Private Single Dwelling []
Commercial []

Private Multi-dwelling [] Public []
Other [] (Explain in remarks)

7. DESCRIPTION OF PROJECT (Use additional sheets, if necessary)

COE
Work Code

A. Structures

1. New work [] Maintenance of existing structure []

2. Piers, docks and use: Commercial [] Private [] Public []

a. Single pier [] length width

b Number of piers [] length width

c Number of boat slips [] length width

d Number of finger piers [] length width

e. Other (please describe)

3. Seawalls, revetments, bulkheads length

a. Type: Vertical [] Riprap [] Slope: Horizontal Vertical

b. Material to be used

4. Other type of structure

B. Excavation or Dredging: New Work [] Maintenance work [] Total acreage involved

1. Access Channel [] or Canal [] Length ft. Width ft. Depth ft.

2. Boat Basin [] or Boat Slip [] Length ft. Width ft. Depth ft.

3. Other Length ft. Width Mean ft. Depth ft.

4. Cubic yards. Total for project

a. cyd. waterward/ cyd. landward of ordinary/mean high water

b. Type of material to be excavated/dredged

C. Fill:

1. Amount of material (see attached narrative)

a. Cubic yards placed waterward of ordinary/mean high water 4705

b. Cubic yards placed landward of ordinary/mean high water 522

c. Total acreage to be filled 4.81 Total acreage of wetlands involved 2.7

2. Containment for fill

a. Dikes [] b. Seawall, etc. [] c. Other (please explain)

All slopes and disturbed areas to be stabilized with sod

3. Type of fill material to be used Fill suitable for roadway construction

4. Source of fill material to be used To be determined by contractor

ER Form 17-1.203(1) Effective November 30, 1982

Page 2 of 2

6-19

8. Date activity is proposed to commence July 1991 ; to be completed January 1994

9. Previous permits for this project have been (N/A) DER # _____ Corps # _____

A. Denied (date) _____

B. Issued (date) _____

C. Other (please explain) _____

Differentiate between existing work and proposed work on the drawings.

10. Remarks (See Instruction Pamphlet for additional information required for all applications and certain activities. Use additional sheets if necessary.)

See attached narrative

11. AFFIDAVIT OF OWNERSHIP OR CONTROL of the property on which the proposed project is to be undertaken

I CERTIFY THAT: (please check appropriate space)

[] I am the record owner, lessee, or record easement holder of the property described below.

[X] I am not the record owner, lessee, or record easement holder of the property described below, but I will have before undertaking the proposed work the requisite property interest. (Please explain what the interest will be and how it will be acquired.)

LEGAL DESCRIPTION OF PROPERTY SITUATED IN Lee COUNTY, FLORIDA
(Use additional sheets if necessary)

See Volume I, Figure 2-3; and Appendix 1.1.

Mr. George E. Reilly, P.E.
Administrative Director, DLCU

Signature

Sworn and subscribed before me at _____ County,

Florida, this 25th day of June, 1990.

NOTARY PUBLIC

My commission expires

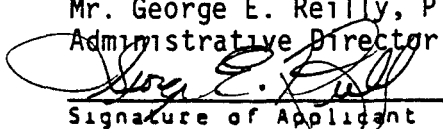
NOTARY PUBLIC STATE OF FLORIDA
COMMISSION NO. 1234567890, 31.3.1993,
BONDED THRU NOTARY PUBLIC UNDERWRITERS

12. Application is made for a permit(s) to authorize the activities described herein

- A. I authorize the agent listed in Item #2 to negotiate modifications or revisions, when necessary, and accept or assent to any stipulations on my behalf
- B. I understand I may have to provide any additional information/data that may be necessary to provide reasonable assurance or evidence to show that the proposed project will comply with the applicable State Water Quality Standards or other environmental standards both before construction and after the project is completed
- C. In addition, I agree to provide entry to the project site for inspectors with proper identification or documents as required by law from the environmental agencies for the purpose of making preliminary analyses of the site. Further, I agree to provide entry to the project site for such inspectors to monitor permitted work if a permit is granted
- D. Further, I hereby acknowledge the obligation and responsibility for obtaining all of the required state, federal or local permits before commencement of construction activities. I also understand that before commencement of this proposed project I must be granted separate permits or authorizations from the U.S. Corps of Engineers, the U.S. Coast Guard, the Department of Environmental Regulation, and the Department of Natural Resources, as necessary.

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 undertake the proposed activities.

Mr. George E. Reilly, P.E.
Administrative Director, DLCU


Signature of Applicant

6/25/90
Date

NOTE: THIS APPLICATION MUST BE SIGNED by the person who desires to undertake the proposed activity or by an authorized agent. If an agent is applying on behalf of the applicant, attach proof of authority for the agent to sign and bind the applicant.

18 U.S.C. Section 1001 provides that "Whoever in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than \$10,000 or imprisoned not more than five years, or both.

NOTICE TO PERMIT APPLICANTS

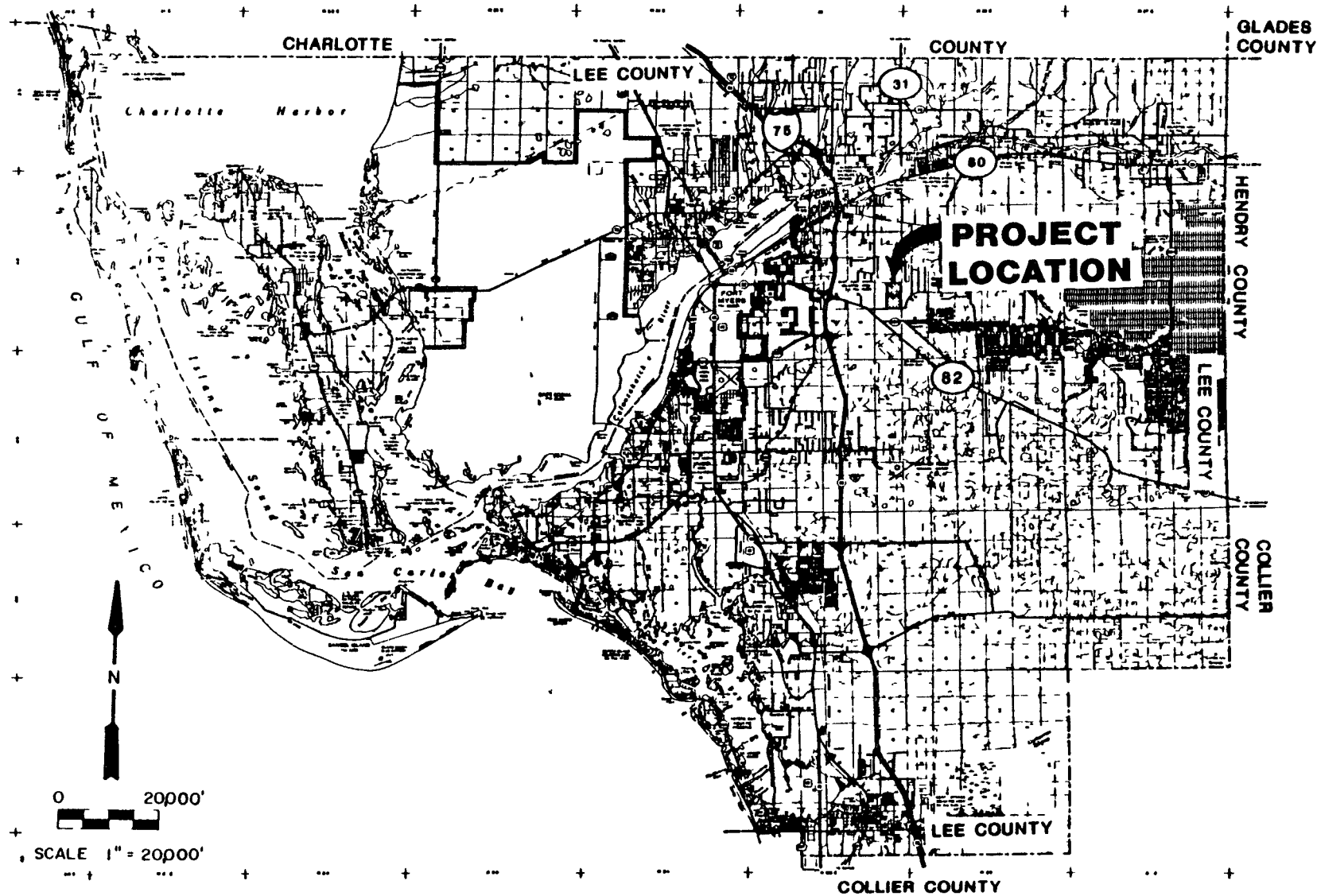
This is a Joint Application; it is NOT a Joint Permit!

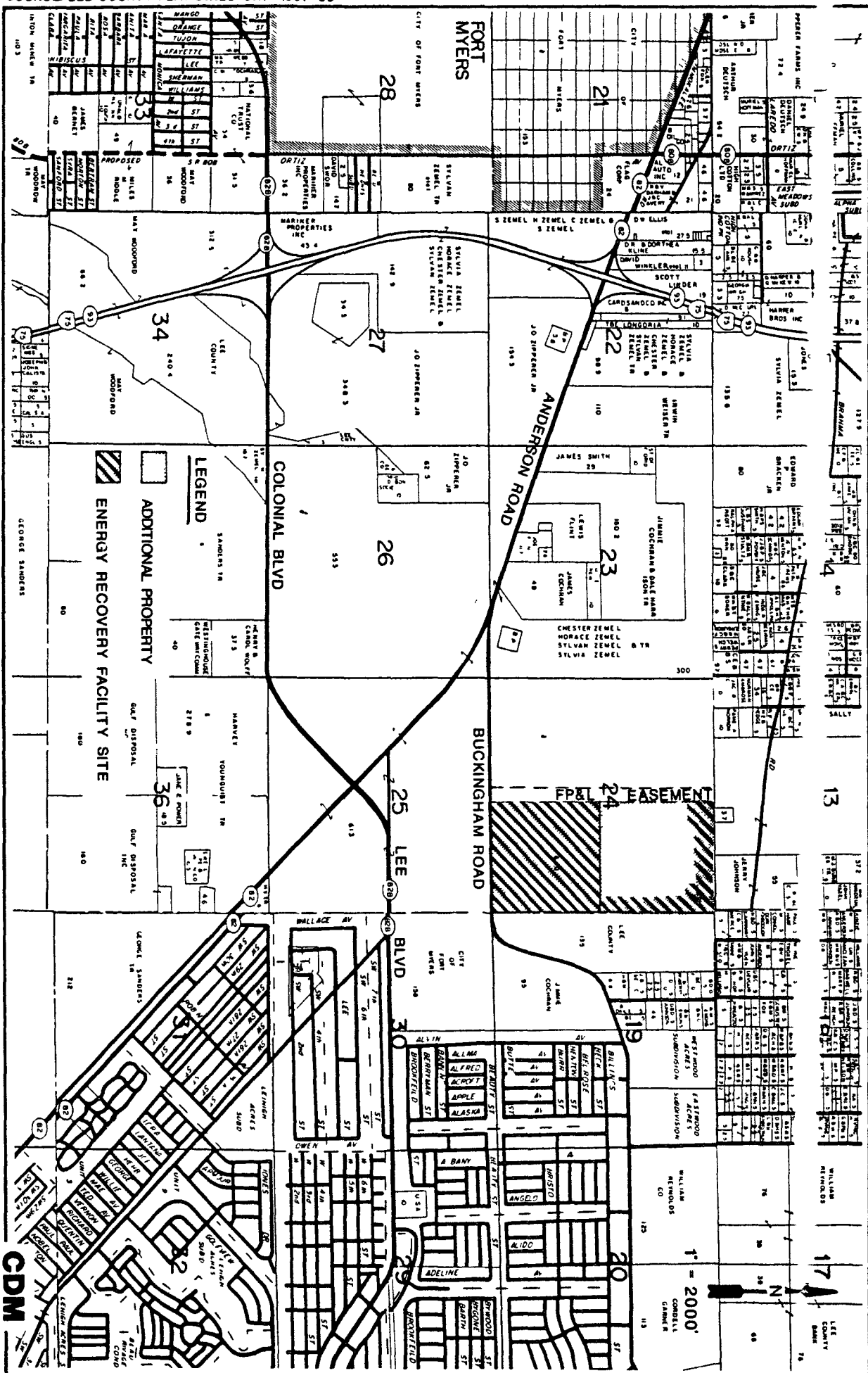
You Must Obtain All Required Local, State, and Federal

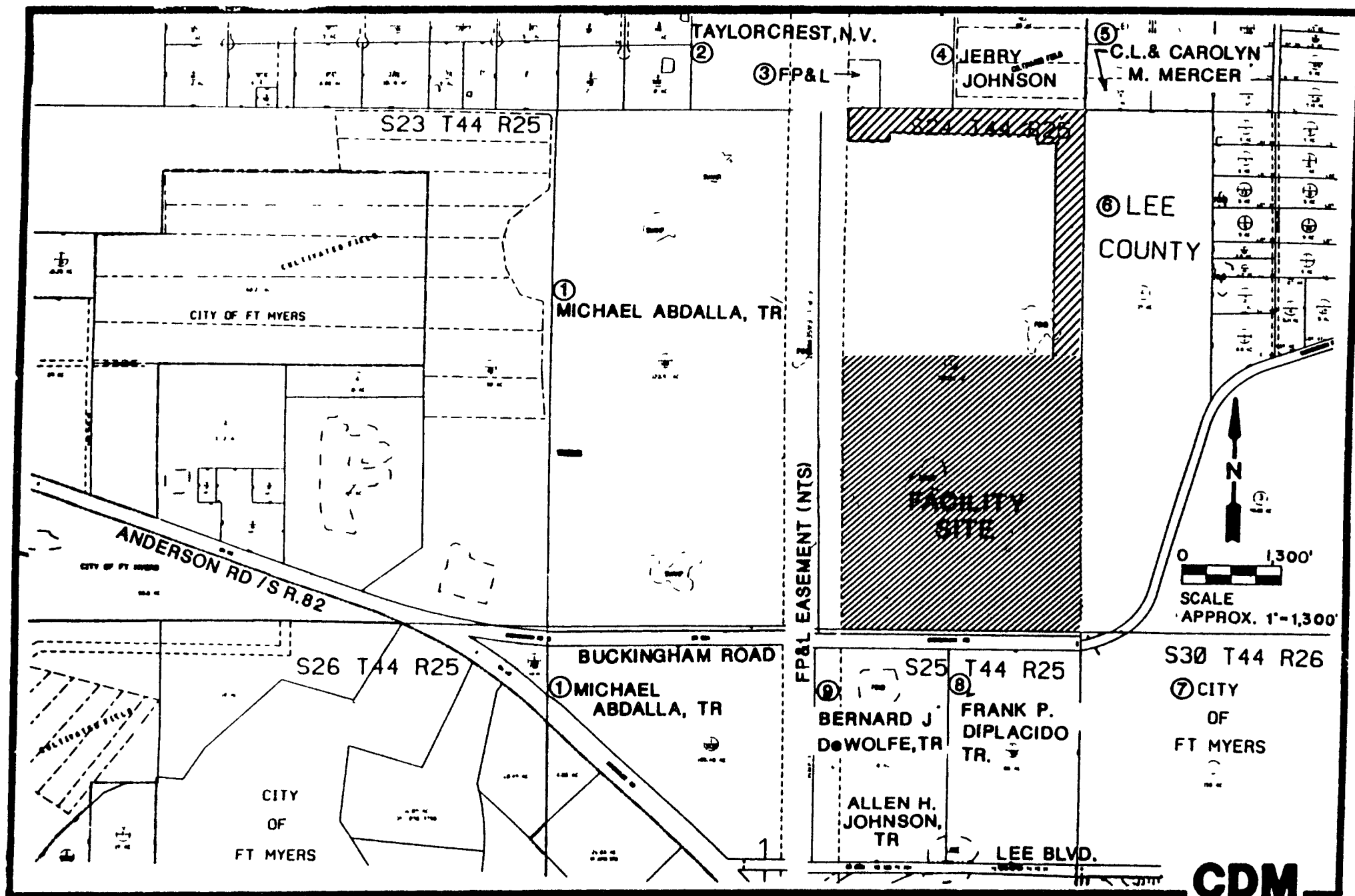
Authorizations or Permits Before Commencing Work!!

For your information. Section 370.034, Florida Statutes, requires that all dredge and fill equipment owned, used, leased, rented or operated in the state shall be registered with the Department of Natural Resources. Before selecting your contractor or equipment you may wish to determine if this requirement has been met. For further information, contact the Chief of the Bureau of Licenses and Motorboat Registration, Department of Natural Resources, 3900 Commonwealth Boulevard, Tallahassee, Florida 32303. Telephone Number 904/488-1195. THIS IS NOT A REQUIREMENT FOR A PERMIT FROM THE DEPARTMENT OF ENVIRONMENTAL REGULATION.

SOURCE MAP BASED ON LEE COUNTY DOT GENERAL HIGHWAY MAP JAN. 1976







ABUTTING PROPERTIES - LEE COUNTY ENERGY RECOVERY FACILITY

ATTACHMENT 4

ABUTTING PROPERTY OWNERS

The owners of property abutting the Facility site are as follows:

- 1) Michael Abdalla, Tr.
1009 Bal Isle Drive
Fort Myers, FL 33919
- 2) Taylorcrest, NV
Attn: Gloria Lerma
6508 NW 82nd Avenue
Miami, FL 33166
- 3) Florida Power & Light Company
Attn: W. H. Bonham - JLM
P.O. Box 14000
Juno Beach, FL 33408
- 4) Jerry Johnson
12810 River Road, SE
Fort Myers, FL 33905
- 5) C. L. & Carolyn M. Mercer
6970 Pangola Drive
Fort Myers, FL 33905
- 6) Lee County
- 7) City of Fort Myers
- 8) Frank P. DiPlacido, Tr.
R.Q. Richards, III, Tr.
P.O. Box 7243
Fort Myers, FL 33911
- 9) Bernard J. DeWolfe, Tr.
Allen H. Johnson, Tr.
6140 Winkler Road
Fort Myers, FL 33919

These properties are delineated on Figure 2-4 in Volume I.

FIGURE 2-26
VEGETATIONAL COMMUNITIES AND LAND USE

COVER TYPE SUMMARY			
COVER TYPE	HABITAT	ACRES	% OF TOTAL
210	FARM PASTURE	51.0	33.17
212	LOW PASTURE	1.3	0.8%
321	PALMETTO PRAIRIE	3.8	2.5%
3219	PALMETTO PRAIRIE INVADED BY EXOTICS	0.3	0.2%
411	PINE FLATWOODS	17.9	11.6%
4119	PINE FLATWOODS INVADED BY EXOTICS	2.6	1.7%
415	WET PINE FLATWOODS	4.7	3.0%
4159	WET PINE FLATWOODS INVADED BY EXOTICS	3.1	2.0%
422	BRAZILLIAN PEPPER	2.9	1.9%
425	MESIC OAK	0.7	0.5%
429	VAX-MYRTLE	40.1	26.0%
437	AUSTRALIAN PINE	0.8	0.5%
514	DRAINAGE CANAL	0.6	0.4%
621	CYPRESS	13.7	8.9%
624	CYPRESS/PINE	2.8	1.8%
6249	CYPRESS/PINE INVADED BY EXOTICS	3.2	2.1%
643	WET PRAIRIE	4.6	3.0%
TOTAL PROJECT ACREAGE		154.1	100%

Kevin L Erwin
Consulting Ecologist, Inc.

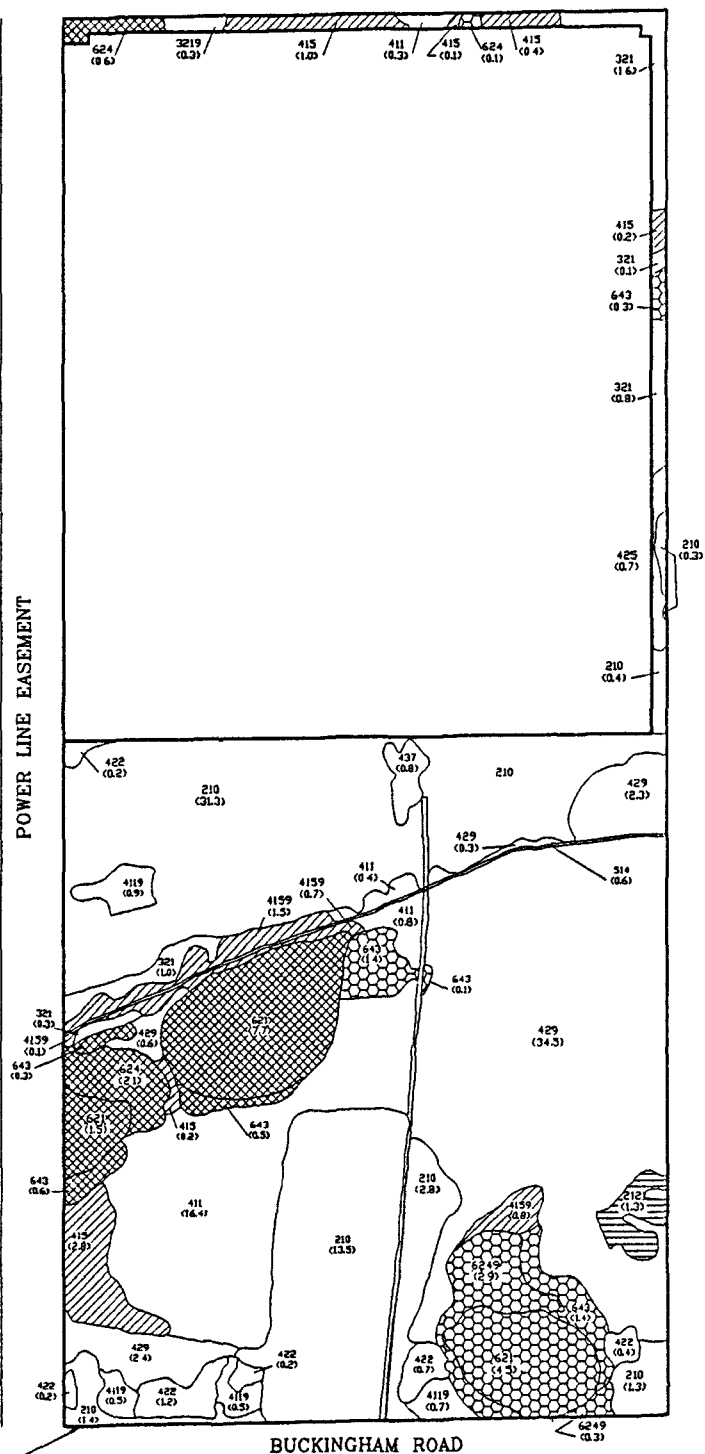
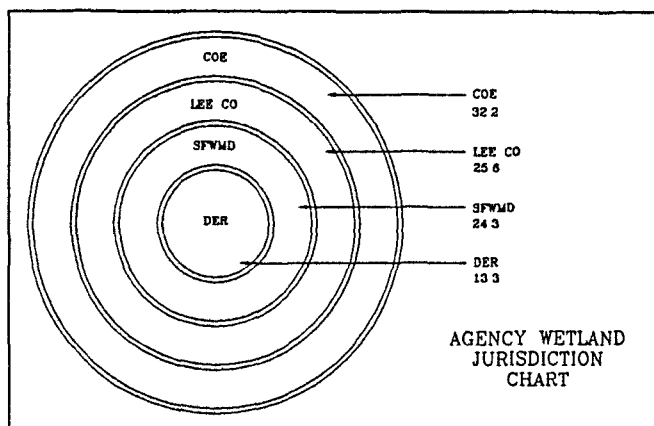
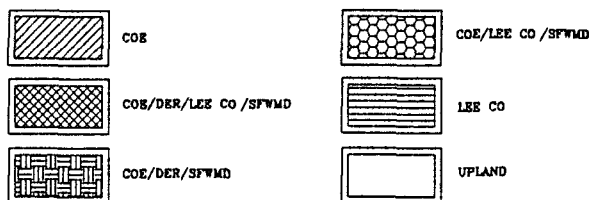
Client	Camp Dresser & McKee
Project	Lee County Energy Recovery Facility Site
Date	1/21/98
By	Kevin L Erwin
For	Lee County Energy Recovery Facility Site

SECTION 24 TWP 44S RANGE 25E

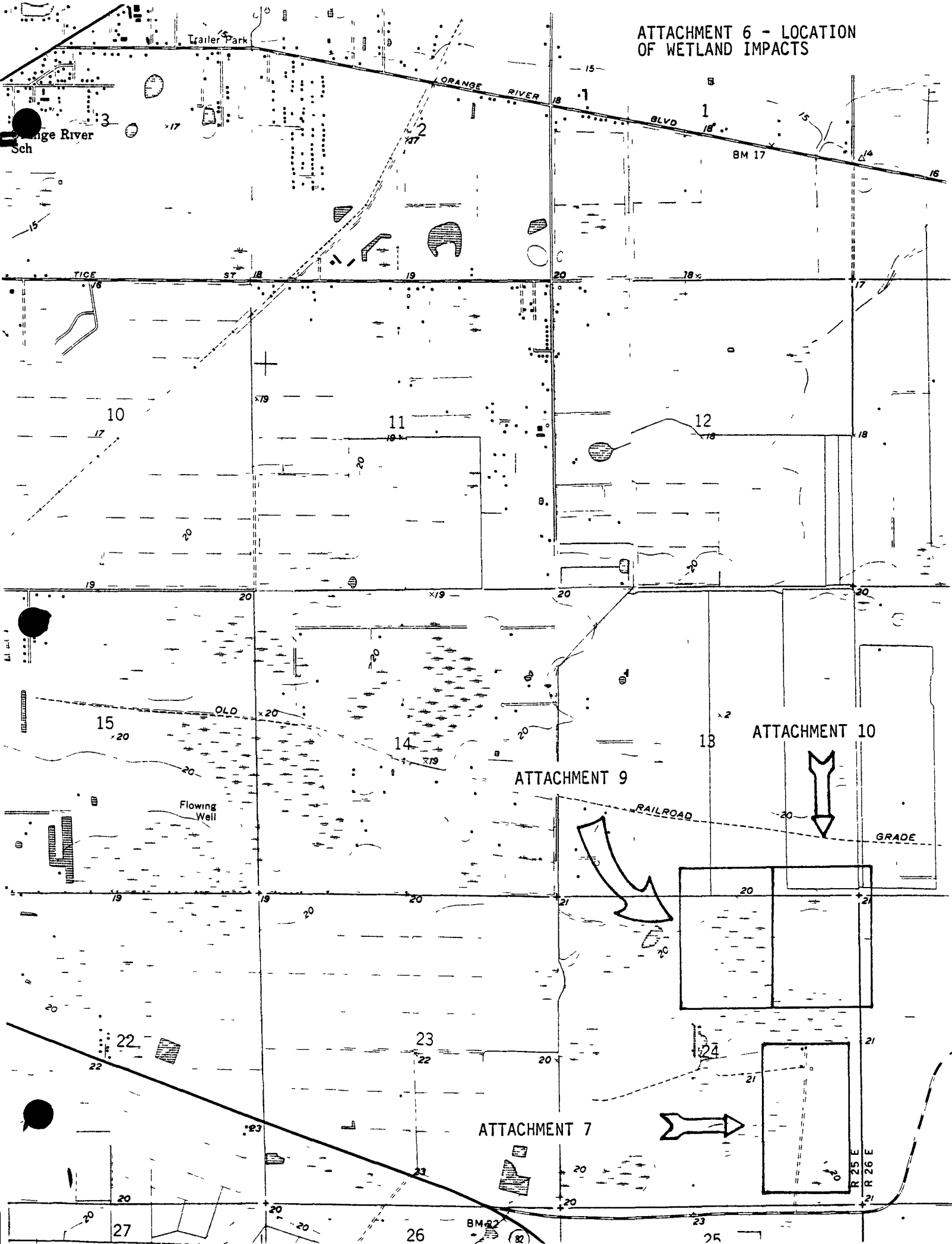
NOTE NOT BASED ON GROUND SURVEY OR
RECTIFIED AERIAL PHOTOGRAPH

WETLAND JURISDICTIONAL SUMMARY							
COVER TYPE	COE ACREAGE	%	SFWMD ACREAGE	%	LEE CO ACREAGE	%	DER ACREAGE
212	0.0	0.0%	0.0	0.0%	1.3	0.8%	0.0
415	4.7	3.0%	0.0	0.0%	0.0	0.0%	0.0
4159	2.6	2.0%	0.0	0.0%	0.0	0.0%	0.0
514	0.6	0.4%	0.0	0.0%	0.0	0.0%	0.0
621	13.7	8.9%	13.7	8.9%	13.7	8.9%	13.7
624	2.8	1.8%	2.8	1.8%	2.8	1.8%	2.8
6249	3.2	2.1%	3.2	2.1%	3.2	2.1%	3.2
643	4.6	3.0%	4.6	3.0%	4.6	3.0%	4.6
TOTAL	32.2	21.2%	24.3	15.8%	25.6	16.6%	13.3

LEGEND



ATTACHMENT 6 - LOCATION
OF WETLAND IMPACTS



(39.6)

429

N
SCALE 1" = 200'

59
3)

514
(0.60)

411

411
(1.3)

643
(1.4)

643
(0.1)

621
(7.7)

ASH
BLDG.

GRIZZLY

FUTURE

SCRUBBERS

REFUSE PIT

TIPPING FLOOR

TURBINE
BUILDING

ADMIN.
BLDG.

COOLING TOWER
ELECTRICAL
SWITCHYARD

PARKING AREA

643
(0.5)

STORMWATER RETENTION AREA

SCALE HOUSE
INBOUND SCALES

OUTBOUND SCALE

210
(2.2)

210
(13.7)

ATTACHMENT 7 - Fill Associated
with facility access road

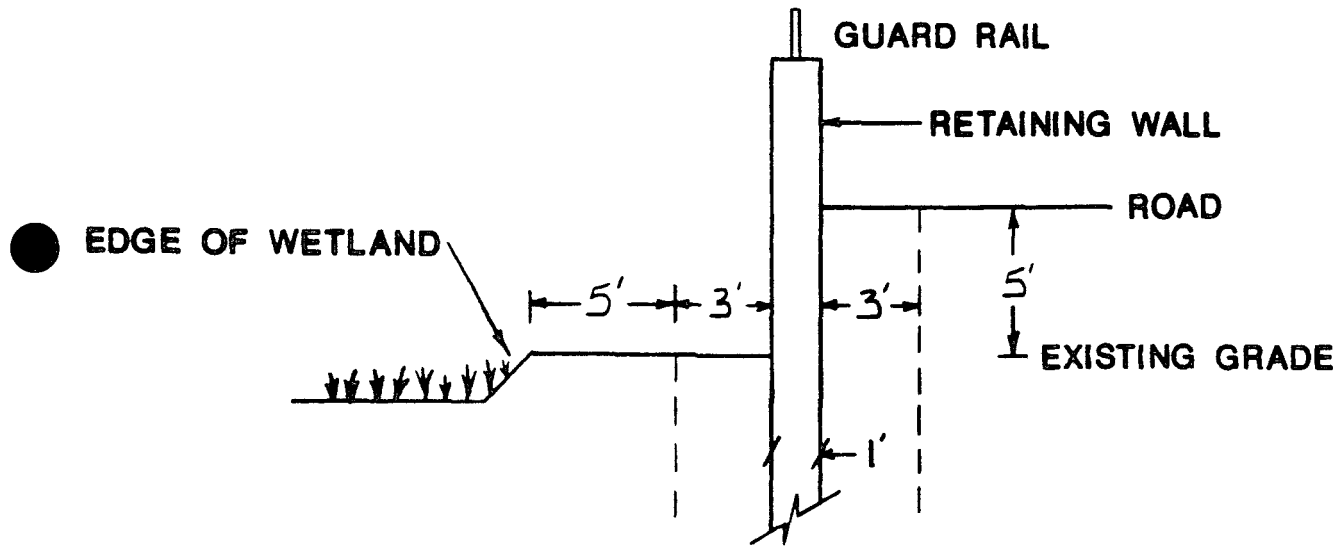
6249
(3.5)

643
(1.4)

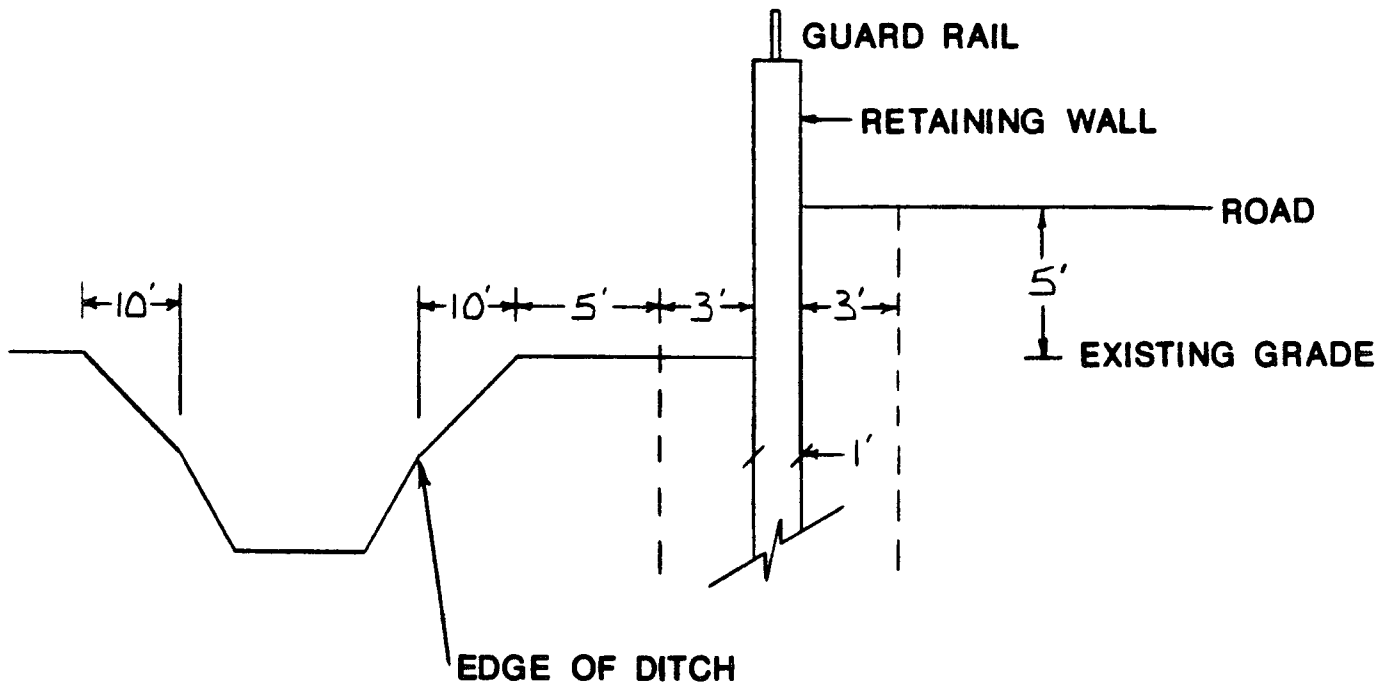
621

422

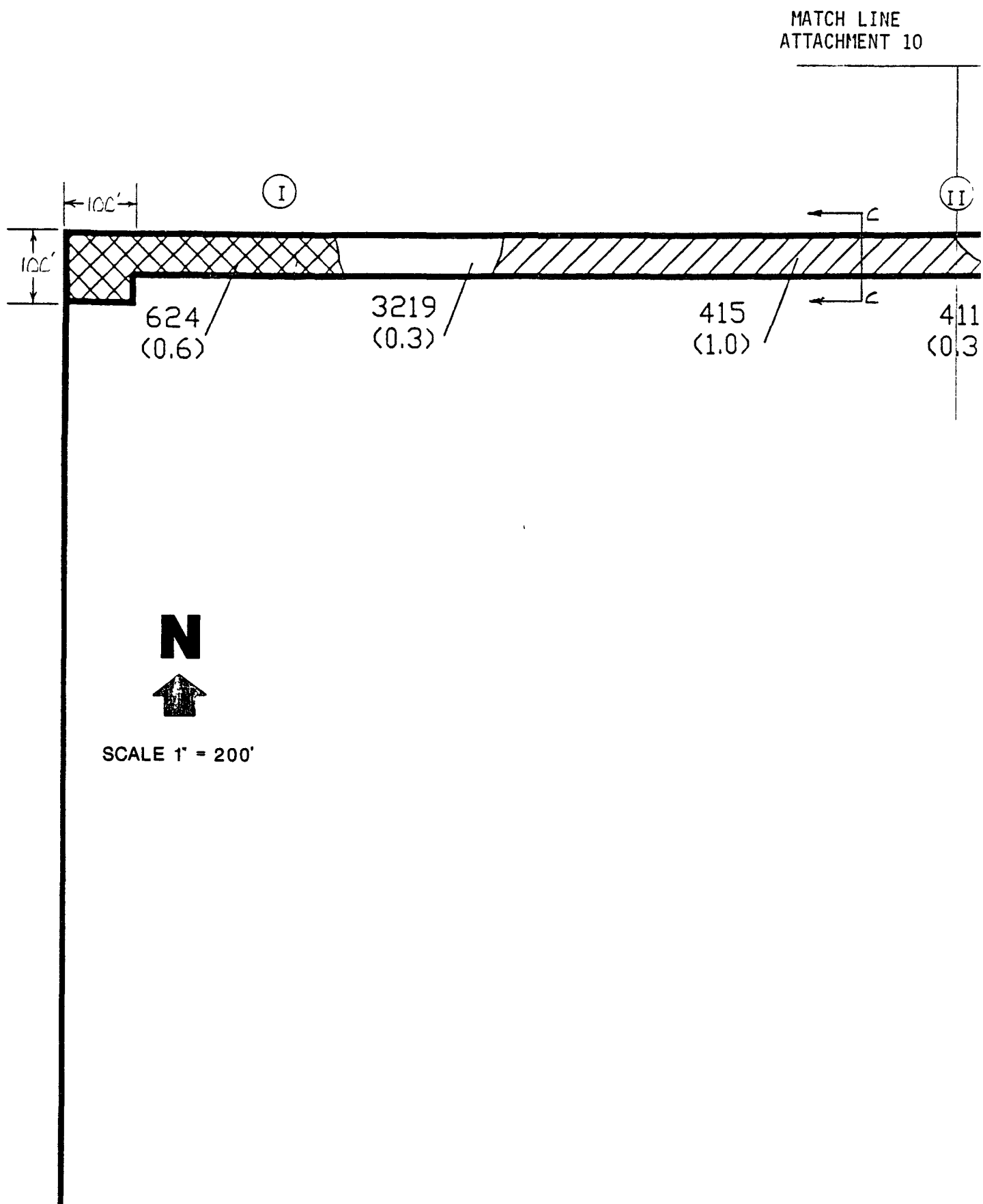
DETAIL A-A



DETAIL B-B



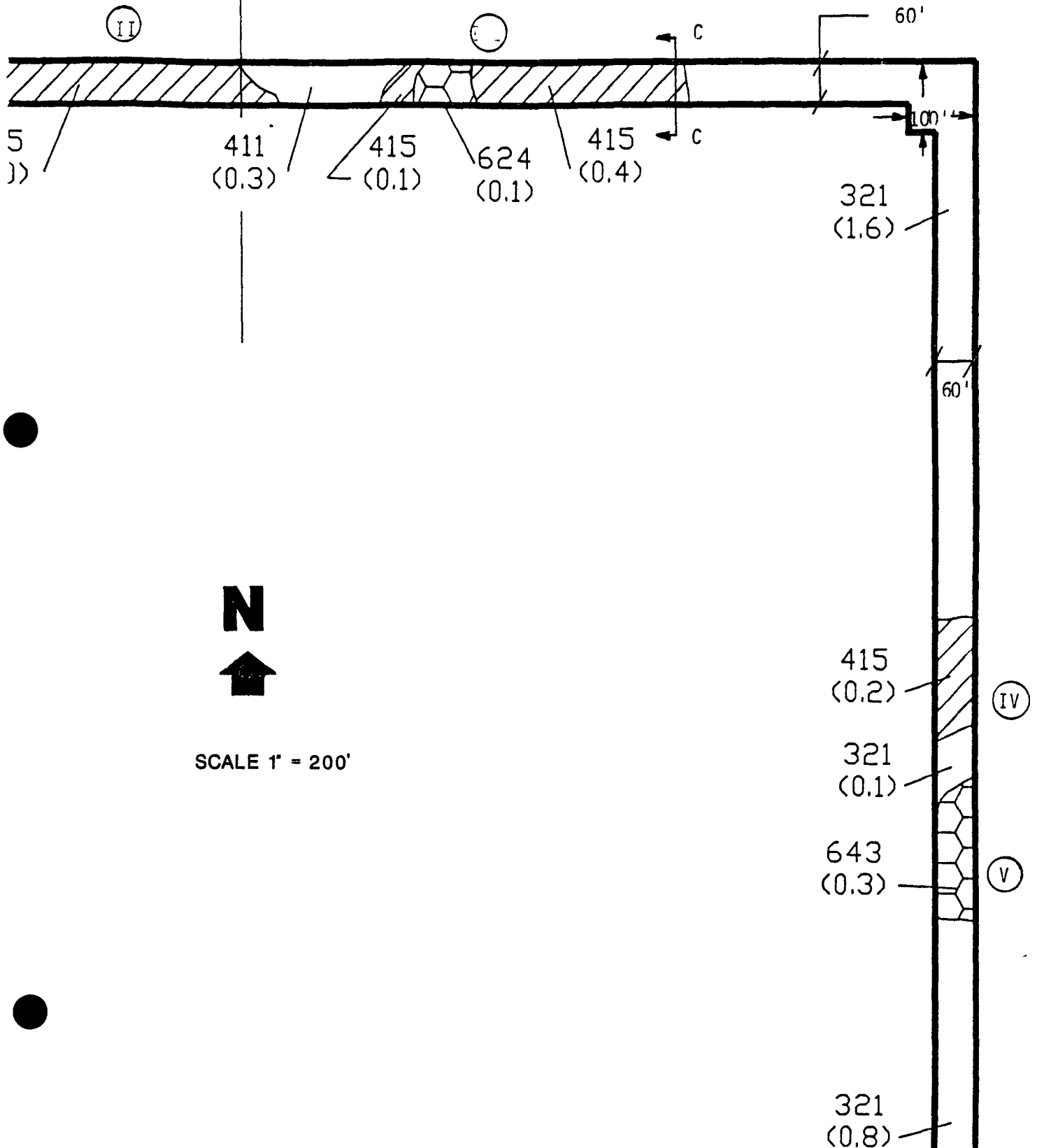
ATTACHMENT 9 - Fill Associated with Power Transmission Route



ATTACHMENT 10 - Fill Associated with Power Transmission Route

Construct power lines within 60-ft corridor along existing, unimproved road (not shown). Road to be improved and stabilized but not paved as per Attachment 12.

MATCH LINE
ATTACHMENT 9



ATTACHMENT 11

Impacts Associated with Alternative Power Transmission Route

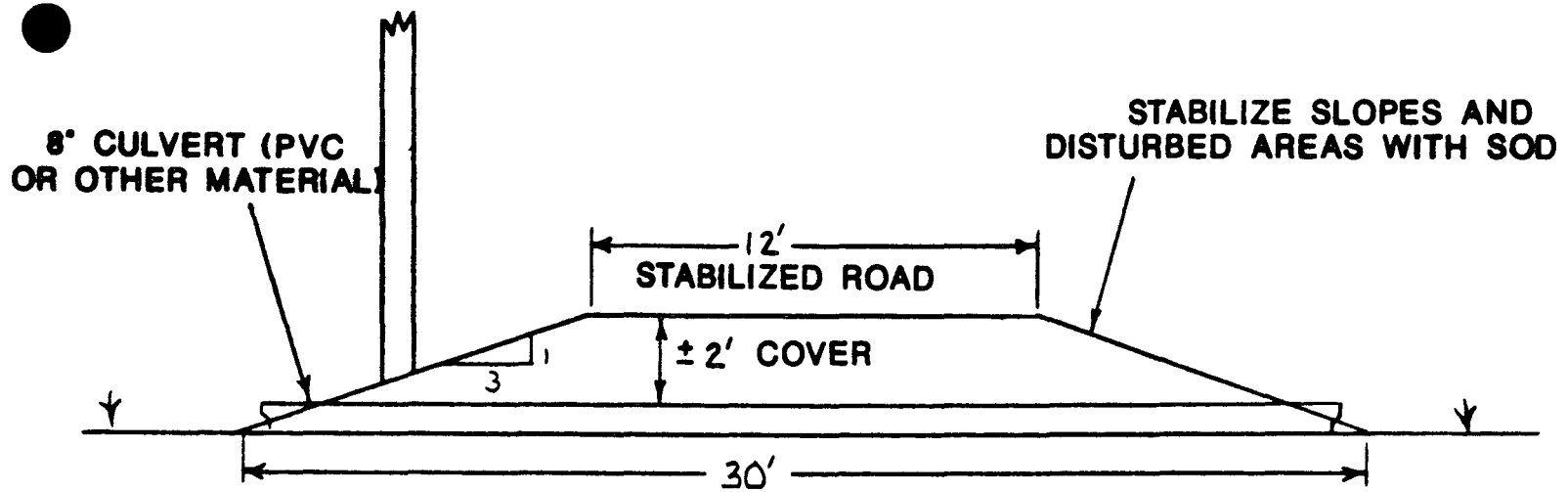
<u>Area</u>	<u>Wetland Type</u>	<u>Jurisdiction</u>	<u>Approx. Acres Filled</u>
I	Cypress/Pine	COE/FDER/LEE CO./ SFWMD	0.6
II	Wet Pine Flatwoods	COE	1.0
III	Wet Pine Flatwoods; Cypress/Pine	COE/LEE CO./SFWMD	0.6
IV	Wet Pine Flatwoods	COE	0.2
V	Wet Prairie	COE/LEE CO./SFWMD	0.3

TOTAL			2.7
TOTAL FROM OTHER AREAS			0.0

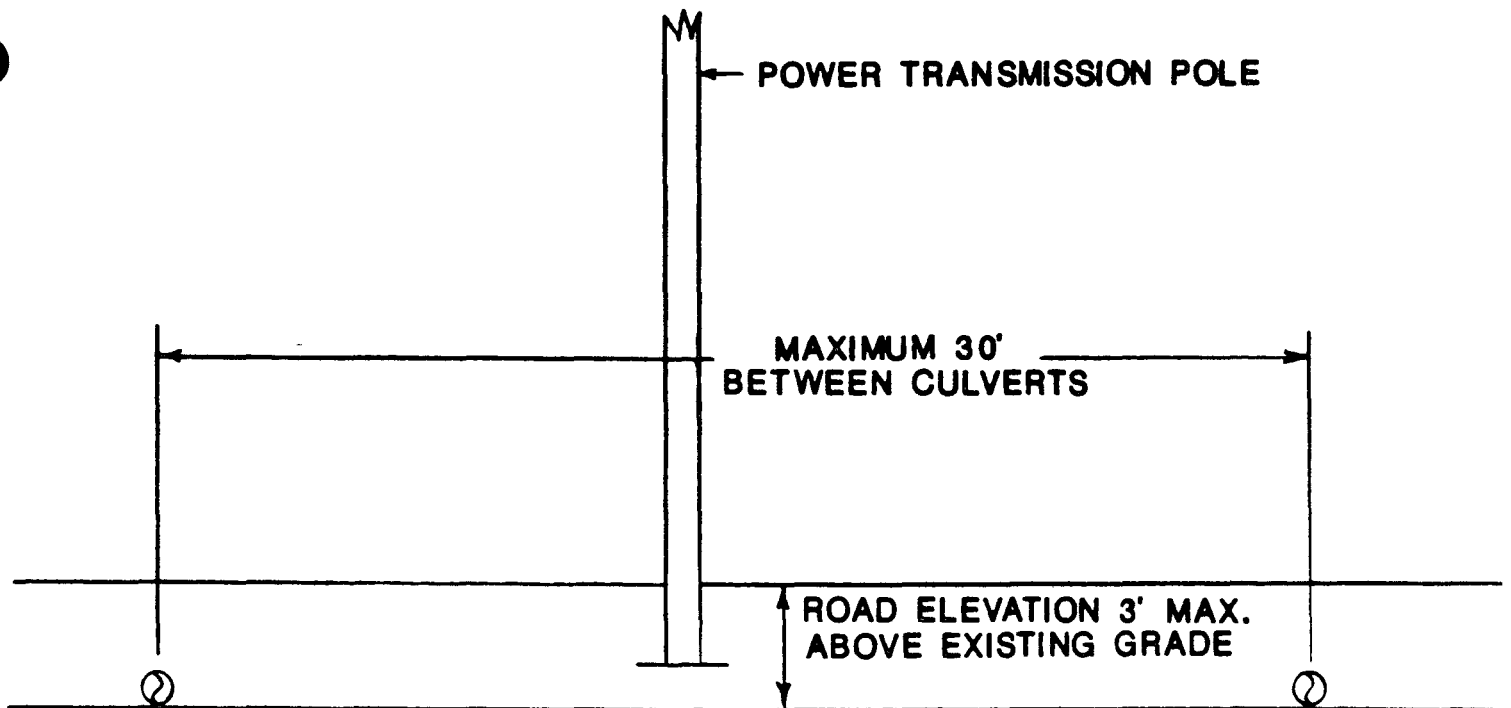
GRAND TOTAL: MAXIMUM POTENTIAL IMPACTS			2.7

COE = U.S. Army Corps of Engineers
 FDER = Florida Department of Environmental Regulation
 LEE CO. = Lee County Division of Environmental Services
 SFWMD = South Florida Water Management District

ATTACHMENT 12
DETAIL OF FILL ASSOCIATED WITH POWER TRANSMISSION ROUTE



SECTION C-C (TYPICAL)



SECTION D-D (TYPICAL)

6.6 COASTAL ZONE MANAGEMENT COORDINATION

APPENDIX 6.6
COASTAL ZONE MANAGEMENT COORDINATION

According to the Florida Coastal Management Program (FCMP) Federal Consistency Evaluation Procedures (15 CFR 930.50), all federal permits for which there are no analogous state permits require certification of compliance with the FCMP.

The only federal permit applicable to the proposed project for which no analogous state permit exists is the U.S. Department of Transportation Federal Aviation Administration (FAA) stack height permit (ss.14 CFR 77). In accordance with the requirements of the Federal Consistency Evaluation Procedures, the permit application must be accompanied by a consistency certification.

As a result of the power plant siting act permit application review, consistency with the Coastal Zone Management Program will be determined. Review by the Florida State Planning and Development Clearinghouse will be performed if deemed necessary by the FAA.



environmental engineers scientists
planners & management consultants

CAMP DRESSER & MCKEE INC

1620 Medical Lane Suite 221
Ft Myers Florida 33907
813 939-3775

Via Facsimile

May 29, 1990

Mr. David Worley
Department of Environmental Regulation
Office of Coastal Zone Management
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: Lee County Energy Recovery Facility
CDM PN: 6685-38-PT-PRMF

Dear Mr. Worley:

Pursuant to our telephone conversation on May 29, 1990, a 5-mile radius location map indicating the Energy Recovery Facility Project for Lee County is enclosed for your review. As we discussed on the phone, please indicate if the location is within the coastal zone. Please forward a copy of this letter to Mr. Ted Hoehn, Federal Consistency Coordinator.

The Energy Recovery Program (Waste-to-Energy Plant) is part of Lee County's Solid Waste Master Plan. Camp Dresser & McKee Inc. is the County's engineering consultant and we are currently in the process of completing the required power plant siting permit application.

CDM is preparing to submit for review a draft permit application to Lee County on June 1, 1990. Your timely response will be greatly appreciated. The information can be faxed to me at (813) 939-3173. Please call me or Carmen Bourgeois at 813-939-3775 if you have any questions.

Very truly yours,

CAMP DRESSER & MCKEE INC.

Deborah Chaiton

DC:lp
LCL2/35

Enclosure

cc: M. Ihnat
C. Bourgeois

Section 7

SECTION 7.0
STATE PERMIT APPLICATIONS
AND
APPROVALS

7.1 LANDFILL PERMIT APPLICATION FORM

APPENDIX 7.1

LANDFILL PERMIT APPLICATION

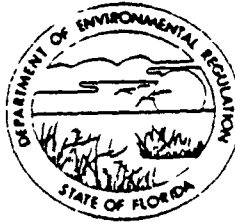
The permit application package for the Lee/Hendry County Sanitary Landfill/Ashfill is currently being prepared. It is anticipated that the permit application will be submitted to the Florida Department of Environmental Regulation (FDER) in July 1990. The draft landfill application form is provided herein.

IMAGE QUALITY

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

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTH FLORIDA DISTRICT
2269 BAY STREET
FORT MYERS, FLORIDA 33901-2896
(813) 332 2667



BOB MARTINEZ
GOVERNOR
DALE TWACHTMANN
SECRETARY
PHILIP R. EDWARDS
DISTRICT MANAGER

APPLICATION FOR PERMIT TO
CONSTRUCT ☒
OPERATE ☒

A SOLID WASTE RESOURCE RECOVERY AND MANAGEMENT FACILITY

GENERAL REQUIREMENTS

Solid Waste Resource Recovery and Management Facilities shall be permitted pursuant to Section 403.707, Florida Statutes, and in accordance with Florida Administrative Code Rule 17-7. A minimum of six copies of the application shall be submitted to the Department District Office having jurisdiction over the facility. Complete appropriate sections for the type of facility for which application is made. Entries should be typed or printed in ink. All blanks should be filled in or marked not applicable. The application shall include all information, drawings, and reports necessary to evaluate the facility. Information required to support the application is listed on the attached pages of this form.

Facility Type: Existing ☐ Proposed ☒

Sanitary Landfill: ☒ Class I, : MSW/ASH ☐ Class II, ☒ Class III: Trash/yard Trash (C&D) ☐ Class III: Yard Trash Composting	Volume Reduction: ☐ Composting ☐ Shredder ☐ Incinerator/Trench Burner ☐ Resource Recovery ☐ Energy ☐ Materials	Sludge Landspreading: ☐ Grade I ☐ Grade II ☐ Grade III ☐ Septage/Food Service
---	--	--

FACILITY NAME Lee County Landfill/Ashfill / DER ID Number _____

FACILITY LOCATION (main entrance) Church Road (Hendry County)

S 4, 9 & 16, T 45S, R 28E / Latitude 26 ° 35 ' 00 " Longitude 81 ° 31 ' 15 "

Applicant Name (operating authority): Lee County Department of Utilities

Street Address & P. O. Box: 2178 McGregor Boulevard Fort Myers, Fla. 33907

City County Zip

Contact Person: George E. Reilly Administrative Director (813) 335-2276

Name Phone Number

Authorized Agent/Consultant Camp Dresser & McKee, Inc. (813) 939-3775

Name Phone Number

Contact Person Mike Ihnat 1620 Medical Lane #221 (813) 939-3775

Name Street P. O. Box Phone Number

Fort Myers Lee Florida 33907

City County State Zip

Landowner (if different than applicant) Lee County Board of County Commissioners

Address of Landowner P.O. Box 298 Fort Myers Florida 33901

Street, P. O. Box City State Zip

Cities, towns and Areas to be Served Unincorporated Areas and municipalities of
Lee and Hendry County

Current and Projected Population to Served: 427,500 (1990) 934,400 (2020)

Acres within Waste Site Boundary: 400 Acres within Property Boundary: 1,719

Volume of Solid Waste to be received: * see below cu. yds/day tons/day gallons/day

Date Site Ready to Received Solid Waste: October 1991 Estimated Life of Facility 40 years

Estimated Cost of Construction, Total: \$ Estimated cost of Closing: \$

Anticipated Construction Starting and Completion Dates
From: October 1990 To: October 1991

* Refuse 1600 ton/day before Resource Recovery starts up
 350 ton/day after Resource Recovery starts up

Ash 202 ton/day

Construction and demolition Waste Class III
 13 ton/day

REQUIRED ATTACHEMENTS FOR CONSTRUCTION/OPERATION PERMIT
FOR A RESOURCE RECOVERY AND MANAGEMENT FACILITY

GENERAL

Permit application and supporting information shall include the following (17-7.030(2), F.A.C.).

- | | <u>Completeness Check</u> |
|---|---------------------------|
| 1. A letter of transmittal to the Department; (17-7.030(3)(a) F.A.C.) | — |
| 2. A table of contents listing the main sections of the application: (17-7.030(3)(b), F.A.C.) | — |
| 3. The permit fee specified in Florida Administrative Code Rule 17-4.05 in check or money order payable to the Department. (17-7.030(3)(c), F.A.C.) | — |
| 4. Six copies, at minimum, of the completed application form, all supporting data, and reports; (17-7.030(2), F.A.C.) | — |
| 5. Engineer seal; (17-7.030(2)(d), F.A.C.) | — |
| 6. Engineer's letter of appointment if applicable; (17-7.030(3)(e), F.A.C.) | — |
| 7. Copy of any lease agreement, transfer of property agreement with right of entry for long-term care, or any other agreement between operator and property owner by which the closing and long-term care of the facility may be affected; (17-7.030(3)(h)) | — |
| 8. Proof of publication of notice of application for the proposed activity in a newspaper of general circulation; (17-7.03(4), F.A.C.) | — |

SPECIFICATION ATTACHMENT ITEMS

The following information items must be included in the application or an explanation given if they are not applicable.

Construction Permits:

- A. Landfills - Submit items 1, 2, 3, 4, 5, 6, 7, 8, 10.
- B. Volume Reduction - Submit items 1, 2, 3, 4, 5, 6, 7, 9, 10.
- C. Sludge Landspreading - Submit items 2, 3, 4, 5, 6, 8, 10.

Operation Permits:

- A. Landfills - All the items above.
- B. Volume Reduction - All the items above.
- C. Sludge Landspreading - All the items above.

NOTE: For facilities that have been satisfactorily constructed in accordance with their construction permit the information required for A, B, and C type facilities does not have to be resubmitted for an operation permit if the information has not changed during the construction period.

- | | |
|---|---|
| 1. A foundation analysis (17-7.050(2)(b), F.A.C.) | — |
| 2. Evidence that the facility is in conformance with local zoning (17-7.050(2)(c)4, F.A.C.) | — |
| 3. <u>Facility Design</u> (17-7.050(3), F.A.C.): | |

NOTE: All maps, plan sheets, drawings, isometrics, cross-sections, or aerial photographs shall be legible, be signed and sealed by the registered professional engineer responsible for their preparation; be of appropriate scale to show clearly all required details, be numbered, referenced to narrative, titled, have a legend of symbols used, contain horizontal and vertical scales (where applicable), and specify drafting or origination dates; and use uniform scales as much as possible, contain a north arrow, and use NGVD for all elevations.

Completeness Check

a. A map or aerial photograph of the area, no more than 1 year old, showing land use and zoning within 1 mile of the facility. (17-7.050(3)(a), F.A.C.)

b. Plot Plan (17-7.050(3)(b), F.A.C.)

NOTE: The plot plan on a scale not greater than 200 feet to the inch showing the following:

- (1) Dimensions and Legal Description of the site
- (2) Location and depth (NGVD) of soil borings
- (3) Plan for trenching or disposal areas
- (4) Fencing or other measures to restrict access
- (5) Cross sections showing both original and proposed fill elevations
- (6) Location, depth, and construction details of monitoring wells

c. Topographic Maps (17-7.050(3)(c), F.A.C.)

NOTE: The topographic maps, which may be combined with the plot plan (item 4b), on a scale not greater than 200 feet to the inch showing the following:

- (1) Five foot contour intervals
- (2) Proposed fill areas
- (3) Borrow areas
- (4) Access roads
- (5) Grades required for proper drainage
- (6) Typical cross sections of disposal site including lifts, borrow areas and drainage controls
- (7) Special drainage devices
- (8) Fencing
- (9) Equipment facilities
- (10) Other pertinent information based on intended use of facility

d. Report (17-7.050(3)(d), F.A.C.)

- (1) Estimated population and area served by the proposed site with basis for the estimate
- (2) Anticipated type, annual quantity, and source of solid waste
- (3) Anticipated life of site
- (4) Source and characteristics of cover material

e. Ground Water Monitoring Plan (17-7.050(3)(e), F.A.C.)

- (1) Plan and hydrogeological survey, including foundation analysis, in accordance with 17-4.245(6), 17-7.030, and 17-7.050 F.A.C.; or
- (2) A copy of a Department letter of approval of a previously submitted plan, if applicable.

Completeness Check

4. Landfill Performance and Design Standards (17-7.050(4), F.A.C.)

a. Liner performance (17-7.050(4)(a)(b), F.A.C.)

- (1) Material type (soil, synthetic, other)
- (2) Adequate base support
- (3) Planned installation adequate to cover all surrounding earth
- (4) Equivalency to design standards

b. Liner quality control plan (17-7.050(4)(c), F.A.C.)

- (1) Specifications
- (2) Construction/installation methods
- (3) Sampling and testing
- (4) Manufacturer's specifications and recommendations

c. Leachate control and removal system performance (17-7.050(4)(e), F.A.C.)

- (1) Construction materials
- (2) Strength and thickness
- (3) Measures to prevent clogging
- (4) Central collection point for treatment and disposal
- (5) Leachate depth not to exceed one foot
- (6) Equivalency to design standards

d. Surface water management system performance (17-7.050(4)(g), F.A.C.)

- (1) Prevention of surface water flow onto waste-filled areas
- (2) Stormwater run-off controls; retention, detention ponds
- (3) Equivalency to design standards
- (4) Water management district approval

e. Gas control system performance (17-7.050(4)(i), F.A.C.)

- (1) Prevention of methane migration
- (2) Prevention of damage to vegetation
- (3) Prevention of objectionable odors off site
- (4) Equivalency to design standards

5. Operations Plan (17-7.050(5)(b),(c)(d) & (e), F.A.C.)

- a. Designation of responsible person(s)
- b. Contingency operations
- c. Controlling the type of waste received at the site:

Completeness Check

- d. Weighing or measuring incoming waste _____
- e. Vehicle traffic control and unloading _____
- f. Method and sequence of filling waste _____
- g. Waste compaction and application of cover _____
- h. Operations of gas, leachate, and storm water controls _____
- i. Ground water monitoring _____
- j. All weather access roads _____
- k. Effective barrier _____
- l. Signs indicating name of operating authority, traffic flow, hours of operation, and charges for disposal (if any) _____
- m. Dust control methods _____
- n. Litter control devices _____
- o. Fire protection and fire fighting facilities _____
- p. Attendant _____
- q. Communication facilities _____
- r. Adequate in-service and reserve equipment _____
- s. Safety devices on equipment to shield and protect operators _____
- 6. Water Quality Standards (17-7.050(5)(g) & (h), F.A.C.) _____
Describe how surface runoff and leachate will be handled to meet water quality standards of Florida Administrative Code Rules 17-3 and 17-4. _____
- 7. Closure (17-7.070(2), F.A.C.)
 - a. Closure plan (17-7.073, F.A.C.)
 - (1) Design _____
 - (2) Final use _____
 - (3) Closure operations _____
 - (4) Post-closure (17-7.075, F.A.C.) _____
 - (5) Financial responsibility(17-7.071, F.A.C.) _____
 - b. Closure plan schedule (17-7.071, F.A.C.) _____
- 8. Solid Waste Disposal Facility Data Form _____
- 9. Solid Waste-Volume Reduction and Resource Recovery Facility Data Form _____
- 10. Certification by Applicant and Engineer or Public Officer _____

SOLID WASTE DISPOSAL FACILITY DATA FORM

Date Form Completed: May 10, 1990

Permit No.: _____ Issue Date: _____ Expires: _____

DER ACTION:	☐ Add	☐ Delete	☐ Change	☐ Deactivate Site
-------------	------------------------------	---------------------------------	---------------------------------	--

1. DER IDENTIFICATION NUMBER		2. SITE NAME Lee County Landfill/Ashfill	
3. COUNTY Hendry		4. FACILITY ADDRESS (Road, cross road, street) Church Road (Hendry County)	
4a. Facility Phone Number: N/A		4b. Facility Site Supervisor	
5a. <u>26° 35' 00"</u> <u>81° 31' 15"</u> Latitude Longitude		5b. <u>45S</u> <u>28E</u> <u>4, 9, & 16</u> Township Range Section	
6. Operating Authority Name Lee County		8. Operating Authority Address 2178 McGregor Boulevard Fort Myers, Florida 33907	
7. Phone Number (813) 335-2276			
9. Owner of Site Property (if different from operator) Lee County		11. Address of Owner 2178 McGregor Boulevard Fort Myers, Florida 33907	
10. Phone Number of Owner (813) 335-2276			
12. Facility Type - ☒ Class I, Sanitary Landfill/Ashfill ☐ Class II, Sanitary Landfill ☒ Class III, Trash/Yard Trash LC & D ☐ Class III Yard trash comp.			
Sludge Landspreading: ☐ Grade I ☐ Grade II ☐ Grade III ☐ Septage Type ☐ Other Facility			
13. Month Year Begun October 1991	14. Disposal Area 400 Acres	15. Population Served 427,500 (1990)	
16. Expected Useful Lifetime 40 Years	17. Weighing Scales ☒ Yes ☐ No	18. Security to Prevent Unauthorized Used ☒ Yes ☐ No	
19. Depth of Water Table Ft. (NGVD)	20. Quantity of Waste/Day 1600 tons or Yd	21. Charge \$unknown yd/ton	
22. Surrounding Land Use Zoning ☐ Residential ☐ None ☒ Agricultural ☐ Commercial ☐ Industrial ☐ Other			
23. Types of Waste Received ☒ Residential ☒ Agricultural ☒ Yard Trash/Trash ☒ Other: _____ ☒ Commercial ☐ Septic Tank ☐ Sewage Sludge ☒ Incinerator Residue ☒ Industrial ☐ Industrial Sludge ☐ Construction/ ☐ Pathological/Infectious ☐ Water/Air Treat Sludge ☐ Hospital ☐ Demolition			
24. Number of Monitoring Wells 140 observation wells 18 pizometer		25. Number of Surface Monitoring Points 2	
26. Gas Control / Recovery ☒ Yes ☐ No / ☐ Yes ☐ No		27. Salvaging Permitted ☐ Yes ☒ No	
		28. Attendant ☒ Yes ☐ No	

29. Leachate Control Method - Liner Type: ☐ Natural ☐ Emplaced Clay ☐ Synthetic ☒ None ☐ Other		
Collection Method: ☐ Well Point ☐ Perimeter Ditch ☐ None ☐ Under Site Drains ☒ Other		
Treatment Method: ☐ Oxidation ☒ Recirculated ☐ Chemical ☐ Advanced ☐ None ☒ Other To be determined		
30. Leachate Discharge ☐ Yes ☒ No	Class of Receiving Water	
31. Site Located in ☐ Floodplain ☐ Wetlands ☒ Other: Uplands 80%		
32. Surface Runoff Collected ☒ Yes ☐ No	Type of Runoff Treatment Retention/Detention Ponds	Class of Receiving Waters Class III
33. Property Recorded as a Solid waste Disposal Site in County Land Records ☐ Yes ☒ No		
34. Days of Operation 7	Days of Cover as required	Hours of Operation 7AM-5PM
35. Name, Title and Phone Number of Person Completing Form Abdul R. Mula Saleh, P.E. (813) 221-2833		

NOTE: All blanks must be filled or marked as not applicable.

Facility No (DER Identification) _____

32. Name and Title of Person Completing Form

7-10

CERTIFICATION BY APPLICANT AND ENGINEER OR PUBLIC OFFICER

A. Applicant

The undersigned applicant or authorized representative of Lee County is aware that statements made in this form and attached information are an application for a Construction and operation of Class I Sanitary Landfill Permit from the Florida Department of Environmental Regulation and certifies that the information in this application is true, correct and complete to the best of his knowledge and belief. Further, the undersigned agrees to comply with the provisions of Chapter 403, Florida Statutes, and all rules and regulations of the Department. It is understood that the Permit is not transferable, and, the Department will be notified prior to the sale or legal transfer of the permitted facility.

Signature of Applicant or Agent
George Reilly, Lee Cty. Public Work Director
Name and Title
Date: _____

Attach letter of authorization if agent is not a governmental official, owner, or corporate officer.

B. Professional Engineer Registered in Florida or Public Officer as Required in Section 403.707 and 403.7075, Florida Statutes

This is to certify that the engineering features of this resource recovery and management facility have been designed/examined by me and found to conform to engineering principals applicable to such facilities. In my professional judgement, this facility, when properly maintained and operated, will comply with all applicable statutes of the State of Florida and rules of the Department. It is agreed that the undersigned will provide the applicant with a set of instructions of proper maintenance and operation of the facility.

Signature
Abdul R. Mulla Saleh, P.E.
Name and Title (please type)
38403
Florida Registration Number
(please affix seal)

Camp Dresser & McKee, Inc.
Mailing Address
1620 Medical Lane #221, Ft. Myers, Fl.
City, State, Zip Code
(813) 939-3775
Telephone Number
Date: _____

Construction Cost Estimate: _____

Permit Number: _____

Issue Date: _____

Review Date: _____

Expiration Date: _____

**7.2 SFWMD WATER USE
PERMIT APPLICATION
FOR EMERGENCY SUPPLY
GROUNDWATER WELLS**

SOUTH FLORIDA WATER MANAGEMENT DISTRICT



Form 0845 001
01/90

P O Box 24680
3301 Gun Club Road
West Palm Beach, FL 33416-4680
Telephone (407) 686-8800
Florida WATS 1-800-432-2045

SURFACE WATER MANAGEMENT PERMIT APPLICATIONS AND/OR WATER USE PERMIT APPLICATIONS

GENERAL INSTRUCTIONS

RELEVANT SECTIONS AND FORMS

In order to ensure efficient processing of your application, please provide the administrative information requested in RC-1A. Applicants for a surface water management permit must complete sections I, II and IV of RC-1A and all of RC-1S. Applicants for a water use permit must complete sections I, III and IV of RC-1A and all of RC-1W. If any of the proposed project is agricultural in nature or if the project is in a Reduced Threshold Area (see Rule 40E-20.302 Florida Administrative Code) surface water management and water use permit applications must be processed concurrently.

SIGNATURE AND FEE

All applicants (or their authorized agents) must sign the application form in Section IV "Certification." No application for which a fee is required shall be considered filed until the appropriate application fee is submitted.

NUMBER OF COPIES

If you are applying for a conceptual approval concurrent with a Development of Regional Impact Application for Development Approval, please submit one completed copy of RC-1A and eight copies of all other completed forms and items. For all other applications, please submit one completed copy of RC-1A and six copies of all other completed forms and items.

GUIDANCE

Please utilize the booklets titled "Guidance for Preparing an Application for a Surface Water Management Permit" and "Guidance for Preparing an Application for a Water Use Permit" to fill in all material which relates to the proposed project. Please refer to the item numbers to identify supporting material that is attached to the Form. If you have questions, please discuss your application with District staff prior to submittal.

AUTHORITY TO REQUIRE INFORMATION

Rules 40E-2.101, 40E-20.112, 40E-4.101 and 40E-40.112, Florida Administrative Code specify information requirements to constitute a complete permit application.

GOVERNING BOARD ACTIONS

Applications for individual surface water management and/or water use permits will require District Governing Board action. Requests for modification of surface water management permits issued before December 1, 1982, may require District Governing Board action. If you have questions, please discuss your application with District staff prior to submittal.

OTHER PERMITS FROM THIS DISTRICT

Applicants who propose projects which involve utilization of District works or land must also submit Form 0122 "Application to the South Florida Water Management District for Authority to Utilize Works or Land of the District."

APPROVALS BY OTHER AGENCIES

The proposed projects may also require approval by other state and federal agencies. SFWMD informs other agencies of permit applications received, but the responsibility for requesting approval from other agencies rests with the owner.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

RC-1A ADMINISTRATIVE INFORMATION FOR SURFACE WATER MANAGEMENT PERMIT APPLICATIONS AND/OR WATER USE PERMIT APPLICATIONS



Form 0845 A01
01/90

I GENERAL INFORMATION

THIS IS AN APPLICATION FOR (PLEASE CHECK APPROPRIATE BOXES)

☐ A SURFACE WATER MANAGEMENT PERMIT ☒ A WATER USE PERMIT

OWNER		APPLICANT (IF DIFFERENT FROM OWNER)	
NAME	Lee County	NAME	
ADDRESS	2178 McGregor Boulevard	ADDRESS	
CITY, STATE, ZIP	Fort Myers, Florida 33901	CITY STATE ZIP	
TELEPHONE (813)	335-2276	TELEPHONE ()	
PROJECT ENGINEER, CONSULTANT OR AGENT		PRE-APPLICATION MEETING	
NAME OF FIRM	Camp Dresser & McKee, Inc.	HAVE ANY PRE APPLICATION MEETINGS BEEN HELD WITH DISTRICT STAFF?	☐ YES ☒ NO
NAME OF CONTACT PERSON	Michael Ihnat, P.E.	DATE(S)	
ADDRESS	1620 Medical Lane, Suite 221	LOCATION(S)	
CITY STATE ZIP	Fort Myers, Florida 33907	NAME(S) OF KEY DISTRICT STAFF	
TELEPHONE (813)	939-3775	NAME(S) OF PROJECT REPRESENTATIVE(S)	

PROJECT INFORMATION

NAME (INCLUDING THE PHASES COVERED BY THIS APPLICATION)				Energy Recovery Facility for Emergency Supply Wells			
TOTAL PROJECT ACREAGE, INCLUDING ALL PHASES				155			
CITY TOWN OR VILLAGE (IF APPLICABLE)				COUNTY Lee County			
SECTION(S) OR GOVERNMENT LOT(S)		TOWNSHIP		RANGE			
SE 1/4 S24		44 S		25 E			
SECTION(S) OR GOVERNMENT LOT(S)		TOWNSHIP		RANGE			
Portion NE 1/4 S25		44 S		25 E			
SECTION(S) OR GOVERNMENT LOT(S)		TOWNSHIP		RANGE			

II SURFACE WATER MANAGEMENT

FORM OF PERMIT (PLEASE CHECK ONLY ONE BOX)

☐ A NEW INDIVIDUAL PERMIT PURSUANT TO RULE 40E 4 FLORIDA ADMINISTRATIVE CODE (F A C)	☐ A NEW GENERAL PERMIT PURSUANT TO RULE 40E 40 F A C
☐ A MODIFICATION OF EXISTING INDIVIDUAL PERMIT NO _____	☐ A MODIFICATION OF EXISTING GENERAL PERMIT NO _____

DESCRIBE IN GENERAL TERMS THE REQUESTED CHANGE(S) OR NEW WORK(S)

SURFACE WATER MANAGEMENT (CONTINUED)



Form 0645-A02

TYPE OF PERMIT (PLEASE CHECK AT LEAST ONE BOX)

- ☐ CONCEPTUAL APPROVAL OF A SURFACE WATER MANAGEMENT SYSTEM WHICH WILL SERVE THE ENTIRE _____ - ACRE SITE (PLEASE FILL IN THE ACREAGE OF YOUR ENTIRE PROJECT)
- ☐ CONSTRUCTION AND OPERATION OF A SURFACE WATER MANAGEMENT SYSTEM WHICH WILL SERVE THE ENTIRE _____ - ACRE SITE (PLEASE FILL IN THE ACREAGE OF YOUR ENTIRE PROJECT)
- ☐ *PHASES OF THE SITE CONSTRUCTION AND OPERATION OF A SURFACE WATER MANAGEMENT SYSTEM WHICH WILL SERVE _____ ACRES (PLEASE FILL IN THE ACREAGE OF THE PART OF YOUR PROJECT FOR WHICH A CONSTRUCTION AND OPERATION PERMIT IS SOUGHT) OF THE ENTIRE _____ - ACRE SITE (PLEASE FILL IN THE ACREAGE OF YOUR ENTIRE PROJECT)
- ☐ OPERATION OF AN EXISTING SURFACE WATER MANAGEMENT SYSTEM WHICH SERVES THE ENTIRE _____ - ACRE SITE (PLEASE FILL IN THE ACREAGE OF YOUR ENTIRE PROJECT.)
- ☐ *PHASES OF THE SITE OPERATION OF AN EXISTING SURFACE WATER MANAGEMENT SYSTEM WHICH SERVES _____ ACRES (PLEASE FILL IN THE ACREAGE OF THE PART OF YOUR PROJECT FOR WHICH AN OPERATION PERMIT IS SOUGHT) OF THE ENTIRE _____ - ACRE SITE (PLEASE FILL IN THE ACREAGE OF YOUR ENTIRE PROJECT)
- *IF THIS IS THE CASE, YOU MUST ALSO USE THIS FORM TO APPLY FOR OTHER TYPES OF PERMITS FOR THE REST OF THE SITE, TO ASSURE THAT THE ENTIRE SITE IS COVERED BY THIS APPLICATION

III

WATER USE

FORM OF PERMIT (PLEASE CHECK ONLY ONE BOX)

- | | |
|---|--|
| ☒ A NEW INDIVIDUAL PERMIT PURSUANT TO RULE 40E-2 101 FLORIDA ADMINISTRATIVE CODE (F A C) | ☐ A NEW GENERAL PERMIT, PURSUANT TO RULE 40E-20 F A C |
| ☐ A MODIFICATION OF EXISTING PERMIT NO _____ | ☐ RENEWAL OF EXISTING PERMIT NO _____ |

THE PURPOSE OF THIS REQUEST To provide on-site source of water from the sandstone aquifer for back-up cooling water supply.

TYPE OF PERMIT (PLEASE CHECK AT LEAST ONE BOX)

- ☐ AGRICULTURAL IRRIGATION ☐ LANDSCAPING IRRIGATION ☐ GOLF COURSE IRRIGATION
- ☐ PUBLIC WATER SUPPLY ☐ MINING/DEWATERING ☒ INDUSTRIAL/COMMERCIAL Emergency Back-Up Supply
- ☐ RECREATIONAL ☐ AQUACULTURE ☐ OTHER (PLEASE DESCRIBE) _____

SOURCE OF WATER (PLEASE CHECK AT LEAST ONE BOX)

- SURFACE WATER FROM THE FOLLOWING WATER BODY(IES)
- ☐ ON-SITE RETENTION POND(S) OR LAKE(S) ☐ ADJACENT LAKE, CANAL RIVER OR CREEK _____ (NAME)
- GROUND WATER FROM THE FOLLOWING NAMED AQUIFER(S) (PLEASE INDICATE FOR EACH AQUIFER WHETHER IT IS SHALLOW OR DEEP)
- Sandstone Aquifer within 150 feet below ground surface (shallow).

IV CERTIFICATION

I hereby certify that to the best of my knowledge the total project acreage listed above is owned or controlled by me and encompasses the project referenced in this permit application. In addition I agree to provide entry to the project site for South Florida Water Management District inspectors with proper identification or documents as required by law for the purpose of making preliminary analyses of the site. Further I agree to provide entry to the site for such inspectors to monitor permitted work if a permit is granted.

Signature (if not the owner certify below)

Date

I hereby certify that I am an authorized agent of the owner.

(T tie)

Administrative Director

Date

7-14

FOR DISTRICT USE ONLY

APPLICATION NUMBER _____

FEE REQUIRED _____

FEE PAID _____

RECEIPT NUMBER _____



Form 0645 W01

01/90

**RC-1W APPLICATION FOR A
WATER USE PERMIT**

FOR SFWMD USE ONLY

Application No _____

SFWMD
ONLY

N A I M

ALL PERMITS: SECTION I - SITE INFORMATION

X	A	LOCATION SKETCH IS SUBMITTED AS ITEM I-1	Items I-1a and I-1b	☐ ☐ ☐ ☐
X	B	AERIAL PHOTOGRAPH IS SUBMITTED AS ITEM I-2	See Volume I, Figures 2-5a and 2-5b	☐ ☐ ☐ ☐
	C	WETLANDS		
X		EXISTING COVER IS SUBMITTED AS ITEM I-3	Also see Volume I, Figure 2-26	☐ ☐ ☐ ☐
X		PROPOSED PRESERVATION TECHNIQUES ARE SUBMITTED AS ITEM I-4		☐ ☐ ☐ ☐
N/A		WETLANDS CONTROL ELEVATION TABLE IS SUBMITTED AS ITEM I-5		☐ ☐ ☐ ☐

ALL PERMITS: SECTION II - PROJECT INFORMATION

	A	GENERAL INFORMATION		
X		MAP OF PROJECT IS SUBMITTED AS ITEM II-1		☐ ☐ ☐ ☐
		START DATE OF WATER USE IS	After 1992	☐ ☐ ☐ ☐
	B	SURFACE WATER MANAGEMENT		
X		THE PROJECT IS PERMITTED, PERMIT NUMBER	Permit applied for.	☐ ☐ ☐ ☐
		THE PROJECT IS EXISTING BUT UNPERMITTED	☐	☐ ☐ ☐ ☐
X		A SWM PERMIT IS APPLIED FOR APPLICATION NO	See Appendix 7.3	☐ ☐ ☐ ☐
		A SWM PERMIT IS NOT REQUIRED	☐	☐ ☐ ☐ ☐
	C	RIGHT OF WAY OCCUPANCY		
		PROJECT IS PERMITTED FOR RIGHT OF WAY, PERMIT NUMBER		☐ ☐ ☐ ☐
		RIGHT OF WAY PERMIT IS APPLIED FOR APPLICATION NO		☐ ☐ ☐ ☐
		RIGHT OF WAY PERMIT IS NOT REQUIRED	☒	☐ ☐ ☐ ☐
	D	FACILITIES See Appendices 9.1 and 9.2		
X		TABLE OF EXISTING AND PROPOSED WELLS IS SUBMITTED AS ITEM II-2A		☐ ☐ ☐ ☐
N/A		TABLE OF EXISTING AND PROPOSED SURFACE WATER WITHDRAWAL PUMPS IS SUBMITTED AS ITEM II-2B		☐ ☐ ☐ ☐
N/A		TABLE OF EXISTING AND PROPOSED WITHDRAWAL CULVERTS IS SUBMITTED AS ITEM II-2C		☐ ☐ ☐ ☐
	E	WATER PROBLEMS		
X		EVALUATION OF EXISTING WATER USE PROBLEMS IS SUBMITTED AS ITEM II-3	☒	☐ ☐ ☐ ☐
		NO EXISTING PROBLEMS	☐	☐ ☐ ☐ ☐
X		EVALUATION OF POTENTIAL IMPACTS ASSOCIATED WITH THE PROPOSED WATER WITHDRAWALS IS SUBMITTED AS ITEM II-4	See Figure 5-1	☐ ☐ ☐ ☐
		PROPOSED MITIGATION IS SUBMITTED AS ITEM II-5		☐ ☐ ☐ ☐
		NO WATER PROBLEMS OR IMPACTS ARE ANTICIPATED	☒	☐ ☐ ☐ ☐
	F	LOCATION OF POLLUTION SOURCES Site is adjacent to existing, closed landfill.		
		NO KNOWN POLLUTION SOURCES	☐	☐ ☐ ☐ ☐
X		A MAP SHOWING POLLUTION SOURCES IS SUBMITTED AS ITEM II-6		☐ ☐ ☐ ☐

**SECTION II - PROJECT INFORMATION
(CONTINUED)**

SEMI-D

ONLY

1-2

G	TYPE OF WATER USE	
	IN ADDITION PLEASE COMPLETE AT LEAST ONE	
	☐ SECTION III FOR IRRIGATION WATER USE	==
	☐ SECTION IV FOR PUBLIC WATER SUPPLY WATER USE	==
	☐ SECTION V FOR MINING/DEWATERING WATER USE	==
	☒ SECTION VI FOR INDUSTRIAL WATER USE Reclaimed Water Use Plan, Item III-6	==
	☐ SECTION VII FOR GENERAL WATER USE PERMITS	==

INDIVIDUAL PERMITS: SECTION III - IRRIGATION WATER USE

A	OWNERSHIP AND LAND USE	Section III is not applicable.	
	PROOF OF OWNERSHIP IS SUBMITTED AS ITEM III-1		==
	PREVIOUSLY PERMITTED NO CHANGE IN OWNERSHIP OR PROJECT ACREAGE ☐ YES		==
	LAND USE DOCUMENT IS SUBMITTED AS ITEM III-2		==
	PREVIOUSLY PERMITTED NO CHANGE IN LAND USE ☐ YES		==
B	CROP TYPE AND IRRIGATION SYSTEM		
	TOTAL IRRIGATED (PLANTED) ACREAGE _____ ACRES		==
	IRRIGATION FOR PHASED PROJECTS IS SUBMITTED AS ITEM III-3		==
	TABLE OF CROP REQUIREMENTS IS SUBMITTED AS ITEM III-4		==
C	WATER USAGE		
	QUANTITY OF WATER NEEDED FOR ALL CROPS _____		==
	BASIS FOR THE WATER REQUESTED _____		==
D	WATER CONSERVATION TECHNIQUES DESCRIPTIONS ARE SUBMITTED AS ITEM III-5		==
	RECLAIMED WATER USE PLAN IS SUBMITTED AS ITEM III-6		==
	RECLAIMED WATER NOT AVAILABLE ☐		==
E	FREEZE PROTECTION		
	NO FREEZE PROTECTION REQUESTED ☐		==
	FREEZE PROTECTION REQUEST IS SUBMITTED AS ITEM III-7		==
F	GOLF COURSE IRRIGATION REQUEST IS SUBMITTED AS ITEM III-8		==

INDIVIDUAL PERMITS: SECTION IV - PUBLIC WATER SUPPLY WATER USE

A	POPULATION AND WATER DEMAND ANALYSIS	Section IV is not applicable.	
	WATER USE FOR 12 MONTH PERIOD IS SUBMITTED AS ITEM IV-1		==
	PAST WATER USE IS SUBMITTED AS ITEM IV-2		==
	PROJECTED WATER USE IS SUBMITTED AS ITEM IV-3		==
	PROJECTED WATER DEMAND (PER CAPITA USE GREATER THAN 200 GPD) IS SUBMITTED AS ITEM IV-4		==
B	SERVICE AREA		
	SERVICE AREA MAP IS SUBMITTED AS ITEM IV-5		==



Form 1645 103

SECTION IV - PUBLIC WATER SUPPLY WATER USE (CONTINUED)

SEWAGE

CITY

1 A

C	INTERCONNECTIONS WITH OTHER SUPPLIERS ARE SUBMITTED AS ITEM IV-6	---	---	---
	SERVICE AREA DOCUMENTATION IS SUBMITTED AS ITEM IV-7	---	---	---
D	FACILITIES	---	---	---
	DESCRIPTION OF FACILITIES IS SUBMITTED AS ITEM IV-8	---	---	---
	AVERAGE DAILY EFFLUENT PRODUCTION _____	---	---	---
E	DISPOSAL POINT OF EFFLUENT _____	---	---	---
	INFORMATION ABOUT RAW WATER QUALITY IS SUBMITTED AS ITEM IV-9	---	---	---
	REVERSE OSMOSIS TREATMENT	---	---	---
F	NO REVERSE OSMOSIS ☐	---	---	---
	REVERSE OSMOSIS OPERATION DESCRIPTION IS SUBMITTED AS ITEM IV-10	---	---	---
	LETTER OF APPROVAL TO DISCHARGE EFFLUENT BRINE IS SUBMITTED AS ITEM IV-11	---	---	---
G	WATER CONSERVATION	---	---	---
	LETTER OF COMPLIANCE WITH THE WATER CONSERVATION ACT OF 1953 IS SUBMITTED AS ITEM IV-12	---	---	---
	WASTEWATER RECYCLING PLANS ARE SUBMITTED AS ITEM IV-13	---	---	---
H	NO WASTEWATER RECYCLING IS PLANNED ☐	---	---	---
	IRRIGATION WATER CONSERVATION TECHNIQUES ARE SUBMITTED AS ITEM IV-14	---	---	---
	WELLFIELD PROTECTION	---	---	---
I	WELLFIELD WILL BE COVERED BY A WELLFIELD PROTECTION ORDINANCE ☐	---	---	---
	DOCUMENTATION OF APPROVAL FROM APPROPRIATE AGENCY IS SUBMITTED AS ITEM IV-15	---	---	---
	WELLFIELD WILL NOT BE COVERED BY A WELLFIELD PROTECTION ORDINANCE ☐	---	---	---
J	PLAN FOR PROTECTION OF THE WELLFIELD IS SUBMITTED AS ITEM IV-16	---	---	---
	HEALTH REVIEW EVALUATION FROM GOVERNMENTAL AGENCY(IES) IS SUBMITTED AS ITEM IV-17	---	---	---

INDIVIDUAL PERMITS: SECTION V - MINING/DEWATERING WATER USE

A	OWNERSHIP AND LAND USE <u>Section V is not applicable.</u>	---	---	---
	PROOF OF OWNERSHIP DOCUMENTATION IS SUBMITTED AS ITEM V-1	---	---	---
	PREVIOUSLY PERMITTED NO CHANGE IN OWNERSHIP FOR PROJECT ACREAGE ☐ YES	---	---	---
	LAND USE DOCUMENTS SUBMITTED AS ITEM V-2	---	---	---
B	PREVIOUSLY PERMITTED NO CHANGE IN LAND USE ☐ YES	---	---	---
	PROJECT DESCRIPTION	---	---	---
	METHOD OF EXCAVATION _____	---	---	---
	EXCAVATION AREA DATA ARE SUBMITTED AS ITEM V-3	---	---	---
	GROUND WATER WILL BE DRAWN DOWN TO _____ FT NC/D	---	---	---
	MAXIMUM DEPTH OF PIT WILL BE EXCAVATED TO _____ FT	---	---	---
	OPERATION SCHEDULE _____ RS/DAY _____ DAYS/WEEK _____ WEEKS YEAR	---	---	---
	REQUESTED ANNUAL ALLOCATION _____ GALLONS	---	---	---
	MAXIMUM DAY PUMPAGE _____ GALLONS	---	---	---
	BASIS FOR THE REQUESTED AMOUNTS _____	---	---	---
DURATION OF THE USE OF WATER _____	---	---	---	



Form 1645 404

SECTION V -
MINING/DEWATERING WATER USE(CONTINUED)N/A
ONLY

✓	CONTRACTOR NAME _____ PHONE _____	=====
	ADDRESS _____	=====
	NO CONTRACTOR ☐	=====
C	LOCATION	=====
	SITE MAP IS SUBMITTED AS ITEM V-4	=====
	NOT A PHASED PROJECT ☐	=====
	SITE MAP FOR PHASED PROJECT IS SUBMITTED AS ITEM V-5	=====
	A TOPOGRAPHIC MAP IS SUBMITTED AS ITEM V-6	=====
D	INFORMATION ON WATER QUALITY IS SUBMITTED AS ITEM V-7	=====
E	HISTORICAL WATER USE	=====
	NOT APPLICABLE ☐ YES	=====
	PUMPAGE RECORDS ARE SUBMITTED AS ITEM V-8	=====
F	WATER TABLE AND GEOLOGIC DATA	=====
	WATER TABLE ELEVATIONS	=====
	☐ WET SEASON _____ (NGVD) ☐ DRY SEASON _____ (NGVD)	=====
	LITHOLOGIC LOGS ARE SUBMITTED AS ITEM V-9	=====
	GEOPHYSICAL LOGS ARE SUBMITTED AS ITEM V-10	=====
	LITHOLOGIC LOGS NOT AVAILABLE ☐	=====
G	DRAINAGE SYSTEM AND STRUCTURAL STABILITY	=====
	PLAN FOR ROUTING OF STORMWATER IS SUBMITTED AS ITEM V-11	=====
	PLAN FOR ON-SITE WATER RETENTION SYSTEM FACILITIES IS SUBMITTED AS ITEM V-12	=====
	STRUCTURAL STABILITY INFORMATION IS SUBMITTED AS ITEM V-13	=====
H	DEWATERING IN CONJUNCTION WITH LANDFILL OPERATIONS	=====
	LANDFILL DEWATERING NOT APPLICABLE ☐	=====
	LANDFILL INFORMATION IS SUBMITTED AS ITEM V-14	=====

INDIVIDUAL PERMITS. SECTION VI - INDUSTRIAL WATER USE

A	WATER DEMAND ANALYSIS	=====
	REQUESTED ANNUAL ALLOCATION <u>Emergency Use Only</u>	=====
	MAXIMUM DAY PUMPAGE <u>1,500,000</u> GALLONS	=====
	MAXIMUM DAY TO AVERAGE DAY DEMAND RATIO <u>Not Applicable</u>	=====
	EXPLAIN BRIEFLY THE BASIS FOR USING THIS NUMBER <u>Daily cooling water demand is 1.5 mgd but use would be infrequent and of short duration. 1/</u>	=====
	FUTURE YEAR FOR WHICH WATER USE IS PROJECTED <u>1992</u>	=====
	FOR EXISTING WATER USE WATER USE FOR 12 MONTH PERIOD IS SUBMITTED AS ITEM VI-1	=====
	WATER USE IS NOT NOW EXISTING SO ITEM VI-1 NOT APPLICABLE ☒	=====

1/ Wells will also provide water supply for fire protection.



Form 6-5 1/05

**SECTION VI - INDUSTRIAL WATER USE
(CONTINUED)**

NEW

DATE

✓	B	FACILITIES	
		WATER TREATMENT PLANT CAPACITY <u>1,500,000</u> GALLONS per day	---
		TREATED WATER STORAGE CAPACITY <u>As required</u> GALLONS	---
		IN PLANT LOSSES <u>Vendor/Technology Specific</u>	---
		FIRE-FLOW CAPABILITY <u>To meet or exceed County Fire Protection Standards</u>	---
		STAND BY CAPACITY <u>Vendor/Technology Specific; Permitted Wells are</u>	---
		<u>stand-by (back-up) capacity.</u>	---
X		PUMP/WELLFIELD OPERATION SCHEDULE IS SUBMITTED AS ITEM VI-2	---
X			---
X	C	DESCRIPTION OF THE INDUSTRIAL PROCESS WATER CHANGES DUE TO THE PROCESS	---
		AND DISPOSAL OF WASTEWATER IS SUBMITTED AS ITEM VI-3	---

X	D	DESCRIPTION OF WATER CONSERVATION TECHNIQUES OR METHODS OF WATER USE OPTIMIZATION	---
		IS SUBMITTED AS ITEM VI-4	---

SECTION VII - GENERAL WATER USE PERMITS

	A	GENERAL INFORMATION <u>Section VII is not applicable.</u>	
		☐ PROPOSED PROJECT ☐ EXISTING HOW LONG _____	---
		ESTIMATED AVERAGE DAILY WATER USE _____ GALLONS	---
		ESTIMATED MAXIMUM DAY WATER USE _____ GALLONS	---
		NAME OF WELL DRILLER (IF APPLICABLE) _____	---

	B	TYPE OF WATER USE	
		IRRIGATION	
		CROP TYPE _____	---
		IRRIGATED ACREAGE _____	---
		IRRIGATION FOR PHASED PROJECTS IS SUBMITTED AS ITEM VII-1	---
		PUBLIC WATER SUPPLY	
		TREATMENT PLANT CAPACITY _____ GALLONS	---
		POPULATION SERVED _____	---
		NUMBER OF UNITS SERVED _____	---
		AQUIFER REHABILITATION	---
		ESTIMATED DATE OF COMPLETION _____	---

**SECTION VIII - WORKS OF THE DISTRICT
SURFACE WATER IMPROVEMENT AND MANAGEMENT (SWIM)**

	A	PROJECT IS PERMITTED FOR WORKS OF THE DISTRICT (SWIM) PERMIT NO _____	---
	B	WORKS OF THE DISTRICT (SWIM) PERMIT IS APPLIED FOR APPLICATION NO _____	---
	C	WORKS OF THE DISTRICT (SWIM) PERMIT IS NOT REQUIRED ☐	---



SFWMD
ONLY

WETLANDS CONTROL ELEVATION TABLE Not Applicable

N A I M

[illegible]

FOR PHASED PROJECTS

Not Applicable

☐ PHASE 1	_____	TOTAL/IRRIGATED ACRES	_____	☐	☐	☐	☐
		INITIATION DATE	_____	☐	☐	☐	☐
☐ PHASE 2	_____	TOTAL/IRRIGATED ACRES	_____	☐	☐	☐	☐
		INITIATION DATE	_____	☐	☐	☐	☐
☐ PHASE 3	_____	TOTAL/IRRIGATED ACRES	_____	☐	☐	☐	☐
		INITIATION DATE	_____	☐	☐	☐	☐
☐ PHASE 4	_____	TOTAL/IRRIGATED ACRES	_____	☐	☐	☐	☐
		INITIATION DATE	_____	☐	☐	☐	☐
☐ ADDITIONAL PHASES	_____			☐	☐	☐	☐
THIS APPLICATION IS FOR PHASE NO. _____				☐	☐	☐	☐

EXCAVATION PROJECTS

Not Applicable

PHASE 1	ACRES	INITIATION/COMPLETION DATES				
PHASE 2	ACRES	INITIATION/COMPLETION DATES				
PHASE 3	ACRES	INITIATION/COMPLETION DATES				
PHASE 4	ACRES	INITIATION/COMPLETION DATES				
ADDITIONAL PHASES						
THIS APPLICATION IS FOR PHASE NO.						



TABLE A
DESCRIPTION OF WELLS

WELL NUMBER	1	2	3	4
MAP DESIGNATION	W-1	W-2	W-3	W-4
EXISTING OR PROPOSED	Proposed	Proposed	Proposed	Proposed
DIAMETER (INCHES)	8	8	8	8
TOTAL DEPTH	$\leq 150'$	$\leq 150'$	$\leq 150'$	$\leq 150'$
CASED DEPTH	$\leq 80'$	$\leq 80'$	$\leq 80'$	$\leq 80'$
SCREENED INTERVAL	Open Hole	Open Hole	Open Hole	Open Hole
PUMPED OR FLOWING	Pumped	Pumped	Pumped	Pumped
WORKING VALVE, IF ARTESIAN (YES OR NO)	N/A	N/A	N/A	N/A
PUMP MANUFACTURER AND MODEL NUMBER		To Be Determined		
PUMP TYPE (CENTRIFUGAL, JET, DEEP JET, TURBINE, ETC.)	Turbine	Turbine	Turbine	Turbine
INTAKE DEPTH (NGVD)		Determined in Field		
PUMP OR FLOW CAPACITY (GPM AT _____ FT OF HEAD AT _____ PSI)	175 gpm	175 gpm	175 gpm	175 gpm
ACTIVE (YES OR NO)				
YEAR DRILLED				
TYPE OF METER				

**TABLE A
DESCRIPTION OF WELLS**

WELL NUMBER	5	6		
MAP DESIGNATION	W-5	W-6		
EXISTING OR PROPOSED	Proposed	Proposed		
DIAMETER (INCHES)	8	8		
TOTAL DEPTH	≤ 150'	≤ 150'		
CASED DEPTH	≤ 80'	≤ 80'		
SCREENED INTERVAL	Open Hole	Open Hole		
PUMPED OR FLOWING	Pumped	Pumped		
WORKING VALVE, IF ARTESIAN (YES OR NO)	N/A	N/A		
PUMP MANUFACTURER AND MODEL NUMBER	To Be Determined			
PUMP TYPE (CENTRIFUGAL, JET, DEEP JET, TURBINE, ETC.)	Turbine	Turbine		
INTAKE DEPTH (NGVD)	Determined In Field			
PUMP OR FLOW CAPACITY (GPM AT _____ FT OF HEAD AT _____ PSI)	175 gpm	175 gpm		
ACTIVE (YES OR NO)				
YEAR DRILLED				
TYPE OF METER				



TABLE B Not Applicable
DESCRIPTION OF SURFACE WATER PUMPS

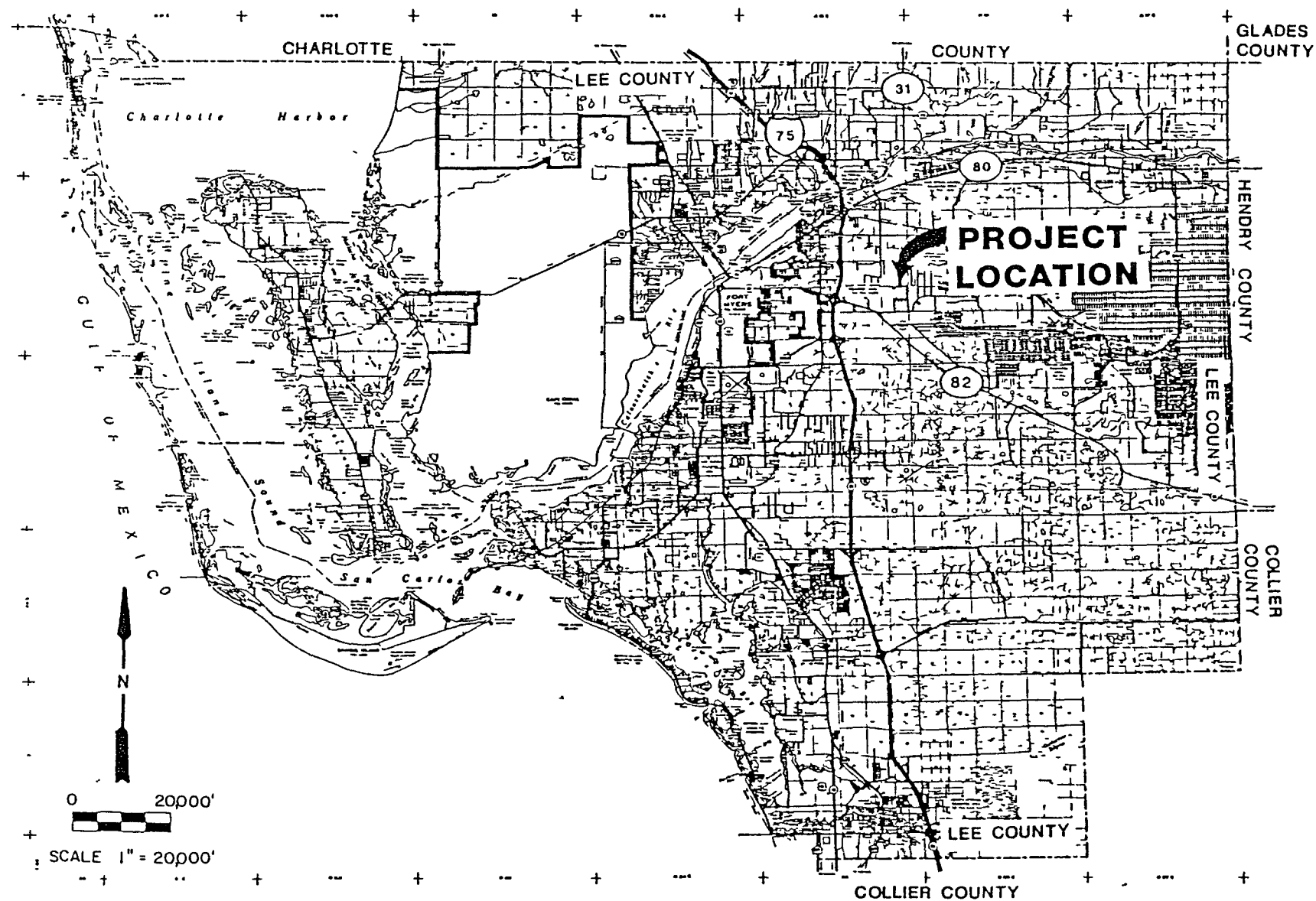
DRAINAGE DISTRICT				
PUMP NUMBER				
MAP DESIGNATION				
SURFACE WATER BODY				
EXISTING OR PROPOSED				
PUMP MANUFACTURER AND MODEL NUMBER				
PUMP TYPE				
PUMP CAPACITY (GPM)				
PUMP HORSEPOWER				
PUMP DIAMETER				
ELEVATION OF INTAKE (NGVD)*				
IS PUMP A TWO WAY PUMP?				

TABLE C Not Applicable
DESCRIPTION OF IRRIGATION CULVERTS

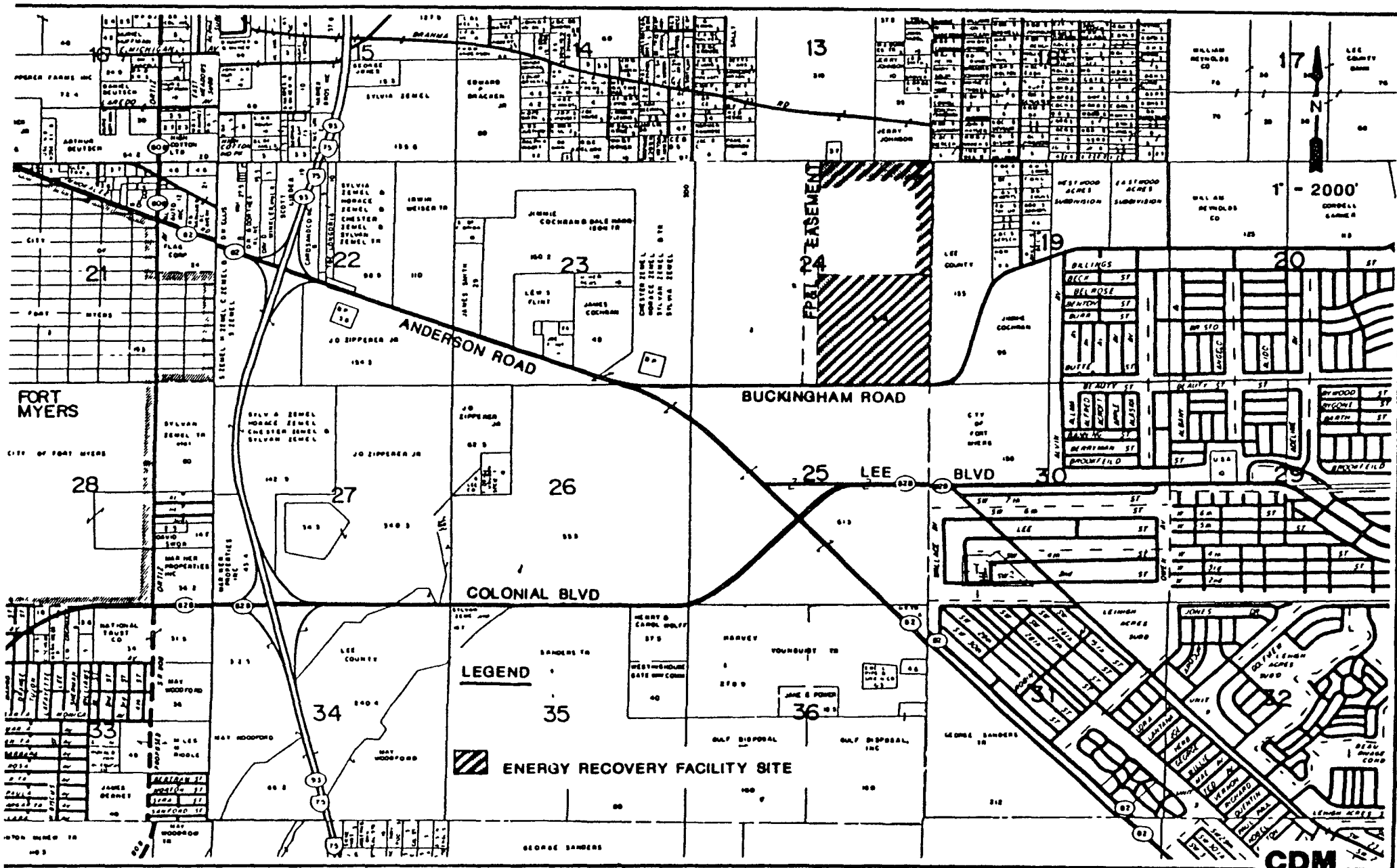
CULVERT NUMBER				
MAP DESIGNATION				
WATER BODY				
EXISTING OR PROPOSED				
DIAMETER**				
HEIGHT***				
WIDTH***				
TYPE OF CULVERT****				
CULVERT LENGTH				
INVERT ELEVATION (NGVD)*				
TYPE OF CONTROL DEVICE				

- * NGVD IS APPROXIMATELY EQUAL TO MEAN SEA LEVEL
- ** FOR CIRCULAR CULVERTS
- *** FOR ELLIPTICAL CULVERTS
- **** CORRUGATED METAL, REINFORCED CONCRETE, ETC.

SOURCE MAP BASED ON LEE COUNTY DOI GENERAL HIGHWAY MAP JAN 1978



General Location Map - Lee County Energy Recovery Facility



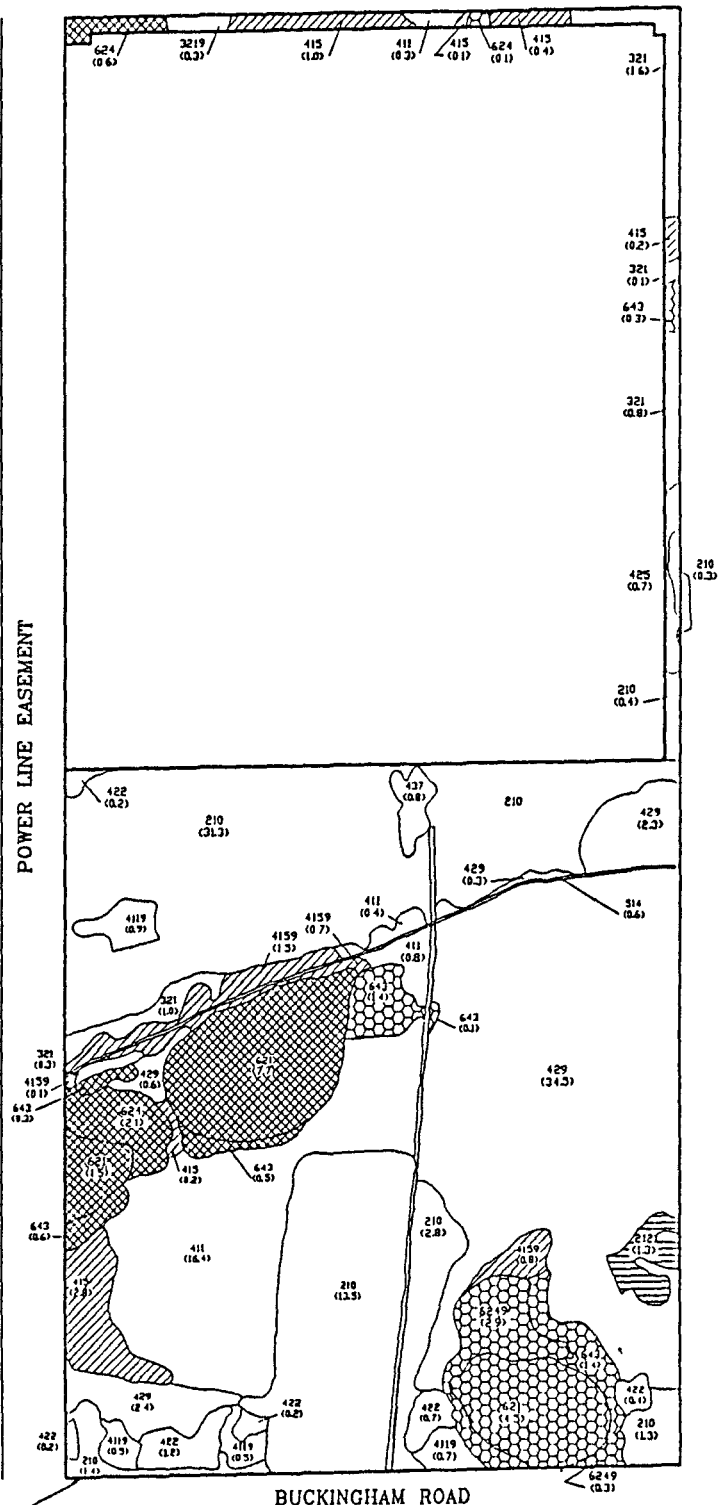
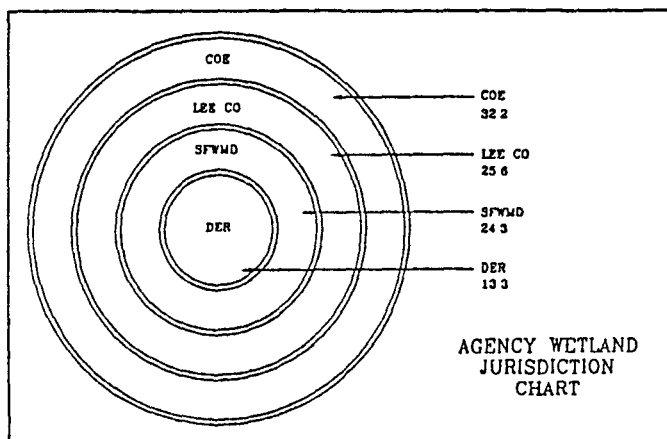
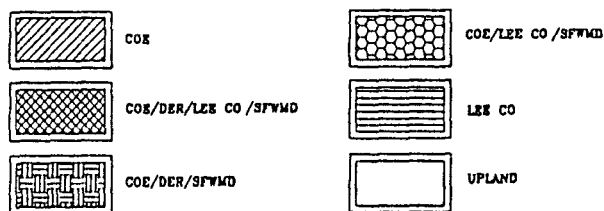
Energy Recovery Facility Site Location Map - Lee County

Kevin L Erwin
Consulting Ecologist, Inc

[illegible]

NOTE NOT BASED ON GROUND SURVEY OR
RECTIFIED AERIAL PHOTOGRAPH

LEGEND



PROPERTY LINE

ITEM I-3

ITEM I-4

PROPOSED WETLAND PRESERVATION TECHNIQUES

This water use permit application is for on-site wells to provide emergency (backup) cooling water and fire protection needs of the Lee County energy recovery facility. The proposed facility is the solid waste volume reduction method of choice for Lee and Hendry Counties.

For the proposed facility, numerous studies have been conducted, including an assessment of ecological impacts. Ecological studies were performed by Kevin L. Erwin Consulting Engineers, Inc. (KLECE) of Fort Myers. As part of their work, KLECE contacted all federal, state and local agencies with jurisdiction over wetlands. Wetland boundaries were mapped and jurisdictional boundaries confirmed, as presented in Item I-3. Ms. Karen Johnson of SFWMD attended an on-site meeting on April 5, 1990 to confirm those wetlands under SFWMD jurisdiction.

KLECE prepared a report indicating that the on-site wetlands are of low quality, having been disturbed by logging and cattle grazing activities over the past twenty years. Nonetheless, impacts to wetlands as a result of the energy recovery project will be avoided to the greatest extent possible.

The proposed wells will be sited in the sandstone aquifer and will provide up to 1.5 mgd of emergency cooling water. Approximately six wells dispersed throughout the uplands portion of the western half of the site will be used to meet the emergency water needs. The wells will be situated outside of the wetlands areas and east of a wildlife corridor that follows the western property boundary. The wells will be spaced to minimize aquifer drawdown impacts (for example, see Item II-1).

There is no anticipated impact on wetlands or on other legal permitted groundwater users due to the pumping from the proposed sandstone wells. The primary source of cooling water, treated reclaimed water from the Ft. Myers Central WWTP, is highly reliable. In the unlikely event that an emergency backup water supply is needed, up to 1.5 mgd will be withdrawn, but the period of withdrawal will be short.

The water table aquifer and wetlands are separated from the underlying sandstone aquifer by a confining unit of silty clay. The thickness of the confining unit at the site is about 50 feet. Though there is leakage through the confining unit, the drawdown of the water table aquifer due to infrequent and short term withdrawals from the sandstone aquifer is negligible.

Impacts to wetlands could not be completely avoided while still maintaining compliance with local requirements and providing all the appurtenances necessary for a viable project. The construction and operation of the Facility will impact no wetlands. There will be minimal wetlands impacted due to stabilization and fill of a dirt road along the powerline corridor. The impaction quantity will be a maximum of 2.7 acres. A complete description of impacts to wetlands can be found in Appendix 6.5, which contains the U.S. Army Corps of Engineers/Florida Department of Environmental Regulation "Joint Application for Activities in the Waters of the State of Florida."

LCERF2.19/CAB
6/25/90

OVERSIZE
DOCUMENT WAS
REMOVED AND
INSERTED INTO
OCULUS
SEPARATELY.

ITEM II-3

EXISTING WATER USE PROBLEMS

The water quality of the cooling water is a critical aspect of the successful operation of the energy recovery facility. As such, it will be necessary to treat groundwater withdrawn from the sandstone aquifer to reduce or remove total dissolved solids, suspended solids, metals, sulfates and other inorganic constituents. It is important to keep treatment costs as low as possible for the backup water quality supply, so it is imperative that water from the sandstone aquifer be used rather than the more brackish water of the underlying Hawthorn and Floridan formations.

LCERF2.19/CAB
6/21/90

ITEM II-4

POTENTIAL IMPACTS OF WITHDRAWALS

The emergency backup cooling water supply needs can be met by 6 wells in the sandstone aquifer pumping continuously at an average rate of 175 gpm for the period during which the emergency supply is required. A higher rate of flow may be needed for fire protection and the pumps and wells will be sized to meet both needs (emergency cooling and fire protection).

The wells can be spaced at a minimum of 500 feet in the uplands areas. Because of the separation distance between the wells, the drawdown impacts during pumping from the sandstone aquifer will be minimized; and the duration of pumping will be short. Therefore, no impacts on other legal users of groundwater are anticipated.

An example of the potential impacts is illustrated in Figure 5-1, Volume I which shows in the 1-foot drawdown contour at a radial distance of approximately 1/2 mile from the site after 10 days of pumping 1.5 mgd. The 10-day period is used for illustrative purposes only since it is not expected to be necessary to rely upon the backup supply for that time period. This drawdown calculation is based on a Theis solution for multiple wells in a leaky confining unit. The solution was codified by Walton (Basic Groundwater Programs for Desktop Microcomputers, Internal Groundwater Modeling Center, GWWMI85-19, 1985). The input data and results of the calculations are attached.

T1(GPD/FT)= .. . 80000 Water Table Aquifer
 T2(GPD/FT)= . . . 10000 Sandstone Aquifer
 P1(GPD/SQFT)=00374 Leakance
 M1(FT)= 50 Thickness of Confining Unit
 S1(DIM)=13 Storage Coefficient for Water Table Aquifer
 S2(DIM)=0003 Storativity of Sandstone Aquifer
 NO.OF COLUMNS= .. 13
 NO OF ROWS=.. .. 20
 GRID SPACING(FT)= 500
 NWELLS=..... 6
 XWELL(FT)=..... 2000
 YWELL(FT)= 5000
 Q2(GPM)=..... 175
 TIME(DAY)= 10
 XWELL(FT)=.. .. 2000
 YWELL(FT)= 5500
 Q2(GPM)= 175
 TIME(DAY)=.. .. 10
 XWELL(FT)= 2000
 YWELL(FT)=..... 7000
 Q2(GPM)=..... 175
 TIME(DAY)= 10
 XWELL(FT)=.. .. 3000
 YWELL(FT)=. . . . 5000
 Q2(GPM)= 175
 TIME(DAY)=..... 10
 XWELL(FT)= 3000
 YWELL(FT)=. . . . 6500
 Q2(GPM)=. 175
 TIME(DAY)=..... 10
 XWELL(FT)=.. .. 3000
 YWELL(FT)=. . . . 7000
 Q2(GPM)=.. . . . 175
 TIME(DAY)= 10

Water Table Aquifer

0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
0.01	0.01	0.01	0.00	0.00
0.01	0.00	0.01	0.01	0.00
0.01	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.01	0.00	0.01
0.01	0.00	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.00

ERF site outlined; Approximate locations of wells indicated below.

Sandstone Aquifer

1.12	1.16	1.08	0.91	0.69
2.16	2.25	2.08	1.71	1.28
3.97	4.14	3.79	3.05	2.18
7.01	7.31	6.62	5.15	3.50
12.26	12.40	11.38	8.17	5.13
41.21	18.05	38.76	11.19	6.61
42.67	19.07	16.39	11.86	7.51
17.22	18.24	17.22	12.79	8.14
16.39	19.07	42.67	14.31	8.40
38.76	18.05	41.21	13.16	7.65

Poor Original

OVERSIZE
DOCUMENT WAS
REMOVED AND
INSERTED INTO
OCULUS
SEPARATELY.

ITEM III-6

RECLAIMED WATER USE PLAN

Reclaimed water from the City of Fort Myers Central WWTP will be the primary source of water for cooling purposes at the proposed facility. This primary supply was selected because of its guaranteed availability in a region where reuse of reclaimed water is encouraged. By using reclaimed water to meet its ultimate cooling water demand of 1.5 mgd, the facility will not impose any additional burden on fresh water resources in Lee County. In addition, valuable use will be made of an as yet untapped resource. The Central WWTP produces a consistently high quality effluent, meeting 5-5-3-1 or better, yet this reclaimed water is currently being discharged to the Caloosahatchee River. Reuse at the energy recovery facility, along with other City and County reuse projects currently in the planning stages, will help eliminate this discharge to surface waters.

A back-up cooling water supply will be needed in the event that reclaimed water becomes unavailable; this is expected to occur only for short periods of time, if at all. After an evaluation of potential back-up supplies, it was determined that on-site wells in the sandstone aquifer would best meet emergency cooling water needs. This well will also be used for fire protection.

ITEM VI-2

PUMP WELLFIELD OPERATION SCHEDULE

The proposed wellfield will be operated only for emergency backup cooling water supply or for fire protection. The use of these wells will be infrequent, and the withdrawals will be for short time periods only. Up to all 6 proposed wells may be pumped concurrently in the unlikely event that the primary source of cooling water, reclaimed water from the Central WWTP, is entirely interrupted. A withdrawal of 1.5 mgd total from all wells is the maximum quantity required for cooling water makeup.

The on-site wells will also be used for fire protection if needed. The pumping schedule and quantity is dependent upon need, but the wells are not expected to be necessary.

The wells and pumps will be periodically exercised to ensure that they maintain their prime working condition. The withdrawals for this routine maintenance will be negligible.

LCERF2.19/CAB
6/25/90

ITEM VI-3

DESCRIPTION OF THE INDUSTRIAL PROCESS,
WATER CHANGES DUE TO THE PROCESS, AND DISPOSAL OF WASTEWATER

The energy recovery facility is a mass-burn facility where municipal solid waste will be incinerated. Heat from this process will be used to produce steam which in turn will be used to generate electrical power. The facility will have an initial capacity of 1,800 tons per day (tpd) of solid waste; it will be expanded to its ultimate capacity of 2,400 tpd as needed. The facility will serve the solid waste disposal needs of both Lee and Hendry Counties and will reduce the volume of landfill space required by up to 70%.

Reclaimed water will be used as the primary cooling water source for the facility. A literature search has been conducted to ascertain the potential for virus and bacterial contamination through the cooling tower drift. Studies conducted at similar facilities have shown negligible potential for microbial transmission from the cooling tower. Continuous monitoring of the free chlorine or biocide level in the cooling water sump will be conducted to ensure that their concentrations are acceptable. These issues are described in more detail in Section 5.2.1 in Volume I of the PPSA application.

In the cooling process, constituents in the reclaimed water will be concentrated. Spent process waters will be treated onsite and reused at the facility to the greatest extent possible. For example, ash quenching for up to 150,000 gallons of wastewater, consisting of sanitary wastewater and a small amount of process water which has been shown to be non-cost-effective to recycle, will be routed to the Fort Myers Central WWTP for treatment. Prior to discharge, all City pretreatment requirements will be met.

ITEM VI-4

DESCRIPTION OF THE WATER CONSERVATION
TECHNIQUES OF METHODS OF WATER
USE OPTIMIZATION

Reclaimed water from the Ft. Myers Central WWTP will be used to supply the primary source of cooling water for the facility. Spent process waters will be treated on-site and reused at the facility for purposes such as quenching.

LCERF2.19/CAB
6/21/90

7.3 SFWMD 40E-4 (STORMWATER)

PERMIT APPLICATION

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
MANAGEMENT AND STORAGE OF SURFACE WATER (MSSW)
CONCEPTUAL PERMIT APPLICATION
FOR THE
LEE COUNTY ENERGY RECOVERY FACILITY

June 1990

IMAGE QUALITY

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

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

RC-1A ADMINISTRATIVE INFORMATION FOR

SURFACE WATER MANAGEMENT PERMIT APPLICATIONS

AND/OR WATER USE PERMIT APPLICATIONS



Form 0645-A01
01/80

I. GENERAL INFORMATION			
THIS IS AN APPLICATION FOR (PLEASE CHECK APPROPRIATE BOXES):			
☒ A SURFACE WATER MANAGEMENT PERMIT		☐ A WATER USE PERMIT	
OWNER		APPLICANT (IF DIFFERENT FROM OWNER)	
NAME Lee County		NAME	
ADDRESS 2178 McGregor Boulevard		ADDRESS	
CITY, STATE, ZIP Fort Myers, Florida 33901		CITY, STATE, ZIP	
TELEPHONE () 813 335-2276		TELEPHONE ()	
PROJECT ENGINEER, CONSULTANT OR AGENT		PRE-APPLICATION MEETING	
NAME OF FIRM Camp Dresser & McKee, Inc.		HAVE ANY PRE-APPLICATION MEETINGS BEEN HELD WITH DISTRICT STAFF? ☒ YES ☐ NO	
NAME OF CONTACT PERSON Michael Ihnat, P.E.		DATE(S) April 5, 1990	
ADDRESS 1620 Medical Lane Suite 221		LOCATION(S) Project Site	
CITY, STATE, ZIP Fort Myers, Florida 33907		NAME(S) OF KEY DISTRICT STAFF Karen Johnson	
TELEPHONE () 813 939-3775		NAME(S) OF PROJECT REPRESENTATIVE(S) Bob Tietz Carmen Bourgeois	
PROJECT INFORMATION			
NAME (INCLUDING THE PHASES COVERED BY THIS APPLICATION) Energy Recovery Facility			
TOTAL PROJECT ACREAGE, INCLUDING ALL PHASES: 155		PHASE AREAS (IF APPLICABLE): 28.7 Acres (developed)	
CITY, TOWN, OR VILLAGE (IF APPLICABLE)		COUNTY Lee County	
SECTION(S) OR GOVERNMENT LOT(S) 24	TOWNSHIP 44 S	RANGE 25 E	
SECTION(S) OR GOVERNMENT LOT(S) Portion of 25	TOWNSHIP 44 S	RANGE 25 E	
SECTION(S) OR GOVERNMENT LOT(S)	TOWNSHIP S	RANGE E	
II. SURFACE WATER MANAGEMENT			
FORM OF PERMIT (PLEASE CHECK ONLY ONE BOX)			
☐ A NEW INDIVIDUAL PERMIT, PURSUANT TO RULE 40E-4, FLORIDA ADMINISTRATIVE CODE (F.A.C.)		☐ A NEW GENERAL PERMIT, PURSUANT TO RULE 40E-40, F.A.C.	
☐ A MODIFICATION OF EXISTING INDIVIDUAL PERMIT NO		☐ A MODIFICATION OF EXISTING GENERAL PERMIT NO	
DESCRIBE IN GENERAL TERMS THE REQUESTED CHANGE(S) OR NEW WORK(S)			



Form 0645-A03

SURFACE WATER MANAGEMENT (CONTINUED)

TYPE OF PERMIT (PLEASE CHECK AT LEAST ONE BOX)

- ☒ CONCEPTUAL APPROVAL OF A SURFACE WATER MANAGEMENT SYSTEM WHICH WILL SERVE THE ENTIRE 155 - ACRE SITE. (PLEASE FILL IN THE ACREAGE OF YOUR ENTIRE PROJECT.)
- ☐ CONSTRUCTION AND OPERATION OF A SURFACE WATER MANAGEMENT SYSTEM WHICH WILL SERVE THE ENTIRE _____ - ACRE SITE. (PLEASE FILL IN THE ACREAGE OF YOUR ENTIRE PROJECT.)
- ☐ *PHASES OF THE SITE: CONSTRUCTION AND OPERATION OF A SURFACE WATER MANAGEMENT SYSTEM WHICH WILL SERVE _____ ACRES (PLEASE FILL IN THE ACREAGE OF THE PART OF YOUR PROJECT FOR WHICH A CONSTRUCTION AND OPERATION PERMIT IS SOUGHT.) OF THE ENTIRE _____ - ACRE SITE. (PLEASE FILL IN THE ACREAGE OF YOUR ENTIRE PROJECT.)
- ☐ OPERATION OF AN EXISTING SURFACE WATER MANAGEMENT SYSTEM WHICH SERVES THE ENTIRE _____ - ACRE SITE. (PLEASE FILL IN THE ACREAGE OF YOUR ENTIRE PROJECT.)
- ☐ *PHASES OF THE SITE: OPERATION OF AN EXISTING SURFACE WATER MANAGEMENT SYSTEM WHICH SERVES _____ ACRES (PLEASE FILL IN THE ACREAGE OF THE PART OF YOUR PROJECT FOR WHICH AN OPERATION PERMIT IS SOUGHT.) OF THE ENTIRE _____ - ACRE SITE. (PLEASE FILL IN THE ACREAGE OF YOUR ENTIRE PROJECT.)
- *IF THIS IS THE CASE, YOU MUST ALSO USE THIS FORM TO APPLY FOR OTHER TYPES OF PERMITS FOR THE REST OF THE SITE, TO ASSURE THAT THE ENTIRE SITE IS COVERED BY THIS APPLICATION

III. WATER USE

FORM OF PERMIT (PLEASE CHECK ONLY ONE BOX):

- | | |
|---|--|
| ☐ A NEW INDIVIDUAL PERMIT PURSUANT TO RULE 40E-2.101, FLORIDA ADMINISTRATIVE CODE (F.A.C.) | ☐ A NEW GENERAL PERMIT, PURSUANT TO RULE 40E-20, F.A.C. |
| ☐ A MODIFICATION OF EXISTING PERMIT NO. _____ | ☐ RENEWAL OF EXISTING PERMIT NO. _____ |

THE PURPOSE OF THIS REQUEST:

TYPE OF PERMIT (PLEASE CHECK AT LEAST ONE BOX):

- ☐ AGRICULTURAL IRRIGATION ☐ LANDSCAPING IRRIGATION ☐ GOLF COURSE IRRIGATION
- ☐ PUBLIC WATER SUPPLY ☐ MINING/DEWATERING ☐ INDUSTRIAL/COMMERCIAL
- ☐ RECREATIONAL ☐ AQUACULTURE ☐ OTHER (PLEASE DESCRIBE) _____

SOURCE OF WATER (PLEASE CHECK AT LEAST ONE BOX):

SURFACE WATER FROM THE FOLLOWING WATER BODY(IES).

- ☐ ON-SITE RETENTION POND(S) OR LAKE(S) ☐ ADJACENT LAKE, CANAL, RIVER, OR CREEK. _____ (NAME)

GROUND WATER FROM THE FOLLOWING NAMED AQUIFER(S) (PLEASE INDICATE, FOR EACH AQUIFER, WHETHER IT IS SHALLOW OR DEEP):

IV. CERTIFICATION

I hereby certify that, to the best of my knowledge, the total project acreage listed above is owned or controlled by me and encompasses the project referenced in this permit application. In addition, I agree to provide entry to the project site for South Florida Water Management District inspectors with proper identification or documents as required by law for the purpose of making preliminary analyses of the site. Further, I agree to provide entry to the project site for such inspectors to monitor permitted work if a permit is granted.

Signature of the Owner, certify below:

I hereby certify that I am an authorized agent of the owner.

(Title) Administrative Director

Date

Date

FOR DISTRICT USE ONLY

APPLICATION NUMBER _____

FEE REQUIRED _____

FEE PAID _____

RECEIPT NUMBER _____



Form 0645 - 501
01/90

RC-1S APPLICATION FOR A SURFACE WATER MANAGEMENT PERMIT

FOR SFWMD USE ONLY

Application No. _____

SFWMD
ONLY

N A I M

SECTION I - SITE INFORMATION

☒	X	A	LOCATION SKETCH IS SUBMITTED AS ITEM I-1	☐ ☐ ☐ ☐
☒	X	B	AERIAL PHOTOGRAPH IS SUBMITTED AS ITEM I-2	☐ ☐ ☐ ☐
☒	X	C	WETLANDS	
☒	X		EXISTING COVER IS SUBMITTED AS ITEM I-3	☐ ☐ ☐ ☐
☒	X		PROPOSED PRESERVATION TECHNIQUES ARE SUBMITTED AS ITEM I-4	☐ ☐ ☐ ☐
☒	N/A		WETLANDS CONTROL ELEVATION TABLE IS SUBMITTED AS ITEM I-5.	☐ ☐ ☐ ☐

SECTION II - PROJECT INFORMATION

☒	X	A	PROJECT DESCRIPTION IS SUBMITTED AS ITEM II-1A.	☐ ☐ ☐ ☐
☒	X		STAFF GUIDANCE DOCUMENTS ARE SUBMITTED AS ITEM II-1B	☐ ☐ ☐ ☐
☒	X	B	TOPOGRAPHIC MAP IS SUBMITTED AS ITEM II-2.	☐ ☐ ☐ ☐
☒	X	C	DRAINAGE MAP IS SUBMITTED AS ITEM II-3	☐ ☐ ☐ ☐
☒	X	D	WATER ELEVATION	
☒	X		BASIN WATER TABLE ELEVATION TABLE IS SUBMITTED AS ITEM II-4A	☐ ☐ ☐ ☐
☒	X		SUPPORTING INFORMATION IS SUBMITTED AS ITEM II-4B	☐ ☐ ☐ ☐
☒	X		DESCRIPTION OF AFFECTED SYSTEMS IS SUBMITTED AS ITEM II-5	☐ ☐ ☐ ☐
☒	X		FLOODPLAIN INFORMATION IS SUBMITTED AS ITEM II-6	☐ ☐ ☐ ☐
☒	N/A	E	PERCOLATION DATA ARE SUBMITTED AS ITEM II-7	☐ ☐ ☐ ☐
☒	X	F	WATER WITHDRAWAL IS SUBMITTED AS ITEM II-8	☐ ☐ ☐ ☐

SECTION III - MASTER PLAN

☒	X	A	MASTER PAVING, GRADING, AND DRAINAGE PLANS	
☒	N/A		CONCEPTUAL APPROVAL, PLANS NOT SUBMITTED ☒ YES ☐ NO	☐ ☐ ☐ ☐
☒	N/A		MASTER PAVING, GRADING, AND DRAINAGE PLANS ARE SUBMITTED AS ITEM III-1	☐ ☐ ☐ ☐
☒	X	B	DRAINAGE PLAN DETAILS ARE SUBMITTED AS ITEM III-2	☐ ☐ ☐ ☐
☒	X	C	RECEIVING BODY LIST IS SUBMITTED AS ITEM III-3	☐ ☐ ☐ ☐
☒	X	D	CONSTRUCTION TECHNIQUES DESCRIPTION	
☒	N/A		CONCEPTUAL APPROVAL, STATEMENT NOT REQUIRED ☒ YES ☐ NO	☐ ☐ ☐ ☐
☒	N/A		CONSTRUCTION TECHNIQUES DESCRIPTION IS SUBMITTED AS ITEM III-4	☐ ☐ ☐ ☐

**SECTION III - MASTER PLAN
(CONTINUED)**SFWMID
ONLY

N A M

☒	E	LEGAL RESERVATIONS	
		CONCEPTUAL APPROVAL, RESERVATIONS NOT REQUIRED ☒ YES ☐ NO	☐ ☐ ☐ ☐
N/A		LEGAL RESERVATIONS ARE SUBMITTED AS ITEM III-5	☐ ☐ ☐ ☐
X	F	AFFECTED FACILITIES ANALYSIS IS SUBMITTED AS ITEM III-6	☐ ☐ ☐ ☐

SECTION IV - SURFACE WATER MANAGEMENT ANALYSIS

	A	FACILITIES	
X		DESCRIPTION OF EXISTING FACILITIES IS SUBMITTED AS ITEM IV-1	☐ ☐ ☐ ☐
N/A		DESCRIPTION OF PREVIOUSLY APPROVED/PERMITTED FACILITIES IS SUBMITTED AS ITEM IV-2	☐ ☐ ☐ ☐
X		DESCRIPTION OF PROPOSED FACILITIES FOR THE ENTIRE PROJECT IS SUBMITTED AS ITEM IV-3	☐ ☐ ☐ ☐
N/A		DESCRIPTION OF PROPOSED FACILITIES FOR THIS PHASE IS SUBMITTED AS ITEM IV-4	☐ ☐ ☐ ☐
N/A		FACILITY DETAILS FOR EXFILTRATION TRENCH ARE SUBMITTED AS ITEM IV-5	☐ ☐ ☐ ☐
N/A		PERCOLATION TESTS AND CALCULATIONS ARE SUBMITTED AS ITEM IV-6	☐ ☐ ☐ ☐
N/A		EXFILTRATION TRENCH COMPUTATIONS ARE SUBMITTED AS ITEM IV-7	☐ ☐ ☐ ☐
X		FACILITY DETAILS FOR GRAVITY DISCHARGE STRUCTURE(S) ARE SUBMITTED AS ITEM IV-8	☐ ☐ ☐ ☐
X		STAGE-DISCHARGE CALCULATION IS SUBMITTED AS ITEM IV-9	☐ ☐ ☐ ☐
N/A		SPREADER SWALE VELOCITY CALCULATION IS SUBMITTED AS ITEM IV-10	☐ ☐ ☐ ☐
X	B	A STAGE-DISCHARGE, A STAGE-STORAGE, AND A LAND COVERAGE TABLE FOR EACH BASIN ARE SUBMITTED AS ITEM IV-11	☐ ☐ ☐ ☐
X	C	DRAINAGE BASIN(S) AND/OR PHASE(S) TABLES ARE SUBMITTED AS ITEM IV-12	☐ ☐ ☐ ☐
X	D	WATER QUALITY BEST MANAGEMENT PRACTICES DESCRIPTION IS SUBMITTED AS ITEM IV-13A	☐ ☐ ☐ ☐
X		RETENTION/DETENTION VOLUME CALCULATIONS FOR EACH BASIN OR PHASE ARE SUBMITTED AS ITEM IV-13B	☐ ☐ ☐ ☐
X	E	WET SEASON WATER TABLE AND SOIL STORAGE CALCULATIONS ARE SUBMITTED AS ITEM IV-13C	☐ ☐ ☐ ☐
X	F	ALLOWABLE DISCHARGE SUPPORTING CALCULATIONS ARE SUBMITTED AS ITEM IV-14	☐ ☐ ☐ ☐
X	G	FLOOD ROUTINGS ARE SUBMITTED AS ITEM IV-15	☐ ☐ ☐ ☐
	H	FLOODPLAIN ENCROACHMENT	
N/A		CONVEYANCE PREDEVELOPMENT CONDITIONS ARE SUBMITTED AS ITEM IV-16	☐ ☐ ☐ ☐
N/A		CONVEYANCE POST-DEVELOPMENT CONDITIONS ARE SUBMITTED AS ITEM IV-17	☐ ☐ ☐ ☐
N/A		STORAGE PREDEVELOPMENT SITE RUNOFF CONDITIONS ARE SUBMITTED AS ITEM IV-18	☐ ☐ ☐ ☐
N/A		STORAGE PREDEVELOPMENT BASIN STORAGE CONDITIONS ARE SUBMITTED AS ITEM IV-19	☐ ☐ ☐ ☐
X		FLOODPLAIN ☐ IMPORTER ☒ EXPORTER SUPPORTING INFORMATION IS SUBMITTED AS ITEM V-20	☐ ☐ ☐ ☐

**SECTION V - LEGAL AND INSTITUTIONAL**

☒	A	PROOF OF OWNERSHIP SUPPORTING INFORMATION IS SUBMITTED AS ITEM V-1.	☐ ☐ ☐ ☐
X	B	RESPONSIBLE ENTITY(IES) SUPPORTING INFORMATION IS SUBMITTED AS ITEM V-2.	☐ ☐ ☐ ☐
	C	UTILITIES	
X		WATER UTILITIES SUPPORTING INFORMATION IS SUBMITTED AS ITEM V-3.	☐ ☐ ☐ ☐
X		SEWERAGE SUPPORTING INFORMATION IS SUBMITTED AS ITEM V-4.	☐ ☐ ☐ ☐
	D	RECEIVING BODY(IES)	
X		LEGAL AVAILABILITY DOCUMENTATION IS SUBMITTED AS ITEM V-5.	☐ ☐ ☐ ☐
X		PHYSICAL CAPACITY DOCUMENTATION IS SUBMITTED AS ITEM V-6.	☐ ☐ ☐ ☐
		RIGHT OF WAY PERMIT APPLICATION IS SUBMITTED NOW. ☐	☐ ☐ ☐ ☐
N/A		RIGHT OF WAY PERMIT IS APPLIED FOR, APPLICATION NO. _____	☐ ☐ ☐ ☐
N/A		PROJECT IS PERMITTED FOR RIGHT OF WAY, PERMIT NO. _____	☐ ☐ ☐ ☐
X	E	LAND USE TABLE IS SUBMITTED AS ITEM V-7.	☐ ☐ ☐ ☐
N/A	F	DEVELOPMENT OF REGIONAL IMPACT STATUS INFORMATION IS SUBMITTED AS ITEM V-8.	☐ ☐ ☐ ☐
X	G	BOUNDARY SURVEY IS SUBMITTED AS ITEM V-9.	☐ ☐ ☐ ☐

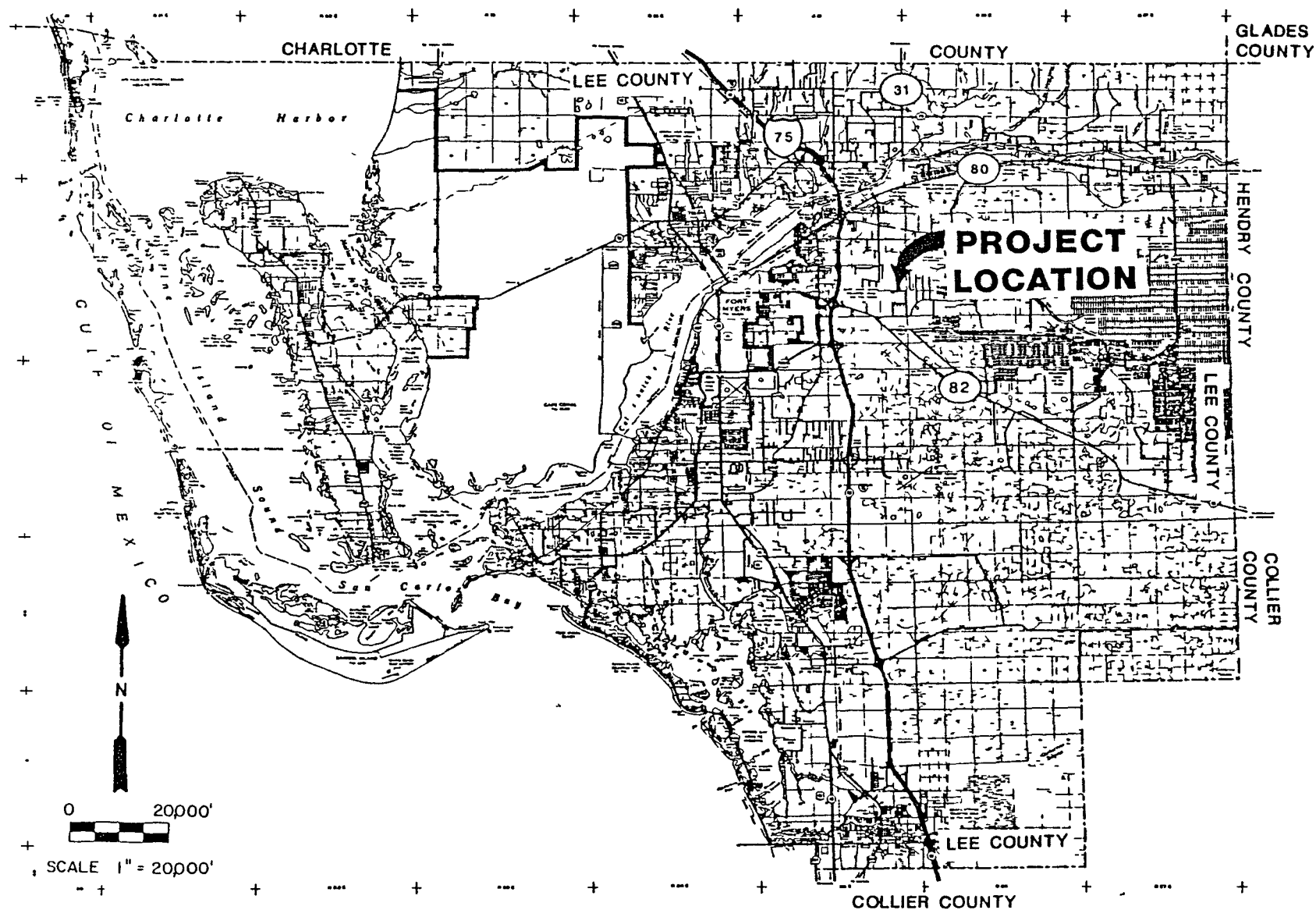
SECTION VI - PUBLIC NOTICING INFORMATION

X	A	DEPICTION OF WORKS AND FACILITIES IS SUBMITTED AS ITEM VI-1.	☐ ☐ ☐ ☐
X	B	PROJECT MAP IS SUBMITTED AS ITEM VI-2.	☐ ☐ ☐ ☐
X	C	WETLANDS STATEMENT IS SUBMITTED AS ITEM VI-3.	☐ ☐ ☐ ☐
X	D	MITIGATION STATEMENT IS SUBMITTED AS ITEM VI-4.	☐ ☐ ☐ ☐

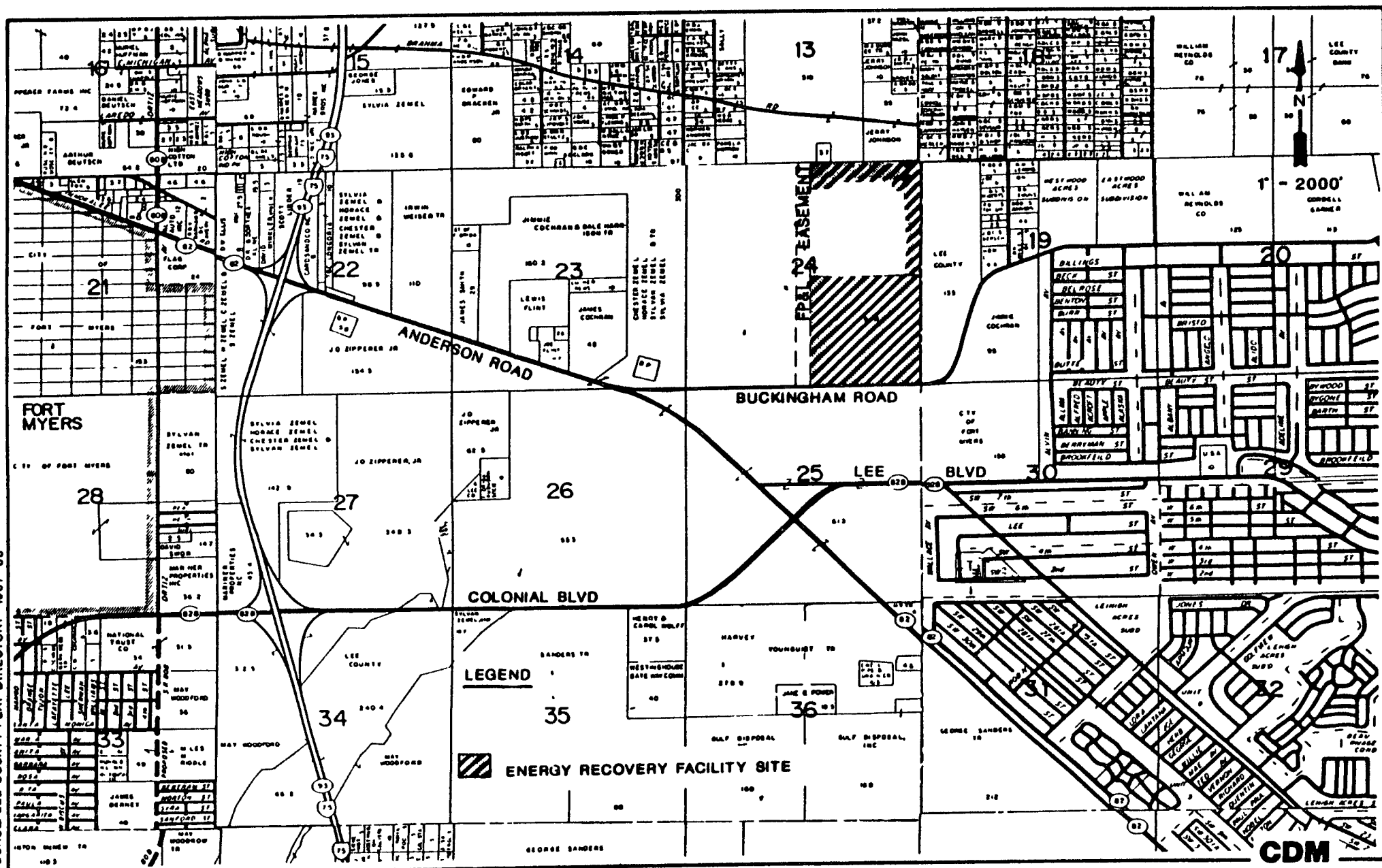
**SECTION VII - WORKS OF THE DISTRICT
SURFACE WATER IMPROVEMENT AND MANAGEMENT (SWIM)**

N/A	A	PROJECT IS PERMITTED FOR WORKS OF THE DISTRICT (SWIM). PERMIT NO. _____	☐ ☐ ☐ ☐
N/A	B	WORKS OF THE DISTRICT (SWIM) PERMIT IS APPLIED FOR. APPLICATION NUMBER: _____	☐ ☐ ☐ ☐
	C	WORKS OF THE DISTRICT (SWIM) PERMIT IS NOT REQUIRED ☒	☐ ☐ ☐ ☐

SECTION I
SITE INFORMATION



General Location Map - Lee County Energy Recovery Facility



Energy Recovery Facility Site Location Map - Lee County

OVERSIZE
DOCUMENT WAS
REMOVED AND
INSERTED INTO
OCULUS
SEPARATELY.

Item I-3

As seen in Figure 1, fifteen land use and vegetation types have been identified on the proposed energy recovery facility site. A cover type summary is included as Table 1.

Over sixty percent of the 148 acre project site is classified as Farm Pasture (210) or Wax-Myrtle (429). The remaining uplands are comprised of Palmetto Prairie (321), Pine Flatwoods (411), Brazilian Pepper (422), Pine Flatwoods invaded by exotics (4119), and Australian Pine (437).

Wetlands are located in the Western portion of the site. The wetlands, dominated by Cypress (621), form the first in a series of connected wetlands that extended offsite to the southwest where, after crossing S.R. 82, the Six Mile Cypress (SMC) Slough begins.

A smaller isolated wetland encompasses approximately nine acres in the southeast portion of the site. This wetland provides storage for stormwater runoff. For large storm events, for which wetland storage is exceeded, stormwater discharges to the swale along Buckingham Road where it then travels west to the SMC.

Figure 1

VEGETATIONAL COMMUNITIES AND LAND USE

COVER TYPE SUMMARY			
COVER TYPE	HABITAT	ACRES	% OF TOTAL
210	FARM PASTURE	31.0	33.14
212	LOW PASTURE	1.2	0.84
321	PALMETTO PRAIRIE	3.8	2.57
3219	PALMETTO PRAIRIE INVADDED BY EXOTICS	0.3	0.27
411	PINE FLATWOODS	17.9	11.64
4119	PINE FLATWOODS INVADDED BY EXOTICS	2.6	1.72
415	WET PINE FLATWOODS	4.7	3.02
4159	WET PINE FLATWOODS INVADDED BY EXOTICS	3.1	2.04
422	BRAZILLIAN PEPPER	2.9	1.97
425	MESIC OAK	0.7	0.37
429	VAX-MYRTLE	40.1	26.04
437	AUSTRALIAN PINE	0.8	0.57
514	DRAINAGE CANAL	0.6	0.47
621	CYPRESS	13.7	8.92
624	CYPRESS/PINE	2.8	1.84
6249	CYPRESS/PINE INVADDED BY EXOTICS	3.2	2.14
643	WET PRAIRIE	4.6	3.04
TOTAL PROJECT ACREAGE		154.1	100%

Kevin L Erwin
Consulting Ecologist, Inc

Project No.	0-13-20	Survey Date	1-2008	Client	Camp Dresser & McKee
Map No.	1-2008	By	LEE	Scale	AS SHOWN
Map Title	1-2008	Date	FEB 1906	Project Name	Lee County Energy Recovery Facility Site
Map Scale	1:200	Map Date	1-2008	Map Author	Kevin L Erwin

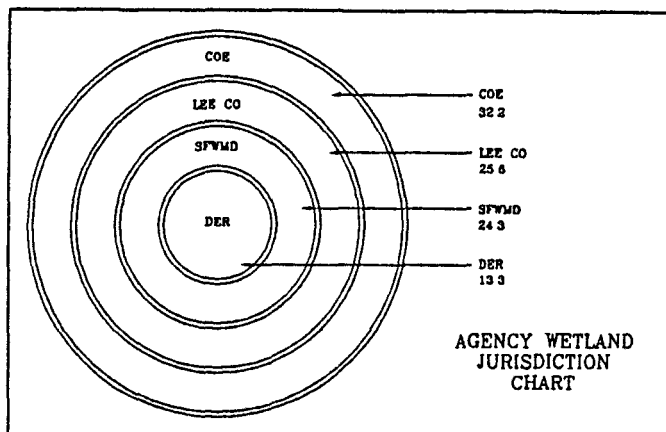
SECTION 24 TWP 44S RANGE 25E

NOTE NOT BASED ON GROUND SURVEY OR RECTIFIED AERIAL PHOTOGRAPH

WETLAND JURISDICTIONAL SUMMARY								
COVER TYPE	COE		SFWMD		LEE CO		DER	
	ACREAGE	%	ACREAGE	%	ACREAGE	%	ACREAGE	%
212	0.0	0.0%	0.0	0.0%	1.3	0.8%	0.0	0.0%
415	4.7	3.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
4159	2.6	2.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
514	0.6	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	32.2	21.2%	24.3	15.8%	25.6	16.6%	13.3	8.7%

LEGEND

	COE		COE/LEE CO/SFWMD
	COE/DER/LEE CO/SFWMD		LEE CO
	COE/DER/SFWMD		UPLAND



POWER LINE EASEMENT

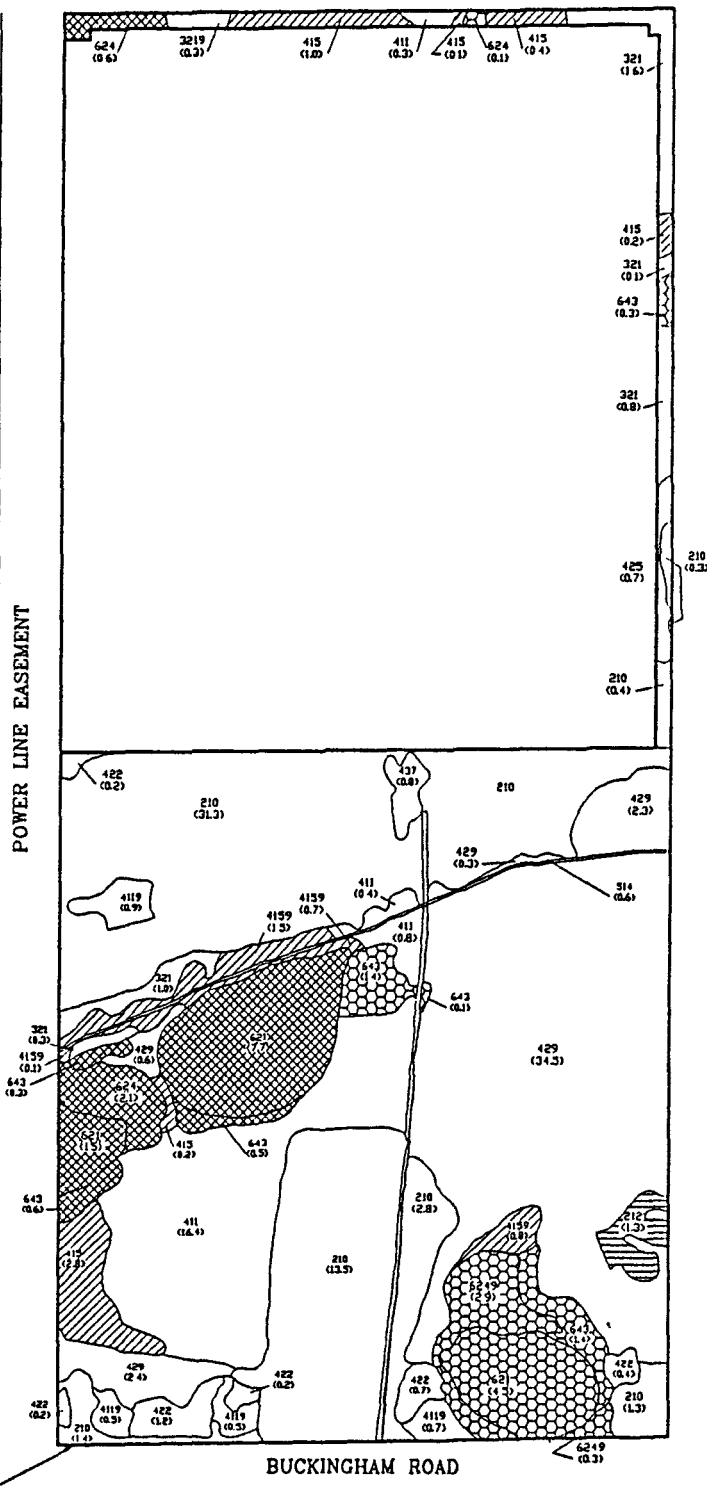


TABLE 1

COVER TYPE SUMMARY

<u>COVER TYPE</u>	<u>HABITAT</u>	<u>ACRES</u>	<u>PERCENT OF TOTAL</u>
UPLAND			
210	Farm Pasture	51.0	33.1
321	Palmetto Prairie	3.8	2.5
3219	Palmetto Prairie Invaded by Exotics	0.3	0.2
411	Pine Flatwoods	17.9	11.6
4119	Pine Flatwoods Invaded by Exotics	2.6	1.7
422	Brazilian Pepper	2.9	1.9
425	Mesic Oak	0.7	0.5
429	Wax-Myrtle	40.1	26.0
437	Australian Pine	<u>0.8</u>	<u>0.5</u>
	TOTAL UPLAND	120.1	78.0
WETLANDS			
212	Low Pasture	1.3	0.8
415	Wet Pine Flatwoods	4.7	3.0
4159	Wet Pine Flatwoods Invaded by Exotics	3.1	2.0
514	Canal/Ditch	0.6	0.4
621	Cypress	13.7	8.9
624	Cypress/Pine	2.8	1.8
6249	Cypress/Pine Invaded by Exotics	3.2	2.1
643	Wet Prairie	<u>4.6</u>	<u>3.0</u>
	TOTAL WETLAND	34.0	22.0
	Total Project Acreage	154.1*	100.0

*Includes power transmission corridor (see Figure 1)

Item I-4

The energy recovery facility has been located in upland areas (farm pasture/wax-myrtle). Approximately 29 acres of uplands will be impacted by the construction of the facility. Proposed mitigation plans for impacted wetlands are included as Exhibit A.

The surface water management system has also been designed to maintain the integrity of the wetland systems onsite. The wetlands onsite are primarily recharged via groundwater. Therefore, the control elevation will be placed at the wet season water table to prevent artificial drainage of the wetlands.

Item I-5

Not Applicable

EXHIBIT A
WETLAND MITIGATION PLAN

The Lee County Energy Recovery Facility site plan will impact approximately 2.7 acres of wetlands. Construction of the maintenance road for the electric power transmission line will require the placement of fill material in the 2.7 acres of wetlands. No additional acreage of wetlands will be disturbed or excavated. These areas consist of 1.7 acres of wet pine flatwoods (415), 0.7 acres of cypress/pine (624), and 0.3 acres of wet prairie (643) wetland habitat.

A wetland mitigation plan will be implemented to offset the functional values of the 2.7 acres of wetlands to be impacted by site development. This plan consists of enhancement of existing low quality wetlands onsite as well as the creation of new wetland habitat. The enhancement and creation techniques are described below.

Enhancement

The 9.9-acre wetland, located in the southeast corner of the property adjacent to Buckingham Road, will be enhanced. This area is currently vegetated in part by approximately 3.2 acres of cypress/pine invaded by exotics (6249) and 1.8 acres of wet pine flatwoods invaded by exotics (4159). The thick growth of the problematic exotics melaleuca (Melaleuca quinquenervia) and Brazilian pepper (Schinus terebinthifolius) in these areas have greatly reduced the value of this wetland. These exotics will be removed from this 9.9-acre wetland.

As additional enhancement, this wetland will be incorporated into the site's surface water management system. Stormwater runoff, treated initially by dry detention and secondly by wet detention, will be discharged into this wetland during major storm events. The water entering the wetland, via the control structure of the detention pond, is expected to meet all applicable state and federal water quality standards. The inclusion of this 9.9-acre wetland into the surface water management system will restore the historic depth of inundation and hydroperiod of this wetland resource.

Creation

Approximately 3.8 acres of new wetland habitat will be created from existing uplands to mitigate for the loss of 2.7 acres of existing wetlands. The wetland mitigation ratios (acres of wetlands created: acre of wetland impacted) are 2.5:1 for cypress/pine habitat, 1:1 for wet pine flatwoods habitat, and 1:1 for wet prairie habitat. The final acreage of the created wetland will be determined utilizing these ratios and may vary from the 3.8 acres depending on the actual acreage of wetland impacted by construction. In any event, the mitigation ratios described above will be used to replace the impacted wetlands, and the estimated acreage of disturbance is believed to be accurate.

The impacted wetland habitat will be mitigated for by the creation of similar wetland habitat types. Approximately 3.5 acres of forested wetland habitat and 0.3 acres of non-forested wetland habitat will be created. The forested area will be planted with nursery stock of one or more species including but not limited to bald cypress (Taxodium distichum), red maple (Acer rubrum), laurel oak (Quercus laurifolia), and pop ash (Fraxinus caroliniana). The non-forested area will either be mulched with wetland topsoil or planted with native wetland herbaceous species including but not limited to sand cordgrass (Spartina bakeri), rush (Juncus spp), sawgrass (Cladium jamaicense), panicum grass (Panicum spp), and pickerel weed (Pontederia cordata). The final species planting list for the created forested and non forested wetlands will be submitted for agency review and approval prior to construction.

The location of the $\pm$ 3.8-acre mitigation has not been finalized in order to allow for needed flexibility of the mitigation plan. Preliminary investigations indicate that the most logical locations are either immediately south or east of the large wetland mosaic located in the west-central portion of the site (Figure 2-26). The 3.8-acre upland area will be recontoured to the appropriate elevation (as determined by the project ecologist) to allow for an appropriate depth of inundation. The mitigation wetland will be connected hydrologically to adjacent DER jurisdictional wetlands. A specific detailed mitigation location, configuration, and planting plan will be submitted for agency review and approval prior to construction.

In order to document the success of the proposed wetland creation and enhancement, a wetland monitoring plan will be developed. This plan will adequately characterize the preconstruction condition of the wetland to be enhanced and the wetlands to be impacted, and will document the post construction condition of the enhanced and created wetlands. A nuisance species control program will also be implemented. These plans will be submitted for agency review and approval prior to construction.

SECTION II

PROJECT INFORMATION

Item II-1A

The project involves the construction of an energy recovery facility for Lee County. Structures to be located in the northeast quarter of the project site include the recovery operation, administration building, turbine building, cooling towers and electrical switchyard. The recovery operation will be fully enclosed and roofed. An access road will allow entry to the site from the southwest and encircle the developed site.

The proposed project area contains 154.1 acres of available property. Six acres will be devoted to a power transmission corridor to Florida Power & Light facilities as shown in Figure 1. Of the remaining 148 acres, only 28.7 acres will be developed for the energy recovery facility site.

Stormwater runoff will be collected in the western portion of the facility site, then be directed south to the stormwater detention pond. Discharge is currently proposed south to an improved swale along Buckingham Road.

Item II-1B

Guidance received from staff includes confirmation of the 37 csm peak discharge criteria for the 25-year, 72-hour storm (Fort Myers office). Also, staff requested that the control elevation of the surface water management facility be placed at or above the surrounding wetland/average wet season water table elevation (Ft. Myers office). Other miscellaneous guidance was given by the West Palm Beach office regarding dewatering, consumptive use and operation/maintenance responsibilities.

2OVERSIZE
DOCUMENT WAS
REMOVED AND
INSERTED INTO
OCULUS
SEPARATELY.

IMAGE QUALITY

**AS YOU REVIEW THE NEXT GROUP OF IMAGES, PLEASE NOTE
THAT THE ORIGINAL DOCUMENTS WERE OF POOR QUALITY.**



WETLANDS CONTROL ELEVATION TABLE

WETLAND			WETLAND-SUPPORTING BASIN		
NUMBER/ LETTER	SIZE (ACRES)	CONTROL ELEVATION (FT,NGVD)	BASIN CONTROL ELEVATION (FT,NGVD)	BASIN NUMBER/ LETTER	
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐

PROJECT DESCRIPTION AND ANY STAFF GUIDANCE:

☐☐☐☐

BASIN WATER TABLE ELEVATION TABLE

Item
II-4A

BASIN NO.	WSWT (FT, NGVD)	
Project Site	20.5	
		☐ ☐ ☐ ☐
		☐ ☐ ☐ ☐
		☐ ☐ ☐ ☐
		☐ ☐ ☐ ☐
		☐ ☐ ☐ ☐
		☐ ☐ ☐ ☐

RECEIVING BODY LIST

DISCHARGE WILL OCCUR TO RECEIVING BODY(IES)
AND VIA ROUTE(S):☐☐☐☐CONTROL
STRUCTURE
NUMBERRECEIVING
BODY*

ROUTE*

☐☐☐☐
☐☐☐☐
☐☐☐☐
☐☐☐☐
☐☐☐☐
☐☐☐☐
☐☐☐☐
☐☐☐☐
☐☐☐☐
☐☐☐☐

*INCLUDE ANY FLORIDA DEPT. OF TRANSPORTATION FACILITIES

Item II-4B

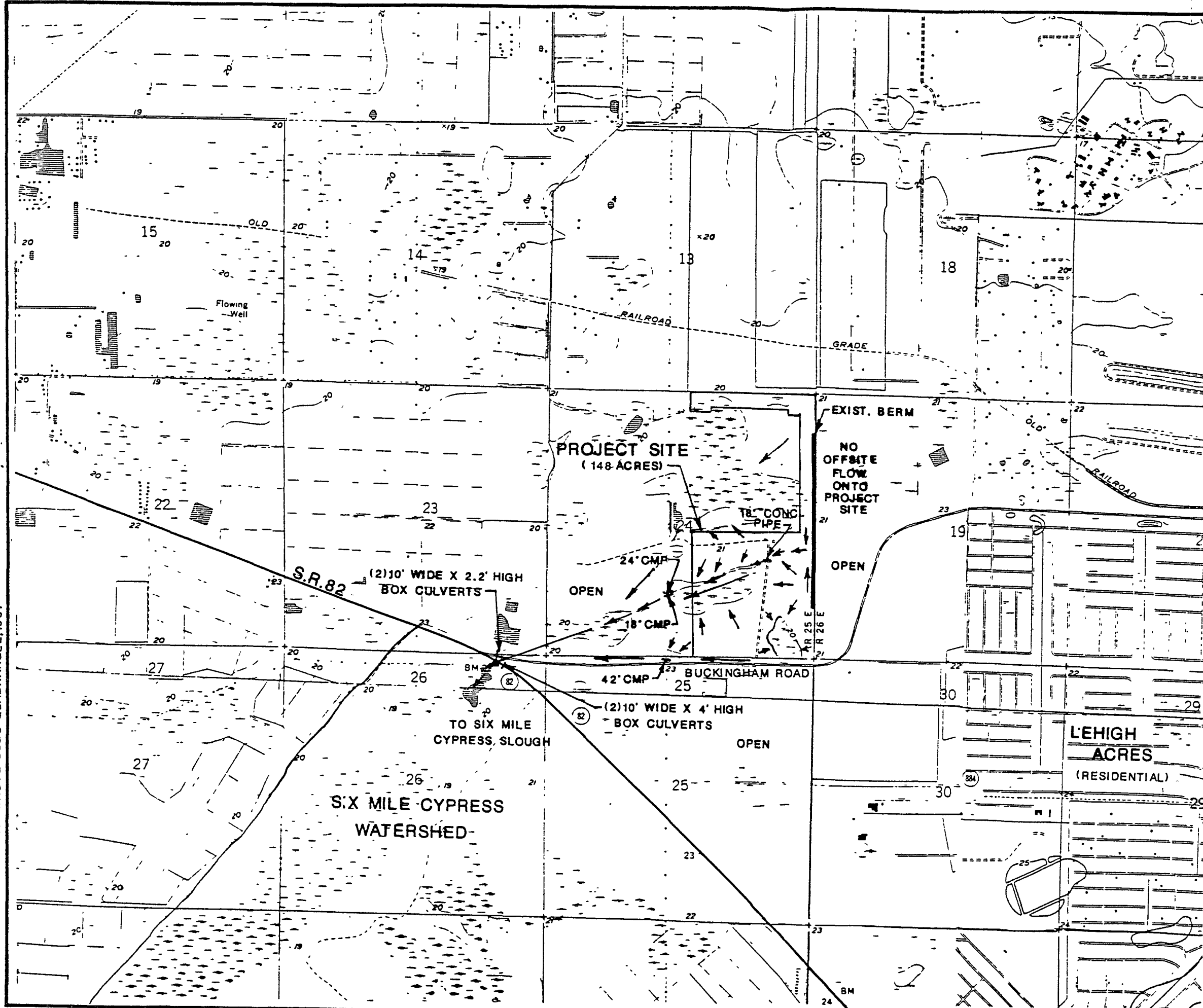
The Lee County Water Resources Management Project (JMM, 1988) included diagrams of the dry season and wet season water elevations by aquifer. Figures 2 and 3 show the water level elevations for the water table aquifer. A comparison of the two figures indicates that the difference between the dry and wet season water level elevations near the proposed site is about 2 feet (from about 16 feet NGVD to 14 feet NGVD). The diagrams also clearly show the regional groundwater 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 on-site groundwater elevations measured during the field geotechnical investigation ranged from 17.2 to 19.2 feet NGVD. The wells are relatively closely spaced and the water level data indicate that there is an overall southeasterly flow direction on site. However, the regional gradient would govern in cases of evaluating groundwater impacts.

The assumed wet season water table elevation (20.5 feet NGVD) was used for design purposes. Depth from ground surface to the wet season water table ranges from 0-2 feet across the site. This value is consistent with the above data and the Lee County SCS soil survey which places the wet season water table at 1 foot below grade. The designated design elevation (20.5 feet NGVD) is approximately 6 inches below natural grade in the area of the proposed detention pond. Actual wet season water table elevations are expected to vary from 19.5 to 20.5 ft. NGVD.

A complete geotechnical report is included in this permit as Appendix A.

SOURCE MAP BASED ON 7.5 MINUTE USGS QUADRANGLE, 1987



Drainage Map - Lee County Energy Recovery Facility

CDM

ITEM II-3

SOURCE: LEE COUNTY WATER RESOURCES MANAGEMENT PROJECT OCTOBER 5, 1988

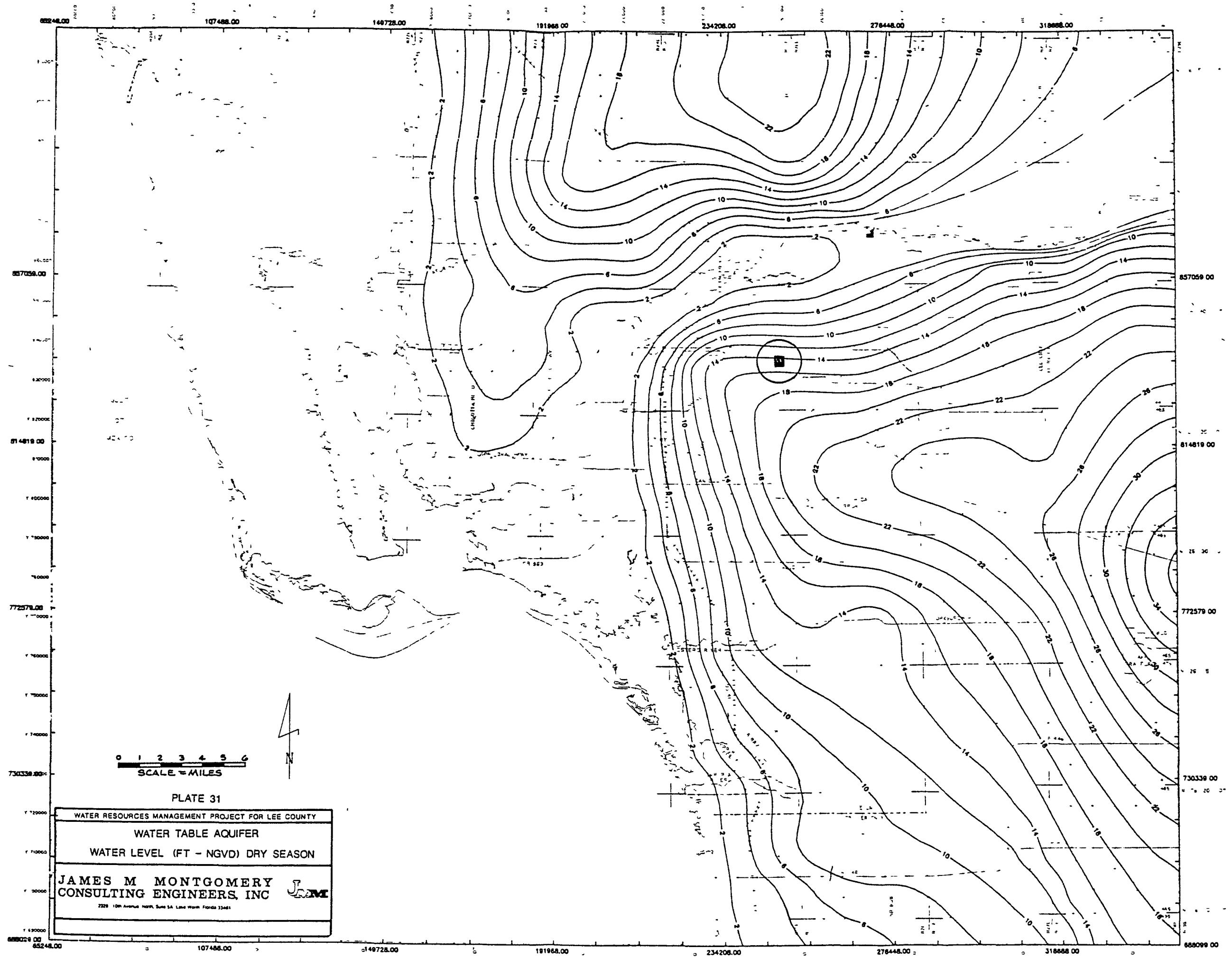
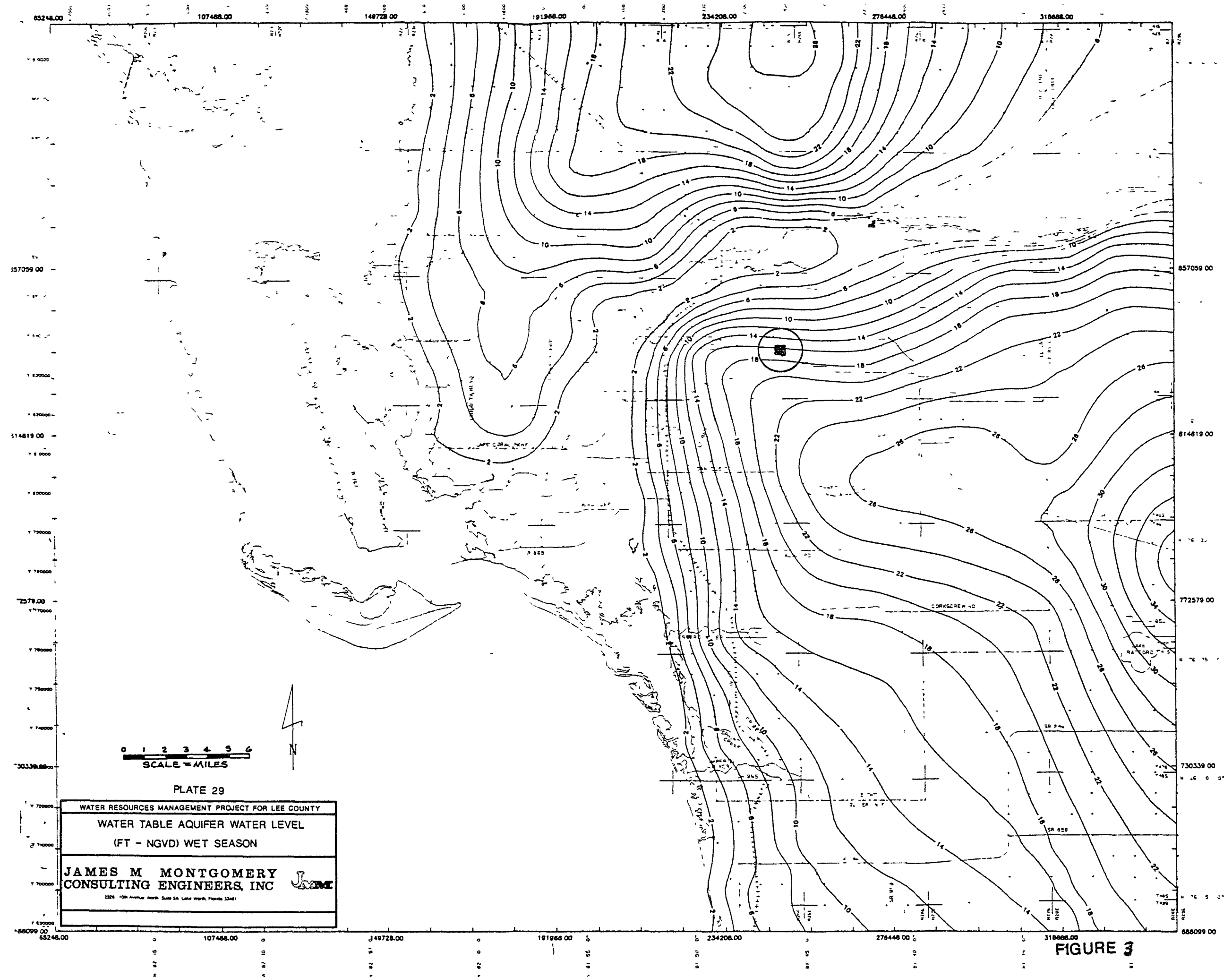


FIGURE 2

SOURCE: LEE COUNTY WATER RESOURCES MANAGEMENT PROJECT OCTOBER 5, 1988



Item II-5

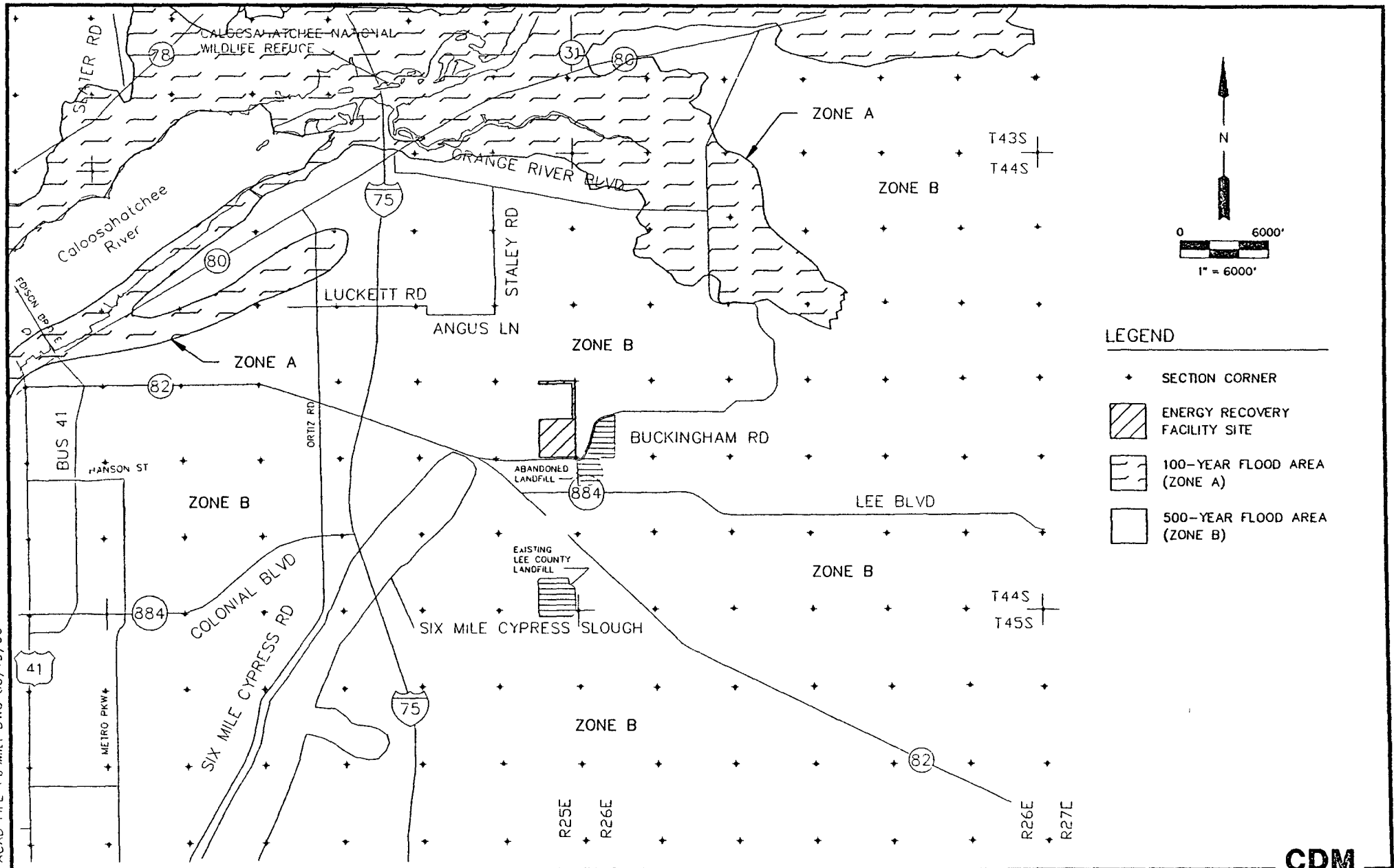
As seen in Item II-6, an abandoned landfill is located southeast of the project area across Buckingham Road. Known as the Buckingham Landfill, the associated property actually consists of two tracts.

The south tract was operated by the City of Fort Myers beginning in May 1954. Based on available information, no known permits existed for the site which accepted mainly residential, commercial, and horticultural waste until December 1973. No references were found which could verify the existence of liners at the site. (See USGS Open File Report 75.594 for additional information.)

The north tract was operated by Lee County starting in November 1972. It is assumed that the landfill accepted mainly residential and commercial waste. Again, based on available information, no known permits exist for the site. No references were found to existing liners.

The surface water management system for the energy recovery facility will not have an adverse impact on water resources in the area of the abandoned landfills. The control elevation will be located at or above the existing wet season water table elevation. Therefore, an artificial hydraulic gradient that may cause pollutant migration will not be created.

ACAD FILE C:\J-MILE DWG 06/19/90



100 Year Flood Prone Areas - Lee County Energy Recovery Facility

Item II-7

Not applicable

Item II-8

A water use permit accompanies this application.

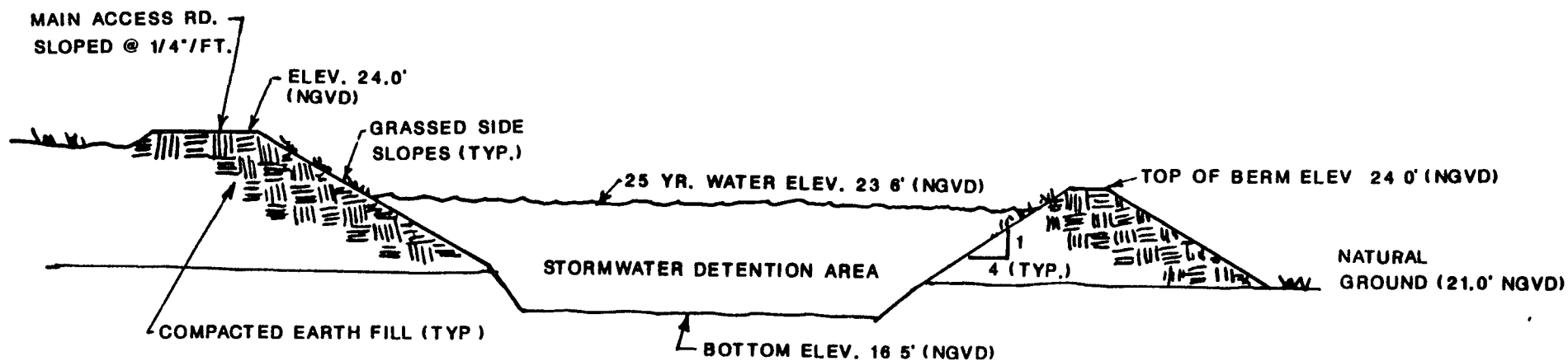
SECTION III

MASTER PLAN

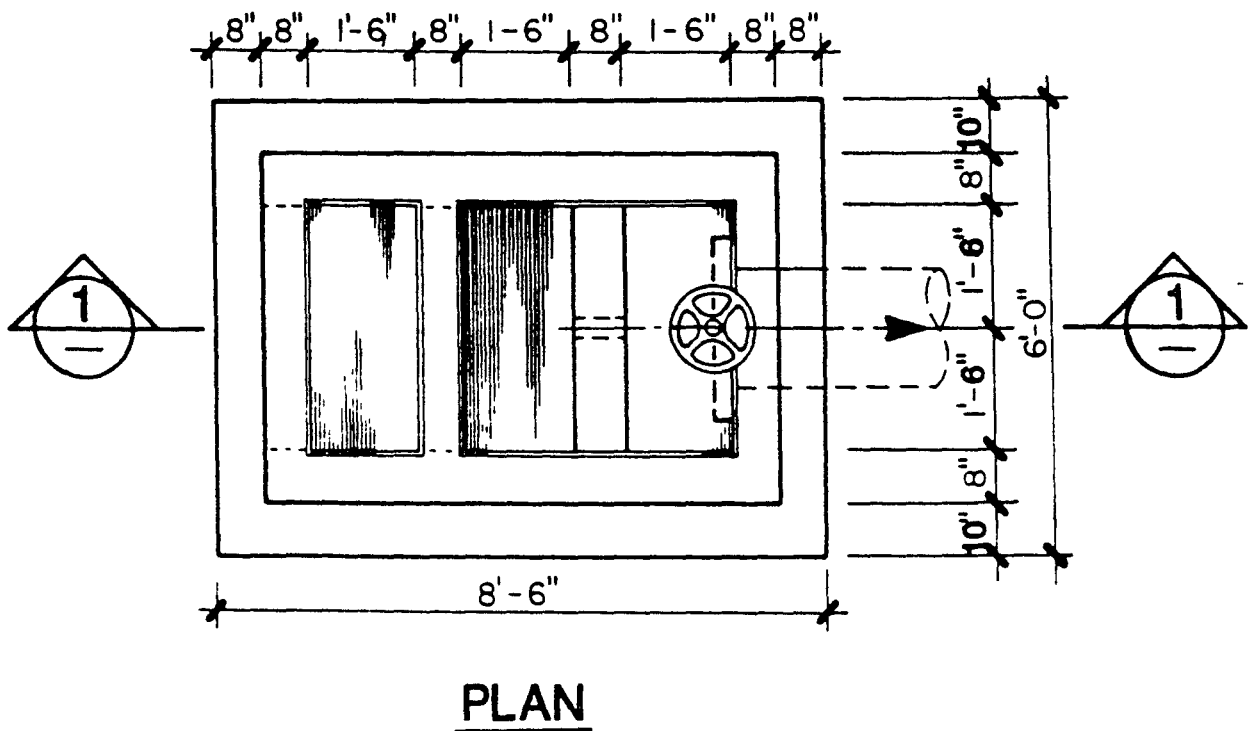
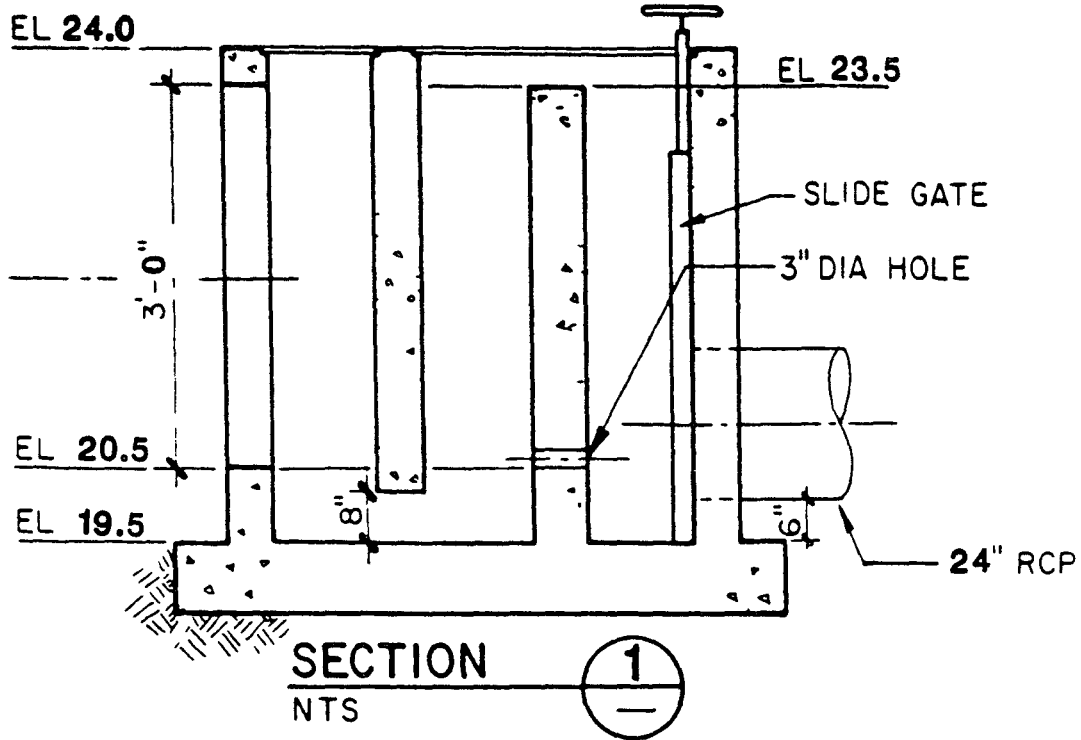
Item III-1

Master Paving, Grading, and Drainage Plans are not required for conceptual approval.

OVERSIZE
DOCUMENT WAS
REMOVED AND
INSERTED INTO
OCULUS
SEPARATELY.

SECTION A-A

NTS

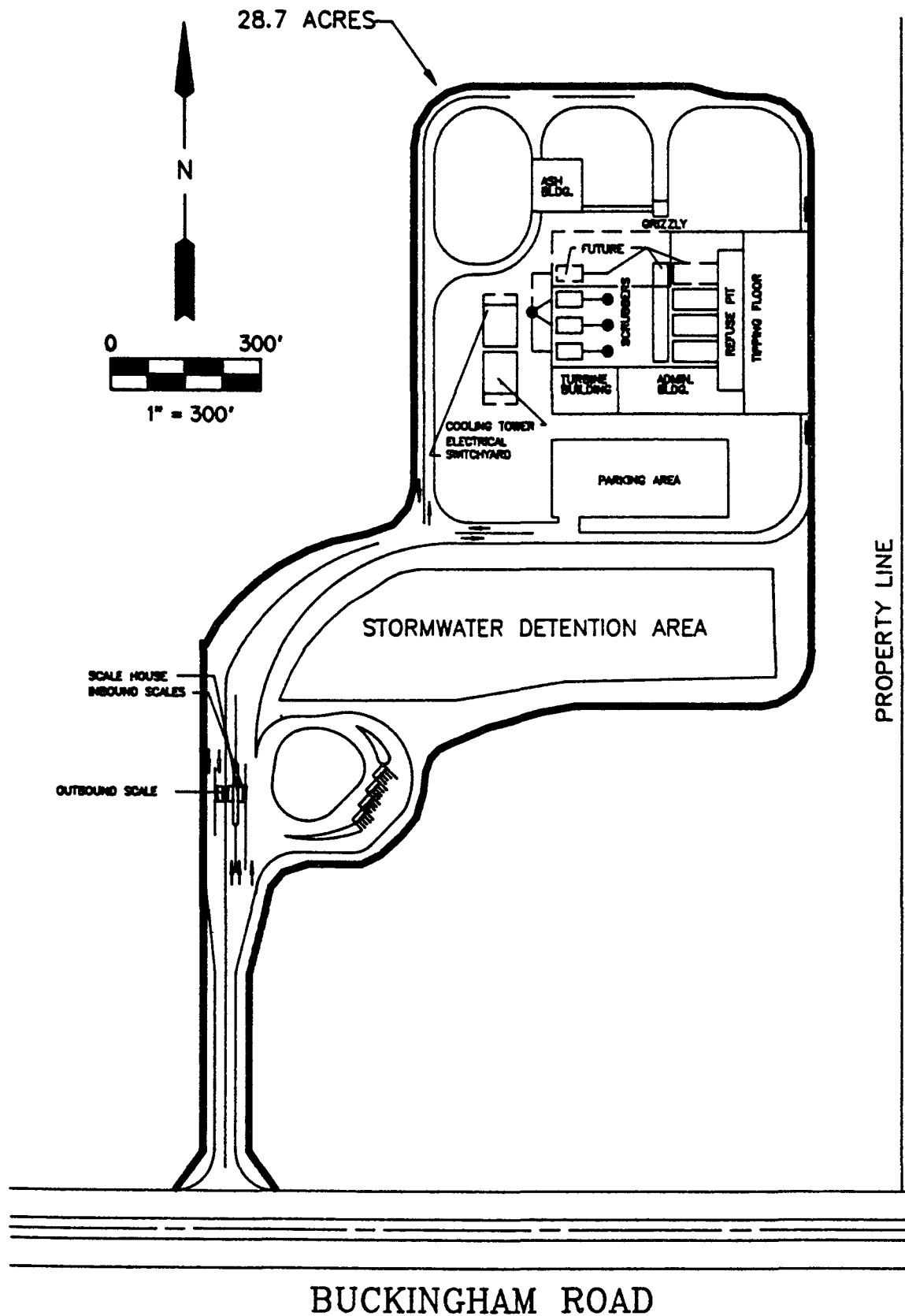


ITEM III-2C

Outflow Structure Detail

CDM
ITEM III-2C

ACAD FILE: RRSITEF2.DWG 06/21/90





WETLANDS CONTROL ELEVATION TABLE

WETLAND			WETLAND-SUPPORTING BASIN		
NUMBER/ LETTER	SIZE (ACRES)	CONTROL ELEVATION (FT, NGVD)	BASIN CONTROL ELEVATION (FT, NGVD)	BASIN NUMBER/ LETTER	
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐
					☐ ☐ ☐ ☐

PROJECT DESCRIPTION AND ANY STAFF GUIDANCE:

☐☐☐☐

BASIN WATER TABLE ELEVATION TABLE

BASIN NO.	WSWT (FT, NGVD)	
		☐ ☐ ☐ ☐
		☐ ☐ ☐ ☐
		☐ ☐ ☐ ☐
		☐ ☐ ☐ ☐
		☐ ☐ ☐ ☐
		☐ ☐ ☐ ☐

RECEIVING BODY LIST

DISCHARGE WILL OCCUR TO RECEIVING BODY(IES)
AND VIA ROUTE(S):☐☐☐☐CONTROL
STRUCTURE
NUMBERRECEIVING
BODY*

ROUTE*

Item III-3

Outfall Structure

County Right-Of-Way

Six Mile Cypress
SloughGrassed swale, wetland
Buckingham Road swale,
under Buckingham Road
through (2) 10'x2.2' box
culvert.
Under S.R. 82 through
(2) 10'x4' box culverts☐☐☐☐
☐☐☐☐
☐☐☐☐
☐☐☐☐
☐☐☐☐
☐☐☐☐
☐☐☐☐
☐☐☐☐
☐☐☐☐
☐☐☐☐

*INCLUDE ANY FLORIDA DEPT. OF TRANSPORTATION FACILITIES

Item III-4

Not required for conceptual approval.

Item III-5

Not required for conceptual approval

Item III-6

The proposed water management system will not create an impact on the existing wetlands. The surface water management system has also been designed to maintain the integrity of the wetland systems onsite. The wetlands onsite are primarily recharged via groundwater. Therefore, the control elevation will be placed at the wet season water table to prevent artificial drainage of the wetlands. Discharge for the detention pond will be directed to the isolated wetland in the south for further polishing. Figure 1 details the location of wetlands in the vicinity of the project area.

SECTION IV

SURFACE WATER MANAGEMENT ANALYSIS

Item IV-1

The proposed project site has no surface water bodies (lakes, canals, streams) within its boundary. Jurisdictional wetlands are present along the western edge of the site. An isolated wetland encompasses approximately 9 acres in the southern portion of the site (see Section 2.3.5). Existing surface water runoff sheet-flows into these wetlands, which provide 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 S.R. 82 into the Six Mile Cypress slough. The Six Mile Cypress Slough is classified in the Lee County Comprehensive Plan as an "Environmentally Critical Area" and a "Resource Protection Area".

Historic drainage patterns onsite have been altered, in part, by an entrance road which acts as a drainage basin divide for small rain events. An existing 18-inch diameter culvert, located under the entrance road, connects a small depressional flowway in the eastern portion of the site to the wetlands in the west (see Figure 2-25).

Item IV-2

Not applicable.

Item IV-3

Runoff from the developed site will be collected and conveyed westerly. Dry Pretreatment is provided within the confines of the perimeter road before runoff reaches the storage facility. Stormwater will then enter a 5.0 acre wet detention pond that provides storage for the 25 year storm event. The proposed control structure is a baffled box outfall with a 36 inch broad crested weir. The weir crest elevation is set at 23.5' NGVD. A 3-inch circular bleeder is located in the weir plate with an invert of 20.5' NGVD. A detail of the control structure is shown in Item III-2.

LCD8/4

Item IV-4, 5, 6, 7

Not applicable

LCD8/4



Form 06-45 G20

SFWMO
ONLY

N A I M

DISCHARGE STRUCTURE TABLE

□ □ □ □

	DISCHARGE STRUCTURE			
	NO. 1	NO.	NO.	
BAFFLE	☒	☐	☐	☐
CONTROL DEVICE	☒	☐	☐	☐
CIRCULAR ORIFICE	☐	☐	☐	☐
INVERT ELEVATION	20.5' NGVD			☐
DIAMETER	3 inch			☐
TRIANGULAR ORIFICE	☐	☐	☐	☐
INVERT ELEVATION				☐
INVERT ANGLE				☐
HEIGHT				☐
TOP WIDTH				☐
OTHER	☐	☐	☐	☐
				☐
				☐
OVERFLOW DEVICE	☐	☐	☐	☐
WEIR	☒	☐	☐	☐
SHARP-CRESTED	☐	☐	☐	☐
BROAD-CRESTED	☒	☐	☐	☐
"C" VALUE	3.06			☐
LENGTH	36 inch			☐
CREST ELEVATION	23.5' NGVD			☐
SIDE SLOPE, IF APPLICABLE (VERTICAL:HORIZONTAL)	1:1	1:1	1:1	☐
OTHER	☐	☐	☐	☐
				☐
				☐
OUTFALL CULVERT, DITCH, ETC.	☒	☐	☐	☐
LENGTH	70			☐
DIMENSION(S)	2 ft. diam			☐
MATERIAL	conc. pipe			☐
INVERT ELEVATION				☐
UPSTREAM	20.0			☐
DOWNSTREAM	19.5			☐
SPREADER SWALE	☐	☐	☐	☐
LENGTH				☐
INVERT ELEVATION				☐
CREST ELEVATION				☐
OTHER	☐	☐	☐	☐
				☐
				☐
				☐

Item IV-9

Discharge Structure Calculations

Circular Orifice

For Partial Flow: $Q = CLH^{3/2}$ $C = 3.0$

For Full Flow: $Q = CA (2gh)^{1/2}$ $C = 0.6$

Broad Crested Weir $Q = CLH^{1.5}$ $C = 3.06$

<u>Stage</u> <u>(ft. NGVD)</u>	<u>Bleeder</u> <u>(CFS)</u>	<u>Weir</u> <u>(CFS)</u>	<u>Discharge</u> <u>(CFS)</u>
20.5	0	0	0
21.0	0.14	0	0.14
21.5	0.22	0	0.22
22.0	0.27	0	0.27
22.5	0.32	0	0.32
23.0	0.36	0	0.36
23.5	0.40	3.24	3.64
24.0	0.43	9.18	9.61
24.5	0.46	16.86	17.32
25.0	0.49	25.96	26.45
25.5	0.52	36.28	36.80

Item IV-10

Not Applicable

LCD8/4

BASIN NO. _____ Site _____ CONTROL STRUCTURE NO. _____ ☐☐☐☐STAGE-DISCHARGE TABLE ☐☐☐☐

CONTROL ELEVATION: 20.5 FT, NGVD

ELEVATION (FT, NGVD)	CONTROL STRUCTURE DISCHARGE (CFS)	COMMENTS	☐ ☐ ☐ ☐
20.5	0	Control Elevation	☐ ☐ ☐ ☐
21.0	.14		☐ ☐ ☐ ☐
21.5	.22		☐ ☐ ☐ ☐
22.0	.27		☐ ☐ ☐ ☐
22.5	.32		☐ ☐ ☐ ☐
23.0	.36		☐ ☐ ☐ ☐
23.5	3.64		☐ ☐ ☐ ☐
24.0	9.61		☐ ☐ ☐ ☐
24.5	17.32		☐ ☐ ☐ ☐
25.0	26.45		☐ ☐ ☐ ☐
25.5	36.80		☐ ☐ ☐ ☐

LAND COVERAGE TABLE ☐☐☐☐

LAND USE	SIZE (ACRES)	STORAGE CAN OCCUR		☐ ☐ ☐ ☐
		FROM ELEVATION (FT, NGVD)	TO ELEVATION (FT, NGVD)	
BUILDING AREAS	4.9			☐ ☐ ☐ ☐
WET AREAS	5.0	20.5	25	☐ ☐ ☐ ☐
OTHER: Pervious	11.4 total	21.5	50	☐ ☐ ☐ ☐
Road/Parking	7.4	24	25	☐ ☐ ☐ ☐
TOTAL	28.7			☐ ☐ ☐ ☐

STAGE-STORAGE TABLE ☐☐☐☐

	ELEVATION (FT, NGVD)	WET AREAS (AC-FT)	ALL OTHERS (AC-FT)	TOTAL (AC-FT)	☐ ☐ ☐ ☐
CONTROL ELEVATION:	20.5	0	0	0	☐ ☐ ☐ ☐
	21.0	2.5	0	2.5	☐ ☐ ☐ ☐
	21.5	5.1	0	5.1	☐ ☐ ☐ ☐
	22.0	7.9	1.1	9.0	☐ ☐ ☐ ☐
	22.5	10.7	2.2	12.9	☐ ☐ ☐ ☐
	23.0	13.5	3.4	16.9	☐ ☐ ☐ ☐
	23.5	16.4	4.5	20.9	☐ ☐ ☐ ☐
	24.0	17.7	5.6	25.1	☐ ☐ ☐ ☐
	24.5	22	6.7	28.7	☐ ☐ ☐ ☐
	25.0	24.5	7.8	32.3	☐ ☐ ☐ ☐
	25.5	27	9.0	36.0	☐ ☐ ☐ ☐
	26.0	29.5	10.2	39.7	☐ ☐ ☐ ☐

* Dry pretreatment areas only. No credit taken for additional on site storage.



DRAINAGE BASIN(S) TABLE

□□□□

	BASIN NO. <u>Site</u>		BASIN NO. _____		TOTAL DRAINAGE AREA	□□□□
	PROJECT	OFF-SITE	PROJECT	OFF-SITE		
	(ACRES)	(ACRES)	(ACRES)	(ACRES)	(ACRES)	
IMPERVIOUS						
BUILDINGS	4.9					□□□□
OTHERS	7.4					□□□□
WATER MANAGEMENT						
WET	5.0					□□□□
DRY	2.2					□□□□
PERVIOUS (11.4-2.2) =	9.2					□□□□
TOTAL	28.7					□□□□
NUMBER OF DWELLING	/		/		/	□□□□
UNITS (ALLOWED/ PROPOSED)						
SQUARE FOOTAGE OF:						
COMMERCIAL						□□□□
INDUSTRIAL approx 180,000						□□□□

PHASE(S) TABLE

□□□□

	CONSTRUCTION AND OPERATION				TOTAL PROJECT AREA (ACRES)	
	ALL PAST PHASES		THIS PHASE			
	PROJECT (ACRES)	OFF-SITE (ACRES)	PROJECT (ACRES)	OFF-SITE (ACRES)		
IMPERVIOUS						
BUILDINGS	_____	_____	_____	_____	_____	☐ ☐ ☐ ☐
OTHERS	_____	_____	_____	_____	_____	☐ ☐ ☐ ☐
WATER MANAGEMENT						
WET	_____	_____	_____	_____	_____	☐ ☐ ☐ ☐
DRY	_____	_____	_____	_____	_____	☐ ☐ ☐ ☐
PERVIOUS	_____	_____	_____	_____	_____	☐ ☐ ☐ ☐
TOTAL	_____	_____	_____	_____	_____	☐ ☐ ☐ ☐
NUMBER OF DWELLING	_____/____	_____	_____/____	_____	_____/____	☐ ☐ ☐ ☐
UNITS (ALLOWED/ PROPOSED)						
SQUARE FOOTAGE OF:						
COMMERCIAL	_____	_____	_____	_____	_____	☐ ☐ ☐ ☐
INDUSTRIAL	_____	_____	_____	_____	_____	☐ ☐ ☐ ☐

Item IV-13A

Best management practices are incorporated into the design of the surface water management system. Although all industrial operations will be fully enclosed and roofed, more than 2.2 acres of the site is devoted to dry pretreatment which is twice the amount required. The control structure will also include a baffle to prevent the discharge of floatable materials. The conveyance from the discharge structure offsite is overland flow through wetlands for polishing. Stormwater sampling is also proposed to verify the operational efficiency of the surface water management system. A screw gate has been incorporated into the outfall structure. When closed, the gate will prevent the discharge of stormwater if necessary.



☐ BASIN NUMBER Site OR ☐ PHASE NUMBER ☐☐☐☐
FOR FIRST INCH:
 $1 \text{ IN.} \times \frac{1 \text{ FT}}{12 \text{ IN.}} \times \frac{28.7}{(\text{PROJECT AREA, ACRES})} = [2.4] \text{ AC-FT}$ ☐☐☐☐

FOR 2.5 IN. TIMES PERCENT IMPERVIOUS (ALL AREA UNITS IN ACRES):
SITE AREA: $\frac{28.7}{\text{PROJECT AREA}} - \left(\frac{5}{\text{LAKES}} + \frac{4.9}{\text{ROOFS}} \right) = \frac{18.8}{\text{SITE AREA}}$ ☐☐☐☐
IMPERVIOUS AREA: $\frac{18.8}{\text{SITE AREA}} - \frac{11.4}{\text{PERVIOUS AREA}} = \frac{7.4}{\text{IMPERVIOUS AREA}}$ ☐☐☐☐

PERCENT IMPERVIOUS: $\frac{\text{IMPERVIOUS AREA } (7.4)}{\text{SITE AREA } (18.8)} \times 100\% = \frac{.39}{\text{PERCENT IMPERV.}}$ ☐☐☐☐

2.5 IN. x % IMPERVIOUS: $2.5 \text{ IN.} \times \frac{.39}{\text{PERCENT IMPERVIOUS}} = \frac{.98}{\text{INCHES TO BE TREATED}}$ ☐☐☐☐

INCHES TO BE TREATED TIMES AREA TO BE TREATED:
 $\frac{.98}{\text{INCHES TO BE TREATED}} \text{ IN.} \times \left(\frac{28.7}{\text{PROJECT AREA}} - \frac{5}{\text{LAKES}} \right) \times \frac{1 \text{ FT}}{12 \text{ IN.}} = [1.9] \text{ AC-FT}$ ☐☐☐☐

REQUIRED WET DETENTION = LARGER OF TWO [2.4, 1.9] VALUES
= 2.4 AC-FT ☐☐☐☐

WILL SYSTEM UTILIZE DRY DETENTION?

☒ NO ☐☐☐☐
☐ YES: ☐☐☐☐
REQUIRED DRY DETENTION = $0.75 \times \frac{\text{REQUIRED WET DETENTION}}{\text{REQUIRED WET DETENTION}} = \text{AC-FT}$ ☐☐☐☐

WILL SYSTEM UTILIZE RETENTION?

☒ NO ☐☐☐☐
☐ YES: ☐☐☐☐
REQUIRED RETENTION = $0.5 \times \frac{\text{REQUIRED WET DETENTION}}{\text{REQUIRED WET DETENTION}} = \text{AC-FT}$ ☐☐☐☐

ACTUAL DETENTION/RETENTION TO BE PROVIDED = $\frac{20.9}{\text{AC-FT}}$ ☐☐☐☐
IT WILL BE PROVIDED BETWEEN CONTROL ELEVATION = $\frac{20.5}{\text{FT, NGVD}}$ ☐☐☐☐
AND ELEVATION = $\frac{24.0}{\text{FT, NGVD}}$ ☐☐☐☐

PARCEL DISCHARGES TO OFW AND IS GREATER THAN 40% IMPERVIOUS?

☐ YES: SEE "DRY PRETREATMENT" BELOW. ☐☐☐☐
☐ NO ☐☐☐☐

PARCEL IS ZONED COMMERCIAL OR INDUSTRIAL?

☐ YES, BUT ITEM IV-6 (ASSURANCES) IS ATTACHED. ☐☐☐☐
☒ YES, BUT ITEM IV-6 (ASSURANCES) IS WAIVED. ☐☐☐☐
SEE "DRY PRETREATMENT" BELOW. ☐☐☐☐
☐ NO ☐☐☐☐

DRY PRETREATMENT

VOLUME REQUIRED:
 $0.5 \text{ IN.} \times \left(\frac{28.7}{\text{PROJECT AREA}} - \frac{5}{\text{LAKES}} \right) \text{ AC} \times \frac{1 \text{ FT}}{12 \text{ IN.}} = \text{AC-FT}$ ☐☐☐☐

METHOD: Dry detention combined with wet detention storage ☐☐☐☐
facilities



☐ BASIN NUMBER _____ Site OR ☐ PHASE NUMBER _____

AVERAGE DEVELOPED SITE PERVIOUS AREAS ELEVATION: * 22.5 FT, NGVD

WET SEASON WATER TABLE (WSWT), ELEVATION: - * 20.5 FT, NGVD*

THEREFORE, AVERAGE DEPTH TO WSWT: 2 FT

*THIS IS BASED ON:

☒ ON-SITE BORING DONE (DATE) _____; OR

☐ SFWM PERMIT (NUMBER) _____; OR

☒ OTHER: see Item II-4 _____

RESULTING SITE-WIDE SOIL STORAGE:

PERVIOUS UNCOMPACTED ACRES x _____ IN. = _____ AC-IN.

11.4 PERVIOUS COMPACTED ACRES x 1.88 IN. = 21.4 AC-IN.

11.4 TOTAL PERVIOUS ACRES TOTAL = _____ AC-IN.

SITE SOIL STORAGE = TOTAL AC-IN. = 21.4 AC-IN. = 1.88 IN.

TOTAL PERVIOUS ACRES 11.4 AC

☐ BASIN NUMBER _____ OR ☐ PHASE NUMBER _____

AVERAGE DEVELOPED SITE PERVIOUS AREAS ELEVATION: _____ FT, NGVD

WET SEASON WATER (WSWT), ELEVATION: - _____ FT, NGVD*

THEREFORE, AVERAGE DEPTH TO WSWT: _____ FT

*THIS IS BASED ON:

☐ ON-SITE BORING DONE (DATE) _____; OR

☐ SFWM PERMIT (NUMBER) _____; OR

☐ OTHER: _____

RESULTING SITE-WIDE SOIL STORAGE:

PERVIOUS UNCOMPACTED ACRES x _____ IN. = _____ AC-IN.

PERVIOUS COMPACTED ACRES x _____ IN. = _____ AC-IN.

TOTAL PERVIOUS ACRES TOTAL = _____ AC-IN.

SITE SOIL STORAGE = TOTAL AC-IN. = _____ AC-IN. = _____ IN.

TOTAL PERVIOUS ACRES AC

Item IV-14

PROPOSED DISCHARGE TABLE

□□□□

PROJECT BASIN OR OFF-SITE AREA NUMBER	RECEIVING BODY		ALLOWABLE DISCHARGE		
	NAME	TAILWATER ELEVATION (FT, NGVD)	AMOUNT (CFS)	METHOD* NUMBER	
Site	ERF	20.5	1.7 (37 csm)	3	□□□□
					□□□□
					□□□□
					□□□□
					□□□□
					□□□□
					□□□□
					□□□□
					□□□□
					□□□□
					□□□□
					□□□□

* FOR EXAMPLE:

1. HISTORIC DISCHARGE (COMMONLY "PRE-VERSUS POST")
(PROVIDE CALCULATIONS IN "UNDEVELOPED BASIN AND
HISTORIC SHEETFLOW COMPUTATIONS" BELOW.)
2. PREVIOUS DISTRICT PERMITS
3. DISTRICT CRITERIA 7-61
4. OTHER: Six Mile Cypress Basin Formula

□□□□



FLOOD ROUTING SUMMARY TABLE

☐ BASIN NO. _____	OR	☐ PHASE NO. _____		☐ ☐ ☐ ☐
			RAINFALL AMOUNT (INCHES)	
ROADS				
DISTRICT 5-YEAR, 24-HOUR			_____	☐ ☐ ☐ ☐
OTHER: _____-YEAR, _____-HOUR			_____	☐ ☐ ☐ ☐
OTHER: _____			_____	☐ ☐ ☐ ☐
FLOOD CONTOUR: _____ FT, NGVD			_____	☐ ☐ ☐ ☐
MINIMUM GRADE: _____ FT, NGVD			_____	☐ ☐ ☐ ☐
PARKING LOTS WITH TRENCH				
DISTRICT 5-YEAR, 1-HOUR			_____	☐ ☐ ☐ ☐
OTHER: _____-YEAR, _____-HOUR			_____	☐ ☐ ☐ ☐
OTHER: _____			_____	☐ ☐ ☐ ☐
FLOOD CONTOUR: _____ FT, NGVD			_____	☐ ☐ ☐ ☐
MINIMUM GRADE: _____ FT, NGVD			_____	☐ ☐ ☐ ☐
BASIN DESIGN				
STANDARD 25-YEAR, 72-HOUR			10.2	☐ ☐ ☐ ☐
OTHER: _____-YEAR, _____-HOUR			_____	☐ ☐ ☐ ☐
OTHER: _____			_____	☐ ☐ ☐ ☐
FLOOD CONTOUR : 23.6 FT, NGVD			_____	☐ ☐ ☐ ☐
MINIMUM PERIMETER SITE GRADE: 24 FT, NGVD			_____	☐ ☐ ☐ ☐
PEAK DISCHARGE				
ALLOWABLE: 1.7 CFS			_____	☐ ☐ ☐ ☐
DESIGN : 0.5 CFS			_____	☐ ☐ ☐ ☐

BUILDING FLOORS

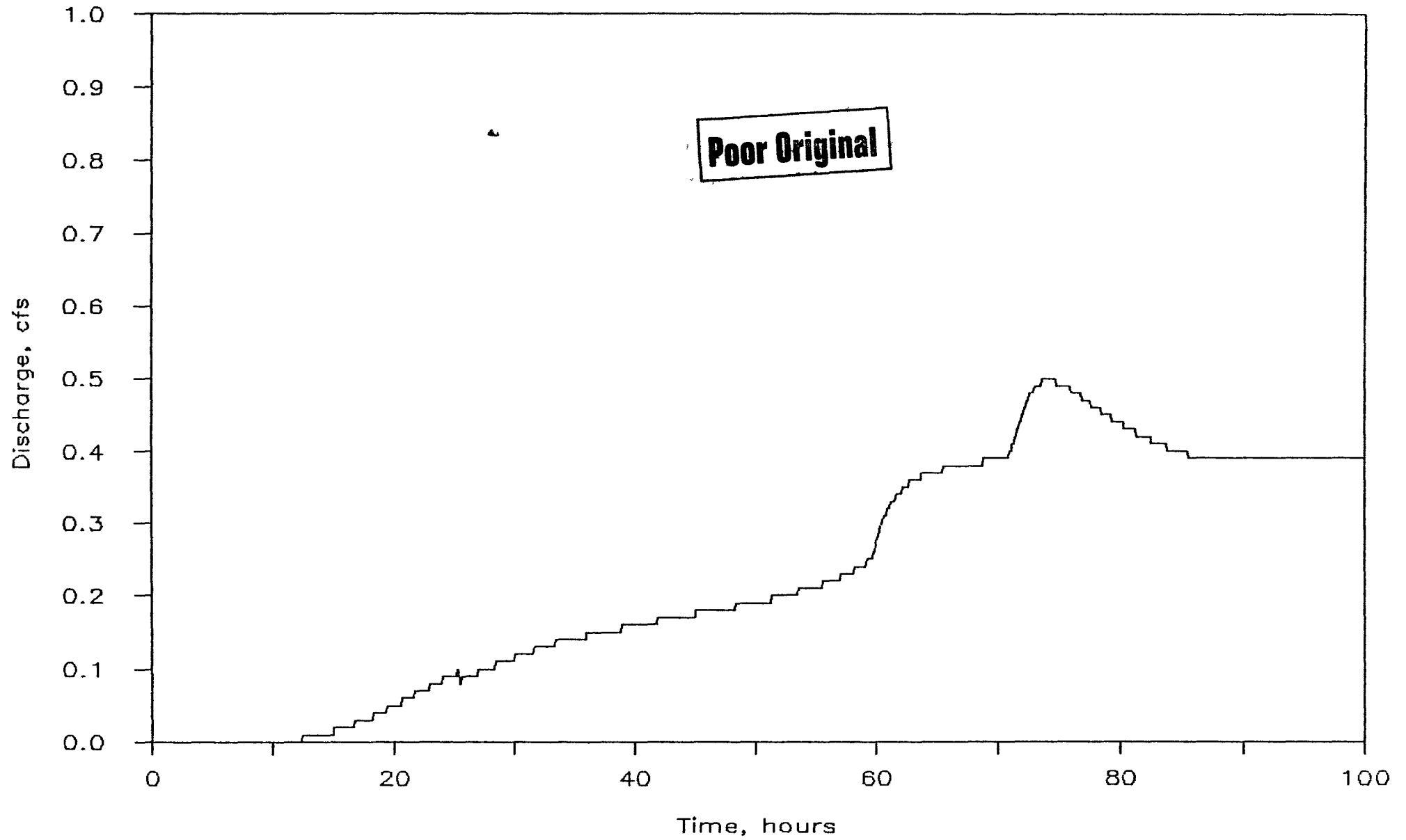
DISTRICT 100-YEAR, 72-HOUR, 0-DISCHARGE	12.9	☐ ☐ ☐ ☐
OTHER: _____	_____	☐ ☐ ☐ ☐
FLOOD CONTOUR : 24.5 FT, NGVD*	_____	☐ ☐ ☐ ☐
MINIMUM FLOOR : 25.0 FT, NGVD	_____	☐ ☐ ☐ ☐
FEMA FLOOD : N/A FT, NGVD	_____	☐ ☐ ☐ ☐
100-YEAR 72-HOUR, 0-DISCHARGE STORM CALCULATIONS		
*P = 12.9 IN.		☐ ☐ ☐ ☐
72-HOUR RAINFALL		
S = 0.75 IN.		☐ ☐ ☐ ☐
SOIL STORAGE		
$Q = \frac{(P - 0.25)^2}{P + 0.8S} = \frac{(12.9 \text{ IN.} - (0.2 \times .75 \text{ IN.}))^2}{12.9 \text{ IN.} + (0.8 \times .75 \text{ IN.})}$		
$= \frac{(12.9 \text{ IN.} - .15 \text{ IN.})^2}{12.9 \text{ IN.} + .6 \text{ IN.}} = \frac{(12.8 \text{ IN.})^2}{13.5 \text{ IN.}} = \frac{162 \text{ IN.}^2}{13.5 \text{ IN.}} = 12 \text{ IN.}$		
RUNOFF VOLUME: $\frac{12}{(Q)} \text{ IN.} \times \frac{28.7}{(\text{SITE AREA})} \text{ AC} \times \frac{1 \text{ FT}}{12 \text{ IN.}} = \frac{28.7}{12} \text{ AC-FT}$		
STAGE TO RETAIN RUNOFF VOLUME: 24.5 FT, NGVD		

MULTI BASIN ROUTING RESULTS

25 YEAR, 72 HOUR STORM

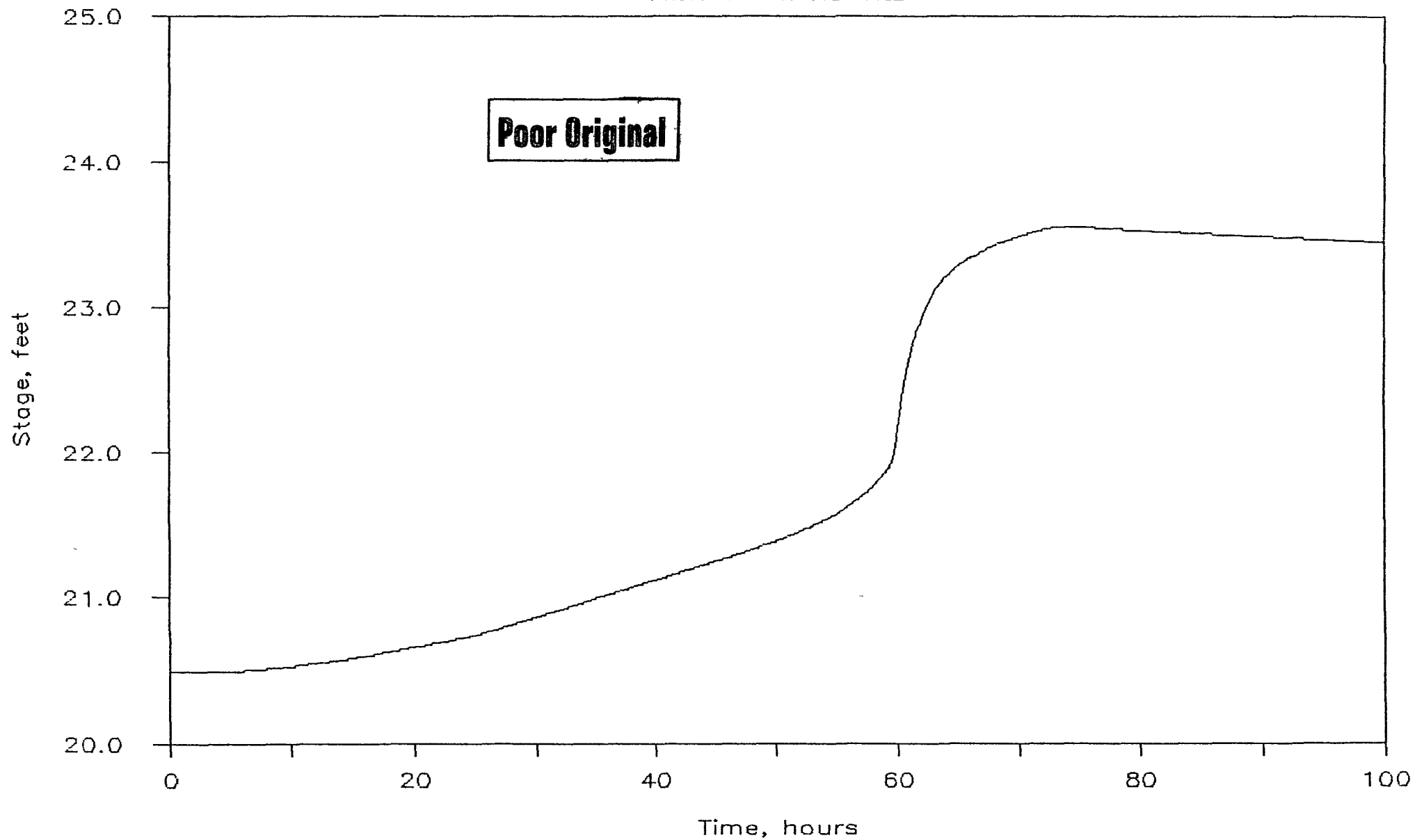
LEE COUNTY ENERGY RECOVERY FACILITY

MBR Model Results



LEE COUNTY ENERGY RECOVERY FACILITY

MBR Model Results



SANTA BARBARA METHOD USED FOR ROUTING

PROJECT NAME : LEE COUNTY ERF

REVIEWER : SPWMD

PROJECT NUMBER - 6685-38

THE ROUTING IS COMPLETE WHEN THE DISCHARGE FOR BASIN 1 IS REDUCED TO 0.38CFS

***** BASIN 1 *****

AREA - 28.70 ACRES GROUND STORAGE - 0.75 INCHES

TIME STEP - 1.00 HOURS TIME OF CONCENTRATION - 1.25 HOURS

RETURN FREQUENCY - 25.00 YEARS RAINFALL DISTRIBUTION : 3- DAY 24-HOUR RAINFALL - 7.50 INCHES

STAGE (FT)	STORAGE (AF)
20.50	0.00
21.00	2.50
21.50	5.10
22.00	9.00
22.50	12.90
23.00	16.90
23.50	20.90
24.00	25.10
24.50	28.70
25.00	32.30
25.50	36.00
26.00	39.70

DISCHARGE STRUCTURE INFORMATION

STRUCT NO.	PIPE		ROUGHNESS	LENGTH (FT)	WEIR		HEAD INVERT ELEVATION	TAIL INVERT ELEVATION	
	SLOPE (%)	DIAMETER (FT)			WEIR CREST TYPE/ELEV	WEIR LENGTH			
1	0.007	2.0	0.013	70.00	BROAD/ 23.50	3.00	20.00	19.50	BASIN 1 TO BASIN 2

BLEEDER INFORMATION

STRUCT NO.	BLEEDER TYPE	ORIFICE		AREA (FT ²)	V-NOTCH		TOP ELEVATION (FT-NGVD)
		DIAMETER OR WIDTH (FT)	INVERT ELEVATION (FT-NGVD)		ANGLE (DEG)	INVERT ELEVATION (FT-NGVD)	
1	CIRCLE	0.2	20.6	0.0			

OFFSITE RECEIVING WATER

<u>TIME(HR)</u>	<u>STAGE(FT-MGVD)</u>
0.00	20.50
30.00	20.60
60.00	20.80
1000 00	20 50

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
0.0	1	1	0.0	0.0	0.0	0.0	0.00	20.50	1	2	
1.0	1	1	0.0	0.0	0.0	0.0	0.00	20.50	1	2	BLEEDER
2.0	1	1	0.1	0.0	0.0	0.0	0.00	20.50	1	2	BLEEDER
3.0	1	1	0.1	0.0	0.0	0.0	0.00	20.50	1	2	BLEEDER
4.0	1	1	0.2	0.0	0.1	0.0	0.00	20.50	1	2	BLEEDER
5.0	1	1	0.2	0.0	0.2	0.1	0.00	20.50	1	2	BLEEDER
6.0	1	1	0.3	0.0	0.3	0.2	0.00	20.50	1	2	BLEEDER
7.0	1	1	0.3	0.0	0.4	0.3	0.00	20.51	1	2	BLEEDER
8.0	1	1	0.4	0.0	0.5	0.4	0.00	20.51	1	2	BLEEDER
9.0	1	1	0.4	0.1	0.6	0.5	0.00	20.52	1	2	BLEEDER
10.0	1	1	0.5	0.1	0.7	0.6	0.00	20.53	1	2	BLEEDER
11.0	1	1	0.5	0.1	0.7	0.6	0.00	20.54	1	2	BLEEDER
12.0	1	1	0.5	0.1	0.8	0.7	0.00	20.55	1	2	BLEEDER
13.0	1	1	0.6	0.2	0.8	0.7	0.01	20.56	1	2	BLEEDER
14.0	1	1	0.6	0.2	0.8	0.8	0.01	20.58	1	2	BLEEDER
15.0	1	1	0.7	0.2	0.9	0.8	0.01	20.59	1	2	BLEEDER
16.0	1	1	0.7	0.3	0.9	0.9	0.02	20.60	1	2	BLEEDER
17.0	1	1	0.8	0.3	0.9	0.9	0.03	20.62	1	2	BLEEDER
18.0	1	1	0.8	0.3	1.0	0.9	0.03	20.63	1	2	BLEEDER
19.0	1	1	0.9	0.4	1.0	0.9	0.04	20.65	1	2	BLEEDER
20.0	1	1	0.9	0.4	1.0	1.0	0.05	20.66	1	2	BLEEDER
21.0	1	1	1.0	0.4	1.0	1.0	0.06	20.68	1	2	BLEEDER
22.0	1	1	1.0	0.5	1.0	1.0	0.07	20.69	1	2	BLEEDER

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
23.0	1	1	1.0	0.5	1.0	1 0	0.08	20.71	1	2	BLEEDER
24.0	1	1	1.1	0.5	1.1	1.0	0.08	20.72	1	2	BLEEDER
25.0	1	1	1.2	0.6	1.6	1 3	0.09	20.74	1	2	BLEEDER
26.0	1	1	1.2	0.6	1.6	1.5	0.09	20.76	1	2	BLEEDER
27.0	1	1	1.3	0.7	1.6	1.6	0.10	20.79	1	2	BLEEDER
28.0	1	1	1.4	0.7	1.6	1.6	0.10	20.81	1	2	BLEEDER
29.0	1	1	1.4	0.8	1.7	1.6	0.11	20.84	1	2	BLEEDER
30.0	1	1	1.5	0.9	1.7	1.7	0.11	20.86	1	2	BLEEDER
31.0	1	1	1.6	0.9	1.7	1.7	0.12	20.89	1	2	BLEEDER
32.0	1	1	1.6	1.0	1.7	1.7	0.13	20.91	1	2	BLEEDER
33.0	1	1	1.7	1.0	1.7	1.7	0.13	20.94	1	2	BLEEDER
34.0	1	1	1.8	1.1	1.7	1.7	0.14	20.96	1	2	BLEEDER
35.0	1	1	1.8	1.2	1.7	1.7	0.14	20.99	1	2	BLEEDER
36.0	1	1	1.9	1.2	1.8	1.7	0.15	21.02	1	2	BLEEDER
37.0	1	1	2.0	1.3	1.8	1.7	0.15	21.04	1	2	BLEEDER
38.0	1	1	2.0	1.3	1.8	1.8	0.15	21.07	1	2	BLEEDER
39.0	1	1	2.1	1.4	1.8	1.8	0.16	21.09	1	2	BLEEDER
40.0	1	1	2.2	1.5	1.8	1.8	0.16	21.12	1	2	BLEEDER
41.0	1	1	2.2	1.5	1.8	1.8	0.16	21.14	1	2	BLEEDER
42.0	1	1	2.3	1.6	1.8	1 8	0.17	21.17	1	2	BLEEDER
43.0	1	1	2.4	1.6	1.8	1.8	0.17	21.20	1	2	BLEEDER
44.0	1	1	2.4	1.7	1.8	1.8	0.17	21.22	1	2	BLEEDER
45.0	1	1	2.5	1.8	1.8	1.8	0.17	21.25	1	2	BLEEDER

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
46.0	1	1	2.6	1.8	1.8	1.8	0.18	21.27	1	2	BLEEDER
47.0	1	1	2.6	1.9	1.8	1.8	0.18	21.30	1	2	BLEEDER
48.0	1	1	2.7	2.0	1.8	1.8	0.18	21.33	1	2	BLEEDER
49.0	1	1	2.8	2.0	2.1	2.0	0.19	21.35	1	2	BLEEDER
50.0	1	1	2.8	2.1	2.1	2.0	0.19	21.38	1	2	BLEEDER
51.0	1	1	2.9	2.2	2.5	2.3	0.19	21.41	1	2	BLEEDER
52.0	1	1	3.0	2.3	2.9	2.5	0.20	21.45	1	2	BLEEDER
53.0	1	1	3.2	2.4	3.8	3.1	0.20	21.49	1	2	BLEEDER
54.0	1	1	3.3	2.6	4.6	3.8	0.21	21.53	1	2	BLEEDER
55.0	1	1	3.5	2.7	5.5	4.6	0.21	21.57	1	2	BLEEDER
56.0	1	1	3.7	3.0	6.3	5.5	0.22	21.62	1	2	BLEEDER
57.0	1	1	4.0	3.2	7.6	6.4	0.22	21.68	1	2	BLEEDER
58.0	1	1	4.3	3.5	9.3	7.8	0.23	21.75	1	2	BLEEDER
59.0	1	1	4.7	3.9	13.6	10.2	0.24	21.85	1	2	BLEEDER
60.0	1	1	7.6	6.8	145.1	56.3	0.27	22.10	1	2	BLEEDER
61.0	1	1	8.4	7.6	16.4	38.1	0.32	22.60	1	2	BLEEDER
62.0	1	1	8.8	8.0	9.9	23.1	0.34	22.90	1	2	BLEEDER
63.0	1	1	9.1	8.2	6.5	14.1	0.36	23.09	1	2	BLEEDER
64.0	1	1	9.3	8.4	6.5	9.9	0.37	23.21	1	2	BLEEDER
65.0	1	1	9.4	8.6	3.9	6.6	0.37	23.29	1	2	BLEEDER
66.0	1	1	9.6	8.7	3.9	5.1	0.38	23.34	1	2	BLEEDER
67.0	1	1	9.7	8.9	3.9	4.4	0.38	23.39	1	2	BLEEDER
68.0	1	1	9.8	9.0	3.9	4.1	0.38	23.43	1	2	BLEEDER

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
69.0	1	1	9.9	9.1	2.6	3.3	0.39	23.46	1	2	BLEEDER
70.0	1	1	10.0	9.2	2.6	2.9	0.39	23.49	1	2	BLEEDER
71.0	1	1	10.1	9.3	2.6	2.7	0.40	23.51	1	2	WEIR
72.0	1	1	10.2	9.3	2.5	2.7	0.45	23.53	1	2	WEIR
73.0	1	1	10.2	9.3	0.0	1.2	0.49	23.55	1	2	WEIR
74.0	1	1	10.2	9.3	0.0	0.5	0.50	23.55	1	2	WEIR
75.0	1	1	10.2	9.3	0.0	0.2	0.49	23.55	1	2	WEIR
76.0	1	1	10.2	9.3	0.0	0.1	0.48	23.55	1	2	WEIR
77.0	1	1	10.2	9.3	0.0	0.0	0.47	23.54	1	2	WEIR
78.0	1	1	10.2	9.3	0.0	0.0	0.46	23.54	1	2	WEIR
79.0	1	1	10.2	9.3	0.0	0.0	0.45	23.53	1	2	WEIR
80.0	1	1	10.2	9.3	0.0	0.0	0.44	23.53	1	2	WEIR
81.0	1	1	10.2	9.3	0.0	0.0	0.43	23.53	1	2	WEIR
82.0	1	1	10.2	9.3	0.0	0.0	0.42	23.52	1	2	WEIR
83.0	1	1	10.2	9.3	0.0	0.0	0.41	23.52	1	2	WEIR
84.0	1	1	10.2	9.3	0.0	0.0	0.40	23.51	1	2	WEIR
85.0	1	1	10.2	9.3	0.0	0.0	0.40	23.51	1	2	WEIR
86.0	1	1	10.2	9.3	0.0	0.0	0.39	23.51	1	2	WEIR
87.0	1	1	10.2	9.3	0.0	0.0	0.39	23.50	1	2	WEIR
88.0	1	1	10.2	9.3	0.0	0.0	0.39	23.50	1	2	BLEEDER
89.0	1	1	10.2	9.3	0.0	0.0	0.39	23.49	1	2	BLEEDER
90.0	1	1	10.2	9.3	0.0	0.0	0.39	23.49	1	2	BLEEDER
91.0	1	1	10.2	9.3	0.0	0.0	0.39	23.49	1	2	BLEEDER

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
92.0	1	1	10.2	9.3	0.0	0.0	0.39	23.48	1	2	BLEEDER
93.0	1	1	10.2	9.3	0.0	0.0	0.39	23.48	1	2	BLEEDER
94.0	1	1	10.2	9.3	0.0	0.0	0.39	23.47	1	2	BLEEDER
95.0	1	1	10.2	9.3	0.0	0.0	0.39	23.47	1	2	BLEEDER
96.0	1	1	10.2	9.3	0.0	0.0	0.39	23.47	1	2	BLEEDER
97.0	1	1	10.2	9.3	0.0	0.0	0.39	23.46	1	2	BLEEDER
98.0	1	1	10.2	9.3	0.0	0.0	0.39	23.46	1	2	BLEEDER
99.0	1	1	10.2	9.3	0.0	0.0	0.39	23.45	1	2	BLEEDER
100.0	1	1	10.2	9.3	0.0	0.0	0.39	23.45	1	2	BLEEDER
101.0	1	1	10.2	9.3	0.0	0.0	0.39	23.45	1	2	BLEEDER
102.0	1	1	10.2	9.3	0.0	0.0	0.39	23.44	1	2	BLEEDER
103.0	1	1	10.2	9.3	0.0	0.0	0.38	23.44	1	2	BLEEDER
104.0	1	1	10.2	9.3	0.0	0.0	0.38	23.43	1	2	BLEEDER
105.0	1	1	10.2	9.3	0.0	0.0	0.38	23.43	1	2	BLEEDER
106.0	1	1	10.2	9.3	0.0	0.0	0.38	23.43	1	2	BLEEDER
107.0	1	1	10.2	9.3	0.0	0.0	0.38	23.42	1	2	BLEEDER
108.0	1	1	10.2	9.3	0.0	0.0	0.38	23.42	1	2	BLEEDER
109.0	1	1	10.2	9.3	0.0	0.0	0.38	23.41	1	2	BLEEDER
110.0	1	1	10.2	9.3	0.0	0.0	0.38	23.41	1	2	BLEEDER
111.0	1	1	10.2	9.3	0.0	0.0	0.38	23.41	1	2	BLEEDER
112.0	1	1	10.2	9.3	0.0	0.0	0.38	23.40	1	2	BLEEDER
113.0	1	1	10.2	9.3	0.0	0.0	0.38	23.40	1	2	BLEEDER
114.0	1	1	10.2	9.3	0.0	0.0	0.38	23.39	1	2	BLEEDER

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
115.0	1	1	10.2	9.3	0.0	0.0	0.38	23.39	1	2	BLEEDER
116.0	1	1	10.2	9.3	0.0	0.0	0.38	23.39	1	2	BLEEDER
117.0	1	1	10.2	9.3	0.0	0.0	0.38	23.38	1	2	BLEEDER
118.0	1	1	10.2	9.3	0.0	0.0	0.38	23.38	1	2	BLEEDER
119.0	1	1	10.2	9.3	0.0	0.0	0.38	23.37	1	2	BLEEDER
120.0	1	1	10.2	9.3	0.0	0.0	0.38	23.37	1	2	BLEEDER
121.0	1	1	10.2	9.3	0.0	0.0	0.38	23.37	1	2	BLEEDER

MULTI-BASIN ROUTING MODEL - OUTPUT

PAGE 11

STRUCTURE NO.	PEAK DISCHARGE (CFS)	TIME OF QPEAK	PEAK STAGE (FT-MGVD)	TIME OF HPEAK
1	0.5	74.1	23.6	74.1

BASIN NO.	TOTAL INFLOW (AC-FT)	TOTAL RUNOFF (AC-FT)	TOTAL OUTFLOW (AC-FT)	FINAL TIME (HOURS)	FINAL STAGE (FT-MGVD)	FINAL STORAGE (AC-FT)
1	0.00	22.35	2.53	121.26	23.37	19.82

RC-4 ROUTING RESULTS
100 YEAR, 72 HOUR STORM
ZERO DISCHARGE

S C S P R O G R A M

PROJECT NAME : LEE COUNTY ENERGY RECOVERY FAC
 REVIEWER : SPWMD
 PROJECT AREA : 28.70 ACRES
 GROUND STORAGE . . . : .75 INCHES
 TERMINATION DISCHARGE : 1.00 CFS
 DISTRIBUTION TYPE . . : SPWMD
 RETURN FREQUENCY . . : 100.00 YEARS
 RAINFALL DURATION . . : 3-DAY
 24-HOUR RAINFALL . . : 9.50 INCHES
 REPORTING SEQUENCE . : STANDARDIZED

STAGE (FT)	STORAGE (AF)	DISCHARGE (CFS)
20.50	.00	.00
21.00	2.50	.00
22.00	9.00	.00
22.50	12.90	.00
23.00	16.90	.00
23.50	20.90	.00
24.00	25.10	.00
24.50	28.70	.00
25.00	32.30	.00
25.50	36.00	.00
26.00	39.70	.00

- - - - - R E S E R V O I R - - - - -

TIME (HR)	RAIN FALL (IN)	ACCUM. RUNOFF (IN)	BASIN DISCHGE (CFS)	ACCUM. INFLOW (AF)	VOLUME (AF)	ACCUM. INSTANT OUTFLOW (AF)	AVERAGE DISCHGE (CFS)	STAGE (FT)
.00	.00	.00	.0	.0	.0	.0	.0	20.50
4.00	.23	.01	.3	.0	.0	.0	.0	20.50
8.00	.46	.09	.8	.2	.2	.0	.0	20.54
12.00	.69	.23	1.1	.5	.5	.0	.0	20.61
16.00	.92	.39	1.3	.9	.9	.0	.0	20.69
20.00	1.16	.58	1.4	1.4	1.4	.0	.0	20.77
24.00	1.39	.77	1.4	1.8	1.8	.0	.0	20.87
28.00	1.72	1.07	2.2	2.6	2.6	.0	.0	21.00
32.00	2.06	1.37	2.2	3.3	3.3	.0	.0	21.12
36.00	2.40	1.69	2.3	4.0	4.0	.0	.0	21.23
40.00	2.74	2.00	2.3	4.8	4.8	.0	.0	21.35
44.00	3.07	2.33	2.3	5.6	5.6	.0	.0	21.47
48.00	3.41	2.65	2.4	6.3	6.3	.0	.0	21.59
52.00	3.84	3.06	3.7	7.3	7.3	.0	.0	21.74
56.00	4.71	3.92	8.1	9.4	9.4	.0	.0	22.04
58.00	5.43	4.63	11.9	11.1	11.1	.0	.0	22.25
59.00	5.97	5.15	17.4	12.3	12.3	.0	.0	22.40

- - - - - R E S E R V O I R - - - - -									
	RAIN ACCUM.		BASIN	ACCUM.	ACCUM. INSTANT AVERAGE				
TIME	FALL	RUNOFF	DISCHGE	INFLOW	VOLUME	OUTFLOW	DISCHGE	DISCHGE	STAGE
(HR)	(IN)	(IN)	(CFS)	(AF)	(AF)	(AF)	(CFS)	(CFS)	(FT)
59.50	6.44	5.62	27.2	13.4	13.4	.0	.0	.0	22.53
59.75	7.87	7.03	163.4	16.8	16.8	.0	.0	.0	22.78
60.00	9.64	8.80	204.3	21.0	21.0	.0	.0	.0	23.25
60.50	10.34	9.49	39.9	22.7	22.7	.0	.0	.0	23.66
61.00	10.70	9.85	20.8	23.6	23.6	.0	.0	.0	23.79
62.00	11.18	10.33	12.6	24.7	24.7	.0	.0	.0	23.94
64.00	11.77	10.92	8.2	26.1	26.1	.0	.0	.0	24.13
68.00	12.45	11.60	4.9	27.7	27.7	.0	.0	.0	24.36
72.00	12.91	12.05	3.3	28.8	28.8	.0	.0	.0	24.51

SUMMARY INFORMATION

MAXIMUM STAGE WAS 24.51 FEET AT 72.00 HOURS
 MAXIMUM DISCHARGE WAS .0 CFS AT .00 HOURS

MULTI BASIN ROUTING RESULTS

100 YEAR, 72 HOUR STORM

SANTA BARBARA METHOD USED FOR ROUTING

PROJECT NAME . . . : LEE COUNTY ERF

REVIEWER . . . : SPWMD

PROJECT NUMBER - 6685-38

THE ROUTING IS COMPLETE WHEN THE DISCHARGE FOR BASIN 1 IS REDUCED TO 0.38CFS

***** BASIN 1 *****

AREA - 28.70 ACRES

GROUND STORAGE - 0.75 INCHES

TIME STEP - 1.00 HOURS

TIME OF CONCENTRATION - 1.25 HOURS

RETURN FREQUENCY - 25.00 YEARS

RAINFALL DISTRIBUTION : 3- DAY

24-HOUR RAINFALL - 9.50 INCHES

STAGE (FT)	STORAGE (AF)
20.50	0.00
21.00	2.50
21.50	5.10
22.00	9.00
22.50	12.90
23.00	16.90
23.50	20.90
24.00	25.10
24.50	28.70
25.00	32.30
25.50	36.00
26.00	39.70

DISCHARGE STRUCTURE INFORMATION

STRUCT NO.	PIPE		ROUGHNESS	LENGTH (FT)	WEIR		HEAD INVERT ELEVATION	TAIL INVERT ELEVATION	
	SLOPE (%)	DIAMETER (FT)			WEIR CREST TYPE/ELEV	WEIR LENGTH			
1	0.007	2.0	0.013	70.00	BROAD/ 23.50	3.00	20.00	19.50	BASIN 1 TO BASIN 2

BLEEDER INFORMATION

STRUCT NO.	BLEEDER TYPE	ORIFICE		AREA (FT ²)	V-NOTCH		TOP ELEVATION (FT-NGVD)
		DIAMETER OR WIDTH (FT)	INVERT ELEVATION (FT-NGVD)		ANGLE (DEG)	INVERT ELEVATION (FT-NGVD)	
1	CIRCLE	0.2	20.6	0.0			

OFFSITE RECEIVING WATER

<u>TIME(HR)</u>	<u>STAGE(FT-NGVD)</u>
0.00	20.50
30.00	20.60
60.00	20.80
1000.00	20.50

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
0.0	1	1	0.0	0.0	0.0	0.0	0.00	20.50	1	2	
1.0	1	1	0.1	0.0	0.0	0.0	0.00	20.50	1	2	BLEEDER
2.0	1	1	0.1	0.0	0.0	0.0	0.00	20.50	1	2	BLEEDER
3.0	1	1	0.2	0.0	0.1	0.0	0.00	20.50	1	2	BLEEDER
4.0	1	1	0.2	0.0	0.3	0.1	0.00	20.50	1	2	BLEEDER
5.0	1	1	0.3	0.0	0.5	0.3	0.00	20.50	1	2	BLEEDER
6.0	1	1	0.3	0.0	0.6	0.4	0.00	20.51	1	2	BLEEDER
7.0	1	1	0.4	0.1	0.7	0.6	0.00	20.52	1	2	BLEEDER
8.0	1	1	0.5	0.1	0.8	0.7	0.00	20.53	1	2	BLEEDER
9.0	1	1	0.5	0.1	0.9	0.8	0.00	20.54	1	2	BLEEDER
10.0	1	1	0.6	0.2	1.0	0.9	0.01	20.56	1	2	BLEEDER
11.0	1	1	0.6	0.2	1.1	1.0	0.01	20.57	1	2	BLEEDER
12.0	1	1	0.7	0.2	1.1	1.0	0.02	20.59	1	2	BLEEDER
13.0	1	1	0.8	0.3	1.2	1.1	0.02	20.60	1	2	BLEEDER
14.0	1	1	0.8	0.3	1.2	1.1	0.03	20.62	1	2	BLEEDER
15.0	1	1	0.9	0.4	1.2	1.2	0.04	20.64	1	2	BLEEDER
16.0	1	1	0.9	0.4	1.3	1.2	0.05	20.66	1	2	BLEEDER
17.0	1	1	1.0	0.4	1.3	1.3	0.06	20.68	1	2	BLEEDER
18.0	1	1	1.0	0.5	1.3	1.3	0.08	20.70	1	2	BLEEDER
19.0	1	1	1.1	0.5	1.3	1.3	0.09	20.72	1	2	BLEEDER
20.0	1	1	1.2	0.6	1.4	1.3	0.10	20.74	1	2	BLEEDER
21.0	1	1	1.2	0.6	1.4	1.4	0.09	20.76	1	2	BLEEDER
22.0	1	1	1.3	0.7	1.4	1.4	0.09	20.78	1	2	BLEEDER

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
23.0	1	1	1.3	0.7	1.4	1.4	0.10	20.80	1	2	BLEEDER
24.0	1	1	1.4	0.8	1.4	1.4	0.11	20.83	1	2	BLEEDER
25.0	1	1	1.5	0.8	2.1	1.8	0.11	20.85	1	2	BLEEDER
26.0	1	1	1.6	0.9	2.1	2.0	0.12	20.88	1	2	BLEEDER
27.0	1	1	1.6	1.0	2.2	2.1	0.13	20.91	1	2	BLEEDER
28.0	1	1	1.7	1.1	2.2	2.1	0.13	20.94	1	2	BLEEDER
29.0	1	1	1.8	1.1	2.2	2.2	0.14	20.98	1	2	BLEEDER
30.0	1	1	1.9	1.2	2.2	2.2	0.15	21.01	1	2	BLEEDER
31.0	1	1	2.0	1.3	2.2	2.2	0.15	21.04	1	2	BLEEDER
32.0	1	1	2.1	1.4	2.2	2.2	0.16	21.08	1	2	BLEEDER
33.0	1	1	2.1	1.5	2.3	2.2	0.16	21.11	1	2	BLEEDER
34.0	1	1	2.2	1.5	2.3	2.3	0.17	21.14	1	2	BLEEDER
35.0	1	1	2.3	1.6	2.3	2.3	0.17	21.18	1	2	BLEEDER
36.0	1	1	2.4	1.7	2.3	2.3	0.18	21.21	1	2	BLEEDER
37.0	1	1	2.5	1.8	2.3	2.3	0.18	21.24	1	2	BLEEDER
38.0	1	1	2.6	1.8	2.3	2.3	0.19	21.28	1	2	BLEEDER
39.0	1	1	2.7	1.9	2.3	2.3	0.19	21.31	1	2	BLEEDER
40.0	1	1	2.7	2.0	2.3	2.3	0.19	21.34	1	2	BLEEDER
41.0	1	1	2.8	2.1	2.3	2.3	0.20	21.38	1	2	BLEEDER
42.0	1	1	2.9	2.2	2.3	2.3	0.20	21.41	1	2	BLEEDER
43.0	1	1	3.0	2.2	2.3	2.3	0.21	21.44	1	2	BLEEDER
44.0	1	1	3.1	2.3	2.3	2.3	0.21	21.48	1	2	BLEEDER
45.0	1	1	3.2	2.4	2.3	2.3	0.21	21.51	1	2	BLEEDER

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
46.0	1	1	3.2	2.5	2.3	2.3	0.21	21.53	1	2	BLEEDER
47.0	1	1	3.3	2.6	2.4	2.3	0.22	21.55	1	2	BLEEDER
48.0	1	1	3.4	2.7	2.4	2.3	0.22	21.57	1	2	BLEEDER
49.0	1	1	3.5	2.7	2.7	2.5	0.22	21.60	1	2	BLEEDER
50.0	1	1	3.6	2.8	2.7	2.6	0.22	21.62	1	2	BLEEDER
51.0	1	1	3.7	2.9	3.2	2.9	0.23	21.65	1	2	BLEEDER
52.0	1	1	3.8	3.1	3.7	3.3	0.23	21.68	1	2	BLEEDER
53.0	1	1	4.0	3.2	4.8	4.0	0.23	21.72	1	2	BLEEDER
54.0	1	1	4.2	3.4	5.9	4.9	0.24	21.76	1	2	BLEEDER
55.0	1	1	4.4	3.6	7.0	5.9	0.24	21.82	1	2	BLEEDER
56.0	1	1	4.7	3.9	8.1	7.0	0.25	21.88	1	2	BLEEDER
57.0	1	1	5.0	4.2	9.7	8.2	0.26	21.96	1	2	BLEEDER
58.0	1	1	5.4	4.6	11.9	10.0	0.27	22.05	1	2	BLEEDER
59.0	1	1	6.0	5.2	17.4	13.1	0.28	22.17	1	2	BLEEDER
60.0	1	1	9.6	8.8	184.3	71.7	0.31	22.49	1	2	BLEEDER
61.0	1	1	10.7	9.8	20.8	48.5	0.36	23.12	1	2	BLEEDER
62.0	1	1	11.2	10.3	12.6	29.3	0.39	23.51	1	2	WEIR
63.0	1	1	11.5	10.6	8.2	18.0	1.38	23.72	1	2	WEIR
64.0	1	1	11.8	10.9	8.2	12.6	2.34	23.85	1	2	WEIR
65.0	1	1	11.9	11.1	4.9	8.4	2.98	23.93	1	2	WEIR
66.0	1	1	12.1	11.3	4.9	6.5	3.36	23.97	1	2	WEIR
67.0	1	1	12.3	11.4	4.9	5.6	3.60	23.99	1	2	WEIR
68.0	1	1	12.5	11.6	4.9	5.2	3.78	24.01	1	2	WEIR

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
69.0	1	1	12.6	11.7	3.3	4.2	3.87	24.02	1	2	WEIR
70.0	1	1	12.7	11.8	3.3	3.7	3.87	24.02	1	2	WEIR
71.0	1	1	12.8	11.9	3.3	3.5	3.84	24.02	1	2	WEIR
72.0	1	1	12.9	12.1	3.1	3.4	3.79	24.01	1	2	WEIR
73.0	1	1	12.9	12.1	0.0	1.5	3.64	24.00	1	2	WEIR
74.0	1	1	12.9	12.1	0.0	0.7	3.40	23.97	1	2	WEIR
75.0	1	1	12.9	12.1	0.0	0.3	3.14	23.95	1	2	WEIR
76.0	1	1	12.9	12.1	0.0	0.1	2.89	23.92	1	2	WEIR
77.0	1	1	12.9	12.1	0.0	0.1	2.66	23.89	1	2	WEIR
78.0	1	1	12.9	12.1	0.0	0.0	2.45	23.87	1	2	WEIR
79.0	1	1	12.9	12.1	0.0	0.0	2.26	23.84	1	2	WEIR
80.0	1	1	12.9	12.1	0.0	0.0	2.09	23.82	1	2	WEIR
81.0	1	1	12.9	12.1	0.0	0.0	1.94	23.80	1	2	WEIR
82.0	1	1	12.9	12.1	0.0	0.0	1.80	23.78	1	2	WEIR
83.0	1	1	12.9	12.1	0.0	0.0	1.67	23.77	1	2	WEIR
84.0	1	1	12.9	12.1	0.0	0.0	1.56	23.75	1	2	WEIR
85.0	1	1	12.9	12.1	0.0	0.0	1.46	23.74	1	2	WEIR
86.0	1	1	12.9	12.1	0.0	0.0	1.37	23.72	1	2	WEIR
87.0	1	1	12.9	12.1	0.0	0.0	1.28	23.71	1	2	WEIR
88.0	1	1	12.9	12.1	0.0	0.0	1.21	23.70	1	2	WEIR
89.0	1	1	12.9	12.1	0.0	0.0	1.14	23.69	1	2	WEIR
90.0	1	1	12.9	12.1	0.0	0.0	1.07	23.67	1	2	WEIR
91.0	1	1	12.9	12.1	0.0	0.0	1.01	23.66	1	2	WEIR

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
92.0	1	1	12.9	12.1	0.0	0.0	0.96	23.65	1	2	WEIR
93.0	1	1	12.9	12.1	0.0	0.0	0.91	23.65	1	2	WEIR
94.0	1	1	12.9	12.1	0.0	0.0	0.86	23.64	1	2	WEIR
95.0	1	1	12.9	12.1	0.0	0.0	0.82	23.63	1	2	WEIR
96.0	1	1	12.9	12.1	0.0	0.0	0.78	23.62	1	2	WEIR
97.0	1	1	12.9	12.1	0.0	0.0	0.75	23.61	1	2	WEIR
98.0	1	1	12.9	12.1	0.0	0.0	0.71	23.61	1	2	WEIR
99.0	1	1	12.9	12.1	0.0	0.0	0.68	23.60	1	2	WEIR
100.0	1	1	12.9	12.1	0.0	0.0	0.65	23.59	1	2	WEIR
101.0	1	1	12.9	12.1	0.0	0.0	0.63	23.59	1	2	WEIR
102.0	1	1	12.9	12.1	0.0	0.0	0.60	23.58	1	2	WEIR
103.0	1	1	12.9	12.1	0.0	0.0	0.58	23.57	1	2	WEIR
104.0	1	1	12.9	12.1	0.0	0.0	0.56	23.57	1	2	WEIR
105.0	1	1	12.9	12.1	0.0	0.0	0.54	23.56	1	2	WEIR
106.0	1	1	12.9	12.1	0.0	0.0	0.52	23.56	1	2	WEIR
107.0	1	1	12.9	12.1	0.0	0.0	0.51	23.55	1	2	WEIR
108.0	1	1	12.9	12.1	0.0	0.0	0.49	23.55	1	2	WEIR
109.0	1	1	12.9	12.1	0.0	0.0	0.48	23.54	1	2	WEIR
110.0	1	1	12.9	12.1	0.0	0.0	0.46	23.54	1	2	WEIR
111.0	1	1	12.9	12.1	0.0	0.0	0.45	23.53	1	2	WEIR
112.0	1	1	12.9	12.1	0.0	0.0	0.44	23.53	1	2	WEIR
113.0	1	1	12.9	12.1	0.0	0.0	0.43	23.53	1	2	WEIR
114.0	1	1	12.9	12.1	0.0	0.0	0.42	23.52	1	2	WEIR

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
115.0	1	1	12.9	12.1	0.0	0.0	0.41	23.52	1	2	WEIR
116.0	1	1	12.9	12.1	0.0	0.0	0.40	23.51	1	2	WEIR
117.0	1	1	12.9	12.1	0.0	0.0	0.40	23.51	1	2	WEIR
118.0	1	1	12.9	12.1	0.0	0.0	0.39	23.51	1	2	WEIR
119.0	1	1	12.9	12.1	0.0	0.0	0.39	23.50	1	2	WEIR
120.0	1	1	12.9	12.1	0.0	0.0	0.39	23.50	1	2	BLEEDER
121.0	1	1	12.9	12.1	0.0	0.0	0.39	23.49	1	2	BLEEDER
122.0	1	1	12.9	12.1	0.0	0.0	0.39	23.49	1	2	BLEEDER
123.0	1	1	12.9	12.1	0.0	0.0	0.39	23.49	1	2	BLEEDER
124.0	1	1	12.9	12.1	0.0	0.0	0.39	23.48	1	2	BLEEDER
125.0	1	1	12.9	12.1	0.0	0.0	0.39	23.48	1	2	BLEEDER
126.0	1	1	12.9	12.1	0.0	0.0	0.39	23.47	1	2	BLEEDER
127.0	1	1	12.9	12.1	0.0	0.0	0.39	23.47	1	2	BLEEDER
128.0	1	1	12.9	12.1	0.0	0.0	0.39	23.47	1	2	BLEEDER
129.0	1	1	12.9	12.1	0.0	0.0	0.39	23.46	1	2	BLEEDER
130.0	1	1	12.9	12.1	0.0	0.0	0.39	23.46	1	2	BLEEDER
131.0	1	1	12.9	12.1	0.0	0.0	0.39	23.45	1	2	BLEEDER
132.0	1	1	12.9	12.1	0.0	0.0	0.39	23.45	1	2	BLEEDER
133.0	1	1	12.9	12.1	0.0	0.0	0.39	23.45	1	2	BLEEDER
134.0	1	1	12.9	12.1	0.0	0.0	0.39	23.44	1	2	BLEEDER
135.0	1	1	12.9	12.1	0.0	0.0	0.39	23.44	1	2	BLEEDER
136.0	1	1	12.9	12.1	0.0	0.0	0.39	23.43	1	2	BLEEDER
137.0	1	1	12.9	12.1	0.0	0.0	0.39	23.43	1	2	BLEEDER

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
138.0	1	1	12.9	12.1	0.0	0.0	0.38	23.43	1	2	BLEEDER
139.0	1	1	12.9	12.1	0.0	0.0	0.38	23.42	1	2	BLEEDER
140.0	1	1	12.9	12.1	0.0	0.0	0.38	23.42	1	2	BLEEDER
141.0	1	1	12.9	12.1	0.0	0.0	0.38	23.41	1	2	BLEEDER
142.0	1	1	12.9	12.1	0.0	0.0	0.38	23.41	1	2	BLEEDER
143.0	1	1	12.9	12.1	0.0	0.0	0.38	23.41	1	2	BLEEDER
144.0	1	1	12.9	12.1	0.0	0.0	0.38	23.40	1	2	BLEEDER
145.0	1	1	12.9	12.1	0.0	0.0	0.38	23.40	1	2	BLEEDER
146.0	1	1	12.9	12.1	0.0	0.0	0.38	23.39	1	2	BLEEDER
147.0	1	1	12.9	12.1	0.0	0.0	0.38	23.39	1	2	BLEEDER
148.0	1	1	12.9	12.1	0.0	0.0	0.38	23.39	1	2	BLEEDER
149.0	1	1	12.9	12.1	0.0	0.0	0.38	23.38	1	2	BLEEDER
150.0	1	1	12.9	12.1	0.0	0.0	0.38	23.38	1	2	BLEEDER
151.0	1	1	12.9	12.1	0.0	0.0	0.38	23.37	1	2	BLEEDER
152.0	1	1	12.9	12.1	0.0	0.0	0.38	23.37	1	2	BLEEDER
153.0	1	1	12.9	12.1	0.0	0.0	0.38	23.37	1	2	BLEEDER
154.0	1	1	12.9	12.1	0.0	0.0	0.38	23.36	1	2	BLEEDER
155.0	1	1	12.9	12.1	0.0	0.0	0.38	23.36	1	2	BLEEDER
156.0	1	1	12.9	12.1	0.0	0.0	0.38	23.35	1	2	BLEEDER

MULTI-BASIN ROUTING MODEL - OUTPUT

PAGE 12

STRUCTURE NO.	PEAK DISCHARGE (CFS)	TIME OF QPEAK	PEAK STAGE (FT-MGVD)	TIME OF HPEAK
1	3.9	69.5	24.0	69.5

BASIN NO.	TOTAL INFLOW (AC-FT)	TOTAL RUNOFF (AC-FT)	TOTAL OUTFLOW (AC-FT)	FINAL TIME (HOURS)	FINAL STAGE (FT-MGVD)	FINAL STORAGE (AC-FT)
1	0.00	28.82	9.09	156.09	23.35	19.73

Item IV-16,17,18,19

Not applicable (See Item II-6)

Item IV-20

The energy recovery facility is located in upland areas. In their predeveloped condition, those uplands provide little or no storage for the 100-year flood. Multi-Basin Routing (MBR) results for the 100 year, 72 hour storm show post development storage of 19.7 acre-feet available at peak stage. Therefore, the post development 100-year, 72-hour storm discharge will be less than predeveloped conditions.

SECTION V

LEGAL AND INSTITUTIONAL

Item V-1

Lee County is currently pursuing the acquisition of the referenced site. An affidavit of ownership or executed contract for purchase will be submitted as part of the individual permit application to be completed by the selected vendor.

Item V-2

It will be the responsibility of the selected vendor to construct and operate the referenced facility including the surface water management system. Upon award of a contract, the selected vendor will submit the application for approval of an individual permit to construct and operate the referenced stormwater facilities. As discussed with SFWMD staff, the selected vendor will submit as part of the permit application, a letter formally accepting operation and maintenance responsibilities.

Item V-3

Potable water will be supplied by Lee County - Olga Water Treatment Plant.

Item V-4

Wastewater will be directed to the Central Advanced Wastewater Treatment Plant.

Item V-5

Stormwater discharge will be directed to County facilities along Buckingham Road. Lee County Department of Transportation and Division of Water Resources have both approved of the proposed point of discharge (see attached letter).

CDM

environmental engineers scientists
planners & management consultants
June 21, 1990

CAMP DRESSER & McKEE INC

1620 Medical Lane Suite 221
Ft Myers, Florida 33907
813 939-3775

Mr. Ron Brown, P.E.
Lee County
Department of Transportation
P.O. Box 398
Fort Myers, FL 33902

Re: Lee County Energy Recovery Project
Stormwater Management
CDM PN: 6685-38-PT

Dear Mr. Brown:

I would like to take this opportunity to document our conversation on June 14th in your offices regarding the proposed energy recovery facility and associated stormwater facilities.

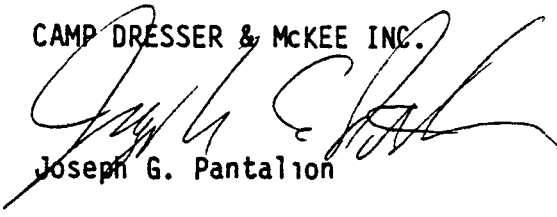
The referenced facility is to be located on Buckingham Road approximately one mile east of State Road 82 (see Item 1). The surface water management system for the site will be designed in conformance with SFWMD criteria. Per the SFWMD conceptual permit application, the 25-year, 72 hour storm event peak discharge for the site will be restricted to 1.7 cubic feet per second due to the 37 cubic feet per second per square mile criteria imposed by SFWMD.

Discharge from the detention facility will be directed to and stored in an isolated wetland onsite which overflows onto County right-of-way for large storm events. It is understood that upgrading of the existing 42" CMP culvert currently in county right-of-way will be included as part of this project.

It was a pleasure meeting with you. Should you have any questions regarding the current status of the project or require additional information, please do not hesitate to call me.

Sincerely,

CAMP DRESSER & McKEE INC.



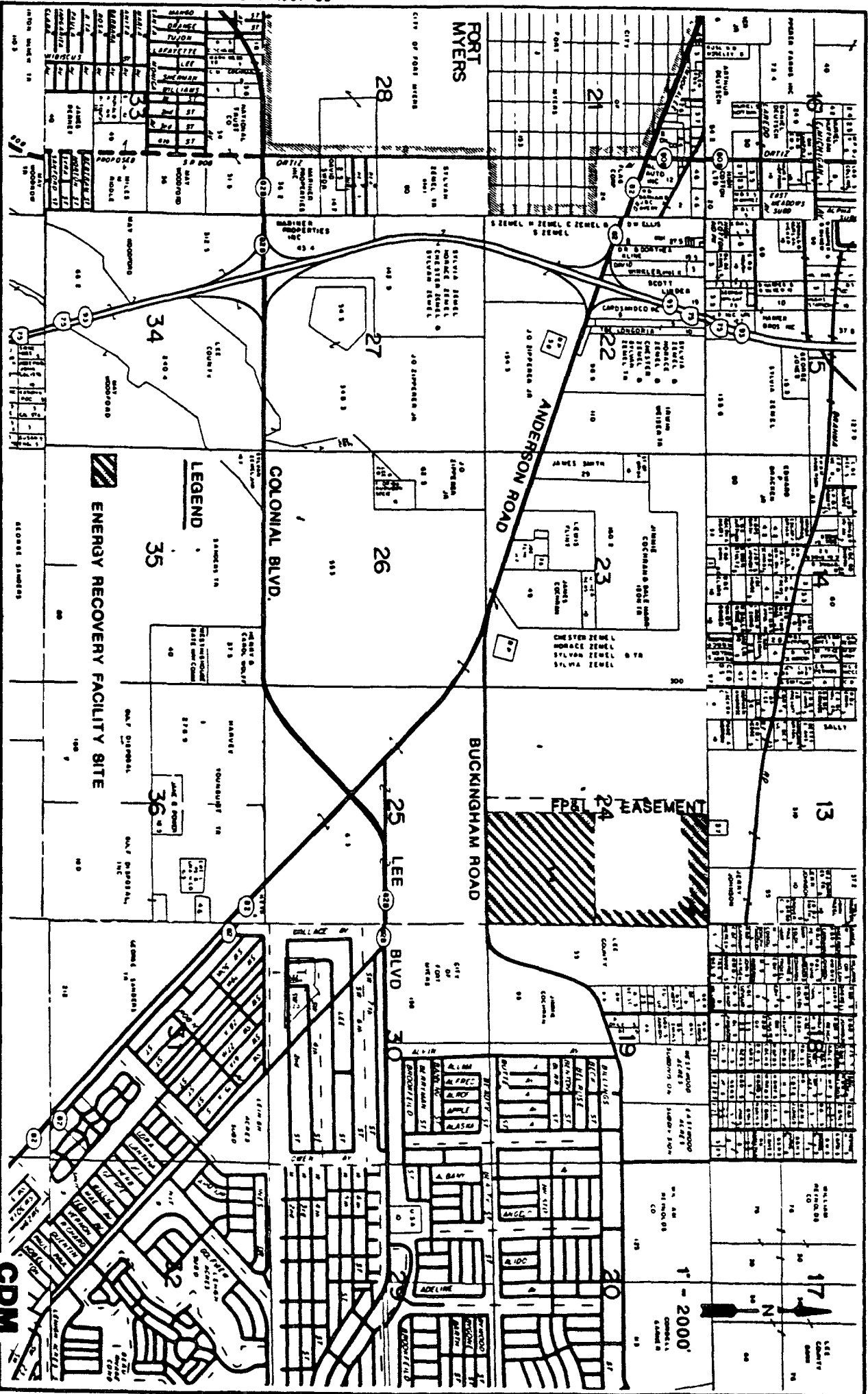
Joseph G. Pantalion

JGP/dm
LCD11/9

Attachment

cc: G. E. Reilly, DLCU
D. Dee, Env. Counsel
E. Lopez, SFWMD
M. Ihnat, CDM
B. Tietz, CDM

Poor Original



Energy Recovery Facility Site Location Map - Lee County



Form 0645 G27

SFWMD
ONLY

N A I M

FLOODPLAIN IMPORTER/EXPORTER TABLE

N/A

PREDEVELOPMENT RUNOFF VOLUME :	_____	AC-FT	☐ ☐ ☐ ☐
PREDEVELOPMENT STORAGE VOLUME: -	_____	AC-FT	☐ ☐ ☐ ☐
DIFFERENCE:	_____	AC-FT	☐ ☐ ☐ ☐

Item V-7

LAND USE TABLETYPE(S) AND ACREAGE(S) OF LAND USE PROPOSED WITHIN THE PROJECT
OR PRESENT PHASE:

	<u>ACRES</u>	<u>TOTAL BUILDING SQUARE FOOTAGE</u>	
AGRICULTURE (TYPE OF CROP):	_____	_____	☐ ☐ ☐ ☐
_____	_____	_____	☐ ☐ ☐ ☐
_____	_____	_____	☐ ☐ ☐ ☐
COMMERCIAL	_____	_____	☐ ☐ ☐ ☐
DEWATERING, LONG TERM	_____	_____	☐ ☐ ☐ ☐
DEWATERING, SHORT TERM	_____	_____	☐ ☐ ☐ ☐
GOLF COURSE	_____	_____	☐ ☐ ☐ ☐
HIGHWAY (PUBLIC FUNDED)	_____	_____	☐ ☐ ☐ ☐
INDUSTRIAL	4.9	Approx 180,000	☐ ☐ ☐ ☐
INSTITUTIONAL	_____	_____	☐ ☐ ☐ ☐
(SCHOOL, HOSPITAL, ETC)	_____	_____	☐ ☐ ☐ ☐
LANDFILL	_____	_____	☐ ☐ ☐ ☐
MINING	_____	_____	☐ ☐ ☐ ☐
OFFICE	_____	_____	☐ ☐ ☐ ☐
PARK/GREENSPACE	_____	_____	☐ ☐ ☐ ☐
RECREATIONAL	_____	_____	☐ ☐ ☐ ☐
RESIDENTIAL	_____	_____	☐ ☐ ☐ ☐
			(NUMBER OF DWELLINGS)
SURFACE WATER MGMT.	5.0	_____	☐ ☐ ☐ ☐
OTHER: Roads and Parking	7.4	_____	☐ ☐ ☐ ☐
OTHER: Pervious	11.4	_____	☐ ☐ ☐ ☐
TOTAL	28.7	_____	☐ ☐ ☐ ☐

Poor Original

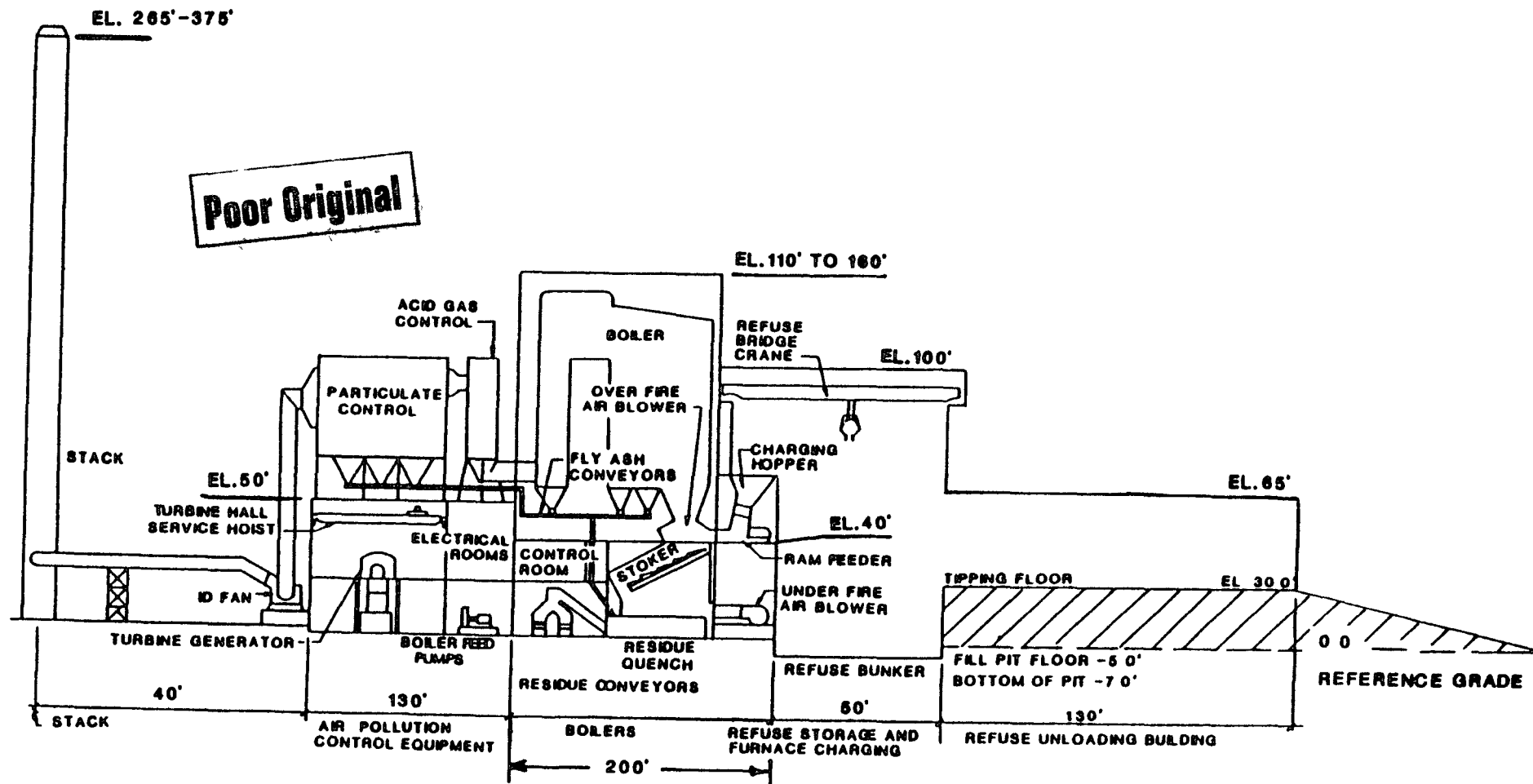
Item V-8

Not applicable

OVERSIZE
DOCUMENT WAS
REMOVED AND
INSERTED INTO
OCULUS
SEPARATELY.

SECTION VI

PUBLIC NOTICING INFORMATION

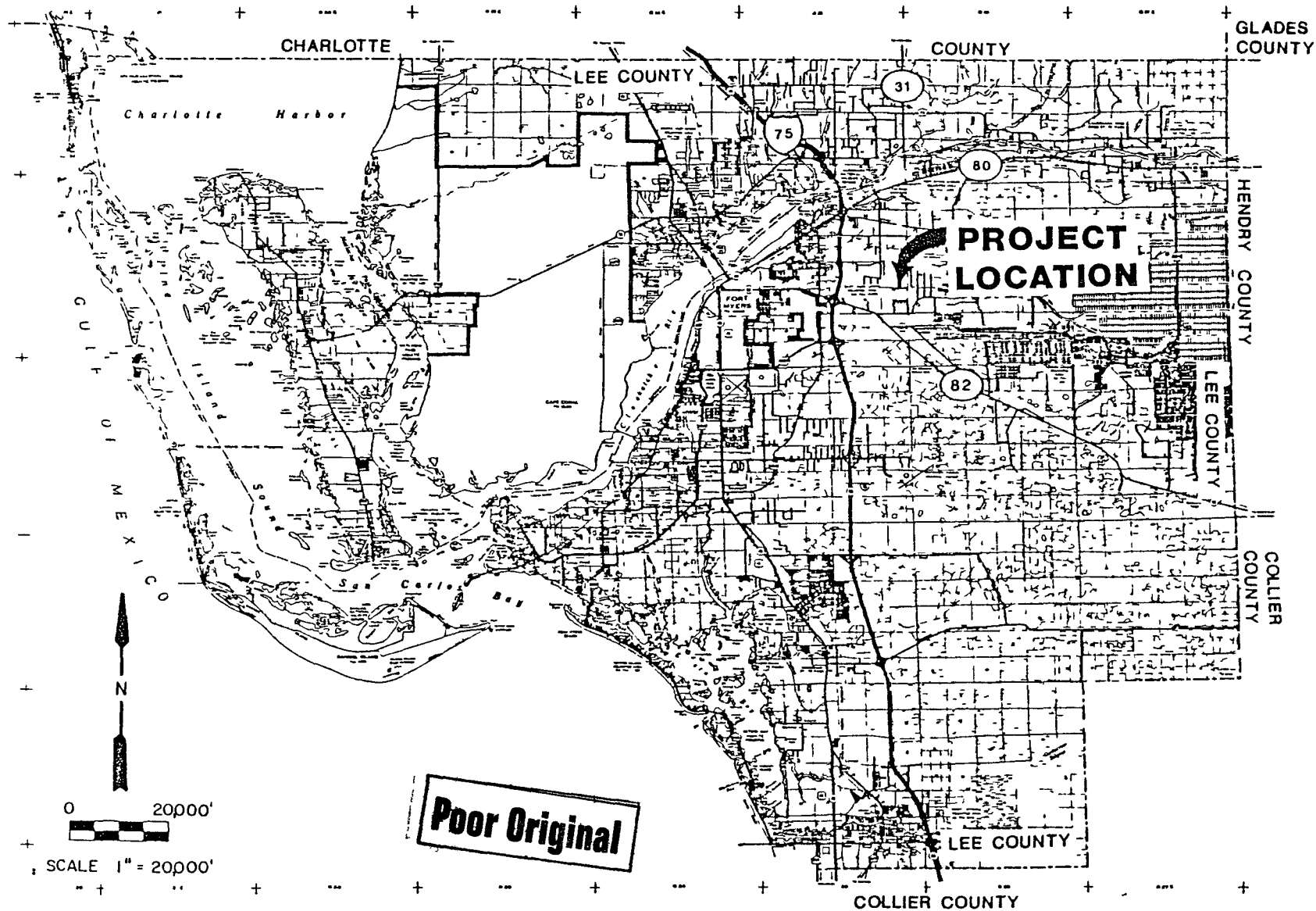


NOTE

O.O REFERENCE GRADE IS 20 TO 25 FEET ABOVE MSL. ALL DIMENSIONS ARE APPROXIMATE NOT TO SCALE.

CDM

SOURCE MAP BASED ON LEE COUNTY DOT GENERAL HIGHWAY MAP JAN 1976



CDM

General Location Map - Lee County Energy Recovery Facility

SECTION VI

PUBLIC NOTICING INFORMATION

Item VI-3

The Lee County Energy Recovery Facility site plan will impact approximately 2.7 acres of wetlands. Construction of the maintenance road for the electric power transmission line will require the placement of fill material in the 2.7 acres of wetlands. No additional acreage of wetlands will be disturbed or excavated. These areas consist of 1.7 acres of wet pine flatwoods (415), 0.7 acres of cypress/pine (624), and 0.3 acres of wet prairie (643) wetland habitat.

Item VI-4

A wetland mitigation plan will be implemented to offset the functional values of the 2.7 acres of wetlands to be impacted by site development. This plan consists of enhancement of existing low quality wetlands onsite as well as the creation of new wetland habitat. The enhancement and creation techniques are described below.

Enhancement

The 9.9-acre wetland, located in the southeast corner of the property adjacent to Buckingham Road, will be enhanced. This area is currently vegetated in part by approximately 3.2 acres of cypress/pine invaded by exotics (6249) and 1.8 acres of wet pine flatwoods invaded by exotics (4159). The thick growth of the problematic exotics melaleuca (Melaleuca quinquenervia) and Brazilian pepper (Schinus terebinthifolius) in these areas have greatly reduced the value of this wetland. These exotics will be removed from this 9.9-acre wetland.

As additional enhancement, this wetland will be incorporated into the site's surface water management system. Stormwater runoff, treated initially by dry detention and secondly by wet detention, will be discharged into this wetland during major storm events. The water entering the wetland, via the control structure of the detention pond, is expected

to meet all applicable state and federal water quality standards. The inclusion of this 9.9-acre wetland into the surface water management system will maintain the historic depth of inundation and hydroperiod of this wetland resource.

Creation

Approximately 3.8 acres of new wetland habitat will be created from existing uplands to mitigate for the loss of 2.7 acres of existing wetlands. The wetland mitigation ratios (acres of wetlands created: acre of wetland impacted) are 2.5:1 for cypress/pine habitat, 1:1 for wet pine flatwoods habitat, and 1:1 for wet prairie habitat. The final acreage of the created wetland will be determined utilizing these ratios and may vary from the 3.8 acres depending on the actual acreage of wetland impacted by construction. In any event, the mitigation ratios described above will be used to replace the impacted wetlands, and the estimated acreage of disturbance is believed to be accurate.

The impacted wetland habitat will be mitigated for by the creation of similar wetland habitat types. Approximately 3.5 acres of forested wetland habitat and 0.3 acres of non-forested wetland habitat will be created. The forested area will be planted with nursery stock of one or more species including but not limited to bald cypress (Taxodium distichum), red maple (Acer rubrum), laurel oak (Quercus laurifolia), and pop ash (Fraxinus caroliniana). The non-forested area will either be mulched with wetland topsoil or planted with native wetland herbaceous species including but not limited to sand cordgrass (Spartina bakeri), rush (Juncus spp), sawgrass (Cladium jamaicense), panicum grass (Panicum spp), and pickerel weed (Pontederia cordata). The final species planting list for the created forested and non forested wetlands will be submitted for agency review and approval prior to construction.

The location of the +3.8-acre mitigation has not been finalized in order to allow for needed flexibility of the mitigation plan. Preliminary investigations indicate that the most logical locations are either immediately south or east of the large wetland mosaic located in the west-central portion of the site (Figure 2-26). The 3.8-acre upland area will be recontoured to the appropriate elevation (as determined by the project ecologist) to allow for an appropriate depth of inundation. The mitigation wetland will be connected hydrologically to adjacent DER

jurisdictional wetlands. A specific detailed mitigation location, configuration, and planting plan will be submitted for agency review and approval prior to construction.

In order to document the success of the proposed wetland creation and enhancement, a wetland monitoring plan will be developed. This plan will adequately characterize the preconstruction condition of the wetland to be enhanced and the wetlands to be impacted, and will document the post construction condition of the enhanced and created wetlands. A nuisance species control program will also be implemented. These plans will be submitted for agency review and approval prior to construction.

APPENDIX A



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

Poor Original

Camp, Dresser & McKee, Inc.
Project No. 90-0413
Page 2

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/cfb.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:

<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.

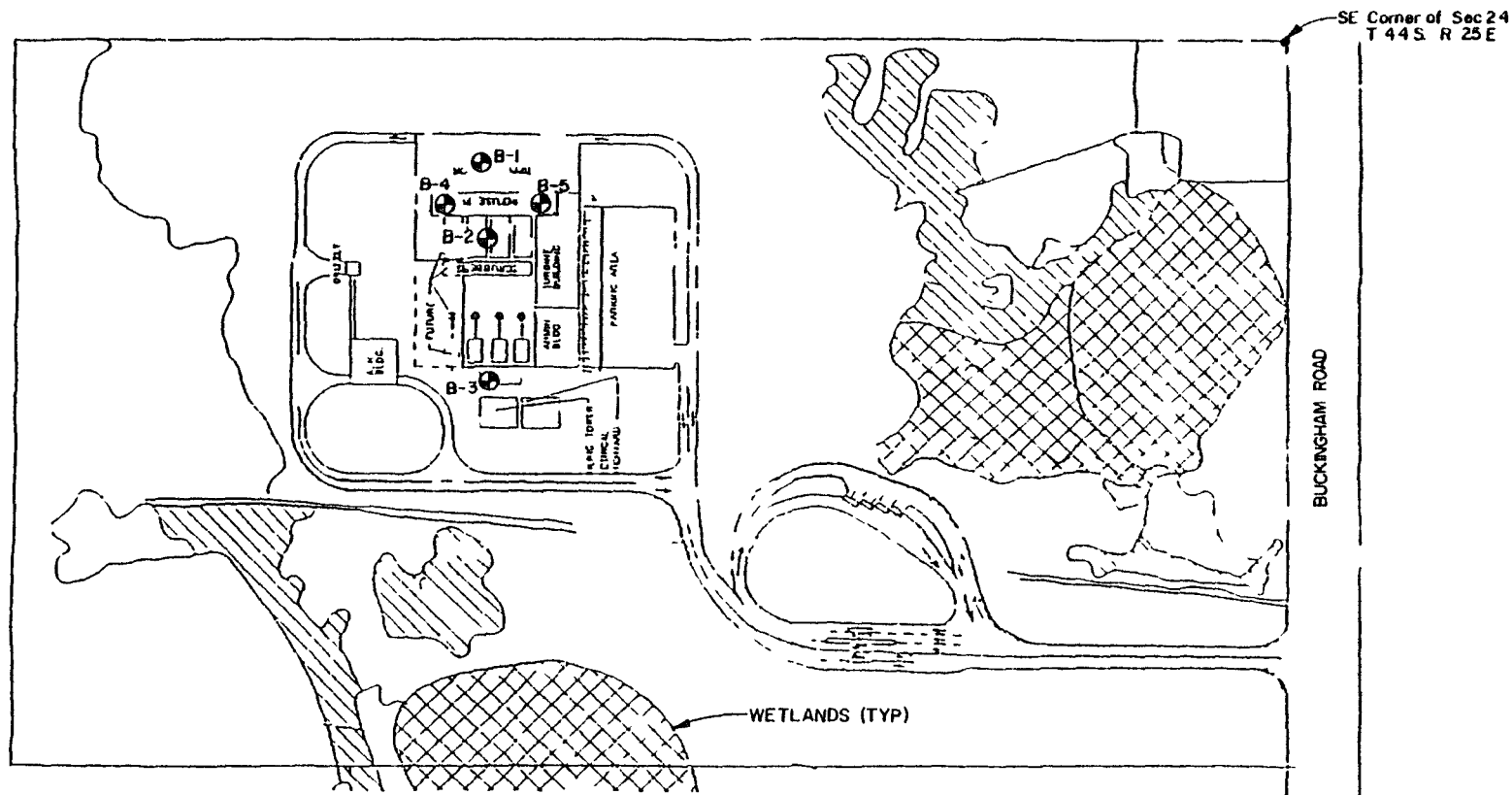
FUTURE GEOTECHNICAL STUDY

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.

Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**



LEGEND

⊕ Approximate SPT boring location

□ Proposed Major Structure Area

BORING LOCATION PLAN

NTS



DRAWN BY	PWV
CHKD.	FLL
APPVD	RAM
SCALE	NOTED

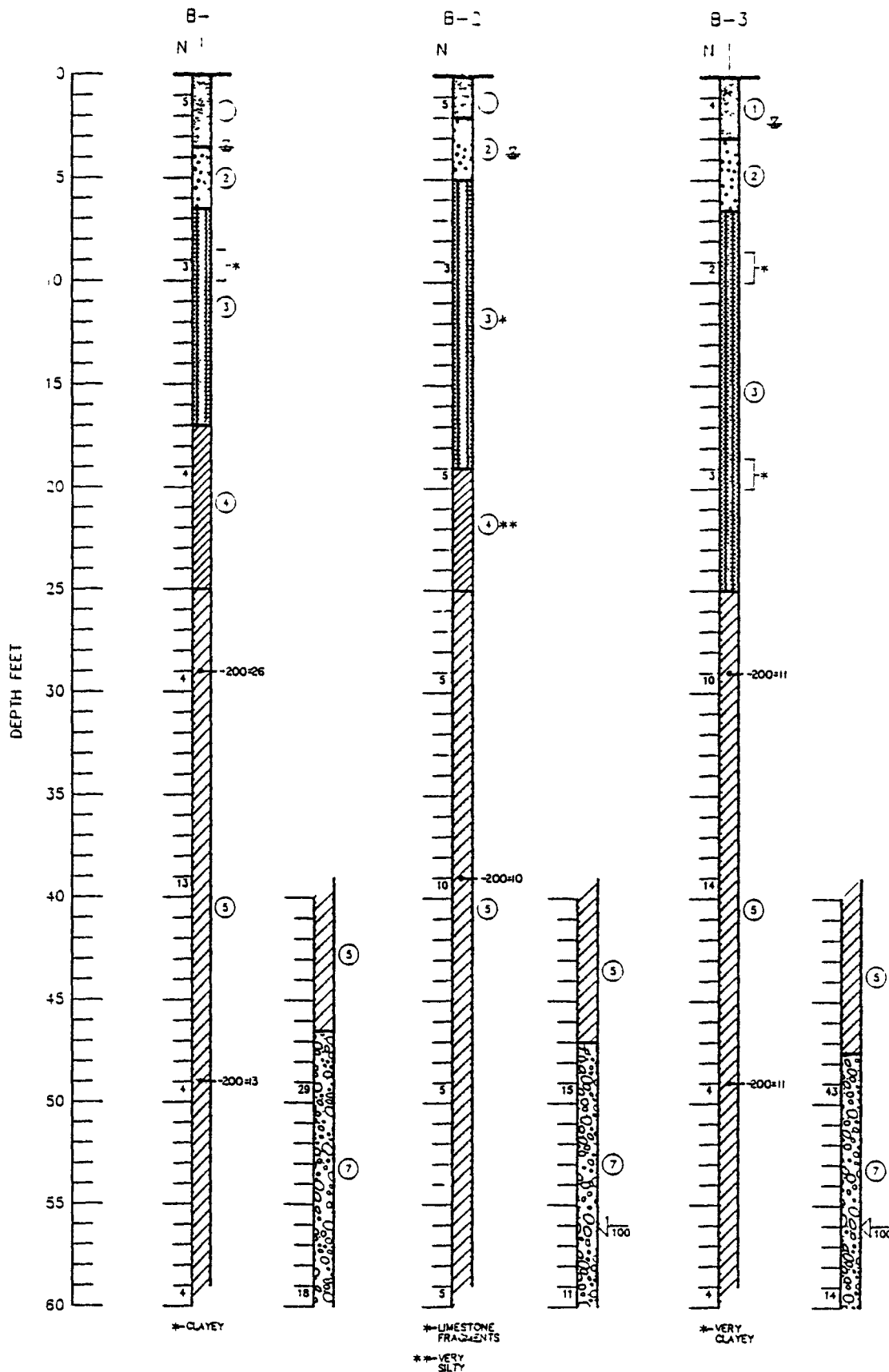
DATE	BY	REVISION

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

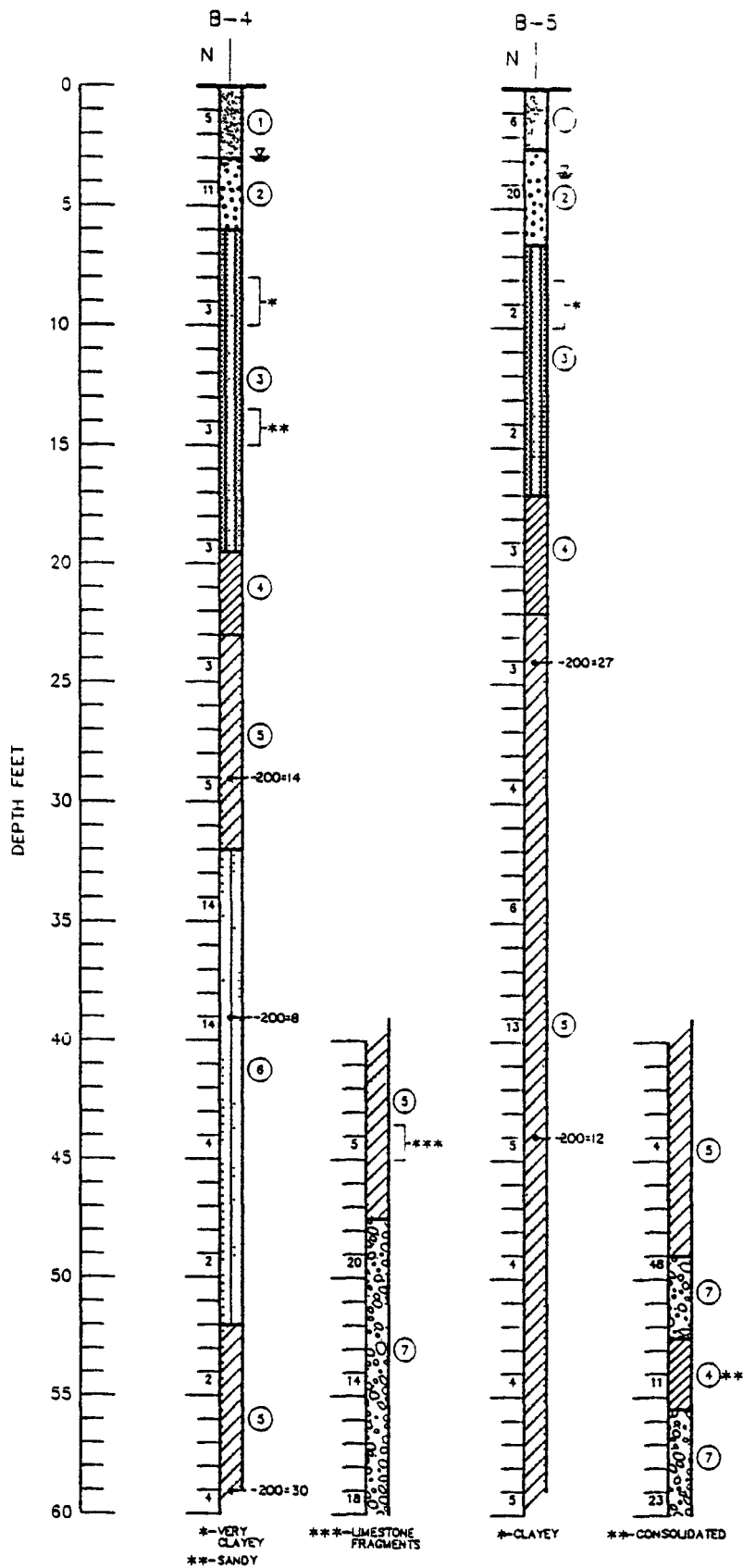
VERTICAL SCALE 1"=5'

DRAWN BY:	PWV
CHECKED:	FLL
APPROVED:	RAM
SCALE:	NOTED

PRELIMINARY FOUNDATION AND SOILS STUDY
PROPOSED RESOURCE RECOVERY PLANT
 LEE COUNTY FLORIDA

MEI MORTENSEN
 Engineering, Inc.

DATE: APRIL 90 PROJ. NO. 90-0413 PLATE 2



SOIL PROFILES

VERTICAL SCALE 1"=5'

DRAWN BY	PWV
CHECKED	FLL
APPROVED	RAM
SCALE	NOTED

PRELIMINARY FOUNDATION AND SOILS STUDY		
PROPOSED RESOURCE RECOVERY PLANT		
LEE COUNTY FLORIDA		
MEI 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.

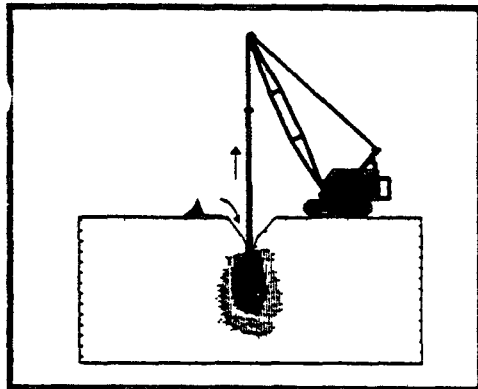
DRAWN: PWV	SCALE: -----	PROJ NO: 90-0413
CHKD: RAM	DATE: APRIL 90	PLATE 4

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

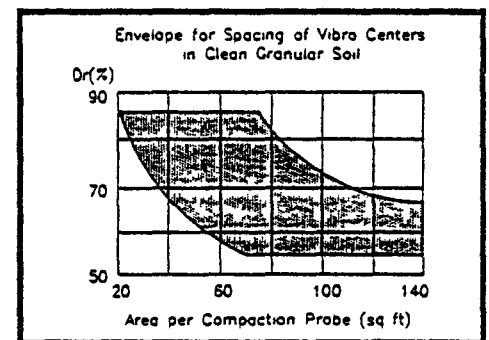
The significant engineering properties of a granular soil - compressibility, shear resistance, permeability, resistance to dynamic loading - are mainly dependent on the state of compaction, typically expressed in terms of relative density.

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.

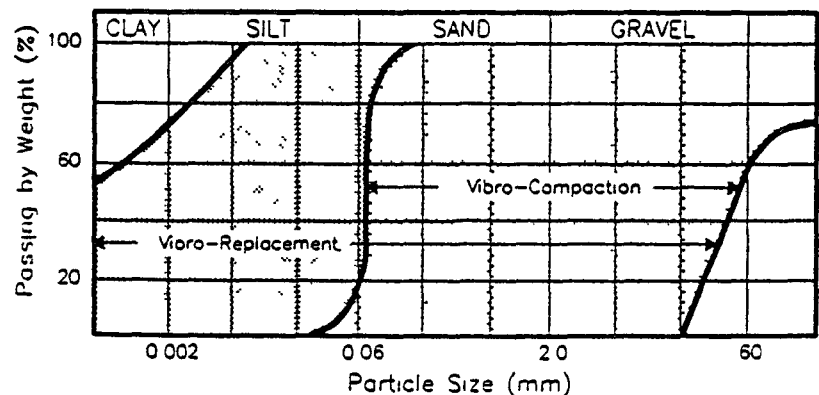
The angle of internal friction is increased on average between 5 and 10 degrees, resulting in much higher shear resistance. The modulus of deformation is often increased to around 1,000 tons/ft² and in some cases even higher, so that settlements are greatly reduced.

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.

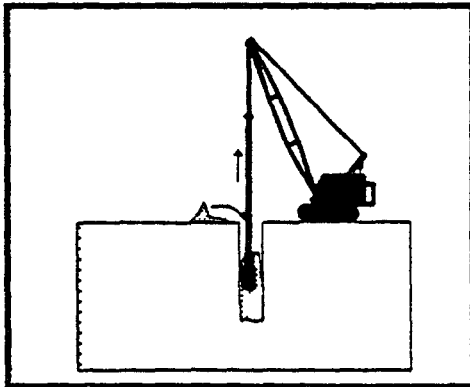


The grain size distribution curves show in general terms where Vibro-Compaction and Vibro-Replacement can be used. Soil having a silt content of less than approximately 15% can be densified by Vibro-Compaction. Silt and clayey strata are improved by Vibro-Replacement as well as mixtures of, for instance, 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.

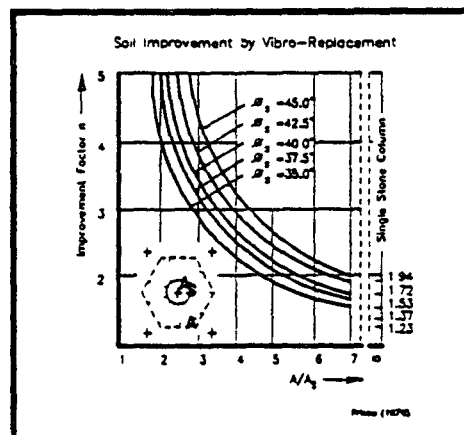
Design Principles

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.

Office Locations

GKN Hayward Baker

Maryland

1875 Mayfield Road
Odenton, MD 21113
(301) 551-8200

Florida

6850 Benjamin Road
Tampa, FL 33634
(813) 884-3441

California

P O Box 7690
Ventura, CA 93006
(805) 933-1331

Illinois

675 North Court
Suite 250
Palatine, IL 60067
(312) 358-1717

Washington

2601 Columbia Center
701 5th Avenue
Seattle, WA 98104
(206) 223-1732

Woodbine Division

Texas

2510 Decatur Avenue
Fort Worth, TX 76106
(817) 625-4241

GKN Keller Canada Ltd.

British Columbia

603 - 810 West Broadway
Vancouver, BC V5Z 4C9
(604) 294-4845

Ontario

2 Robert Speck Parkway
Suite 750
Mississauga, ON L4Z 1H8
(416) 276-9157

Part of the worldwide group
of GKN Keller Companies

GKN Hayward Baker INC
GROUND MODIFICATION

7.4 SFWMD NOTICE OF INTENT TO SHORT-TERM DEWATER



South Florida Water Management District
P O Box 24680, West Palm Beach FL 33416-4680

NOTICE OF INTENT TO SHORT-TERM DEWATER
(CHAPTER 40E-20 F A C)

APPLICANT'S NAME Lee County
PROPERTY OWNER'S NAME Lee County
CONSULTANT'S NAME Camp Dresser & McKee Inc.
APPLICANT OR AUTHORIZED AGENT Director, Department of Lee County Utilities
MAILING ADDRESS: P.O. Box 398
CITY Ft. Myers STATE FL ZIP 33902-0398 PHONE (813) 335-2276
PROJECT NAME: Lee County Energy Recovery Facility
PROJECT LOCATION, CITY East of Ft. Myers, FL COUNTY Lee County
SECTION(S) Southeastern 1/4 Section 24 TOWNSHIP(S) 44 South RANGE(S) 25 East
and portion of Northeastern 1/4 Section 25
ADDRESS OF PROJECT (or nearest landmark and distance): North of Buckingham Road
CITY East of Ft. Myers STATE FL ZIP 33901
EVIDENCE OF SITE OWNERSHIP: ☒ OWNED ☐ LEASED ☐ EASEMENT ☐ AFFIDAVIT OF OWNERSHIP
SURFACE WATER MANAGEMENT PERMIT NUMBER, IF ANY: In Process
DESCRIBE THE PURPOSE OF USE OR WITHDRAWAL AND THE ACTIVITY TO BE PERFORMED: Dewater uppermost aquifer to construct refuse pit of facility
GIVE A DETAILED STATEMENT OF WHY DEWATERING IS NECESSARY: Refuse pit to be constructed up to about 20 feet below existing ground surface. Refuse pit will be a concrete lined pit approximately 80 feet wide by 300 feet long.
METHOD OF PROPOSED EXCAVATION: Bulldozers and dredges as required
AVERAGE DAILY PUMPAGE: 10 mgd HOW DERIVED: Model Program based on Theis Solution (Walton)
MAXIMUM DAILY PUMPAGE: 16 mgd HOW DERIVED: Estimated discharge to maintain drawdown.
PUMP RATING(S): Based on available pumps. GPM ≥ 150 gpm
DESCRIBE ALL EXISTING PUMPS None
DESCRIBE ALL PROPOSED PUMPS. Pumps to be supplied by Contractor.
DESCRIBE ALL EXISTING CULVERTS 36" diameter CMP culvert under FP&L Easement Road; 2 10' wide culverts below SR 82 at intersection with Buckingham Road, also for flow to west, 24" diameter CMP culvert and 18" diameter CMP culvert downgradient.

DESCRIBE ALL PROPOSED CULVERTS: None planned.

GROUNDWATER DRAW DOWN ELEVATION: About 8 feet NGVD MAXIMUM DEPTH OF EXCAVATION: 20 below ground

DEWATERING CONTRACTOR'S NAME (if different from applicant): To Be Determined

ADDRESS: _____

CITY _____ STATE _____ ZIP _____

BRIEF STATEMENT OF FACTS WHICH SHOW WHY THE PROPOSED ACTIVITIES QUALIFY FOR A GENERAL PERMIT: _____

Temporary dewatering for construction to last less than 120 days.

DATE OF EXPECTED COMMENCEMENT: Winter 1990-1991 DATE OF EXPECTED COMPLETION: Spring 1991

ESTIMATED AMOUNT OF WATER TO BE WITHDRAWN BY EACH PUMP: Approximately 150 gpm or more from about 8 to 10 wells to dewater.

BRIEF STATEMENT EXPLAINING HOW POSSIBLE ADVERSE ENVIRONMENTAL IMPACTS WILL BE AVOIDED: _____

Overflow from retention basins will be routed to some of the nearest wetlands to the withdrawal.

PROPOSED DISCHARGE LOCATION (if applicable): Sufficient uplands exist

onsite for construction of temporary retention basin to which dewatering water will be

pumped. An onsite stormwater retention basin will also be used. Overflow from retention

basins will flow to onsite wetlands or existing ditches after suspended solids have settled

WILL THE CONTRACTOR COMMENCE DEWATERING WHILE THIS NOTICE IS UNDER REVIEW, IF THE CONDITIONS OF RULE 40E-20.302(4) ARE SATISFIED? Not planned to do so.

I HEREBY CERTIFY THAT THE LIMITING CONDITIONS SPECIFIED IN RULE 40E-20 381, F.A.C. WILL BE SATISFIED

APPLICANT'S SIGNATURE: George E. Reilly

APPLICANT'S NAME: George E. Reilly, P E TITLE: Administrative Director

(IF NOT THE OWNER, CERTIFY BELOW)

I HEREBY CERTIFY THAT I AM AN AUTHORIZED AGENT OF THE OWNER

SIGNATURE: _____

NAME: _____ TITLE: _____

NOTE:

1. Attach pertinent evidence of site ownership;

2. Include a recent aerial photo, topographic map of the site, site plan showing dewatering operation layout, and

3. Voluntary publication of the Notice of Intent pursuant to Rule 40E-1.606(3)(b), must provide the information as set forth

in Rule 40E-1.606(3)(b)2. and occur within seven days of submission to the District, if at all. Once received, proof of publication must be submitted to the District.

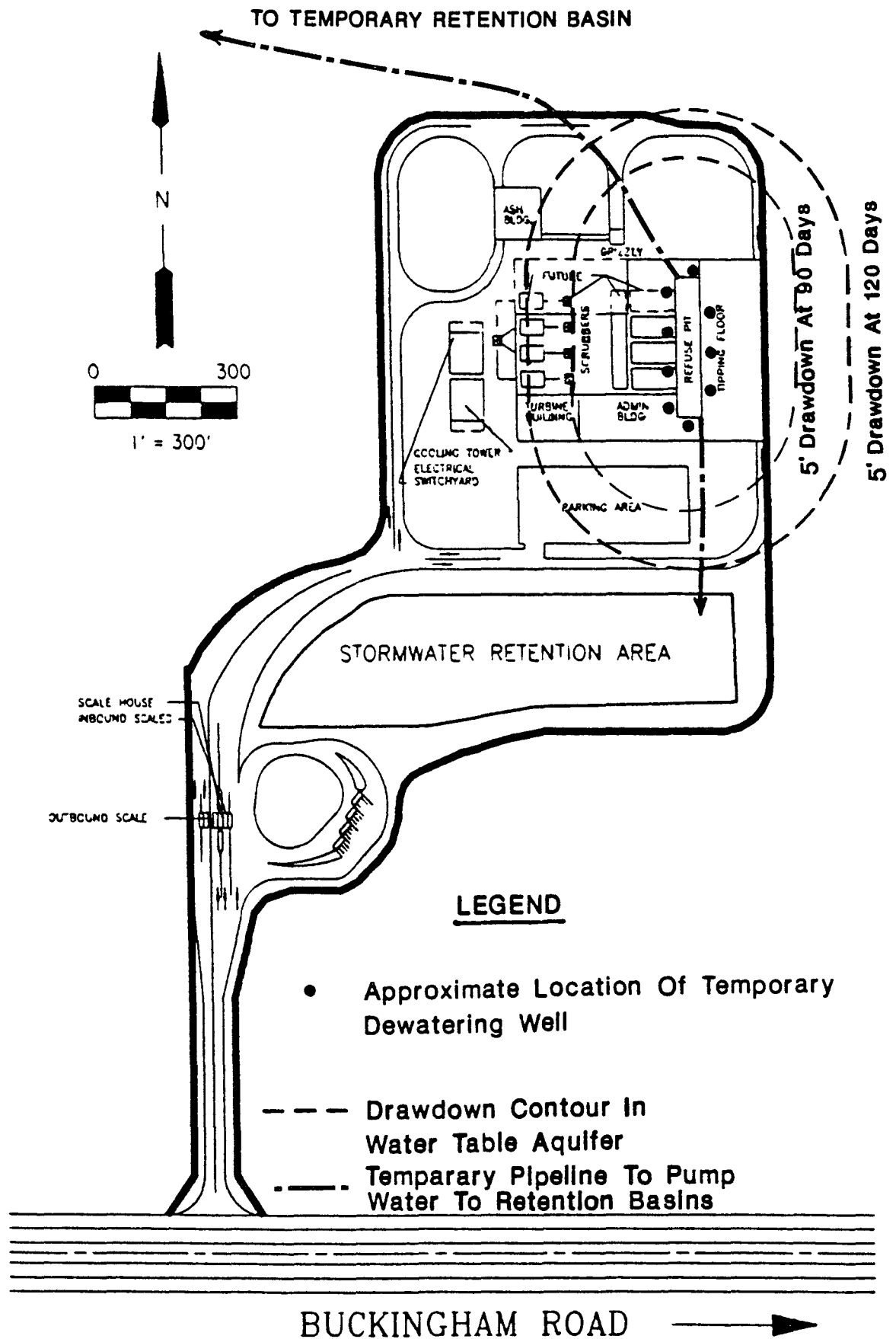
NOTES FOR SFWMD NOTICE
OF
INTENT TO SHORT - TERM
DEWATER
LEE COUNTY ENERGY
RECOVERY FACILITY

1. Evidence of Site Ownership
See Appendix 1.1, Volume II
2. Recent Aerial Photo
See Figures 2-5a and 2-5b, Volume I

Topographic Map of Site
See Appendix 7.3, Volume II

Site Plan Showing Dewatering Wells
See Attached Figure
Also See Figure 2.6, Volume I for Complete Site
Layout

ACAD FILE: RRSITEF2.DWG 05/29/90



7.5 ELECTRIC AND MAGNETIC FIELD COMPLIANCE

DER 17-274



Transmission Line Data Request Form

- Voltage Classification 69 ___ KV 115 ___ KV 138 X KV 230 ___ KV 500 ___ KV
- MCR 272A (MVA) Highest Operating Voltage: 138 kv (L-L)
- Conductor Temperature at MCR 167 (°F)
- Mid-span minimum clearance from bottom conductor to ground elevation 25 feet (as measured at MCR)
- Structure type wood pole
- Conductor diameter. 0.502 inches 3/0 kcmil ACSR type
- Subconductors per bundle. 1 X 2 ___ 3 ___
- Bundle configuration vertical ___ horizontal ___ delta ___ inverted delta ___ diamond ___ other N/A
- Bundle spacing. N/A inches
- Overhead ground wires: number 1 size 0.355 inches
- Centerline of structure to edge of right-of-way. right 30 feet left 30 feet (as seen with back to the power source)
- Attach Row location map. See Figure 6-1, Volume 1

Phase Configuration (1)		
Horizontal ___	Delta ___	Vertical <u>X</u>

X_1 10 ; X_2 ___ ; X_3 0 , X_4 ___ (feet)

Y_1 8 ; Y_2 8 ; Y_3 11 (feet)

(1) show X & Y to geometric center of bundled conductors. (See back for dbi cct.)

Section 8

SECTION 8.0

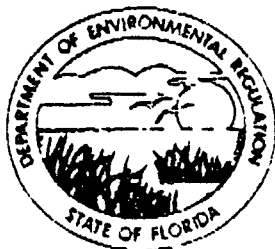
CORRESPONDENCE FROM FEDERAL, STATE, & LOCAL AGENCIES

APPENDIX 8.0

CORRESPONDENCE FROM FEDERAL, STATE, AND LOCAL AGENCIES

Correspondence from federal, state, and local agencies to Keven L. Erwin Consulting Engineers, Inc. and Camp Dresser & McKee Inc. regarding the Lee County Energy Recovery Facility is contained in this appendix.

MLC19/4



Florida Department of Environmental Regulation

South District • 2269 Bay Street • Fort Myers, Florida 33901 2896 • 813-332 2667

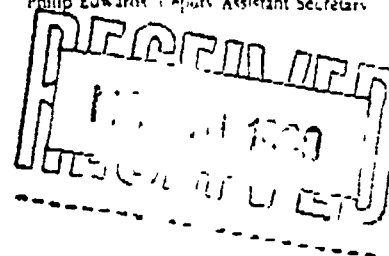
R. B. Martinez, Governor

Dale Twachmann, Secretary

John Shearer, Assistant Secretary
Philip Edwards, Deputy Assistant Secretary

May 8, 1990

Kevin L. Erwin
Consulting Ecologist, Inc.
2077 Bayside Parkway
Fort Myers, FL 33901



Re: Lee County - SW
Resource Recovery Site "F"
S24 T44S R25E
(Your Ref. KLECE CDMRR105)

Dear Mr. Erwin:

Please consider this in response and follow up to the April 24th meeting with Mr. Phil Barbaccia and Mr. Ron Blackburn.

A site inspection of the referenced property was conducted on April 5th by Mr. Patrick Kenney of our staff. It is felt that the mapping of wetland jurisdictional (DER) areas is correct. Therefore, as long as the project stays within the limits proposed and does not encroach into those areas under our jurisdiction, no wetland resource permits will be required from this office.

It should be noted that this determination is informal in nature. As the project is anticipated to be processed through the Power Plant Siting Act review procedures, permitting requirements associated with that process may supercede our findings.

In that regard, all permits for activities on site will go through the Power Plant Siting review staff. Only those permits necessary for off site elements, ie., wastewater, potable, and reuse lines, will be reviewed and processed by this office.

Thank you for allowing us to participate in this project. In the event you have any questions or feel that we can be of any further assistance, feel free to contact us.

Sincerely,

Philip R. Edwards
Deputy Assistant Secretary

PRE/RDB/jrh

cc: Hamilton Oven, P.E.



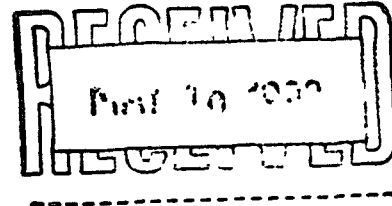
South Florida Water Management District

Fort Myers Area Office • 2209 Peck Street • Fort Myers FL 33901 • (813) 332-0399 • FL WATS 1 800 248 1201

Regulation Department

May 14, 1990

Mr. William R. Cox
KECE, Inc
2077 Bayside Parkway
Fort Myers, Florida 33901



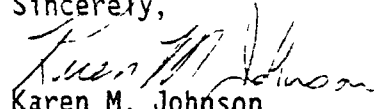
Dear Bill.

Subject. Wetlands Pre-Application Inspection
Project: Resource Recovery Plant Site F
Location Lee County, S24/T44S/R25E

Please find enclosed copy of a memorandum to Terri Bates of our West Palm Beach office regarding the above referenced project. As outlined in the memorandum, the field delineated wetlands lines have been approved by staff.

If you have any questions regarding this matter, please contact me at 332-0399.

Sincerely,


Karen M. Johnson
Senior Environmental Analyst
Natural Resource Management Division

cc: T. Bates
E. Lopez

Governing Board

James F. Garner, Chairman Fort Myers
Doran A. Jason, Vice Chairman Key Biscayne
J.D. York, Palm City

Arsenio Milian, Miami
Fritz Stein, Belle Glade
Mike Stout, Windermere

Ken Adams, West Palm Beach
Valerie Boyd, Naples
James E. Nall, Fort Lauderdale

John R. Wodraska, Executive Director
Tilford C. Creel, Deputy Executive Director
Thomas K. MacVicar, Deputy Executive Director

District Headquarters, P.O. Box 24680 • 3301 Gun Club Road • West Palm Beach, FL 33416-4680 • (407) 686-8800 • Florida WATS 1 800 432 2045

M E M O R A N D U M

TO: Terrri Bates

FROM: Karen M. Johnson 

DATE: May 14, 1990

SUBJECT: Resource Recovery Plant Site F
Lee County, S14/T44S/R25E
Pre-Application Inspection

Pursuant to an April 5, 1990 pre-application inspection, at which time a flagged wetland line was reviewed, a plotted wetland line has been forwarded to me for review. The subject property contains palmetto prairies, pine flatwoods, improved pasture, wet pine flatwoods, cypress wetlands and cypress/pine wetlands. Some wetlands have been invaded by exotics.

Staff has reviewed the submitted delineations and agrees that these accurately represent the wetland limits on the subject property. Record of the approved delineations will be kept in the Fort Myers office for future referral.

cc: File
E. Lopez
B. Cox

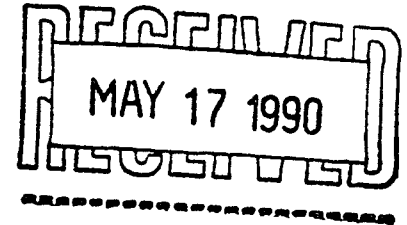


DEPARTMENT OF THE ARMY
GULF COAST AREA OFFICE JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P O BOX 19247
TAMPA FLORIDA 33686-9247

REPLY TO
ATTENTION OF

May 15, 1990

Regulatory Section
90JD(4)0108
JURISDICTIONAL



Kevin L. Ervin Consulting Ecologist, Inc.
c/o Mr. William R. Cox
2077 Bayside Parkway
Ft. Myers, Florida 33901

Dear Mr. Cox:

Reference is made to your correspondence received on April 26, 1990, concerning a jurisdictional determination for the "Lee County Resource Recovery Site F" located in Section 24, Township 44 South, Range 25 East, near Lehigh Acres in Lee County, Florida. Your request was made on behalf of Lee County, Department of Utilities. An onsite field meeting on April 2, 1990, was attended by Mr. Skip Bergmann of my staff.

The lines shown on the aerial maps, which were submitted with your correspondence, have been verified by Mr. Bergmann and represent the approximate boundaries of the various vegetation communities as they currently exist. Vegetation communities identified by cover types 4111, 415, 4159, 514, 621, 624, 6249 and 643 are jurisdictional wetland areas. Vegetation communities identified by cover types 210, 212, 321, 3219, 411, 4119, 422, 425, 429 and 437 are non-jurisdictional areas.

The jurisdictional wetland areas are regulated by the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act. The discharge of dredged or fill material into these areas will require Department of the Army authorization. Other Federal, State or local authorization may also be required.

This jurisdictional determination can be considered current and correct for a period of two (2) years from the date of this letter. Any reliance upon jurisdictional correspondence beyond that time frame may lead to incorrect planning and design efforts as well as possible violations of current Federal Laws and/or Regulations.

Thank you for your cooperation with the U.S. Army Corps of Engineers Regulatory Program. If you have any questions regarding this letter or the Corps of Engineers regulations, please contact Mr. Bergmann at the Ft. Myers Regulatory Office, telephone 813-332-7808.

Sincerely,

Dianne M. Rosenwerg
for JOSEPH R. BACHELER
Chief, Tampa Regulatory Office

Enclosure(s)

Copies Furnished:

Lee County, Department of Utilities w/o encl

Kevin L. Erwin Consulting Ecologist, Inc.

Ecologists • Biologists • Computer Scientists

May 21, 1990

Mr. Joseph R. Bacheler
Chief, Tampa Regulatory Office
Department of the Army
Gulf Coast Area Office
Jacksonville District
Corps of Engineers
P.O. Box 19247
Tampa, FL 33686-9247

Dear Mr. Bacheler:

In the second paragraph of your letter to us dated May 15, 1990 (see enclosure) you refer to vegetation community 4111 as a jurisdictional wetland area for the proposed Resource Recovery Site F in Lee County. This appears to be a mistake. If you agree, please correct and send us a corrected letter.

We appreciate your speedy response on this matter.

Sincerely,

KEVIN L. ERWIN CONSULTING ECOLOGIST, INC.

William R. Cox / KSF
William R. Cox
Ecologist

Enclosure

WRC/ksf

FLORIDA GAME AND FRESH WATER FISH COMMISSION

WILLIAM G BOSTICK, JR
Winter Haven

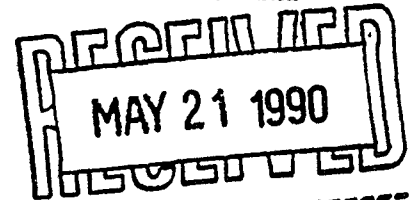
DON WRIGHT
Orlando

THOMAS L HIRES, SR
Lake Wales

MRS GILBERT W HUMPHREY
Micosukee

JOE MARLIN HILLIARD
Clewiston

ROBERT M BRANTLY, Executive Director
ALLAN L. EGBERT, Ph D., Assistant Executive Director



Office of Environmental
Services
29200 Tucker Grade
Punta Gorda, FL 33955
May 17, 1990

Mr. Bill Cox
Kevin L. Erwin Consulting Ecologist, Inc.
2077 Bayside Parkway
Ft Myers, FL 33901

RE. Resource Recovery Plant, S24,
T44S/R25E, Lee County

Dear Mr. Cox:

In response to your request for information on listed species concerns within five miles of the proposed Lee County Resource Recovery Site, please see the following information and attached map:

- 1) Red-cockaded woodpecker habitat has been identified in the Colonial Boulevard and Westinghouse DRI vicinities as well as west of I-75 north of Penzance Road (exact location not accurately identified). Management plans have not been developed to date.
- 2) Wood storks, sandhill cranes, and various listed wading birds are associated with drainage features and natural wetlands throughout the 5-mile radius. Locations coincide with the season in most cases. Sandhill cranes are also associated with range, airport, or pasture land in the project vicinity. Pertinent management plans are enclosed.
- 3) Snail kites are utilizing and roosting in freshwater ponds and utilizing man-made drainage ditches near S.R. 82 and in the Halfway Pond area. Contact Kathleen Hultgren at Lee County if specific locations are required.
- 4) A relatively new eagle nest is located in the Six Mile Strand in Section 34 in the southeast quadrant of I-75 and S.R. 82. Two other eagles nests are apparently located on the Westinghouse DRI project (old LE-31 and a new nest recorded but unverified as west of the landfill site). Kevin should have these locations. Management plans have not been developed.
- 5) Gopher tortoises, scrub jays, and burrowing owls are located in local populations throughout LeHigh Acres. Contact Mike Buono, who is I believe with Lee County Environmental Lab, for locations. I have been told

Mr Bill Cox
May 17, 1990
Page 2

that a scrub on Buckingham Road contains scrub jays but have not verified the information. Gopher tortoises are also associated with the Orange and Caloosahatchee River corridors. No mapping of these locations has been conducted.

6) Mangrove or Big Cypress fox squirrels are found in pine flatwoods/cypress or other hardwood canopy throughout the project area. Information on this species is minimal, although a study on fox squirrels is being conducted in Collier County as I indicated.

7) Old (15-years ago) sitings of Audubon's caracara have been recorded in the vicinity of Colonial Blvd. Recent sitings have been recorded in the City of Ft. Myers, but information on actual territories within the project area is limited. Contact Jim Layne, Archibold Biological Station, for specifics if necessary.

8) The project site is located in the home range of a young male panther which was injured at the Southwest Regional Airport in November 1988, and subsequently released at Corkscrew Sanctuary. See attached a map recording the home range of this cat.

Please call me if you have any questions.

Sincerely,

Kimberly A. Dryden

Kimberly A. Dryden
Biological Scientist III

KD/kd
ENV 2-11-2/3
cc: Ms. Lisa Dodd
Lee County Environmental Sciences

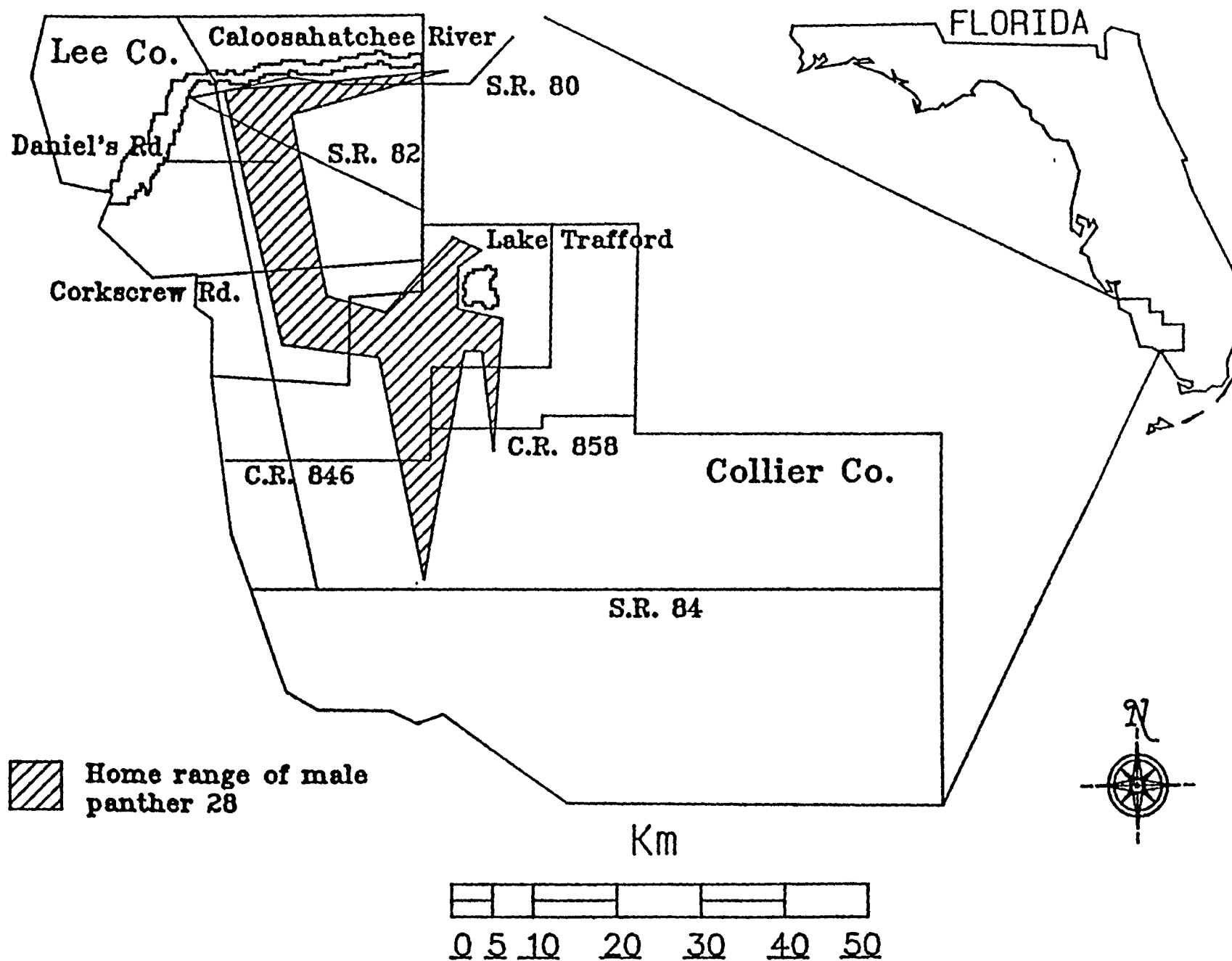
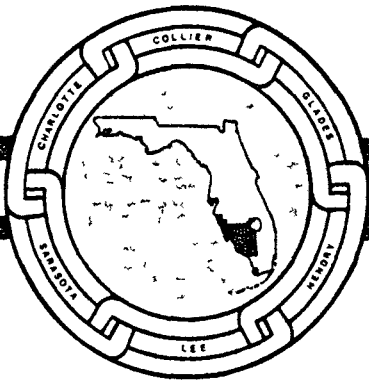


Figure 11



Southwest Florida Regional Planning Council

4980 Bayline Drive, 4th Floor, N. Ft. Myers, FL 33917-3909 (813) 995-4282

P O Box 3455, N. Ft. Myers, FL 33918-3455 SUNCOM 721-7290 / 7291

FAX 813-995-7895

April 24, 1990

Deborah Chaiton
Camp Dresser & McKee, Inc.
1620 Medical Lane
Suite 221
Fort Myers, FL 33907

RECEIVED

APR 25 1990

CAMP DRESSER & MCKEE
FT. MYERS, FLORIDA

Dear Ms Chaiton

Mr Daltry has asked me to respond to your letter of April 12, concerning the new location for the proposed Lee County Energy Recovery Project. Regional staff concerns are related to the potential impacts of the project on:

- * Interstate 75,
State Roads,
- * The Caloosahatchee River,
- * The Orange River,
- * The Six Mile Cypress Slough and Preserve Area
- * The Caloosahatchee River,
- * The Caloosahatchee River National Wildlife Refuge,
and The Orange River.

To staff knowledge, there is no Indian Reservation in Lee County, although there are reservations in neighboring counties. If Regional staff can be of further assistance, please contact Mr. Daltry or myself at 813-995-4282.

Sincerely,

SOUTHWEST FLORIDA REGIONAL PLANNING COUNCIL

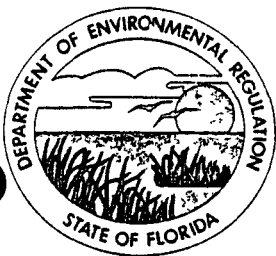
Glenn E. Heath

Glenn E. Heath
Regional Planner

GEH/sb

Reviewed By Deb Chaiton
XC DEC(original) CAB, HJE

File No 6685-38-DT-PPLH-F
File Topic Lee County ERF
Subtopic Governmental Jurisdiction



Florida Department of Environmental Regulation

Twin Towers Office Bldg • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Bob Martinez, Governor

Dale Twachtmann, Secretary

John Shearer, Assistant Secretary

June 1, 1990
Reviewed By Deb Chaiton
XC RST, MJI, File

Ms. Deborah Chaiton
Camp, Dresser & McKee, Inc.
1620 Medical Lane, Suite 221
Ft. Myers, Florida 33907

File No 16085-38 PT-PRMF

File Topic Lee County ERF

Subject Governmental Jurisdiction

Dear Ms. Chaiton:

In response to your letter of May 29, 1990, I would like to clarify the federal consistency requirements of the Coastal Zone Management Act as they apply to the proposed Lee County Energy Recovery Facility Project. The proposed facility is located in the State's coastal zone. Therefore, all federal approvals required to construct and operate the project are subject to a review for consistency with the Florida Coastal Management Program as specified in 15 CFR 930, Subpart D.

When the facility is reviewed for approval under the power plant siting requirements of Chapter 403, Florida Statutes, all the federal permits will be considered including the FAA stack height permit. DER's review of power plant siting applications includes an interagency review to address all relevant state statutory concerns. Therefore, this permit decision serves as the state's consistency decision for purposes of CZMA compliance. Unless FAA requests a separate federal consistency review through the Governor's Office State Clearinghouse, the consistency of the stack height permit will be determined as a part of the DER permit review.

I have enclosed a federal consistency procedures manual for your reference. If you have any further questions or need more information, please contact me at 904/488-0130.

Cordially,

Lynn F. Griffin

Lynn F. Griffin
Environmental Specialist
Intergovernmental Coordination

LFG/pmg

Enclosure

cc: Don Henningsen
Buck Oven

RECEIVED

JUN 04 1990

CAMP DRESSER & MCKEE
FT MYERS, FLORIDA

FLORIDA NATURAL AREAS INVENTORY

1018 Thomasville Road, Suite 200-C • Tallahassee, Florida 32303 • (904) 224-8207

May 31, 1990

Ms Debbie Chaiton
Camp Dresser & McKee Inc
1620 Medical Lane, Suite 221
Ft Meyers, Florida 33907

Dear Ms. Chaiton

This letter is in reference to your second request for information from the Florida Natural Areas Inventory for information on special elements (rare, threatened, and endangered species and other unique natural features of the Florida landscape) within a 5 mile wide study area for The Resource Recovery Program facility site. The first request (28, December 1989) specified a 5 mile wide zone in Lee County, Township 43 South Range 25 East Section 25. I understand from your correspondence of 12 April, 1990 that the study site has been redefined as an area 5 miles to the south, the new location, is centered in Township 44 South Range 25 East Section 24.

The computer search for records of special elements conducted for the original siting study also included a search of the new area. Twenty-eight special elements are reported for the. The records of special elements provided to you for the original study area are also valid for the new area.

The quantity and quality of data collected by the Florida Natural Areas Inventory (FNAI) are dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys, many natural areas in Florida have never been thoroughly surveyed, and new species of plants and animals are still being discovered. For these reasons, the FNAI cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of Florida. Florida Natural Areas Inventory reports summarize the existing information known to FNAI at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments.

We strongly suggest that a site specific survey be conducted on this property to determine the current presence - absence of rare, threatened, or endangered species. This survey should be conducted by individuals familiar with Florida's flora and fauna. For your convenience summary lists of the elements for Duval County, FNAI special plants, special animals and capsule descriptions of the natural communities are enclosed.

Information provided by this data base may not be published without prior written notification to the Florida Natural Areas Inventory and FNAI must be credited as an information source in these publications. FNAI data may not be resold for profit.

w d y Deb Chaiton
HJT, RJT, DOT Sauer

NJ 6685-38-PT-PRMF

Lee County ERF

Governmental Jurisdiction

RECEIVED
JUN 01 1990

CAMP DRESSER & MCKEE
FT. MYERS, FLORIDA

Page 2
May 31, 1990
Ms. Debbie Chaiton

I hope this information is of use to you. Please call if you have any questions or if I can be of further assistance to you.

Sincerely,

A handwritten signature in cursive script that reads "Steve Friedman".

Steve Friedman
Data Request Manager

encs
GMF-FLLEE

STATE OF FLORIDA
DEPARTMENT OF NATURAL RESOURCES

FACSIMILE COVER SHEET
FAX NUMBER: 904/ 922-5380
FAX SUNCOM NUMBER: 292-5380

DATE: 5/31/90 2 PAGES, INCLUDING THE COVER SHEET, ARE BEING SENT.

FROM: Greg Brock PHONE NUMBER: 904/487-1750

PLEASE DELIVER TRANSMISSION TO:

NAME: Debbie Chaiton PHONE NUMBER: 813/939-3173

MESSAGE: Ms. Chaiton: The nearest CARL project area in which acquisition of
some parcels has occurred is Estero Bay Buffer. We ha indicated the partial
boundaries on the map we are returning. The Estero Bay project is no longer on
the CARL priority list, since it was ranked #62 by the Land Acquisition Advisory
Council in December, 1989.

received
5/31/90

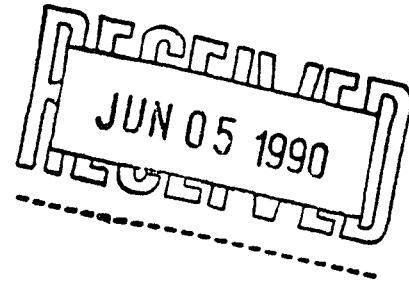


United States Department of the Interior

FISH AND WILDLIFE SERVICE

P O. BOX 2676

VERO BEACH, FLORIDA 32961-2676



June 4, 1990

Mr. Kevin Irwin, President/Ecologist
Kevin L. Irwin Consulting Ecologist
2077 Bayside Parkway
Fort Myers, Florida 33901

Dear Mr Irwin:

This letter is to confirm a recent telephone conversation between Mr. Emmons of your office and Mr. Gallagher of this office regarding endangered species in the vicinity of the new alternate location for the proposed Lee County Resource Recovery Facility, Lee County, Florida. Mr. Emmons requested our listing of endangered species within a 5-mile radius of the proposed facility.

The material recently forwarded your office regarding the previous siting of the proposed Recovery Facility along the Caloosahatchee River at the junction of S.R. 15 and S.R. 30 is still valid.

We are enclosing for your information another listing of the endangered species in Lee County. Hope this is helpful. If you have any further questions, do not hesitate to contact this office (407-562-3909).

Sincerely yours,

David L. Ferrell
David L. Ferrell
Field Supervisor

Enclosure

LEE COUNTY

E = Endangered / T = Threatened

12-19-1988

- E West Indian Manatee (Trichechus manatus)
Year around
- T Florida Scrub Jay (Aphelocoma coerulescens)
Marginal populations
- T Arctic Peregrine Falcon (Falco peregrinus tundrius)
Some overwintering possible
- E Bald Eagle (Haliaeetus leucocephalus)
Nests along coastal and the Caloosahatchee River
- E Wood Stork (Mycteria americana)
Wetlands
- E Bachman's Warbler (Vermivora bachmani)
Breeding season
- T Loggerhead Sea Turtle (Caretta caretta)
Nesting
- T Eastern Indigo Snake (Drymarchon corais couperi)
Dry, well drained soils
- E Beautiful Pawpaw (Deeringothamnus pulchellus)
Pine Island

CDM

environmental engineers, scientists
planners, & management consultants

Lee County Board of
CAMP DRESSER & MCKEE INC *Power*

1620 Medical Lane Suite 221
Ft Myers Florida 33907
813-939-3775

RECEIVED

APR 26 1990

CAMP DRESSER & MCKEE

April 18, 1990

Mr. Walter P. Jones, III
Chief, Real Estate Division
U.S. Army Corp of Engineers
P. O. Box 4970
Jacksonville, Florida 32232-0019

Re: Lee County Energy Recovery Facility
CDM PN: 6685-38-PT-PRMF

Dear Mr. Jones:

Pursuant to the telephone conversation on April location map for the energy recovery project for your review. Please determine if there are any the map and return the map to me. If there are miles of the proposed site, please note in your

The Energy Recovery Program (Waste-to-Energy Pl. Solid Waste Master Plan. Camp Dresser & McKee engineering consultant and we are currently in required power plant siting permit application.

Your timely response will be greatly appreciated. Please call me or Carmen Bourgeois at 813-939-3775 if you have any questions.

Very truly yours,

CAMP DRESSER & MCKEE INC.

Deborah Chaiton

Deborah Chaiton

DC:lp
LCL1/17

Enclosure

cc: M. Ihnat
C. Bourgeois

Reviewed By

XC

Deborah Chaiton
Dee (original) *CAB, MJT*
File No *6685-38-PT-PRMF*
File Topic *Lee County ERF*
Subtopic *Governmental Jurisdiction*

RECEIVED

APR 20 1990

COE - REAL ESTATE DIV.



**South Florida
Water Management District**

Lee Henderson

Senior Landscape Architect/Planner
Department of Land Management

P.O. Box 24680 3301 Gun Club Road West Palm Beach FL 33416-4680
(407) 686 8800 Florida WATS 1 800 432 2045

4/19/90

Per your request, areas delineated
concerning SOR lands.

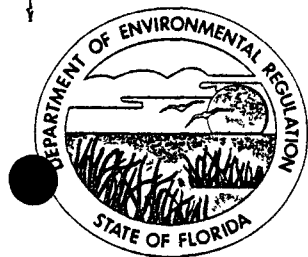
RECEIVED

APR 20 1990

**CAMP DRESSER & MCKEE
FT. MYERS, FLORIDA**

Deborah
MJI, TAB, DEC (original)

6685-38-PT.
Lee County Energy Recovery
Governmental Jurisdiction



Florida Department of Environmental Regulation

Twin Towers Office Bldg • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Bob Martinez, Governor

Dale Twachtmann, Secretary

John Shearer, Assistant Secretary

April 16, 1990

Ms. Deborah Chaiton
Camp, Dresser & McKee, Inc.
1620 Medical Lane
Suite 221
Ft. Myers, Florida 33907

Dear Ms. Chaiton:

Thank you for your April 12 letter and map regarding the proposed Lee County Energy Recovery Facility and its location in relation to nearby Outstanding Florida Waters (OFW). There is only one OFW located within the five mile radius shown on the map (Caloosahatchee National Wildlife Refuge). This refuge is barely within the five mile radius and consists of several small islands in the Caloosahatchee River. The next nearest OFW is Caloosahatchee River State Recreation Area which is located approximately nine miles away from the proposed site.

If you have any questions or need additional information, please don't hesitate to write or call me at (904)487-0505.

Sincerely,

Eric R. Shaw
Environmental Specialist
Standards & Monitoring

ERS/

Enclosure

Reviewed by Deb Chaiton
by MJI, CAB, DEC (original)

6685-38-PJ
Lee County Energy Recovery
Government Jurisdiction

RECEIVED

APR 19 1990

16 DRESSER & MCKEE
FT. MYERS, FLORIDA



RECEIVED
MAY 02 1990

CAMP DRESSER & MCKEE
FT MYERS, FLORIDA

STATE OF FLORIDA
DEPARTMENT OF COMMUNITY AFFAIRS

2740 CENTERVIEW DRIVE • TALLAHASSEE, FLORIDA 32399

BOB MARTINEZ
Governor

THOMAS G. PELHAM
Secretary

April 27, 1990

Ms. Deborah Chaiton
Camp Dresser & McKee Inc.
1620 Medical Lane, Suite 221
Ft. Myers, Florida 33907

Dear Ms. Chaiton:

Thank you for your letter of April 23, 1990, requesting information on Lee County as related to Areas of Critical State Concern (ACSC). There are no ACSC areas in Lee County or any adjacent counties.

Should you have any further questions please feel free to call me at (904) 488-4925.

Sincerely,

James L. Quinn
James L. Quinn
ACSC Administrator

JLQ/vs

Reviewed By Deborah Chaiton
cc MJI, CAB, DEC (original)
File No. 6685-38-PI-PPMF
File In Lee County Energy Recovery Facility
" " " Governmental Jurisdiction

STATE OF FLORIDA
DEPARTMENT OF NATURAL RESOURCES

Marjory Stoneman Douglas Building • 3900 Commonwealth Boulevard • Tallahassee, Florida 32399
Tom Gardner, Executive Director

District 8 Administration
1843 South Tamiami Trail
Osprey, Florida 34229
April 15, 1990

Ms. Deborah Chaiton
Camp Dresser and McKee, Inc.
1620 Medical Lane, Suite 221
Fort Myers, Florida 33907

Dear Ms. Chaiton:

There are no state park units within five miles of the proposed Lee County energy recovery project. Koreshan State Historic Site, in Estero, is the closest area and is approximately twelve miles to the southwest.

Sincerely,



Robert Dye
District Manager

RD/bh
cc:Joe Knoll
Ken Alvarez
file

Reviewed By Deb Chaiton
cc: CAB, MJE, DEC (original)

File # 1605-38-PF-

File # Lee County Energy Recovery
Subject Governmental Jurisdiction

RECEIVED

APR 20 1990

CAMP DRESSER & MCKEE
FT. MYERS, FLORIDA



8-21



STATE OF FLORIDA
DOYLE CONNER, COMMISSIONER

FLORIDA DEPARTMENT OF AGRICULTURE & CONSUMER SERVICES
DIVISION OF FORESTRY ■

6420
April 16, 1990

Ms. Deborah Chaiton
Camp Dresser & McKee, inc.
1620 Medical Lane, Suite 221
Fort Myers, Fla. 33907

Dear Ms. Chaiton:

Please be advised that there are no state forests located within the five (5) mile area of the proposed site.

Should you have any questions, please do not hesitate to contact me.

Sincerely,

Kevan L. Moore
Forest Area Supervisor
694-2181

KLM:bb

Received By Deb Chaiton
MJE, CAB, DEC (original)

File # 1685-38-PT
File type Lee County BA Energy Recovery
Subject Government Jurisdiction

RECEIVED

APR 19 1990

CAMP DRESSER & MCKEE
FT MYERS, FLORIDA

STATE OF FLORIDA
DEPARTMENT OF NATURAL RESOURCES

Marjory Stoneman Douglas Building • 3900 Commonwealth Boulevard • Tallahassee, Florida 32399

Tom Gardner, Executive Director

RECEIVED
APR 17 1990

CAMP DRESSER & MCKEE
FT. MYERS, FLORIDA

April 16, 1990

Deborah Chaiton
Camp Dresser & McKee Inc.
1620 Medical Lane, Suite 221
Ft. Myers, Florida 33907

Re: Lee County Energy Recovery Facility
CDM PN: 6685-PT-PRMF

Dear Ms. Chaiton,

In response to your letter dated April 12, 1990, regarding Lee County Energy Recovery Facility. There are no aquatic preserve within 5-miles of the proposed site. Also your map is enclosed.

Very truly yours,



Robert Repenning, Manager
South West Florida Aquatic Preserves
P.O. Box 591
Bokeelia, Florida 33922

Enclosure :

Reviewed By Deb Chaiton
XC MJT, CAB, DEC(Original)

File No 6685-PT-38-PT-PRMF
File Topic Lee County Energy Recovery
Subtopic Government Jurisdiction



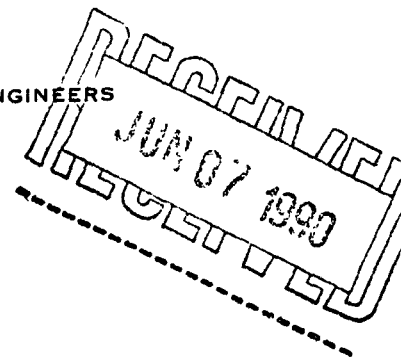
8-23



DEPARTMENT OF THE ARMY
GULF COAST AREA OFFICE JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P O BOX 19247
TAMPA FLORIDA 33686-9247

REPLY TO
ATTENTION OF

May 30, 1990



Regulatory Section
90JD(4)0102
JURISDICTIONAL

Kevin L. Erwin Consulting Ecologist, Inc.
c/o Mr. William R. Cox
2077 Bayside Parkway
Fort Myers, Florida 33901

Dear Mr. Cox:

Reference is made to your correspondence dated May 15, 1990, from our office concerning a jurisdictional determination made by Mr. Skip Bergmann, of my staff, for "Lee County Resource Recovery Site" located in Section 24, Township 44 South, Range 25 East, Lee County, Florida.

Paragraph two of the subject letter (enclosed) contains a typing error which describes which vegetation communities are considered jurisdictional wetlands. The correct vegetative communities considered to be jurisdictional include 415, 4159, 514, 621, 624, 6249 and 643. Please note that vegetation community 4111 should not have been included as a jurisdictional vegetative community.

Please keep this letter with your original permit package.

Thank you for your cooperation with the U.S. Army Corps of Engineers Regulatory Program.

Sincerely,

Dianne M. Rosensweig

for
JOSEPH R. BACHELER
Chief, Regulatory Section

Enclosure

May 15, 1990

Regulatory Section
90JD(4)0108
JURISDICTIONAL

Kevin L. Ervin Consulting Ecologist, Inc.
c/o Mr. William R. Cox
2077 Bayside Parkway
Ft. Myers, Florida 33901

Dear Mr. Cox:

Reference is made to your correspondence received on April 26, 1990, concerning a jurisdictional determination for the "Lee County Resource Recovery Site F" located in Section 24, Township 44 South, Range 25 East, near Lehigh Acres in Lee County, Florida. Your request was made on behalf of Lee County, Department of Utilities. An onsite field meeting on April 2, 1990, was attended by Mr. Skip Bergmann of my staff.

The lines shown on the aerial maps, which were submitted with your correspondence, have been verified by Mr. Bergmann and represent the approximate boundaries of the various vegetation communities as they currently exist. Vegetation communities identified by cover types 4111, 415, 4159, 514, 621, 624, 6249 and 643 are jurisdictional wetland areas. Vegetation communities identified by cover types 210, 212, 321, 3219, 411, 4119, 422, 425, 429 and 437 are non-jurisdictional areas.

The jurisdictional wetland areas are regulated by the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act. The discharge of dredged or fill material into these areas will require Department of the Army authorization. Other Federal, State or local authorization may also be required.

This jurisdictional determination can be considered current and correct for a period of two (2) years from the date of this letter. Any reliance upon jurisdictional correspondence beyond that time frame may lead to incorrect planning and design efforts as well as possible violations of current Federal Laws and/or Regulations.

Thank you for your cooperation with the U.S. Army Corps of Engineers Regulatory Program. If you have any questions regarding this letter or the Corps of Engineers regulations, please contact Mr. Bergmann at the Ft. Myers Regulatory Office, telephone 813-332-7808.

Sincerely,

Enclosure(s)

JOSEPH R. BACHELER
Chief, Tampa Regulatory Office

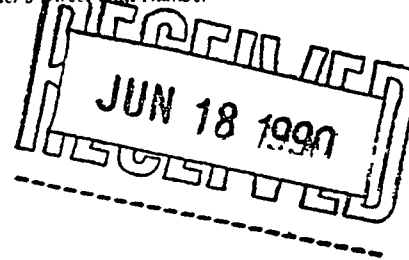
Copies Furnished:
Lee County, Department of Utilities w/o encl



BOARD OF COUNTY COMMISSIONERS

PO Box 398
Fort Myers, Florida 33902-0398
(813) 334-2166
335-2477

Writer's Office Dial Number



John E. Manning
District One

Douglas R. St. Cerny
District Two
June 15, 1990

Ray Judah
District Three

Bill Fussell
District Four

Donald Stisher
District Five

Kevin L. Erwin Consulting Ecologist, Inc.
Attn: Craig Smith, Ecologist
2077 Bayside Parkway
Fort Myers, Fl. 33901

Marsha Segal-George
County Administrator

Dear Mr. Smith:

James G. Yaeger
County Attorney

R. Scott Barker
County Hearing Examiner

Division of Environmental Sciences (DES) staff has reviewed and recommends approval of the Threatened and Endangered Species survey Methodology submitted to us by your firm. I concur with their recommendation. This alternative survey methodology can be utilized by Kevin L. Erwin consultants and other qualified environmental consultants to assess the status of Lee County protected species on sites proposed for development as required by Lee County Ordinance 89-34.

This methodology is to be utilized on projects of 40.0 acres or greater total size. This is the first general alternative survey methodology to be approved by the director of DES since the ordinance was adopted on August 30, 1989.

Thank you and your firm's staff for enhancing the Lee County Protected Species Ordinance. If you have any questions or comments please call Kathleen Hultgren at (813) 335-2477.

Respectfully,

DEPARTMENT OF COMMUNITY DEVELOPMENT

Lisa B. Dodd, Ph.D., Director
Division of Environmental Sciences

cc: Hans Behrens, Deputy Director, Community Development
Rick K. Joyce, Principal Planner, Environmental Sciences
Kathleen S. Hultgren, Planner, Environmental Sciences

KSH/ksc
(0474E)



"City of Palms"

City of Fort Myers, Florida

PO DRAWER 2217
FT MYERS FL 33902 2217
TELEPHONE (813) 334 1281

April 19, 1990

RECEIVED
APR 19 1990

CAMP DRESSER & McKEE, INC.
Attn: Deborah Chaiton
1620 Medical Lane, Suite 221
Fort Myers, Florida 33907

CAMP DRESSER & McKEE
FT MYERS, FLORIDA

Dear Ms Chaiton:

Please find enclosed, the location map sent to us with the purpose of indicating any City parks within the five mile radius. I have also included a copy of the map used for the last survey. On it, I have in red, an outline indicating the current five mile radius. Attached is a legend which gives the name and facilities on each site.

Also, please find enclosed a copy of the "Existing Park and Recreation Facilities-MAP A, and the "Parkland and Recreational Facilities Inventory: 1966

If you have any further questions please call me at 939-2200.

Sincerely

Irene Rensing

Irene B. Rensing
Administrative Aide
Dept. of Recreation

Reviewed By Deborah Chaiton
XC DEC (original) CAB, HJI
FILED 6685-38-PT-PRHE
F. Lee County GRF
SUBJECT Governmental Jurisdiction



BOARD OF COUNTY COMMISSIONERS

PO Box 398
Fort Myers, Florida 33902-0398
(813) 334-2166

~~(813) 335-2662~~
Writer's Direct Dial Number

John E. Manning
District One

Douglas R. St. Cerny
District Two

Ray Judah
District Three

Bill Fussell
District Four

Donald Slusher
District Five

Marsha Segal George
County Administrator

James G. Yaeger
County Attorney

R. Scott Barker
County Hearing
Examiner

April 18, 1990

RECEIVED
APR 23 1990

CAMP DRESSER & MCKEE
FT. MYERS, FLORIDA

Ms. Deborah Chaiton
Camp Dresser & McKee, Inc.
1620 Medical Lane, Suite 221
Fort Myers, Florida 33907

RE: Lee County Energy Recovery Facility
CDM PN G685-38-PT-PRMF

Dear Ms. Chaiton

Enclosed, please find the map you furnished with parks and library facilities added to it in red pen.

If you have any questions concerning this information, please feel free to call me.

Sincerely,

Department of Community Services
Division of Planning and Construction

Alan D. Whitworth
Alan D. Whitworth
Principal Planner

ADW:mj
cc: Jim Lavender

(2317C)

Reviewed By Debs Chaiton
XC 1471 CAB, DEC (original)
File No 6685-38-PT-PRMF
File Topic Lee County Energy Recovery
Subtopic Environmental Jurisdiction

State of Florida



Department of Natural Resources

Memorandum

DNR STATE LANDS

DATE: APRIL 25, 1990

TO: KATHY MIKLUS
TITLE SECTION

FROM: ELAINE RICHARDSON
SWFFO

JUN 06 1990
RECEIVED
SWFFO TITLE

JUN 8 1990

RE: LEE COUNTY ENERGY RECOVERY FACILITY TYP DRESSER & McKEE
FILE NO: NOT AVAILABLE - DO NOT HAVE ONE FT MYERS, FLORIDA

WE DO NOT HAVE AN APPLICATION OR ANY OTHER INFORMATION; JUST THE ENCLOSED INFORMATION.

WILL YOU PLEASE "DELINEATE SUBMERGED LANDS ON THE MAP" AND RETURN IT TO US?

THANK YOU VERY, VERY, VERY, MUCH!

Sorry, can't do th

ENCLOSURES

May 31, 1990

*TO: Elaine Richardson
SWFFO*

*FROM: Kathy Miklus
Title and Land Records Section*

Reviewed By Deb Clanton
XC Deb Clanton (original)
HJE, RJI, & file
File No. 6685-38-DT-1214F
File Topic Lee County FKE
Subtopic documental title

Please note that there are state owned submerged lands involving not only the submerged lands of the Caloosahatchee and Orange Rivers but any naturally occurring navigable waterbodies within the

Section 9

SECTION 9.0

GROUNDWATER WELL INVENTORY

9.1 CONSUMPTIVE USE PERMITS

APPENDIX 9.1

GROUNDWATER WELL INVENTORY
CONSUMPTIVE USE PERMITS

Reference: South Florida Water Management District
Consumptive Use Permits
April 3, 1990

** - Indicates SFWMD - permitted well within a 5-mile radius of the project site.

Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

WATER USE PERMIT FILE
COUNTY LEE
RUN 04/30/90

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
11-00376-W	890821-0	BARRON COLLIER COMPANY	SILVER STRAND V	17 48 30	30 48 30	08-JAN-87	15-APR-92	14-DEC-89
	ADDRESS	P O DRAWER K	PHONE					
		IMMOKALEE FL 33934						

ACRES OWNED 1925 00 ACRES_SERVED 909 00 COUNTIES LEE

FACILITIES

1-9INX40FT WELL AT 900 GPM, 1-6INC80FT WELL AT 600 GPM, 1-8INX 51FT WELL AT 800 GPM, 1-8INX47FT WELL AT 800 GPM, 1-9INX36FT W ELL AT 900 GPM, 1-6INX33FT WELL AT 600 GPM AND 16-12INX80FT WE LL AT 800 GPM EACH

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS WATBAQ / GDW / / 000
ANNUAL ALLOC 1763 36 MAX MONTH ALLOC 248 39 MAX DAILY ALLOC 00 TOTAL CAPACITY 17400 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
15	NAPLES	00 40	SEEPAGE		50	909 0	5 0	248 4	1763 4	0

**

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00003-W		LEE CO BRD OF CO COMMISSI	LEE COUNTY UTILITIES	22 46 26	0 0 0	11-JUL-75	07-JAN-92	07-OCT-82
	ADDRESS	PO BOX 398	PHONE					
		FT MYERS FL 33902						

ACRES OWNED 00 ACRES_SERVED 34000 00 COUNTIES LEE

FACILITIES

16 WELLS AT 7100 GPM (E) + 8 WELLS (P)

USES PWS TREATMENT Y SALT PROB WATER SHORTAGE CROPS Y
SOURCE/CLASS C00043 / SFC DTAMAQ / GDW /
ANNUAL ALLOC 3650 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 19 10 TOTAL CAPACITY 10 00

PROPOSED SERVICE AREA 34000 PSC REG N PER CAP USE 128 PRESENT POP (THSND)/YR 53 / 80 PROPOSED POP (THSND)/YR 63 / 92
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP 10 0 HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	-------	--------	-----	------------	-----------	---------------	------------	-------------

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00004-W	04129-B	YODER BROTHERS, INC	LIVE OAK FARM	26 43 27	0 0 0	17-MAY-79	15-OCT-91	14-MAY-87
	ADDRESS	BOX 68	PHONE 8137282535					
		ALVA FL 33920						

ACRES OWNED 83 00 ACRES_SERVED 36 00 COUNTIES LEE

FACILITIES

1-4INX90FT WELL AT 40 GPM & 2-3INX5HP PUMPS AT 175 GPM EACH

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS CALOOS / SFC SSANDS / GDW /
ANNUAL ALLOC 50 96 MAX MONTH ALLOC 00 MAX DAILY ALLOC 28 TOTAL CAPACITY 390 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
05	LABELLE	01 50	OVERHEAD SPRINK		50	36 0	4 3		51 0	3

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00005-W	01167-E	YODER BROTHERS, INC	ALVA FARM	29 43 27	0 0 0	14-NOV-75	15-APR-92	10-DEC-87
	ADDRESS	PO BOX 68	PHONE 8137282535					
		ALVA FL 33920						

ACRES OWNED 262 00 ACRES_SERVED 126 40 COUNTIES LEE

FACILITIES

1-48INX190FT CULVERT W/FLAP GATE, 1-48INX160FT CULVERT W/FLAP GATE, 1-6INX126FT WELL AT 75 GPM & 1-6INX120FT WELL AT 75 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
 SOURCE/CLASS C00043 / SFC DOHAQ / GDW /
 ANNUAL ALLOC 268 27 MAX MONTH ALLOC .00 MAX DAILY ALLOC 1 20 TOTAL CAPACITY 150 00

PROPOSED	SERVICE AREA	PSC REG	PER CAP USE	PRESENT POP (THSND)/YR /	PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG	MAX DAY CAP	STORAGE CAP	HI SERVICE CAP	DER CAP	

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
05						126 4			368 3	1 2

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00006-W		LATTOF GROVES, INC	LATTOF GROVES	23 43 27	0 0 0	19-DEC-75	15-OCT-91	11-JUN-87
	ADDRESS	P O BOX 398	PHONE 8137283575					
		ALVA FL 33920						

ACRES OWNED 167 00 ACRES_SERVED 161 00 COUNTIES LEE

FACILITIES

1-6INX25HP PUMP AT 400 GPM & 1-3INX25HP PUMP AT 400 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
 SOURCE/CLASS C00043 / SFC / /
 ANNUAL ALLOC 83 93 MAX MONTH ALLOC .00 MAX DAILY ALLOC 1 03 TOTAL CAPACITY 800 00

PROPOSED	SERVICE AREA	PSC REG	PER CAP USE	PRESENT POP (THSND)/YR /	PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG	MAX DAY CAP	STORAGE CAP	HI SERVICE CAP	DER CAP	

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
13	LABELLE	01 50		SPRINKLER	75	161 0	5 3		83 9	1 0

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00007-W	890720-13	FLA POWER & LIGHT CO	FT MYERS POWER PLANT	36 43 25		19-FEB-76	15-MAR-95	15-MAR-90
	ADDRESS	P O BOX 078768	PHONE					
		WEST PALM BEACH FL 33407						

ACRES OWNED 460 00 ACRES_SERVED 460 00 COUNTIES LEE

FACILITIES

1-6IN WELL AT 160 GPM, 4-6IN WELLS AT 45 GPM EACH, 2-3IN WELLS AT 44 GPM EACH, 2-1 5IN WELLS AT 50 GPM EACH, 1-4IN WELL AT 50 GPM, 1-4IN WELL AT 45 GPM, 2-54INX390HP PUMPS AT 58,500 GPM EACH, 2-78 INX2400HP PUMPS AT 37,500 GPM EACH, 2-18INX100HP PUMPS AT 3,000 G PM EACH, 2-16INX215HP PUMPS AT 6,000 EACH, 4-13 5INX35HP PUMPS AT 600 GPM EACH

USES IND TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS N
 SOURCE/CLASS 8SANDS / GDW CALOOS / SFC /
 ANNUAL ALLOC 215674 40 MAX MONTH ALLOC MAX DAILY ALLOC 594 28 TOTAL CAPACITY 413023 00

PROPOSED	SERVICE AREA	PSC REG	PER CAP USE	PRESENT POP (THSND)/YR /	PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG	MAX DAY CAP	STORAGE CAP	HI SERVICE CAP	DER CAP	

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE

36-00008-W 07107-D BONITA SPRINGS WATER SYST PUBLIC WATER SUPPLY 0 48 26 0 0 0 19-OCT-78 15-APR-92 11-FEB-88
ADDRESS PO DRAWER 640 PHONE 8139920711
BONITA SPRINGS FL 33923

ACRES OWNED 00 ACRES SERVED 35000 00 COUNTIES LEE

FACILITIES

8-8INX80FT-85FT WELLS AT 100-465 GPM EACH & 3-12INX90FT-97FT WELLS AT 470-520 GPM EACH (E) & 5-12INX100FT WELLS AT 300 GPM EACH

USES PWS TREATMENT Y SALT PROB N WATER SHORTAGE 02 CROPS N
SOURCE/CLASS STAMII / GDW / /
ANNUAL ALLOC 1131 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 4 30 TOTAL CAPACITY 3985 00

PROPOSED N SERVICE AREA 35000 PSC REG N PER CAP USE 232 PRESENT POP (THSNDS)/YR 8 / 78 PROPOSED POP (THSNDS)/YR 21 / 88
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP 1 3 HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG.	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	--------	--------	-----	------------	-----------	---------------	------------	-------------

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00012-W		BAKER, THOMAS H		10 43 26	0 0 0	10-JUN-76	15-JUL-87	
	ADDRESS	P O BOX 337	PHONE					
		ALVA FL 33920						

ACRES OWNED 630 00 ACRES SERVED 630 00 COUNTIES LEE

FACILITIES

5-6IN WELL

USES AGR TREATMENT N SALT PROB WATER SHORTAGE CROPS Y
SOURCE/CLASS WATBAQ / GDW / /
ANNUAL ALLOC 00 MAX MONTH ALLOC 160 00 MAX DAILY ALLOC 00 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG.	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	--------	--------	-----	------------	-----------	---------------	------------	-------------

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00015-W	01207-M	FRANKLIN, PAUL G	CATTLE RANCH	8 44 26	0 0 0	09-SEP-76	15-APR-92	12-NOV-87
	ADDRESS	P O BOX 1208	PHONE 8133321225					
		FT MYERS FL 33902						

ACRES OWNED 175 00 ACRES SERVED 175 00 COUNTIES LEE

FACILITIES

1-4INX400FT WELL AT 180 GPM, 1-4INX400FT WELL AT 90 GPM, 1-3IN X700FT WELL AT 120 GPM, 1-4INX700FT WELL AT 120 GPM & 1-3INX30 FT WELL AT 7 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y
SOURCE/CLASS DFLOAQ / GDW WATBAQ / GDW DMIDHW / GDW
ANNUAL ALLOC 52 MAX MONTH ALLOC 00 MAX DAILY ALLOC 00 TOTAL CAPACITY 517 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
20						175 0			5	

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00016-W		BAKER, THOMAS H		11 43 27	0 0 0	09-SEP-76	15-JUL-87	
	ADDRESS	P O BOX 337	PHONE					
		ALVA FL 33920						

SOURCE/CLASS DLOWHW / GDW LPLAKE / SFC /
ANNUAL ALLOC 39 95 MAX MONTH ALLOC 00 MAX DAILY ALLOC 20 TOTAL CAPACITY 985 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG. SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ
15 FT MYERS 00 80 SPRINKLER 75 35 0 4 8 39 9 2

** PERMIT # APPLIC # PERMITTEE PROJECT SC TWP RGE SC TWP RGE ISSUE EXPIRE REISSUE
36-00027-W ADDRESS LEHIGH ACRES DEVELOP ENT 3 44 26 0 0 0 14-APR-77 15-JUL-87
201 EAST JOEL BOULEVA PHONE
LEHIGH FL 33936

ACRES OWNED 640 00 ACRES SERVED 380 00 COUNTIES LEE

FACILITIES
2-6INX9FT WELLS + 1-600FT WELL

USES AGR TREATMENT N SALT PROB WATER SHORTAGE CROPS Y

SOURCE/CLASS DTAMAQ / GDW DFLOAQ / GDW /
ANNUAL ALLOC 00 MAX MONTH ALLOC 99 00 MAX DAILY ALLOC 00 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

** PERMIT # APPLIC # PERMITTEE PROJECT SC TWP RGE SC TWP RGE ISSUE EXPIRE REISSUE
36-00028-W 01207-J GARNER FARMS, INC FARM 2 44 25 0 0 0 14-APR-77 15-OCT-91 09-APR-87
ADDRESS P O BOX 1109 PHONE 8136942188
FT. MYERS FL 33902

ACRES OWNED 80 00 ACRES SERVED 22 00 COUNTIES LEE

FACILITIES
2-8INX14HP PUMPS AT 1500 GPM EACH, 1-4INX40HP PUMP AT 500 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS LPPOND / SFC / /
ANNUAL ALLOC 79 57 MAX MONTH ALLOC 00 MAX DAILY ALLOC 44 TOTAL CAPACITY 3575 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG. SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ
15 FT MYERS 00 20 SPRINKLER 20 22 0 4 5 79 6 4

** PERMIT # APPLIC # PERMITTEE PROJECT SC TWP RGE SC TWP RGE ISSUE EXPIRE REISSUE
36-00029-W 01287-L GIDDES, IRVING FARM 10 44 26 0 0 0 14-APR-77 15-APR-92 14-MAY-87
ADDRESS RT 14, BOX 314 PHONE 8136944174
FT MYERS FL 33905

ACRES OWNED 30.00 ACRES SERVED 30 00 COUNTIES LEE

FACILITIES
1-4INX100FT WELL AT 275 GPM & 1-4INX350FT WELL AT 16 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS DMIDHW / GDW SSANDS / GDW /
ANNUAL ALLOC 00 MAX MONTH ALLOC 30 18 MAX DAILY ALLOC 18 TOTAL CAPACITY 291 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /

#36-00029-W, cont.

POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG.	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
20	LABELLE	00 80	FLOOD		50	30 0	3 4		30 2	2

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00030-W	01287-H	WIGHTMAN, ROY W & KARL A	FARM	25 43 26	0 0 0	09-JUN-77	15-OCT-91	09-APR-87
	ADDRESS	17450 S R. 80	PHONE 8137282608					
		FT MYERS FL 33920						

ACRES OWNED 35 00 ACRES SERVED 35 00 COUNTIES LEE

FACILITIES

1-6INX750FT VALVED ARTESIAN WELL

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS DFLOAQ / GDW / /
ANNUAL ALLOC 28 11 MAX MONTH ALLOC 00 MAX DAILY ALLOC 20 TOTAL CAPACITY 00

PROPOSED	SERVICE AREA	PSC REG	PER CAP USE	PRESENT POP (THSNDS)/YR /	PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG	MAX DAY CAP	STORAGE CAP	HI SERVICE CAP	DER CAP	

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
20	FT MYERS	01 50	FLOOD		50	35 0	3 2		28 1	2

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00032-W	890710-5	PALMETTO PINES COUNTRY CL	PALMETTO PINES COUNTRY CL	27 44 23	0 0 0	11-AUG-77	15-APR-92	14-SEP-89
	ADDRESS	P O BOX 445	PHONE 8135745445					
		CAPE CORAL FL 33910						

ACRES OWNED 120 00 ACRES SERVED 95 00 COUNTIES LEE

FACILITIES

2-3IN PUMPS AT 390 GPM

USES GOL TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y

SOURCE/CLASS CCANAL / SFC / / 000
ANNUAL ALLOC 108 44 MAX MONTH ALLOC 00 MAX DAILY ALLOC 55 TOTAL CAPACITY 780 00

PROPOSED	SERVICE AREA	PSC REG	PER CAP USE	PRESENT POP (THSNDS)/YR /	PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG	MAX DAY CAP	STORAGE CAP	HI SERVICE CAP	DER CAP	

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
15	FT MYERS	00 80	SPRINKLER		75	95 0	4 8	0	108 4	5

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00034-W	07177-F	ISLAND WATER ASSOCIATION	PUBLIC WATER SUPPLY	21 46 22	0 0 0	19-JAN-78	12-NOV-92	12-NOV-87
	ADDRESS	P O BOX H	PHONE 8134721502					
		SANIBEL FL 33957						

ACRES OWNED 00 ACRES SERVED 11798 00 COUNTIES LEE

FACILITIES

15-WELLS AT 4110 GPM (E), & 2-WELLS (P)

USES PWS TREATMENT Y SALT PROB Y WATER SHORTAGE 02 CROPS N

SOURCE/CLASS DLOWHW / GDW / / 000
ANNUAL ALLOC 1240 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 5 40 TOTAL CAPACITY 00

PROPOSED N	SERVICE AREA	PSC REG	PER CAP USE	PRESENT POP (THSNDS)/YR /	PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG	MAX DAY CAP	STORAGE CAP	HI SERVICE CAP	DER CAP	

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	-------	--------	-----	------------	-----------	---------------	------------	-------------

** PERMIT # 36-00035-W APPLIC # 10097-D PERMITTEE FT MYERS, CITY OF PROJECT PUBLIC WATER SUPPLY SC TWP RGE 0 44 25 SC TWP RGE 0 0 0 ISSUE 17-NOV-77 EXPIRE 13-APR-92 REISSUE 13-APR-89
 ADDRESS PO BOX 227 PHONE
 FT MYERS FL 33901

ACRES OWNED 00 ACRES_SERVED 00 COUNTIES LEE

FACILITIES

16-WELLS OF VARIOUS DEPTHS TALLING 19550GPM PS

USES PWS TREATMENT Y SALT PROB N WATER SHORTAGE 02 CROPS N
 SOURCE/CLASS WSURQA / GDW C00043 / SFC /
 ANNUAL ALLOC 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 30 62 TOTAL CAPACITY 19550 00

PROPOSED N SERVICE AREA 19200 PSC REG N PER CAP USE 1 PRESENT POP (THSND)/YR 53 / 84 PROPOSED POP (THSND)/YR 74 / 94
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP 13 0 HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT # 36-00041-W APPLIC # 02027-C PERMITTEE CARTER, JAMES L PROJECT CARTER RANCH SC TWP RGE 26 43 26 SC TWP RGE 0 0 0 ISSUE 13-APR-78 EXPIRE 15-OCT-92 REISSUE 13-AUG-87
 ADDRESS 15910 HIGHWAY 80 PHONE 8136942034
 ALVA FL 33920

ACRES OWNED 700 00 ACRES_SERVED 40 00 COUNTIES LEE

FACILITIES

2-4INX500FT WELLS

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
 SOURCE/CLASS DMIDHW / GDW / /
 ANNUAL ALLOC 40 10 MAX MONTH ALLOC 00 MAX DAILY ALLOC 25 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

20 FT MYERS 00 80 FLOOD 50 40 0 3 5 40 1 2
 PERMIT # 36-00042-W APPLIC # 02027-T PERMITTEE ADAMS, ARTHUR J PROJECT ADAMS GROVES SC TWP RGE 34 43 27 SC TWP RGE 0 0 0 ISSUE 13-APR-78 EXPIRE 15-OCT-91 REISSUE 13-AUG-87
 ADDRESS 44 SCOVILLE HILL ROAD PHONE 2034851934
 HARTWINTON CT 06791

ACRES OWNED 80 00 ACRES_SERVED 59 00 COUNTIES LEE

FACILITIES

1-4INX27FT WELL, 2-9INX180FT WELLS & 1-6INX600FT WELL

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
 SOURCE/CLASS DFLOAQ / GDW SSANDS / GDW /
 ANNUAL ALLOC 46 13 MAX MONTH ALLOC 00 MAX DAILY ALLOC 56 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

13 LABELLE 00 80 FLOOD-SEEPAGE 50 59 0 0 46 1 6
 PERMIT # 36-00043-W APPLIC # 28822 PERMITTEE HUNTER, NAT H - ESTATE O PROJECT HUNTER RANCH SC TWP RGE 33 43 26 SC TWP RGE 0 0 0 ISSUE 13-APR-78 EXPIRE 15-OCT-91 REISSUE 13-AUG-87
 ADDRESS 3181 BUCKINGHAM ROAD PHONE 8136941310

#36-00043-W, cont.

FT MYERS FL 33905

ACRES OWNED 600 00 ACRES_SERVED 590 00 COUNTIES LEE

FACILITIES

5-6IN WELLS AT 300-700 GPM EACH & 1-2INX890FT WELL AT 15 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS DFLOAQ / GDW DMIDHW / GDW /
ANNUAL ALLOC 595 84 MAX MONTH ALLOC 00 MAX DAILY ALLOC 3 72 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
20	FT MYERS	00 80	FLOOD		50	590 0	3 5		591 5	3 7

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00044-W		DUNES GOLF & COUNTRY CLUB		18 46 23	0 0 0	13-APR-78	15-OCT-89	
	ADDRESS	FT MYERS FL 33901	PHONE					

ACRES OWNED 340 00 ACRES_SERVED 109 00 COUNTIES LEE

FACILITIES

1-8INX732FT WELL, 1-8INX896FT WELL AT 350 GPM EACH

USES REC TREATMENT N SALT PROB WATER SHORTAGE CROPS Y
SOURCE/CLASS DFLOAQ / GDW / /
ANNUAL ALLOC 00 MAX MONTH ALLOC 15 10 MAX DAILY ALLOC 00 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	-------	--------	-----	------------	-----------	---------------	------------	-------------

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00045-W	10307-A	GREATER PINE ISLAND WATER	PUBLIC WATER SUPPLY	0 44 23	0 0 0	13-APR-78	14-JUL-93	14-JUL-88
	ADDRESS	5281 PINE ISLAND ROAD	PHONE 8132831071					
		BOKEELIA FL 33922						

ACRES OWNED 00 ACRES_SERVED 26000 00 COUNTIES LEE

FACILITIES

4-10INX750FT WELLS AT 800 GPM EACH & 13-6IN WELLS AT 90-120 GP M EACH

USES PWS TREATMENT Y SALT PROB Y WATER SHORTAGE 02 CROPS N
SOURCE/CLASS DMIDHW / GDW DLOWHW / GDW DSUWAN / GDW
ANNUAL ALLOC 491 70 MAX MONTH ALLOC 00 MAX DAILY ALLOC 1 00 TOTAL CAPACITY 00

PROPOSED N SERVICE AREA 26000 PSC REG N PER CAP USE 113 PRESENT POP (THSND)/YR 9 / 82 PROPOSED POP (THSND)/YR 12 / 90
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP 0 HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	-------	--------	-----	------------	-----------	---------------	------------	-------------

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00046-W	890201-10	CAPE CORAL, CITY OF	PUBLIC WATER SUPPLY	4 45 23	0 0 0	13-APR-78	14-SEP-91	14-SEP-89
	ADDRESS	PO BOX 150027	PHONE 8135740423					
		CAPE CORAL FL 339150027						

ACRES OWNED 00 ACRES_SERVED 12000 00 COUNTIES LEE

FACILITIES

1-10INX745FT WELL AT 540 GPM & 23-12IN WELLS AT 12935 GPM

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00082-W	890608-13	HAWKINS G T	HAWKINS FLOWER FARM	08 45 26		18-JAN-79	15-APR-92	15-FEB-90
	ADDRESS	1592 CUMBERLAND CT	PHONE 8133320862					
		FT MYERS FL 33919						

ACRES OWNED 70 00 ACRES_SERVED 70 00 COUNTIES LEE

FACILITIES

1-6INX35FT WELL AT 645 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
 SOURCE/CLASS WATBAQ / GDW / /
 ANNUAL ALLOC 63 85 MAX MONTH ALLOC MAX DAILY ALLOC 61 TOTAL CAPACITY 645 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ
 15 FT MYERS 00 80 SEEPAGE 50 70 0 4 8 63 9 6

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00084-W		6 L/S FARMS, INC		0 47 26	0 0 0	18-JAN-79	15-OCT-89	
	ADDRESS	PO BOX 936	PHONE					
		IMMOKALEE FL 33934						

ACRES OWNED 4480 00 ACRES_SERVED 2520 00 COUNTIES LEE

FACILITIES

2-12IN WELLS AT 3000 GPM EACH, 3-5IN WELLS AT 1500 GPM EACH + 30-8IN WELLS AT 2000 GPM

USES AGR TREATMENT Y SALT PROB 0 WATER SHORTAGE CROPS Y
 SOURCE/CLASS WATBAQ / GDW / /
 ANNUAL ALLOC 00 MAX MONTH ALLOC 1330 00 MAX DAILY ALLOC 00 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00087-W		HOBBS, HARVEY		33 44 25	0 0 0	18-JAN-79	15-OCT-89	
	ADDRESS	1246 CARLENE	PHONE					
		FT MYERS FL 33902						

ACRES OWNED 380 00 ACRES_SERVED 380 00 COUNTIES LEE

FACILITIES

3-6IN WELLS AT 1255 GPM + 1-500 GPM PUMP

USES AGR TREATMENT Y SALT PROB 0 WATER SHORTAGE CROPS Y
 SOURCE/CLASS WATBAQ / GDW LPPOND / SFC /
 ANNUAL ALLOC 00 MAX MONTH ALLOC 75 80 MAX DAILY ALLOC 00 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

9-10

FACILITIES

USES GOL LAN	TREATMENT N	SALT PROB N	WATER SHORTAGE 04	CROPS Y
SOURCE/CLASS	DLOWHW / GDW	DMIDHW / GDW	LPLAKE / SFC	
ANNUAL ALLOC	142 69	MAX MONTH ALLOC 00	MAX DAILY ALLOC 73	TOTAL CAPACITY 2355 00

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
15	ET MYERS	00 80		SPRINKLER	75	125 0	4 8	0	142 7	7

ACRES OWNED 575 00 ACRES SERVED 282 40 COUNTIES LEE

FACILITIES

2-6INX40FT WELL AT 1200GPM, 1-6INX40FT WELL AT 1500GPM, 1-8INX 54HP PUMP AT 5000GPM & 1-12INX25HP PUMP AT 10,000GPM

USERS AGR	TREATMENT N	SALT PROB N	WATER SHORTAGE 04	CROPS Y
SOURCE/CLASS	WATBAQ /	GDW LPLAKE /	SFC /	
ANNUAL ALLOC	309 07	MAX MONTH ALLOC	00	MAX DAILY ALLOC 2 15
				TOTAL CAPACITY 18900 00

PROPOSED POTENTIAL POP CHNG	SERVICE AREA MAX DAY CAP	PSC REG STORAGE CAP	PER CAP USE HI SERVICE CAP	PRESENT POP (THSND)/YR / DER CAP	PROPOSED POP (THSND)/YR /
--------------------------------	-----------------------------	------------------------	-------------------------------	-------------------------------------	---------------------------

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
05	FT MYERS	00 80	FLOOD		50	55 6	4 8		95 2	5
20	FT MYERS	00 80	FLOOD		50	135 0	3 5		135 3	8
13	FT MYERS	00 80	FLOOD		50	73 0	5 3		57 1	7

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP	RGE	SC TWP	RGE	ISSUE	EXPIRE	REISSUE
36-00090-W		BEARDSLEE, R G		28 46	27	0 0	0	15-FEB-79	15-OCT-89	
	ADDRESS	PO BOX 1982	PHONE							
		FT MYERS FL 33902								

ACRES OWNED 60 00 ACRES SERVED 50 00 COUNTIES LEE

FACILITIES

2-8 IN X 23 FT WELLS AT 1500 GPM

USES AGR	TREATMENT Y	SALT PROB 0	WATER SHORTAGE	CROPS Y
SOURCE/CLASS	WATBAQ / GDW /	/ /		
ANNUAL ALLOC	00	MAX MONTH ALLOC	29 90	MAX DAILY ALLOC 00
				TOTAL CAPACITY 00

PROPOSED POTENTIAL POP CHNG	SERVICE AREA MAX DAY CAP	PSC REG	PER CAP USE STORAGE CAP	PRESENT POP (THSNDS)/YR / HI SERVICE CAP	DER CAP	PROPOSED POP (THSNDS)/YR /
--------------------------------	-----------------------------	---------	----------------------------	---	---------	----------------------------

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	-------	--------	-----	------------	-----------	---------------	------------	-------------

PERMIT	APPLIC	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
--------	--------	-----------	---------	------------	------------	-------	--------	---------

ACRES OWNED 50 00 ACRES_SERVED 49 00 COUNTIES LEE

FACILITIES

4-13INX100FT WELLS AT 1200 GPM EACH & 1-8INX200FT WELL AT 200 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS SSANDS / GDW STAMZI / GDW / 000
ANNUAL ALLOC 25 54 MAX MONTH ALLOC 00 MAX DAILY ALLOC 31 TOTAL CAPACITY 5000 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
13	FT MYERS	00 80		SPRINKLER	75	49 0	5 3	0	25 5	3

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00097-W	01029-B	PARKER, R G	LEATHAN PLACE-PEACE ROAD	8	44 26	0 0 0	15-FEB-79	15-APR-92 12-NOV-87
	ADDRESS	4590 WILLIAMSON ROAD	PHONE 8136942818					
		FT MYERS FL 33905						

ACRES OWNED 55 00 ACRES_SERVED 30 00 COUNTIES LEE

FACILITIES

2-6INX100FT WELL AT 500 GPM & 1-4INX80FT WELL AT 8 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS SSANDS / GDW / /
ANNUAL ALLOC 30 07 MAX MONTH ALLOC 00 MAX DAILY ALLOC 19 TOTAL CAPACITY 1008 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
20	FT MYERS	00 80		FLOOD	50	30 0	3 5		30 1	2

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00098-W	01029-D	PARKER, R G	NEAL ROAD	7	44 26	0 0 0	15-FEB-79	15-APR-92 12-NOV-87
	ADDRESS	4590 WILLIAMSON ROAD	PHONE 8136942818					
		FT MYERS FL 33905						

ACRES OWNED 20.00 ACRES_SERVED 18 00 COUNTIES LEE

FACILITIES

1-4INX80FT WELL AT 500 GPM & 1-4INX40FT WELL AT 500 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS WATBAQ / GDW SSANDS / GDW /
ANNUAL ALLOC 18 04 MAX MONTH ALLOC 00 MAX DAILY ALLOC 11 TOTAL CAPACITY 1000 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
20	FT MYERS	00 80		FLOOD	50	18 0	3 5		18 0	1

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00099-W	01029-C	PARKER, R G	HOME & HIGGINBOTHAM LEASE	1	44 25	0 0 0	15-FEB-79	15-APR-92 12-NOV-87
	ADDRESS	4590 WILLIAMSON ROAD	PHONE 8136942818					
		FT MYERS FL 33905						

ACRES OWNED 76 00 ACRES_SERVED 54 00 COUNTIES LEE

#36-00099-W, cont.

FACILITIES

1-6INX550FT WELL

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS DFLOAQ / GDW / /

ANNUAL ALLOC 54 13 MAX MONTH ALLOC 00 MAX DAILY ALLOC 34 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
20	FT MYERS	00 80	FLOOD		50	54 0	3 5		54 1	3

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00100-W	02067-J	RIGSBY, ROBERT	RIGSBY NURSERY	14 43 25	0 0 0	15-FEB-79	15-OCT-91	12-NOV-87
	ADDRESS	PO BOX 05865	PHONE 8135433379					
		TICE FL 33905						

ACRES OWNED 50 00 ACRES SERVED 45 00 COUNTIES LEE

FACILITIES

1-12INX30FT WELL AT 175 GPM, 1-12INX30FT WELL AT 150 GPM, 2-6I NX30FT WELLS AT 90 GPM EACH & 20-2IN-6INX3HP-10HP PUMPS AT 339 5 GPM

USES NUR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS WATBAQ / GDW LPPOND / SFC CCREEK / SFC

ANNUAL ALLOC 83 99 MAX MONTH ALLOC 00 MAX DAILY ALLOC 51 TOTAL CAPACITY 3900 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
05	FT MYERS	01 50	SPRINKLER		75	8 0	4 6		7 3	

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00101-W		SOUTHALL CORP		17 47 25	0 0 0	15-FEB-79	15-OCT-89	
	ADDRESS	3236 MAIN STREET	PHONE					
		BUFFALO NY 14214						

ACRES OWNED 28 00 ACRES SERVED 20 00 COUNTIES LEE

FACILITIES

1-900 GPM PUMP + 4-6IN WELLS AT 640 GPM

USES AGR TREATMENT N SALT PROB WATER SHORTAGE CROPS Y

SOURCE/CLASS WATBAQ / GDW LPPOND / SFC /

ANNUAL ALLOC 00 MAX MONTH ALLOC 5 05 MAX DAILY ALLOC 00 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	-------	--------	-----	------------	-----------	---------------	------------	-------------

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00102-W		WALDEE BROS FARM		0 46 26	0 0 0	15-FEB-79	15-OCT-89	11-MAR-82
	ADDRESS	PO BOX 487	PHONE					
		FT MYERS FL 33902						

ACRES OWNED 1145 00 ACRES SERVED 800 00 COUNTIES LEE

FACILITIES

01236 14-WELLS AT 25,600 GPM + 1-12IN LIFT PUMP AT 300 0 GPM

USES AGR TREATMENT N SALT PROB WATER SHORTAGE CROPS Y

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00111-W	01269-F	FLINT, CHARLES W	BUCKINGHAM	0 44 26	0 0 0	15-MAR-79	15-APR-92	10-DEC-87
	ADDRESS	6071 BUCKINGHAM ROAD	PHONE 8136942810					
		FT MYERS FL 33905						

ACRES OWNED 172 40 ACRES_SERVED 132 00 COUNTIES LEE

FACILITIES

2-6INX80FT WELLS AT 500 GPM EACH & 1-6INX600FT WELL AT 650 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
 SOURCE/CLASS WSURQA / GDW / /
 ANNUAL ALLOC 132 33 MAX MONTH ALLOC 00 MAX DAILY ALLOC 83 TOTAL CAPACITY 1650 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
20	FT MYERS	00 80	FLOOD		50	132 0	3 5		132 3	8

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00112-W		GRIFFITHS, JR + PEAG E M		16 45 25	0 0 0	15-MAR-79	15-OCT-89	
	ADDRESS	P O BOX 1587	PHONE					
		FT MYERS FL 33902						

ACRES OWNED 225 00 ACRES_SERVED 150 00 COUNTIES LEE

FACILITIES

2-6INX20FT + 2-8INX20FT WELLS PUMPED BY 1-1200 GPM + 1-900 GPM PORT PUMPS

USES AGR TREATMENT N SALT PROB WATER SHORTAGE CROPS Y
 SOURCE/CLASS WATBAQ / GDW / /
 ANNUAL ALLOC 00 MAX MONTH ALLOC 75 60 MAX DAILY ALLOC 00 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	-------	--------	-----	------------	-----------	---------------	------------	-------------

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00113-W	01269-D	FLINT, CHARLES W	LEHIGH ACRES	9 45 27	0 0 0	15-MAR-79	15-APR-92	10-DEC-87
	ADDRESS	6071 BUCKINGHAM ROAD	PHONE 8136942810					
		FT MYERS FL 33905						

ACRES OWNED 40 00 ACRES_SERVED 40 00 COUNTIES LEE

FACILITIES

1-6INX80FT WELL AT 500 GPM, 1-2INX200FT WELL AT 7 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
 SOURCE/CLASS SSANDS / GDW / /
 ANNUAL ALLOC 40 10 MAX MONTH ALLOC 00 MAX DAILY ALLOC 25 TOTAL CAPACITY 507 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
20	FT MYERS	00 80	FLOOD		50	40 0	3 5		40 1	2

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00114-W	890717-6	ISLAND TROPICALS INC	EASTERDAY NURSERY	9 44 22	0 0 0	15-MAR-79	15-APR-92	12-OCT-89
	ADDRESS	PO BOX 340	PHONE 8132831011					
		PINELAND FL 33945						

ACRES OWNED 45 00 ACRES_SERVED 15 50 COUNTIES LEE

FACILITIES

1-2INX60 FT WELL AT 30 GPM OFT WELL AT 1000 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS DLOWHW / GDW LPLAKE / SFC WATBAQ / GSW
ANNUAL ALLOC 17 60 MAX MONTH ALLOC 00 MAX DAILY ALLOC 09 TOTAL CAPACITY 1090 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00115-W		MCMAHON, R E		23 45 25	0 0 0	15-MAR-79	15-OCT-89	
	ADDRESS	PO BOX 6335	PHONE					
		FT MYERS FL 33901						

ACRES OWNED 80 00 ACRES_SERVED 50 00 COUNTIES LEE

FACILITIES

3-6INX15FT WELLS AT 1800 GPM

USES AGR TREATMENT N SALT PROB WATER SHORTAGE CROPS Y
SOURCE/CLASS WATBAQ / GDW / /
ANNUAL ALLOC 00 MAX MONTH ALLOC 25 20 MAX DAILY ALLOC 00 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00117-W		MCMAHON, R E		9 45 25	0 0 0	15-MAR-79	15-OCT-89	
	ADDRESS	PO BOX 6335	PHONE					
		FT MYERS FL 33901						

ACRES OWNED 320 00 ACRES_SERVED 160 00 COUNTIES LEE

FACILITIES

4-6IN WELLS AT 3000 GPM

USES AGR TREATMENT N SALT PROB WATER SHORTAGE CROPS Y
SOURCE/CLASS WATBAQ / GDW / /
ANNUAL ALLOC 00 MAX MONTH ALLOC 80 60 MAX DAILY ALLOC 00 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00119-W		FLINT, C		27 45 27	0 0 0	15-MAR-79	15-OCT-89	
	ADDRESS	RT 1, BOX 498	PHONE					
		FT MYERS FL 33905						

ACRES OWNED 650 00 ACRES_SERVED 325 00 COUNTIES LEE

FACILITIES

3-6IN WELLS AT 500 GPM EACH + 2-500 GPM PORT PUMPS

USES AGR TREATMENT N SALT PROB WATER SHORTAGE CROPS Y
SOURCE/CLASS WATBAQ / GDW / /
ANNUAL ALLOC 00 MAX MONTH ALLOC 43 20 MAX DAILY ALLOC 00 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT # APPLIC # PERMITTEE PROJECT SC TWP RGE SC TWP RGE ISSUE EXPIRE REISSUE
** 36-00120-W 02129-B MELOY, DAVID W DAVID MELOY HAY COMPANY 33 43 26 0 0 0 15-MAR-79 15-OCT-91 07-JAN-88
ADDRESS 3621 BUCKINGHAM ROAD PHONE 8136944611
FT MYERS FL 33905

ACRES OWNED 317 00 ACRES_SERVED 300 00 COUNTIES LEE

FACILITIES

1-3INX380FT WELL AT 200 GPM, 4-6INX60FT WELLS W/2-500 GPM PUMP S

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS WSURQA / GDW DLOWHW / GDW /
ANNUAL ALLOC 300 74 MAX MONTH ALLOC 00 MAX DAILY ALLOC 1 73 TOTAL CAPACITY 1200 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ
65 FT MYERS 00 80 FLOOD 50 300 0 3 5 300 7 1 7

PERMIT # APPLIC # PERMITTEE PROJECT SC TWP RGE SC TWP RGE ISSUE EXPIRE REISSUE
36-00121-W FLINT, C 36 45 25 0 0 0 15-MAR-79 15-OCT-89
ADDRESS RT 1, BOX 498 PHONE
FT MYERS FL 33905

ACRES OWNED 480 00 ACRES_SERVED 320 00 COUNTIES LEE

FACILITIES

4-6IN WELLS AT 2000 GPM

USES AGR TREATMENT N SALT PROB WATER SHORTAGE CROPS Y
SOURCE/CLASS WATBAQ / GDW / /
ANNUAL ALLOC 00 MAX MONTH ALLOC 83 80 MAX DAILY ALLOC 00 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT # APPLIC # PERMITTEE PROJECT SC TWP RGE SC TWP RGE ISSUE EXPIRE REISSUE
36-00122-W GULF UTILITY COMPANY 0 46 25 0 0 0 15-MAR-79 14-MAY-91 14-MAY-81
ADDRESS PO BOX 350 PHONE
ESTERO FL 33928

ACRES OWNED 00 ACRES_SERVED 6860 00 COUNTIES LEE

FACILITIES

7-WELLS AT 1989 GPM

USES PWS TREATMENT Y SALT PROB WATER SHORTAGE CROPS Y
SOURCE/CLASS WATBAQ / GDW DTAMAQ / GDW /
ANNUAL ALLOC 1110 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 4 42 TOTAL CAPACITY 1 00

ACRES OWNED 1240 00 ACRES_SERVED 863 00 COUNTIES LEE

FACILITIES

59-12IN WELLS AT 48288 GPM TOTAL, 2-8IN WELLS AT 945 GPM TOTAL, 1 -9IN WELL AT 60 GPM, 5-10IN WELLS AT 3885 GPM TOTAL (ACTIVE), 5-9 IN WELLS AND 1-10IN WELL (INACTIVE)

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS WATBAQ / GDW / /

ANNUAL ALLOC 492 10 MAX MONTH ALLOC MAX DAILY ALLOC 5 21 TOTAL CAPACITY 53178 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
13	FORT MYERS	N/A	SPRINKLER		75	662 0	5 3		492 1	5 2
12	FORT MYERS	00 80	SPRINKLER		75	201 0	4 0		147 0	

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00130-W	02129-A	BAUCOM, DONALD L	BAUCOM RANCH	29 43 26	0 0 0	19-APR-79	15-OCT-91	12-NOV-87
	ADDRESS	12405 KAUNE-BAUCOM RD	PHONE 8136944400					
		FT MYERS FL 33905						

ACRES OWNED 1190 00 ACRES_SERVED 800 00 COUNTIES LEE

FACILITIES

1-6INX93FT WELL AT 750 GPM, 1-6INX485FT WELL AT 600 GPM, 1-6IN X510FT WELL AT 9 GPM, 2-6INX85FT & 120FT INACTIVE WELLS, 6-4IN X76-105FT INACTIVE WELLS & 1-24IN PUMP AT 15000 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS LPOND / SFC SSANDS / GDW DLOWHW / GDW

ANNUAL ALLOC 801 98 MAX MONTH ALLOC 00 MAX DAILY ALLOC 5 04 TOTAL CAPACITY 16359 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
65	FT MYERS	00 80	FLOOD		50	800 0	3 5		802 0	5 0

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00133-W	890712-10	LEE COUNTY SCHOOL BOARD	CAPE CORAL HIGH SCHOOL	26 44 23	0 0 0	19-APR-79	15-APR-92	14-DEC-89
	ADDRESS	2055 CENTRAL AVENUE	PHONE 8133341102					
		FORT MYERS FL 33901						

ACRES OWNED 34 90 ACRES_SERVED 6 20 COUNTIES LEE

FACILITIES

1-3INX3HP PUMP AT 90 GPM, 1-6INX15HP PUMP AT 300 GPM

USES LAN TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y

SOURCE/CLASS CCAPER / SFC / / 000

ANNUAL ALLOC 7 08 MAX MONTH ALLOC 00 MAX DAILY ALLOC 04 TOTAL CAPACITY 390 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
15	FT MYERS	00 80	SPRINKLER		75	6 2	4 8	0	7 1	0

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00138-W		MCGREGOR VILLAS, INC		0 45 24	0 0 0	07-JUN-79	15-OCT-89	
	ADDRESS	1026 LONGWOOD DRIVE	PHONE					
		FT MYERS FL 33907						

** (36-00151-SW: See Page 36)

ANNUAL ALLOC 00 MAX MONTH ALLOC 115 00 MAX DAILY ALLOC 00 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

** PERMIT # APPLIC # PERMITTEE PROJECT SC TWP RGE SC TWP RGE ISSUE EXPIRE REISSUE
36-00166-W LEHIGH ACRES DEV 0 45 27 0 0 0 13-DEC-79 13-DEC-89
ADDRESS 201 E JOEL BLVD PHONE
LEHIGH ACRES FL 33936

ACRES OWNED 00 ACRES_SERVED 60160 00 COUNTIES LEE

FACILITIES

10 WELLS AT 1700 GPM, 4 WELLS AT 1170 GPM (MIC-2 45 MGD-10 WELLS, 1 68 MGD-4 WELLS) (MDW-1 8 MGD)

USES PWS TREATMENT Y SALT PROB WATER SHORTAGE CROPS Y

SOURCE/CLASS DTAMAQ / GDW /

ANNUAL ALLOC 479 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 00 TOTAL CAPACITY 1 70

PROPOSED SERVICE AREA 60160 PSC REG N PER CAP USE 164 PRESENT POP (THSND)/YR 13 / 79 PROPOSED POP (THSND)/YR 22 / 89

POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP 1 7 HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT # APPLIC # PERMITTEE PROJECT SC TWP RGE SC TWP RGE ISSUE EXPIRE REISSUE
36-00167-W 05268-B WILDCAT FARMS, INC WILDCAT FARMS 0 45 27 0 0 0 13-DEC-79 15-APR-92 11-AUG-88
ADDRESS PO BOX 640 PHONE 8132627215
NAPLES FL 33939

ACRES OWNED 4220 00 ACRES_SERVED 2715 00 COUNTIES LEE

FACILITIES

10-6INX40FT WELLS (E), 2-8INX40FT WELLS (E) & 32-12INX100FT WELLS AT 550 GPM EACH (P)

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS N

SOURCE/CLASS WSURAQ / GDW /

ANNUAL ALLOC 1248 77 MAX MONTH ALLOC 00 MAX DAILY ALLOC 15 32 TOTAL CAPACITY 17600 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /

POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT # APPLIC # PERMITTEE PROJECT SC TWP RGE SC TWP RGE ISSUE EXPIRE REISSUE
36-00178-W 11097-E LEE COUNTY UTILITIES NORTH FT MYERS WELL FIELD 20 43 25 0 0 0 14-FEB-80 07-OCT-92 11-AUG-88
ADDRESS PO BOX 398 PHONE 8136944038
FT MYERS FL 33902

ACRES OWNED 00 ACRES_SERVED 34000 00 COUNTIES LEE

FACILITIES

1-8INX198FT WELL AT 125 GPM & 1-8INX105FT WELL AT 150 GPM (EMERGENCY PURPOSES ONLY)

USES PWS TREATMENT Y SALT PROB Y WATER SHORTAGE 02 CROPS N

SOURCE/CLASS SSANDS / GDW DMIDHW / GDW /

ANNUAL ALLOC 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 20 TOTAL CAPACITY 275 00

PROPOSED SERVICE AREA 34000 PSC REG N PER CAP USE 140 PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR 1 /

POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP 5 0 HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00186-W	890601-7	BONITA SPRINGS GOLF & C C	BONITA SPRINGS GOLF & C C	14 47 25	0 0 0	07-JAN-82	15-APR-92	09-NOV-89
	ADDRESS	10200 MADDOX LANE	PHONE 8139922800					
		BONITA SPRINGS FL 33923						

ACRES OWNED 257 00 ACRES SERVED 160 00 COUNTIES LEE

FACILITIES

2-6INX50HP PUMPS AT 600 GPM EACH, 1-3INX10HP PUMP AT 100 GPM, -8INX63HP PUMP AT 750 GPM, 1-8INX80FT WELL AT 275 GPM

USES GOL TREATMENT N SALT PROB Y WATER SHORTAGE 04 CROPS Y

SOURCE/CLASS STAMZI / GDW LPLAKE / SFC / 000

ANNUAL ALLOC 182 60 MAX MONTH ALLOC 00 MAX DAILY ALLOC 93 TOTAL CAPACITY 2325 00

PROPOSED	SERVICE AREA	PSC REG	PER CAP USE	PRESENT POP (THSNDS)/YR /	PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG	MAX DAY CAP		STORAGE CAP	HI SERVICE CAP	DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
15	NAPLES	00 80	SPRINKLER		75	160 0	4 8	0	182 6	9

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00188-W	891002-13	COUNTY LINE DRAINAGE DIST	COUNTY LINE DRAINAGE DIST	14 43 27	01 0	08-MAY-80	15-APR-92	15-FEB-90
	ADDRESS	ROUTE 1 BOX 888	PHONE 8134943800					
		ARCADIA FL 33821						

ACRES OWNED 3869 00 ACRES SERVED 3550 00 COUNTIES LEE

FACILITIES

1-8INX22FT AT 250 GPM, 5-24INX120-160HP PUMPS AT 12,000 GPM EACH, 1-12INX80HP PUMP AT 3,000 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS WATBAQ / GDW LPLAKE / SFC /

ANNUAL ALLOC 2775 82 MAX MONTH ALLOC MAX DAILY ALLOC 34 06 TOTAL CAPACITY 63250 00

PROPOSED	SERVICE AREA	PSC REG	PER CAP USE	PRESENT POP (THSNDS)/YR /	PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG	MAX DAY CAP		STORAGE CAP	HI SERVICE CAP	DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
13	LABELLE	00 80	FLOOD		50	3550 0	5 3		2775 8	34 1

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
**36-00191-W		GULF COAST CENTER		7 44 26	0 0 0	01-APR-80	10-APR-90	
	ADDRESS	5820 BUCKINGHAM ROAD	PHONE					
		FT MYERS FL 33905						

ACRES OWNED 00 ACRES SERVED 350 00 COUNTIES LEE

FACILITIES

4-WELLS AT 360 GPM

USES PWS TREATMENT Y SALT PROB N WATER SHORTAGE CROPS Y

SOURCE/CLASS DTAMAQ / GDW / /

ANNUAL ALLOC 61 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 29 TOTAL CAPACITY 28

PROPOSED	SERVICE AREA	PSC REG	PER CAP USE	PRESENT POP (THSNDS)/YR 2 / 80	PROPOSED POP (THSNDS)/YR 2 / 90
POTENTIAL POP CHNG	MAX DAY CAP		STORAGE CAP	HI SERVICE CAP	DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	-------	--------	-----	------------	-----------	---------------	------------	-------------

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00201-W		COL-LEE GROVES, INC	COL-LEE GROVES	27 46 27	0 0 0	10-JUL-80	15-OCT-89	
	ADDRESS	PO BOX 381	PHONE 8137467390					

ACRES OWNED 2375 00 ACRES_SERVED 2375 00 COUNTIES LEE

FACILITIES

3 WELLS AT 1050 GPM + 23 OBSERVATION WELLS (E) + 7 WEL LS AT 3150 GPM (P)

USES LAN TREATMENT N SALT PROB WATER SHORTAGE CROPS Y

SOURCE/CLASS WATBAQ / GDW DTAHAQ / GDW /

ANNUAL ALLOC 1200 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 4 13 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ		
PERMIT #	APPLIC #	PERMITTEE			PROJECT			SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00283-W	891127-7	TAGGART MERRILL TRUSTEE			R & B FARMS			11 46 26	14 46 26	07-JAN-82	15-APR-92	12-APR-90
	ADDRESS	1305 RIO VISTA DRIVE			PHONE 8139365145							
		FT MYERS FL 33901										

ACRES OWNED 323 00 ACRES_SERVED 276 00 COUNTIES LEE

FACILITIES

3-8INX85FT WELLS AT 600 GPM EACH

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS STAMZI / GDW / /

ANNUAL ALLOC 228 31 MAX MONTH ALLOC MAX DAILY ALLOC 1 54 TOTAL CAPACITY 1800 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
61	FT MYERS	00 80	FLOOD		50	276 0	3 1		228 3	1 5

PERMIT #	APPLIC #	PERMITTEE			PROJECT			SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00284-W	11121-T	KINZIE, WALTER E			KINZIE'S NURSERY			6 44 26	0 0 0	07-JAN-82	15-OCT-91	09-JUL-87
	ADDRESS	4300 ORANGE RIVER LOO			PHONE 8136944414							
		FT MYERS FL 33905										

ACRES OWNED 55 00 ACRES_SERVED 33 00 COUNTIES LEE

FACILITIES

1-2INX90FT WELL AT 40GPM, 1-4INX100FT WELL AT 150GPM, 1-6INX 100FT WELL AT 300GPM, 1-6INX120FT WELL AT 400GPM & 1-6INX715

USES NUR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS DLOWHW / GDW SSANDS / GDW /

ANNUAL ALLOC 31 10 MAX MONTH ALLOC 00 MAX DAILY ALLOC 26 TOTAL CAPACITY 1110 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
05	FT MYERS	01 50	SPRINKLER		20	5 0	4 6		17 2	
13	FT MYERS	01 50	DRIP EMITTER		85	25 0	5 3		11 5	1

PERMIT #	APPLIC #	PERMITTEE			PROJECT			SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00285-W		POTTINGER, G A						5 46 24	0 0 0	07-JAN-82	15-OCT-87	
	ADDRESS	900 SUNSET VISTA DRIV			PHONE							
		FT MYERS FL 33907										

ACRES OWNED 30 00 ACRES_SERVED 20 00 COUNTIES LEE

FACILITIES

00302 6-2INX30FT WELLS AT 100 GPM, 1-6INX150FT WELL AT 300 GPM, 1-2INX30FT WELL AT 30 GPM

USES AGR TREATMENT N SALT PROB WATER SHORTAGE CROPS Y

SOURCE/CLASS DOTHQA / GDW / /

ANNUAL ALLOC 00 MAX MONTH ALLOC 3 26 MAX DAILY ALLOC 00 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /

POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00351-W		LEHIGH CORPORATION	DEER RUN GOLF COURSE	33 44 26	0 0 0	14-OCT-82	12-DEC-88	10-OCT-85
	ADDRESS	201 E JOEL BLVD	PHONE					
		LEHIGH FL 33936						

ACRES OWNED 335 00 ACRES_SERVED 77 00 COUNTIES LEE

FACILITIES

3-WELLS AT 300 GPM

USES GOL TREATMENT N SALT PROB WATER SHORTAGE 04 CROPS Y

SOURCE/CLASS WSURAQ / GDW / /

ANNUAL ALLOC 87 89 MAX MONTH ALLOC 13 00 MAX DAILY ALLOC 44 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /

POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00366-W		HARBOR UTILITIES COM		27 47 25	0 0 0	10-FEB-83	10-FEB-93	
	ADDRESS	PO BOX 128	PHONE					
		BONITA SPRINGS FL 33923						

ACRES OWNED 00 ACRES_SERVED 800 00 COUNTIES LEE

FACILITIES

5-WELLS AT 565 GPM (0 813 MGD) (E) + 2-4INX63FT W ELLS W/PUMPS (P)

USES PWS TREATMENT Y SALT PROB WATER SHORTAGE CROPS Y

SOURCE/CLASS DTAMAQ / GDW / /

ANNUAL ALLOC 153 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 95 TOTAL CAPACITY 04

PROPOSED SERVICE AREA 800 PSC REG N PER CAP USE 65 PRESENT POP (THSNDS)/YR 1 / 82 PROPOSED POP (THSNDS)/YR 7 / 92

POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP 0 HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00395-W	890117-25	HIDEWAY COUNTRY CLUB PROP	HIDEWAY COUNTRY CLUB, THE	12 45 24	0 0 0	11-AUG-83	13-APR-92	13-APR-89
	ADDRESS	5910 TRAILWAYS DRIVE,	PHONE 8132755802					
		FT MYERS FL 33907						

ACRES OWNED 137 40 ACRES_SERVED 93 50 COUNTIES LEE

FACILITIES

6-PUMPS TOTALLING 1300GPM

USES GOL LAN TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y

SOURCE/CLASS ONSITE / SFC / /

ADDRESS 12345 SUMMERLIN ROAD
FT MYERS FL 33908

PHONE

ACRES OWNED 80 00 ACRES_SERVED 38 50 COUNTIES LEE

FACILITIES

1-WELL AT 60 GPM (P) + 1-WELL AT 60 GPM (E)

USES LAN TREATMENT SALT PROB WATER SHORTAGE 04 CROPS

SOURCE/CLASS DMIDHW / GDW DLOWHW / GDW / 000

ANNUAL ALLOC 43 94 MAX MONTH ALLOC 00 MAX DAILY ALLOC 00 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00534-W	07058-G	SOMERSET DEVELOPMENT CORP	TERRAVERDE COUNTRY CLUB	12 46 24	0 0 0	10-JAN-85	08-SEP-91	08-SEP-88
	ADDRESS	10700 N KENDALL DR, #	PHONE 3052719551					
		MIAMI GL 33176						

ACRES OWNED 60 00 ACRES_SERVED 11 50 COUNTIES LEE

FACILITIES

1-4INX20HP PUMP AT 200GPM & 1-3INX10HP PUMP AT 100GPM

USES GOL TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y

SOURCE/CLASS DOTHQA / SFC / /

ANNUAL ALLOC 13 13 MAX MONTH ALLOC 00 MAX DAILY ALLOC 06 TOTAL CAPACITY 300 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ
15 FT MYERS 00 80 SPRINKLER 75 11 5 4 8 13 1 1

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00535-W	11144-A	W L GORE + ASSOCIATES, I	MEMBRANE DISTILLATION DIV	10 44 25	0 0 0	10-JAN-85	10-JAN-89	
	ADDRESS	5580 ENTERPRISE PARKW	PHONE					
		FT MYERS FL 33905						

ACRES OWNED 2 80 ACRES_SERVED 2 80 COUNTIES LEE

FACILITIES

2-8INX195FT WELLS

USES IND TREATMENT SALT PROB WATER SHORTAGE 04 CROPS N

SOURCE/CLASS DMIDHW / GDW / / 000

ANNUAL ALLOC 80 60 MAX MONTH ALLOC 00 MAX DAILY ALLOC 00 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00549-W	890712-8	LEE COUNTY SCHOOL BOARD	GULF ELEMENTARY SCHOOL	4 45 23	0 0 0	11-APR-85	15-APR-92	14-SEP-89
	ADDRESS	3308 CANAL STREET	PHONE 8133346326					
		FT MYERS FL 33916						

ACRES OWNED 30 93 ACRES_SERVED 11 80 COUNTIES LEE

FACILITIES

1-6IN PUMP AT 125 GPM

USES LAN TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y

SOURCE/CLASS CTYCOO / SFC / / 000

ANNUAL ALLOC 13 47 MAX MONTH ALLOC 00 MAX DAILY ALLOC 06 TOTAL CAPACITY 125 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
15	FT MYERS	00 80	SPRINKLER		75	11 8	4 8	0	13 5	

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00556-W	890614-9	FT MYERS MEMORIAL CEMETER	FT MYERS MEMORIAL CEMETER	35 44 24	0 0 0	15-APR-85	15-APR-92	09-NOV-89
	ADDRESS	1589 COLONIAL BLVD	PHONE 8139360555					
		FT MYERS FL 33901						

ACRES OWNED 40 00 ACRES SERVED 36 00 COUNTIES LEE

FACILITIES

2-6INX21FT WELLS AT 60 GPM EACH, 1-6INX200FT WELL AT 70 GPM, 1 -3IN PUMP AT 360 GPM

USES LAN TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y

SOURCE/CLASS DMIDHW / GDW LPPOND / SFC / 000

ANNUAL ALLOC 41 10 MAX MONTH ALLOC 00 MAX DAILY ALLOC 21 TOTAL CAPACITY 550 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
15	FT MYERS	00 80	SPRINKLER		75	36 0	4 8	0	41 1	2

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00564-W	06168-C	11691 GATEWAY BOULEVA	GATEWAY SERVICES DISTRICT	0 44 25	0 0 0	13-JUN-85	15-APR-91	08-SEP-88
	ADDRESS	FT MYERS FL 33913	PHONE 8135611131					

ACRES OWNED 5319 00 ACRES SERVED 86 50 COUNTIES LEE

FACILITIES

1-6INX20FT WELL AT 400 GPM, 1-6INX18FT WELL AT 3-10GPM, 1-6IN X20FT WELL AT 3-10 GPM, 1-6INX25FT WELL & 1-6INX83FT WELL

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS WATBAQ / GDW / /

ANNUAL ALLOC 86 71 MAX MONTH ALLOC 00 MAX DAILY ALLOC 54 TOTAL CAPACITY 420 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
20	FT MYERS	00 80	SEEPAGE		50	86 5	3 5		86 7	5

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00565-W	06256-F	LEE COUNTY SCHOOL BOARD	GULF MIDDLE SCHOOL	4 45 23	0 0 0	13-JUN-85	11-SEP-87	11-SEP-86
	ADDRESS	3308 CANAL STREET	PHONE 8133343836					
		FT MYERS FL 33901						

ACRES OWNED 5 00 ACRES SERVED 4 50 COUNTIES LEE

FACILITIES

1-6INX180FT WELL AT 120 GPM

POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
PERMIT #	APPLIC #	PERMITTEE	PROJECT			SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00585-W	01145-A	SMITH, C MICHAEL TRUSTEE	HIDDEN LAKES			32 45 24	0 0 0	08-AUG-85	14-NOV-90	14-NOV-85
	ADDRESS	RT 34, BOX 489	PHONE							
		ET MYERS FL 33908								

ACRES OWNED 00 ACRES_SERVED 00 COUNTIES LEE

FACILITIES

1-8IN PUMP AT 2000 GPM

USES MIN UND TREATMENT SALT PROB WATER SHORTAGE 04 CROPS N

SOURCE/CLASS WATBAQ / GDW / / 000

ANNUAL ALLOC 356 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 2 88 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
PERMIT #	APPLIC #	PERMITTEE	PROJECT			SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00586-W	02128-B	SPANISH WELLS COUNTRY CLU	SPANISH WELLS COUNTRY CLU			2 48 25	0 0 0	12-SEP-85	08-SEP-91	08-SEP-88
	ADDRESS	PO BOX 2288	PHONE 8139926623							
		BONITA SPRINGS FL 33923								

ACRES OWNED 631 00 ACRES_SERVED 90 00 COUNTIES LEE

FACILITIES

2-12INX75HP PUMPS AT 700 GPM & 1-6INX15HP PUMP AT 140 GPM

USES GOL TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y

SOURCE/CLASS WATBAQ / GDW / /

ANNUAL ALLOC 105 20 MAX MONTH ALLOC 00 MAX DAILY ALLOC 52 TOTAL CAPACITY 1540 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
PERMIT #	APPLIC #	PERMITTEE	PROJECT			SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00594-W	02215-B	BLACKBURN, K K	BLACKBURN GROVES			18 43 26	0 0 0	10-OCT-85	15-OCT-89	
	ADDRESS	RT 2, BOX 300	PHONE							
		ALVA FL 33920								

ACRES OWNED 100 00 ACRES_SERVED 100 00 COUNTIES LEE

FACILITIES

2-WELLS AT 1000 GPM

USES AGR TREATMENT SALT PROB WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS SSANDS / GDW / / 000

ANNUAL ALLOC 35 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 46 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
PERMIT #	APPLIC #	PERMITTEE	PROJECT			SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00595-W	09196-G	FLA POWER & LIGHT COMPANY	MANATEE PROTECTION WELLS			35 43 25	0 0 0	11-DEC-86	11-DEC-91	

#36-00595-W, cont.

ADDRESS P O BOX 14000
JUNO BEACH FL 33408

PHONE 3058633635

ACRES OWNED 00 ACRES_SERVED 1 00 COUNTIES LEE

FACILITIES

3-10INX800FT WELLS PUMPED AT 1200 GPM EACH

USES OTH TREATMENT SALT PROB WATER SHORTAGE 04 CROPS N
SOURCE/CLASS DSUWAN / GDW / / 000
ANNUAL ALLOC 364 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 5 20 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
PERMIT #	APPLIC #	PERMITTEE		PROJECT		SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00596-W	12287-C	TOLLES READY-MIX, INC		ALICO ROAD SITE		8 46 25	0 0 0	10-OCT-85	14-APR-93	14-APR-88
	ADDRESS	PO BOX 4727		PHONE 8135742370						
		NORTH FT MYERS FL 33904								

ACRES OWNED 3 00 ACRES_SERVED 3 00 COUNTIES LEE

FACILITIES

2-6INX260FT WELLS AT 200 GPM EACH & 2-6IN WELLS AT 40 GPM EACH

USES IND TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS N
SOURCE/CLASS DMIDHW / GDW WATBAQ / GDW /
ANNUAL ALLOC 9 82 MAX MONTH ALLOC 00 MAX DAILY ALLOC 08 TOTAL CAPACITY 480 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
PERMIT #	APPLIC #	PERMITTEE		PROJECT		SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00597-W	12107-F	TOLLES READY-MIX, INC		PONDELLA ROAD SITE		8 44 24	0 0 0	10-OCT-85	14-APR-93	14-APR-88
	ADDRESS	PO BOX 4727		PHONE 8135744252						
		NORTH FT MYERS FL 33903								

ACRES OWNED 3 00 ACRES_SERVED 3 00 COUNTIES LEE

FACILITIES

1-4INX240FT WELL AT 20 GPM, 1-4INX240FT WELL AT 35 GPM & 1-4IN X220FT WELL AT 50 GPM

USES IND TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS N
SOURCE/CLASS DMIDHW / GDW / /
ANNUAL ALLOC 9 82 MAX MONTH ALLOC 00 MAX DAILY ALLOC 06 TOTAL CAPACITY 105 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
PERMIT #	APPLIC #	PERMITTEE		PROJECT		SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00598-W	07225-E	BRANSCOME, GENE		BRANTLEY ROAD APARTMENTS		14 45 24	0 0 0	10-OCT-85	15-OCT-89	
	ADDRESS	4721 GARTH ROAD		PHONE						
		BAYTOWN TX 77520								

ACRES OWNED 38 70 ACRES_SERVED 22 00 COUNTIES LEE

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
PERMIT #	APPLIC #	PERMITTEE		PROJECT		SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00622-W	10236-C	U S HOME CORPORATION		CROSS CREEK		17 45 25	0 0 0	09-JAN-86	15-OCT-89	12-FEB-87
	ADDRESS	43 BARKELY CIRCLE, #1		PHONE 8134817202						
		FT MYERS FL 33907								

ACRES OWNED 279 00 ACRES_SERVED 42 60 COUNTIES LEE

FACILITIES

2-PUMPS AT 240 GPM, 13-4IN WELLS & 3-6IN WELLS (E), 12-PUMPS A T 615 GPM, 6-4IN WELLS & 4-6IN WELLS (P)

USES LAN TREATMENT SALT PROB Y WATER SHORTAGE 04 CROPS Y
 SOURCE/CLASS SSANDS / GDW DLOWHW / GDW LPLAKE / SFC
 ANNUAL ALLOC 48 62 MAX MONTH ALLOC 00 MAX DAILY ALLOC 25 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
PERMIT #	APPLIC #	PERMITTEE		PROJECT		SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00623-W	11097-F	MCGREGOR BAPTIST CHURCH		MCGREGOR BAPTIST CHURCH		5 45 25	0 0 0	09-JAN-86	15-APR-92	14-APR-88
	ADDRESS	3750 COLONIAL BLVD		PHONE 8139361754						
		FT MYERS FL 33912								

ACRES OWNED 18 80 ACRES_SERVED 9 90 COUNTIES LEE

FACILITIES

1-6INX320FT WELL AT 200 GPM

USES LAN TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y
 SOURCE/CLASS DMIDHW / GDW / /
 ANNUAL ALLOC 4 87 MAX MONTH ALLOC 00 MAX DAILY ALLOC 02 TOTAL CAPACITY 200 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
15	FT MYERS	00 80			75	9 9	4 8		4 9	
PERMIT #	APPLIC #	PERMITTEE		PROJECT		SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00625-W	890717-5	TESONE LAND COMPANY		GLIDDEN FARMS		24 47 25	0 0 0	09-JAN-86	15-APR-92	09-NOV-89
	ADDRESS	BOX 238A RD #3		PHONE 4123629200						
		TARENTUM PA 15084								

ACRES OWNED 360 00 ACRES_SERVED 200 00 COUNTIES LEE

FACILITIES

1-12INX60HP PUMP, 1-8INX52FT WELL, 1-INX65FT WELL, 1-8INX50-60 FT WELL

USES AGR TREATMENT N SALT PROB Y WATER SHORTAGE 03 CROPS Y
 SOURCE/CLASS STAMZI / GDW LPLAKE / SFC / 000
 ANNUAL ALLOC 123 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 1 31 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
52	FT MYERS	00 80	FLOOD		50	50 0	4 5	0	38 0	4
56	FT MYERS	00 80	FLOOD		50	50 0	2 6	0	15 5	2
61	FT MYERS	00 80	FLOOD		50	50 0	3 3	0	33 3	3
60	FT MYERS	00 80	FLOOD		50	50 0	4 1	0	36 5	4

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
PERMIT #	APPLIC #	PERMITTEE	PROJECT			SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00665-W	02186-J	CLARK, TED	PASTURE			9 44 26	0 0 0	08-MAY-86	15-OCT-89	
	ADDRESS	RT 4, BOX 1530	PHONE 9044962183							
		STARK FL 32091								

ACRES OWNED 36 00 ACRES_SERVED 36 00 COUNTIES LEE

FACILITIES
 2-WELLS AT 760 GPM

USES AGR TREATMENT SALT PROB N WATER SHORTAGE 03 CROPS Y
 SOURCE/CLASS SSANDS / GDW / / 000
 ANNUAL ALLOC 61 63 MAX MONTH ALLOC 00 MAX DAILY ALLOC 31 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
PERMIT #	APPLIC #	PERMITTEE	PROJECT			SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00671-W	890926-14	GNS PARTNERSHIP	BACK FIFTY			17 44 22		11-SEP-86	15-APR-90	12-APR-90
	ADDRESS	PO BOX 514	PHONE 8132831200							
		BOKEELIA FL 33922								

ACRES OWNED 50 00 ACRES_SERVED 30 00 COUNTIES LEE

FACILITIES
 1-8INX57FT WELL AT 120 GPM

USES AGR TREATMENT N SALT PROB Y WATER SHORTAGE 03 CROPS Y
 SOURCE/CLASS WATBAQ / GDW / /
 ANNUAL ALLOC MAX MONTH ALLOC 02 MAX DAILY ALLOC TOTAL CAPACITY 120 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
13	N/A		MICROJET			30 0				
PERMIT #	APPLIC #	PERMITTEE	PROJECT			SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00672-W	03197-C	MURRAH, NOLAN	MURRAH CITRUS DEVELOPMENT			8 44 22	0 0 0	11-SEP-86	15-JUL-92	09-JUL-87
	ADDRESS	P O BOX 162	PHONE 8134725967							
		CAPTIVA FL 33924								

ACRES OWNED 122 00 ACRES_SERVED 93 00 COUNTIES LEE

FACILITIES
 1-6INX55FT WELL AT 105 GPM & 1-6INX60FT WELL AT 105 GPM (E) &

USES AGR TREATMENT N SALT PROB Y WATER SHORTAGE 03 CROPS Y
 SOURCE/CLASS WATBAQ / GDW / / 000
 ANNUAL ALLOC 00 MAX MONTH ALLOC 2 24 MAX DAILY ALLOC 22 TOTAL CAPACITY 410 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
13	FT MYERS	00 80	DRIP EMITTER		85	45 0				

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00675-W	05146-K	FT MYERS-BRANTLEY RD PART 5400 NW GRAND BLVD, # OKLAHOMA OK 73112	BRANTLEY PINES PHONE	14 45 24	0 0 0	10-JUL-86	15-JAN-86	

ACRES OWNED 20 00 ACRES_SERVED 5 32 COUNTIES LEE

FACILITIES

1-WELL AT 150 GPM (P) & 1-PUMP AT 85 GPM (P)

USES LAN TREATMENT SALT PROB N WATER SHORTAGE 04 CROPS Y
SOURCE/CLASS DLOWHW / GDW LPLAKE / SFC / 000
ANNUAL ALLOC 6 07 MAX MONTH ALLOC 00 MAX DAILY ALLOC 03 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	-------	--------	-----	------------	----------	---------------	------------	-------------

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00676-W	10305-B	BRECKENRIDGE, LTD 12751 CLEVELAND AVENU FT MYERS FL 33907	BRECKENRIDGE PHONE 8132756500	21 46 25	0 0 0	14-AUG-86	15-OCT-89	

ACRES OWNED 97 00 ACRES_SERVED 26 00 COUNTIES LEE

FACILITIES

28-WELLS AT 840 GPM

USES LAN TREATMENT SALT PROB N WATER SHORTAGE 04 CROPS Y
SOURCE/CLASS WSURAQ / GDW / / 000
ANNUAL ALLOC 29 68 MAX MONTH ALLOC 00 MAX DAILY ALLOC 15 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	-------	--------	-----	------------	----------	---------------	------------	-------------

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00677-W	02098-C	11691 GATEWAY BLVD FT MYERS FL 33913	GATEWAY SERVICES DISTRICT PHONE 8135611313	0 44 25	0 0 0	10-JUL-86	14-JUL-91	14-JUL-88

ACRES OWNED 5319 00 ACRES_SERVED 84 00 COUNTIES LEE

FACILITIES

4-10INX25FT WELLS AT 350 GPM

USES GOL TREATMENT SALT PROB N WATER SHORTAGE 04 CROPS Y
SOURCE/CLASS WATBAQ / GDW / / 000
ANNUAL ALLOC 95 88 MAX MONTH ALLOC 00 MAX DAILY ALLOC 48 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	-------	--------	-----	------------	----------	---------------	------------	-------------

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00684-W	890807-14	HENDRY, LLOYD AND JODY 14631 ORANGE RIVER RO FT MYERS FL 33905	HENDRY FARM GROVE PHONE	9 44 26	0 0 0	14-AUG-86	15-APR-92	12-OCT-89

#36-00684-W, cont.

ACRES OWNED 60 00 ACRES_SERVED 20 00 COUNTIES LEE

FACILITIES

1-4INX110FT WELL W/ 154 GPM PUMP, 2-4INX100FT WELLS W/ A 93 GP M AND A 189 GPM PUMP, 1-2INX130FT WELL W/ A 41 GPM PUMP, 1-2IN X115 FT WELL W/ A 64 GPM PUMP

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS SSANDS / GDW / / 000

ANNUAL ALLOC 9 20 MAX MONTH ALLOC 00 MAX DAILY ALLOC 11 TOTAL CAPACITY 541 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
13	FT MYERS	00 80	MICROJET		85	20 0	5 3	0	9 2	1

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00687-W	03076-J	HALL, MELVIN CECIL	VEGETABLE FARM	24 47 25	0 0 0	14-AUG-86	15-OCT-89	
	ADDRESS	1230 IMMOKALEE ROAD	PHONE 8135977154					
		NAPLES FL 33963						

ACRES OWNED 200 00 ACRES_SERVED 100 00 COUNTIES LEE

FACILITIES

1-WELL AT 600 GPM & 1-PUMP AT 3000 GPM

USES AGR TREATMENT SALT PROB N WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS WATBAQ / GDW BORROW / SFC / 000

ANNUAL ALLOC 106 21 MAX MONTH ALLOC 00 MAX DAILY ALLOC 70 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	-------	--------	-----	------------	-----------	---------------	------------	-------------

** 36-00688-W	06108-J	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
	ADDRESS	11691 GATEWAY BOULEVA	GATEWAY SERVICES DISTRICT	0 44 25	0 0 0	14-AUG-86	15-APR-92	08-SEP-88
		FT MYERS FL 33913	PHONE 8135611313					

ACRES OWNED 5319 00 ACRES_SERVED 228 20 COUNTIES LEE

FACILITIES

3-12INX10 5FT WELLS AT 350 GPM EACH (P)

USES LAN TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y

SOURCE/CLASS SSANDS / GDW / /

ANNUAL ALLOC 260 49 MAX MONTH ALLOC 00 MAX DAILY ALLOC 1 33 TOTAL CAPACITY 1050 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
15	FT MYERS	00 80	SPRINKLER		75	228 2	4 8		260 4	1 3

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00689-W	890728-10	BYER, DONALD L	ASHLAND AT LAKERIDGE, THE	26 45 24	0 0 0	14-AUG-86	15-APR-92	12-OCT-89
	ADDRESS	7109 LAKERIDGE COURT	PHONE 8134812863					
		FT MYERS FL 33907						

ACRES OWNED 14 00 ACRES_SERVED 3 20 COUNTIES LEE

** (36-00716-W: See Page 36)

ACRES OWNED 213 90 ACRES_SERVED 25 00 COUNTIES LEE

FACILITIES

1-PUMP AT 900 GPM & 2-4INX100FT WELLS AT 45 GPM EACH

USES GOL TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y
SOURCE/CLASS SSANDS / GDW LPLAKE / SFC / 000
ANNUAL ALLOC 28 54 MAX MONTH ALLOC 00 MAX DAILY ALLOC 21 TOTAL CAPACITY 990 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
20	FT MYERS	00 80	SPRINKLER		75	25 0	4 8		28 5	1

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00751-W	890811-9	DAVIS, RONALD L	CARILLON WOODS	2 45 24	0 0 0	09-APR-87	15-APR-92	12-OCT-89
	ADDRESS	3040 DEL PRADO BOULEV	PHONE 0000000000					
		CAPE CORAL FL 33904						

ACRES OWNED 50 00 ACRES_SERVED 6 25 COUNTIES LEE

FACILITIES

1-4INX130FT WELL AT 30 GPM

USES LAN TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y
SOURCE/CLASS SSANDS / GDW / / 000
ANNUAL ALLOC 7 10 MAX MONTH ALLOC 00 MAX DAILY ALLOC 03 TOTAL CAPACITY 30 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
15	FT MYERS	00 80	SPRINKLER		75	6 3	4 8	0	7 1	0

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00761-W	12036-G	K HOVNANIAN CO OF FT MYE	PINE RIDGE AT FT MYERS	3 44 25	0 0 0	14-MAY-87	15-APR-92	
	ADDRESS	260 PROFESSIONAL PLAC	PHONE 8139958500					
		NORTH FT MYERS FL 33903						

ACRES OWNED 135 00 ACRES_SERVED 37 40 COUNTIES LEE

FACILITIES

2-PUMPS AT 540 GPM

USES LAN TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y
SOURCE/CLASS LPLAKE / SFC / / 000
ANNUAL ALLOC 42 68 MAX MONTH ALLOC 00 MAX DAILY ALLOC 21 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
15	FT MYERS	00 80	SPRINKLER		75	37 4	4 8		42 7	2

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00762-W	02277-C	SAN CARLOS-SUMMERLIN SQUA	SUMMERLIN SQUARE SHOPPING	7 46 24	0 0 0	14-MAY-87	15-APR-92	
	ADDRESS	17105 SAN CARLOS BLVD	PHONE 8134665800					
		FT MYERS FL 33907						

ACRES OWNED 31 80 ACRES_SERVED 7 00 COUNTIES LEE

15 FT MYERS 00 80 SPRINKLER 75 5 8 4 8 6 6

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP	RGE	SC TWP	RGE	ISSUE	EXPIRE	REISSUE
36-00794-W	06247-E	BREWER, WESLEY C	BREWER'S FARM	5	44	22	0	0	0	08-OCT-87 15-APR-92
	ADDRESS	P O BOX 232	PHONE 8134726331							
		PINELAND FL 33945								

ACRES OWNED 32 00 ACRES_SERVED 10 00 COUNTIES LEE

FACILITIES

2-6INX55FT WELLS AT 175 GPM EACH

USES AGR TREATMENT N SALT PROB Y WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS WATBAQ / GDW / /
ANNUAL ALLOC 00 MAX MONTH ALLOC 33 MAX DAILY ALLOC 03 TOTAL CAPACITY 350 00

PROPOSED	SERVICE AREA	PSC REG	PER CAP USE	PRESENT POP (THSND)/YR /	PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG	MAX DAY CAP	STORAGE CAP	HI SERVICE CAP	DER CAP	

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
61	FT MYERS	00 80	DRIP		85	10 0	2 8	3		

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP	RGE	SC TWP	RGE	ISSUE	EXPIRE	REISSUE
36-00802-W	04307-E	MACK INDUSTRIES	MACK INDUSTRIES	15	47	24	0	0	0	12-NOV-87 12-NOV-92
	ADDRESS	PO BOX 10	PHONE 8133323022							
		BONITA SPRINGS FL 33923								

ACRES OWNED 24 00 ACRES_SERVED 24 00 COUNTIES LEE

FACILITIES

1-12INX35FT WELL AT 300 GPM

USES IND TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS N
SOURCE/CLASS WATBAQ / GDW SSANDS / GDW /
ANNUAL ALLOC 10 07 MAX MONTH ALLOC 00 MAX DAILY ALLOC 03 TOTAL CAPACITY 300 00

PROPOSED	SERVICE AREA	PSC REG	PER CAP USE	PRESENT POP (THSND)/YR /	PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG	MAX DAY CAP	STORAGE CAP	HI SERVICE CAP	DER CAP	

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	-------	--------	-----	------------	-----------	---------------	------------	-------------

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP	RGE	SC TWP	RGE	ISSUE	EXPIRE	REISSUE
36-00804-W	08207-D	JORDAN, JUANITA M	JORDAN JUNGLE	26	43	27	0	0	0	10-DEC-87 15-OCT-91
	ADDRESS	PO BOX 367	PHONE 8139360132							
		ALVA FL 33920								

ACRES OWNED 10 04 ACRES_SERVED 9 50 COUNTIES LEE

FACILITIES

2-3INX2HP PUMPS AT 75 GPM EACH

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS BEDMAN / SFC / /
ANNUAL ALLOC 4 37 MAX MONTH ALLOC 00 MAX DAILY ALLOC 05 TOTAL CAPACITY 150 00

PROPOSED	SERVICE AREA	PSC REG	PER CAP USE	PRESENT POP (THSND)/YR /	PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG	MAX DAY CAP	STORAGE CAP	HI SERVICE CAP	DER CAP	

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
13	LABELLE	01 50	DRIP		85	9 5	5 3		4 4	

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP	RGE	SC TWP	RGE	ISSUE	EXPIRE	REISSUE
** 36-00805-W	08137-B	GATEWAY SERVICES DISTRICT	GATEWAY SERVICES DISTRICT	0	45	25	0	0	0	10-DEC-87 10-DEC-90

#36-00805-W, cont.

ADDRESS 1625 HENDRY STREET, #
FT FL 33901

PHONE 8133371263

ACRES OWNED 5299 00 ACRES_SERVED 1400 00 COUNTIES LEE

FACILITIES

VARIABLE CONTROL, PORTABLE CENTRIFUGAL PUMPS

USES MIN UND TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS N
SOURCE/CLASS WATBAQ / GDW / /
ANNUAL ALLOC 5040 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 30 24 TOTAL CAPACITY 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00808-W	08127-C	HARVEY BROTHERS FARM, INC	FARM	9 44 22	0 0 0	07-JAN-88	01-JUL-90	
	ADDRESS	5500 12TH AVENUE, NW	PHONE					
		NAPLES FL 33999						

ACRES OWNED 40 00 ACRES_SERVED 32 00 COUNTIES LEE

FACILITIES

1-6INX60FT WELL AT 250 GPM

USES AGR TREATMENT N SALT PROB Y WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS WATBAQ / GDW / /
ANNUAL ALLOC 1 80 MAX MONTH ALLOC 00 MAX DAILY ALLOC 06 TOTAL CAPACITY 250 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ
60 DRIP 32 0 1 8

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00811-W	07167-E	DAKOS, WILLIAM M	SUNRISE NURSERIES	11 44 25	0 0 0	07-JAN-88	15-APR-92	
	ADDRESS	1240 COCONUT DRIVE	PHONE 8133343439					
		FT MYERS FL 33901						

ACRES OWNED 25 90 ACRES_SERVED 21 30 COUNTIES LEE

FACILITIES

1-6INX100FT WELL AT 260 GPM (E) & 2-6INX100FT WELLS AT 260 GPM EACH

USES AGE TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS SSANDS / GDW / /
ANNUAL ALLOC 69 80 MAX MONTH ALLOC 00 MAX DAILY ALLOC 42 TOTAL CAPACITY 780 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ
05 FT MYERS 01 50 DRIP 85 1 3 4 6 1 1

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00821-W	01267-J	GRANT, WM D - TRUSTEE A	VEGETABLE FARM	35 47 26	0 0 0	11-FEB-88	15-APR-92	
	ADDRESS	PO BOX 712	PHONE 8139921801					
		BONITA SPRINGS FL 33923						

60 GPM, 1-3INX2HP PUMP AT 50 GPM (E) & 1-6INX500FT WEL L AT 70 GPM

USES NUR TREATMENT N SALT PROB WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS DMIDHW / GDW DLOWHW / GDW LPPOND / SFC
ANNUAL ALLOC 27 50 MAX MONTH ALLOC 00 MAX DAILY ALLOC 13 TOTAL CAPACITY 825 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ
05 13 5 27 5 1

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00838-W	11307-D	MASON, JOHN	CHIEF MASON ORANGE GROVE	22 43 25	0 0 0	14-APR-88	15-APR-92	
	ADDRESS	17900 NALLE ROAD	PHONE 8135433792					
		NORTH FT MYERS FL 33917						

ACRES OWNED 18 00 ACRES_SERVED 13 30 COUNTIES LEE

FACILITIES
2-4INX50FT WELLS AT 32 GPM EACH

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS WSURAQ / GDW / /
ANNUAL ALLOC 6 12 MAX MONTH ALLOC 00 MAX DAILY ALLOC 07 TOTAL CAPACITY 64 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ
13 FT MYERS 00 80 DRIP/SPRAY-JET 85 13 3 5 3 6 1

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-00843-W	02058-E	FLINT, MONTE CHRIS	MONTE'S GROVE	23 44 25	0 0 0	12-MAY-88	15-APR-92	
	ADDRESS	7760 LIGHTARD KNOTT L	PHONE 8133322562					
		FT MYERS FL 33905						

ACRES OWNED 14 34 ACRES_SERVED 7 66 COUNTIES LEE

FACILITIES
1-6INX100FT WELL AT 120 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS SSANDS / GDW / /
ANNUAL ALLOC 3 50 MAX MONTH ALLOC 00 MAX DAILY ALLOC 04 TOTAL CAPACITY 120 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ
13 N/A 85 7 7 5 3 3 5

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-00844-W	890810-9	GREEN FRANK	B & B GROVE	17 43 27		12-MAY-88	15-APR-92	12-APR-90
	ADDRESS	PO BOX 25	PHONE 8137282669					
		ALVA FL 33920						

ACRES OWNED 40 00 ACRES_SERVED 35 00 COUNTIES LEE

FACILITIES
2-4INX13FT WELLS AT 25 GPM EACH, 1-6INX25FT WELL AT 35 GPM, 1-12 INX180FT WELL AT 350 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS WATBAQ / GDW SSANDS / GDW /
ANNUAL ALLOC 16 10 MAX MONTH ALLOC MAX DAILY ALLOC 20 TOTAL CAPACITY 435 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ
13 FT MYERS 00 80 JET SPRAY 85 35 0 5 3 16 1 2

PERMIT # APPLIC # PERMITTEE PROJECT SC TWP RGE SC TWP RGE ISSUE EXPIRE REISSUE
** 36-00846-W 02188-D CITIZENS & SOUTHERN TRUST JOHN JASSY VEGETABLES 33 44 25 0 0 0 12-MAY-88 15-APR-92
ADDRESS PO BOX 1857 PHONE
NAPLES FL 33939

ACRES OWNED 33 00 ACRES_SERVED 21 00 COUNTIES LEE

FACILITIES
1-4INX60FT WELL AT 100 GPM

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS WATBAQ / GDW / /
ANNUAL ALLOC 14 10 MAX MONTH ALLOC 00 MAX DAILY ALLOC 14 TOTAL CAPACITY 100 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ
61 FT MYERS 00 80 FURROW 50 21 0 3 8 14 1 1

PERMIT # APPLIC # PERMITTEE PROJECT SC TWP RGE SC TWP RGE ISSUE EXPIRE REISSUE
36-00847-W 02268-I MINNELUSA CORPORATION DEEP LAGOON MARINA 20 45 24 0 0 0 12-MAY-88 15-APR-92
ADDRESS 6850 MCGREGOR BLVD PHONE 8134818200
FT MYERS FL 33907

ACRES OWNED 26 68 ACRES_SERVED 5 70 COUNTIES LEE

FACILITIES
2-4INX400FT WELLS AT 70 GPM EACH

USES LAN TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y
SOURCE/CLASS DLOWHQ / GDW / /
ANNUAL ALLOC 6 50 MAX MONTH ALLOC 00 MAX DAILY ALLOC 03 TOTAL CAPACITY 140 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSND)/YR / PROPOSED POP (THSND)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID RAIN STATION SOIL IRRIG SYSTEM EFF CROP ACRES SUPPL REQ MAX MONTH REQ ANNUAL REQ MAX DAY REQ
15 FT MYERS 00 80 SPRINKLER 75 5 7 4 8 6 5

PERMIT # APPLIC # PERMITTEE PROJECT SC TWP RGE SC TWP RGE ISSUE EXPIRE REISSUE
36-00848-W 11127-G GREEN, FRANK GREENS CITRUS 10 43 27 0 0 0 12-MAY-88 15-OCT-91
ADDRESS PO BOX 25 PHONE
ALVA FL 33920

ACRES OWNED 110 00 ACRES_SERVED 67 00 COUNTIES LEE

FACILITIES
9-4INX20FT WELLS AT 250 GPM (E) & 1-6INX20FT WELL AT 30 GPM (P)

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS DFLOAQ / GDW / /
ANNUAL ALLOC 30 82 MAX MONTH ALLOC 00 MAX DAILY ALLOC 37 TOTAL CAPACITY 280 00

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
PERMIT #	APPLIC #	PERMITTEE	PROJECT			SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-01055-W	09238-F	LEE COUNTY, SCHOOL BOARD	MIDDLE SCHOOL "EE"			28 44 23	0 0 0	13-APR-89	15-APR-92	
	ADDRESS	2055 CENTRAL AVENUE	PHONE 8133341102							
		CAPE CORAL FL 33901								
ACRES OWNED 56 90		ACRES_SERVED 21 20		COUNTIES LEE						
FACILITIES										
1-4IN X 160GPM X 15HP PUMP										
USES LAN TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y										
SOURCE/CLASS ONSITE / SFC / / 000										
ANNUAL ALLOC 24 20 MAX MONTH ALLOC 00 MAX DAILY ALLOC 00 TOTAL CAPACITY 160 00										
PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /										
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP										
CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
15	FT MYERS	00 80	SPRINKLER		75	21 2	4 2		24 2	
PERMIT #	APPLIC #	PERMITTEE	PROJECT			SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
**36-01063-W	890221-13	KING, JOSEPH (LESSEE)	KING & SONS PRODUCE FARM			23 44 25	0 0 0	13-APR-89	15-APR-92	
	ADDRESS	PO BOX 816	PHONE 8133686029							
		LABELLE FL 33935								
ACRES OWNED 160 20		ACRES_SERVED 160 00		COUNTIES LEE						
FACILITIES										
2-8IN X 6IN X 1200GPM X 15HP PUMPS (E) & 4-12IN X 30FT X 60GPM WELLS (P)										
USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y										
SOURCE/CLASS WATBAQ / GDW ONSITE / SFC / / 000										
ANNUAL ALLOC 172.00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 1 04 TOTAL CAPACITY 2640 00										
PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /										
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP										
CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
61	FT MYERS	00 80	FLOOD		50	160 0	3 5		172 0	1 0
PERMIT #	APPLIC #	PERMITTEE	PROJECT			SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-01069-W	04258-D	TRINGALI, DOMINIC V	HICKEY CREEK GROVES			31 43 27	0 0 0	13-APR-89	15-OCT-92	
	ADDRESS	3001 BATEMAN ROAD	PHONE							
		ALVA FL 33920								
ACRES OWNED 30 00		ACRES_SERVED 29 00		COUNTIES LEE						
FACILITIES										
1-8IN X 100FT X 1100GPM WELL										
USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y										
SOURCE/CLASS SSANDS / GDW / / 000										
ANNUAL ALLOC 13 30 MAX MONTH ALLOC 00 MAX DAILY ALLOC 00 TOTAL CAPACITY 1100 00										
PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /										
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP										
CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
13	N/A		MICRO JET		85	29 0	5 3		13 3	

** 36-01102-W 890210-2 FT MYERS, CITY OF EASTWOOD GOLF COURSE 29 44 25 0 0 0 11-MAY-89 15-APR-92
 ADDRESS PO DRAWER PHONE 8133341281
 FT MYERS FL 33901

ACRES OWNED 232 00 ACRES SERVED 100 00 COUNTIES LEE

FACILITIES

2-8IN X 75HP X 800GPM & 1-4IN X 15HP X 100GPM PUMPS

USES GOL TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y

SOURCE/CLASS ONSITE / SFC / / 000

ANNUAL ALLOC 114 00 MAX MONTH ALLOC 00 MAX DAILY ALLOC 00 TOTAL CAPACITY 1700 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
15	FT MYERS	00 80	SPRINKLER		75	100 0	4 8		114 0	

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-01106-W	12308-W	HARVEY BROTHERS	HARVEY BROTHERS FARM	8 44 22	0 0 0	11-MAY-89	15-APR-92	
	ADDRESS	5500 12TH AVENUE, NW	PHONE 8135975692					
		NAPLES FL 33999						

ACRES OWNED 61 00 ACRES SERVED 46 00 COUNTIES LEE

FACILITIES

1-8IN X 50HP X 500GPM PUMP

USES AGR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y

SOURCE/CLASS ONSITE / SFC / / 000

ANNUAL ALLOC 34 56 MAX MONTH ALLOC 00 MAX DAILY ALLOC 00 TOTAL CAPACITY 500 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
61	FT MYERS	00 80	DRIP		85	46 0	4 1		34 5	

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-01111-W	10288-A	PINE HAVEN, INC	PINE HAVEN CONDOS	2 48 25	0 0 0	11-MAY-89	15-APR-92	
	ADDRESS	10911 BONITA BEACH RO	PHONE 8135973432					
		BONITA SPRINGS FL 33923						

ACRES OWNED 22 00 ACRES SERVED 3 52 COUNTIES LEE

FACILITIES

3-2IN X 62FT X 35GPM WELLS & 7-2IN X 38FT X 35GPM WELLS

USES LAN TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y

SOURCE/CLASS WATBAQ / GDW STAMZI / 000

ANNUAL ALLOC 4 02 MAX MONTH ALLOC 00 MAX DAILY ALLOC 00 TOTAL CAPACITY 350 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
 POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
15	FT MYERS	00 80	SPRINKLER		75	3 5			4 0	

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-01134-W	12308-9	WATSON, ROGER L	WATSON NURSERY	1 44 27	0 0 0	15-JUN-89	15-APR-92	
	ADDRESS	RT 1, BOX 8-K	PHONE 8136573489					
		IMMOKALEE FL 33934						

ACRES OWNED 13 00 ACRES_SERVED 12 00 COUNTIES LEE

FACILITIES

1-8IN X 75FT X 600GPM WELL & 1-9IN X 600GPM X 40HP PUMP

USES NUR TREATMENT N SALT PROB N WATER SHORTAGE 03 CROPS Y
SOURCE/CLASS DOGCAN / SFC SSANDS / GDW / 000
ANNUAL ALLOC 11 80 MAX MONTH ALLOC 00 MAX DAILY ALLOC 00 TOTAL CAPACITY 1200 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
05	LABELLE	00 80		MICRO-JET	85	12 0	4 9		11 8	

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-01135-W	12298-K	LEHIGH CORPORATION	WOODCREST VILLAGE	31 44 27	0 0 0	15-JUN-89	15-APR-92	
	ADDRESS	PO BOX 573	PHONE 8133692161					
		LEHIGH ACRES FL 33936						

ACRES OWNED 11 77 ACRES_SERVED 8 06 COUNTIES LEE

FACILITIES

3-4IN X 80FT X 20GPM WELLS (E) & 3-4IN X 200FT X 20GPM WELLS (P)

USES LAN TREATMENT N SALT PROB N WATER SHORTAGE 04 CROPS Y
SOURCE/CLASS SSANDS / GDW / / 000
ANNUAL ALLOC 9 20 MAX MONTH ALLOC 00 MAX DAILY ALLOC 00 TOTAL CAPACITY 1200 00

PROPOSED SERVICE AREA PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / PROPOSED POP (THSNDS)/YR /
POTENTIAL POP CHNG MAX DAY CAP STORAGE CAP HI SERVICE CAP DER CAP

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
15	FT MYERS	00 80		SPRINKLER	75	8 0	4 8		9 2	

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
** 36-01136-W	12098-I	GATEWAY SERVICES DISTRICT	GATEWAY	0 44 25	0 0 0	15-JUN-89	15-JUN-94	
	ADDRESS	1625 HENDRY ST, SUITE	PHONE 8133371141					
		FT MYERS FL 33901						

ACRES OWNED 00 ACRES_SERVED 5319 00 COUNTIES LEE

FACILITIES

3-12IN WELLS AT A TOTAL OF 1050GPM

USES PWS TREATMENT Y SALT PROB N WATER SHORTAGE 02 CROPS N
SOURCE/CLASS SSANDS / GDW / / 000
ANNUAL ALLOC 269 10 MAX MONTH ALLOC 00 MAX DAILY ALLOC 1 47 TOTAL CAPACITY 1050 00

PROPOSED Y SERVICE AREA 5319 PSC REG PER CAP USE PRESENT POP (THSNDS)/YR / 89 PROPOSED POP (THSNDS)/YR 5 / 94
POTENTIAL POP CHNG 00 MAX DAY CAP 0 STORAGE CAP 0 HI SERVICE CAP 0 DER CAP 0

CROP ID	RAIN STATION	SOIL	IRRIG	SYSTEM	EFF	CROP ACRES	SUPPL REQ	MAX MONTH REQ	ANNUAL REQ	MAX DAY REQ
---------	--------------	------	-------	--------	-----	------------	-----------	---------------	------------	-------------

PERMIT #	APPLIC #	PERMITTEE	PROJECT	SC TWP RGE	SC TWP RGE	ISSUE	EXPIRE	REISSUE
36-01188-W	890112-1	FIRST FLORIDA BANK - TRUS	RAINBOW FARMS GROVE	30 43 25	0 0 0	13-JUL-89	15-OCT-91	
	ADDRESS	P O BOX 2148	PHONE 8135433434					
		FT MYERS FL 33902						

ACRES OWNED 85 00 ACRES_SERVED 80 00 COUNTIES LEE

** PERMIT #36-00151-SW

A water use permit servicing 10 acres, with a monthly withdrawal of 7.95 million gallons from the shallow aquifer.

** Permit #36-00716-W

A water use permit for a surface water on-site borrow pit servicing 121.79 acres. The annual withdrawal rate is 84.4 million gallons.

Per Bill Haight, SFWMD/Ft. Lauderdale, May 1990

9.2 PRIVATE WELLS

APPENDIX 9.2
GROUNDWATER WELL INVENTORY
PRIVATE WELLS

Reference: Lee County
Division of Water Resources
May 8, 1990

NOTE:

1. Listed wells are private wells, generally not permitted by SFWMD because of their small size.
2. The first six digits of the strap number indicate Section, Township (all South), and Range (all East), respectively, of the well location.

3. Key to Data:

CDEPTH = Casing Depth, Feet

TDEPTH = Total Depth, Feet

USE = Permitted type of use, where

DO = Domestic Well
FI = Fire Well
HP = Heat Pump
IR = Irrigation Well
MO = Monitoring Well
PL = Plugged Well (no longer in use)
PO = Potable Well
TS = Test Well

MLC13/17
5/15/90

IMAGE QUALITY

**PLEASE NOTE:
THE ORIGINAL DOCUMENT WHICH
WERE SCANNED FOR THIS RECORD
WERE OF POOR QUALITY.**

SECTION 25, TWP 43S, RGE 25E

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
254325020000A0210	15062	17150 WATERS EDGE CI<	59	78	DO
254325020000C0060	12798	17161 WATERS EDGE CI<	80	100	IR

* END OF RESULT ***** 2 ROWS DISPLAYED ***** COST ESTIMATE IS 1 **

SECTION 34, TWP 43S, RGE 25E

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF-LINE

ENTER A DISPLAY COMMAND

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
34432502000190080	14748	320 MORSE PLAZA-OFF <	62	75	IR
34432503000010360	13608	247 CONNECTICUT-MORS<	70	90	IR
34432503000150120	10136	103 SHAW BLVD.-MORSE<	59	64	IR

* END OF RESULT ***** 3 ROWS DISPLAYED ***** COST ESTIMATE IS 1 **

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF-LINE

ENTER A DISPLAY COMMAND

SECTION 35, TWP 43S, RGE 25E

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
35432500000010000	9274	RIGHT HAND SIDE OF M<	?	20	PL
35432500000050040	14633	3950 ELLIS ROAD-ELLI<	63	78	DO
35432500000050050	7974	ORANGE RIVER TO ELLI<	?	100	DO
3543250100000003E	11695	3660 ELLIS ROAD-EAST<	110	130	DO
354325070000C0190	13908	4612 LITTLE RIVER LAK	60	100	IR

* END OF RESULT ***** 5 ROWS DISPLAYED ***** COST ESTIMATE IS 1 **

SECTION 36, TWP 43S, RGE 25E

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF-LINE

ENTER A DISPLAY COMMAND

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
36432500000120000	8362	EAST ON 80-1/2 MILE <	65	85	PO
36432500000210000	11572	ORANGE RIVER BLVD. T<	84	100	DO
36432501000010000	11866	END OF ROAD-LEFT SEC<	63	75	DO
36432502000000080	13706	3850 LITTLE CREEK DR<	240	380	DO
36432502000000080	15048	3850 LITTLE CREEK DR<	80	100	IR
36432502000000080	15111	3850 LITTLE CREEK DR<	68	100	DO
36432502000000120	14578	3770 LITTLE CREEK DR<	63	80	DO
36432502000000120	15344	3770 LITTLE CREEK-N.<	150	200	DO
36432502000000200	8417	E PALM BEACH/R ORANG<	63	80	DO
36432502000000250	10382	LITTLE CREEK-EAST ON<	74	90	DO
36432502000000250	12925	3911 LITTLE CREEK D<	120	160	DO
36432503000000030	13377	3108 RIVER GROVE CIR<	63	80	DO
36432503000000050	13661	3116 RIVER GROVE CIR<	60	80	DO
36432503000000080	9009	EAST N S.R.80 TO ORA<	50	63	DO
36432503000000120	12932	3144 RIVERGROVE CIRC<	70	90	DO
36432503000000150	10307	ORANGE RIVER BLVD. T<	50	69	DO
36432503000000270	15331	3141 RIVERGROVE CIRC<	150	180	DO
36432503000000280	10801	OFF ORANGE RIVER ROA<	105	130	DO
36432503000000370	14307	3199 RIVER GROVE CIR<	63	71	DO
36432503000000430	8333	RIVER GROVE CIRCLE, <	80	100	DO

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF-LINE

ENTER A DISPLAY COMMAND

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
36432502000000080	15048	3850 LITTLE CREEK DR<	80	100	IR
36432502000000080	15111	3850 LITTLE CREEK DR<	68	100	DO
36432502000000120	14570	3770 LITTLE CREEK DR<	63	80	DO
36432502000000120	15344	3770 LITTLE CREEK-N.<	150	200	DC
36432502000000200	8417	E PALM BEACH/R ORANG<	67	80	CC
36432502000000250	10382	LITTLE CREEK-EAST ON<	74	90	CC
36432502000000250	12925	3911 LITTLE CREEK D<	120	160	DC
36432503000000030	13377	3108 RIVER GROVE CIR<	63	80	DC
36432503000000050	13661	3116 RIVER GROVE CIR<	60	80	DC
36432503000000080	9009	EAST N S.R.80 TO ORA<	50	62	DC
36432503000000120	12932	3144 RIVERGROVE CIRC<	70	90	DO
36432503000000150	10307	ORANGE RIVER BLVD. T<	50	69	DO
36432503000000270	15331	3141 RIVERGROVE CIRC<	150	180	DO
36432503000000280	10801	OFF ORANGE RIVER ROA<	105	130	DO
36432503000000370	14307	3199 RIVER GROVE CIR<	63	71	DO
36432503000000430	8333	RIVER GROVE CIRCLE, <	80	100	DO
36432503000000460	8066	RIVERGROVE CIRCLE-RI<	85	145	DC
36432503000000470	15151	3212 RIVER GROVE CIR<	150	200	DO
36432503000000490	11235	3220 RIVER GROVE CIR<	60	78	DO

* END OF RESULT ***** 23 ROWS DISPLAYED ***** COST ESTIMATE IS 1 **

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF-LINE

ENTER A DISPLAY COMMAN

VARIOUS SECTIONS, TWP 43S, RGE 26E

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
21432609000000150	9903	OFF OLD OLGA ROAD ON<	84	94	IR
25432600000070030	9993	RT. 80 TAKE RIGHT-CO<	63	75	DO
25432600001180000	10099	OAK CREEK FARMS-80 T<	52	70	DO
30432606000000120	10290	NORTH OFF HWY. 80 ON<	63	95	IR
25432600001190110	10364	17801 OAK CREEK ROAD<	63	77	DO
24432600000080020	10515	17211 STATE RT. #80-<	90	100	DO
21432608000000060	10551	EAST ON HWY. 80 TO R<	42	44	DO
19432602000290810	10555	12482 RIVER ROAD-FT.<	63	110	DO
21432608000000060	10565	80 TO OLD OGA ROAD-T<	38	38	HP
20432605000910820	10571	13426 MARQUETTE BLVD<	90	115	DO
21432606000650070	10609	14170 NEVIS DRIVE S.<	84	130	DO
25432600001220120	10764	17321 OAK CREEK ROAD<	63	80	DO
20432600000060070	10832	13284 ISLAND ROAD-FT<	95	110	IR
194326040000D0180	10874	2200 SANTIAGO AVENUE<	?	102	FL
194326040000D0180	10875	2200 SANTIAGO AVENUE<	80	100	IR
29432605000840430	10976	13106 CARIBBEAN BLVD.<	63	100	DO
22432603000030010	11021	OLD OLGA ROAD HIGHWA<	80	100	DO
194326040000A0230	11111	2203 ISLE OF PINES-F<	63	85	DO
20432607000001350	11127	75 TO STATE ROAD 80-<	90	130	IR
25432600001190060	11134	EAST ON HIGHWAY 80 T<	63	80	DO

ENTER A DISPLAY COMMAND

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF-LINE

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
25432600000040040	11286	SR 80 TO COOK LANE-T<	31	32	DO
19432602000250190	11517	12518 DAVIS BLVD. S.<	63	100	IR
20432605000840130	11529	1943 BAHAMA AVENUE-F<	80	120	DO
19432602000290100	11590	PALM BEACH BLVD. TO <	98	115	IR
20432603000000190	11895	13896 RIVERFOREST DR<	63	91	IR
25432600001190080	12071	17850 FRANK ROAD-EAS<	63	70	DO
25432600001010000	12222	HWY 80 EAST TO HICKE<	57	72	DO
29432606000900350	12279	13513 MARQUETTE BLVD<	110	140	DO
20432605000840130	12429	80 TO RIVER RIDGE TO<	93	100	IR
32432600000100020	12460	13051 BIRD ROAD-END <	72	87	DO
31432600000060010	12479	4281 ORANGE RIVER LO<	70	85	DO
17432602000000080	12482	EAST STATE ROAD 78-N<	80	100	DO
20432605000910760	12757	13380 MARQUETTE BLVD<	84	102	DO
22432600000070000	12773	EAST ON 80-LEFT OLD <	63	80	DO
2443260000011002A	12775	1981 SEMINOLE HARBOR<	61	70	DO
25432600001060020	12784	17341 FRANK ROAD- <	64	85	DO
29432603000360330	12819	2832 W. CYPRESS AVEN<	63	110	IR
17432602000000030	12873	8931 SERENOA COURT-N<	67	77	DO
29432606000680210	12912	13862 5TH STREET S.E.<	63	110	IR
30432602000290630	12937	12419 RIVER RD S.E.-<	87	97	IR

ENTER A DISPLAY COMMAND

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF LINE

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
22432602000K00170	7886	ALVA <	60	80	DO
19432602000210400	7897	2102 PARKVIEW DRIVE <	80	100	IR
24432604000000240	8000	GOODE ROAD-ALVA <	63	85	CC
25432600001190130	8065	EAST ON 80 TO HICKEY<	03	80	CC
28432608000040160	8174	15757 CORALVINE LN I<	63	70	IR
20432608000001520	8253	TAKE TROPIC AVENUE OK<	63	80	IR
20432600000060340	8266	RIVER FOREST ROAD TC<	80	95	IR
25432600001190120	8319	17781 OAK CREEK ROAD<	63	80	DO
20432605000850120	8364	2107 ARUBA AVENUE C.<	85	100	IR
25432600001190090	8437	HICKEY CREEK ROAD TO<	66	86	DO
19432600000021000	8433	HWY 78-1ST PAVED ROA<	65	90	IR
19432600000021000	8432	HWY. 78-1ST PAVED RO<	70	115	IR
25432600001060000	8496	FRANK ROAD OFF HICKY<	50	75	DO
22432603000040090	8531	HIGHWAY 80 TO BROWN R<	100	115	DO
21432606000580600	8593	2552 BARCELONA AVENU<	84	100	DO
21432609000000080	8674	RT. 80 TO OLD OLGA R<	60	70	IR
24432601000040000	8678	TAYLOR RD. OFF OLD 7<	126	130	DO
21432608000000090	8722	SR 80 TO OLD 78 T/L <	19	20	IR
14432600000030150	8763	HWY 78 EAST OF(31) T<	80	84	DO
31432600000120000	8807	ORANGE RIVER BLVD. T<	70	90	DO

ENTER A DISPLAY COMMAND

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF-LINE

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
29432600000060000	8942	PALM BEACH BLVD. JUS<	95	115	DO
15432607000000200	8955	78 TO TRAVIS TO INTE<	80	100	DO
20432605000750180	9091	TROPIC TOWARD RIVER <	108	135	IR
19432604000000070	9124	FT. MYERS SHORES-224<	84	92	IR
24432604000000240	9125	GOODE ROAD-ALVA. <	72	85	DC
21432609000000070	9247	1821 PINWOOD CT.-SR<	84	98	IR
25432600001220160	9284	FRANK ROAD-OAK CREEK<	63	70	DO
24432603000000120	9454	GOODE AVENUE-OFF PAL<	80	95	DO
284326080000050140	9487	15723 CORAL VINE LAN<	100	125	IR
30432601000011000	9498	HGWY. 80 TO 2259 DAV<	95	115	IR
14432600000030270	9500	TELEGRAPH CREEK LANE<	93	101	DO
08432600000110030	9563	1/8 MILE PAST OWL CR<	88	120	DO
25432600001190160	9565	ACROSS FROM FRANKLIN<	150	200	DO
20432605000530170	9593	13805 4TH STREET C.E<	95	115	IR
08432600000100030	9740	RT. 78, 1 MILE EAST <	80	120	DO
24432600000110020	9744	1921 SEMINOLE HARBOR<	60	75	DO
33432600000020030	9755	BUCKINGHAM ROAD. <	700	850	IR
14432600000030230	9857	TELEGRAPH ROAD OFF R<	79	90	DO
19432602000210420	9869	2101 HIBISCUS ROAD S<	90	100	IR
25432600000040030	9920	EAST 80 TO HICKEY CR<	90	110	DO

ENTER A DISPLAY COMMAND

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF-LINE

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
23432600000120050	15223	16160 OLD OGLA ROAD <	75	85	DO
25432600001190170	15229	17851 OAK CREEK ROAD<	63	70	DO
2443260100006000A	15267	17720 TAYLOR ROAD AL<	63	82	DO
14432600000030000	15293	18561 TELEGRAPH CREE<	90	120	DC
14432600000030000	15301	18640 TELEGRAPH CREE<	70	90	CO
294326050000000140	15401	13036 8TH STREET FT.<	72	100	LC
2243260300004009A	15437	1901 BROWN ROAD ALVA<	63	88	DO
30432605000790050	15482	13014 7TH STREET CE <	21	22	IR
154326070000000010	15557	18161 INTERLOCHEN LA<	80	100	DO
2443260100004000F	15568	17420 TAYLOR ROAD GO<	100	135	DC
20432600000060440	15569	13388 JOURNEY'S END <	70	100	DC
154326070000C0020	15583	18141 TRAVERSE DRIVE<	63	80	DO
16432600000010030	15608	14410 DUKE HWY-OFF 7<	100	120	DO
304326060000000130	15616	2235 SANTIAGO AVENUE<	?	80	DC
25432600001190140	15648	17930 OAK CREEK ROAD<	60	80	DO
20432605000040090	15772	1965 BAHAMA AVENUE F<	70	90	IR
14432600000030240	15791	18301 TELEGRAPH CREE<	130	143	DO
29432605000850110	15811	2113 ARUBA FT. MYER<	100	120	DO
154326070000E0170	15834	18110 INTERLOCHEN-BI<	80	100	DO

* END OF RESULT ***** 122 ROWS DISPLAYED ***** COST ESTIMATE IS 4 **

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF LINE

ENTER A DISPLAY COMMAND

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
28432608000050130	13027	15749 CORAL VINE LAN<	100	120	IR
22432602000J00150	13263	1741 LINWOOD AVENUE <	63	80	DO
29432603000490230	13312	2430 POINCIANA BLVD.<	63	120	IR
16432600000070090	13441	OFF CT RD 78 ON OLD <	70	90	DC
17432602000000100	13457	18870 SERENOA COURT <	45	70	DO
2243260300004010A	13525	1991 BROWN ROAD-NORT<	84	110	DC
17432602000000070	13531	18811 SERENOA COURT <	63	88	DO
284326060000660070	13547	14019 JT KITTS DRIVE<	80	130	DO
284326060000630180	13599	HWY 80-OLD OLGA ROAD<	30	50	DO
17432602000000140	13667	18990 SERENOA COURT-<	105	168	DC
1543260000012004C	13762	SR 78 EAST ON LEFT P<	90	120	IR
1343260000002007A	13820	18081 FICHTERD'S CREE<	140	200	DO
154326070000B0150	13825	18090 INTERLOCHEN LA<	78	89	DO
294326030005000280	13849	13408 3RD STREET S.E.<	25	40	IR
25432600001050000	13971	17461 FRANK RD.-EAST<	76	100	DO
30432602000260250	13998	2202 PARKER AVENUE <	26	40	IR
32432600000090010	14001	13401 BIRD ROAD-OFF <	87	105	DO
20432600000060130	14215	13290 ISLAND RD-RIVE<	90	140	DO
20432605000910680	14314	13332 MARQUETTE BLVD<	92	110	DO
29432605000850330	14367	2056 ARUBA AVENUE-FT<	86	110	DO

ENTER A DISPLAY COMMAND

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF LINE

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
23432600000120050	14405	16160 OLD OLGA ROAD <	80	95	DO
20432605000910860	14650	13444 MARQUETTE BLVD<	90	110	DO
224326070000B0140	15183	18080 INTERLOCHEN LA<	63	80	DO
23432600000120050	15223	16160 OLD OLGA ROAD-<	75	85	DO
25432600001190170	15229	17851 OAK CREEK ROAD<	63	70	DO
2443260100006000A	15267	17720 TAYLOR ROAD-AL<	63	82	DO
14432600000030000	15293	18561 TELEGRAPH CREE<	90	120	DO
14432600000030000	15301	18640 TELEGRAPH CREE<	70	90	DO
29432605000800140	15401	13036 8TH STREET-FT.<	72	100	DO
2243260300004009A	15437	1901 BROWN ROAD-ALVA<	68	88	DO
30432605000790050	15482	13014 7TH STREET SE-<	21	22	IR
154326070000B0010	15557	18161 INTERLOCHEN LA<	80	100	DO
2443260100004000F	15568	17420 TAYLOR ROAD-GO<	100	135	DO
20432600000060440	15569	13388 JOURNEY'S END <	70	100	DO
154326070000C0020	15583	18141 TRAVERSE DRIVE<	63	80	DO
16432600000010030	15608	14410 DUKE HWY-OFF 7<	100	120	DO
30432606000000130	15616	2235 SANTIAGO AVENUE<	?	80	DO
25432600001190140	15648	17930 OAK CREEK ROAD<	60	80	DO
20432605000840090	15772	1965 BAHAMA AVENUE-F<	70	90	IR
14432600000030240	15791	18301 TELEGRAPH CREE<	130	143	DO

ENTER A DISPLAY COMMAND

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF LINE

VARIOUS SECTIONS. TWP 44S, RGE 25E

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
04442521000000170	7965	411 NEW YORK DRIVE-OK	80	100	IR
01442501000070020	8152	291 WOODBRIER DRIVE-<	100	120	DO
11442500000021020	8347	EAST OF I-75 APPROX.<	60	75	DO
1744250C081890010	8337	LEE COUNTY VO-TECH <	84	121	IR
01442501000200000	8020	ORANGE RIVER BLVD. T<	80	96	DO
01442500000030010	8393	WILLIAMSON ROAD-ROUT<	150	200	DO
12442502000000110	8517	ORANGE RIVER BLVD. T<	?	80	DO
09442513000000170	8516	4719 HUNTERD GREEN C<	87	100	DO
144425000000023000	8609	STALEY ROAD SOUTH TO<	116	120	DO
01442501000200000	8639	ORANGE GROVE BLVD. T<	62	75	DO
32442500000100030	8658	COLONIAL BLVD. EXTEN<	145	185	PO
044425100000000060	8771	OFF 80 LEFT ON FLORE<	77	100	IR
12442502000000120	8840	STALEY RD. SOUTH OF <	90	90	DO
04442501000000070	8846	PROSPECT TO 4424 RAI<	70	95	DO
1244250000011001A	8947	GO EAST ON PALM BEAC<	84	100	IR
12442502000000100	8968	TICE STREET TO STALE<	95	100	DO
14442500000002217A	9053	TICE ST. TO STALEY R<	75	127	DO
02442506000000040	9049	.8 MILE EAST OF I-75<	72	90	PO
11442501000010000	9137	OFF TICE STREET-600'<	68	135	TC
11442500000002103C	9182	TICE STREET EAST PAC<	65	85	DO

ENTER A DISPLAY COMMAN

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF-LINE

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
1244250200000012A	9185	OFF STALEY ROAD TO L<	80	100	DO
11442500000002102B	9217	10300 TICE STREET-1/<	65	75	DO
014425000000040000	9262	ORANGE RIVER BLVD. E<	58	78	DO
144425000000024160	9264	BRAHMA DRIVE-TICE-HA<	63	86	DO
09442512000010000	9292	4524 TICE STREET-TIC<	105	120	TC
124425000000040020	9466	5171 STALEY ROAD-EAS<	64	100	DO
14442500000011020	9822	623 LUCKETT ROAD-END<	80	100	DO
044425010000C0010	9756	INTERSECTION OF NEW <	136	756	PL
14442500000011170	9831	10310 ANGUS LANE-DOW<	85	100	DO
094425150000C0180	9870	4993 SHERRY STREET-S<	84	105	IR
034425030000G0020	9897	374 KINGSTON DR. EAS<	30	37	IR
03442505000020070	9906	HGWY. 80 TO ALMEDA T<	80	100	IR
114425030000D0010	10017	TICE ST. EAST OVER 7<	63	80	DO
12442500000070000	10246	OFF SLATER ROAD. <	63	80	DO
144425000000024070	10537	STALEY ROAD TO DIRT <	80	100	DO
144425000000023020	10564	6851 CARMILTA DRIVE-<	63	80	DO
034425050000020150	10633	154 ALMEDA AVENUE-FT<	135	155	IR
104425020000000430	10845	5826 CORPORATION CIR<	84	100	IR
304425010000040040	10963	CORNER OF METRO & HA<	?	11	MO
144425000000022080	11105	10771 BRAHMA ROAD-TI<	84	110	DO

ENTER A DISPLAY COMMAN

Alt Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF LINE

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
12442501000000180	14267	TICE STREET TO GLENN<	63	88	DO
044425150000A0080	14313	465 CAROLINA AVENUE-<	158	195	IR
12442502000000090	14347	5631 STALEY ROAD-<	84	116	DO
10442500000080000	14354	5250 TICE STREET-I-7<	63	110	DO
13442500000011000	14389	6090 GREENBRIAR FARM<	100	100	DO
10442500000080000	14790	5250 TICE STREET-<	?	100	TC
10442500000080000	14794	5250 TICE STREET-<	20	30	TC
14442500000022140	14811	6730 LOUELLA DRIVE-E<	110	130	DO
10442500000080000	14919	5250 TICE STREET-<	?	100	TC
03442500000080060	14051	5251 TICE STREET-COR<	81	90	PO
13442500000011050	15020	6321 GREENBRIAR FARM<	80	100	DO
02442501030370200	15300	4220 WOODBRIER DRIVE<	80	90	DO
02442501000370010	15325	4141 WOODBRIER DRIVE<	63	98	DO
02442501000210030	15367	4040 STALY ROAD-ORAN<	70	100	DO
12442502000000020	15439	11091 LAZY ACRES LAN<	?	80	DO
12442500000110000	15499	5971 STALEY ROAD TIC<	76	95	DO
1444250000001001C	15582	6400 LONGHORN TRAIL <	63	80	DO
16442501000000210	15645	123 UTANA STREET-<	63	80	DO
13442500000011020	15722	6091 GREENBRIAR ROAD<	150	200	DO

* END OF RESULT ***** 88 ROWS DISPLAYED ***** COST ESTIMATE IC 4 **

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | CFF-LINE

ENTER A DISPLAY COMMAND

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
16442505000000340	11136	3983 MANASCAS COURT <	84	120	IR
30442501000050000	11231	PRODUCERS FERTILIZER<	60	60	MO
28442501000010080	11467	2789 ORTIZ AVENUE S.<	85	125	IR
01442501000370020	11528	4225 WOODBRIAR DRIVE<	78	100	DO
14442500000011230	11568	6261 HOLSTEIN DRIVE <	60	80	DO
17442500000030000	11575	3640 MARION STREET PA<	150	180	IR
15442500000170000	11830	LUCKETT ROAD EAST TO<	13	13	MO
09442521000000760	12023	5096 BILLYS CREEK DR<	87	120	IR
11442500000080300	12115	5141 PREVATT LANE-OF<	60	92	DO
12442500000070000	12125	END OF TICE TO END O<	75	115	DO
14442500000022160	12184	TICE TO STALEY TO HA<	80	100	DO
30442501000070010	12319	METRO PKWY SOUTH FRO<	73	100	IR
01442504000000110	12424	4401 RIVER GROVE LAN<	53	92	DO
14442500000011230	12478	LUCKETT ROAD TO HOLST<	93	100	DO
04442503000125020	12682	321 N BALDOA AVENUE-<	63	91	DO
0344250600006A0230	12694	HWY 80 TO MORSE PLAZ<	63	110	DO
11442500000120030	13028	5998 STALEY ROAD- <	80	100	DO
09442504000160050	13147	653 HOWELL CIRCLE DR<	63	105	DO
1144250000005001A	13189	5542 TICE STREET-SEE<	60	77	DO
28442500000020010	13244	3451 ORTIZ AVENUE. <	78	95	IR

ENTER A DISPLAY COMMAND

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF LINE

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
01442500000040020	13365	4440 WILLIAMSON ROAD<	70	85	DO
14442500000011040	13691	10261 ANGUS LANE- <	85	125	DO
04442516000060170	13760	221 ORTIZ AVENUE-PAR<	63	100	IR
01442504000000050	13855	4380 RIVERGROVE LANE<	77	97	DO
23442500000030010	13887	7760 LIGHTARD KNOTT <	80	100	IR
10442503000000770	13897	5642 ENTERPRISE PKWY<	85	95	IR
12442500000100000	14004	12075 HOMESTEAD LANE<	84	98	DO
16442502000000230	14015	4965 MARS STREET-ORT<	80	107	IR
11442500000110000	14102	5680 STALEY ROAD- <	85	105	DO
12442501000000180	14267	TICE STREET TO GLENN<	63	88	DO
044425150000A0080	14313	465 CAROLINA AVENUE-<	158	195	IR
12442502000000090	14347	5631 STALEY ROAD- <	84	116	DO
10442500000080000	14354	5250 TICE STREET-I-7<	63	110	DO
13442500000011000	14389	6090 GREENBRIAR FARM<	100	108	DO
10442500000080000	14790	5250 TICE STREET- <	?	100	TC
10442500000080000	14794	5250 TICE STREET- <	20	30	TC
14442500000022140	14811	6730 LOUELLA DRIVE-E<	110	130	DO
10442500000080000	14919	5250 TICE STREET <	?	100	TC
03442500000080060	14051	5251 TICE STREET-COR<	81	90	PO
13442500000011050	15020	6321 GREENBRIAR FARM<	80	100	DO

ENTER A DISPLAY COMMAND

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF LINE

04/25/90

SELECT STRAP,PERMIT_NO,SITE_LOCATION1,CASING_IN_DPTH,TOTAL_DEPTH,WELL_USE FROM SQLDBA.WELLS WHERE ST

PAGE 1

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
28442602000120180	7895	4TH STREET AND JACK,<	75	87	DO
28442602000120200	7896	4TH AND JACK, LEHIGH<	70	82	DO
27442601000110140	7926	410 DOUGLAS AVENUE:<	150	200	DO
27442605000600180	7945	ON LEE BLVD. IN LEHI<	60	76	IR
28442608000750080	7954	225 FRED AVENUE-LEE <	63	70	DO
15442600000010020	7984	BUCKINGHAM RD. TO CE<	120	150	DO
04442600010042220	7993	S. ON BUCKINGHAM TO <	?	80	DO
04442600010042020	7998	BUCKINGHAM ROAD TO C<	?	80	DO
27442606000650010	7999	3819 FOURTH STREET, <	63	85	DO
04442600010042030	8003	LOT 36 B-1 SKATES CI<	?	83	DO
28442604000380070	8118	203 HENRY AVENUE-LEH<	60	74	DO
08442601000040060	8136	CEMETARY ROAD TO OIL<	80	85	DO
27442604000450100	8153	3901 4TH ST. WEST LE<	61	78	DO
25442604000270170	8183	2ND STREET WEST-LEHI<	63	75	DO
27442604000450110	8203	3900 3RD STREET WEST<	58	76	DO
27442604000460170	8225	3912 2ND STREET WEST<	50	70	DO
33442607000020010	8231	GUNNERY ROAD TO HARO<	63	69	DO
28442601000110190	8239	N.E. CORNER OF LEE B<	65	75	DO
33442607000160390	8262	82 TO LEE BLVD. RIGH<	62	84	DO
33442607000110180	8263	82 TO LEE BLVD. RIGH<	63	70	DO
33442607000150190	8264	82 TO LEE BLVD.-RIGH<	55	74	DO
35442602000140070	8288	FIFTH STREET OFF OF <	50	60	DO
15442601000190050	8299	NORTH ON BUCKINGHAM <	63	70	DO
28442604000370020	8352	4514 THIRD STREET WE<	63	80	DO
28442605000530020	8371	15 GUNNERY ROAD-NORT<	75	95	DO
34442603000190070	8372	9TH STREET S.W. DOUG<	21	22	DO
15442601000250020	8374	BUCKINGHAM RD. TO HO<	?	70	DO
28442605000470130	8373	4606 6TH STREET S.W.<	60	75	IR
33442607000100240	8379	LEE BLVD. TO GUNNERY<	63	70	DO
33442607000140220	8380	LEE BLVD. TO GUNNERY<	63	75	DO
33442607000090100	8381	LEE BLVD. TO GUNNERY<	63	68	DO
33442607000030060	8382	LEE BLVD. TO GUNNERY<	63	68	DO
31442603000180110	8385	CORNER OF VERNON AVE<	?	65	DO
28442601000100180	8418	EAST ON LEE BLVD., L<	?	85	DO
28442605000480070	8416	LEE BLVD. TO GORDON <	68	76	DO
31442602000160100	8407	5508 HAWALASKA-OFF H<	75	85	DO
36442602000020060	8030	3005 1ST STREET S.W.<	70	80	DO
05442603000000090	8430	CITRUS RIVER ESTATES<	80	100	DO
36442607000690110	8470	2700 7TH STREET S.W.<	60	70	DO
27442604000520060	8495	LEE BLVD. TO S.W. 2N<	70	75	DO
34442609000890090	8503	3711 1ST. STREET S.W<	40	40	DO
06442600000020010	8468	KINZIES NURSERY ON O<	120	150	IR
28442601000090060	8524	E ON 82, LEFT ON LEE<	63	85	DO
32442609000200110	8529	5302 BUNKER ROAD-LEH<	68	93	DO
35442609000800100	8512	2ND STREET S.W.-LEHI<	?	77	DO
15442601000250130	8575	82 EAST TO BUCKINGHA<	56	60	DO
28442607000700110	8582	4305 FIFTH STREET WE<	63	70	DO
27442604000440030	8594	3915 LEE BLVD.-AFTER<	60	76	DO
27442604000440020	8595	3917 LEE BLVD.-AFTER<	60	76	DO
29442604000290080	8626	5202 FOURTH STREET W<	84	100	DO
28442601000100020	8627	4717 SIXTH STREET WE<	63	70	DO
28442608000740010	8628	4317 THIRD STREET WE<	51	68	DO
33442607000020010	8634	1014 ROBERTS AVENUE-<	63	70	DO
33442601000070050	8673	4311 1ST. S.W. (S) O<	63	66	DO
33442601000070060	8671	4309 1ST ST S.W. (S)<	63	73	DO
28442608000710140	8685	4300 FOURTH STREET W<	63	70	DO
27442604000460090	8686	LEE BLVD. TO BRUCE T<	68	72	DO

VARIOUS SECTIONS, TWP 44S, RGE 26E

04/25/90

SELECT STRAP,PERMIT_NO,SITE_LOCATION1,CASING_IN_DPTH,TOTAL_DEPTH,WELL_USE FROM SQLDBA.WELLS WHERE ST

PAGE 2

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
28442606000570100	8689	NORTH ON LEE BLVD. T<	?	65	DO
33442602000120060	8751	4307 SW 4TH STREET-L<	60	70	DO
27442610001130090	8746	10TH STREET WEST. <	61	70	DO
27442611001330050	8747	16TH STREET WEST. <	60	78	DO
34442611001020150	8758	3808 9TH STREET S.W.<	66	78	DO
28442604000320010	8767	LEE BLVD. LEHIGH ACR<	63	68	DO
08442600000180010	8779	82 TO BUCKINGHAM T/L<	40	40	IR
18442607000140000	8837	BUCKINGHAM ROAD TO W<	80	96	DO
15442601000250220	8849	BUCKINGHAM AIR PARK.<	60	74	DO
08442600000120010	8850	BUCKINGHAM ROAD. <	74	80	DO
15442601000250230	8851	BUCKINGHAM AIR PARK.<	61	74	DO
25442605000620150	8879	LEE BLVD. TO IDA T/R<	63	70	DO
34442607000680170	8888	SOUTH ON GUNNERY LEF<	63	69	DO
27442609000980060	8895	3904 WEST 16TH STREE<	75	80	DO
27442609001090090	8897	3800 WEST 13TH STREE<	60	75	DO
27442609001030090	8917	3900 WEST 15TH STREE<	62	78	DO
27442609001090110	8919	3804 WEST 13TH STREE<	63	85	DO
28442609000810060	8920	4303 WEST 15 STREET-<	61	85	DO
28442609000810010	8921	4313 WEST 15TH STREE<	62	80	DO
26442615000250190	8922	917 REED AVENUE-LEHI<	61	75	DO
25442605000600060	8970	2809 4TH STREET WEST<	63	70	DO
304426050000C0000	8971	5810 LEE BLVD.-LEHIG<	84	115	DO
10442600000012198	8981	BUCKINGHAM ROAD TO L<	60	78	DO
27442609001000150	9007	4012 WEST 14TH STREE<	70	85	DO
27442609001000150	9006	4010 WEST 14TH STREE<	70	85	DO
0544260300000001A	8400	PALM BEACH-ORANGE RI<	84	86	DO
28442608000720050	9034	4317 FOURTH STREET W<	63	70	DO
04442600010041230	8984	SKATES CIRCLE-BUCKIN<	63	73	DO
28442607000700160	9040	LEE BLVD. EAST JUST <	60	70	DO
27442601000070070	9061	EAST ON LEE BLVD-1 B<	63	70	DO
28442605000480190	9103	LEE BLVD. TO HARRY N<	63	70	DO
25442606000530090	9122	6TH STREET WEST-2805<	63	70	IR
31442603000110150	9129	4428 GEORGE AVENUE-L<	63	90	DO
29442602000170170	9151	82 TO LEE BLVD. TO L<	63	90	DO
27442611001330060	8748	3705 16TH STREET WES<	85	105	DO
08442600000110000	9159	5320 BUCKINGHAM ROAD<	65	85	DO
28442608000710170	9165	LEE BLVD. TO GUNNERY<	53	68	DO
27442601000020040	9166	LEE BLVD. TO DOUGLAS<	63	80	DO
04442600010042290	9170	DOWN CEMETARY RD. IN<	63	88	DO
28442601000060050	9179	EAST ON LEE BLVD.-RI<	63	75	DO
28442601000090160	9180	EAST ON LEE BLVD.-LE<	63	80	DO
27442609001090100	8898	3802 WEST 13TH STREE<	55	85	DO
0644260000031003A	9200	ORANGE RIVER BLVD. T<	63	80	DO
27442609001030100	8918	3902 WEST 1ST STREET<	61	75	DO
27442609000980070	8896	3902 WEST 16TH STREE<	62	78	DO
32442609000010270	9223	5302 LOCKE LANE-LEHI<	63	90	DO
32442609000010600	9225	2006 FAIRWAY DRIVE-I<	60	80	DO
26442615000260210	9241	901 SUSAN AVENUE-LEH<	60	85	DO
26442612000070090	9243	1204 SUNNYLAND BLVD.<	70	85	DO
27442611001320200	9257	3736 12TH STREET WES<	70	85	DO
27442611001340120	9258	3706 14TH STREET WES<	70	85	DO
27442602000120030	9271	4217 LEE BLVD.-LEHIG<	?	18	IR
29442602000170190	9272	SR 82 TO LEE BLVD.-T<	63	86	DO
31442602000050180	9319	I-75 TO EXIT 32 GO E<	60	80	DO
27442606000710010	9324	106 ALAN AVENUE-LEHI<	70	75	DO
19442604000220080	9330	1714 ALBERT AVENUE-L<	70	85	DO
27442609001070070	9332	3803 WEST 16TH STREE<	70	85	DO

04/25/90 SELECT STRAP,PERMIT_NO,SITE_LOCATION1,CASING_IN_DPTH,TOTAL_DEPTH,WELL_USE FROM SQLDBA.WELLS WHERE ST

PAGE 3

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
33442601000020070	9340	LEE ROAD-R/T ON GUNN<	62	68	DO
31442603000040070	9353	5448 27TH ST. S.W.-L<	88	92	DO
31442603000070100	9354	2505 & 2507 NORA AVE<	85	92	DO
29442605000450110	9363	LEE BLVD. TO LEE STR<	75	80	DO
28442601000090050	9364	EAST ON 82-LEFT ON L<	63	70	DO
28442601000090170	9365	EAST ON 82-LEFT ON L<	63	75	DO
15442601000190030	9373	82 TO BUCKINGHAM RD.<	56	58	DO
36442605000320060	9389	3009 14TH STREET S.W.<	85	85	DO
27442604000450030	9430	3915 4TH STREET S.W.<	70	80	DO
03442610000480180	9432	LACOTA AVENUE-LEHIGH<	50	80	DO
04442600010041100	7935	4196 SKATES CIRCLE-O<	76	85	DO
33442607000100030	9443	308 AND 310 GILBERT <	63	80	DO
29442604000380040	9440	5025 4TH STREET WEST<	63	70	DO
28442603000310060	9441	4609 5TH STREET WEST<	63	75	DO
28442607000680110	9442	4307 7TH STREET-LEHI<	63	80	DO
29442602000110120	9447	LEE BLVD. TO LEE STR<	63	90	DO
31442603000100150	9461	STATE RD. 82-T/L ON <	90	98	DO
31442603000100140	9462	ST. RD. 82 AND MAKE <	92	100	DO
31442603000110080	9463	SR 82-T/L ON OWEN AV<	92	100	DO
274426090001020030	9471	4013 13TH STREET WES<	70	85	DO
35442602000130110	9472	3601 4TH STREET S.W.<	60	65	DO
36442607000660070	9473	2707 4TH STREET S.W.<	63	73	DO
36442603000200060	9474	2905 6TH STREET S.W.<	75	85	DO
36442606000520020	9475	2717 2ND STREET S.W.<	85	100	DO
25442605000600060	9481	2809 4TH STREET WEST<	63	73	IR
28442610000950070	9513	FLOYD AVENUE-LEHIGH <	75	85	DO
15442601000270120	9521	6730 CIRCLE DRIVE-BU<	60	80	DO
25442606000520140	9526	2804 6TH STREET WEST<	65	75	IR
25442606000530030	9527	2817 6TH STREET WEST<	63	66	IR
07442604000430000	9543	NEAL ROAD TO 6191 PA<	95	115	DO
28442604000330030	9550	4613 4TH STREET WEST<	63	75	DO
26442603000130110	9564	3218 11TH STREET WES<	65	85	DO
34442602000090070	9567	4224 4TH STREET S.W.<	70	85	DO
05442600000360020	9582	ORANGE RIVER BLVD.-I<	70	75	DO
15442601000020180	9595	INDUSTRY ROAD-BUCKIN<	80	120	DO
26442615000230060	9600	910 SUSAN AVENUE-LEH<	56	68	DO
36442606000490170	9623	2812 2ND STREET S.W.<	70	85	DO
36442606000490120	9624	2802 2ND STREET S.W.<	65	70	DO
35442608000700050	9625	3411 14TH STREET S.W.<	63	70	DO
35442608000700040	9626	3413 14TH STREET S.W.<	61	72	DO
04442600010040010	9628	4938 SKATES CIRCLE. <	75	85	DO
27442604000440110	9631	400 BRUCE AVENUE-LEH<	60	78	DO
33442603000150040	9645	LEE BLVD. TO GUNNERY<	55	60	DO
28442608000740030	9646	LEE BLVD. TO GUNNERY<	56	60	DO
15442601000230030	9665	6731 CHEROKEE AVENUE<	48	72	DO
19442604000210210	9666	1701 ABRAMS BLVD.-LE<	63	76	DO
19442603000170150	9667	TURN RIGHT OF BUCKIN<	68	76	DO
25442603000180110	9673	3000 6TH STREET S.W.<	42	56	IR
25442606000520180	9674	2820 6TH STREET WEST<	63	65	IR
25442606000520180	9675	2818 6TH STREET WEST<	63	67	IR
25442606000520180	9676	2812 6TH STREET WEST<	63	68	IR
27442604000450030	9682	3915 4TH STREET WEST<	60	80	DO
34442608000730120	9686	LEE BLVD. TO GUNNERY<	63	72	DO
34442609000900150	9708	I-75 N TO 82 EAST TO<	60	80	DO
18442606000300010	9709	EAST ON COLONIAL BLV<	70	85	DO
27442609000990080	9715	4006 16TH ST.S.W.-LE<	70	75	DO
28442602000210060	9717	221 HOMER AVENUE-LEE<	68	80	DO

04/25/90 SELECT STRAP,PERMIT_NO,SITE_LOCATION1,CASING_IN_DPTH,TOTAL_DEPTH,WELL_USE FROM SQLDBA.WELLS WHERE ST

PAGE 4

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
33442601000060150	9745	4310 1ST. S.W.-LEHIG<	63	70	DO
33442601000060030	9746	4315 DOUGLAS LANE-LE<	63	70	DO
34442608000840050	9789	1406 BRUCE AVENUE-LE<	62	73	DO
31442603000090110	9783	2705 LANTANA STREET-<	95	110	DO
26442607000330190	9798	3416 3RD STREET WEST<	60	70	DO
36442607000630080	9805	2805 6TH STREET S.W.<	73	80	DO
28442609000780060	9806	4320 15TH STREET WES<	85	85	DO
27442611001330130	9807	3708 15TH STREET WES<	70	85	DO
27442611001330130	9808	3710 15TH STREET WES<	65	85	DO
28442609000780060	9809	4319 16TH STREET WES<	65	75	DO
29442607000580040	9812	LEE BLVD. TO LEE STR<	63	86	DO
27442605000590160	9825	LEE BLVD. TO XELDA A<	55	60	DO
21442605000140190	9852	5014 BEECHER STREET-<	60	80	DO
26442607000300090	9858	82, LEFT ON LEE BLVD<	63	79	DO
34442607000690100	9873	3803 7TH STREET S.W.<	63	75	DO
36442608000820190	9872	2716 12TH STREET S.W<	63	85	DO
35442607000580120	9871	3504 11TH STREET S.W<	70	85	DO
35442611001010150	9879	75 N TO 82 EAST TO L<	60	80	DO
29442605000450110	9911	4920 5TH STREET WEST<	63	70	DO
18442607000010000	9916	9430 BUCKINGHAM ROAD<	80	100	DO
33442607000100190	9926	LEE BLVD TO GUNNERY <	55	65	DO
25442605000620040	9977	LEE BLVD. TO 2ND STR<	65	75	DO
28442606000610070	9975	203 GILBERT AVENUE-L<	69	69	DO
26442607000340010	9974	CORNER OF THIRD & SA<	42	75	DO
34442603000170020	9968	4205 7TH STREET S.W.<	72	80	DO
36442609000880180	9963	2714 14TH STREET S.W<	70	85	DO
35442606000540060	9956	3309 SIXTH STREET S.<	60	80	DO
36442602000100090	9950	RT. OFF LEE BLVD. TO<	63	71	DO
27442609001040090	9938	3900 14TH STREET S.W<	65	72	DO
27442606000650170	9929	3812 3RD STREET WEST<	62	75	DO
18442600000011110	9989	82 TO BUCKINGHAM-T/L<	83	85	DO
31442602000050180	9991	82 TO LEE BLVD.-T/L <	63	88	DO
28442608000760050	9997	204 FRED AVENUE-LEE <	63	69	DO
34442603000170020	10002	4205 7TH STREET S.W.<	60	80	DO
34442606000590160	10003	3910 7TH STREET S.W.<	65	85	DO
26442611000680160	10005	75 NORTH TO 82 EAST <	?	47	DO
28442608000710200	10007	EAST ON LEE BLVD.-RI<	63	70	DO
27442611001350070	10039	3701 14TH STREET WES<	70	90	DO
27442611001350070	10040	3703 14TH STREET WES<	72	98	DO
34442611001070160	10041	3712 10TH ST. S.W.-L<	63	75	DO
34442611001070170	10042	3714 10TH STREET S.W<	63	75	DO
04442600010040000	10053	21 B SKATES CIRCLE-B<	75	85	DO
32442609000010600	10054	SR 82 TO LEE BLVD.-T<	63	92	DO
25442606000530080	10063	2807 6TH STREET WEST<	63	67	IR
34442604000350020	10089	DOUGLAS AVENUE-LEHIG<	63	80	DO
10442600000040000	10092	CEMETARY RD. TURN RI<	63	75	DO
21442605000140190	10096	5014 BEECHER ST.-LEH<	63	71	DO
35442611001010150	10098	3110 11TH STREET S.W<	49	60	DO
094426020000A0050	10105	MELALUCA DRIVE OFF C<	75	90	DO
34442609000900150	10113	LEE BLVD. TO GUNNERY<	62	67	DO
04442600010041250	10128	4841 SKATES CIRCLE S<	60	80	DO
0744260100A030040	10138	12070 HOMESTEAD ROAD<	92	112	DO
25442606000530060	10148	2811 6TH STREET WEST<	42	56	IR
33442603000150030	10150	GUNNERY ROAD TO 8TH <	65	85	DO
26442607000330190	10154	3416 3RD STREET WEST<	63	80	DO
29442601000100140	10155	5414 LEE STREET-LEE <	63	95	DO
29442604000370090	10156	5024 FOURTH STREET W<	63	80	DO

04/25/90 SELECT STRAP,PERMIT_NO,SITE_LOCATION1,CASING_IN_DPTH,TOTAL_DEPTH,WELL_USE FROM SQLDBA.WELLS WHERE ST

PAGE 5

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
18442607000090000	10160	SR 82 EAST TO BUCKIN<	84	90	DO
26442607000330080	10168	3403 4TH STREET WEST<	80	100	DO
28442601000100010	10228	JAMES AVENUE-LEE BLV<	80	100	DO
25442603000180170	10230	3012 6TH STREET WEST<	55	60	IR
33442607000070270	10250	SOUTH ON GUNNERY RD.<	63	72	TS
36442613001180180	10258	2614 13TH STREET S.W<	75	105	DO
25442606000520200	10279	2816 6TH STREET WEST<	52	62	IR
25442603000190030	10275	3015 6TH STREET WEST<	58	65	IR
25442603000180150	10273	3008 6TH STREET WEST<	56	65	IR
06442600000150020	10293	12751 ORANGE RIVER B<	57	77	DO
36442609000880020	10306	LEE BLVD. TO SUNSHIN<	63	65	DO
15442601000230030	10308	6731 CHEROKEE AVENUE<	61	71	DO
15442601000230030	10309	6731 CHEROKEE AVENUE<	?	60	PL
33442607000180170	10310	LEE BLVD. TO GUNNERY<	63	78	DO
33442607000150160	10311	LEE BLVD. TO GUNNERY<	63	78	DO
27442604000450050	10332	LEE BLVD. TO GUNNERY<	60	68	DO
28442607000690200	10339	4310 5TH STREET WEST<	63	72	DO
25442601000080130	10340	2904 12TH STREET WES<	55	60	DO
28442607000690230	10346	4316 5TH STREET WEST<	63	72	DO
03442613000720120	10347	6107 LATIMER AVENUE-<	63	80	DO
35442602000200010	10352	3519 7TH STREET S.W.<	60	85	DO
36442603000200010	10353	2927 6TH STREET S.W.<	55	70	DO
36442607000660180	10354	2722 5TH STREET S.W.<	50	70	DO
36442603000140110	10355	3004 6TH STREET S.W.<	50	70	DO
34442612001140050	10356	3709 13TH STREET S.W<	65	75	DO
34442608000740020	10357	4017 12TH STREET S.W<	60	70	DO
34442610000950040	10358	3719 5TH STREET S.W.<	65	85	DO
34442612001170010	10359	1401 YVONNE AVENUE-G<	65	75	DO
34442612001160090	10360	1402 YVONNE AVENUE-G<	65	80	DO
25442609000710170	10491	RICHMOND TO 10TH-T/L<	54	60	DO
28442606000620070	10503	203 GERALD AVENUE WE<	50	70	DO
35442606000540060	10509	3309 6TH STREET WEST<	63	70	DO
28442606000570170	10532	4512 3RD STREET WEST<	65	70	DO
21442603000200210	10538	BUCKINGHAM ROAD TO S<	80	100	DO
27442603000400090	10583	3800 LEE BLVD.-LEHIG<	65	75	DO
31442603000040040	10584	82-GOING EASTBOUND-T<	90	110	DO
27442602000170020	10594	COLONIAL TO I-75-NOR<	60	80	DO
28442601000060090	10629	SR 82 TO LEE BLVD. T<	49	76	DO
27442602000210010	10631	104 DONALD AVENUE-SR<	42	70	DO
28442607000680220	10637	NORTH ON GUNNERY-FRO<	62	72	DO
03442611000530060	10660	DOWN CEMETARY ROAD T<	63	75	DO
21442601000380040	10665	OFF GUNNERY ROAD-COR<	65	80	DO
27442603000290050	10667	702 BERT AVENUE S.E.<	63	70	DO
28442601000110050	10677	4711 5TH STREET-EAST<	63	76	DO
06442600000319018	10698	APPROX. 2 MILES EAST<	84	86	DO
34442606000530150	10699	82 TO LEE BLVD.-T/L <	?	69	DO
08442603000180000	10714	SOUTH ON BUCKINGHAM <	80	100	IR
26442613000120100	10787	82 TO LEE BLVD.-T/L <	55	63	DO
26442607000290060	10799	3509 LEE BLVD.-LEHIG<	83	95	DO
16442602000360150	10833	6290 BUCKINGHAM ROAD<	60	75	DO
27442609001090050	10838	GUNNERY ROAD TO 3807<	68	80	DO
25442601000070090	10857	2903 14TH STREET WES<	53	60	DO
31442602000070130	10912	LEE BLVD. T LEONARD <	82	90	DO
25442607000470020	10930	2717 12TH STREET WES<	60	80	DO
28442606000570150	10951	4508 3RD ST. WEST-LE<	70	80	DO
33442607000180140	10984	1141-43 HARRY AVENUE<	63	70	DO
33442607000140230	10985	705-707 GORDON AVENU<	63	77	DO

04/25/90 SELECT STRAP,PERMIT_NO,SITE_LOCATION1,CASING_IN_DPTH,TOTAL_DEPTH,WELL_USE FROM SQLDBA.WELLS WHERE ST

PAGE 6

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
27442612001460040	10993	807 XELDA-LEHIGH ACR<	70	80	DO
28442602000130040	10997	4413 4TH STREET WEST<	65	79	DO
27442602000170020	11072	LEE BLVD. TO DOUGLAS<	63	78	DO
26442607000260140	11110	LEE BLVD.-T/R ON TER<	84	95	DO
36442611001030090	11112	260 6TH STREET S.W.-<	60	65	DO
25442603000230080	11113	LEE BLVD. TO IDA-T/L<	42	58	DO
27442605000600050	11141	LEE BLVD. TO XELDA A<	50	70	DO
34442602000140180	11148	LEE BLVD. TO GUNNERY<	63	69	DO
15442601000250100	11162	CIRCLE ROAD-BUCKINGH<	55	80	DO
28442603000230040	11169	705 HOMER ROAD-LEHIG<	58	70	DO
04442600010042320	11196	4281 SKATE CIRCLE-RI<	63	78	DO
28442603000310070	11227	4607 FIFTH STREET WE<	63	75	DO
10442600000090000	11232	15600 WINDY LANE-OFF<	70	82	DO
07442602000160000	11248	SR 80 TO ORANGE RIVE<	70	105	DO
25442607000470020	11275	2717 12TH STREET WES<	58	63	DO
27442602000120050	11276	4213 LEE BLVD.-LEHIG<	70	80	DO
18442600000011280	11288	EAST ON BUCKINGHAM R<	70	90	DO
29442608000660130	11292	LEE BLVD. PAST GUNNE<	70	82	DO
31442603000040040	11293	CORNER OF 26TH STREE<	82	92	DO
03442607000320160	11327	649 LARELWOOD-LEHIGH<	70	80	DO
28442601000080040	11346	4803 5TH STREET WEST<	63	80	DO
27442602000170020	11359	LEE BLVD. TO DOUGLAS<	70	80	DO
27442607000810020	11363	4211 13TH STREET WES<	60	80	DO
33442607000060110	11389	LEE BLVD. TO GUNNERY<	63	74	DO
33442607000160140	11390	LEE BLVD. TO GUNNERY<	63	80	DO
25442603000190080	11409	LEE BLVD. TO JOAN-T/<	50	58	IR
04442600010040010	11490	SOUTH ON BUCKINGHAM-<	63	70	DO
03442606000270170	11514	3750 KITTYHAWK DRIVE<	50	68	DO
26442608000500090	11523	3104 12TH STREET WES<	60	69	DO
34442608000730180	11544	4014 12TH STREET S.W<	60	70	DO
10442600000010011	11545	SOUTH ON BUCKINGHAM-<	63	85	DO
34442612001160080	11550	1404 YVONNE AVENUE-O<	65	75	DO
34442606000560060	11561	GUNNERY ROAD TO EIGH<	61	74	DO
25442605000610140	11570	2806 2ND STREET WEST<	63	70	DO
27442610001130010	11583	4017 10TH STREET WES<	62	75	DO
31442603000070040	11607	2501-2503 NORA AVENU<	74	100	DO
15442601000230080	11654	NORTH DRIVE-BUCKINGH<	63	80	DO
34442603000180130	11663	4204 9TH STREET WEST<	60	75	DO
28442606000570100	11670	LEE BLVD. TO GUNNERY<	63	70	DO
03442609000440240	11680	3854 INSDALE STREET-<	63	70	DO
03442609000440010	11681	3855 HUNTLEY STREET-<	63	70	DO
06442600000319020	11684	4875 CEDAR HAMMOCK C<	63	88	DO
29442603000230160	11699	LEE BLVD. TO LEE ST.<	63	70	DO
32442608000120170	11704	229 HENRY AVENUE-LEH<	60	80	DO
36442607000680130	11712	LEE BLVD.-RIGHT ON S<	45	60	DO
27442605000600090	11716	5TH & XELDA-LEHIGH A<	65	75	DO
35442609000810090	11717	3100 3RD STREET S.W.<	70	80	DO
09442602000080010	11808	CEMETARY ROAD-BUCKIN<	30	40	DO
05442600000020010	11837	TURN SOUTH ON BUCKIN<	63	70	DO
25442601000080020	11857	2917 13TH ST., SW <	80	80	DO
05442603000000120	11856	13100 HICKORY GROVE <	72	87	DO
04442600010042170	11852	EAST FORT MYERS-4770<	63	75	DO
28442601000040030	11871	JACK AVENUE OFF LEE <	63	70	DO
06442600000310030	11888	4961 NEAL ROAD. <	100	120	DO
28442605000500070	11933	4402 6TH STREET WEST<	63	70	DO
05442603000000040	11958	4720 LONG LAKE DRIVE<	63	80	DO
34442605000430050	11961	50 BRIAN AVENUE-LEHI<	70	80	DO

04/25/90 SELECT STRAP,PERMIT_NO,SITE_LOCATION1,CASING_IN_DPTH,TOTAL_DEPTH,WELL_USE FROM SQLDBA.WELLS WHERE ST

PAGE 7

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
34442603000240160	12001	4110 11TH STREET S.W<	65	85	DO
28442609000770100	12002	4316 16TH STREET S.W<	50	65	DO
28442602000170060	12004	201 JAMES AVENUE-LEH<	?	80	DO
35442606000500010	12005	3418 6TH STREET S.W.<	60	66	DO
28442607000650010	12006	701 FLOYD AVENUE-LEH<	57	75	DO
04442601000120000	12022	4540 GOEBLE DRIVE-RA<	63	80	DO
05442603000000080	12042	ORANGE RIVER TO LONG<	72	90	DO
28442609000860030	12044	3911 13TH STREET WES<	80	125	DO
27442610001160130	12045	3908 9TH STREET WEST<	62	75	DO
27442610001160090	12046	3900 9TH STREET WEST<	62	75	DO
28442609000860040	12047	4307 13TH STREET WES<	58	80	DO
30442601000030090	12049	RT 82 TO ENTRANCE TO<	30	110	FI
03442610000510060	12070	CEMETARY ROAD-T/L ON<	63	80	DO
32442608000120170	12072	GUNNERY-T/R ON DOUGL<	55	71	DO
16442602000360020	12082	6071 BUCKINGHAM ROAD<	96	200	DO
34442607000690110	12091	3801 7TH ST S.W.-LEE<	63	75	DO
26442607000310200	12108	LEE BLVD.-T/R ON TER<	63	84	DO
26442607000280120	12109	LEE BLVD. TO TERRY-T<	63	80	DO
26442607000260160	12110	LEE BLVD. TO TERRY-T<	84	92	DO
28442601000030050	12123	703 JACK AVENUE-EAST<	63	72	DO
054426030000000120	12130	ORANGE RIVER BLVD.-T<	70	90	DO
31442602000290240	12131	2484 OWENS AVENUE-OF<	60	80	DO
25442606000510180	12157	2812 WEST 7TH STREET<	52	55	DO
15442601000230180	12162	6841 TECH COURT-BUCK<	60	90	DO
28442601000100010	12156	JAMES AVENUE-LEE BLV<	65	75	DO
33442601000060090	12169	4303 DOUGLAS LANE-LE<	57	74	DO
35442609000770070	12198	3121 1ST STREET S.W.<	65	70	DO
36442609000870060	12199	2709 12TH ST. S.W.-L<	58	80	DO
35442605000420120	12200	3402 4TH STREET-S.W.<	60	80	DO
35442612001090030	12201	3121 14TH STREET-LEH<	60	90	DO
36442610000950030	12202	2500 1ST. STREET S.W<	60	105	DO
35442602000160110	12203	3600 8TH ST. S.W.-LE<	60	80	DO
35442606000540070	12204	3507 5TH ST. S.W.-LE<	60	80	DO
36442608000780160	12205	2850 12TH STREET-S.W<	55	85	DO
35442608000700120	12206	3302 15TH STREET S.W<	63	75	DO
35442601000070020	12207	3619 1ST STREET S.W.<	65	75	DO
34442605000480050	12208	3911 1ST STREET S.W.<	65	80	DO
36442604000240180	12209	3014 11TH ST-S.W.-LE<	60	70	DO
27442604000460070	12227	3907 3RD ST W-LEHIGH<	68	80	DO
28442608000740090	12234	205 FELIX AVENUE-LEE<	66	70	DO
03442608000390090	12253	6117 HIGGINS AVENUE-<	63	80	DO
28442607000690100	12259	4309 6TH STREET WEST<	63	70	DO
27442611001320090	12287	LEE BLVD. TO SUNNILA<	58	74	DO
05442605000000060	12306	4291 FULTON CIRCLE-O<	83	95	DO
27442602000130040	12327	4213 4TH STREET WEST<	63	66	DO
29442607000570010	12320	5019 4TH STREET WEST<	60	80	DO
26442608000500020	12358	3109 13TH STREET WES<	42	60	DO
26442608000500030	12357	3107 13TH STREET WES<	42	60	DO
26442608000500040	12356	3105 13TH STREET WES<	42	60	DO
26442615000230190	12363	917 SALLY AVENUE-LEE<	47	70	DO
36442606000380030	12373	218 SW 1ST STREET-LE<	62	70	DO
15442601000230100	12383	BUCKINGHAM AIR PARK-<	58	70	DO
35442607000560090	12394	OFF SUNSHINE BLVD-35<	60	70	DO
3044260100007000A	12400	SETH AVENUE & LEE ST<	84	100	IR
25442612000930090	12404	2614 5TH STREET-LEHI<	55	60	DO
28442601000030040	12403	705 JACK AVENUE-LEE <	70	75	DO
34442607000710040	12421	3913 9TH ST SW-LEHIG<	70	80	DO

04/25/90 SELECT STRAP,PERMIT_NO,SITE_LOCATION1,CASING_IN_DPTH,TOTAL_DEPTH,WELL_USE FROM SQLOBA.WELLS WHERE ST

PAGE 8

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
16442601000250170	12432	CHEROKEE AVENUE-BUCK<	65	85	DO
27442611001340010	12440	3715 15TH ST WEST- L<	63	75	DO
27442609001020040	12439	4011 13TH STREET WES<	51	70	DO
27442609001000130	12438	4008 14TH STREET-LEE<	63	69	DO
27442609001000130	12437	4006 14TH STREET WES<	63	70	DO
27442610001150110	12436	3906 10TH STREET WES<	42	50	DO
06442600000310030	12434	4961 NEAL ROAD-82 TO<	63	78	DO
36442608000780060	12464	2809 11TH STREET S.W.<	65	80	DO
34442607000710170	12465	3912 10TH STREET S.W.<	70	80	DO
34442607000710170	12466	3914 10TH STREET S.W.<	78	80	DO
35442611000910080	12467	3304 8TH STREET S.W.<	60	70	DO
34442612001120050	12501	3709 11TH ST. WEST-O<	70	90	DO
34442607000700120	12507	3902 9TH ST SW-LEHIG<	63	75	DO
29442605000420020	12509	603 LEO STREET-LEHIG<	70	90	DO
36442608000820090	12510	2703 11TH STREET WES<	60	80	DO
35442603000230020	12511	3613 10TH STREET S.W.<	70	90	DO
29442607000560030	12534	4903 LEE STREET-LEHI<	60	80	DO
28442601000020040	12581	705 JAMES AVENUE-LEH<	63	75	DO
07442600000030010	12587	12611 COWTRAIL LANE-<	84	85	DO
28442609000860050	12592	4305 13TH STREET WES<	63	70	DO
25442603000240010	12602	2919 5TH STREET WEST<	63	70	IR
35442608000640120	12609	3402 13TH STREET S.W.<	60	80	DO
15442601000230060	12615	6761 CHEROKEE AVENUE<	60	90	DO
04442600010041320	12674	4098 SKATES CIRCLE-O<	60	80	DO
25442608000360010	12676	1202 IDA AVENUE-SEE <	63	90	DO
16442601000250240	12681	6980 CHEROKEE AVENUE<	55	62	DO
34442602000160020	12690	4117 6TH STREET S.W.<	70	80	DO
34442612001160030	12691	1405 ALAN AVENUE-LEH<	68	75	DO
34442608000760040	12693	3913 11TH ST S.W.-OF<	70	80	DO
34442607000640110	12703	4012 8TH STREET S.W.<	63	72	DO
25442601000080170	12720	2912 12TH STREET WES<	63	65	DO
03442611000590120	12719	3707 TEAKWOOD STREET<	45	65	DO
33442602000140030	12817	4313 6TH STREET S.W.<	63	72	DO
28442608000720110	12802	4305 4TH STREET WEST<	80	100	DO
33442607000180180	12800	1125 HARRY AVENUE-LE<	63	80	DO
33442607000120180	12799	725 HARRY AVENUE-LEE<	63	70	DO
35442606000530170	12794	3312 6TH STREET S.W.<	60	80	DO
31442602000080190	12828	5125 26TH ST S.W.-LE<	84	102	DO
35442606000540090	12854	3303 6TH ST S.W.-LEH<	72	80	DO
34442603000240180	12856	4114 11TH ST S.W.-LE<	63	70	DO
34442608000740120	12857	4002 13TH ST S.W.-LE<	70	77	DO
27442602000180010	12860	4219 2ND STREET WEST<	70	80	DO
04442600010042360	12865	S ON BUCKINGHAM-E ON<	55	75	DO
34442610000990050	12896	3702 6TH STREET S.W.<	63	70	DO
25442605000620150	12944	2810 1ST WEST-LEHIGH<	63	68	DO
33442601000080030	12950	4315 2ND ST EAST-OFF<	56	76	DO
35442601000050010	12952	51 TENA AVENUE-SEE A<	63	72	DO
36442605000320130	13006	3004 15TH STREET S.W.<	65	75	DO
36442612001160170	13007	2510 11 STREET S.W.-<	50	60	DO
34442608000740080	13009	4005 12TH STREET S.W.<	63	75	DO
34442608000760140	13010	3906 12TH STREET S.W.<	63	75	DO
34442608000760150	13011	3908 12TH STREET S.W.<	62	75	DO
36442613001190060	13012	2609 13TH ST S.W.-LE<	60	75	DO
34442612001130090	13013	3701 12TH STREET S.W.<	60	75	DO
03442606000270100	13014	3755 KEMPER STREET-L<	65	75	DO
36442609000870140	13015	2706 13TH STREET S.W.<	60	70	DO
36442609000880080	13016	2705 13TH STREET S.W.<	60	75	DO

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
33442608000070040	13022	4721 DOUGLAS AVENUE-<	65	75	DO
36442605000300120	13029	3002 13TH STREET S.W<	42	55	DO
31442603000280070	13030	5009 28TH STREET S.W<	73	100	DO
27442605000590070	13046	3721 6TH ST WEST-LEH<	63	72	DO
34442606000590070	13057	3907 6TH STREET S.W.<	60	80	DO
36442605000300120	13073	3002 13TH ST S.W.-LE<	?	0	PL
30442601000030090	13081	LEONARD STREET OFF L<	30	100	FI
30442601000030090	13082	LEONARD STREET OFF L<	30	100	FI
30442601000030090	13083	LEONARD STREET-OFF L<	87	140	FI
04442600010041270	13087	SKATES CIRCLE. <	80	84	DO
29442603000230140	13099	5218 6TH STREET WEST<	63	88	DO
25442601000080020	13112	2917 13TH STREET WES<	59	65	DO
09442603000170000	13115	14281 RIVER ROAD-BUC<	80	100	DO
35442602000180060	13116	3509 5TH ST S.W.-OFF<	60	75	DO
34442605000470180	13120	4014 3RD STREET S.W.<	60	75	DO
34442606000610180	13121	3812 5TH STREET S.W.-	60	75	DO
34442602000150080	13122	4105 5TH ST S.W.-OFF<	60	75	DO
35442610000830030	13123	3215 4TH ST S.W.-LEH<	60	80	DO
34442607000700020	13124	3917 8TH ST S.W.-OFF<	60	75	DO
35442602000150080	13125	3605 6TH ST S.W.-OFF<	60	75	DO
36442612001120190	13126	2616 11TH ST S.W.-OF<	60	80	DO
34442611001060110	13127	3702 9TH STREET S.W.<	60	75	DO
05442603000000250	13170	4421 LONG LAKE DRIVE<	63	85	DO
03442603000130220	13171	6137 HESTER AVENUE. <	63	70	DO
36442611001030080	13183	2603 6TH ST S.W.-LEH<	55	58	DO
07442604000030010	13191	12141 CLOVER ROAD- <	76	88	DO
09442600000060080	13206	14850 EAST HAL COURT<	80	95	DO
28442603000300170	13221	4612 5TH ST WEST-LEH<	63	70	DO
04442601000120000	13252	4540 GOEBLE DRIVE-ST<	92	112	DO
32442603000130080	13260	2429-2431 GEORGE AVE<	65	95	DO
25442605000610020	13270	2817 3RD STREET WEST<	63	75	DO
35442610000890130	13272	3108 7TH ST S.W.-LEH<	63	70	DO
36442608000810060	13277	2709 10TH ST S.W.-LE<	60	80	DO
36442608000810060	13278	2707 10TH ST S.W.-LE<	65	80	DO
34442601000070160	13279	4110 2ND ST S.W.-LEH<	60	75	DO
34442601000080040	13280	4113 2ND ST S.W.-LEH<	60	75	DO
29442607000560030	13294	5005 LEE STREET-LEH<	63	78	DO
36442606000490060	13308	2809 1ST STREET S.W.<	63	70	DO
04442600010041020	13313	BUCKINGHAM ROAD TO C<	63	72	DO
03442606000270170	13325	3754 KITTYHAWK DRIVE<	50	68	DO
29442603000260110	13326	5208 6TH STREET WEST<	63	85	DO
34442604000290060	13343	4109 12 TH STREET S.<	60	75	DO
35442608000680160	13344	3310 13TH ST S.W.-OF<	60	72	DO
03442601000030480	13345	6135 HOLT COURT-CEME<	60	80	DO
35442611000990080	13346	3103 8TH ST S W -OFF<	60	74	DO
27442612001400090	13347	3700 11TH ST WEST-OF<	60	80	DO
27442610001130030	13348	4013 10TH ST WEST-OF<	60	75	DO
03442614000820180	13349	6010 JESSICA STREET-<	60	75	DO
34442604000290180	13350	4114 13TH ST S.W.-OF<	60	75	DO
36442608000800150	13351	2708 10TH ST S.W.-OF<	60	80	DO
26442609000580070	13368	3100 8TH STREEET WES<	65	90	DO
29442604000380110	13371	5108 WEST 3RD STREET<	63	75	DO
29442601000100010	13399	5313 5TH ST WEST-LEH<	63	88	DO
26442614000180050	13400	3409 15TH ST WEST-LE<	63	79	DO
26442612000040010	13401	3504 14TH ST WEST-LE<	57	68	DO
34442605000510180	13439	3812 3RD ST S.W.-LEH<	30	36	DO
27442603000260040	13464	703 COLIN AVENUE NOR<	63	80	DO

04/25/90

SELECT STRAP,PERMIT_NO,SITE_LOCATION1,CASING_IN_DPTH,TOTAL_DEPTH,WELL_USE FROM SQLDBA.WELLS WHERE ST

PAGE 10

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
34442601000080140	13475	4106 3RD STREET S.W.<	63	76	DO
34442606000590070	13476	3907 6TH STREET S.W.<	63	72	DO
23442601000060340	13521	3226 NANCY DRIVE-LEE<	42	58	DO
16442601000010160	13522	82 TO BUCKINGHAM TO <	63	70	IR
28442603000260030	13524	4620 6TH STREET WEST<	63	72	DO
03442604000170070	13535	6130 HUTTON COURT-LE<	60	80	DO
35442601000070030	13579	3617 1ST ST SW-LEHIG<	60	75	DO
26442609000550100	13580	3106 11ST WEST-LEHIG<	60	80	DO
26442602000050120	13581	3322 12 ST S.W.-LEHI<	55	65	DO
28442601000090180	13591	4714 6TH ST WEST-LEH<	63	80	DO
27442602000130190	13590	4214 3RD ST WEST-LEH<	60	70	DO
33442607000100190	13618	321/323 GORDON AVENU<	63	81	DO
33442602000110140	13630	4308 4TH ST S.W.-LEH<	60	75	DO
23442602000100060	13629	3316 27TH STREET WES<	60	80	DO
34442604000290060	13628	4109 12TH ST S.W.-LE<	60	75	DO
29442605000420030	13639	605 LEO AVENUE NORTH<	63	79	DO
29442607000560040	13640	5013 LEE STREET-LEHI<	63	80	DO
23442602000170080	13648	3214 24TH ST WEST-LE<	50	65	DO
28442609000860030	13649	4309 13TH ST WEST-LE<	60	75	DO
24442609000750030	13650	2804 BETH AVENUE-LEH<	61	61	DO
29442605000440100	13651	5110 5TH ST S.W.-LEH<	60	80	DO
25442610000820020	13652	1102 BETH AVENUE-LEH<	60	60	DO
23442606000340170	13654	3312 17TH ST S.W.-LE<	55	75	DO
35442608000640180	13655	3414 13TH ST S.W.-LE<	56	75	DO
26442608000490020	13658	3109 14TH ST W-LEHIG<	55	65	DO
16442601000260220	13685	6910 CIRCLE DRIVE-BU<	42	65	DO
31442600000010030	13686	12791 SR 82 - LEHIGH<	120	140	PO
25442606000530050	13689	2813 6TH STREET WEST<	42	50	IR
28442603000250020	13707	702 HENRY AVENUE NOR<	80	100	DO
28442610000890090	13740	4318 10TH ST WEST-LE<	52	75	DO
06442600000020010	13752	4240 ORANGE RIVER LO<	65	94	IR
03442611000570120	13758	3707 TALLMAN STREET-<	63	70	DO
34442602000090020	13776	4205 3RD ST S.W.-LEH<	60	69	DO
054426000000282000	13777	4841 BUCKINGHAM ROAD<	75	95	DO
19442603000130040	13778	1027 ALVIN AVENUE-LE<	80	100	DO
26442608000490030	13779	3107 14TH ST S.W.-LE<	55	65	DO
34442612001100090	13824	3803 12TH STREET S.W<	63	75	DO
29442615001090190	13835	4905 BROOKFIELD STRE<	63	76	DO
29442603000210070	13860	703 LERORY AVENUE-LE<	63	70	DO
0744260000001002A	13893	5400 HIGGINBOTHAM RO<	60	80	DO
28442601000080060	13918	4800 LEE BLVD.-EAST <	63	81	DO
23442602000170080	13929	3216 24TH STREET WES<	55	65	DO
25442608000410030	13930	1204 GENE AVENUE NOR<	60	60	DO
26442609000550110	13931	3108 11TH STREET WES<	60	80	DO
20442601000010120	13933	8711 BUCKINGHAM ROAD<	60	80	DO
03442604000170070	13947	6130 HUTTON COURT-BU<	63	70	DO
0644260000003001C	13949	4390 ORANGE RIVER LO<	65	80	IR
26442613000120190	13959	913 UNICE AVENUE NOR<	54	66	DO
25442608000410110	13970	1205 FLORA AVENUE NO<	50	60	DO
03442602000070220	14017	6147 HUGHES AVENUE-L<	63	70	DO
29442603000280010	14018	5211 5TH STREET WEST<	63	70	DO
03442602000070220	14020	6151 HUGHES AVENUE-L<	63	70	DO
26442607000260120	14036	3600 4TH STREET WEST<	84	100	DO
29442607000590060	14043	5009 2ND STREET WEST<	63	90	DO
29442603000230040	14065	5225 7TH STREET WEST<	63	87	DO
06442600000030040	14068	4460 ORANGE RIVER LO<	70	90	DO
34442607000650040	14077	4013 8TH STREET S.W.<	65	76	DO

04/25/90 SELECT STRAP,PERMIT_NO,SITE_LOCATION1,CASING_IN_DPTH,TOTAL_DEPTH,WELL_USE FROM SQLDBA.WELLS WHERE ST

PAGE 11

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
18442600000011260	14109	6850 NEAL ROAD-OFF O<	63	80	DO
16442601000020140	14117	6030 INDUSTRY AVENUE<	63	78	DO
29442603000240150	14126	5220 5TH ST WEST-LEH<	63	70	DO
26442614000170170	14127	3414 15TH ST WEST-LE<	42	57	DO
26442613000120230	14128	921 UNICE AVENUE-LEH<	48	65	DO
04442600010042350	14141	CEMETARY ROAD-TO SKA<	57	80	DO
34442612001120050	14166	3709 11TH ST SW-LEH<	60	75	DO
26442607000340160	14179	3396 SHERWOOD RD-LEH<	80	80	DO
35442605000400170	14182	3412 SECOND ST-LEHIG<	63	70	DO
06442600000110060	14183	4020 ORANGE RIVER LO<	63	70	DO
04442600010042390	14197	SKATE CIR-RIVERDALE <	67	85	DO
25442602000150170	14208	2912 9TH ST W-LEHIGH<	60	75	DO
25442607000450200	14209	2816 9TH ST W-LEHIGH<	50	60	DO
03442610000510070	14210	6060 LATIMER AVE-LEH<	60	75	DO
03442611000580100	14211	6038 STRATTON RD-LEH<	60	70	DO
26442603000090060	14213	3317 12TH ST W-LEHIG<	?	66	DO
25442602000100140	14214	3006 10TH ST W-LEHIG<	60	80	DO
31442603000020030	14220	5017 24TH ST W-LEHIG<	60	80	DO
26442615000260040	14222	914 RITA AVE N-LEHIG<	60	80	DO
05442605000000070	14227	4211 FULTON CIR-ORAN<	79	90	DO
21442601000400110	14236	7700 BUCKINGHAM ROAD<	52	68	DO
04442600010042190	14244	4308 SKATES CIRCLE-R<	74	90	DO
12442602000150010	14250	3017 56TH ST WEST-LE<	60	80	DO
16442601000250010	14256	6981 CIRCLE DRIVE-BU<	57	65	DO
35442612001050020	14261	3217 14TH ST S.W.-LE<	60	65	DO
36442604000220020	14262	3013 8TH ST ST S.W.-<	60	75	DO
24442609000750030	14278	2804 BETH AVENUE-LEH<	60	80	DO
31442602000020130	14283	2604 HAWALASKA STREE<	60	80	DO
16442601000010120	14285	6201 BUCKINGHAM ROAD<	61	68	DO
33442607000030080	14298	128/30 GORDON AVENUE<	63	78	DO
25442606000530070	14332	2809 6TH ST WEST-LEH<	63	66	IR
25442606000520190	14371	2814 6TH ST WEST-LEH<	42	58	IR
34442607000660160	14383	4010 10TH ST S.W.-LE<	60	80	DO
36442609000830040	14382	2813 12TH ST S.W.-LE<	50	80	DO
34442608000780190	14381	2816 12TH ST S.W.-LE<	55	80	DO
34442607000710090	14380	3903 9TH ST S.W.-LEH<	?	78	DO
34442608000770180	14379	3914 13TH ST S.W.-LE<	60	75	DO
34442602000160160	14378	4110 7TH ST S.W.-LEH<	60	80	DO
23442603000210030	14377	3113 25TH STREET WES<	60	65	DO
35442612001050030	14376	3215 14TH ST S.W.-LE<	?	66	DO
27442604000440060	14439	3815 LEE BLVD.-LEHIG<	63	80	DO
02442608000790030	14446	6016 RUTH AVENUE-LEH<	60	80	DO
05442603000000240	14460	4401 LONG LAKE DRIVE<	72	90	DO
33442608000150110	14461	220/222 HENRY AVENUE<	63	70	DO
36442604000260160	14470	2910 9TH ST S.W.-LEH<	47	55	DO
03442611000560100	14478	3719 TARECO STREET-L<	61	65	DO
1844260000001100A	14482	6170 NEAL ROAD-BUCKI<	94	108	DO
28442603000250020	14487	702 HENRY AVENUE NOR<	63	68	DO
35442612001050020	14497	3217 14TH STREET S.W<	60	80	DO
28442602000150020	14501	4715 4TH STREET WEST<	63	80	DO
27442603000320100	14502	4001 7TH STREET WEST<	63	68	DO
23442602000120080	14514	3305 26TH ST WEST-LE<	60	80	DO
28442606000600080	14519	205 GORDON AVENUE-LE<	60	75	DO
28442606000600090	14520	207 GORDON AVENUE-NO<	62	75	DO
29442604000340170	14533	5212 3RD STREET WEST<	63	85	DO
26442612000050040	14535	3507 14TH STREET WES<	80	100	DO
26442612000080220	14536	1502 UNICE AVENUE NO<	80	100	DO

04/25/90 SELECT STRAP,PERMIT_NO,SITE_LOCATION1,CASING_IN_DPTH,TOTAL_DEPTH,WELL_USE FROM SQLDBA.WELLS WHERE ST

PAGE 12

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
05442605000000030	14548	4231 FULTON CIRCLE-O<	101	120	DO
27442602000130170	14552	4210 3RD ST WEST-LEH<	55	70	DO
25442607000450200	14553	2818 9TH ST WEST-LEH<	55	60	DO
05442602000220000	14573	4673 ORANGE RIVER LO<	80	100	DO
18442607000190000	14579	6331 WEST WOOD ACRES<	96	125	IR
31442603000080090	14580	SR 82 TO LOLA AVENUE<	85	100	DO
31442603000080060	14581	SR 82 TO LOLA AVENUE<	85	97	DO
29442603000240130	14585	5216 5TH STREET WEST<	63	85	DO
28442608000720070	14586	4313 4TH STREET WEST<	60	68	DO
03442604000200120	14587	6130 STRATTON ROAD-L<	53	63	DO
35442612001120170	14588	3114 14TH STREET WES<	60	80	DO
35442608000660160	14589	3410 15TH ST S.W.-OF<	60	70	DO
36442612001110020	14590	2617 9TH STREET WEST<	?	78	DO
23442602000170070	14591	3212 24TH STREET WES<	60	63	DO
29442607000570200	14592	5018 3RD STREET S.W.<	63	75	DO
27442603000250030	14601	701 COLIN AVENUE-LEH<	53	70	DO
03442605000250230	14604	3717 KESSLER STREET-<	42	57	DO
27442603000260010	14607	4006 7TH STREET WEST<	51	68	DO
27442610001110010	14625	4017 12 TH STREET-LE<	55	67	DO
27442610001110020	14626	4015 12TH STREET-LEH<	57	68	DO
36442608000760200	14634	2818 10TH STREET S.W<	63	80	DO
25442601000050040	14674	2913 16TH STREET WES<	63	75	DO
27442605000590160	14675	3724 5TH STREET WEST<	63	75	DO
23442604000260020	14677	3213 23RD ST W -OF<	56	72	DO
26442615000260040	14678	914 RITA AVENUE-OFF <	60	75	DO
34442612001140040	14713	3711 13TH ST S.W.-LE<	52	60	DO
34442611001080050	14718	3709 10TH ST S.W.-LE<	60	80	DO
34442611001080030	14719	3713 10TH ST S.W.-LE<	60	70	DO
34442611001080030	14720	3711 10TH ST S.W.-LE<	60	75	DO
23442606000380150	14721	3208 17TH ST WEST-LE<	60	65	DO
26442609000580050	14722	3103 9TH ST WEST-LEH<	?	79	DO
23442608000230290	14723	1729 UNICE AVENUE-LE<	60	75	DO
34442612001110120	14724	3802 14TH ST S.W.-LE<	60	80	DO
23442604000240150	14725	3308 21 ST WEST-LEH<	60	80	DO
23442602000100060	14727	3314 27TH ST WEST-LE<	60	80	DO
18442607000190000	14752	6331 WESTWOOD ACRES <	101	138	IR
27442610001180060	14784	3805 11TH ST WEST-LE<	110	150	DO
27442610001180070	14785	3803 11TH STREET WES<	110	150	DO
05442603000000070	14809	4690 LONG LAKE DRIVE<	72	92	DO
26442604000170010	14841	3325 8TH STREET WEST<	42	55	DO
15442600000010010	14846	15301 ORANGE RIVER R<	80	100	DO
03442602000090200	14866	6151 LAURELWOOD DRIV<	42	75	DO
25442607000500110	14895	2700 8TH STREET WEST<	63	80	DO
33442608000060290	14909	GULFVIEW-LEHIGH ACRE<	60	80	DO
03442611000540080	14914	3725 KITTYHAWK DRIVE<	54	60	DO
31442600000010030	14923	12791 SR 82-EAST OF <	20	26	FI
29442604000400050	14931	5103 2ND STREET WEST<	63	78	DO
23442602000120080	14950	3305 26TH STREET WES<	58	64	DO
26442612000050040	14961	3507 14TH STREET WES<	52	65	DO
26442612000080220	14962	1502 VENICE AVEUNE-L<	63	75	DO
35442612001120120	14974	3104 14TH STREET S.W<	60	80	DO
35442602000180110	14978	3500 6TH STREET S.W.<	63	70	DO
36442603000120070	14981	3003 3RD STREET S.W.<	63	80	DO
18442604000410000	14986	6311 PANGOLA ROAD- <	85	100	IR
27442604000440050	15022	3901 LEE BLVD.-LEHIG<	56	70	IR
10442600000010000	15027	15050 CEMETARY ROAD-<	63	70	DO
27442609000990100	15036	4000 15TH STREET WES<	63	70	IR

04/25/90 SELECT STRAP,PERMIT_NO,SITE_LOCATION1,CASING_IN_DPTH,TOTAL_DEPTH,WELL_USE FROM SQLDBA.WELLS WHERE ST

PAGE 13

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
23442604000270020	15055	3217 22ND STREET WES<	55	70	DO
23442606000330170	15056	3312 18TH STREET WES<	58	70	DO
23442602000120150	15070	3308 25TH STREET WES<	63	70	DO
26442604000170110	15071	3302 7TH STREET WEST<	63	70	DO
26442602000020060	15072	3318 15TH STREET WES<	42	66	DO
23442602000090320	15073	2710 RENA LANE-LEHIG<	63	70	DO
20442601000010120	15095	8711/13 BUCKINGHAM R<	63	66	DO
27442601000060150	15098	4208 6TH STREET WEST<	60	80	DO
35442605000460020	15104	3317 2ND STREET SW=L<	60	80	DO
04442600010040010	15113	4952 S.E. SKATES CIR<	60	62	DO
224426010000370030	15140	15140 HOMESTEAD ROAD<	110	150	DO
28442606000620080	15144	205 GERALD AVENUE-LE<	63	65	DO
28442601000100170	15145	4712 5TH STREET WEST<	63	72	DO
31442600000010030	15149	12777 SR 82-LEE MEMO<	110	125	TS
29442603000280010	15152	5211 5TH STREET WEST<	63	88	DO
07442602000130010	15190	5717 NEAL ROAD- <	63	80	DO
03442606000270010	15206	6104 LAURELWOOD DRIV<	42	58	DO
294426060000500150	15213	4906 7TH STREET WEST<	63	77	DO
29442608000650020	15220	5411 BANNING STREET-<	63	80	DO
29442607000570060	15221	5009 4TH STREET WEST<	63	80	DO
23442601000020120	15225	3209 31 STREET WEST-<	60	80	DO
23442601000020240	15226	3222 30TH STREET WES<	60	80	DO
28442601000060070	15228	4802 6TH STREET WEST<	6	70	DO
25442605000590010	15241	402 IDA AVENUE-LEE B<	42	68	IR
25442605000590010	15242	402 IDA AVENUE-LEE B<	63	66	IR
25442605000590010	15243	402 IDA AVENUE-LEE B<	63	70	DO
25442605000590010	15244	402 IDA AVENUE-LEE B<	63	68	IR
27442606000680120	15288	3702 3RD STREET WEST<	63	81	DO
25442612000930050	15317	2524 DORA COURT-LEHI<	42	50	DO
07442604000090000	15318	5680 PANGOLA DRIVE-P<	63	85	DO
27442608000960060	15328	803 DOZIER AVENUE-LE<	63	70	DO
27442603000340190	15329	4016 LEE BLVD <	63	70	DO
27442603000350080	15332	3905 7TH STREET-LEHI<	150	180	DO
27442603000350080	15333	3903 7TH STREET-LEHI<	150	180	DO
33442603000190090	15337	4300 10TH STREET S.E<	63	73	DO
05442603000000060	15354	4700 LONGLAKE DRIVE-<	110	150	DO
04442600010040010	15356	4799 SKATES CIRCLE-W<	110	150	DO
23442604000250180	15358	3314 20TH STREET WES<	60	80	DO
35442604000330100	15359	3506 13TH STREET S.W<	60	80	DO
35442604000330100	15360	3508 13TH STREE S.W.<	60	80	DO
35442604000290100	15361	3602 13TH STREET S.W<	60	80	DO
35442603000280080	15362	3502 12TH ST S.W.-SU<	60	80	DO
36442604000290020	15363	2917 11TH STREET S.W<	60	80	DO
36442605000300040	15364	3013 12TH STREET S.W<	60	80	DO
36442613001250020	15365	2519 15TH STREET S.W<	60	80	DO
27442610001150110	15386	3904 10TH STREET WES<	63	70	DO
03442608000360210	15384	3836 HOFFMAN STREET-<	63	76	DO
04442600010042180	15383	4784 SKATES CIRCLE-O<	63	76	DO
25442604000250110	15403	403 JOAN AVENUE-LEE <	63	80	IR
31442603000020030	15405	5017 24TH STREET S.W<	85	95	DO
27442610001130060	15443	4007 10TH STREET WES<	63	72	DO
03442610000480210	15453	6071 LACOTA AVENUE-L<	63	70	DO
29442603000280100	15469	5208 LEE STREET-LEHI<	63	90	DO
36442607000690200	15470	2728 8TH STREET S.W.<	50	60	DO
27442611001320160	15474	3728 12TH STREET WES<	50	60	DO
36442607000690180	15477	2724 8TH STREET S.W.<	60	80	DO
09442603000110000	15500	RIVER ROAD-MACKABOY <	62	80	DO

04/25/90 SELECT STRAP,PERMIT_NO,SITE_LOCATION1,CASING_IN_DPTH,TOTAL_DEPTH,WELL_USE FROM SQLDBA.WELLS WHERE ST

PAGE 14

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
25442606000530040	15533	2815 6TH STREET WEST<	42	58	IR
27442601000080070	15543	4207 5TH STREET WEST<	63	70	DO
26442602000070060	15542	3303 14TH STREET WES<	42	55	DO
29442603000280010	15573	5209 5TH STREET WEST<	63	80	DO
03442613000710140	15574	6013 LANGDON AVENUE-<	63	80	DO
27442607000840040	15621	4113 WEST 14TH STREE<	70	90	DO
28442603000310040	15625	4613 5TH STREET WEST<	63	80	DO
34442606000560140	15653	3906 4TH STREET S.W.<	60	80	DO
26442602000080130	15651	3310 12TH STREET WES<	42	50	DO
36442609000890190	15680	2716 15TH STREET S.W<	60	80	DO
26442601000010250	15679	3109 16TH STREET WES<	60	80	DO
28442609000780050	15678	4321 16TH STREET WES<	63	73	DO
10442600000150018	15676	5751 JACKSON ROAD- <	60	80	DO
27442610001210010	15695	806 DENIS AVENUE-LEH<	80	100	DO
28442607000680120	15696	4305 7TH STREET WEST<	80	100	DO
27442611001340030	15697	3711 15TH STREE- WES<	80	100	DO
27442612001380010	15698	3735 11TH STREET WES<	80	100	DO
29442607000590090	15710	5001 2ND STREET-LEHI<	42	50	DO
03442610000490040	15720	6070 LACOTA AVENUE-L<	63	80	DO
28442605000440040	15719	705 GILBERT AVENUE-L<	63	80	DO
01442609000990070	15730	2501 73RD STREET WES<	60	80	DO
25442603000190050	15732	3011 6TH STREET WEST<	63	80	IR
25442602000120140	15734	3006 8TH STREET WEST<	63	80	DO
36442607000690130	15761	2714 8TH STREET S.W.<	63	80	DO
36442607000690190	15760	2726 8TH STREET-OFF <	63	80	DO
03442613000710100	15763	6010 LATIMER AVENUE-<	63	80	DO
27442601000060150	15777	4208 6TH STREET WEST<	63	80	DO
27442603000340180	15775	4014 LEE BLVD-LEHIGH<	63	70	IR
16442601000020050	15785	6241 TERRACE ROAD-BU<	60	80	DO
04442600010040010	15786	4799 SKATES CIRCLE-E<	63	80	DO

SECTION 5, TWP 45S, RGE 25E

CTRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
05452500000120010	12372	OFF COLONIAL BLVD.-1<	160	180	DO
05452500000120070	8960	10491 DEER RUN FARM<	165	185	DO
05452500000120260	14595	10851 BROMLEY LANE <	150	200	DO
0545250000012029A	13622	10851 DEER RUN ROAD-<	170	230	DO

* END OF RESULT ***** 4 RCWS DISPLAYED ***** COST ESTIMATE IS 1 **

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF-LINE

ENTER A DISPLAY COMMAND

SECTION 10, TWP 45S, RGE 25E

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
10452500000060070	10914	11581 PALOMINO LANE <	60	80	DC
10452500000060070	11314	PALOMINO LANE OFF DA<	85	107	DO
10452500000060070	11708	PALOMINO LANE OFF DA<	?	107	PL
10452500000060070	11709	PALOMINO LANE OFF DA<	140	200	DC
10452500000060090	9172	11580 PALEMENO LANE <	180	200	CO
10452500000060130	15671	11580 MORGAN HILL RO<	140	200	CC
10452500000060130	15708	11580 MORGAN HILL RO<	196	230	DC

* END OF RESULT ***** 7 ROWS DISPLAYED ***** COST ESTIMATE IS 1 **

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF LINE

ENTER A DISPLAY COMMAND

VARIOUS SECTIONS, TWP 45S, RGE 26E

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
01452612001230100	11534	LEE BLVD. TO SUNSHINE<	50	55	DC
04452605000210000	11536	4511 28TH STREET LEH<	63	75	DC
35452600000020000	11547	GREEN MEADOWS WELL F<	?	220	PL
02452602000100110	11594	3602 S.W. 23RD STREET<	65	75	DC
12452605000540010	11703	2713 33RD STREET S.W.<	60	80	DC
01452605000540000	11734	S.W. 17TH STREET SEE<	?	100	DC
08452600000010000	11742	GATEWAY ENTRANCE OFF<	70	100	TC
254526000000020000	11802	CORNER OF GREEN HEAD<	80	100	CL
03452608000700040	11833	3909 28TH STREET S.W.<	65	72	DC
03452606000400010	11880	4017 22ND STREET S.W.<	60	80	DC
03452605000440160	11911	LEE BLVD TO GUNNERY<	63	75	DC
1145260500050170	11934	3212 37TH STREET S.W.<	52	57	DC
11452610000890130	11935	3204 43RD ST S.W. OF<	42	60	CC
03452612001060120	12000	3808 29TH ST S.W. SE<	52	68	DC
04452601000060040	12122	4305 17TH ST S.W. LEH<	63	75	DC
10452605000620040	12168	3815 39TH STREET S.W.<	21	22	DC
03452606000400010	12264	4017 22ND STREET S.W.<	65	70	DC
11452605000610060	12285	3209 38TH STREET S.W.<	60	80	DC
11452603000260050	12315	3511 41 STREET LEHIGH<	60	80	CC
12452607000600110	12353	2806 40TH STREET S.W.<	63	70	DC

ENTER A DISPLAY COMMAND

Alt Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF LINE

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
01452607000720130	12379	2804 26TH STREET S.W.<	63	65	DC
01452601000020110	12388	1602 KAREN AVENUE LE<	63	80	DC
01452601000020100	12389	1604 KAREN AVENUE-LE<	51	80	DC
02452611001000080	12390	3205 24TH ST S.W.-LE<	63	70	DC
08452600000010000	12407	GATEWAY OFF DANIEL R<	72	105	IR
08452600000010000	12406	GATEWAY-OFF DANIELS <	72	105	IR
11452605000550010	12433	3319 36TH STREET S.W.<	52	70	CC
11452603000260050	12542	SUNSHINE BLVD. TO 40<	62	80	DC
01452603000330200	13018	2918 27TH STREET S.W.<	63	80	DC
22452600000011080	13002	13081 CHEROKEE ROAD-<	55	75	DC
02452601000120090	13239	3505 18TH ST S.W.-LE<	60	80	DC
1345260000001003A	13398	17900 JAYNE COURT-LE<	71	80	IR
15452600000021250	13423	12150 SHAWNEE ROAD-T<	60	80	CC
25452600000010140	13511	14031 BRIAR LANE <	63	70	DC
11452611000960170	13530	3214 46TH STREET S.W.<	60	61	DC
13452604000390130	13555	2604 50TH ST S.W. LE<	60	80	DC
22452600000011360	13620	13530 SHAWNEE ROAD-L<	63	65	DC
13452604000390130	13674	2604 50TH ST LEHIGH <	42	53	DC
02452609000800060	13680	1508 PEARL AVENUE SO<	60	80	DC
02452601000120090	13731	3505 18TH ST S.W. LE<	63	70	DC

ENTER A DISPLAY COMMAND

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF LINE

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
01452610001040140	8078	21ST STREET SOUTH WE<	?	65	DC
12452612001160140	8121	2606 44TH ST LEHIGH <	62	63	DC
02452611001000170	8129	3414 25TH ST. LA OFF<	63	70	DC
02452602000190100	8160	23RD STREET C.W. TO <	30	40	DC
02452611001030090	8164	3109 C.W. 23 STREET <	18	20	DC
13452609000620160	8230	55 STREET C.W. LEIGH<	42	60	DC
13452606000490110	8254	2600 55TH STREET C.W<	63	80	DC
15452600000020450	8339	12511 CHAWNEE ROAD-T<	150	200	DC
02452607000590050	8477	3513 SW 23RD STREET <	63	80	DC
2545260000001001A	8469	WILLOW BROOK FARMS T<	100	115	DC
04452605000210080	8534	28TH STREET T/R GO 1<	63	70	DC
04452605000100420	8927	82B TC GUNERY RD. TC<	63	76	PO
18452600000010000	9031	FT. MYERS. <	8	15	MC
24452600000032000	9074	KEN TARA ROAD 82 TO <	63	70	DC
12452602000120030	9105	I-75 TO EXIT 23 E TO<	60	80	DC
01452612001250060	9160	LEE BLVD. TO SUNSHIN<	51	52	DC
22452600000011270	9169	LOT 35 SHAWNEE ROAD-<	64	84	DC
12452608000790170	9203	SUNSHINE BLVD. TO 40<	54	55	DC
03452605000370010	9279	SR 82 WEST TO LEE BL<	63	70	DC
13452604000350010	9291	GENE AVENUE & 48TH C<	30	40	DC

ENTER A DISPLAY COMMAND

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF-LINE

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
01452609001020020	9318	2505 18TH STREET S.W<	60	80	DO
03452608000670090	9329	4003 WEST 27TH STREE<	70	85	DO
11452611000970120	9382	82 TO SUNSHINE T/L T<	49	54	DO
01452611001220140	9390	2508 27TH STREET-S.W<	60	85	DC
01452611001220150	9391	2510 27TH STREET S.W<	70	85	DO
03452609000840030	9392	3712 15TH STREET-C.W<	?	72	DO
02452601000050080	9393	1506 REMA AVENUE-LEH<	60	85	DO
03452607000540020	9476	4013 24TH STREET C.W<	?	75	DC
03452601000100090	9478	82 TO GUNNERY-RIGHT <	63	68	DO
12452602000120030	9495	SUNSHINE TO 40TH ST.<	80	100	DC
13452606000490180	9508	82 TO SUNSHINE-T/L T<	63	70	DO
03452604000280090	9568	4203 28TH STREET C.W<	75	90	DC
01452606000690120	9584	75 NORTH TO 82 EAST <	60	80	DC
03452605000350070	9586	LEE BLVD. TO GUNNERY<	58	69	DO
08452600000010000	9706	IN BETWEEN RT. 82 & <	20	40	MC
02452601000050090	9810	1604 TENA AVENUE-LEH<	60	70	DO
02452609000890040	9876	3107 17TH STREET S.W<	54	80	DO
02452609000890040	9875	3105 17TH STREET C.W<	75	85	DC
02452601000050070	9874	1504 TINA AVENUE-LEH<	61	70	DO
22452600000011000	10073	82 TO TIMBER TRIAL T<	57	59	DO

ENTER A DISPLAY COMMAND

Alt-Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF-LINE

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
04452601000080050	13739	1808 FLOYD AVENUE SOK	60	80	DO
22452600000011360	13772	13530 CHAWNEE ROAD LK	60	80	DO
11452611000950100	13786	3201 44TH STREET S.WK	42	55	DO
11452611000950080	13823	3205 44TH STREET S.WK	60	80	DO
11452603000220050	13834	3605 40TH STREET S.WK	21	22	DO
02452605000490020	13958	3717 17TH ST S.W. LEK	63	65	DO
03452600000860010	14029	1601 YVONNE AVENUE LK	60	70	DO
04452601000080050	14092	1902 FLOYD AVENUE SOK	57	75	DO
02452609000800060	14192	1508 PEARL AVE LEHIK	63	69	DO
10452600000010420	14218	11650 VISTA RIDGE DRK	6	100	DO
22452600000011330	14294	13081 CHAWNEE ROAD TK	61	30	DO
03452605000430070	14348	3905 17TH STREET S.WK	60	60	DO
03452601000050150	14428	4206 19TH ST S.W. LEK	52	79	DO
03452600000750080	14569	2904 BRUCE AVENUE LEK	72	100	DO
12452607000680080	14602	2824 40TH STREET S.WK	63	80	DO
24452600000014010	14734	17911 RICHARD ROAD LK	63	70	DO
034526050000360060	14780	4009 15TH STREET S.WK	60	70	DO
03452608000760060	14844	2908 BRIAN AVENUE LEK	21	30	DO
01452601000120100	14899	2904 18TH STREET S.WK	60	80	DO
11452605000610060	14972	3209 38TH ST S.W. LEK	63	64	DO

ENTER A DISPLAY COMMAND

Alt Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF LINE

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
034526050000360060	14780	4009 15TH STREET S.WK	60	70	DO
03452608000760060	14844	2908 BRIAN AVENUE LEK	21	30	DO
01452601000120100	14899	2904 18TH STREET S.WK	60	80	DO
11452605000610060	14972	3209 38TH ST S.W. LEK	63	64	DO
03452609000810090	15002	3803 16TH STREET S.WK	54	72	DO
10452602000280170	15026	4142 34TH STREET S.WK	21	38	DO
03452604000320020	15155	4109 28TH STREET S.WK	21	22	DO
02452606000530090	15268	3403 21 ST S.W. LEHIK	63	67	DO
10452602000270200	15277	4016 33RD STREET S.WK	21	25	DO
11452603000240040	15296	3613 42ND STREET S.WK	63	64	DO
14452601000030060	15335	4702 OLIVE AVENUE SOK	60	80	DO
01452611001220010	15374	2517 26TH STREET S.WK	63	65	DO
11452605000550160	15375	3310 37TH STREET S.WK	60	80	DO
04452605000240030	15601	2900-02 HAVILAND AVEK	60	80	DO
15452600000020910	15626	12301 CHAWNEE ROAD <	90	110	DO
01452603000330020	15682	2917 26TH STREET S.WK	63	70	DO
10452600000010380	15692	11840 VISTA RIDGE DRK	60	80	IR
10452605000620170	15783	3810 40TH STREET S.WK	15	30	DO
10452605000620180	15784	1329 MEADOW ROAD-LEHK	15	30	DO

* END OF RESULT ***** 155 ROWS DISPLAYED ***** COST ESTIMATE IS 4 **

ENTER A DISPLAY COMMAND

Alt Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF LINE

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
11452607000740190	10079	3203 RUTH LANE-82 TO<	42	55	DO
02452602000150110	10124	SR 82 TO GUNNERY T/L<	51	53	DO
12452612001170090	10139	2603 44TH ST. S.W. L<	48	50	DO
02452613000360050	10173	82 TO GUNNERY T/R TO<	30	1	DO
03452605000390150	10200	3917 11TH STREET S W<	70	80	DO
01452609001010080	10201	2506 18TH STREET S W<	60	80	DO
02452611001000170	10223	3312 25TH ST S W S<	30	75	DO
10452600000010440	10241	ST RD. 82 TO TIMBER<	82	90	DO
08452600000010000	10267	OFF GRIFFIN DRIVE <	30	30	IR
08452600000010000	10266	OFF GRIFFIN DRIVE. <	31	31	IR
08452600000010000	10265	OFF GRIFFIN DRIVE. <	30	30	IR
08452600000010000	10264	OFF GRIFFIN DRIVE. <	31	31	IR
08452600000010000	10263	OFF GRIFFIN DRIVE. <	30	30	IR
12452612001190130	10329	LEE BLVD. TO HOMESTE<	50	60	DO
01452610001060070	10351	2601 22ND STREET S W<	65	80	DO
03452605000390150	10361	4010 19TH STREET S.W<	70	80	DO
03452607000620130	10398	82 TO GUNNERY T/L TO<	63	65	DO
24452600000021030	10409	82 TO WILLOW BROOK C<	63	64	DO
24452600000021010	10410	82 TO WILLOW BROOK C<	63	64	DO
01452610001030070	10546	82 TO SUNSHINE BLVD.<	59	63	DO

ENTER A DISPLAY COMMAND

Alt Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF LINE

STRAP	PERMIT_NO	SITE_LOCATION1	CDPTH	TDPTH	USE
10452601000050020	10582	S ON GUNNERY TO JUST<	63	72	DO
03452607000580030	10658	SW 24TH STREET-2 BLO<	63	69	DO
25452600000030000	10680	RT. 82-7 MILES EAST <	80	100	IR
12452605000440030	10700	82 TO SUNSHINE-T/L T<	47	52	DO
01452606000690120	10725	82 TO LEE BLVD.-T/L <	52	56	DO
11452610000890130	10735	LEE BLVD.-T/L TO SUN<	60	80	DO
03452604000330080	10814	4122 30TH STREET S.W<	18	23	DO
03452604000330080	10815	4122 30TH STREET S.W<	?	0	PL
01452609001020020	10913	2505 18TH STREET S.W<	62	70	DO
11452611001000010	10977	SR 82 TO SUNSHINE-T/<	46	52	DO
11452611000980120	10978	SR 82 TO SUNSHINE-T/<	49	55	DO
13452606000490180	11063	82 TO SUNSHINE-T/L T<	42	50	DO
03452609000880210	11070	82 EAST TO LEE BLVD.<	53	70	DO
13452607000570120	11123	82 TO ALADAMA-T/L TO<	42	44	DO
10452601000120110	11234	GUNNERY ROAD LEFT ON<	70	81	DO
03452602000130140	11257	80 TO GUNNERY ROAD-T<	63	70	DO
26452600000020000	11281	GREEN MEADOWS WELL F<	?	160	PO
26452600000020000	11282	GREENMEADOW WELL FIE<	20	40	PO
11452613000930050	11361	3208 43RD STREET S.W<	63	78	DO
02452612001110250	11505	3122 29TH STREET S.W<	56	67	DO

ENTER A DISPLAY COMMAND

Alt Z FOR HELP | 3270/950 | FDX | 9600 N81 | LOG CLOSED | PRINT OFF | OFF LINE

Section 10

SECTION 10.0
GEOTECHNICAL REPORT
AND
ARCHAEOLOGICAL REPORT

10.1 GEOTECHNICAL REPORT

IMAGE QUALITY

**AS YOU REVIEW THE NEXT GROUP OF IMAGES, PLEASE NOTE
THAT THE ORIGINAL DOCUMENTS WERE OF POOR QUALITY.**

10.1 GEOTECHNICAL REPORT

IMAGE QUALITY

AS YOU REVIEW THE NEXT GROUP OF IMAGES, PLEASE NOTE THAT THE ORIGINAL DOCUMENTS WERE OF POOR QUALITY.



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

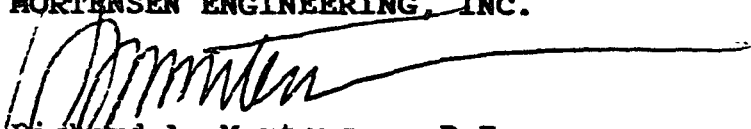
Geotechnical • Hydrogeologic • Materials Testing
Environmental/Contamination Assessments

Camp, Dresser & McKee, Inc.
Project No. 90-0413
Page 2

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/cfb.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.

BORING LOCATION PLAN

N T.S



-  Approximate SPT boring location
 Proposed Major Structure Area

DRAWN BY	PWV
CHECKED	FLL
APPROVED	RAM
SCALE	NOTED

[illegible]

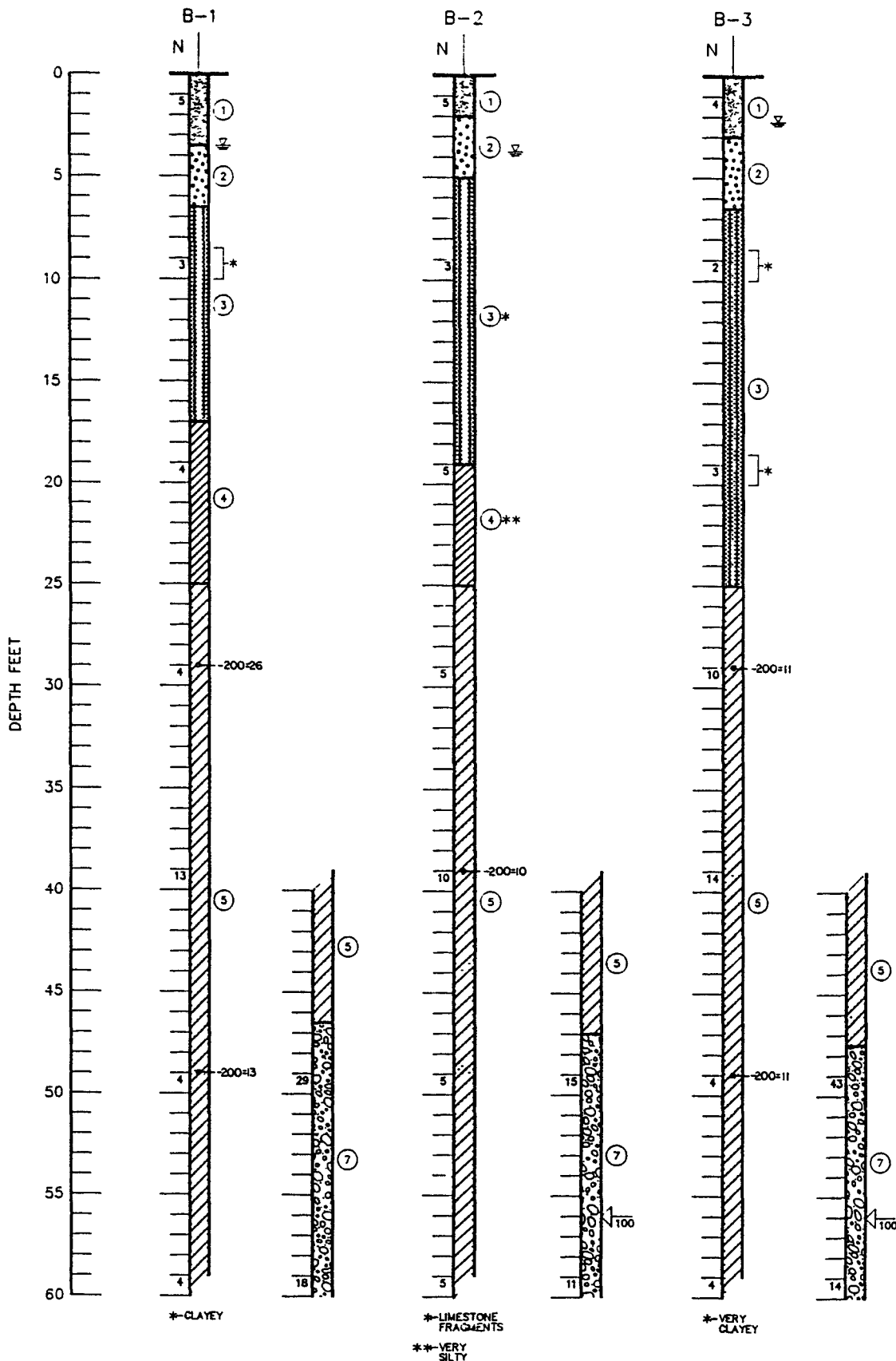
PRELIMINARY FOUNDATION AND SOILS STUDY
PROPOSED RESOURCE RECOVERY PLANT

LEE COUNTY, FLORIDA



MORTENSEN
Engineering, Inc.

DATE APRIL 90	PROJ NO 90-0413	PLATE 1
---------------	-----------------	---------



SOIL PROFILES

VERTICAL SCALE 1"=5'

DRAWN BY:	PWV
CHKD:	FLL
APPVD:	RAM
SCALE:	NOTED

PRELIMINARY FOUNDATION AND SOILS STUDY
PROPOSED RESOURCE RECOVERY PLANT
 LEE COUNTY, FLORIDA

MEI MORTENSEN
 Engineering, Inc.

DATE: APRIL 90 PROJ. NO: 90-0413 PLATE 2

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.

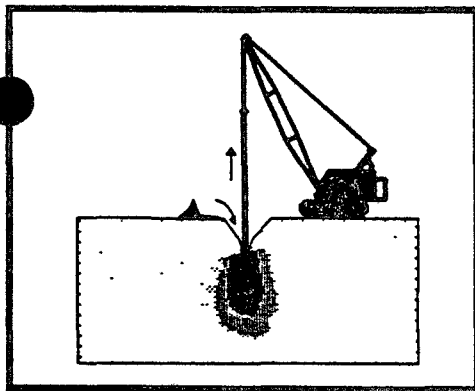
DRAWN: PWV	SCALE: ----	PROJ. NO: 90-0413
CHKD: RAM	DATE: APRIL 90	PLATE 4

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

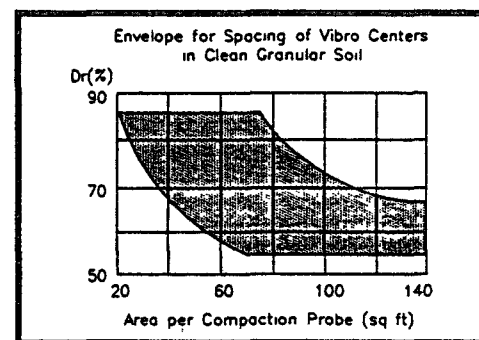
The significant engineering properties of a granular soil - compressibility, shear resistance, permeability, resistance to dynamic loading - are mainly dependent on the state of compaction, typically expressed in terms of relative density.

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.

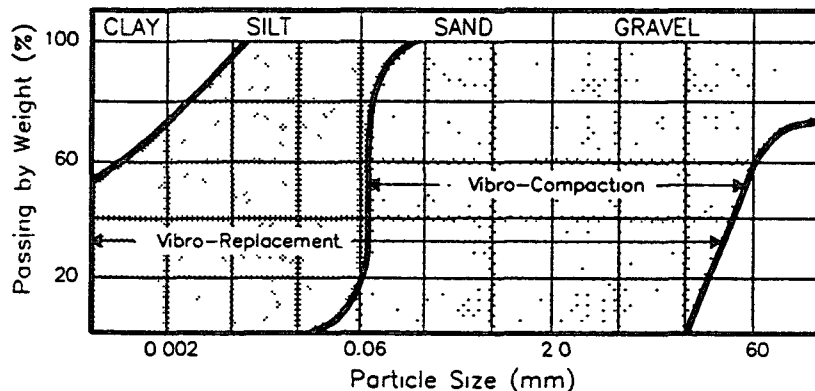
The angle of internal friction is increased on average between 5 and 10 degrees, resulting in much higher shear resistance. The modulus of deformation is often increased to around 1,000 tons/ft² and in some cases even higher, so that settlements are greatly reduced.

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.

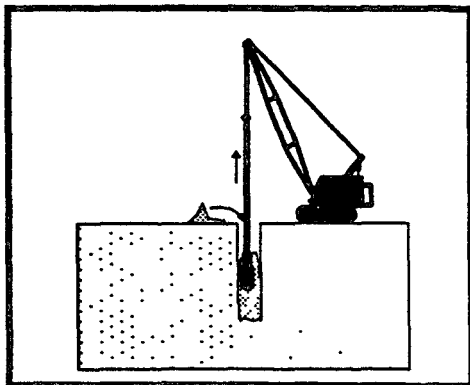


The grain size distribution curves show in general terms where Vibro-Compaction and Vibro-Replacement can be used. Soil having a silt content of less than approximately 15% can be densified by Vibro-Compaction. Silt and clayey strata are improved by Vibro-Replacement as well as mixtures of, for instance, 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.

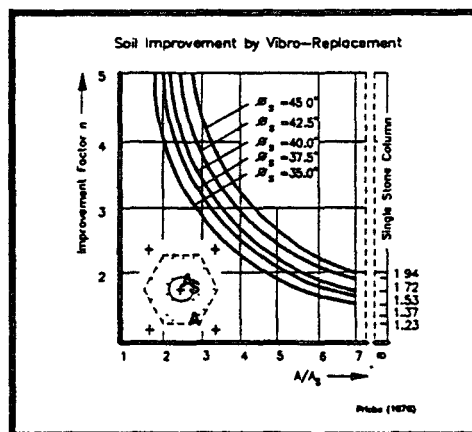
Design Principles

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.

Office Locations

GKN Hayward Baker

Maryland

1875 Mayfield Road
Odenton, MD 21113
(301) 551-8200

Florida

6850 Benjamin Road
Tampa, FL 33634
(813) 884-3441

California

P.O. Box 7690
Ventura, CA 93006
(805) 933-1331

Illinois

675 North Court
Suite 250
Palatine, IL 60067
(312) 358-1717

Washington

2601 Columbia Center
701 5th Avenue
Seattle, WA 98104
(206) 223-1732

Woodbine Division

Texas

2510 Decatur Avenue
Fort Worth, TX 76106
(817) 625-4241

GKN Keller Canada Ltd.

British Columbia

603 - 810 West Broadway
Vancouver, BC V5Z 4C9
(604) 294-4845

Ontario

2 Robert Speck Parkway
Suite 750
Mississauga, ON L4Z 1H8
(416) 276-9157

 Part of the worldwide group of GKN Keller Companies

GKN Hayward Baker INC
GROUND MODIFICATION

10.2 ARCHAEOLOGICAL REPORT

**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
---	---

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.

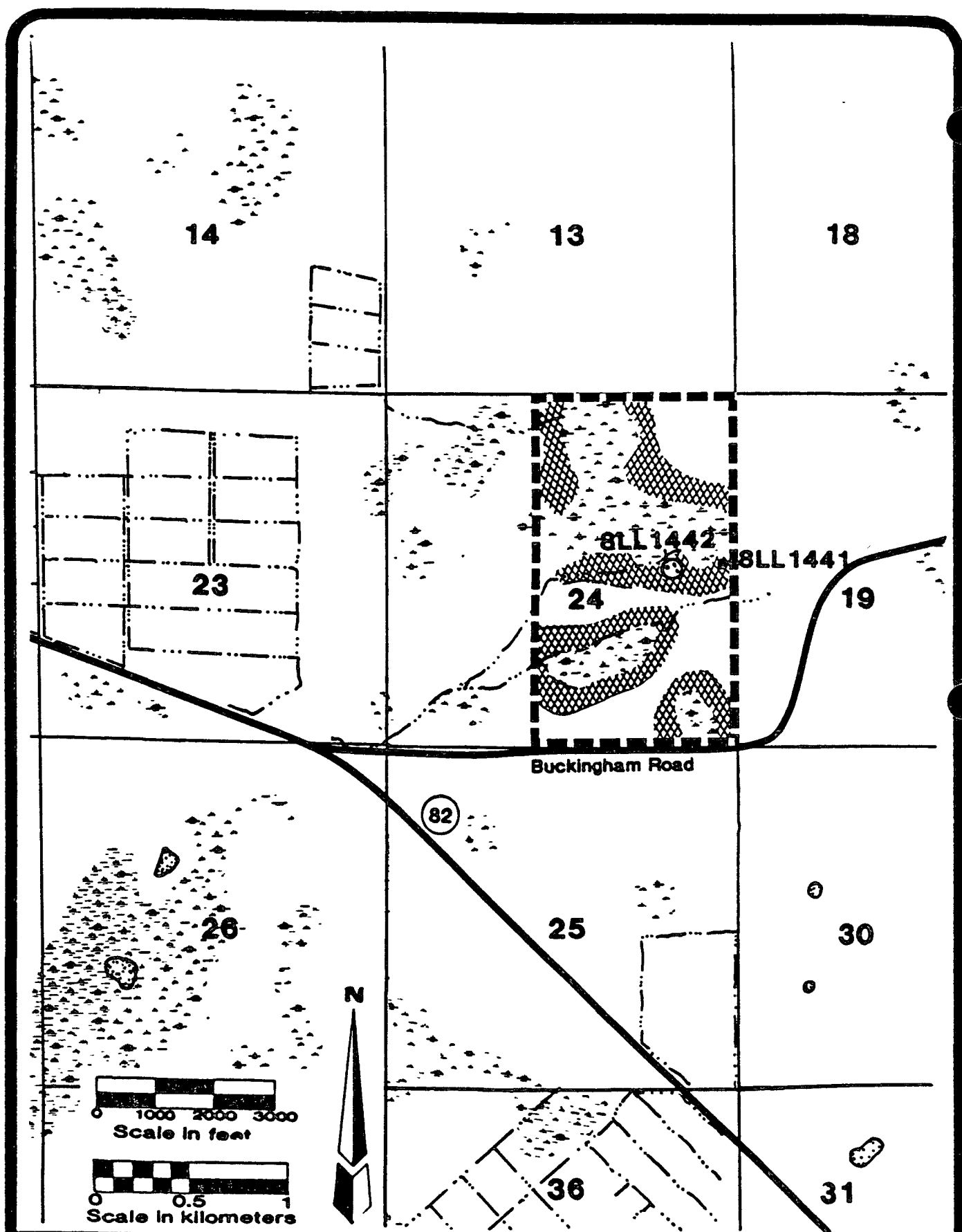


Figure 1: Map of Lee County Resource Recovery Site F showing archaeological site & historic structure. Cross-hatching indicates survey areas.

PIPER
ARCHAEOLOGY

St. Petersburg, FL

CULTURAL PREHISTORY

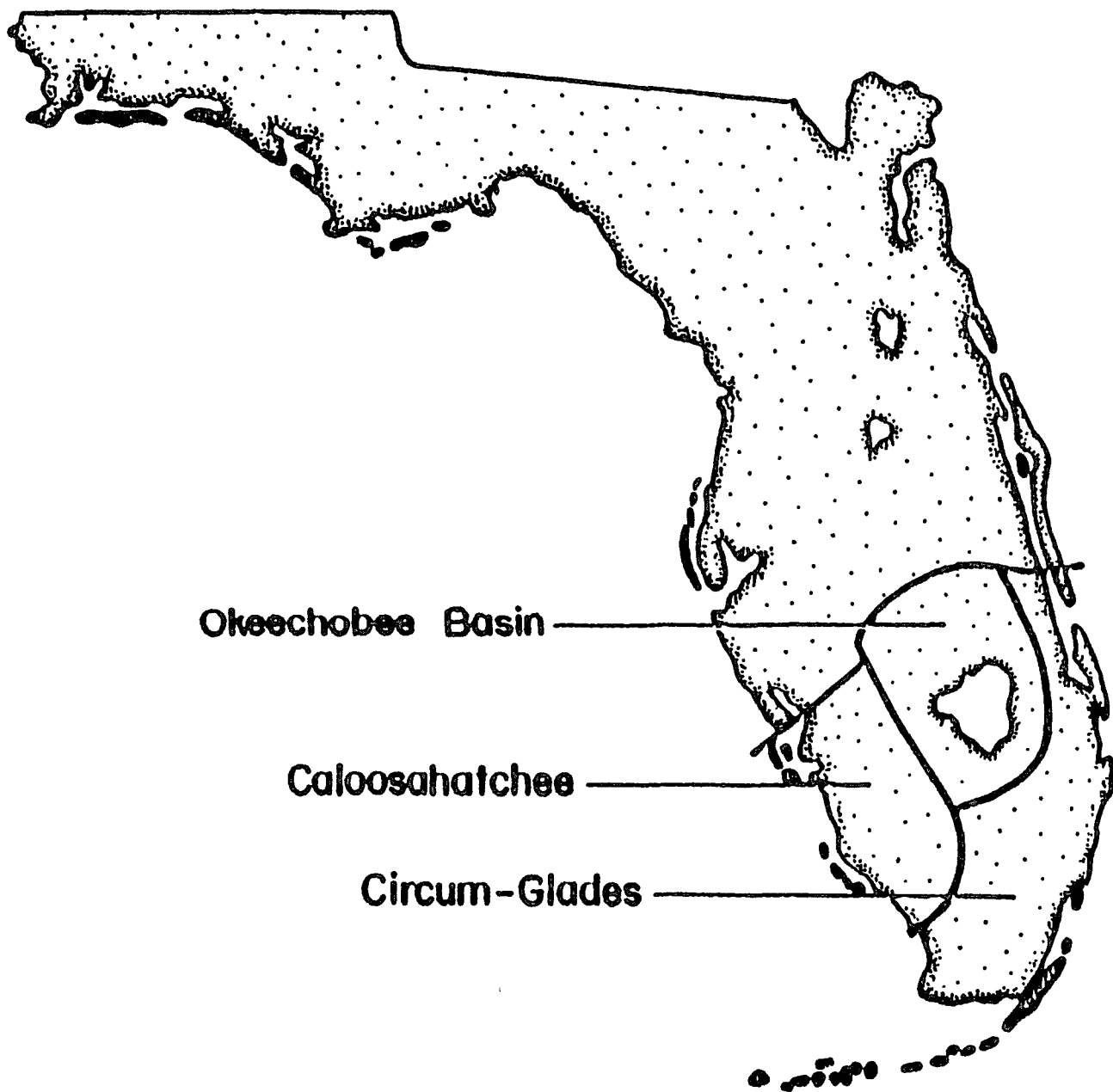
The following review of the region's prehistory will serve as a framework for understanding any prehistoric sites located during this survey. Aboriginal peoples have inhabited Florida for at least 14,000 years. The earliest cultural stages are pan-Florida in extent while later cultures exhibited differing 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)

PIPER
ARCHAEOLOGY

St. Petersburg, FL

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 Shackleford, 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.

REFERENCES CITED

- Beriault, John, Robert Carr, Jerry Stipp, Richard Johnson, and Jack Meeder
1981 The Archaeological Salvage of the Bay West Site, Collier County, Florida. Florida Anthropologist 34:39-58.
- Bullen, Ripley P. and Adelaide K. Bullen
1956 Excavations on Cape Haze Peninsula, Florida. Contributions of the Florida State Museum, Social Sciences No. 1, Gainesville.
- Carr, Robert S.
1986 Preliminary Report of Archaeological Excavations at the Cutler Fossil Site in Southern Florida. Paper presented at the 51st annual meeting of the Society for American Archaeology, New Orleans.
- Carr, Robert S. and John G. Beriault
1984 Prehistoric Man in Southern Florida. In Environments of South Florida: Present and Past II, edited by Patrick J. Gleason, pp. 1-14. Miami Geological Society, Miami.
- Chance, Marsha A.
1983 Climatic Influences on Maintenance Site Assemblages in the South Florida Archaic. Paper presented at the 35th annual meeting of the Florida Anthropological Society, Tallahassee.
- Cockrell, Wilburn A.
1970 Glades I and Pre-Glades Settlement and Subsistence Pattern on Marco Island (Collier County, Florida). M.A. Thesis on file Department of Anthropology, Florida State University, Tallahassee.
- Cockrell, W.A. and Larry Murphy
1978 Pleistocene Man in Florida. Archaeology of Eastern North America Vol. 6. Eastern States Archaeological Federation, Newark, Delaware.
- Cushing, F.H.
1897 Exploration of Ancient Key-Dweller Remains on the Gulf Coast of Florida. Proceedings of the American Philosophical Society Vol. 35, No. 153, pp. 329-448. Philadelphia.

- Daniel, I. Randolph J.
1985 A Preliminary Model of Hunter-Gatherer Settlement
in Central Florida. The Florida Anthropologist
39:24-56.
- Daniel, I. Randolph and Michael Wisenbaker
1987 Harney Flats. Baywood Publishing Company,
Farmingdale., New York.
- Durnford, C.D.
1895 The Discovery of Aboriginal Rope and Wood Imple-
ments in the Mud in West Florida. American
Naturalist 29:1032-1039.
- Ehrenhard, John E., Robert S. Carr and Robert C. Taylor
1978 The Archaeological Survey of the Big Cypress
National Preserve: Phase I. National Park
Service, Southeast Archaeological Center, Talla-
hassee.
- Fradkin, Arlene
1976 The Wightman Site: A Study of Prehistoric Culture
and Environment on Sanibel Island, Lee County,
Florida. M.A. Thesis on file Department of
Anthropology, University of Florida, Gainesville.
- Fritz, Florence
1963 Unknown Florida. University of Miami Press, Coral
Gables, Florida.
- Gilliland, Marion S.
1975 The Material Culture of Key Marco, Florida.
University Presses of Florida, Gainesville.
- Goggin, John M.
1939 A Ceramic Sequence for South Florida. New Mexico
Anthropologist 3:35-40.
1947 A Preliminary Definition of Archaeological Areas
and Periods in Florida. American Antiquity
13:114- 127.
1949a Cultural Occupation at Goodland Point, Florida.
Florida Anthropologist 2:65-91.
1949b Cultural Traditions in Florida Prehistory. In The
Florida Indian and His Neighbors, edited by John
W. Griffin. Inter-American Center, Rollins Col-
lege, Winter Park.
- Goggin, John M. and William T. Sturtevant
1964 The Calusa: A Stratified Non-Agricultural Society
(With Notes on Sibling Marriage). In Explorations
in Cultural Anthropology: Essays in Honor of

George Peter Murdock, edited by Ward Goodenough,
pp. 179-219. McGraw-Hill, New York.

Goodyear, Albert C. and Lyman O. Warren
1972 Further Observations on the Submarine Oyster Shell
Deposits of Tampa Bay. Florida Anthropologist
25(2, part 1):52-66.

Griffin, John W.
1949 Notes on the Archaeology of Useppa Island.
Florida Anthropologist 2:92.
1974 Archaeology and Environment in South Florida. In
Environments of South Florida: Present and Past,
edited by Patrick J. Gleason, pp. 342-346. Memoir
2: Miami Geological Society, Miami.

Griffin, John W., Sue B. Richardson, Mary Pohl, Carl D. MacMur-
ray, C. Margaret Scarry, Suzanne K. Fish, Elizabeth S. Wing,
L. Jill Loucks, and Marcia K. Welch
1984 Excavations at the Granada Site: Archaeology and
History of the Granada Site, Volume I. Florida
Division of Archives, History and Records Manage-
ment, Tallahassee.

Grismer, Karl H.
1949 The Story of Fort Myers. The St. Petersburg
Printing Company, Inc., St. Petersburg.

Hammond, E.A.
1973 The Spanish Fisheries of Charlotte Harbor.
Florida Historical Quarterly 51:355-380.

Klein, Howard
1954 Ground Water Resources of the Naples Area, Collier
County, Florida. Florida Geological Survey Report
of Investigations No. 11.

Lane, Ed
1980 Environmental Geology Series West Palm Beach
Sheet. Florida Bureau of Geology Map Series
No. 100, Tallahassee.

Laxson, D.D.
1966 The Turner River Jungle Gardens Site, Collier
County, Florida. Florida Anthropologist 19:125--
140.

Lewis, Clifford M.
1978 The Calusa. In Tacachale: Essays on the Indians
of Florida and Southeastern Georgia During the
Historic Period, edited by Jerald Milanich and

Samuel Proctor, pp. 19-49. University Presses of Florida, Gainesville.

Long, Robert W.

1974 Origin of the Vascular Flora of South Florida. In Environments of South Florida: Present and Past, edited by Patrick J. Gleason, pp. 28-36. Memoir 2: Miami Geological Society, Miami.

Luer, George M. and Marion M. Almy

1980 The Development of Some Aboriginal Pottery of the Central Peninsular Gulf Coast of Florida. Florida Anthropologist 33:207-225.

Marquardt, William H.

1984 The Josslyn Island Mound and Its Role in the Investigation of Southwest Florida's Past. Miscellaneous Project Report Series No. 22, Department of Anthropology, Florida State Museum, University of Florida, Gainesville.

McCoy, H.J.

1962 Ground Water Resources of Collier County, Florida. Florida Geological Survey Report of Investigation No. 31.

McMichael, Alan E.

1982 A Cultural Resource Assessment of Horrs Island, Collier County, Florida, M.A. Thesis on file Department of Anthropology, University of Florida, Gainesville.

Milanich, Jerald T., J. Chapman, A.S. Cordell, S. Hale and R.A. Marrinan

1984 Prehistoric Development of Calusa Society in Southwest Florida: Excavations at Useppa Island. In Perspectives on Gulf Coast Prehistory, edited by Dave D. Davis, pp. 258-314. University Presses of Florida, Gainesville.

Milanich, Jerald T. and Charles H. Fairbanks

1980 Florida Archaeology. Academic Press, New York.

Morris, Allen

1974 Florida Place Names. University of Miami Press, Coral Gables, Florida

Puri, Harbans S. and Robert O. Vernon

1964 Summary of the Geology of Florida and A Guidebook to the Classic Exposures. Florida Geological Survey Special Publication No. 5, Tallahassee.

Ruppe, Reynold J.

- 1980 The Archaeology of Drowned Terrestrial Sites: A Preliminary Report. In Bureau of Historic Sites and Properties Bulletin No. 6. Florida Division of Archives, History, and Records Management, Tallahassee.

Scholl, David W.

- 1964a Recent Sedimentary Record in Mangrove Swamps and Rise in Sea Level Over the Southwest Coast of Florida, part 1. Marine Geology 1:344-366.
- 1964b Recent Sedimentary Record in Mangrove Swamps and Rise in Sea Level Over the Southwest Coast of Florida, part 2. Marine Geology 1:343-364.

Sears, William H.

- 1956 The Turner River Site, Collier County, Florida. Florida Anthropologist 9:47-60.
- 1967 Archaeological Survey in the Cape Coral Area at the Mouth of the Caloosahatchee River. Florida Anthropologist 20:93-102.

Smith, Hale G. and Mark Gottlob

- 1978 Spanish-Indian Relationships: Synoptic History and Archeological Evidence, 1500-1763. In Tacachale: Essays on the Indians of Florida and Southeastern Georgia during the Historic Period, edited by Jerald T. Milanich and Samuel Proctor, pp.1-18. University Presses of Florida, Gainesville.

Swanton, John R.

- 1979 The Indians of the Southeastern United States. Smithsonian Institution Press, Washington, D.C.

Taylor, Robert

- 1980 Archaeological Survey of Big Cypress National Preserve. Southeastern Archaeological Conference Bulletin 23:49-50.

Tebeau, Charlton

- 1966 Florida's Last Frontier: The History of Collier County. University of Miami Press, Miami.
- 1971 A History of Florida. University of Miami Press, Miami.

Upchurch, Sam B., Richard N. Strom and Mark G. Nuckels

- 1982 Method of Provenance Determination of Florida Cherts. On file Department of Geology, University of South Florida, Tampa.

- Van Beck, John C. and Linda M. Van Beck
1965 The Marco Midden, Marco Island, Florida. Florida Anthropologist 31(2, Part 1):64-73.
- Watts, W.A.
1971 Post Glacial and Interglacial Vegetation History of Southern Georgia and Central Florida. Ecology 52:676-690.
- White, William A.
1970 The Geomorphology of the Florida Peninsula. Florida Geological Survey Bulletin No. 51, Tallahassee.
- Widmer, Randolph J.
1983 The Evolution of the Calusa, A Non-Agricultural Chiefdom on the Southwest Florida Coast. Phd. Dissertation on file Department of Anthropology, Pennsylvania State University.

Appendix A:
COMPLETED FLORIDA MASTER SITE FILE FORMS

ARCHAEOLOGICAL SITE FORM FLORIDA MASTER SITE FILE

Site #8 L1 1441

☒ original
☐ update

Version 1.1: 11/88

Recorder # _____

Field Date _____

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 ☐ NW

(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

☐ aboriginal boat

☐ fort

☐ road segment

FUNCTION

☒ none specified

DENSITY

☐ unknown

☐ agric/farm bldg

☐ midden

☐ shell midden

☐ campsite

☒ single artifact

☐ wetland fresh

☐ burial mound

☐ mill unspecified

☐ shell mound

☐ extractive site

☐ diffuse scatter

☐ wetland salt/tidal

☐ building remains

☐ mission

☐ shipwreck

☐ habitatn/homestead

☐ dense scatter > 2/m²

☐ cemetery/grave

☐ mound unspecif

☐ subsurface features

☐ farmstead

☐ variable density

☐ underwater

☐ dump/refuse

☐ plantation

☐ well

☐ village/town

☐ earthworks

☐ platform mound

☐ wharf/dock

☐ quarry

OTHER _____

HISTORIC CONTEXTS (All that apply)

☐ unknown culture

☒ aboriginal unspecif

☐ hist unspecified

ABORIGINAL:

☐ Early Archaic

☐ Glades IIb

☐ Manasota

☐ St. Johns unspecif

☐ Swift Creek

☐ Alachua

☐ Early Swift Creek

☐ Glades IIc

☐ Middle Archaic

☐ St. Johns I

☐ Transitional

☐ Archaic unspc.

☐ Englewood

☐ Glades III

☐ Mount Taylor

☐ St. Johns Ia

☐ Weeden Island

☐ Belle Glade

☐ Fort Walton

☐ Glades IIIa

☐ Norwood

☐ St. Johns Ib

☐ Weeden Island I

☐ Belle Glade I

☐ Glades unspecif

☐ Glades IIIb

☐ Orange

☐ St. Johns II

☐ Weeden Island II

☐ Belle Glade II

☐ Glades I

☐ Glades IIIc

☐ Paleo-Indian

☐ St. Johns IIa

☐ Belle Glade III

☐ Glades Ia

☐ Hickory Pond

☐ Pensacola

☐ St. Johns IIb

☐ Belle Glade IV

☐ Glades Ib

☐ Late Archaic

☐ Perico Island

☐ St. Johns IIc

☐ Cades Pond

☐ Glades II

☐ Late Swift Creek

☐ Safety Harbor

☐ Santa Rosa

☐ prehistc-aceramic

☐ Deptford

☐ Glades IIa

☐ Leon-Jefferson

☐ St. Augustine

☐ Seminole

☐ prehistc-ceramic

NONABORIGINAL:

☐ 1st Spn 1700-63

☐ Amer Terr 1821-44

☐ Postrecn 1880-97

☐ Depress 1930-40

☐ American 1821-

☐ 1st Spanish unsp

☐ Brit 1763-1783

☐ Statehood 1845-60

☐ SpWar 1898-1916

☐ WW II 1941-49

☐ American 1821-99

☐ 1st Spn 1513-99

☐ 2dSpn 1783-1821

☐ Civil War 1861-65

☐ WW I 1917-1920

☐ Modern 1950-

☐ American 1900-

☐ 1st Spn 1600-99

☐ Reconstr 1866-79

☐ Boom 1921-1929

☐ Afro-American

OTHER _____

RECORDER'S EVALUATION OF SITE

Eligible for National Register? ☐ yes ☒ no

☐ likely, need information

☐ insufficient information

Significant as part of district? ☐ yes ☒ no

☐ likely, need information

☐ insufficient information

Significant at the local level? ☐ yes ☒ no

☐ likely, need 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:

Yes ☐ No ☐ Date _____

SHPO EVALUATION OF ELIGIBILITY:

Yes ☐ No ☐ Date _____

LOCAL DETERMINATION OF ELIGIBILITY:

Yes ☐ No ☐ Date _____

Local Office _____

DHR USE ONLY

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)

1 _____ N= _____ 4 _____ N= _____
2 _____ N= _____ 5 _____ N= _____
3 _____ N= _____ 6 _____ N= _____
4 _____ 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 O-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

XXX original
— update

HISTORICAL STRUCTURE FORM
FLORIDA MASTER SITE FILE

Site 8L1 1442
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 Two-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 * *

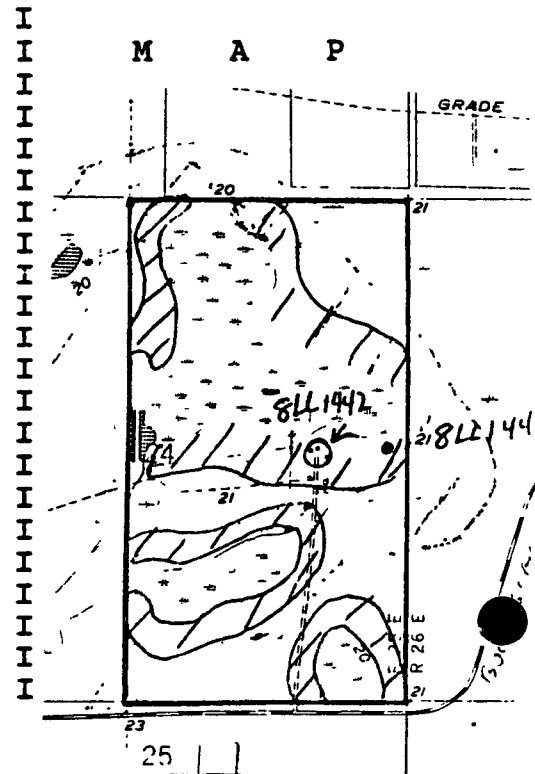
RECORDER INFORMATION: NAME F Howard M F. L Hansen
 DATE: MO 5 YR 90 AFFILIATION PAR

PHOTOGRAPHS (Attach a labeled print bigger than contact size)

LOCATION OF NEGATIVES PARNEGATIVE NUMBERS

P H O T O G R A P H

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.



Section 11



SECTION 11.0
NOISE IMPACT STUDY
AND
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:

$$SPL = 10 \log \left(\frac{I}{10^{-12}} \right)$$

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.

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.

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 11-8

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 11-7
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 11-9 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.

$$\text{Loss} = 20 * \log (D/D_{ref})$$

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.

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**

**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								
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								2.4

**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								

**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								52.5
Increase in noise level								0.5

**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 (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/Ventilation								
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								9.1

**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	30.0	2.62E-12	42
Generator	1	100	3	1500	54.0	30.0	4.00E-11	160
Turbine	1	90	3	1500	54.0	30.0	4.00E-12	60
Stack	1	75	3	1700	55.1		9.85E-11	199
Dry Scrubber/Baghouse	5	85	3	1600	54.5	30.0	5.56E-12	74
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	10
Fan/Vent								
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	292
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	192
Materials Handling								
Material Handling - Crane	1	82	4	1550	51.8	20.0	1.06E-11	102
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	140
Scale - Trucks Idling	1	89.5	5	950	45.6		2.47E-08	439

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

1.0

**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	42
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								50.0
Future noise level								50.4
Increase in noise level								

**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								0.1

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								0.1

**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								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)
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								55.0
Future noise level								55.1
Increase in noise level								0.1

**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	
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								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 9.3

**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								1.9

**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	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								42.0
Future noise level								45.6
Increase in noise level								3 6

**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								

**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 18.6

**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								
Boller	5	82	3	1650	54.8	30.0	2.62E-12	42
Generator	1	100	3	1500	54.0	30.0	4.00E-11	160
Turbine	1	90	3	1500	54.0	30.0	4.00E-12	60
Stack	1	75	3	1700	55.1		9.85E-11	199
Dry Scrubber/Baghouse	5	85	3	1600	54.5	30.0	5.56E-12	74
Cooling Tower	1	72	25	1500	35.6		4.40E-09	364
Deaerator	1	85	3	1500	54.0	30.0	1.26E-12	10
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	292
Induced Draft Fan	4	106	3	1650	54.8	20.0	5.26E-09	372
Draft Fans - Enclosure	8	95	3	1650	54.8	30.0	8.36E-11	192
Materials Handling								
Material Handling - Crane	1	82	4	1550	51.8	20.0	1.06E-11	102
Tipping Floor	1	112	3	1550	54.3	20.0	5.94E-09	377
Residue Handling	1	90	3	1900	56.0	20.0	2.49E-11	140
Scale - Trucks Idling	1	89.5	5	950	45.6		2.47E-08	439

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		5.6

**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)
Boiler/Generator/Stack								
Boiler	5	82	3	1650	54.8	30.0	2.62E-12	42
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								

**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)
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								39.0
Future noise level								41.8
Increase in noise level								2.8

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								

**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)
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								39.0
Future noise level								41.3
Increase in noise level								2.3

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 (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								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 (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	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								2.1

**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								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 Hunt
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. 10 p.m.- 7 a.m.	66 68 <u>55</u>
Commercial or Business	7 a.m.-10 p.m. 10 p.m.- 7 a.m.	72 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: Betty L. LaCoste
Deputy Clerk

By: [Signature]
Chairman

Poor Original

(131-N)

Approved 8-10-83
James Upsher
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 or its successor agency 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 Robert L. Justice
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

By: James S. Ishee
Deputy Clerk

BOARD OF COUNTY COMMISSIONERS
OF LEE COUNTY, FLORIDA

By: Donald 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 TRAFFIC IMPACT STUDY

Florida Transportation Engineering

Poor Original

TRAFFIC IMPACT STATEMENT

for

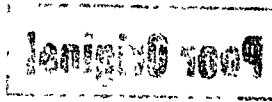
LEE COUNTY ENERGY

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

IMAGE QUALITY

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

TABLE 1

**HOURLY DISTRIBUTION OF INCREASED TRAFFIC VOLUME
FOR YEAR 2010 VEHICLE TRIPS**

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

^aIt 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.

^bExisting peak traffic volume hours.

^cEstimated facility peak traffic volume hours.

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

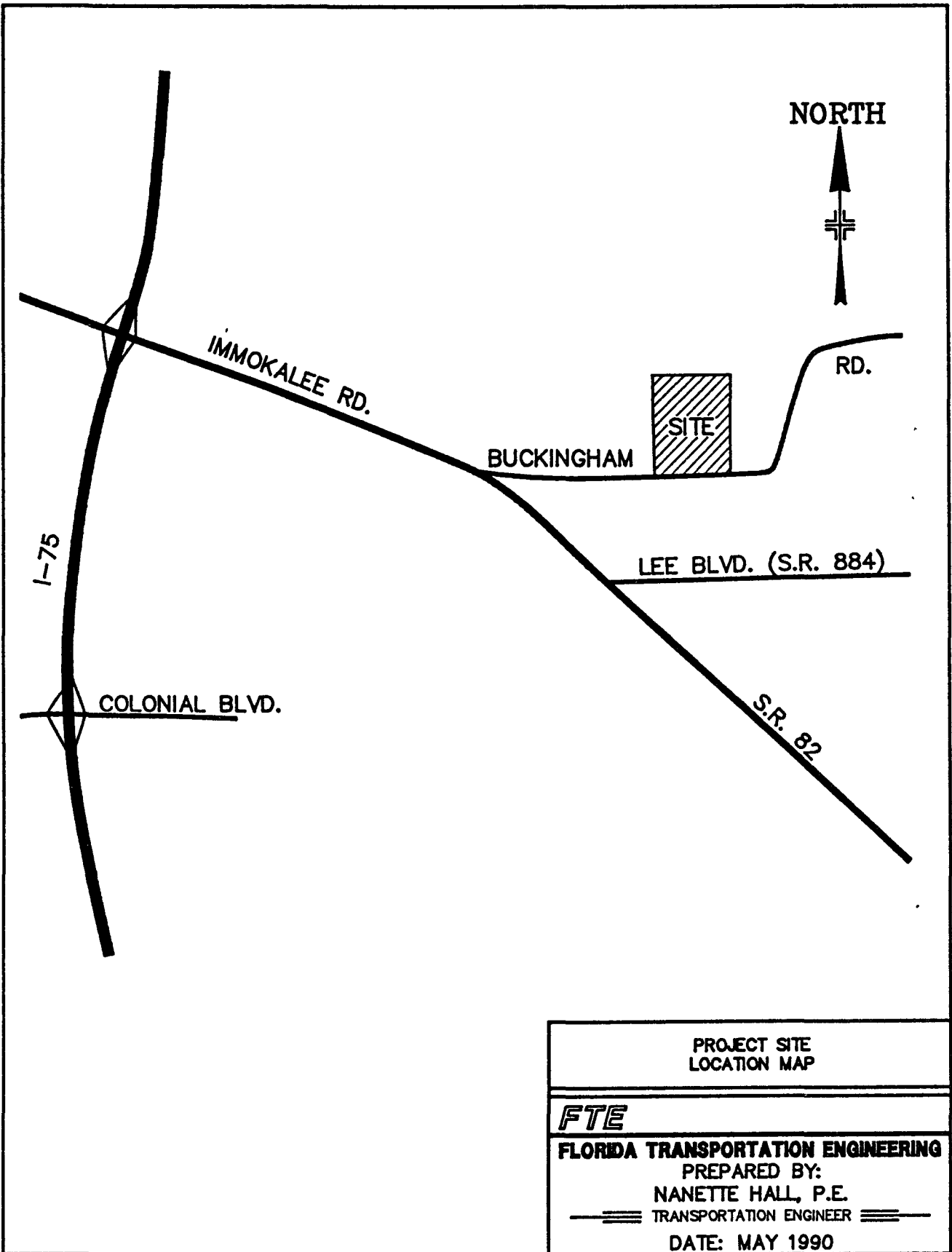
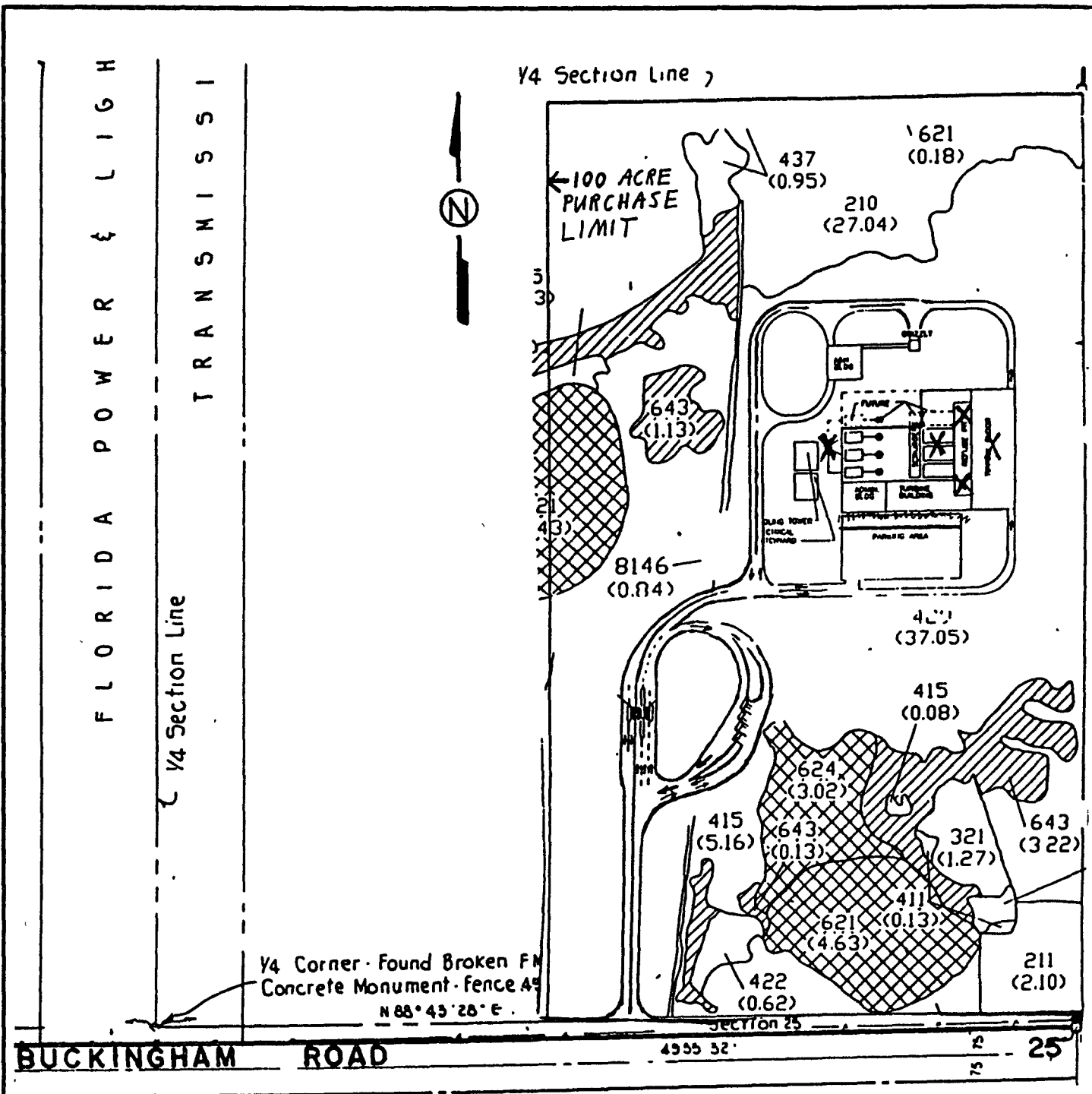


EXHIBIT 1



SITE PLAN

FTE

FLORIDA TRANSPORTATION ENGINEERING

PREPARED BY:

NANETTE HALL, P.E.

TRANSPORTATION ENGINEER

DATE: MAY 1990

SCALE: 1" = 40'-0"

EXHIBIT 2

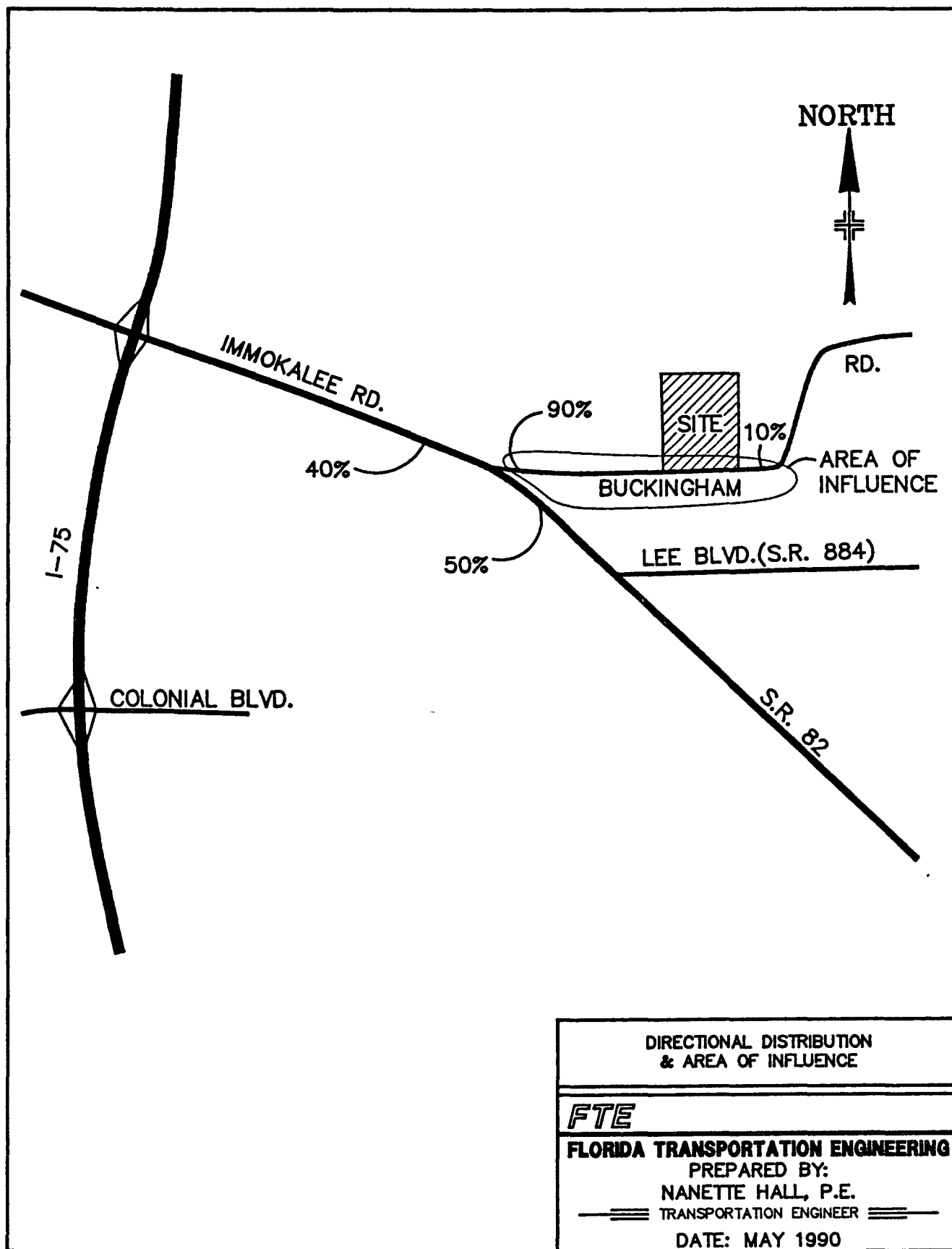


EXHIBIT 3

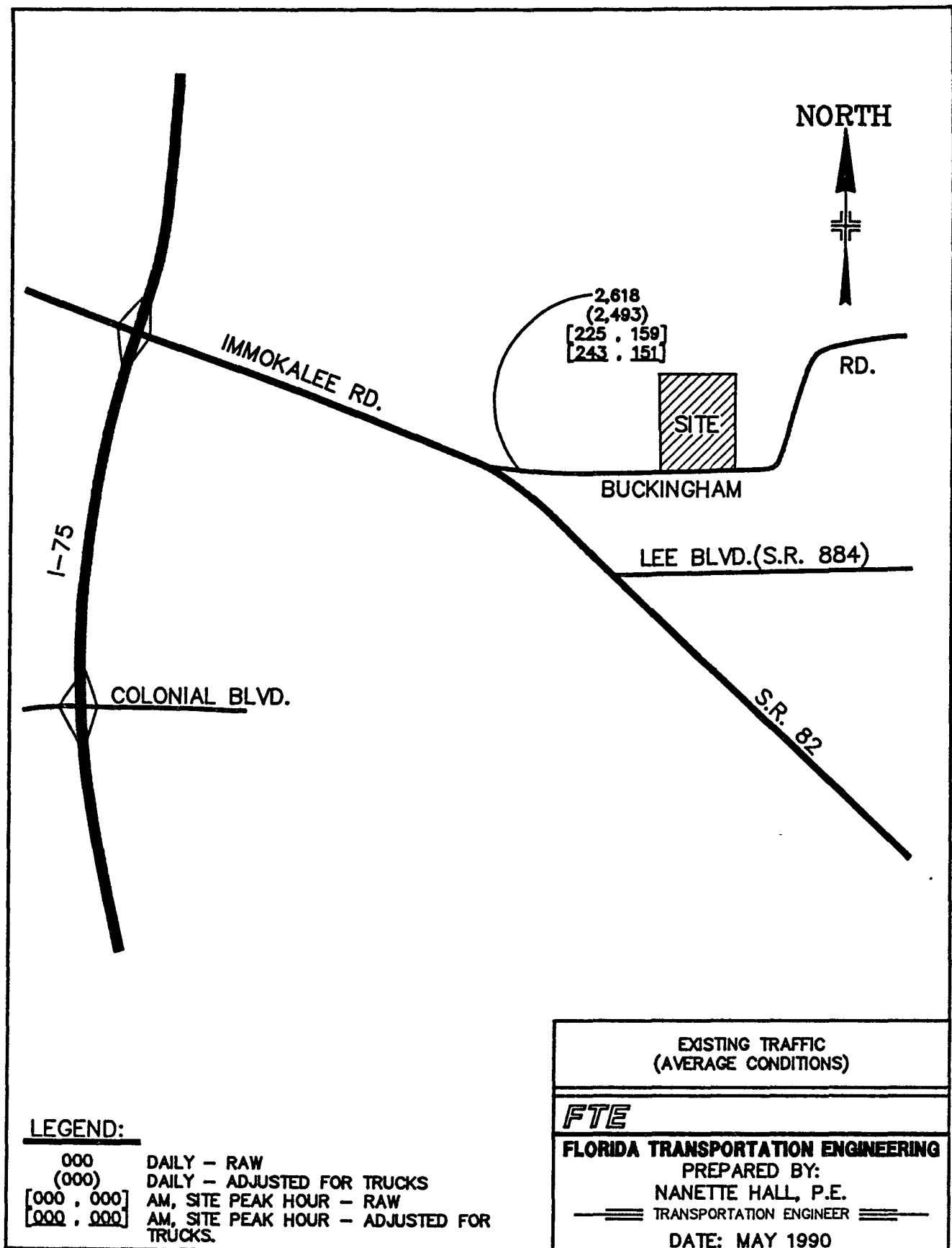


EXHIBIT 4

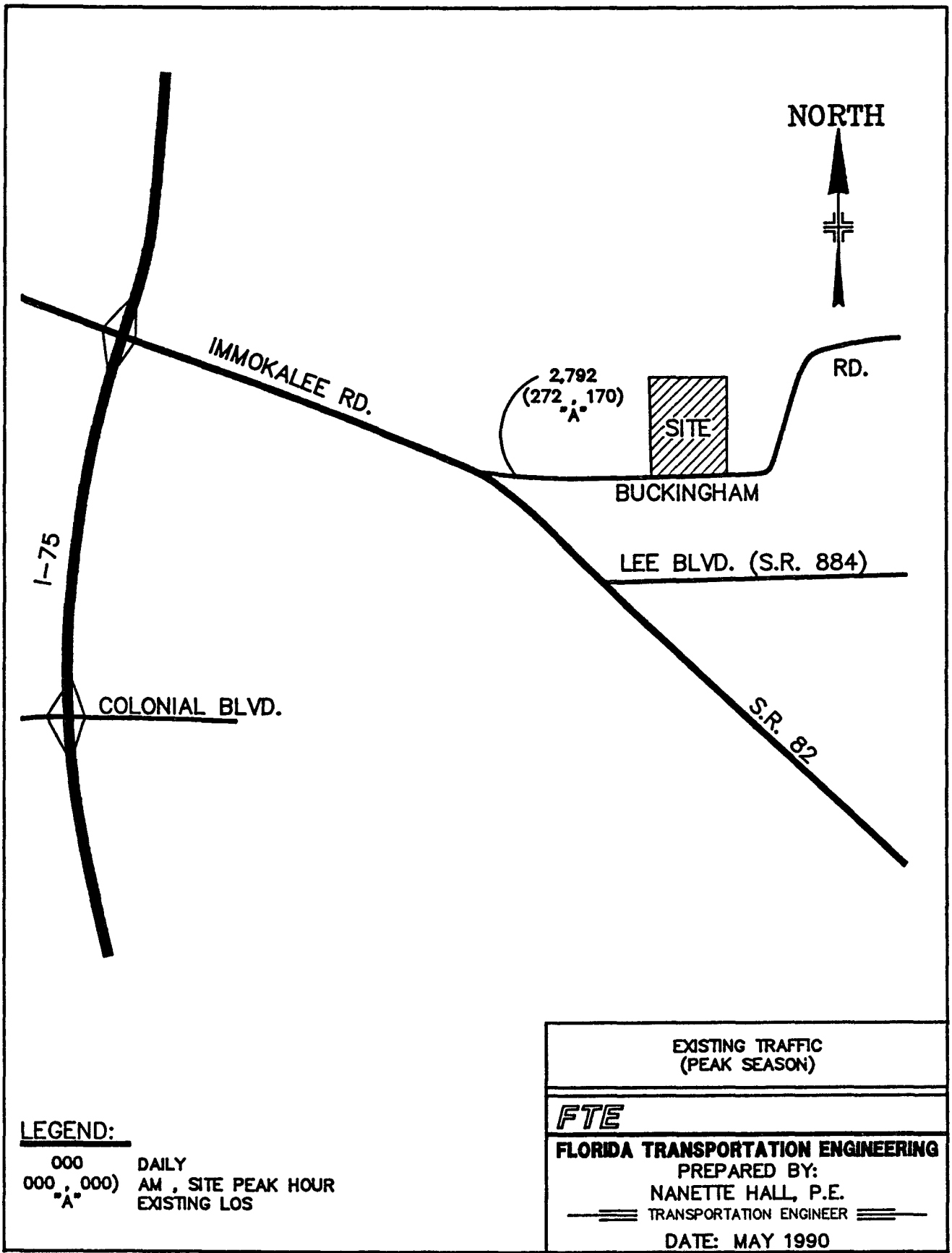


EXHIBIT 5

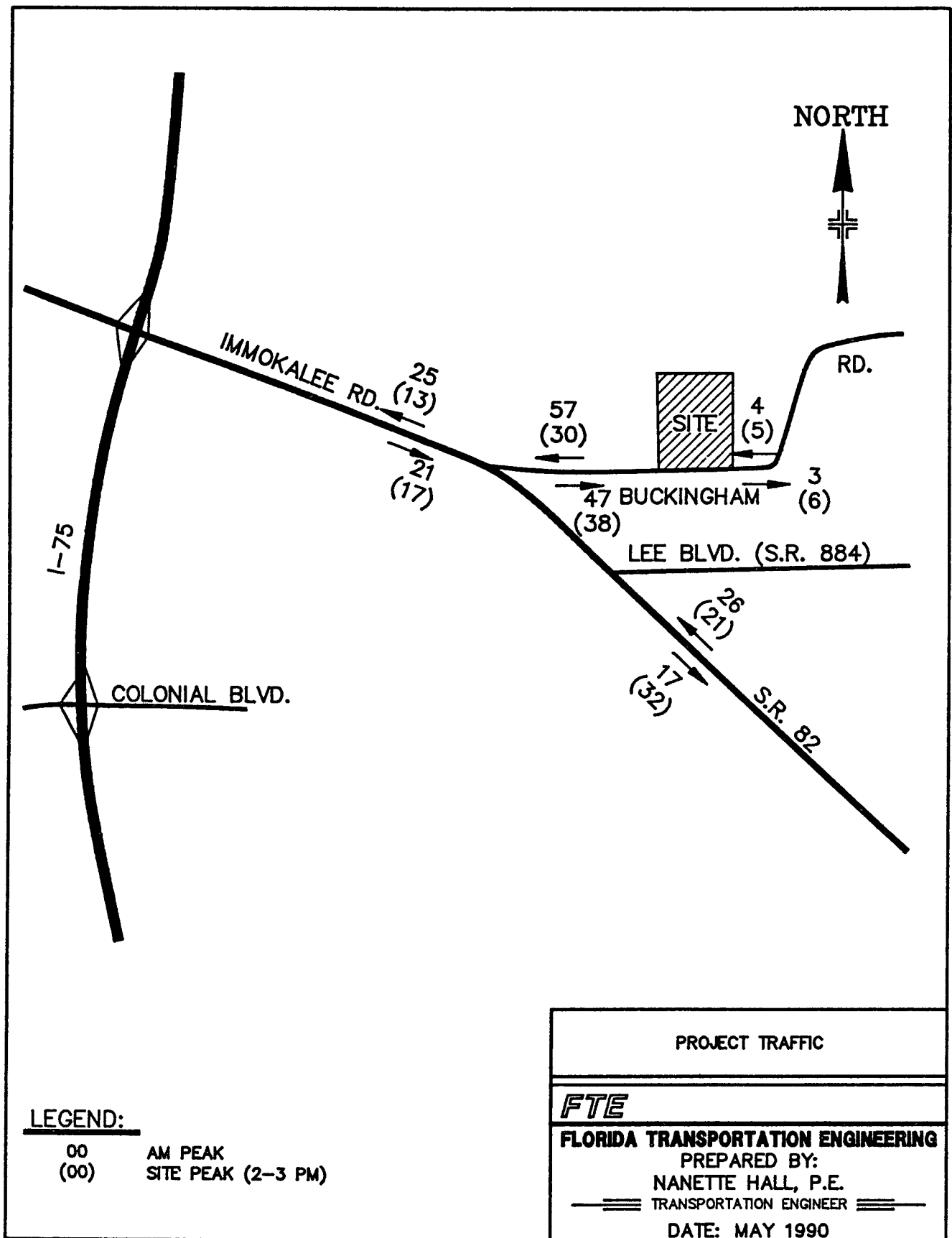


EXHIBIT 6

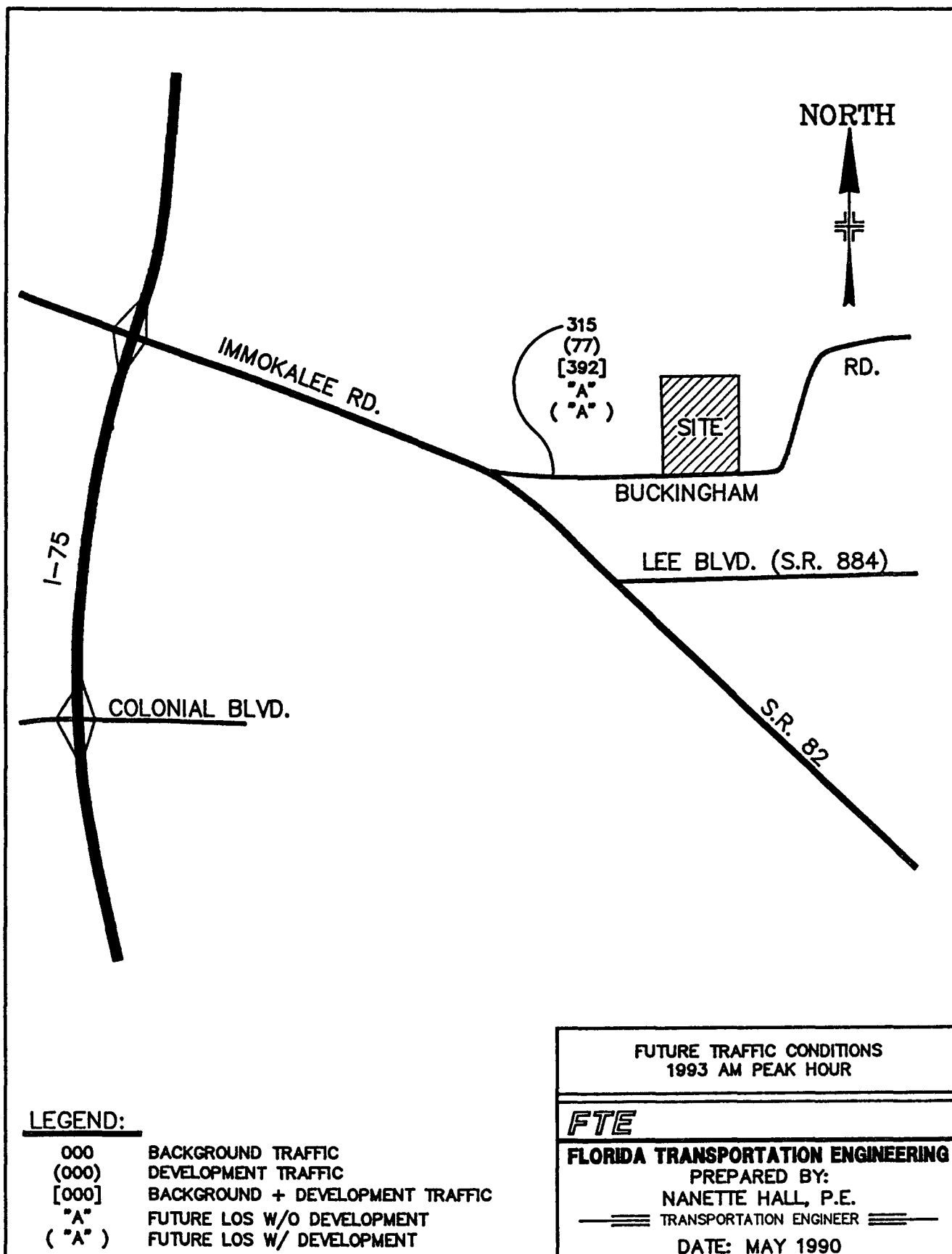


EXHIBIT 7

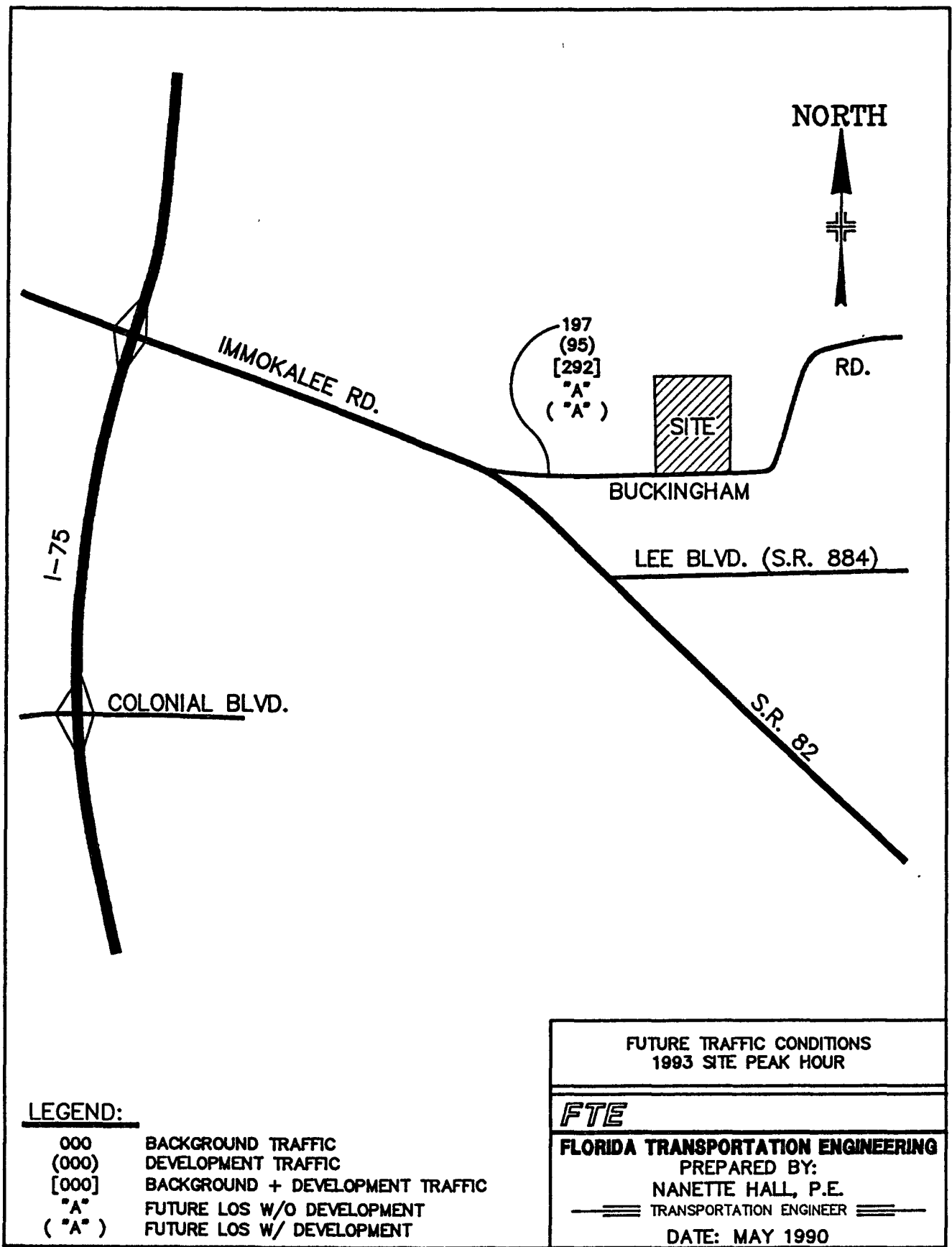


EXHIBIT 8

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
 Real 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 - 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).

5/16/90

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 - 07:49 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
 Real 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).

5/16/90

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 : 123EB -- 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.

Section 12

SECTION 12.0

ECOLOGICAL STUDIES METHODOLOGY

APPENDIX 12.0

ECOLOGICAL STUDIES METHODOLOGY

This appendix contains the methodology used in conducting the ecological studies provided in Sections 2.3.5 (Vegetation/Land Use) and 2.3.6 (Ecology) of Volume I.

The ecological studies identified 17 land use and vegetation types on the Lee County energy recovery facility site: farm pasture, low pasture, palmetto prairie, palmetto prairie invaded by exotics, pine flatwoods, pine flatwoods invaded by exotics, wet pine flatwoods, wet pine flatwoods invaded by exotics, Brazilian pepper, mesic oak, wax-myrtle, Australian pine, drainage canal, cypress, cypress/pine, cypress/pine invaded by exotics, and wet prairie. Eight of these are considered wetland habitats; however, they have been severely impacted from drainage practices, cattle grazing, and logging. In fact, most of the habitats on the site are in poor condition.

A total of 126 wildlife species were expected to occur on the site; however, only 39 species were actually observed during over 100 hours of observation by four ecologists during March and April 1990. The species and habitats on the site are common to Lee County and southwest Florida; there are no species that are endemic or unique to this site. Of the wildlife species observed, four are listed as species of special concern: the tricolored heron, the snowy egret, the little blue heron, and the big cypress fox squirrel. The proposed Facility would have minimal affect on the habitats of these species; in fact, the restoration and protection of buffer areas and the restoration of the pine habitats would most likely improve the habitats of these four wildlife species which have already been environmentally stressed.

THREATENED AND ENDANGERED SPECIES SURVEY METHODOLOGY

Lee County Ordinance No. 89-34 requires a survey to identify and locate animal and plant species on the Lee County Protected Species List prior to development. This ordinance specifies a methodology to be utilized to conduct the survey but also allows the use of an alternate method, subject to County approval. The methodology described below has been utilized extensively throughout southern Florida, including Lee, Collier, and Charlotte Counties. This methodology has been utilized in the preparation of Environmental Impact Statements (EIS), Developments of Regional Impact (DRI), rezone applications, real estate evaluation reports, and wildlife surveys for the GFC and USFWS.

The following methodology has been drafted based on the experience and expertise of and for the primary use of Kevin L. Erwin Consulting Ecologist, Inc. Therefore, it is strongly recommended that this alternative methodology only be utilized by personnel with similar levels of experience and familiarity with the flora and fauna of southwest Florida. The proposed alternative methodology is presented below. This methodology is to be utilized on projects of 40.0 acres or greater total size.

STEP ONE:

Alternative

All major upland and wetland vegetation associations onsite are delineated on recent 1"= <400' aerial photography by a qualified ecologist or field biologist. Those habitats are mapped utilizing the Florida Land Use, Cover, and Forms Classification System (FLUCCS), Level III or Level IV. Extensive ground truthing is performed to ensure the accuracy and completeness of the mapping effort. The acreage of each individual FLUCCS mapping unit is calculated and depicted on the vegetation map (Figure 1). A cumulative acreage total for each FLUCCS is provided as Table 1 (Table 1 may be included on the vegetation map).

STEP TWO:

Alternative

The list of FLUCCS, Level III or IV codes compiled during Step One are compared to the FLUCCS codes presented in the Lee County Protected Species List.

STEP THREE:

Alternative

For each FLUCCS mapping unit suitable for Lee County Listed Species an intensive pedestrian survey is conducted. The pedestrian survey consists of a sufficient number of parallel, over lapping belt transects through all of the suitable habitat to insure that 100 percent visual coverage of ground and flora is attained. The number of transects through each FLUCCS is recorded. This includes thorough coverage of all edges or ecotones between differing habitat types. The spacing between adjacent belt transects is dependent on the type of habitat and the density of the vegetation. Pedestrian surveys will be conducted by a minimum of two (2) qualified ecologists or field biologists, as approved by the County Administrator. The approximate location of all Lee County Listed Species (sightings and signs) are identified on the aerial or vegetation map. This methodology will be utilized by only those persons with an educational equivalent to a Bachelor of Science (B.S.) in ecological science and two (2) years ecological consulting/government experience.

STEP FOUR

Alternative

The number of individuals of each Lee County Listed Species found onsite is calculated using one or two methods. The selection of the appropriate method is guided by the approximate densities and habitat sizes tabulated in Steps 1 and 3. Method 1, which consists of counting all individuals onsite will be utilized for all surveys. Following the completion of Method 1, if it is determined that the species occurs over large areas (75.0 acres) the area will be intensively subsampled as described in Method 2. The results of the abundance and density calculations utilizing both Methods 1 and 2 will be reported. When utilized, the results of Method 2 will be assumed to be the most accurate.

Method 1: This method is appropriate to calculate abundance and density for use with all species which are found to occur onsite within small areas (<5.0 acres of total suitable habitat). The location and number of all individuals is recorded for each FLUCCS habitat. The abundance and density calculated as follows:

$$\begin{aligned}\text{Abundance} &= \text{sum of } n_i \\ \text{Density} &= (\text{sum of } n_i)/A\end{aligned}$$

Where n_i is the number of individuals observed in belt transect i , and A is the acreage of the FLUCCS habitat.

Method 2: This method is appropriate to calculate abundance and density for use with species which are found to occur onsite within large areas (>5.0 acres of total suitable habitat). The number of individuals within belt transects of a standard width and a known variable length are recorded. A sufficient number of linear feet of transect is sampled to insure that 10 - 20 percent of the habitat is sampled. The location of these sampling transects are indicated on the vegetation map. The density and abundance is calculated as follows:

$$\begin{aligned}\text{Abundance} &= \{(\text{sum of } n_i)/[(t_L \times t_w)/43560]\} \times A \\ \text{Density} &= (\text{sum of } n_i)/[(t_L \times t_w)/43560]\end{aligned}$$

Where n_i is the number of individuals recorded on transect i , t_L is the total length of all transects, t_w is the transect width, and A is the acreage of the FLUCCS habitat. The abundance and density calculated in this step will be compiled by species in Table 3.

In cases where evidence is by sighting or sign that does not provide abundance and density information, such as gopher tortoise burrows or red-cockaded cavity trees, a further characterization of activity/inactivity will be pursued as outlined in Step Five Alternative.

STEP FIVE:

Alternative

The identification of the presence of certain Lee County Listed Species onsite requires addition population characterization. Subsequent to the documentation of red-cockaded woodpeckers (Picoides borealis) or gopher tortoises (Gopherus polyphemus) onsite further sampling is performed to accurately assess population size.

Gopher tortoise

- a) Active and inactive gopher tortoise burrows identified in each FLUCCS code are subdivided into categories based on FLUCCS code.
- b) Approximately 25% (5 minimum and 30 maximum) of all active and inactive burrows are stick trapped for a period of four consecutive days (daytime high temperature must equal or exceed 70°F on each day).
- c) Daily and mean gopher tortoise occupancy correction factors are calculated for each FLUCCS code category as follows:
 1. Daily correction factor = sum of active burrows/ numbers of burrows sampled.
 2. Mean correction factor = sum of daily correction factors/4.

- d) The density of gopher tortoises is calculated for each FLUCCS code category as follows:
 - 1. Density = mean correction factor x number of burrows per acre.
- e) The abundance of gopher tortoises is calculated for each FLUCCS code category as follows:
 - 1. Abundance = density x acreage of FLUCCS code category.

Red-cockaded Woodpecker

- a) All active and inactive cavity hole and start hole trees are identified and located on the aerial.
- b) A series of no less than four (4) early morning or late afternoon stake outs are conducted to determine the activity status of each cavity tree.
- c) On no less than four mornings the red-cockaded woodpeckers are followed from the time they emerge from the cavity trees in order to estimate clan size and foraging range.

Site specific circumstances may require that differing methodologies be utilized to accurately characterize the abundance and density of Lee County Listed Species onsite. Approval of the County Administrator will be obtained prior to the utilization of an alternative sampling methodology. These population characterizations will be performed by qualified ecologists or field biologists utilizing methodologies consistent with Florida Game and Fresh Water Fish Commission (FGFWFC) guidelines or other recognized professional standards and will be submitted to the County for approval.

STEP SIX:

Alternative

The completed survey would include:

- 1. Vegetation map or aerial depicting the location, configuration, and acreage of all FLUCCS mapping units; and
- 2. Table 1 - an acreage summary and percent of total site for each FLUCCS code; and

3. Table 2 - the abundance and density of observed Lee County Listed Species presented by species; and
4. The calculations utilized to produce the abundance and density figures; and
5. The name(s) of personnel who conducted the survey, the survey date(s) and the survey time(s); and
6. Proposed methodology for additional field work (if required).

Table 1.

ACREAGE AND PERCENT OF TOTAL PROPERTY FOR
EACH FLUCCS MAPPING UNIT

<u>FLUCCS, LEVEL III AND IV</u>	<u>ACRES</u>	<u>PERCENT</u>
321 Palmetto Prairie	6.35	15.27
411 Pine Flatwoods	21.00	50.52
4119 Pine Flatwoods/Invaded by Exotics	9.45	22.73
424 Melaleuca	0.49	1.17
621 Cypress	1.90	4.57
6219 Cypress/Invaded by Exotics	0.92	2.21
624 Cypress - Pine	0.21	0.50
6249 Cypress - Pine/Invaded by Exotics	1.24	2.98
TOTAL	<u>41.56</u>	<u>100.00</u>

Table 2. ABUNDANCE AND DENSITY CALCULATIONS FOR LEE COUNTY LISTED SPECIES OBSERVED ONSITE

<u>Species</u>	<u>FLUCCS</u>	<u>Transects Through FLUCCS</u>	<u>Present/ Absent</u>	<u>METHOD 1</u>		<u>METHOD 2</u>		<u>Comments:</u>
				<u>Abundance</u>	<u>Density</u>	<u>Abundance</u>	<u>Density</u>	
Gopher Tortoise	321 (3.35 ac.)	7	P	9	2.7	-	-	burrow occupancy correction factor = 0.31
	321 (1.76 ac.)	4	P	3	1.7	-	-	burrow occupancy correction factor = 0.42
	321 (0.17 ac.)	1	A	-	-	-	-	
	321 (0.67 ac.)	3	A	-	-	-	-	
	411 (14.17 ac.)	21	P	10	0.7	12	0.8	burrow occupancy correction factor = 0.38
	411 (6.39 ac.)	11	A	-	-	-	-	
	411 (0.44 ac.)	2	A	-	-	-	-	

THREATENED AND ENDANGERED SPECIES RATIONALE

STEP ONE:

Rationale

The initial mapping of the property is an extremely important step in the survey methodology. This should be done only by qualified personnel in order to ensure accuracy. Ground truthing is imperative. It is also important that the delineation be conducted to at least FLUCCS Level III. Existing development areas, FLUCCS codes 100 (Urban and Built-up) and 800 (Transportation, Communication and Utilities), should be mapped to Level I or Level II. The acreage of each individual FLUCCS mapping unit should be calculated and presented on the vegetation map so that separate areas of similar habitat type can be referenced. Cumulative totals for each FLUCCS code should be calculated and provided so that the quantity of the various habitats onsite can be easily reviewed by County staff.

STEP TWO:

Rationale

The process of reviewing the Lee County Protected Species List will ensure that the personnel conducting the survey are aware of all of the Lee County Listed Species which may potentially occur onsite. This will also document the knowledge of the species status by the personnel.

STEP THREE:

Rationale

The use of overlapping belt transects covering 100 percent of the suitable habitat and the ecotones virtually insures that any evidence (sighting, sign, etc.) of Lee County Listed Species will be found. It is absolutely imperative that only qualified personnel conduct the survey. The results of any survey will only be as accurate and reliable as the expertise of the personnel performing it.

STEP FOUR

Rationale

The use of these two methods for calculating species density and abundance will provide the maximum usable information for the effort and money expended. The size and distribution of a population of a species occurring in small areas can be best quantified by locating and counting all the individuals of the species. For populations which occur over greater areas intensively subsampling a smaller unit of the habitat is often appropriate.

STEP FIVE:

Rationale

In order to characterize the population of certain species further information is required. For example, the existence of 25 gopher tortoise burrows does not necessarily indicate that 25 tortoises are found onsite. Because the burrow occupancy rate may be quite low (<0.5 tortoise per burrow) the calculation of a site specific burrow occupancy correction factor should be calculated. This can be accomplished by stick trapping. Early morning and late afternoon surveys should be conducted to determine the activity status of red-cockaded woodpecker cavity trees. Forage range and clan size should also be determined.

STEP SIX:

Rationale

The submittal of this information will provide the County with a reliable estimate of Lee County Listed Species populations occurring onsite. The information can then be utilized by the County to evaluate the potential impact on Lee County Listed Species by the development of the subject property.

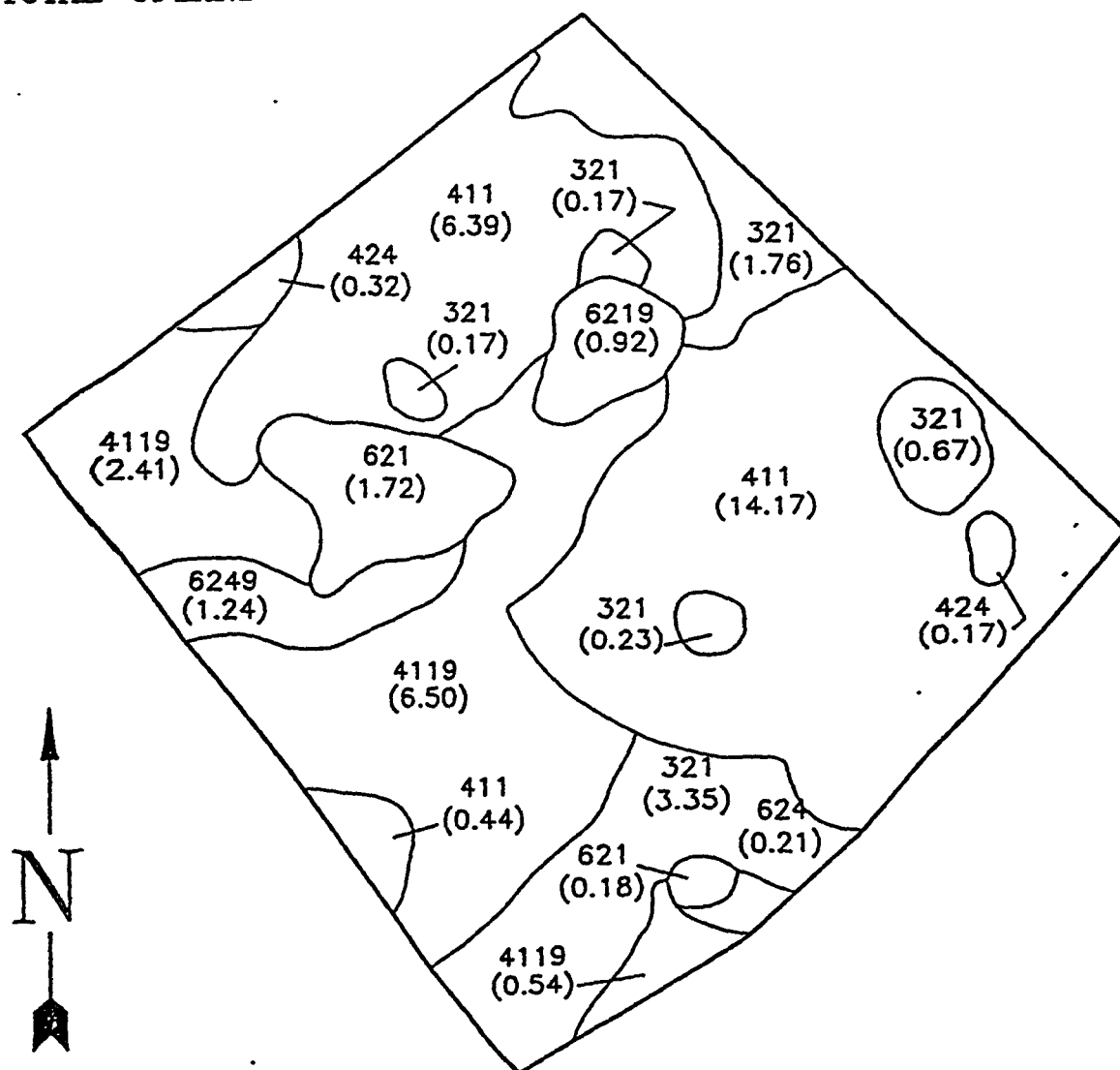
Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

FIGURE 1. FLUCFCS, Levels III and IV
Vegetation Map.

ACREAGE AND PERCENT OF TOTAL
PROPERTY FOR EACH FLUCFCS MAPPING UNIT

FLUCFCS, LEVEL III & IV	ACRES	PERCENT
321 Palmetto Prairie	6.35	15.27%
411 Pine Flatwoods	21.00	50.52%
424 Melaleuca	0.49	1.17%
4119 Pine Flatwoods/Invaded by Exotics	9.45	22.73%
* 621 Cypress	1.90	4.57%
* 624 Cypress - Pine	0.21	0.50%
* 6219 Cypress Invaded by Exotics	0.92	2.21%
* 6249 Cypress - Pine Invaded by Exotics	1.24	2.98%
TOTAL	41.56	100%
* TOTAL WETLAND	4.27	10.27%
TOTAL UPLAND	37.29	89.73%





United States Department of the Interior
FISH AND WILDLIFE SERVICE
P.O. BOX 2676
VERO BEACH, FLORIDA 32961-2676

April 13, 1990

Mr. William R. Cox, Ecologist
c/o Kevin L. Erwin Consulting Ecologist, Inc.
2077 Bayside Parkway
Fort Myers, Florida 33901

Dear Mr. Cox:

This letter is to provide you with an update on the known locations of endangered and threatened species within a 5-mile radius of the proposed Lee County Resource Recovery Site. We understand the site is located along the Caloosahatchee River near the intersection of S.R. 80 and S.R. 31, Fort Myers, Lee County, Florida.

Enclosed for your information are the following materials regarding species which may possibly be involved with your siting plans for the Lee County Resource Recovery Site:

1. A list of endangered and threatened species for Lee County.
2. A resource priority list for species found throughout Lee County.
3. Habitat management guidelines for the bald eagle in the southeast region.
4. Habitat management guidelines for the wood stork in the southeast region.

We hope this information is useful for your ecological analysis of the proposed site. If you have any further questions regarding species in that area, do not hesitate to contact Jack Gallagher at this office (407/562-3909).

Sincerely yours,


David L. Ferrell
Field Supervisor

Enclosures

cc:

FWS, Jacksonville, FL

LEE COUNTY

E = Endangered / T = Threatened

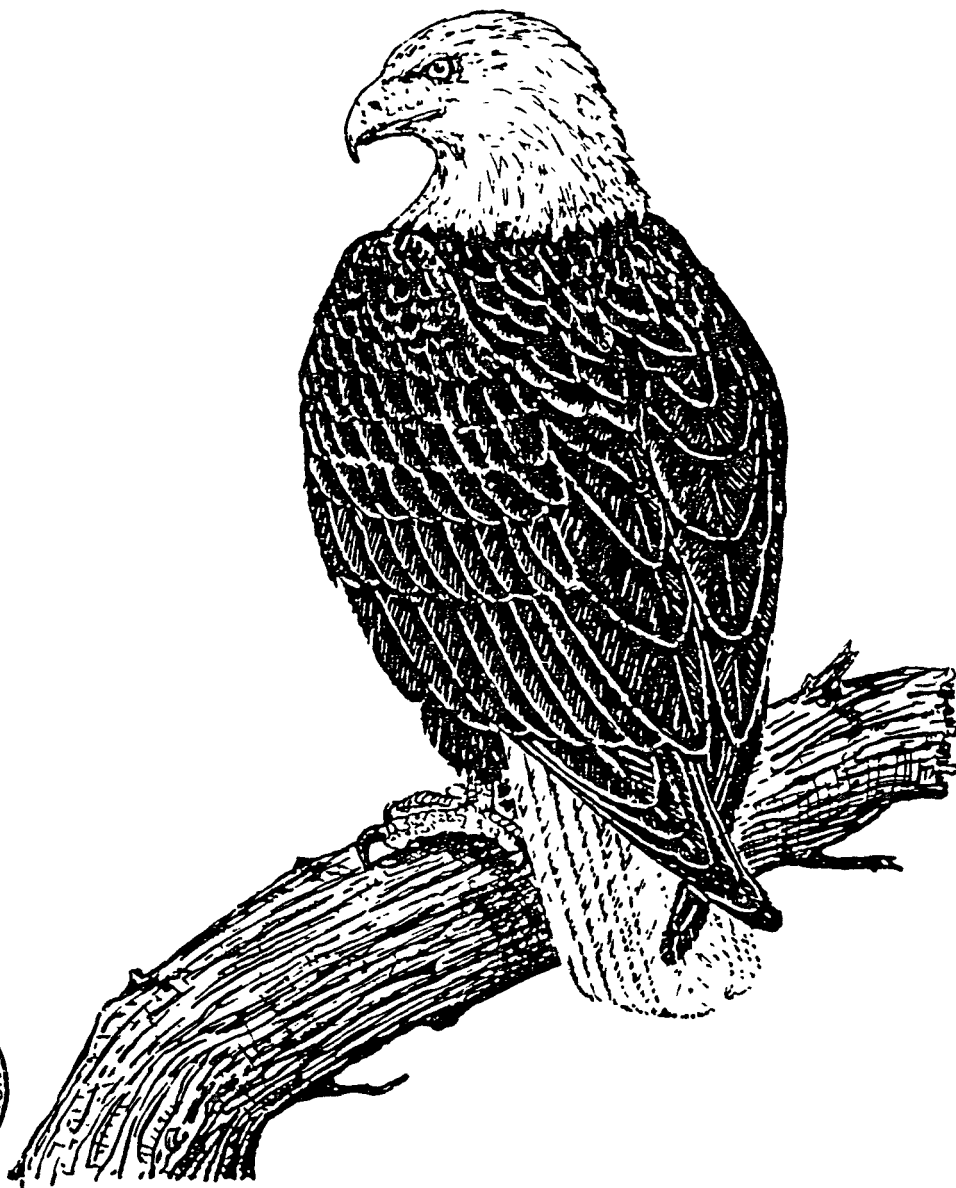
03-13-1989

- E West Indian Manatee (Trichechus manatus)
Year around
- T Florida Scrub Jay (Apelocoma coerulescens coerulescens)
Marginal populations
- T Arctic Peregrine Falcon (Falco peregrinus tundrius)
Some overwintering possible
- E Bald Eagle (Haliaeetus leucocephalus)
Nests along coastal and the Caloosahatchee River
- : Wood Stork (Mycteria americana)
Wetlands
- i Bachman's Warbler (Vermivora bachmanii)
Breeding season
- T Loggerhead Sea Turtle (Caretta caretta)
Nesting
- T Eastern Indigo Snake (Drymarchon corais couperi)
Dry, well drained soils
- E Beautiful Pawpaw (Deeringothamnus pulchellus)
Pine Island

LEE COUNTY

sp	sw	fp	fw	mb	mn	mg	ro	xp	SPECIES	COMMENTS	HSI MODEL
								1	Florida scrub jay	tolerant of human intrusions	
1		1							manatee		
	1	1	1						American alligator	long hydroperiod, ponds, canals	B,V
			1						Florida sandhill crane	prairies, wetlands, pastures, shy	B
1	1	1	1						bald eagle	nest trees near open water, forage sites	B
				1	1		1	1	eastern indigo snake	piners, cypress, trop. hammocks	
						1	1	1	gopher tortoise	scrub, old fields	B
				1	1	1	1	1	American kestrel	open habitats	
	1								eastern least tern	beaches, spoil mounds, roofs	B
	1								black mangrove		
1	1	1	1						snook	juv. use fw shallows, high saltmarsh	/
1	1								red mangrove		
1	1								American oyster	substrate, salinity critical	E
1	1	1	1	1					osprey	nest trees near water, coastal and inland	B,V
1	1								redfish		B
1	1								brown pelican	nest islands, forage	B
		1							pipin plover	beaches, mudflats	
		1	1	1					Florida duck	nest on spoil islands in estuary, fw marsh	B
1									queen conch		
								1	sand pine	sandy, acid soil	
1	1	1	1						river otter	marsh, lakes, estuary	
	1		1						roseate spoonbill	nests in mangroves, feed in shallows	B
			1	1	1				barred owl	cavity trees incl. palms, cypress, hammocks	B
	1		1	1	1		1	1	bobcat	swamps, forests	B
	1		1						snowy egret	nesting, foraging hab.	
			1				1		northern harrier	prairies, marshes	V
	1		1						white ibis	nesting, foraging hab.	B
1	1								pink shrimp	scagrass, marsh creeks	B
	1	1	1						common egret	nesting, foraging hab.	B,V
			1						round-tailed muskrat	shallow, emergents	B
			1	1					cypress	wet clays, mucks, sand	
			1	1	1				crayfish, P. alleni	flatwoods, marshes, canals	V
	1		1	1	1				pileated woodpecker	pinelands to cypress, mangroves	E
sp	saltwater, (>5ppt), exposed less than 30 days per year										
sw	saltwater, (>5ppt), flooded and exposed on > 30 days per year										
fp	freshwater, (<5ppt), drydown frequency => 6 years										ro xeric, oak dominated
fw	freshwater, (<5ppt), drydown frequency .1 to 6 years										xp xeric, pine dominated
mb	mesic (surface dry => .9 of year), broadleaf dominated										
mn	mesic (surface dry => .9 of year), narrowleaf dominated										B = bluebook
ng	mesic (surface dry => .9 of year), grassland										V = Vero Bch.

HABITAT MANAGEMENT GUIDELINES FOR THE BALD EAGLE IN THE SOUTHEAST REGION



THIRD REVISION - JANUARY 1981

Introduction

These guidelines are published and issued by the U.S. Fish and Wildlife Service, Southeast Region, but were prepared in consultation with all the Southeastern State wildlife agencies and a number of bald eagle experts, with assistance from FWS solicitors. A number of Federal and State laws and/or regulations prohibit, cumulatively, such acts as harassing, disturbing, harming, molesting, pursuing, etc., bald eagles, or destroying their nests, (see Section IV); although advisory in nature, these guidelines represent a biological interpretation of what would constitute violations of one or more of such prohibited acts. Their purpose is to maintain and/or improve the environmental conditions that are required for the survival and well-being of bald eagles in the Southeastern United States, and are designated essentially for application in bald eagle/human activity (principally land development) conflicts. The emphasis is to avoid or minimize detrimental human-related impacts on bald eagles, particularly during the nesting season.

General

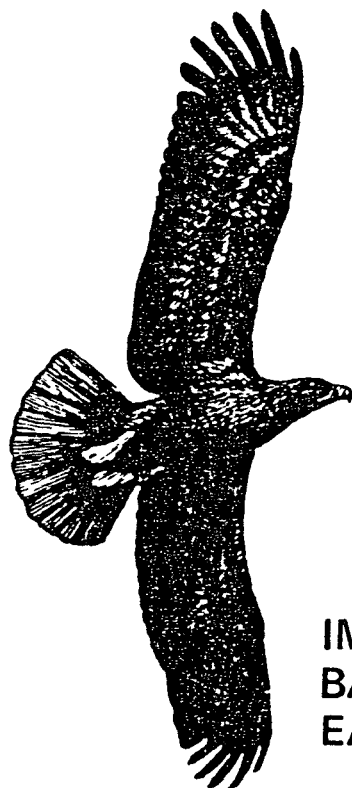
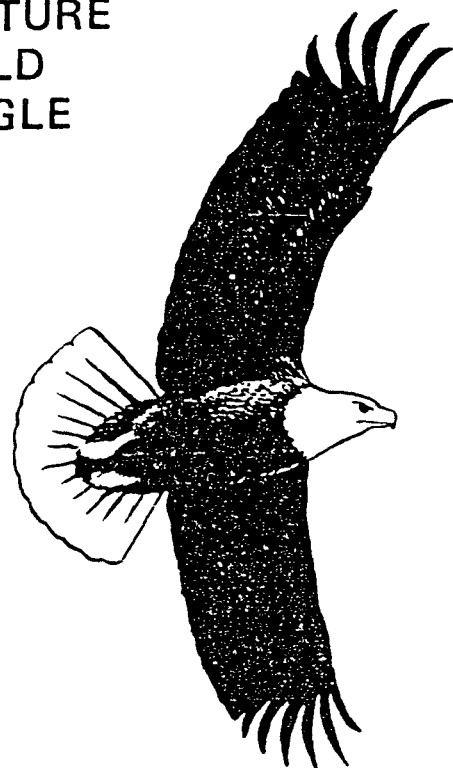
Individual bald eagle pairs exhibit considerable variation in response to human activity, depending in part upon the type, frequency, and duration of activity; extent of modification of the environment; time in the bird's reproductive cycle; and various other factors not well understood. Therefore, it cannot be predicted with absolute certainty the effects a given disturbance might have on a particular pair of bald eagles. Certain human activities are, however, known to disturb bald eagles more than others, and are addressed in the following sections as recommended restrictions. The guidelines are divided into sections on nesting, feeding, roosting, and legal considerations.

- I. **NESTING:** In the Southeast, the bald eagle nesting period is usually from October 1 to May 15. However, in the northern portion of the range, nesting has occurred as late as August. Individual pairs return to their same territories year after year, and often territories are inherited by subsequent generations. Eagles are most vulnerable to disturbance early in the nesting period, i.e. during courtship, nest building, egg laying, incubation, and brooding (roughly the first 12 weeks of the nesting cycle). Disturbance during this critical period may lead to nest abandonment and/or chilled or overheated eggs or young. Human activity near a nest later in the nesting cycle may cause premature fledging, thereby lessening the chance of survival.

Loss of Nests or Nest Trees: Although bald eagle nests are legally protected, a nest in and of itself, from a biological perspective, is relatively inconsequential to a given pair of eagles (a pair can construct a nest in less than a week). It is the nest site that originally attracted the pair that is of critical importance. It is not uncommon for nests to be blown from trees by storms, after which the resident pairs typically renest on the same sites, often in the same trees. Therefore, in instances where nests, and even nest trees, are lost, these guidelines should continue to apply in their absence for a period extending through at least two complete breeding seasons subsequent to the loss.



MATURE
BALD
EAGLE



IMMATURE
BALD
EAGLE



TO AVOID CONFUSION WITH MATURE
GOLDEN EAGLE REMEMBER

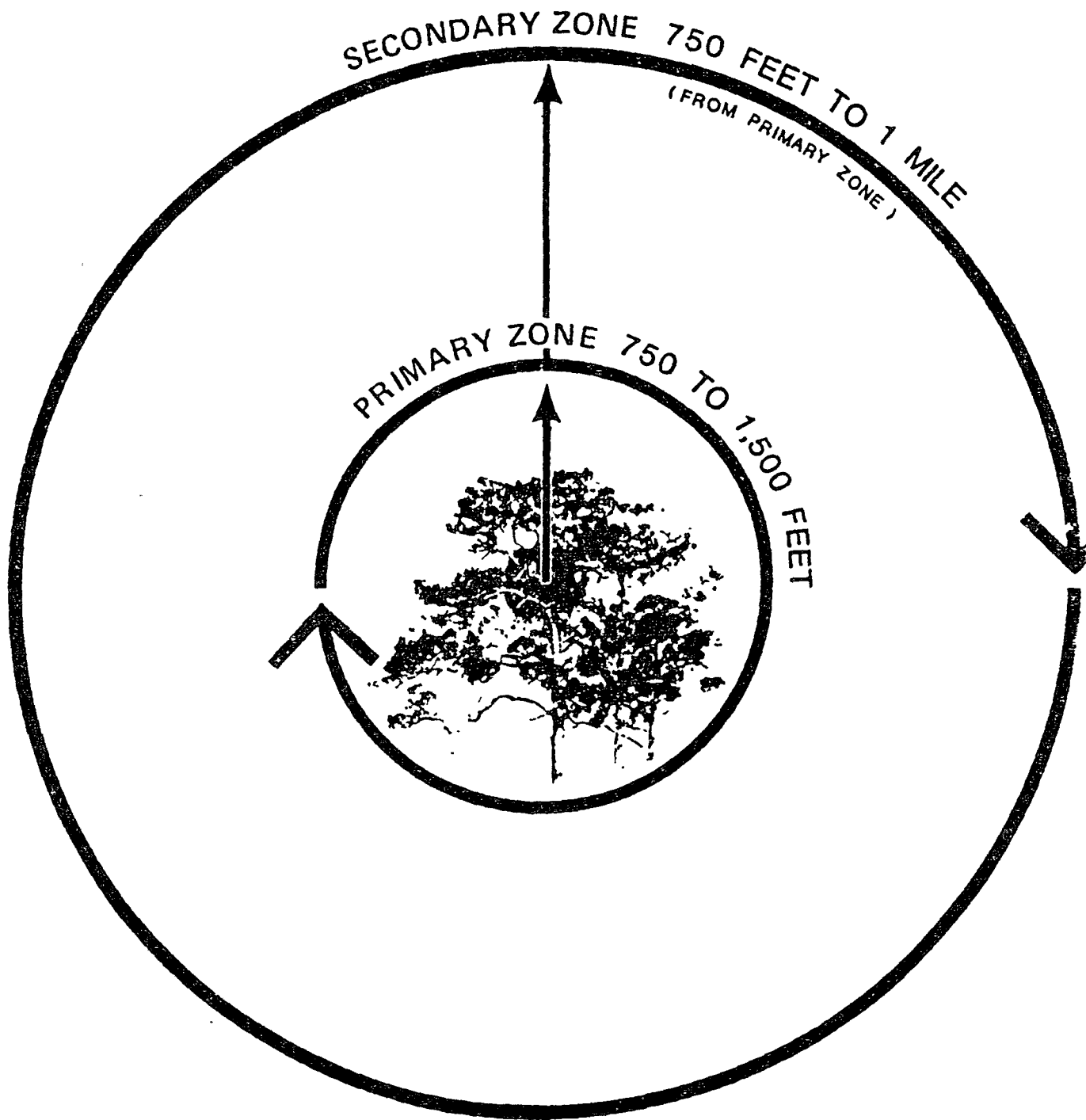
- IMMATURE BALD EAGLES HAVE
WHITE ON WING LININGS
- AND DO NOT HAVE FEATHERS
EXTENDING TO TOES

"Abandoned" Nests: Bald eagles often use alternate nests in different years. Although all nests used by a given pair are situated in the same general vicinity, some nests go unused for several consecutive years and thereby may appear abandoned. Even a solitary nest can go unused for several years, often due to the death of one member of the resident pair, and then be reoccupied by either the original pair or one member of the original pair with a new mate. Even in instances where both members of a pair have died, the site would likely be taken over by another pair if no habitat degradation occurs. For these reasons, these guidelines should apply to apparently "abandoned" nests for a period extending at least through five consecutive breeding seasons of non-use.

Management Zones:

- A. **Primary Zone:** This is the most critical area and must be maintained to promote acceptable conditions for eagles.
 1. **Size:** Except under unusual circumstances, the primary zone should encompass an area extending from 750 to 1,500 feet outward from the nest tree. The precise radius distance between these two extremes would be dependent upon the proximal and spatial configuration of the critical elements (nest tree(s), feeding area, roost trees, etc.) within a particular nesting area, or other compelling factors.
 2. **Recommended Restrictions:**
 - a. Close proximity of the following activities to bald eagle nests are likely to have detrimental impacts on eagle nesting and, therefore, should not occur within the primary management zone at any time:
 - (1) Residential, commercial or industrial development, tree cutting, logging, construction and mining; and
 - (2) Use of chemicals toxic to wildlife.
 - b. The following activities would likely be detrimental while eagles are present and, therefore, should be restricted in the primary zone during the nesting period, but not necessarily during the non-nesting season:
 - (1) Unauthorized human entry; and
 - (2) Helicopter or fixed-wing aircraft operation within 500 feet vertical distance or 1,000 feet horizontal distance from a nest.

Revised 1/87



9. **Secondary Zone:** Restrictions in this zone are needed to minimize disturbance that might compromise the integrity of the primary zone and to protect important areas outside the primary zone. The secondary zone should be arranged so as to be contiguous with feeding areas and provide a protected access between nests and the feeding area. In some cases that would involve extending a corridor from the primary zone to a particular feeding area, with that corridor requiring the same restrictions as the secondary zone.

1. **Size:** The secondary zone should encompass an area extending outward from the boundary of the primary zone, a distance of 750 feet to 1 mile. The precise distance will be dependent upon site-specific circumstances.

2. **Recommended Restrictions:**

- a. Certain activities within the secondary zone are likely to be detrimental to bald eagles and in most cases should be restricted. These activities include, but are not necessarily limited, to:

- (1) Development of new commercial and industrial sites;
- (2) Construction of multi-story buildings and high density housing developments between the nest and the eagles' feeding area;
- (3) Construction of new roads, trails, and canals which would tend to facilitate access to the nest; and
- (4) Use of chemicals toxic to wildlife, such as herbicides or pesticides.

- b. Other activities may take place in the secondary zone, but only during the non-nesting period. Even intermittent use or activities of short duration during nesting are likely to constitute disturbance. Examples are logging, land clearing, construction, seismographic activities employing explosives, mining, oil well drilling, and low-level aircraft operations. Minor activities such as hiking, bird watching, fishing, camping, picnicking, hunting, and recreational off-road vehicle use may be permitted in the secondary zone at any time.

II. **FEEDING:** These guidelines are designed to enhance the quality of bald eagle feeding areas and eliminate or minimize human disturbance.

- A. The use of toxic chemicals in watersheds and rivers where bald eagles feed should be prohibited.
- B. Alteration of natural shorelines where bald eagles feed should be prevented or limited. Degraded shorelines should be rehabilitated where possible.

Revised 1/87

- C. Water quality in eagle feeding areas should be monitored and remedial steps taken when needed.

III. **ROOSTING:** These guidelines are designed to help preserve present roosting sites and provide future habitat.

A. Roosts within and adjacent to nesting territories

- 1. Within the primary management zone, no trees, living or dead, should be removed.
- 2. Within the secondary management zone, as many large trees as possible, living or dead, should be retained as roost and perch trees. Characteristically, these should be the larger trees in the stand. Trees with open crowns and stout lateral limbs are preferable.

B. Communal Roosts

- 1. There should be no significant logging, land clearing, or disruptive human activity within 1,500 feet of traditional roost sites.
- 2. Bald eagle roosting concentrations should be brought to the attention of the Fish and Wildlife Service or State wildlife agency so that a public or private agency can consider preservation of the roost by purchase, easement, or land exchange.

IV. **LEGAL CONSIDERATIONS:**

A. **Federal Statutes:**

- 1. The Bald Eagle Protection Act (16 U.S.C. 668-668d), and the regulations derived therefrom (50 CFR 22), state, in part, that no person ". . . shall take . . . any bald eagle . . . or any golden eagle, alive or dead, or any part, nest, or egg thereof . . .," with 'take' meaning ". . . to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb" Whoever violates any part of the BEPA may be fined from \$5,000 to \$10,000 or imprisoned from 1 to 2 years or both.
- 2. Section 9 of the Endangered Species Act of 1973 (16 U.S.C. 1531), as amended, makes it unlawful to 'take' any listed species with 'take' meaning to ". . . harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct"

Revised 1/87

For persons who violate the provisions of Section 9, the penalties can be civil or criminal with fines of from \$5,000 to \$20,000 and/or imprisonment from 6 months to 1 year. Section 7 of the ESA requires that all Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitat.

- 3. The Migratory Bird Treaty Act (16 U.S.C. 703-711) makes it unlawful "... to pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, ... offer for sale, sell, ... , any migratory bird, any part, nest or eggs of any such bird" Violators may be fined from \$500 to \$2,000 and/or imprisoned from 6 months to 2 years.

8. State Statutes

1. State of Alabama:

Section 9-11-232 of Alabama's Fish, Game and Wildlife regulations curtails the possession, sale, and purchase of wild birds. "Any person, firm, association, or corporation who takes, catches, kills or has in possession at any time, living or dead, any protected wild bird not a game bird or who sells or offers for sale, buys, purchases or offers to buy or purchase any such bird or exchange same for anything of value or who shall sell or expose for sale or buy any part of the plumage, skin or body of any bird protected by the laws of this state or who shall take or willfully destroy the nests of any wild bird or who shall have such nests or eggs of such birds in his possession, except as otherwise provided by law, shall be guilty of a misdemeanor. . . ." Section 9-11-236, which prohibits the hunting of or possession of protected birds during closed season and carries a fine of up to \$500, also protects eagles.

2. State of Arkansas:

Section 14.01 of the Official Codebook of Arkansas Game and Fish Commission Regulations states, "It shall be unlawful to take or attempt to take wild birds or bird eggs." A violation of this code carries a \$100 to \$500 fine.

3. State of Florida:

Rule 39-27.011 of the State of Florida Wildlife Code (Chapter 39, Florida Administrative Code) reads, "No person shall kill, attempt to kill, or wound any endangered or threatened species," and Rule 39-27.002(1) states, in part, "No person shall pursue, molest, harm, harass, capture or possess any endangered or threatened species or parts thereof or their nests or eggs" (The bald eagle is listed as a threatened species by the State of

Revised 1/87

State of Florida (cont'd):

Florida.) Violation of those regulations constitutes a second degree misdemeanor punishable by a \$500 fine and/or up to 60 days in jail.

4. State of Georgia:

State law 27-3-22, referring to wildlife, states, in part, "It shall be unlawful for any person to hunt, trap, take, possess, sell, purchase, ship, or transport any hawk, eagle, owl, or any other bird or any part, nest, or egg thereof"

5. State of Kentucky:

Chapter 150, Section 330, of the Kentucky Fish and Wildlife Codes, revised in 1986, reads ". . . No person shall take, pursue, possess, purchase or sell or attempt to do so, any migratory birds, except as authorized by the migratory bird treaty act (40 stat. 755) as amended and regulations under it" Section 183 prohibits the importing, transporting, or possessing of endangered wildlife.

6. State of Louisiana

Chapter 9, Section 1901.C., which was amended in 1981, prohibits or carefully regulates ". . . the taking, possession, transportation, exportation from the state, processing, sale, or offer for sale or shipment within the state of . . . endangered species." (Endangered or threatened species are defined as those covered under the Federal Endangered Species Act, as concurred in by the Louisiana Wildlife and Fisheries Commission.) The bald eagle is recognized as an endangered species in Louisiana.

7. State of Mississippi:

Section 49-5-7 of the Mississippi Code of 1972 reads, "No wild bird other than a game bird shall be pursued, taken, wounded, killed, captured, possessed, or exported at any time, dead or alive. No part of the plumage, skin, or body of any bird . . . shall be sold or had in possession for sale in this state. No person shall molest, take or destroy the nests or eggs of any wild bird, or have such nests in his possession" Section 49-5-109 states, ". . . it shall be unlawful for any person to take, possess, transport, export, process, sell or offer for sale or ship, and for any common or contract carrier knowingly to transport or receive for shipment any species or subspecies of wildlife appearing on the following lists: (1) the list of wildlife indigenous to the state determined to be endangered within the State" (The bald eagle is listed as endangered in Mississippi.) Any person who violates these regulations will face a \$1,000 fine and/or imprisonment for up to 1 year.

Revised 1/87

8. State of North Carolina:

In 1985 North Carolina law G. S. 113-294 was amended to include subsection(1) which refers specifically to eagles. It reads: ". . . any person who unlawfully takes, possesses, transports, sells or buys any bald eagle or golden eagle, alive or dead, or any part, nest or egg of a bald eagle or golden eagle is guilty of a misdemeanor. Unless a greater penalty is prescribed for the offense in question, any person convicted under this subsection is punishable by a fine of not more than \$1,000, or imprisonment of not more than 1 year, or both."

9. State of South Carolina:

Regulation 123-160, derived from the Nongame and Endangered Species Conservation Act, and adopted in December 1976, protects eagles and other wildlife of the Orders Falconiformes and Strigiformes. "It shall be unlawful for any person to take, possess, transport, export, process, sell or offer for sale or ship, and for any contract carrier knowingly to transport or receive for shipment any such species or products or parts thereof except by permit for scientific, educational or falconry purposes issued by the South Carolina Wildlife and Marine Resources Department."

10. State of Tennessee:

Section 70-8-105(c) of the Tennessee Nongame and Endangered or Threatened Wildlife Conservation Act of 1974 states, ". . . it shall be unlawful for any person to take, possess, transport, export, process, sell or offer for sale or ship, and for any common or contract carrier knowingly to transport or receive for shipment any species or subspecies of wildlife appearing on any of the following lists: (1) The list of wildlife indigenous to the state determined to be endangered or threatened within the state pursuant to subsection (a); (2) The United States' List of Endangered Native Fish and Wildlife as it appears on April 5, 1974 (Part 17 of Title 50, Code of Federal Regulations, Appendix D); and (3) The United States' List of Endangered Foreign Fish and Wildlife (Part 17 of Title 50, Code of Federal Regulations, Appendix A)" A violation of this code constitutes a \$25 to \$1,000 fine and/or imprisonment for up to 1 year.

Revised 1/87

HABITAT MANAGEMENT GUIDELINES FOR THE WOOD STORK IN THE SOUTHEAST REGION

Introduction

A number of Federal and state laws and/or regulations prohibit, cumulatively, such acts as harrassing, disturbing, harming, molesting, pursuing, etc., wood storks, or destroying their nests (see Section VII). Although advisory in nature, these guidelines represent a biological interpretation of what would constitute violations of one or more of such prohibited acts. Their purpose is to maintain and/or improve the environmental conditions that are required for the survival and well-being of wood storks in the southeastern United States, and are designed essentially for application in wood stork/human activity conflicts (principally land development and human intrusion into stork use sites). The emphasis is to avoid or minimize detrimental human-related impacts on wood storks. These guidelines were prepared in consultations with state wildlife agencies and wood stork experts in the four southeastern states where the wood stork is listed as Endangered (Alabama, Florida, Georgia, South Carolina).

General

The wood stork is a gregarious species, which nests in colonies (rookeries), and roosts and feeds in flocks, often in association with other species of long-legged water birds. Storks that nest in the southeastern United States appear to represent a distinct population, separate from the nearest breeding population in Mexico. Storks in the southeastern U.S. population have recently (since 1980) nested in colonies scattered throughout Florida, and at several central-southern Georgia and coastal South Carolina sites. Banded and color-marked storks from central and southern Florida colonies have dispersed during non-breeding seasons as far north as southern Georgia, and the coastal counties in South Carolina and southeastern North Carolina, and as far west as central Alabama and northeastern Mississippi. Storks from a colony in south-central Georgia have wintered between southern Georgia and southern Florida. This U.S. nesting population of wood storks was listed as endangered by the U.S. Fish and Wildlife Service on February 28, 1984 (*Federal Register* 49(4):7332-7335).

Wood storks use freshwater and estuarine wetlands as feeding, nesting, and roosting sites. Although storks are not habitat specialists, their needs are exacting enough, and available habitat is limited enough, so that nesting success and the size of regional populations are closely regulated by year-to-year differences in the quality and quantity of suitable habitat. Storks are especially sensitive to environmental conditions at feeding sites; thus, birds may fly relatively long distances either daily or between regions annually, seeking adequate food resources.

All available evidence suggests that regional declines in wood stork numbers have been largely due to the loss or degradation of essential wetland habitat. An understanding of the qualities of good stork habitat should help to focus protection efforts on those sites

that are seasonally important to regional populations of wood storks. Characteristics of feeding, nesting, and roosting habitat, and management guidelines for each, are presented here by habitat type.

I. Feeding habitat.

A major reason for the wood stork decline has been the loss and degradation of feeding habitat. Storks are especially sensitive to any manipulation of a wetland site that results in either reduced amounts or changes in the timing of food availability.

Storks feed primarily (often almost exclusively) on small fish between 1 and 8 inches in length. Successful foraging sites are those where the water is between 2 and 15 inches deep. Good feeding conditions usually occur where water is relatively calm and uncluttered by dense thickets of aquatic vegetation. Often a dropping water level is necessary to concentrate fish at suitable densities. Conversely, a rise in water, especially when it occurs abruptly, disperses fish and reduces the value of a site as feeding habitat.

The types of wetland sites that provide good feeding conditions for storks include: drying marshes or stock ponds, shallow roadside or agricultural ditches, narrow tidal creeks or shallow tidal pools, and depressions in cypress heads or swamp sloughs. In fact, almost any shallow wetland depression where fish tend to become concentrated, either through local reproduction or the consequences of area drying, may be used by storks.

Nesting wood storks do most of their feeding in wetlands between 5 and 40 miles from the colony, and occasionally at distances as great as 75 miles. Within this colony foraging range and for the 110-150 day life of the colony, and depending on the size of the colony and the nature of the surrounding wetlands, anywhere from 50 to 200 different feeding sites may be used during the breeding season.

Non-breeding storks are free to travel much greater distances and remain in a region only for as long as sufficient food is available. Whether used by breeders or non-breeders, any single feeding site may at one time have small or large numbers of storks (1 to 100+), and be used for one to many days, depending on the quality and quantity of available food. Obviously, feeding sites used by relatively large numbers of storks, and/or frequently used areas, potentially are the more important sites necessary for the maintenance of a regional population of birds.

Differences between years in the seasonal distribution and amount of rainfall usually mean that storks will differ between years in where and when they feed. Successful nesting colonies are those that have a large number of feeding site options, including sites that may be suitable only in years of rainfall extremes. To maintain the wide range of feeding site options requires that many different wetlands, with both relatively short and long annual hydroperiods, be preserved. For example, protecting only the larger wetlands, or those with longer annual hydroperiods, will result in the eventual loss of smaller, seemingly less important wetlands. However, these small scale wetlands are crucial as the only available feeding sites during the wetter periods when the larger habitats are too deeply flooded to be used by storks.

II. Nesting habitat.

Wood storks nest in colonies, and will return to the same colony site for many years so long as that site and surrounding feeding habitat continue to supply the needs of the birds. Storks require between 110 and 150 days for the annual nesting cycle, from the period of courtship until the nestlings become independent. Nesting activity may begin as early as December or as late as March in southern Florida colonies, and between late February and April in colonies located between central Florida and South Carolina. Thus, full term colonies may be active until June-July in south Florida, and as late as July-August at more northern sites. Colony sites may also be used for roosting by storks during other times of the year.

Almost all recent nesting colonies in the southeastern U.S. have been located either in woody vegetation over standing water, or on islands surrounded by broad expanses of open water. The most dominant vegetation in swamp colonies has been cypress, although storks also nest in swamp hardwoods and willows. Nests in island colonies may be in more diverse vegetation, including mangroves (coastal), exotic species such as Australian pine (*Casuarina*) and Brazilian Pepper (*Schinus*), or in low thickets of cactus (*Opuntia*). Nests are usually located 15-75 feet above ground, but may be much lower, especially on island sites when vegetation is low.

Since at least the early 1970's, many colonies in the southeastern U.S. have been located in swamps where water has been impounded due to the construction of levees or roadways. Storks have also nested in dead and dying trees in flooded phosphate surface mines, or in low, woody vegetation on mounded, dredge islands. The use of these altered wetlands or completely "artificial" sites suggests that in some regions or years storks are unable to locate natural nesting habitat that is adequately flooded during the normal breeding season. The readiness with which storks will utilize water impoundments for nesting also suggests that colony sites could be intentionally created and maintained through long-term site management plans. Almost all impoundment sites used by storks become suitable for nesting only fortuitously, and therefore, these sites often do not remain available to storks for many years.

In addition to the irreversible impacts of drainage and destruction of nesting habitat, the greatest threats to colony sites are from human disturbance and predation. Nesting storks show some variation in the levels of human activity they will tolerate near a colony. In general, nesting storks are more tolerant of low levels of human activity near a colony when nests are high in trees than when they are low, and when nests contain partially or completely feathered young than during the period between nest construction and the early nestling period (adults still brooding). When adult storks are forced to leave their nests, eggs or downy young may die quickly (<20 minutes) when exposed to direct sun or rain.

Colonies located in flooded environments must remain flooded if they are to be successful. Often water is between 3 and 5 feet deep in successful colonies during the nesting season. Storks rarely form colonies, even in traditional nesting sites, when they are dry, and may abandon nests if sites become dry during the nesting period. Flooding in colonies may be most important as a defense against mammalian predators. Studies of stork colonies in Georgia and

Florida have shown high rates of raccoon predation when sites dried during the nesting period. A reasonably high water level in an active colony is also a deterrent against both human and domestic animal intrusions.

Although nesting wood storks usually do most feeding away from the colony site (>5 miles), considerable stork activity does occur close to the colony during two periods in the nesting cycle. Adult storks collect almost all nesting material in and near the colony, usually within 2500 feet. Newly fledged storks, near the end of the nesting cycle, spend from 1-4 weeks during the fledging process flying locally in the colony area, and perched in nearby trees or marshy spots on the ground. These birds return daily to their nests to be fed. It is essential that these fledging birds have little or no disturbance as far as one-half mile within at least one or two quadrants from the colony. Both the adults, while collecting nesting material, and the inexperienced fledglings, do much low, flapping flight within this radius of the colony. At these times, storks potentially are much more likely to strike nearby towers or utility lines.

Colony sites are not necessarily used annually. Regional populations of storks shift nesting locations between years, in response to year-to-year differences in food resources. Thus, regional populations require a range of options for nesting sites, in order to successfully respond to food availability. Protection of colony sites should continue, therefore, for sites that are not used in a given year.

III. Roosting habitat.

Although wood storks tend to roost at sites that are similar to those used for nesting, they also use a wider range of site types for roosting than for nesting. Non-breeding storks, for example, may frequently change roosting sites in response to changing feeding locations, and in the process, are inclined to accept a broad range of relatively temporary roosting sites. Included in the list of frequently used roosting locations are cypress "heads" or swamps (not necessarily flooded if trees are tall), mangrove islands, expansive willow thickets or small, isolated willow "islands" in broad marshes, and on the ground either on levees or in open marshes.

Daily activity patterns at a roost vary depending on the status of the storks using the site. Non-breeding adults or immature birds may remain in roosts during major portions of some days. When storks are feeding close to a roost, they may remain on the feeding grounds until almost dark before making the short flight. Nesting storks traveling long distances (>40 miles) to feeding sites may roost at or near the latter, and return to the colony the next morning. Storks leaving roosts, especially when going long distances, tend to wait for mid-morning thermals to develop before departing.

IV. Management zones and guidelines for feeding sites.

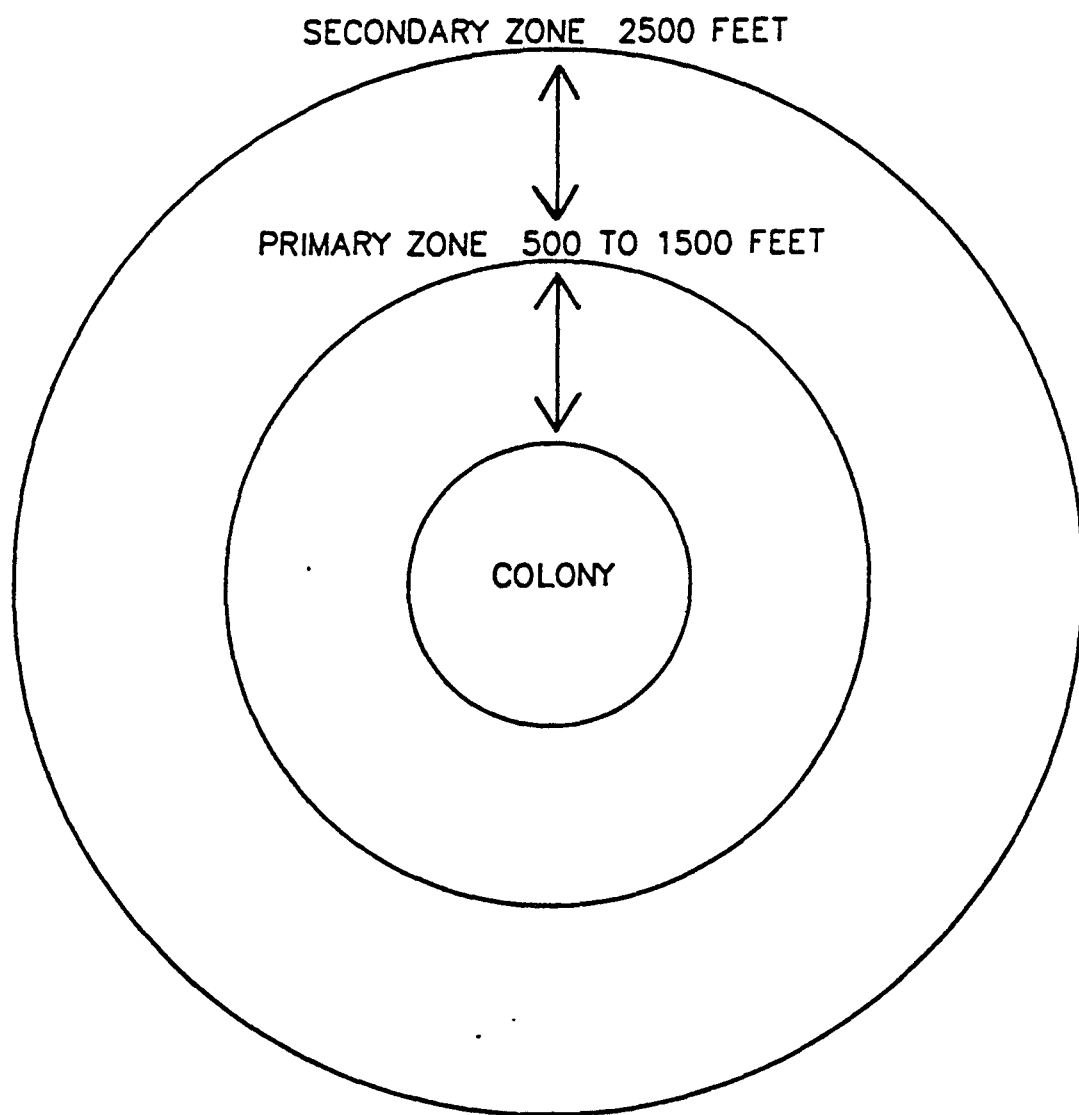
To the maximum extent possible, feeding sites should be protected by adherence to the following protection zones and guidelines:

- A. There should be no human intrusion into feeding sites when storks are present. Depending upon the amount of screening vegetation, human activity should be no closer than between 300 feet (where solid vegetation screens exist) and 750 feet (no vegetation screen).

- B. Feeding sites should not be subjected to water management practices that alter traditional water levels or the seasonally normal drying patterns and rates. Sharp rises in water levels are especially disruptive to feeding storks.
- C. The introduction of contaminants, fertilizers, or herbicides into wetlands that contain stork feeding sites should be avoided, especially those compounds that could adversely alter the diversity and numbers of native fishes, or that could substantially change the characteristics of aquatic vegetation. Increase in the density and height of emergent vegetation can degrade or destroy sites as feeding habitat.
- D. Construction of tall towers (especially with guy wires) within three miles, or high power lines (especially across long stretches of open country) within one mile of major feeding sites should be avoided.

V. Management zones and guidelines for nesting colonies.

- A. Primary zone: This is the most critical area, and must be managed according to recommended guidelines to insure that a colony site survives.
 - 1. Size: The primary zone must extend between 1000 and 1500 feet in all directions from the actual colony boundaries when there are no visual or broad aquatic barriers, and never less than 500 feet even when there are strong visual or aquatic barriers. The exact width of the primary zone in each direction from the colony can vary within this range, depending on the amount of visual screen (tall trees) surrounding the colony, the amount of relatively deep, open water between the colony and the nearest human activity, and the nature of the nearest human activity. In general, storks forming new colonies are more tolerant of existing human activity, than they will be of new human activity that begins after the colony has formed.
 - 2. Recommended Restrictions:
 - a. Any of the following activities within the primary zone, at any time of the year, are likely to be detrimental to the colony:
 - (1) Any lumbering or other removal of vegetation, and
 - (2) Any activity that reduces the area, depth, or length of flooding in wetlands under and surrounding the colony, except where periodic (less than annual) water control may be required to maintain the health of the aquatic, woody vegetation, and
 - (3) The construction of any building, roadway, tower, power line, canal, etc.
 - b. The following activities within the primary zone are likely to be detrimental to a colony if they occur when the colony is active:
 - (1) Any unauthorized human entry closer than 300 feet of the colony, and



- (2) Any increase or irregular pattern in human activity anywhere in the primary zone, and
 - (3) Any increase or irregular pattern in activity by animals, including livestock or pets, in the colony, and
 - (4) Any aircraft operation closer than 500 feet of the colony.
- B. Secondary Zone: Restrictions in this zone are needed to minimize disturbances that might impact the primary zone, and to protect essential areas outside of the primary zone. The secondary zone may be used by storks for collecting nesting material, for roosting, loafing, and feeding (especially important to newly fledged young), and may be important as a screen between the colony and areas of relatively intense human activities.
- 1. Size: The secondary zone should range outward from the primary zone 1000-2000 feet, or to a radius of 2500 feet of the outer edge of the colony.
 - 2. Recommended Restrictions:
 - a. Activities in the secondary zone which may be detrimental to nesting wood storks include:
 - (1) Any increase in human activities above the level that existed in the year when the colony first formed, especially when visual screens are lacking, and
 - (2) Any alteration in the area's hydrology that might cause changes in the primary zone, and
 - (3) Any substantial (>20 percent) decrease in the area of wetlands and woods of potential value to storks for roosting and feeding.
 - b. In addition, the probability that low flying storks, or inexperienced, newly-fledged young will strike tall obstructions, requires that high-tension power lines be no closer than one mile (especially across open country or in wetlands) and tall transmission towers no closer than 3 miles from active colonies. Other activities, including busy highways and commercial and residential buildings may be present in limited portions of the secondary zone at the time that a new colony first forms. Although storks may tolerate existing levels of human activities, it is important that these human activities not expand substantially.

VI. Roosting site guidelines.

The general characteristics and temporary use-patterns of many stork roosting sites limit the number of specific management recommendations that are possible:

- A. Avoid human activities within 500-1000 feet of roost sites during seasons of the year and times of the day when storks may be present. Nocturnal activities in active roosts may be especially disruptive.

- B. Protect the vegetative and hydrological characteristics of the more important roosting sites--those used annually and/or used by flocks of 25 or more storks. Potentially, roosting sites may, some day, become nesting sites.

VII. Legal Considerations.

A. Federal Statutes

The U.S. breeding population of the wood stork is protected by the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)(Act). The population was listed as endangered on February 28, 1984 (49 Federal Register 7332); wood storks breeding in Alabama, Florida, Georgia, and South Carolina are protected by the Act.

Section 9 of the Endangered Species Act of 1973, as amended, states that it is unlawful for any person subject to the jurisdiction of the United States to take (defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.") any listed species anywhere within the United States.

The wood stork is also federally protected by its listing (50 CFR 10.13) under the Migratory Bird Treaty Act (167 U.S.C. 703-711), which prohibits the taking, killing or possession of migratory birds except as permitted.

B. State Statutes

1. State of Alabama

Section 9-11-232 of Alabama's Fish, Game, and Wildlife regulations curtails the possession, sale, and purchase of wild birds. "Any person, firm, association, or corporation who takes, catches, kills or has in possession at any time, living or dead, any protected wild bird not a game bird or who sells or offers for sale, buys, purchases or offers to buy or purchase any such bird or exchange same for anything of value or who shall sell or expose for sale or buy any part of the plumage, skin, or body of any bird protected by the laws of this state or who shall take or willfully destroy the nests of any wild bird or who shall have such nests or eggs of such birds in his possession, except as otherwise provided by law, shall be guilty of a misdemeanor..."

Section 1 of the Alabama Nongame Species Regulation (Regulation 87-GF-7) includes the wood stork in the list of nongame species covered by paragraph (4). "It shall be unlawful to take, capture, kill, possess, sell, trade for anything of monetary value, or offer to sell or trade for anything of monetary value, the following nongame wildlife species (or any parts or reproductive products of such species) without a scientific collection permit and written permission from the Commissioner, Department of Conservation and Natural Resources..."

2. State of Florida

Rule 39-4.001 of the Florida Wildlife Code prohibits "taking, attempting to take, pursuing, hunting, molesting, capturing, or killing (collectively defined as "taking"), transporting, storing, serving, buying, selling,

possessing, or wantonly or willingly wasting any wildlife or freshwater fish or their nests, eggs, young, homes, or dens except as specifically provided for in other rules of Chapter 39, Florida Administrative Code.

Rule 39-27.011 of the Florida Wildlife Code prohibits "killing, attempting to kill, or wounding any endangered species." The "Official Lists of Endangered and Potentially Endangered Fauna and Flora in Florida" dated 1 July 1988, includes the wood stork, listed as "endangered" by the Florida Game and Fresh Water Fish Commission.

3. State of Georgia

Section 27-1-28 of the Conservation and Natural Resources Code states that "Except as otherwise provided by law, rule, or regulation, it shall be unlawful to hunt, trap, fish, take, possess, or transport any nongame species of wildlife..."

Section 27-1-30 states that, "Except as otherwise provided by law or regulation, it shall be unlawful to disturb, mutilate, or destroy the dens, holes, or homes of any wildlife; "

Section 27-3-22 states, in part, "It shall be unlawful for any person to hunt, trap, take, possess, sell, purchase, ship, or transport any hawk, eagle, owl, or any other bird or any part, nest, or egg thereof..."

The wood stork is listed as endangered pursuant to the Endangered Wildlife Act of 1973 (Section 27-3-130 of the Code). Section 391-4-13-.06 of the Rules and Regulations of the Georgia Department of Natural Resources prohibits harassment, capture, sale, killing, or other actions which directly cause the death of animal species protected under the Endangered Wildlife Act. The destruction of habitat of protected species on public lands is also prohibited.

4. State of South Carolina

Section 50-15-40 of the South Carolina Nongame and Endangered Species Conservation Act states, "Except as otherwise provided in this chapter, it shall be unlawful for any person to take, possess, transport, export, process, sell, or offer of sale or ship, and for any common or contract carrier knowingly to transport or receive for shipment any species or subspecies of wildlife appearing on any of the following lists: (1) the list of wildlife indigenous to the State, determined to be endangered within the State...(2) the United States' List of Endangered Native Fish and Wildlife... (3) the United States' List of Endangered Foreign Fish and Wildlife ..."

FLORIDA GAME AND FRESH WATER FISH COMMISSION

WILLIAM G. BOSTICK, JR.
Winter Haven

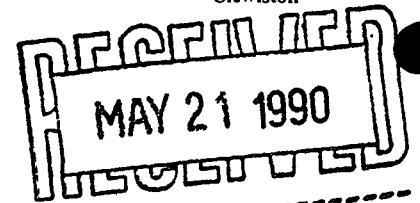
DON WRIGHT
Orlando

THOMAS L. HIRES, SR.
Lake Wales

MRS. GILBERT W. HUMPHREY
Miccosukee

JOE MARLIN HILLIARD
Clewiston

ROBERT M. BRANTLY, Executive Director
ALLAN L. EGBERT, Ph.D., Assistant Executive Director



Office of Environmental
Services
29200 Tucker Grade
Punta Gorda, FL 33955
May 17, 1990

Mr. Bill Cox
Kevin L. Erwin Consulting Ecologist, Inc.
2077 Bayside Parkway
Ft. Myers, FL 33901

RE: Resource Recovery Plant, S24,
T44S/R25E, Lee County

Dear Mr. Cox:

In response to your request for information on listed species concerns within five miles of the proposed Lee County Resource Recovery Site, please see the following information and attached map:

- 1) Red-cockaded woodpecker habitat has been identified in the Colonial Boulevard and Westinghouse DRI vicinities as well as west of I-75 north of Penzance Road (exact location not accurately identified). Management plans have not been developed to date.
- 2) Wood storks, sandhill cranes, and various listed wading birds are associated with drainage features and natural wetlands throughout the 5-mile radius. Locations coincide with the season in most cases. Sandhill cranes are also associated with range, airport, or pasture land in the project vicinity. Pertinent management plans are enclosed.
- 3) Snail kites are utilizing and roosting in freshwater ponds and utilizing man-made drainage ditches near S.R. 82 and in the Halfway Pond area. Contact Kathleen Hultgren at Lee County if specific locations are required.
- 4) A relatively new eagle nest is located in the Six Mile Strand in Section 34 in the southeast quadrant of I-75 and S.R. 82. Two other eagles nests are apparently located on the Westinghouse DRI project (old LE-31 and a new nest recorded but unverified as west of the landfill site). Kevin should have these locations. Management plans have not been developed.
- 5) Gopher tortoises, scrub jays, and burrowing owls are located in local populations throughout LeHigh Acres. Contact Mike Buono, who is I believe with Lee County Environmental Lab, for locations. I have been told

Mr Bill Cox
May 17, 1990

that a scrub on Buckingham Road contains scrub jays but have not verified the information. Gopher tortoises are also associated with the Orange and Caloosahatchee River corridors. No mapping of these locations has been conducted.

6) Mangrove or Big Cypress fox squirrels are found in pine flatwoods/cypress or other hardwood canopy throughout the project area. Information on this species is minimal, although a study on fox squirrels is being conducted in Collier County as I indicated.

7) Old (15-years ago) sightings of Audubon's caracara have been recorded in the vicinity of Colonial Blvd. Recent sightings have been recorded in the City of Ft. Myers, but information on actual territories within the project area is limited. Contact Jim Layne, Archibald Biological Station, for specifics if necessary.

8) The project site is located in the home range of a young male panther which was injured at the Southwest Regional Airport in November 1988, and subsequently released at Corkscrew Sanctuary. See attached a map recording the home range of this cat.

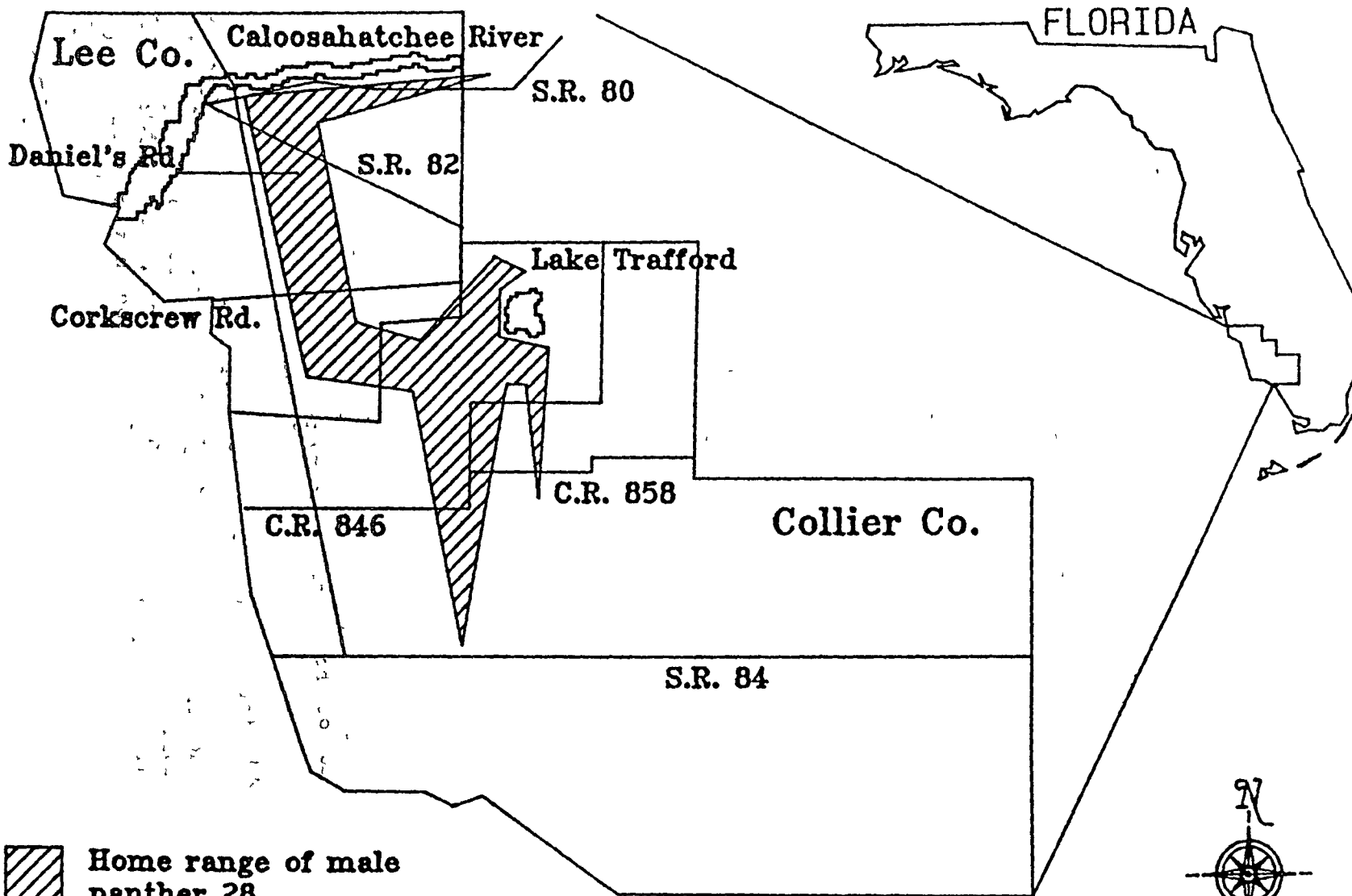
Please call me if you have any questions.

Sincerely,

Kimberly A. Dryden

Kimberly A. Dryden
Biological Scientist III

KD/kd
ENV 2-11-2/3
cc Ms. Lisa Dodd
Lee County Environmental Sciences



Km

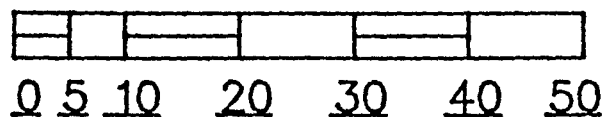


Figure 1

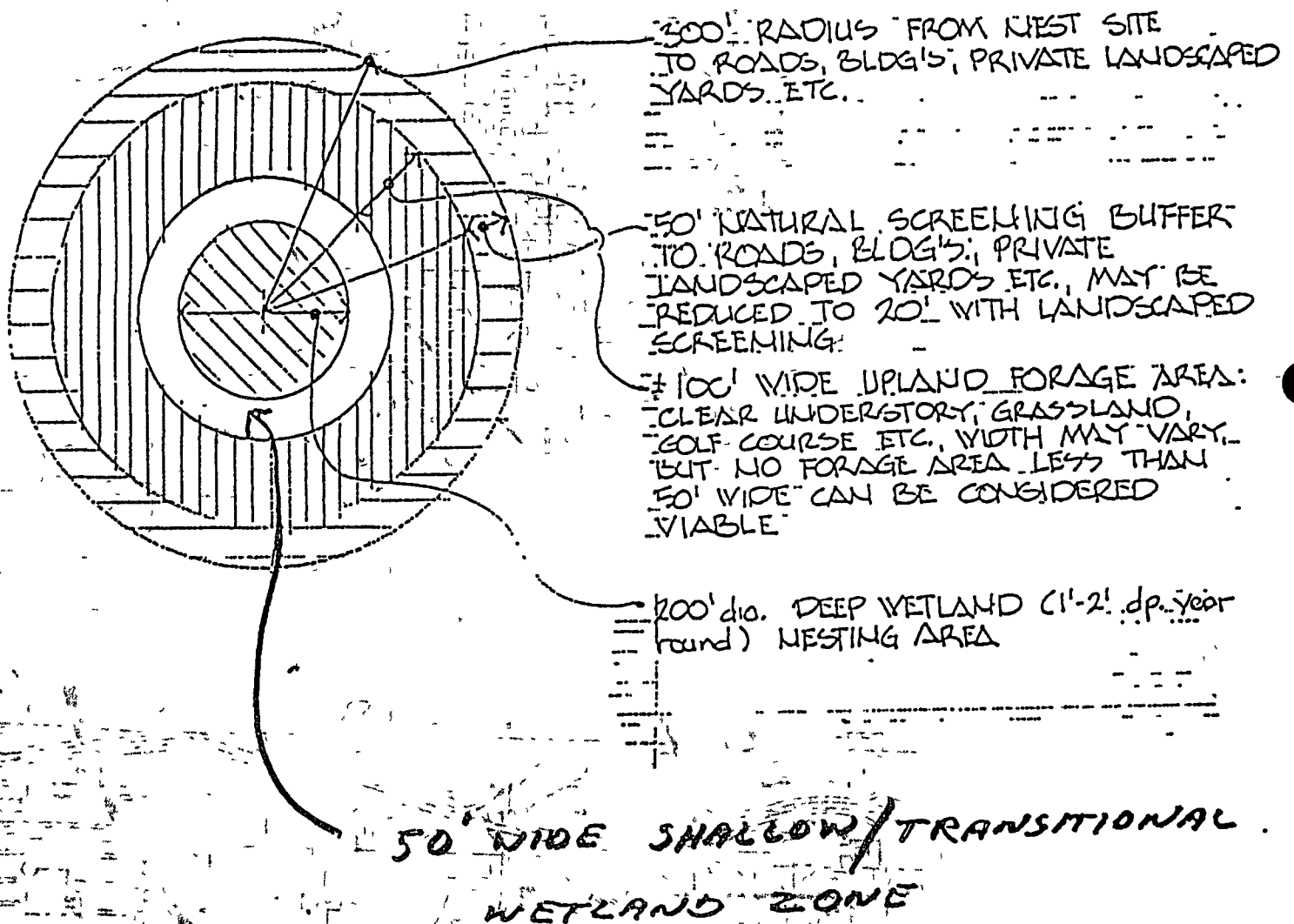
Sandhill Crane Nesting Site Criteria

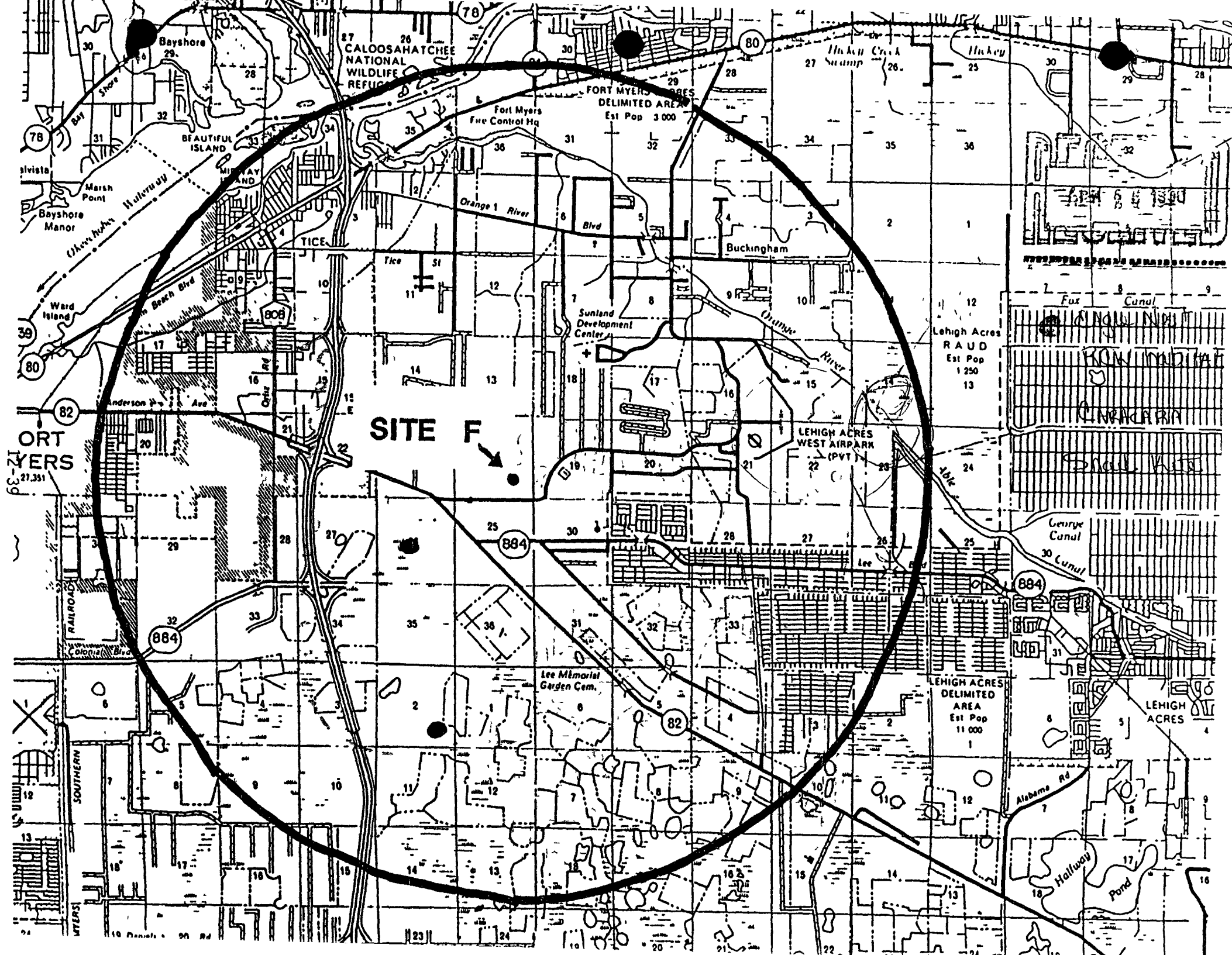
I. Nest site criteria

- A. within 1/2 mile of known nest site
- B. minimum depressional wetland radius of 100 feet
 - 1. ordinary high water depth of 2-3 feet
 - 2. ordinary low water depth of 0.5-2 feet
 - 3. dominated by wetland grasses and forbs, with little if any woody vegetation
- C. minimum total wetland (including wetland slope and transitional area) radius of 150 feet
 - 1. dominated by wetland and transitional grasses and forbs, with little if any woody vegetation.
- D. minimum managed upland perimeter buffer of 100 feet width
 - 1. managed as open native uplands foraging habitat, with or without forest canopy, but characterized by grassy ground cover and less than 20% shrubby understory 3.0 feet or less in height
- E. visual screen of native upland vegetation at least 5 feet in height and at least 20 feet in width (50 feet preferred), sufficient to provide effective visual barrier to surrounding construction activities and other human disturbances from nest site
- F. where golf course fairways are adjacent to the nest site wetland, the managed upland perimeter (D. above) may be reduced to 50 feet in width and the visual screen may be eliminated, provided the adjacent fairway is at least 150 feet wide
- G. where lakes are adjacent to the nest site wetland, the visual screen may be eliminated provided the lake is at least 150 feet wide
- H. where other recreational uses of "green space" (playgrounds, picnic areas, exercise trails, etc) are proposed adjacent to the nesting site wetland, the visual screen must be constructed as recommended above; or alternatively, the managed upland foraging zone may be increased in width to 250 feet, with all recreational facilities located outside of the widened foraging zone

The upland perimeters and buffers may be modified as appropriate to accommodate landscape design or sound environmental planning, so long as the proposed plan will not significantly reduce the area of the wetland nesting depression, transitional wetland, or upland foraging habitat; and so long as no construction occurs within 300 feet of the designated "center" of the proposed nesting site.

SANDHILL CRANE NEST SITE CRITERIA





SITE F

LEHIGH ACRES WEST AIRPARK (PVT)

LEHIGH ACRES DELIMITED AREA Est Pop 11 000

Lehigh Acres RAUD Est Pop 1 250 13

FORT MYERS ACRES DELIMITED AREA Est Pop 3 000

27 CALOOSAHATCHEE NATIONAL WILDLIFE REFUGA

Bayshore 29

BEAUTIFUL ISLAND

Marsh Point

Bayshore Manor

Ward Island

Anderson Ave

Colonial Blvd

SUNLAND DEVELOPMENT CENTER

Lee Memorial Garden Cem.

Lehigh Acres

Lehigh Acres West Airpark

Lehigh Acres Delimited Area

Lehigh Acres RAUD

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

Lehigh Acres

**LEE COUNTY, FLORIDA
SOLID WASTE ENERGY RECOVERY FACILITY
APPLICATION FOR
POWER PLANT CERTIFICATION**

VOLUME III - AIR QUALITY

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



JUNE 1990

CDM

**LEE COUNTY, FLORIDA
SOLID WASTE ENERGY RECOVERY FACILITY
APPLICATION FOR
POWER PLANT CERTIFICATION**

VOLUME III - AIR QUALITY

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



**JUNE 1990
JUNE 1991 (REVISED)**

CDM

**LEE COUNTY, FLORIDA
SOLID WASTE ENERGY RECOVERY FACILITY
APPLICATION FOR
POWER PLANT CERTIFICATION**

VOLUME III - AIR QUALITY



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

**JUNE 1990
JUNE 1991 (REVISED)**

**PREPARED BY
CAMP DRESSER & MCKEE INC.**

THIS DOCUMENT IS PRINTED ON RECYCLED PAPER.

Poor Original

PREFACE

On May 1, 1991, the Board of County Commissioners of Lee County formally adopted a resolution to build an energy recovery facility with an initial capacity of 1,200 tons per day (tpd), and a future maximum capacity of 1,800 tpd. This Facility will be smaller than that previously considered by the County (1,800 tpd initially, with a future maximum of 2,400 tpd). An Application for Power Plant Site Certification was submitted to the Florida Department of Environmental Regulation for the previously considered larger Facility in June, 1990. This current permit application contains revisions to the one submitted in June, 1990, to reflect the reduced predicted air quality impacts for the current smaller Facility size. Other changes have been made to incorporate the recently promulgated New Source Performance Standards for Municipal Waste Combustors, and the passage of the Clean Air Act Amendments of 1990.

All changes, updates, and revisions are underlined throughout this Volume III. All other material has remained unchanged from Volume III of the permit application submitted in June, 1990. This highlighting of the new material is intended to simplify the review of this revised permit application.

LEE COUNTY, FLORIDA
SOLID WASTE ENERGY RECOVERY FACILITY
APPLICATION FOR
POWER PLANT CERTIFICATION

VOLUME III - AIR QUALITY

8/15/91 REPLACEMENT PAGES

TABLE 1-1

LEE COUNTY ENERGY RECOVERY FACILITY

SUMMARY OF PROPOSED MAXIMUM EXPECTED STACK EMISSION RATES BASED
ON RESULTS OBTAINED FROM BACT ANALYSES

Pollutant	Emission Rate and Associated Averaging Time ^a
Carbon Monoxide (CO)	(a) 100 ppm _{dv} @ 7% O ₂ , 4-hr (0.099 lb/MMBtu) (b) 400 ppm _{dv} @ 7% O ₂ , 1-hr (0.395 lb/MMBtu)
Nitrogen Oxides (NO _x)	(a) 180 ppm _{dv} @ 7% O ₂ , 24-hr (0.292 lb/MMBtu) (b) 220 ppm _{dv} @ 7% O ₂ , 1-hr (0.356 lb/MMBtu)
Sulfur Dioxide (SO ₂)	(a) 80% reduction by weight of uncontrolled SO ₂ emissions or 30 ppm _{dv} @ 7% O ₂ , both 24-hr (b) 66 ppm _{dv} @ 7% O ₂ , 24-hr (0.149 lb/MMBtu) (c) 82.5 ppm _{dv} @ 7% O ₂ , 3-hr (0.186 lb/MMBtu)
Particulate Matter (TSP or PM ₁₀)	0.010 gr/dscf @ 7% O ₂ (0.0194 lb/MMBtu)
VOC (non-methane HC)	37.3 ppm _{dv} @ 7% O ₂ , (0.0210 lb/MMBtu)
Lead (Pb)	6.0 x 10 ⁻⁴ lb/MMBtu
Beryllium (Be)	1.35 x 10 ⁻⁷ lb/MMBtu
Fluorides (as HF)	5 ppm _{dv} @ 7% O ₂ (0.0035 lb/MMBtu)
Mercury (Hg)	6.0 x 10 ⁻⁴ lb/MMBtu
Sulfuric Acid Mist (H ₂ SO ₄)	0.0358 lb/MMBtu
Hydrogen Chloride (HCl)	(a) 95% reduction by weight of uncontrolled HCL emissions or 25 ppm _{dv} @ 7% O ₂ , both 8-hr (b) 50 ppm _{dv} @ 7% O ₂ , 8-hr (0.0643 lb/MMBtu)

TABLE 1-1
(continued)

Pollutant	Emission Rate and Associated Averaging Time ^a
Arsenic (As)	9.1×10^{-6} lb/MMBtu
<u>Dioxins/Furans (Total tetra-octa PCDD & PCDF)</u>	<u>30 ng/dscm @ 7% O₂</u> (<u>2.54×10^{-8}</u> lb/MMBtu)

SOURCE: Camp Dreser & McKee Inc., 1991 (see Section 4.0 and Attachment A of this volume).

^a Compliance with these proposed emission rates is to be based on either CEM measurement data and/or compliance stack testing data, as appropriate for the given pollutant.

TABLE 2-1

PSD POLLUTANT APPLICABILITY FOR THE LEE COUNTY
ENERGY RECOVERY FACILITY

PSD Pollutant	EPA Significant Emission Rates (tpy) ^a	Proposed Facility Emission Rate (tpy) ^b	Need for Formal PSD Analysis (X)
Carbon Monoxide	100	324	X
Nitrogen Oxides	40	<u>959</u>	X
Sulfur Dioxide	40	<u>490</u>	X
Particulate Matter (total)	25	<u>64</u>	X
Particulate Matter (PM ₁₀)	15	<u>64</u>	X
Ozone (as volatile organic compounds)	40	<u>69</u>	X
Lead	0.6	<u>2.0</u>	X
Asbestos	0.007	<u>—</u> *	
Beryllium	4.0x10 ⁻⁴	<u>4.4x10⁻⁴</u>	X
Mercury	0.1	<u>2.0</u>	X
Vinyl Chloride	1	<u>—</u> *	
Fluorides	3	<u>11.5</u>	X
Sulfuric Acid Mist	7	<u>118</u>	X
Hydrogen Sulfide (H ₂ S)	10	<u>—</u> *	
Total Reduced Sulfur (including H ₂ S)	10	<u>—</u> *	
Reduced Sulfur Compounds (including H ₂ S)	10	<u>—</u> *	
Hydrogen Chloride	NA ^c	<u>212</u>	
Arsenic	AER ^d	<u>0.03</u>	X
Total Dioxins and Furans ^c	NA ^c	<u>8.3x10⁻⁵</u>	
Benzene	AER ^d	<u>—</u> *	
Radionuclides	AER ^d	<u>—</u> *	
Radon 222	AER ^d	<u>—</u> *	

^a SOURCE: FAC 17.2, Part V, Table 500.2, or 40 CFR 52.21.

^b Emission rates (annual average basis) are based on 100 percent load and continuous unit availability using the expected maximum emission rates for appropriate averaging periods as discussed in Attachment A. The Facility is assumed to be firing at a rate of 7.5×10^{-8} Btu/hr, and burning 1,800 tpd of MSW with a reference waste higher heating value (HHV) of 5,000 Btu/lb, resulting in 657,000 tpy of MSW being combusted by the Facility.

^c Not applicable. These pollutants are not regulated under the PSD regulations, but are provided to DER for review. These pollutants have been included in the New Source Performance Standards for municipal waste combustors.

TABLE 2-1
(continued)

^dAny emission rate. These pollutants (benzene, radionuclides, arsenic, and radon 222) are regulated by the Clean Air Act under the NESHAPS program, and any emission rate is considered a significant emission rate. In September 1991, EPA plans to propose regulations to implement changes to the PSD/NSR program. According to a March 11, 1991 policy memo prepared by John Seitz, EPA's OAQPS Director, Section 112(b)(6) PSD/NSR analysis (includes the NESHAPS pollutants). However, pursuant to the 1986 North County remand decision, the BACT analysis should consider all pollutants, including Title III hazardous air pollutants for which national standards have been set (previously subject to PSD), in determining which control strategy is best.

*Emission rates for these pollutants are negligible because these emissions are not expected from an MSW combustion environment or are not considered to be part of an MSW stream (e.g., asbestos).

TABLE 3-2
CONTROLLED EMISSION FACTORS
FOR THE LEE COUNTY ENERGY RECOVERY FACILITY

Pollutant	Emission Factor	
	lb/ton Refuse	lb/MMBtu*
Particulate Matter	0.194	0.0194
Sulfur Dioxide (24-hour)	1.49	0.149
(3-hour)	1.86	0.186
Nitrogen Oxides (as NO ₂)		
(24-hour)	2.92	0.292
(1-hour)	3.56	0.356
Carbon Monoxide		
(4-hour)	0.99	0.099
(1-hour)	3.95	0.395
Non-Methane Hydrocarbons		
(1-hour)	0.211	0.0211
Lead	0.006	6.0x10 ⁻⁴
Sulfuric Acid Mist	0.358	0.0358
Hydrogen Chloride	0.643	0.0643
Fluoride (as HF)	0.035	0.0035
Beryllium	1.35x10 ⁻⁶	1.35x10 ⁻⁷
Mercury	6.0x10 ⁻³	6.0x10 ⁻⁴
Inorganic Arsenic	9.1x10 ⁻⁵	9.1x10 ⁻⁶
Asbestos	**	**
Vinyl Chloride	**	**
Total Reduced Sulfur	**	**
Reduced Sulfur Compounds	**	**
Benzene	**	**
Radionuclides	**	**
Dioxin (Total tetra-octa PCDD & PCDF)	2.54x10 ⁻⁷	2.54x10 ⁻⁸

SOURCE: Camp Dresser McKee Inc., 1991 (see Emission Factor Support Document, Attachment A of this volume).

*Based on a higher heating value of 5000 Btu/lb.

**Negligible emission rate, the numerical value of which is strongly dependent on the composition of the refuse incinerated. Lee County municipal solid waste is not expected to contain these compounds.

TABLE 3-3

COMPARISON OF ESTIMATED EMISSION FACTORS TO
PERMITTED VALUES AT OTHER REGIONAL MASS-BURN FACILITIES
(lb/ton of refuse)^a

Pollutants	Lee	Pasco ^b	Hillsborough ^c	North Broward ^d	Pinellas 3 ^e	Palm Beach ^f	Bay County ^b	South Broward ^g
Particulate matter	0.194	0.309	0.42	0.42	0.5	0.33	0.56	—
Sulfur dioxide (24-hr)	1.49	2.15	8.5	2.79*	4.08	7.7	2.8	2.79
Nitrogen oxides (24-hr)	2.92	6.17	6.4	5.04	6.1	4.0	2.2	5.0
Carbon monoxide (4-hr)	0.99	0.470	1.8	0.81	1.58	12.0	11.4	0.8
Hydrocarbons (1-hr)	0.211	0.202	0.2	0.12	0.3	0.20	0.232	—
Lead	0.006	0.0067	0.02	0.018	0.067	0.005	0.0036	0.018
Mercury	0.006	0.0077	0.004	0.0083	0.01	0.003	0.00171	—
Beryllium	1.35×10^{-6}	1.30×10^{-6}	1.31×10^{-5}	8.4×10^{-6}	1.3×10^{-6}	9.0×10^{-6}	48×10^{-6}	—
Arsenic	9.1×10^{-5}	8.74×10^{-5}	—	—	—	—	—	—
Fluorides	0.035	0.077	0.06	0.16	0.1	0.04	—	—
Sulfuric acid mist	0.358	0.344	1.38	0.42	—	0.0004	—	—
Hydrogen chloride	0.643	1.22	4.0	—	4.0	3.5	—	—

^aNote that the heat content (Btu/lb) of the reference waste for each facility differs. Relative emission rates will change if converted to a lb/MMBtu basis.

^bPasco County, Power Plant Site Certification, PA 87-23, August 23, 1988.

^cHillsborough County, Power Plant Site Certification, PA 83-19 - Requested Modification May 1, 1987.

^dNorth Broward, Power Plant Site Certification, February 1, 1986.

^ePinellas County Unit 3, Power Plant Site Certification, PA 83-18 and an August 87, telephone conversation with the DER.

^fPalm Beach, Power Plant Site Certification, February 11, 1986, per telephone conversation with Barry Andrews DER, October 8, 1987.

^gSouth Broward, August 87 telephone conversation with the Florida DER.

*Based on a SO₂ upper limit of 0.31 lb/MMBtu and a refuse heat content of 4,500 Btu/lb, telephone conversation with Barry Andrews of DER, August 26, 1987.

TABLE 3-4

ESTIMATED EMISSION RATES FOR THE LEE COUNTY ERF

Pollutant	Single Unit Pounds/Hour (110%) ^a	Whole Facility Controlled Emission Rate	
		Tons/year ^b	Pounds/hour ^a
Particulate Matter (PM)	<u>5.34</u>	<u>64</u>	<u>16.0</u>
Sulfur Dioxide (SO ₂)	<u>40.98^c</u>	<u>490</u>	<u>123^c</u>
Nitrogen Dioxide (NO ₂)	<u>80.3^c</u>	<u>959</u>	<u>241^c</u>
Carbon Monoxide (CO)	<u>27.23^d</u>	<u>324</u>	<u>81.7^d</u>
Hydrocarbons (VOC)	<u>5.80</u>	<u>69</u>	<u>17.4</u>
Lead (Pb)	<u>0.165</u>	<u>2.0</u>	<u>0.495</u>
Arsenic (As)	<u>2.5 x 10⁻³</u>	<u>0.03</u>	<u>7.51x10⁻³</u>
Mercury (Hg)	<u>0.165</u>	<u>1.97</u>	<u>0.495</u>
Beryllium (Be)	<u>3.7 x 10⁻⁵</u>	<u>4.4x10⁻⁴</u>	<u>1.11x10⁻⁴</u>
Fluoride (as HF)	<u>0.96</u>	<u>11.5</u>	<u>2.89</u>
Sulfuric Acid (H ₂ SO ₄)	<u>9.85</u>	<u>118</u>	<u>29.5</u>
Hydrogen Chloride (HCl)	<u>17.68</u>	<u>212</u>	<u>53.0</u>
Dioxin (Total tetra-octa PCDD & PCDF)	<u>7.0 x 10⁻⁶</u>	<u>8.3x10⁻⁵</u>	<u>2.1x10⁻⁵</u>

SOURCE: Camp Dresser McKee Inc., 1991 (see Emission Factor Support Document, Attachment A of this volume, for basis for emission factors).

^a Short-term maximum emission rates based on 110 percent of design heat release rate (lb/MMBtu), 1,650 tpd Facility total throughput of 6,000 Btu/lb waste.

^b Annual emission rate based on 100 percent of the design heat release rate firing 1,800 tpd of reference waste at 5,000 Btu/lb.

^c NO_x and SO₂ lb/hr emission rates based on Table 3-2 24-hour average value for lb/MMBtu.

^d CO lb/hr emission rate based on Table 3-2 4-hour average value for lb/MMBtu.

TABLE 4-1

LEE COUNTY ENERGY RECOVERY FACILITY - 3 UNITS, 1800 TPD FACILITY
BACT SUMMARY
COMPARISON OF THE PROJECTED EMISSION RATES
TO PSD SIGNIFICANCE VALUES AND PROPOSED CONTROL TECHNOLOGY

Pollutant	PSD Significant Emission Rate (tpy)	Proposed BACT Emission Rate ^a (lbs/ton) (tpy)		Proposed Control Technology
Carbon Monoxide (CO) ^b (stoker waterwall)	100	0.987	<u>324</u>	Furnace Design & Proper Operation
Nitrogen Oxides (NO _x) ^c	40	<u>2.92</u>	<u>959</u>	<u>Thermal DeNO_x</u>
Sulfur Dioxide (SO ₂) ^d	40	1.49	<u>490</u>	Dry Scrubber/Fabric Filter, least stringent 80% removal by weight or 30 ppm _{dv} @ 7% O ₂ , both over a 24-hour block average
Particulate Matter (PM)	25 (TSP) 15 (PM ₁₀)	0.194	<u>64</u>	Fabric Filter - 0.010 gr/dscf @ 7% O ₂
Ozone (VOC) ^e (stoker waterwall)	40	0.21	<u>69</u>	Furnace Design & Proper Operation
Lead (Pb)	0.6	6.0×10^{-3}	<u>2.0</u>	Dry Scrubber/Fabric Filter
Asbestos ^f	0.007	Nil	<u>Nil</u>	
Beryllium (Be)	0.0004	1.35×10^{-6}	<u>4.4×10^{-4}</u>	Dry Scrubber/Fabric Filter
Fluorides (as HF) ^g	3	0.035	<u>11.5</u>	Dry Scrubber/Fabric Filter
Mercury (Hg)	0.1	<u>6.0×10^{-3}</u>	<u>2.0</u>	Dry Scrubber/Fabric Filter
Vinyl Chloride ^f	1	Nil	<u>Nil</u>	
Sulfuric Acid Mist (H ₂ SO ₄)	7	0.358	<u>118</u>	Dry Scrubber/Fabric Filter

TABLE 4-1
(continued)

Pollutant	PSD Significant Emission Rate (tpy)	Proposed BACT Emission Rate ^a (lbs/ton) (tpy)	Proposed Control Technology
Hydrogen Sulfide ^f	10	Nil	Nil
Total Reduced Sulfur ^f	10	Nil	Nil
Hydrogen Chloride (HCl) ^h	NA ⁱ	0.643	<u>212</u> Dry Scrubber/Fabric Filter, least stringent of at least 95% removal by weight or 25 ppmdv @ 7% O ₂ ; both over an 8-hr average
Arsenic (As)	AER ^j	9.1x10 ⁻⁵	<u>3.0x10⁻²</u> Dry Scrubber/Fabric Filter
Total tetra-octa PCDD & PCDF	NA ⁱ	<u>2.54x10⁻⁷</u>	<u>8.3x10⁻⁵</u> Furnace Design, Proper Operation, Dry Scrubber and Fabric Filter
Benzene ^f	AER ^j	Nil	Nil
Radionuclides ^f	AER ^j	Nil	Nil
Radon 222 ^f	AER ^j	Nil	Nil
MWC Emissions	___ ^k	___ ^k	___ ^k Dry Scrubber/Fabric Filter

^a Assumes 100 percent annual facility availability at the design capacity of 1800 tpd; however, the accepted industry standard for on-line availability of an energy recovery facility is 85 percent. The tpy emission rates have been rounded off.

^b The mass-burn stoker waterwall combustor design is the basis of this CO emission rate. The BACT tpy emission rate is based on 100 ppm_{dv} @ 7% O₂, 4-hr block average, as required by the NSPS, which differentiates among combustor design with a 400 ppm_{dv} @ 7% O₂, maximum 1-hr average allowance.

^c The mass-burn stoker waterwall combustor design is the basis of this NO_x emission rate. The BACT tpy emission rate is based on 180 ppm_{dv} @ 7% O₂ over a 24-hr average, as required by the NSPS, with a 220 ppm_{dv} @ 7% O₂, maximum 1-hr average allowance.

TABLE 4-1
(continued)

- ^d The proposed BACT tpy emission rate is based on 66 ppm_{dv} @ 7% O₂ over a 24-hr average from a 330 ppm_{dv} @ 7% O₂ scrubber inlet SO₂ concentration with 80% removal; there is a 82.5 ppm_{dv} @ 7% O₂ maximum 3-hr average from 330 ppm_{dv} @ 7% O₂ scrubber inlet SO₂ concentration with 75% removal allowance.
- ^e The mass-burn stoker waterwall combustor is the basis of this VOC emission rate expressed as non-methane hydrocarbons. The BACT tpy emission rate is based on 37.3 ppm_{dv} at 7% O₂ hourly average concentration.
- ^f A negligible emission rate was assigned to these pollutants since they are not typically found in the flue gas of refuse combustors or are not characteristic of a refuse waste stream. Representative stack test data are not available to support their presence in the flue gas of MWCs.
- ^g The BACT tpy emission rate for HF is based on 5 ppm_{dv} at 7% O₂ hourly average concentration.
- ^h The proposed BACT tpy emission rate is based on 50 ppm_{dv} @ 7% O₂ over an 8-hr average from a 1,000 ppm_{dv} @ 7% O₂ scrubber inlet HCl concentration with 95% removal.
- ⁱ Not applicable. These pollutants are not regulated under the PSD regulations, but were provided for review to the Florida Department of Environmental Regulation (FDER). Recently, these pollutants were included in the NSPS with emission limitations assigned to organics (specifically PCDD and PCDF), metals via particulate control, and acid gases (specifically HCl and SO₂). The indicated total dioxins/furans (tetra-octa isomers) BACT emission rate is 30 ng/dscm at 7% O₂.
- ^j Any emission rate (AER). These pollutants (i.e., benzene, radionuclides, arsenic, radon 222) are regulated by the Clean Air Act under NESHAPS, and any emission is considered a significant emission rate. Footnote "f" also applies except for arsenic. In September 1991, EPA plans to propose regulations to implement changes to the PSD/NSR program. According to a March 11, 1991 policy memo prepared by John Seitz, EPA's OAQPS Director, Section 112(b)(6) under Title III of the 1990 CAA Amendments excludes the 189 air toxics listed in the law from PSD/NSR analysis (includes the NESHAPS pollutants). However, pursuant to the 1986 North County remand decision, the BACT analysis should consider all pollutants, including Title III hazardous air pollutants for which national standards have been set (previously subject to PSD), in determining which control strategy is best.
- ^k The NSPS has established new PSD de minimis emission levels for the following MWC regulated pollutants: 40 tpy for MWC acid gases (HCl and SO₂), 15 tpy for MWC metals (measured as particulate matter), and 3.5 x 10⁻⁶ tpy for MWC organics (measured as total tetra through octa dioxins and furans). 40 CFR Part 51.166(b)(23)(i) and Part 52.21(b)(23)(i) have been amended accordingly.

The maximum Be emission rate from the Facility is estimated to be 1.35×10^{-6} pounds per ton of refuse which equates to 4.4×10^{-4} tpy. The resulting incremental GLC of Be from the Facility is estimated to be $2.79 \times 10^{-6} \mu\text{g}/\text{m}^3$ for a 24-hour averaging time. Although no NAAQS exists for Be, the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Be is based on an acceptable concentration of $0.01 \mu\text{g}/\text{m}^3$ for a 30-day averaging period (40 CFR 61.32) for facilities combusting beryllium containing industrial waste, which does not apply to the Facility. Therefore, the Facility is expected to have a minimal impact on ambient air quality with respect to Be since its more conservative GLC, with respect to average time, is substantially less than the NESHAP requirement.

The Hg emissions are typically not well controlled by particulate control devices. As indicated in the recently promulgated NSPS, observed Hg removal efficiencies vary widely among MWCs. The maximum expected Hg emission rate from the Facility is estimated to be 6.0×10^{-3} pounds per ton of refuse which equates to 2.0 tpy of Hg with 100 percent availability. From the air quality analysis, this emission rate results in an incremental GLC of 0.012 $\mu\text{g}/\text{m}^3$ for a 24-hour average. The NESHAP for mercury (when co-firing with sludge which is not the case for this Facility) is based on an acceptable concentration of $1.0 \mu\text{g}/\text{m}^3$ for a 30-day averaging period (40 FR 48302, October 14, 1975). The Facility is expected to have a minimal impact on ambient air quality for Hg since its more conservative GLC, with respect to averaging time, is less than the NESHAP requirement.

The maximum As emission rate from the Facility is estimated to be 9.1×10^{-5} pounds per ton of refuse which equates to 3.0×10^{-2} tpy. The pollutant, As, does not have a NAAQS and, although it is regulated by the Clean Air Act under NESHAP, it is applicable only to glass manufacturing plants, primary copper smelters, and metallic arsenic production facilities. The Facility's emission of As is expected to have a minimal impact on ambient air quality, and the control of particulate to 0.010 gr/dscf corrected to 7 percent O_2 is determined to be BACT.

BACT for these heavy metals is a dry scrubber/fabric filter with the fabric filter having a maximum outlet grain loading of 0.010 gr/dscf corrected to 7 percent O_2 .

TABLE 6-2

ANNUAL AVERAGE EMISSION RATE OF POLLUTANTS FOR THE
LEE COUNTY ENERGY RECOVERY FACILITY

Pollutant ^c	Controlled Emission Rate ^a	
	(lb/hr)	(g/s)
Particulate Matter (as TSP or PM ₁₀)	<u>14.6</u>	<u>1.83</u>
Sulfur Dioxide (SO ₂)		
(annual)	<u>112</u>	<u>14.08</u>
(24-hour)	<u>112</u>	<u>14.08</u>
(3-hour)	<u>140</u>	<u>17.6</u>
Nitrogen Dioxide (NO ₂)	<u>219</u>	<u>27.59</u>
Carbon Monoxide (CO)		
(8-hour)	<u>74</u>	<u>9.33</u>
(1-hour)	<u>296</u>	<u>37.3</u>
Hydrocarbons (VOC)	<u>15.8</u>	<u>1.98</u>
Lead (Pb)	<u>0.45</u>	<u>0.057</u>
Fluoride (as (HF))	<u>2.63</u>	<u>0.331</u>
Sulfuric Acid (H ₂ SO ₄)	<u>26.9</u>	<u>3.38</u>
Hydrogen Chloride (HCl)	<u>48.2</u>	<u>6.08</u>
Mercury (Hg)	<u>0.45</u>	<u>5.67x10⁻²</u>
Beryllium (Be)	<u>1.01x10⁻⁴</u>	<u>1.28x10⁻⁵</u>
Arsenic (As)	<u>6.83x10⁻³</u>	<u>8.6x10⁻⁴</u>
Dioxin (Total tetra-octa PCDD & PCDF)	<u>1.91x10⁻⁵</u>	<u>2.40x10⁻⁶</u>

SOURCE: Camp Dresser & McKee Inc., 1991.

^a Emission rates are based on 100% of the nominal capacity (i.e., 1,800 tpd at 5,000 Btu/lb) and continuous operation of the air pollution control system during reference waste firing. System availability is rated 100% (8,760 hrs/yr) for the modeling exercise. The lb/hr emission rates shown are rounded and may not convert precisely to the g/s emission rates shown. See Tables 3-2 and 3-3.

^b Assumes total NO_x emissions are emitted as NO₂.

^c Dioxins and hydrogen chloride are not PSD regulated pollutants (40 CFR 52.21).

NOTE: g/s conversion is calculated without using rounded numbers.

TABLE 6-8

LEE COUNTY ENERGY RECOVERY FACILITY
COMPARISON OF MAXIMUM PREDICTED CONCENTRATIONS OF
REGULATED POLLUTANTS TO SIGNIFICANT IMPACT AND
DE MINIMIS MONITORING LEVELS
(concentrations in $\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Period	Rank ^a	Maximum Predicted Concentration ^b	Significant Impact Level	PSD De Minimis Monitoring Level
Sulfur Dioxide (SO_2)	Annual	H	<u>0.19</u>	1	—
	24-hour	H	3.1	—	13
		HSH	<u>2.52</u>	5	—
	3-hour	H	15.8	—	—
		HSH	<u>12.5</u>	25	—
Nitrogen Dioxide (NO_2)	Annual	H	<u>0.36</u>	1	14
Particulate Matter (as TSP or PM_{10})	Annual	H	<u>0.024</u>	1	—
	24-hour	H	0.40	—	10
		HSH	<u>0.33</u>	5	—
Carbon Monoxide (CO)	8-hour	H	5.0	—	575
		HSH	<u>4.0</u>	500	—
	1-hour	H	71.9	—	—
		HSH	<u>46.9</u>	2,000	—
Lead (Pb)	3-month	H	<u>0.012^c</u>	—	0.1
Mercury (Hg)	24-hour	H	<u>0.012</u>	—	0.25
Beryllium (Be)	24-hour	H	<u>2.79×10^{-6}</u>	—	1×10^{-3}
Fluorides (as HF)	24-hour	H	<u>0.072</u>	—	0.25

SOURCE: Camp Dresser & McKee Inc., 1991.

^aAbbreviations: H = Highest concentration
HSH = Highest, second-highest concentration

^bLocation and time-of-occurrence for maximum impacts (by rank) are provided in Table 6-7.

^cThe de minimis monitoring level for lead is a quarterly-averaged value. The 24-hour highest average concentration was substituted as a conservative estimate of the quarterly value.

NOTE: No significance guideline level is exceeded.

TABLE 6-10

MAXIMUM PREDICTED CONCENTRATION OF NON-CRITERIA POLLUTANTS
RESULTING FROM LEE COUNTY ERF EMISSIONS

Pollutant ^a	Averaging Period	Highest Concentration (ug/m ³)	ACGIH TLV ^b (ug/m ³)	North Carolina AAL ^c (ug/m ³)	Kentucky AAL ^d (ug/m ³)
Mercury (Hg)	8-hour	3.0×10^{-2}	50	—	2.38
	24-hour	1.2×10^{-2}	—	0.6	—
	Annual	7.5×10^{-4}	—	—	—
Beryllium (Be)	8-hour	6.85×10^{-6}	2.0	—	BR
	24-hour	2.79×10^{-6}	—	—	—
	Annual	1.69×10^{-7}	—	4.1×10^{-3}	—
Fluorides (as HF)	1-hour	0.638	—	250	—
	8-hour	0.177	2,000	—	—
	24-hour	0.072	—	30	49,070
	Annual	4.37×10^{-3}	—	—	—
Sulfuric Acid Mist (H ₂ SO ₄ aqueous)	1-hour	6.52	—	100	—
	8-hour	1.81	1,000	—	23.8
	24-hour	0.737	—	12	—
	Annual	0.045	—	—	—
Arsenic (As)	8-hour	4.6×10^{-4}	200	—	BR
	24-hour	1.87×10^{-4}	—	—	—
	Annual	1.14×10^{-5}	—	2.3×10^{-4}	—
Hydrogen Chloride ^e	1-hour	11.7	—	700	167
	8-hour	3.25	7,000	—	—
	24-hour	1.33	—	—	—
	Annual	0.083	—	—	—
Dioxins ^e (Total tetra-octa TCDD & PCDF)	Annual	3.17×10^{-8}	—	3.0×10^{-6}	BR

REVISED 8/5/91

TABLE 6-10
(continued)

SOURCE: Camp Dresser & McKee Inc., 1991.

^aAsbestos, vinyl chloride, and hydrogen sulfide are regulated (40 CFR 52.21) pollutants with nil emission rates from the proposed Lee County RRF. Therefore, the resulting ambient impacts are nil, and are not listed.

^bAmerican Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1989-1990.

^cAcceptable Ambient Levels, North Carolina Administrative Code, Title 15A, Chapter 2, Subchapter 2D, effective May 1, 1990. 15-minute averaging times for the standards of acid gases have been applied to one-hour average Facility concentrations.

^d"Y" values from Kentucky Air Regulation 401KAR63:022, "New or Modified Sources Emitting Toxic Air Pollutants." The "Y" values are a function of the number of Facility operating hours per week, assumed, in this case, to be 168. The fluoride standard shown is an approximation of the actual standard, 60 ppm for a 2-month averaging period, from Appendix A of Regulation 401KAR53:010.

^eHydrogen chloride and dioxins are not regulated under the Clean Air Act or NESHAPS, and thereby are not PSD regulated pollutants.

^fNot specified as 2,3,7,8 - TCDD toxic equivalents. Standard applicable after May 1, 1991.

BR - BACT required if emission rate exceeds review threshold.

adsorbed in soils, therefore only minor amounts are available for uptake by vegetation.

Although lead in soils is largely unavailable to plants, the primary entry-way of lead into vegetation is through the root system (Zimdahl, 1976). Lagerwerff (1971) found that in radishes grown in an area contaminated by auto emissions, nearly all of the lead in the roots and 60 percent of the lead in the leafy growth was attributable to soil, not air.

Mercury (Hg)

Mercurial compounds emitted to the atmosphere may affect plants by either foliar adsorption or by uptake and translocation from soils (CAST, 1976). In the study cited above, the environmental concentrations of mercury which result in elevated levels in soils and vegetation are considerably greater than the 7.5×10^{-4} ug/m³ annual average predicted for the Facility. Deposition as particulate would result in a maximum of 0.014 g/m² over the 30-year life of the Facility. The resulting soil concentration of mercury is conservatively estimated to be 0.95 mg/kg. Vegetative impacts are not expected to occur, nor is bioaccumulation due to this source expected to be a problem.

The accumulation of mercury by plants is more of concern due to bioaccumulation in the food chain than due to phytotoxic effects. An experiment to evaluate the uptake of Hg by bromegrass by applying 10 mg/kg of Hg to soils indicated that considerable accumulation of Hg was found in the plant root system, and only small amounts were translocated to the above-ground portions of the plant (Hogg et al., 1978). The environmental hazards associated with high levels of mercury deposition to soils at waste application sites have previously been identified as those related to ingestion of soil and plant parts by grazing animals.

Beryllium (Be)

Beryllium is toxic to plants due to poisoning of plant metabolic functions and nutrient depletion. Visible toxicity and decreases in growth rates

TABLE A-2

LEE COUNTY ENERGY RECOVERY FACILITY
EMISSION RATE CALCULATIONS FOR TRACE METALS

Pollutant	Emission Factor (lb/ton MSW)	Emission Factor (lb/MMBTu)	Total Facility Emission Rate (lb/hr) ^a	Total Facility Emission Rate (tons per year) ^a
Lead	6.0×10^{-3}	6.0×10^{-4}	<u>0.45</u>	<u>2.0</u>
Beryllium	1.35×10^{-6}	1.35×10^{-7}	<u>1.01×10^{-4}</u>	<u>4.4×10^{-4}</u>
Mercury	<u>6.0×10^{-3}</u>	<u>6.0×10^{-4}</u>	<u>0.45</u>	<u>2.0</u>
Arsenic	9.1×10^{-5}	9.1×10^{-6}	<u>6.83×10^{-3}</u>	<u>0.03</u>

^a Emission rates are based on 100 percent availability at nameplate design capacity (1,800 tpd at 5,000 Btu/lb reference waste), operating 8,760 hours per year.

REVISED 8/5/91

the grate residue, as Hg is volatilized into the flue gas. As vaporized Hg passes through the boiler and air pollution control system, some Hg vapor condenses onto suspended particulate matter in the flue gas stream. Because fine particles have a high surface area to volume ratio, the fraction of Hg vapor that does condense would be preferentially associated with fine particulate matter.

Because of the lower outlet temperatures and the additional retention times between boiler outlet and fabric filter inlet, facilities incorporating a dry scrubber are assumed to have lower Hg emissions. However, a sufficient long-term data base does not exist to verify or quantify the degree of reduction that may be achieved. Some facilities equipped with just ESP particulate control have tested within the same range as those equipped with scrubber-baghouses; however, waste stream variations may have affected such tests.

The proposed emission factors for mercury are 6.0×10^{-4} lb Hg per MMBtu or 6.0×10^{-3} lb Hg per ton of refuse. These values represent some anticipated reduction of emissions compared to facilities using particulate control alone, while still representing an upper bound estimate of potential Hg emissions. The estimated annual Facility total emission rate for Hg is 2.0 tons per year.

A.6.4 ARSENIC

As with mercury emissions, arsenic (As) is expected to be emitted both as a vapor and particle. The St. Louis Demonstration (Gorman, 1977) calculated vapor metal emissions of arsenic. The study indicated that the fraction of metal in the vapor phase to metal in the particulate phase is 0.30. Because dry scrubbers are assumed to promote additional condensation and agglomeration, the vapor to particle ratio is expected to be lower and the fraction of arsenic controlled is expected to be greater.

The proposed emission factors for arsenic are 9.1×10^{-6} lb As per MMBtu or 9.1×10^{-5} lb As per ton of refuse. This value represents some anticipated reduction of emissions over facilities that do not have a dry scrubber,

FDER FORM 17-1.202(1)

APPLICATION TO OPERATE/CONSTRUCT

AIR POLLUTION SOURCES

STOKER WATERWALL DESIGN

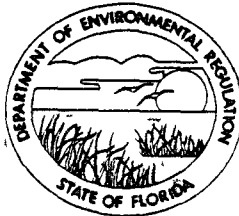
Poor Original

IMAGE QUALITY

**PLEASE NOTE:
THE ORIGINAL DOCUMENT WHICH
WERE SCANNED FOR THIS RECORD
WERE OF POOR QUALITY.**

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400



BOB MARTINEZ
GOVERNOR
DALE TWACHTMANN
SECRETARY

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Energy Recovery Facility (ERF) ☒ New¹ ☐ Existing¹

APPLICATION TYPE: ☒ Construction ☐ Operation ☐ Modification

COMPANY NAME. Lee County COUNTY Lee

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) See footnote below**

SOURCE LOCATION: Street Buckingham Road & State Route 82 City Lee County

UTM: East 424 Km North 2946 Km

Latitude 26° 37' 54"N Longitude 81° 45' 41"W

APPLICANT NAME AND TITLE. Lee County

APPLICANT ADDRESS: 2178 McGregor Blvd., Ft. Myers, FL 33902

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Lee County

I certify that the statements made in this application for an operate/construct permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: George E. Reilly
George E. Reilly, P.E., Director
Dept. of Lee County Utilities
Name and Title (Please Type)

Date: 6/27/91 Telephone No. (813) 335-2276

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

¹ See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Poor Original

Signed

Michael J. Ihnat, P.E.

Name (Please Type)

Camp Dresser & McKee, Inc.

Company Name (Please Type)

8191 College Parkway, Suite 206
Fort Myers, Florida

Mailing Address (Please Type)

Florida Registration No. 39126

Date: 6/28/91

Telephone No. (813) 433-0046

SECTION II: GENERAL PROJECT INFORMATION

- A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

See Attachment I

- B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction March 1992 Completion of Construction June 1994

- C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

See PSD Permit Application Section 4.0

- D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Not Applicable

ATTACHMENT I

The Lee County RRF will combust 1,800 tons per day of municipal solid waste in three (3) mass-burn stoker waterwall combustors and generate steam for electrical production. Each of the Facility's combustors will use a SNCR system to reduce nitrogen oxides, innovative reagent injection which may further reduce mercury emissions, a dry scrubber to remove acid gases and a baghouse to remove particulate matter. The proposed emission limits will meet existing state and federal standards and satisfy BACT requirements for all applicable pollutants.

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;
if power plant, hrs/yr 8760 ; if seasonal, describe _____

F. If this is a new source or major modification, answer the following questions.
(Yes or No)

1 Is this source in a non-attainment area for a particular pollutant? No

a. If yes, has "offset" been applied? _____

b. If yes, has "Lowest Achievable Emission Rate" been applied? _____

c. If yes, list non-attainment pollutants. _____

2. Does best available control technology (BACT) apply to this source?
If yes, see Section VI. Yes

3. Does the State "Prevention of Significant Deterioration" (PSD)
requirement apply to this source? If yes, see Sections VI and VII. Yes

4. Do "Standards of Performance for New Stationary Sources" (NSPS)
apply to this source? Yes

5. Do "National Emission Standards for Hazardous Air Pollutants"
(NESHAP) apply to this source? No

H. Do "Reasonably Available Control Technology" (RACT) requirements apply
to this source? No

a. If yes, for what pollutants? _____

b. If yes, in addition to the information required in this form,
any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justifi-
cation for any answer of "No" that might be considered questionable

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Approximate Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Lime Silo	Pebble Lime		2,300	See Section 4.0 of the PSD Permit Application
Ash Handling Bldg.	Ash Residue		41,600	

B. Process Rate, if applicable. (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr) - _____

2. Product Weight (lbs/hr). _____

C. Airborne Contaminants Emitted (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Emission ¹		Allowed ² Emission Rate per Rule 17-2	Allowable ³ Emission lbs/hr	Potential ⁴ Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
Pebble Lime	0.006	0.027					See Section 4.0 of PSD Permit Application
Ash Residue*	1.2	5.23					
	* Ash residue wetted to 30 percent moisture to suppress dust formation						

¹See Section V, Item 2.

²Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

³Calculated from operating rate and applicable standard.

⁴Emission, if source operated without control (See Section V, Item 3).

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
Baghouse*	Pebble Lime			Manufacturer
Baghouse*	Ash Residue			Specification
	*Additional information to be provided by vendor			

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max /hr	
Refuse*	150,000 lb/hr	165,000 lb/hr	825 MMBtu/hr
Propane Gas**	0.0045 MMcf/hr	0.139 MMcf/hr	360 MMBtu/hr
	* Facility Processing Totals		
	** Facility Totals - Used for Auxiliary Purposes		

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis: (Refuse)

Percent Sulfur: 0.10 (wet basis) Percent Ash: 20.9 (wet basis)
 Density: N/A lbs/gal Typical Percent Nitrogen. 0.50 (wet basis)
 Heat Capacity 5,000 BTU/lb N/A BTU/gal
 Other Fuel Contaminants (which may cause air pollution):
Chlorine 0.40 (wet basis) (See Ultimate Analysis in Section 3.0, attached)

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average _____ Maximum _____

G. Indicate liquid or solid wastes generated and method of disposal.

Spent/Reacted lime and combustion ash which will be landfilled.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack)

Stack Height: _____ ft. Stack Diameter: _____ ft.

Gas Flow Rate _____ ACFM _____ DSCFM Gas Exit Temperature: _____ °F.

Water Vapor Content: _____ % Velocity: _____ FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq. & Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated			150,000				
Uncontrolled (lbs/hr)			150,000				

Description of Waste Municipal Solid Waste

Total Weight Incinerated (lbs/hr) 150,000 Design Capacity (lbs/hr) 165,000 (110%)

Approximate Number of Hours of Operation per day 24 day/wk 7 wks/yr. 52

Manufacturer Vendor not yet selected

Date Constructed _____ Model No. _____

	Volume (ft) ³	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber	Vendor Specific Information				
Secondary Chamber					

Stack Height. 275 ft. Stack Diameter: 74 in per flue⁽³⁾ Stack Temp. 239.9°F

Gas Flow Rate. 116943 per flue⁽³⁾ ACFM 72039 DSCFM* Velocity: 65 FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air

Type of pollution control device: ☐ Cyclone ☐ Wet Scrubber ☐ Afterburner

☒ Other (specify) Selective Non-catalytic Reduction
Dry Scrubber and Baghouse
Carbon Injection

Brief description of operating characteristics of control devices: _____

See Attachment II

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.).

Ash residue will be sent to Lee/Hendry Counties' landfill

Wastewater effluent will be treated at the Facility to meet the City of Fort Myers industrial pretreatment standards.

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).
6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.
7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example. Copy of relevant portion of USGS topographic map).
8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation
10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

- A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

☒ Yes ☐ No

Contaminant	Rate or Concentration
Particulate Matter	0.010 gr/dscf
Nitrogen Oxides	180 ppmdv at 7% O ₂ , 24-hr
Dioxins/Furans (Total tetra-octa PCDD & PCDF)	30 ng/dscm at 7% O ₂
Hydrogen Chloride	95% removal or 25 ppmdv at 7% O ₂ , 8-hr avg.
Sulfur Dioxide	80% removal or 30 ppmdv at 7% O ₂ , 24-hr avg.

- B. Has EPA declared the best available control technology for this class of sources (if yes, attach copy)

☒ Yes ☐ No

Contaminant	Rate or Concentration
See Section 4.0 of PSD Application	

- C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration
Carbon Monoxide, Nitrogen Oxides	See PSD Permit Application
Sulfur Dioxide, Volatile Organic Substances,	Section 4.0 & Attachment A
Particulate, Matter, Lead Beryllium, Mercury,	
Fluorides and Sulfuric Acid Mist	

- D. Describe the existing control and treatment technology (if any).

- | | |
|---------------------------|--------------------------|
| 1. Control Device/System. | 2. Operating Principles. |
| 3. Efficiency * | 4. Capital Costs |

*Explain method of determining

ATTACHMENT II

Each of the Facility's mass-burn stoker waterwall combustors shall have a dedicated selective non-catalytic reduction (SNCR) system, a dry scrubber, innovative reagent injection (which may further reduce mercury emissions), and a baghouse. The SNCR system shall reduce nitrogen oxides (NO_x) in the flue gas stream to elemental nitrogen (N_2) through the injection of ammonia (NH_3) in the boiler. A dry scrubber shall remove SO_2 and other acid gases from the flue gas stream through the injection of a lime slurry into a reaction vessel. The lime slurry reacts with the acid gases to form calcium based salts which are removed downstream by a baghouse. Reagent will be injected into the flue gas stream, which may adsorb volatilized mercury or compounds of mercury from the flue gas stream; the particles are removed downstream by a baghouse. Through physical filtration, the baghouse collects and removes particulate matter and calcium based salts from the flue gas that accumulate on the fabric filter media.

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant

Rate or Concentration

10. Stack Parameters

a. Height: ft. b. Diameter: ft.
c. Flow Rate: ACFM d. Temperature: °F.
e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1. See Attachment III

a. Control Device: b. Operating Principles
c. Efficiency:¹ d. Capital Cost:
e. Useful Life: f. Operating Cost:
g. Energy:² h. Maintenance Cost:

i. Availability of construction materials and process chemicals

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device: b. Operating Principles
c. Efficiency:¹ d. Capital Cost
e. Useful Life: f. Operating Cost
g. Energy:² h. Maintenance Cost

i. Availability of construction materials and process chemicals:

¹Explain method of determining efficiency.

²Energy to be reported in units of electrical power - KWH design rate

j. Applicability to manufacturing processes.

k. Ability to construct with control device, install in available space, and operate within proposed levels:

3.

a. Control Device:

b. Operating Principles

c. Efficiency.¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device

b. Operating Principles.

c. Efficiency ¹

d. Capital Costs

e. Useful Life

f. Operating Cost.

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes.

k. Ability to construct with control device, install in available space, and operate within proposed levels.

F. Describe the control technology selected:

See Attachment IV

1. Control Device.

2. Efficiency.¹

3. Capital Cost.

4. Useful Life.

5. Operating Cost

6. Energy.²

7. Maintenance Cost

8. Manufacturer

9. Other locations where employed on similar processes.

a. (1) Company:

(2) Mailing Address.

(3) City.

(4) State

¹Explain method of determining efficiency.

²Energy to be reported in units of electrical power - KWH design rate.

ATTACHMENT III

1.
 - a. Control Device: Dry Scrubber
 - b. Operating Principles: Acid gas neutralization with lime slurry
 - c. Efficiency:
 - i) 95% HCl removal by weight or 25 ppmdv @ 7% O₂, both over an 8-hour average.
 - ii) 80% SO₂ removal by weight or 30 ppmdv @ 7% O₂, both over a 24-hour average.
 - d. Capital Cost: \$6,817,000 (includes bond burden)
 - e. Useful Life: 20 years
 - f. Operating Cost: \$1,455,300
 - g. Energy: \$2,358,750 kWh/yr
 - h. Maintenance Cost: \$80,600
 - i. Availability of Materials
Construction and Process Chemicals: Readily Available
 - j. Applicability to Manufacturing Processes: Not Applicable
 - k. Ability to construct with control device, install in available space and operate within proposed levels: Site and design are adequate
2.
 - a. Control Device: Baghouse (also known as fabric filter)
 - b. Operating Principles: Fabric filtration and removal of particulate matter.
 - c. Efficiency: 0.010 gr/dscf @ 7% O₂
 - d. Capital Cost; See PSD Permit Application Section 4.0. Best demonstrated control technology applied with top down BACT level of control.
 - e. Useful Life: 20 years
 - f. Operating Cost: See above, 2d. Capital Cost
 - g. Energy: See above, 2d, Capital Cost
 - h. Maintenance Costs: See above, 2d, Capital Cost
 - i. Availability of Construction
Materials and Process Chemicals: Readily Available
 - j. Applicability to Manufacturing Processes: Not Applicable
 - k. Ability to construct with control device, install available space, and operate within proposed levels: Site and design are adequate.

ATTACHMENT III (cont'd.)

3. a. Control Device: Electrostatic Precipitator (ESP)
b. Operating Principles: Dry collection by electrically charging particles on oppositely charged surfaces.
c. Efficiency: 0.010 gr/dscf @ 7% O₂
d. Capital Cost: See PSD Permit Application Section 4.0
e. Useful Life: 20 years
f. Operating Cost: See above, 3d. Capital Cost
g. Energy: See above, 3d. Capital Cost
h. Maintenance Costs: See above, 3d. Capital Cost
i. Availability of Construction Materials and Process Chemicals: Readily Available
j. Applicability to Manufacturing Processes: Not Applicable
k. Ability to construct with control device, install available space, and operate within proposed levels: Site and design are adequate.
4. a. Control Device: Selective Non-catalytic Reduction System
b. Operating Principles: Nitrogen oxide reduction to elemental nitrogen with ammonia or other nitrogen based compound
c. Efficiency: 45% NO_x removal
d. Capital Cost: See PSD Permit Application Section 4.0. Best demonstrated control technology applied with top down BACT level of control.
e. Useful Life: 20 years
f. Operating Cost: See above, 4d. Capital Cost
g. Energy: See above, 4d. Capital Cost
h. Maintenance Costs: See above, 4d. Capital Cost
i. Availability of Construction Materials and Process Chemicals: Readily Available
j. Applicability to Manufacturing Processes: Not Applicable
k. Ability to construct with control device, install available space, and operate within proposed levels: Site and design are adequate.

ATTACHMENT IV

1. a. Control Device: Dry Scrubber
b. Efficiency: i) 95% HCl removal by weight or 25 ppm_{dv} @ 7% O₂, both over an 8-hour average
ii) 80% SO₂ removal by weight or 30 ppm_{dv} @ 7% O₂, both over a 24-hour average
c. Capital Cost: \$6,817,000 (includes bond burden)
d. Useful Life: 20 years
e. Operating Cost: \$1,455,300
f. Energy: \$2,358,750 KWh/yr
g. Maintenance Cost: \$80,600
h. Manufacturer: Not yet selected
i. Other locations where employed on similar processes: Kent County
1500 Scribner Avenue N.W.
Grand Rapids, MI 49504
2. a. Control Device: Baghouse (also known as fabric filter)
b. Efficiency: 0.010 gr/dscf @ 7% O₂
c. Capital Cost: See PSD Permit Application Section 4.0. Best demonstrated control technology applied with top down BACT level of control.
d. Useful Life: 20 years
e. Operating Cost: See above, B.3, Capital Cost
f. Energy: See above, B.3, Capital Cost
g. Maintenance Cost: See above, B.3, Capital Cost
h. Manufacturer: Not yet selected
i. Other locations where employed on similar processes: Kent County
1500 Scribner Avenue N.W.
Grand Rapids, MI 49504
3. a. Control Device: Selective Non-catalytic Reduction System
b. Efficiency: 45% NO_x reduction
c. Capital Cost: See PSD Permit Application Section 4.0. Best demonstrated control technology applied with top down BACT level of control.

ATTACHMENT IV (cont'd.)

d. Useful Life:	20 years
e. Energy:	See above, C.3, Capital Cost
f. Energy:	See above, C.3, Capital Cost
g. Maintenance Cost:	See above, C.3, Capital Cost
h. Manufacturer:	Not yet selected
i. Other locations where employed on similar processes:	Stanislaus County P.O. Box 642 Modesto, CA 95353 SERRF 333 W. Ocean Blvd. Long Beach City Hall Long Beach, CA 90802

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions ¹

Contaminant

Rate or Concentration

(8) Process Rate:¹

b. (1) Company

(2) Mailing Address

(3) City

(4) State

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions ¹

Contaminant

Rate or Concentration

(8) Process Rate:¹

10. Reason for selection and description of systems

¹Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A Company Monitored Data

1. _____ no. sites _____ TSP _____ () SO₂* _____ Wind spd/dir

Period of Monitoring _____ / _____ / _____ to _____ / _____ / _____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

*Specify bubbler (B) or continuous (C)

2. Instrumentation, Field and Laboratory

- a. Was instrumentation EPA referenced or its equivalent? ☐ Yes ☐ No
- b. Was instrumentation calibrated in accordance with Department procedures?
☐ Yes ☐ No ☐ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. 5 Year(s) of data from 01 / 01 / 82 to 12 / 30 / 86
month day year month day year
2. Surface data obtained from (location) Ft. Myers (Page Field)
3. Upper air (mixing height) data obtained from (location) Tampa International Airport
4. Stability wind rose (STAR) data obtained from (location) Not Used

C. Computer Models Used

1. Industrial Source Complex (ISC) Version Modified? If yes, attach description.
Date 90346
2. VISCREEN Modified? If yes, attach description.
3. _____ Modified? If yes, attach description.
4. _____ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate ***	
ISP	<u>1.83</u>	grams/sec
SO ₂	<u>14.08</u>	grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review

- G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.) Include assessment of the environmental impact of the sources.
- H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

*** Based on 100% of nominal capacity (1800 TPD) at 5,000 Btu/lb of reference waste.

TABLE OF CONTENTS

Poor Original

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 SUMMARY OF THE PROJECT AND IMPACTS	
1.1 Introduction	1-1
1.2 Facility Description	1-2
1.3 Good Engineering Practice Stack Height Evaluation	1-4
1.4 Boiler Operating Conditions	1-6
1.5 Air Quality Impact Assessment	1-7
2.0 REGULATORY REVIEW	
2.1 Applicable Regulations	2-1
2.2 Prevention of Significant Deterioration	2-1
2.2.1 Source Applicability	2-2
2.2.2 Pollutant Applicability	2-2
2.3 New Source Performance Standards	2-6
2.4 National Emission Standards for Hazardous Air Pollutants	2-10
2.5 Federal Aviation Administration Notification Requirements	2-11
2.6 DER Air Pollution Control Regulations	2-11
2.6.1 Emission Limitations	2-11
2.6.2 Ambient Air Quality Standards	2-12
2.6.3 Permit Requirements	2-12
3.0 AIR POLLUTANT EMISSIONS	
3.1 Introduction	3-1
3.2 Combustion of Municipal Solid Waste	3-2
3.3 Comparison to Other Permitted Facilities	3-2
4.0 EMISSION CONTROL TECHNOLOGY EVALUATION	
4.1 Description of BACT Review	4-1
4.1.1 Energy Impacts	4-2
4.1.2 Economic Impacts	4-2
4.1.3 Environmental Impacts	4-3
4.1.4 Pollutant Applicability	4-3
4.1.5 Material Separation	4-8
4.1.6 Selection and Evaluation of Alternative Control Strategies	4-8
4.2 Regulatory Permitting Basis for the Proposed Emission Control Strategies	4-09
4.3 BACT Review for SO ₂ and Acid Gas Compounds	4-15
4.3.1 Proposed Control Technology	4-15
4.3.2 Compliance with Applicable Emission Standards	4-16
4.3.3 Emission of Gaseous Sulfur Compounds and Acid Gases	4-17
4.3.4 Description of SO ₂ and Other Acid Gas Control Alternatives	4-19

TABLE OF CONTENTS
(continued)

<u>Section</u>	<u>Page</u>
4.0 EMISSION CONTROL TECHNOLOGY EVALUATION (continued)	
4.3 BACT Review for SO ₂ and Acid Gas Compounds (continued)	
4.3.5 Evaluation of SO ₂ and Acid Gas Control	4-36
4.3.6 BACT Determination for SO ₂ and Other Acid Gases	4-40
4.4 BACT Review for Particulate Matter	4-44
4.4.1 Proposed Control Technology	4-44
4.4.2 Compliance with Applicable Emission Standards	4-44
4.4.3 Rationale for Proposed BACT Determination	4-45
4.4.4 Description of Particulate Control Technology Alternatives	4-46
4.4.5 BACT Determination of Total Suspended Particulate Matter	4-55
4.4.6 BACT Determination of PM ₁₀	4-57
4.5 BACT Review for Trace Heavy Metal Emissions	4-60
4.5.1 Proposed Control Technology	4-60
4.5.2 Compliance with the Applicable Standards	4-60
4.5.3 Rationale for Proposed BACT Determination	4-61
4.5.4 BACT Determination	4-64
4.6 BACT Review for By-Products of Combustion	4-66
4.6.1 BACT Determination for Nitrogen Oxides	4-67
4.6.2 Emission of Nitrogen Oxides	4-68
4.6.3 Description of NO _x Control Techniques	4-71
4.6.4 Evaluation of NO _x Control Techniques	4-85
4.6.5 BACT Determination for NO _x	4-86
4.6.6 BACT Determination for Carbon Monoxide	4-87
4.6.7 BACT Determination for Volatile Organic Compounds	4-88
4.6.8 Compliance with Applicable Emission Standards	4-89
4.7 BACT Review for Trace Organic Compounds	4-90
4.8 Summary of BACT Determinations	4-97
5.0 EXISTING AMBIENT AIR QUALITY AND METEOROLOGY	
5.1 National and Florida Ambient Air Quality Standards	5-1
5.1.1 Attainment Status for Criteria Pollutants	5-2
5.2 Available Ambient Monitoring Data	5-5
5.3 Selection of Background Pollutant Concentrations	5-9
5.4 Available Meteorological Data	5-13
6.0 AIR QUALITY ANALYSIS	
6.1 Overview	6-1
6.2 Source Characteristics	6-2
6.3 Modeling Methodology	6-7
6.3.1 Industrial Source Complex Model	6-7
6.3.2 ISC Model Options	6-8

TABLE OF CONTENTS
(continued)

<u>Section</u>	<u>Page</u>
6.0 AIR QUALITY ANALYSIS (continued)	
6.4 Screening Analysis	6-11
6.5 Detailed Modeling Analysis	6-14
6.5.1 Receptor Grids	6-14
6.5.2 Detailed Modeling Results	6-16
6.6 Comparison with Ambient Air Quality Standards	6-21
6.7 Assessment of Non-Criteria Pollutant Impacts	6-23
6.7.1 Assessment Methods	6-26
6.7.2 Comparison with ACGIH TLVs and AALs	6-28
6.8 Comparison with PSD Increments	6-28
6.8.1 PSD Class II Areas	6-28
6.8.2 PSD Class I and Special Receptor Areas	6-31
7.0 ADDITIONAL IMPACT ANALYSES	
7.1 Introduction	7-1
7.2 Visibility Impacts	7-1
7.3 Growth Analysis	7-3
7.4 Class I Air Quality Analysis	7-3
7.5 Soils and Vegetation Impact Analysis	7-6
7.5.1 Predicted Air Quality Impacts	7-9
7.5.2 Specific Pollutants	7-10
7.6 Assessment of Secondary Sources	7-17
7.6.1 Lime Silo Roof Vent	7-17
7.6.2 Ash Handling Building Vent	7-18
7.7 Impact Within Pollutant Non-Attainment Areas	7-18
8.0 REFERENCES	8-1
9.0 ATTACHMENTS	
A - Emission Factor Support Document	A-1
B - Meteorological Data	B-1
C - BACT Determinations for Facilities Burning Refuse	C-1
D - BURN Model Output	D-1

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1-1	Summary of Proposed Maximum Expected Stack Emission Emission Rates Based on Results Obtained from BACT Analyses	1-9
2-1	PSD Pollutant Applicability for the Lee County Energy Recovery Facility	2-4
2-2	EPA-Proposed Municipal Waste Combustor Emissions Standards	2-7
3-1	Reference Waste Ultimate Analysis	3-3
3-2	Controlled Emission Factors for the Lee County ERF	3-5
3-3	Comparison of Estimated Emission Factors to Permitted Values at Other Regional Mass-Burn Facilities	3-6
3-4	Estimated Emission Rates for the Lee County ERF	3-8
4-1	BACT Summary - Comparison of the Projected Emission Rates to PSD Significance Values and Proposed Control Technology	4-5
4-2	Permitting Data for Additional Refuse Combustion Facilities	4-11
4-3	Partial Listing of Advanced Particulate Control Equipment Applications to MSW Combustion Facilities, 1970-1988	4-13
4-4	Refuse Combustion Facilities with Dry Scrubbers	4-26
4-5	Performance of Dry Scrubbers on Refuse Combustion Facilities	4-27
4-6	Performance of Dry Scrubbers on Additional United States Refuse Combustion Facilities	4-28
4-7	Dioxin Reduction Across the Dry Scrubber/Fabric Filter Systems at Refuse Combustion Facilities	4-31
4-8	Capital and Operations/Maintenance Costs for SO ₂ Control Strategy	4-39
4-9	First-Year SO ₂ Control Strategy Costs	4-42
4-10	Particle Size Distribution Data	4-59
4-11	Inlet and Outlet Heavy Metal Emission Data Across the Dry Scrubber/Fabric Filter Air Pollution Control System at the Marion County Facility	4-63
4-12	Average NO _x Emissions from Recently Constructed Refuse Combustion Facilities	4-70
4-13	Alternative NO _x Control Techniques	4-72
4-14	Observed Control Efficiency Associated with SCR Installations at Two Refuse Combustors in Japan	4-75
TABLES DELETED		
4-18	Dioxin Reduction Across the Dry Scrubber/Fabric Filter Systems at the Marion County, Stockholm-Hogdalen, and Malmo Facilities	4-95

LIST OF TABLES
(continued)

<u>Table</u>		<u>Page</u>
5-1	State and Federal Air Quality Guidelines and Standards	5-3
5-2	NAAQS Attainment Status for Select Counties Within the Southwest Florida Intrastate AQCR	5-4
5-3	Ambient Air Monitors Specified by County and Criteria Pollutants	5-6
5-4	Ambient Monitoring Data Used to Derive Background Concentrations for the Lee County Energy Recovery Facility	5-7
5-5	Proposed Background Concentrations for Criteria Pollutants Emitted by the Lee County Energy Recovery Facility	5-10
6-1	Source Parameters of 14 Potential Operating Conditions for the Lee County ERF	6-5
TABLE DELETED		
6-2	Annual Average Emission Rate of Pollutants for the Lee County Energy Recovery Facility	6-6
6-3	Screening Modeling Options ISCST	6-12
6-4	Lee County ERF Screening Analysis Results for Various Operating Loads	6-13
6-5	Detailed Modeling Options for ISCST	6-15
6-6	Maximum Coarse Grid Ground-Level Concentrations for the Lee County Energy Recovery Facility	6-17
6-7	Maximum Normalized Ground-Level Concentrations Based on the Fine Grid Analyses for the Lee County Energy Recovery Facility	6-19
6-8	Comparison of Maximum Predicted Concentrations of Regulated Pollutants to Significant Impact and De Minimis Monitoring Levels	6-20
6-9	Comparison of Predicted Impacts from the Lee County Energy Recovery Facility and Ambient Background Concentrations to the NAAQS/FAAQs	6-22
6-10	Maximum Predicted Concentration of Non-Criteria Pollutants Resulting from Lee County ERF Emissions	6-24
6-11	Comparison of Impacts from the Lee County Energy Recovery Facility to PSD Class II Increments	6-30
6-12	Special Discrete Receptor Locations Used in the PSD Increment Consumption Analysis	6-32
6-13	Special Receptor Modeling Results	6-34
6-14	Comparison of Maximum Concentrations at Special Receptor Locations to Class I (SIL)s and PSD Increments	6-35
7-1a	Visual Effect Screening Analysis for Lee County ERF, Class I Area: Everglades National Park	7-4
7-1b	Visual Effect Screening Analysis for Lee County ERF, Sensitive Area: Big Cypress National Preserve	7-5
7-2	Special Receptor Modeling Results	7-7
7-3	Maximum Concentrations at Special Receptor Locations	7-8

LIST OF FIGURES

<u>Figure</u>		<u>Following Page</u>
1-1	General Site Location	1-2
FIGURE DELETED		
1-3	Typical Facility Cross-Section (Stoker Waterwall Design)	1-2
4-1	Wet Venturi Scrubber	4-21
4-2	Dry Scrubber	4- 23
4-3	Dry Injection Scrubber and Particulate Matter Collection Device	4- 33
4-4	Electrostatic Precipitator	4-47
4-5	Fabric Filter Operation	4-50
4-6	Saturation Temperature of Metal Compounds	4-62
4-7	Schematic of a Typical SCR Process	4-73
4-8	General Schematic of the Thermal DeNOx Process	4- 77
FIGURES DELETED		
5-1	Florida Counties Near the Site	5-6
6-1	Auer Land Use Classification	6-10
6-2	Coarse Grid Receptor Array	6- 16
6-3	Normalized Ground-Level Concentration Isopleths: Highest Annual Average (1984)	6- 18
6-4	Normalized Ground-Level Concentration Isopleths: High, Second-High 24-Hour Average	6- 18
6-5	Normalized Ground-Level Concentration Isopleths: High, Second-High 3-Hour Average	6- 18
6-6	Discrete Receptor Locations	6- 31

Section 1

SECTION 1.0

SUMMARY OF THE PROJECT AND IMPACTS

1.0 SUMMARY OF THE PROJECT AND IMPACTS

1.1 INTRODUCTION

For several years, Lee County has been investigating alternative methods for long-term solid waste disposal. The County began its investigation in 1979, after the State of Florida enacted legislation (Chapter 403.706, Florida Statutes) requiring the County to submit solid waste resource recovery and management plans. The current solid waste disposal method of sanitary landfilling is becoming inadequate as a primary disposal method due to environmental and siting constraints. Land areas in the region which are suitable for landfills are quickly diminishing.

In accordance with Florida law, the County intends to reduce the amount of waste requiring disposal by 30 percent through an aggressive recycling program. However, this still leaves 70 percent of the waste which must be disposed of. Studies commissioned by Lee County since 1987 have concluded that a mass-burn energy recovery system is the most prudent long-term primary solid waste disposal method for the waste which remains after recycling.

Lee and Hendry Counties have entered into an agreement that provides for the use of an integrated waste management system. The system will consist of an aggressive recycling program, the energy recovery facility (the "Facility") described in this document, and a new regional landfill to be constructed in Hendry County. These facilities will serve the solid waste disposal needs of both Lee and Hendry counties. The sanitary landfill/ashfill in Hendry County and the recycling program will be permitted separately from the energy recovery facility. The power produced by the combustion of refuse will be sold to the Florida Power & Light Company (FP&L). Revenues from the sale of this energy will help offset the cost of owning and operating the Facility.

A site selection report was completed on February 6, 1990 which evaluated a number of potential sites for the development of the Facility. The Board

of County Commissioners ultimately chose a site on Buckingham Road, off State Route 82, as the location for the Lee County Energy Recovery Facility (ERF). The general location of this site is shown in Figure 1-1.

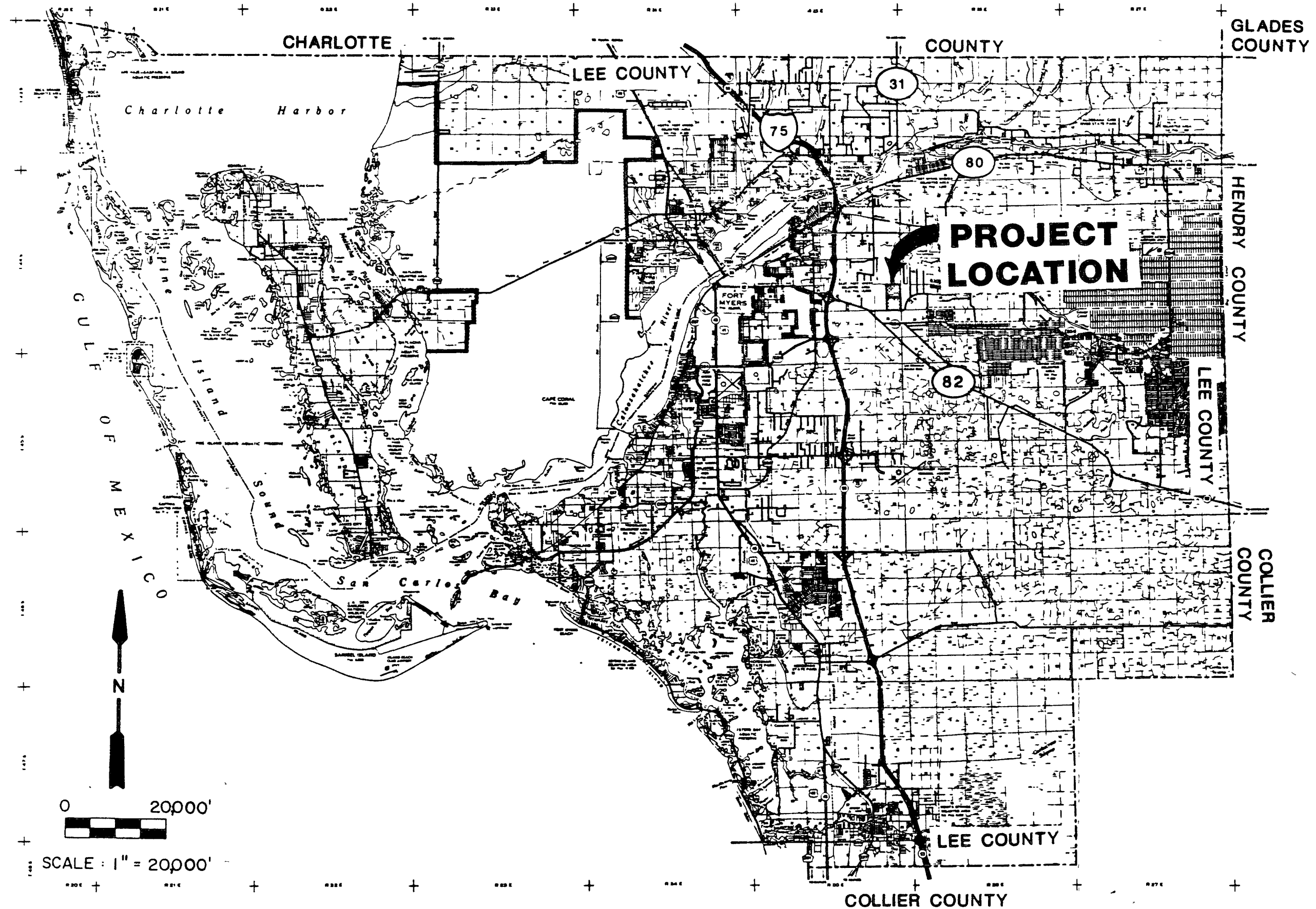
1.2 FACILITY DESCRIPTION

After evaluating several technologies, the County has concluded that an energy recovery facility incorporating a mass-burn technology and operated by a full-service vendor under contract to the County would best fit its present and foreseeable needs. The energy recovery facility is anticipated to have a nameplate generating capacity of approximately 30 megawatts (MW), using 1,200 tons per day (tpd) of municipal solid waste (MSW) as fuel. However, certification for an ultimate site capacity of about 45 MW, capable of processing 1,800 tpd of MSW, is being sought in anticipation of future solid waste disposal requirements. The energy produced would be used to satisfy internal power demands, with the surplus being sold to an electric utility.

When determining the appropriate size of the Facility, the County assumed that it would exceed the state recycling goal of 30 percent by 1994. The Facility is sized to handle the waste that will remain after this higher percentage is removed for recycling.

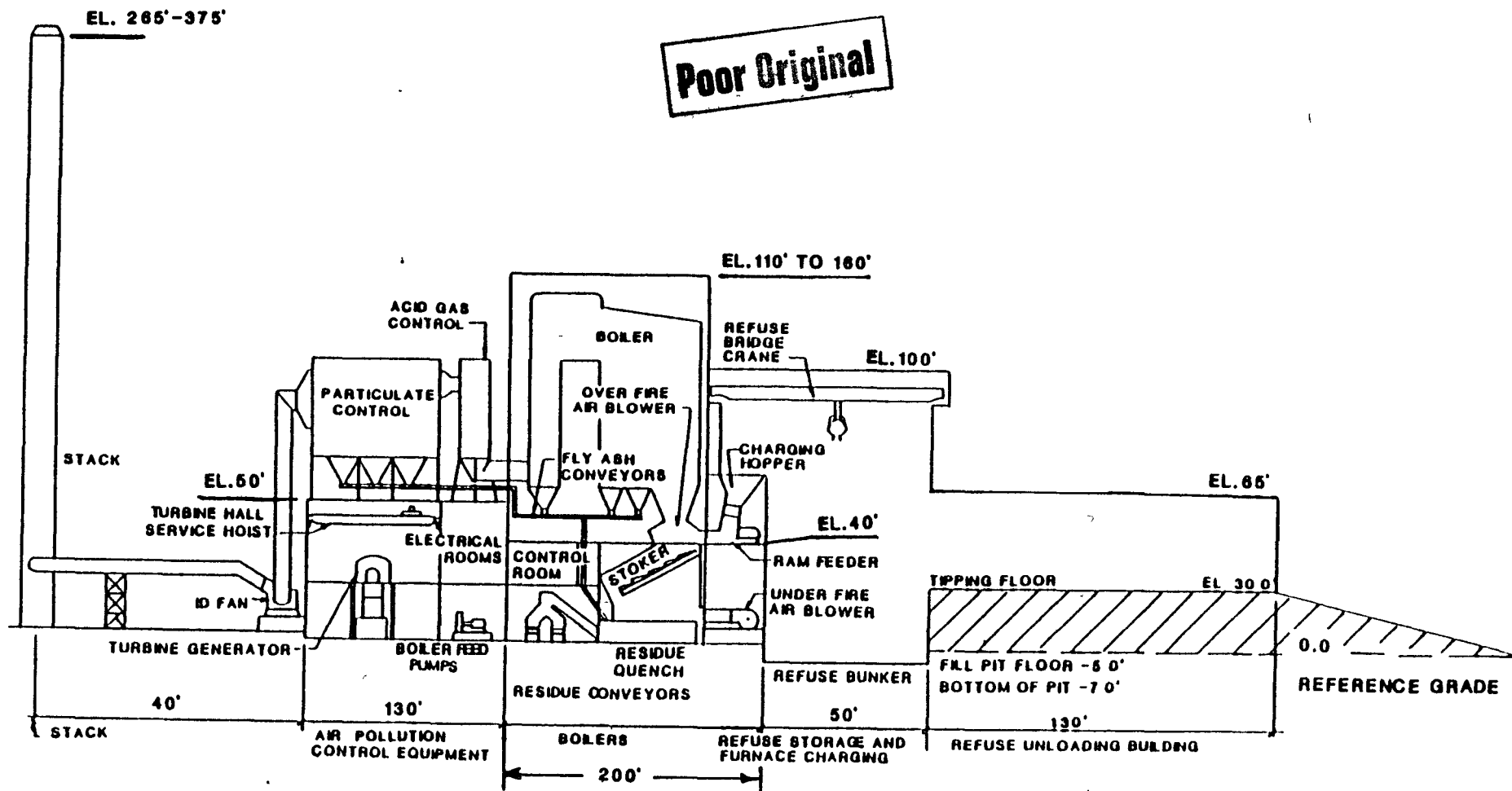
Because the proposed Facility will use mass-burn technology, there will be no complex preprocessing of wastes at the Facility prior to combustion. Sludge from wastewater treatment plants and any materials, such as construction waste, containing asbestos or other potentially hazardous materials, will not be accepted at the Facility. Inadvertently delivered oversized items will be separated from the incoming refuse by an overhead crane.

A conceptual schematic diagram of the Facility is presented in Figure 1-2. The figure shows a stoker waterwall combustor design, which uses a fixed combustion chamber, in which the waste is combusted as



General Location Map - Lee County Energy Recovery Facility

Poor Original



NOTE

O.O REFERENCE GRADE IS 20 TO 25 FEET ABOVE MSL. ALL DIMENSIONS ARE APPROXIMATE.
NOT TO SCALE.

FIGURE 1-2

CDM

Lee County Energy Recovery Facility
Typical Facility Cross-Section (Stoker Water Wall Design)

it moves over a stoker grate. The specific combustor design used at the Facility will depend on the vendor selected.

An 1,800-tpd facility based on a stoker waterwall design would consist of three 600-tpd combustor units. Each combustor unit would have its own flue with a pollution control system train. The total of three flues would be grouped together in a single stack shell.

Truck transport will be used to deliver municipal solid waste (MSW) to the Facility and to remove ash residue from the Facility. MSW would be dumped into the refuse bunker directly from packer trucks. All waste will be stored inside the fully enclosed building prior to combustion. No waste will be visible from the outside. The waste will be kept under negative air pressure by withdrawing combustion air from the storage pit area. As a result, fugitive dust and odors will be contained within the building, and drawn into the furnace, where they will be eliminated or removed from the air stream. The overhead cranes will mix MSW in the bunker and load the four or five charging hoppers as required. Each combustor train will be equipped with a dry scrubber and fabric filter (baghouse) for acid gas and particulate air emission control. Injection of reagent (to be specified by the selected vendor) may provide additional control of mercury emissions.

A dry scrubber is a flue gas chamber into which lime slurry is injected to react with acidic compounds in the flue gases. Pebble lime is mixed with water to form a lime slurry which is injected into the vessel through spray nozzles or a rotary atomizer. The water in the slurry evaporates, cooling the flue gases, while the lime reacts with SO_2 , HCl , and other acidic compounds. The salts formed by this reaction and any residual lime are collected in the particulate control device.

Injection of reagent into the flue gas stream to help control mercury emissions will be either before or after the dry scrubber. Mercury vapor which does not condense onto particulate matter can be adsorbed by the reagent, which is removed downstream by the particulate control device.

A fabric filter collects particulate matter by filtering flue gases through a fabric filter media. Multiple fabric filters are contained in a series of modular units which compose the total fabric filter system. Initial collection forms a thick porous cake of collected particulate on the filters. This cake then acts as the filter collection medium, with the fabric filter serving to support the particulate cake. As the cake builds, the pressure drop across the fabric filter also increases. Periodically, the cake is removed by reversing the air flow of each modular unit, blowing a pulse of compressed air through the filters, or shaking the filters, depending on the type of filter unit employed. The fabric filter for this Facility will be designed to achieve an emission limitation for particulate matter of 0.010 grains per dry standard cubic foot (gr/dscf) corrected to 7 percent O₂. The flue gas will be drawn through the fabric filter by an induced draft fan which will be located between the stack and the fabric filter.

Bottom ash from the furnace and fly ash from the fabric filters will be mixed prior to removal from the Facility. Ash will comprise approximately 10 percent of the volume and 25 percent of the weight of the MSW processed by the facility. The ash will be quenched with water prior to transport to a landfill in Hendry County. The ash handling area is fully enclosed. Emissions of particulate matter are not likely to be generated during the handling of the wet ash, but any such emissions will be controlled through a particulate control device before building air is vented to the atmosphere.

1.3 GOOD ENGINEERING PRACTICE STACK HEIGHT EVALUATION

The 1977 Clean Air Act Amendments sought to require that pollutant emission limitations were not affected by the stack height which exceeds good engineering practice (GEP) or by any other dispersion technique. The GEP stack height was that "height necessary to insure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, and wakes which may be created by the source itself, nearby structures, or nearby terrain obstacles" (PL 95-11). The Act does not

restrict the actual height of any stack; it only limits the theoretical stack height used in determining a source's allowable emission rate for pollutants regulated under the Act.

The U.S. Environmental Protection Agency (EPA) promulgated regulations to implement Section 123 of the Clean Air Act on July 8, 1985 (50 FR 27892). The GEP stack height is the greater of 65 meters or the height calculated from:

$$H_g = H + 1.5L$$

where:

H_g = the maximum GEP stack height

H = the height of the structure

L = the lesser dimension (height or maximum projected width) of the structure

This formula is applicable to any structure located within five times dimension "L," but not exceeding 0.8 km, of the proposed stack. The height and width of a structure is based on the frontal area of the structure projected onto a plane perpendicular to a line originating from the stack and following the direction of the wind. The stack height may be less than the maximum GEP height if excess concentrations do not result due to aerodynamic downwash and/or would not result in a violation of applicable ambient air quality standards.

The location of the proposed Facility on the site, shown in Figure 2-6 of Volume I of this application, is in a relatively flat rural environment; thus, only the furnace and boiler building is within the area of influence of the plume. This structure is anticipated to be a squat building, one for which the height is the lesser dimension in comparison with the width. The selected vendor will be required to construct a stack of GEP height. Therefore, of all the vendor designs under consideration, the one which would produce the shortest boiler building, and the shortest resulting GEP stack,

was selected for the dispersion modeling analysis. This represents a conservative scenario and will produce the greatest ground-level concentrations; thus, it will be the worst case assumed for dispersion modeling. Of the boiler building designs likely to be proposed, the shortest one is 110 feet tall. The GEP stack height equation, as applied to this Facility, is two and one-half times the building height. The GEP stack height for this building is calculated to be 275 feet. Because the stack height will be set equal to the GEP stack height, the effects of downwash do not need to be considered in predicting ground-level concentrations.

1.4 BOILER OPERATING CONDITIONS

The energy recovery facility will fire at design capacity when processing 1,800 tpd of 5,000 Btu/lb reference waste. This firing rate is based on the average higher heating value (HHV). The waste firing rate will be adjusted as the heat content of the waste changes. This variability occurs as the plant maintains the heat load to the boiler by providing a constant heat release in the combustor. When the HHV is low (higher moisture and ash fractions, lower combustibles fraction), more waste will be processed (up to 2,605 tpd at 110 percent of the design heat release). Likewise, when the HHV is high, less waste will be processed.

The boiler operating conditions selected for modeling were based on identifying minimum, maximum, and typical load conditions, as well as identifying high and low values of the HHV. These are shown in Section 6.4.

Auxiliary burners will be used primarily during start-up and shut-down to assure that furnace temperatures sufficient to achieve good combustion are maintained. The propane gas fired burners will also be used if combustion temperatures fall below a predetermined set point when firing refuse with a low heat content. Because combustion of propane gas results in the release of lower NO_x and CO on a pound per million Btu basis than the combustion of refuse, the operation of the auxiliary burner during start-up, shut-down, or operation for temperature maintenance would result in the release of pollutants no greater than when firing refuse alone.

1.5 AIR QUALITY IMPACT ASSESSMENT

An air quality impact assessment was conducted on pollutant emissions from the Lee County ERF. The Industrial Source Complex (ISC) dispersion model was used to predict the potential air quality impacts in accordance with the modeling protocol (dated May 9, 1990, and revised June 6, 1991) approved by the Florida Department of Environmental Regulation (DER). The refined dispersion modeling analysis was conducted using surface meteorological data from the Ft. Myers Airport (Page Field), and mixing height meteorological data from Tampa International Airport, both for the five-year period from 1982 to 1986. The Fort Myers/ Tampa data are the most representative data that are available of conditions at the Facility site. They were provided by Mr. Thomas Rogers of DER for use in this permit application.

Two worst-case operating conditions for the stoker waterwall design were selected on the basis of screening modeling (see Section 6.4) for the prediction of maximum air quality impacts:

- o 1,800-tpd throughput with a refuse heat content of 5,000 Btu/lb (design capacity, or 100 percent of design heat release) for long-term (annual average) periods; and
- o 1,650-tpd throughput with a refuse heat content of 6,000 Btu/lb for short-term (24 hours or less) periods. (This condition results in the minimum flue gas flow rate which was coupled with the maximum emission rates calculated at 110 percent of design heat release.)

A comparison was conducted of the maximum predicted ground-level concentrations and the background concentrations to the Florida and National Ambient Air Quality Standards. This comparison demonstrated that the Lee County ERF would not violate ambient air quality standards. In fact, maximum ground-level concentrations due to the Facility alone would be no more than 0.97 percent of any of the standards. When Facility concentrations are added to existing background pollutant concentrations, the resulting maximum concentration would be no more than 60 percent of any of the standards. A

comparison between the maximum air quality impacts to the PSD Class II increments demonstrates that the Lee County ERF would have an insignificant impact on Class II increment consumption, by consuming no more than 2.8 percent of any applicable increment.

The predicted pollutant ground-level concentrations are compared to PSD de minimis monitoring levels in Table 6-8. The highest predicted impacts are below the de minimis monitoring levels. Therefore, in accordance with 40 CFR 52.21(i)(8), the DER may exempt the Facility from pre-construction monitoring requirements. In light of the modeling results shown in Table 6-8, DER (December 5, 1990) concurred that pre-construction monitoring is not required.

An analysis was also conducted of Facility impacts at the nearest Class I (pristine) air quality area: the Everglades National Park, 92 kilometers to the southeast of the Facility. The results show that no more than 3.2 percent of any Class I increment would be consumed there, and that visibility (clarity of the air) at this area would not be impaired. A similar analysis was conducted for the Big Cypress National Preserve, which although not an officially designated Class I Area, is a sensitive area nearer to the site: about 61 kilometers to the southeast. The modeled results for this location show that the Facility would consume no more than 4.4 percent of any Class I increment, and would not impair visibility. A detailed discussion of air quality impacts from the Facility is provided in Section 6.0.

The proposed Lee County ERF maximum expected emission rates, based on results obtained from Best Available Control Technology (BACT) analyses are summarized in Table 1-1. The basis for these emission rates is described in Section 4.0, Emission Control Technology Evaluation, and in Attachment A of this Volume, Emission Factor Support Document.

TABLE 1-1

LEE COUNTY ENERGY RECOVERY FACILITY

SUMMARY OF PROPOSED MAXIMUM EXPECTED STACK EMISSION RATES BASED
ON RESULTS OBTAINED FROM BACT ANALYSES

Pollutant	Emission Rate and Associated Averaging Time ^a
Carbon Monoxide (CO)	(a) 100 ppm _{dv} @ 7% O ₂ , 4-hr (0.099 lb/MMBtu) (b) 400 ppm _{dv} @ 7% O ₂ , 1-hr (0.395 lb/MMBtu)
Nitrogen Oxides (NO _x)	(a) 180 ppm _{dv} @ 7% O ₂ , 24-hr (0.292 lb/MMBtu) (b) 220 ppm _{dv} @ 7% O ₂ , 1-hr (0.356 lb/MMBtu)
Sulfur Dioxide (SO ₂)	(a) 80% reduction by weight of uncontrolled SO ₂ emissions or 30 ppm _{dv} @ 7% O ₂ , both 24-hr (b) 66 ppm _{dv} @ 7% O ₂ , 24-hr (0.149 lb/MMBtu) (c) 82.5 ppm _{dv} @ 7% O ₂ , 3-hr (0.186 lb/MMBtu)
Particulate Matter (TSP or PM ₁₀)	0.010 gr/dscf @ 7% O ₂ (0.0194 lb/MMBtu)
VOC (non-methane HC)	37.3 ppm _{dv} @ 7% O ₂ , (0.0210 lb/MMBtu)
Lead (Pb)	6.0 x 10 ⁻⁴ lb/MMBtu
Beryllium (Be)	1.35 x 10 ⁻⁷ lb/MMBtu
Fluorides (as HF)	5 ppm _{dv} @ 7% O ₂ (0.0035 lb/MMBtu)
Mercury (Hg)	6.0 x 10 ⁻⁴ lb/MMBtu
Sulfuric Acid Mist (H ₂ SO ₄)	0.0358 lb/MMBtu
Hydrogen Chloride (HCl)	(a) 95% reduction by weight of uncontrolled HCL emissions or 25 ppm _{dv} @ 7% O ₂ , both 8-hr (b) 50 ppm _{dv} @ 7% O ₂ , 8-hr (0.0643 lb/MMBtu)

TABLE 1-1
(continued)

Pollutant	Emission Rate and Associated Averaging Time ^a
Arsenic (As)	9.1×10^{-6} lb/MMBtu
<u>Dioxins/Furans (Total</u> <u>tetra-octa PCDD & PCDF)</u>	<u>30 ng/dscm @ 7% O₂</u> (2.54×10^{-8} lb/MMBtu)

SOURCE: Camp Dreser & McKee Inc., 1991 (see Section 4.0 and Attachment A of this volume).

^a Compliance with these proposed emission rates is to be based on either CEM measurement data and/or compliance stack testing data, as appropriate for the given pollutant.

Section 2



SECTION 2.0
REGULATORY REVIEW

2.0 REGULATORY REVIEW

2.1 APPLICABLE REGULATIONS

Air quality regulations promulgated by the U.S. EPA and the Florida Department of Environmental Regulation (DER) define ambient air quality standards and regulate the sources of air contaminants in order to achieve and maintain these ambient standards. The Lee County ERF will be subject to the following rules and regulations.

- o Prevention of Significant Deterioration (PSD)
- o New Source Performance Standards (NSPS)
- o National Emission Standards for Hazardous Air Pollutants (NESHAP)
- o Florida DER Rules (Chapter 17-2, Florida Administrative Code) governing air pollution
- o Federal Aviation Administration (FAA) Regulations governing stack height

In many cases, the Florida DER air pollution rules reflect the standards established by EPA. For those cases where the Florida rules represent a more restrictive requirement, the Florida regulation has been applied.

2.2 PREVENTION OF SIGNIFICANT DETERIORATION

In general, a PSD permit application must contain the following basic components.

- o A complete description of the nature and operation of the source.
- o A Best Available Control Technology (BACT) review and application.

- o An analysis of existing ambient air quality.
- o An impact assessment demonstrating that emissions from the new source will not cause a violation of ambient air quality standards or PSD increments.
- o An assessment of the source's impact on air quality-related values including soils, vegetation, and visibility.

2.2.1 SOURCE APPLICABILITY

The proposed Facility is a major stationary source subject to PSD review because: (1) it is a combustion facility that is capable of burning more than 250 tons per day (tpd) of waste, and (2) at least one (or more) of the PSD-regulated pollutants will be emitted at a rate that exceeds 100 tons per year (tpy). Emission rates for both PSD-regulated pollutants and additional non-regulated pollutants (i.e., metals and trace organic compounds such as toxic equivalent dioxin) were developed for the proposed Facility. The rationale for the selected pollutant emission factors is presented in Attachment A.

PSD requirements apply to new major sources or major modifications located in areas which have been designated attainment or unclassified for a particular pollutant. New major sources proposing to locate in nonattainment areas are also subject to DER's New Source Review requirements. Lee County has been designated as in attainment or unclassified for all PSD-regulated pollutants (see Section 5.1), so New Source Review would not apply.

2.2.2 POLLUTANT APPLICABILITY

Under the PSD program, if the potential annual emission rate exceeds EPA's PSD significant emission rates designated in 40 CFR Part 52.21, then a best available control technology (BACT) analysis and air quality modeling need to be conducted for each affected pollutant for the PSD permit application.

Table 2-1 compares projected annual Facility emission rates, presented in Section 3.0, with the corresponding EPA PSD significant emission rates, and identifies those pollutants for which BACT analyses must be performed. The detailed approaches and considerations for performing BACT analyses are presented in Section 4.0. As shown in Table 2-1, formal PSD analyses (including a BACT analysis) are required for nitrogen oxides, sulfur dioxide, carbon monoxide, particulate matter including PM_{10} , volatile organic compounds, lead, beryllium, mercury, fluorides, sulfuric acid mist, and arsenic.

The maximum annual emission rates presented in Table 2-1 were calculated assuming that each combustor operates 365 days per year at 100 percent load. This throughput would be equivalent to combusting 657,000 tpy (1,800 tpd) of MSW. This assumption is conservative, because the Facility is expected to have an annual availability factor of approximately 85 percent of its nameplate capacity due to scheduled and unscheduled downtime. In addition to BACT analyses for applicable PSD pollutants, an air quality modeling analysis, an assessment of existing background air quality levels, and additional impact analyses are included.

An air quality modeling analysis is performed to show that applicable Florida and National Ambient Air Quality Standards (FAAQS and NAAQS), and PSD increments, will be met. Table 6-8 (see Section 6.6) lists the NAAQS, which have been adopted by Florida, as well as the more stringent Florida standards for sulfur dioxide, and the PSD increments to be considered in this evaluation. Approaches employed and results obtained from the PSD modeling studies are presented in Section 6.0.

Section 7.0 presents the additional impact analysis required as part of the PSD review. An impact analysis is performed to ascertain the potential impact of modeled Facility emissions on soils, vegetation, and visibility.

The PSD regulations establish mandatory Class I, or pristine, areas in the United States. The regulations require that any major source proposing to locate near (generally accepted to be within 100 kilometers) a Class I Area have an assessment performed of the source's effect on visibility

TABLE 2-1

PSD POLLUTANT APPLICABILITY FOR THE LEE COUNTY
ENERGY RECOVERY FACILITY

PSD Pollutant	EPA Significant Emission Rates (tpy) ^a	Proposed Facility Emission Rate (tpy) ^b	Need for Formal PSD Analysis (X)
Carbon Monoxide	100	324	X
Nitrogen Oxides	40	959	X
Sulfur Dioxide	40	490	X
Particulate Matter (total)	25	64	X
Particulate Matter (PM ₁₀)	15	64	X
Ozone (as volatile organic compounds)	40	69	X
Lead	0.6	2.0	X
Asbestos	0.007	—*	
Beryllium	4.0x10 ⁻⁴	4.4x10 ⁻⁴	X
Mercury	0.1	2.0	X
Vinyl Chloride	1	—*	
Fluorides	3	11.5	X
Sulfuric Acid Mist	7	118	X
Hydrogen Sulfide (H ₂ S)	10	—*	
Total Reduced Sulfur (including H ₂ S)	10	—*	
Reduced Sulfur Compounds (including H ₂ S)	10	—*	
Hydrogen Chloride	NA ^c	212	
Arsenic	AER ^d	0.03	X
Total Dioxins and Furans ^c	NA ^c	8.3x10 ⁻⁵	
Benzene	AER ^d	—*	
Radionuclides	AER ^d	—*	
Radon 222	AER ^d	—*	

^a SOURCE: FAC 17.2, Part V, Table 500.2, or 40 CFR 52.21.

^b Emission rates (annual average basis) are based on 100 percent load and continuous unit availability using the expected maximum emission rates for appropriate averaging periods as discussed in Attachment A. The Facility is assumed to be firing at a rate of 7.5x10⁻⁸ Btu/hr, and burning 1,800 tpd of MSW with a reference waste higher heating value (HHV) of 5,000 Btu/lb, resulting in 657,000 tpy of MSW being combusted by the Facility.

^c Not applicable. These pollutants are not regulated under the PSD regulations, but are provided to DER for review. These pollutants have been included in the New Source Performance Standards for municipal waste combustors.

TABLE 2-1
(continued)

^d Any emission rate. These pollutants (benzene, radionuclides, arsenic, and radon 222) are regulated by the Clean Air Act under the NESHAPS program, and any emission rate is considered a significant emission rate. In September 1991, EPA plans to propose regulations to implement changes to the PSD/NSR program. According to a March 11, 1991 policy memo prepared by John Seitz, EPA's OAQPS Director, Section 112(b)(6) PSD/NSR analysis (includes the NESHAPS pollutants). However, pursuant to the 1986 North County remand decision, the BACT analysis should consider all pollutants, including Title III hazardous air pollutants for which national standards have been set (previously subject to PSD), in determining which control strategy is best.

* Emission rates for these pollutants are negligible because these emissions are not expected from an MSW combustion environment or are not considered to be part of an MSW stream (e.g., asbestos).

(clarity of the air) at the Class I Area, and on Class I increment consumption. The Everglades National Park, a designated Class I Area, is 92 kilometers from the Facility site. A visibility impacts analysis and Class I increment consumption demonstration for this and other sensitive areas is presented in Section 7.0.

2.3 NEW SOURCE PERFORMANCE STANDARDS

The Florida Administrative Code, Chapter 17-2, Part VI, incorporates the federal New Source Performance Standards (NSPS) by reference. EPA originally promulgated standards of performance for new municipal incinerators on December 23, 1971. These standards are contained in 40 CFR 60, Subpart E. On February 11, 1991, the U.S. EPA promulgated revised NSPS for new, modified, or reconstructed municipal waste combustors (56 FR 5488). The new NSPS (40 CFR 60, Subpart Ea) will become effective on August 12, 1991, and will affect those municipal waste combustors that commence construction or modification after December 20, 1989, and that have a unit with a capacity to combust at least 250 tpd. The Lee County Facility, with three units of 600 tpd each, will be governed by these NSPS. The NSPS contain requirements that the affected units use best demonstrated control technology, maintain good combustion practices, have certified operators, and meet the emissions standards shown in Table 2-2. The NSPS also set standards for stack testing and reporting.

On November 15, 1990, the Clean Air Act (CAA) Amendments of 1990 became law, and they included in Title III, Hazardous Air Pollutants, a new Section 129 that applies to a range of solid waste incinerators. The following CAA deadlines for EPA to promulgate air emission standards and other requirements were imposed in Section 129:

- solid waste incineration units with capacity to combust greater than 250 tpd of municipal solid waste (MWS) - by November 15, 1991.
- solid waste incineration units with capacity to combust equal to or less than 250 tpd of MSW, and units combusting hospital waste, medical waste, and infectious waste - by November 15, 1992.

TABLE 2-2

NEW SOURCE PERFORMANCE STANDARDS
FOR MUNICIPAL WASTE COMBUSTORS^a

Pollutant	<u>Emission Standard</u>	Basis
Particulate Matter	0.015 gr/dscf (@7% O ₂) 10% opacity (6-min. avg.)	Fabric filter
Hydrogen Chloride	95% reduction or 25 ppm _{dv} (@7% O ₂)	Spray dryer plus fabric filter
Sulfur Dioxide	80% reduction or 30 ppm _{dv} (@7% O ₂), <u>daily block geometric</u> average	Spray dryer plus fabric filter
Nitrogen Oxides	180 ppm _{dv} (@7% O ₂), <u>daily block arithmetic</u> average	Selective Non-catalytic Reduction (SNCR) and/or good combustion practice
Carbon monoxide	100 ppm _{dv} (@7% O ₂), 4-hour block average (stoker waterwall)	Good combustion practice
Total Dioxins and Furans	30 ng/dscm (@7% O ₂)	Good combustion practice, spray dryer plus fabric filter

SOURCE: 56 FR 5488, February 11, 1991.

^aThis is a summary of emissions standards for new facilities with unit capacity throughputs of more than 250 tons per day. There are also combustion parameters, operator certification, and stack test requirements.

- solid waste incinerator units combusting commercial or industrial waste - by November 15, 1993 (proposed rule); by November 15, 1994 (promulgated rule).
- a schedule for the promulgation of standards for all other possible categories of solid waste incineration units - by May 15, 1992.

Promulgated numerical emission standards are to reflect the maximum degree of reduction in emissions of air pollutants (particulate matter, sulfur dioxide, hydrogen chloride, nitrogen oxides, carbon monoxide, lead, cadmium, mercury, and dioxins and dibenzofurans) that EPA determines is achievable. Developed standards will apply to both new and existing units and be based, in part, on costs, energy requirements, and any non-air quality health and environmental impacts. EPA may distinguish among classes, types (including mass-burn, refuse derived fuel, modular, and other types of units), and sizes of units within a category in establishing such standards.

Other CAA provisions discuss "maximum achievable control technology" (MACT) and emission standards provisions contained in Section 301 of the same Title (which amends Section 112(d) for hazardous air pollutants), and will not apply to solid waste incineration units regulated under Section 129, except that EPA could set future emission standards based on residual risk considerations. Solid waste incineration units are also exempt from the CAA Title IV acid deposition control provisions; that is, they are not considered to be a "utility unit" provided that more than 80% of the unit's annual average fuel consumption on a Btu basis is from a fuel other than a fossil fuel. Finally, through November 15, 1991, ash from solid waste incineration units burning MSW will not be regulated by EPA, pursuant to Section 3001 of the Solid Waste Disposal Act.

The new NSPS for municipal waste combustors, which resulted from a consent decree, represent one of the first sets of rules issued under the new CAA. Section 129 of the CAA did not affect the adoption of these final standards and guidelines; however, the CAA requires that these standards and guidelines be modified by November 15, 1991, to be fully consistent with

Section 129. A number of additions to or revisions of the final promulgated NSPS may result; as a minimum, EPA is required to include the addition of numerical emission limits for mercury, cadmium, and lead.

On December 16, 1987, EPA promulgated revised standards of performance for industrial-commercial-institutional steam generating units. These standards are contained in 40 CFR 60, Subpart Db and set emissions limitations for particulate matter, as well as nitrogen oxide and sulfur dioxide, for steam generating units having heat input capacities greater than 100 million Btus per hour. The nominal heat input rating for the proposed Facility's combustors is approximately 250 million Btu/hr for a 600-tpd unit.

40 CFR Section 60.43b(c)(1) limits particulate matter emissions from each unit firing primarily municipal type solid waste (having an annual capacity factor for auxiliary fuels of 10 percent or less) to 0.1 pounds per million Btus of heat input. The Facility will comply with this limit by emitting no more than 0.0194 pounds per million Btu. Section 60.43b(e) limits the opacity of the exhaust gases from the units. Specifically, it prohibits the discharge of gases exhibiting greater than 20 percent opacity (six-minute average), except for one six-minute period per hour of not more than 27 percent opacity. The Facility will comply with this limit. The particulate matter and opacity standards apply at all times, except during periods of start-up, shut-down, or malfunction.

Section 60.44b(d) sets a nitrogen oxide emission standard of 0.2 pounds per million Btu of heat input which would be applicable to the Facility's combustors should the annual capacity factor for any unit firing propane exceed 10 percent. This standard applies at all times including periods of start-up, shut-down, or malfunction. The annual capacity factor is defined as the actual heat input to the unit resulting from the firing of the auxiliary fuels during a calendar year to the total potential heat input to the unit had it operated 8,760 hours per year at maximum steady state design heat input capacity. For the proposed Facility, propane gas will be used during start-up and shut-down situations, which are expected

to occur infrequently, and as a supplemental fuel on limited occasions when decreased combustor temperature conditions occur due to causes such as high moisture content wastes.

Based on the Facility design MSW feed rate of 1,800 tons per day, the Facility could fire up to 6.57×10^{11} Btu/year of auxiliary fuel before reaching 10 percent of the design heat input. Under no circumstances should the annual capacity factor for the propane gas fired in each of the Facility's combustors exceed 10 percent. Therefore, the 0.2 pounds per million Btu of heat input NO_x limitation will not be applicable. The Facility is expected to fire approximately 1.05×10^{10} Btu/yr of propane gas for start-up, shut-down, and maintaining proper furnace combustion temperature, or 0.16 percent of the annual design heat input.

40 CFR, Section 60.42b, sets forth emission limitations for sulfur dioxide. However, such limitations only apply to facilities which combust coal or oil, which is not the case for the proposed Facility.

2.4 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Pursuant to Section 112 of the Clean Air Act, the U.S. EPA originally promulgated National Emission Standards for Hazardous Air Pollution (NESHAPS) on April 6, 1973. These standards are contained in 40 CFR 61. Some of the PSD pollutants identified in Table 2-1 are also regulated under NESHAPS. 40 CFR Subpart C, Section 61.32, contains a stationary source limitation for facilities firing beryllium-containing industrial waste of 10 grams over a 24-hour period, or a 30-day ambient air incremental impact of 0.01 ug/m^3 . Subpart E, Section 61.50 regulations for mercury do not apply since the proposed Facility will not combust or dry wastewater treatment plant sludge. Other NESHAPS, such as Subpart F for vinyl chloride, and Subparts N, O, and P for inorganic arsenic emissions, do not apply to municipal waste combustion facilities.

The proposed maximum expected beryllium emission factor of 1.35×10^{-6} pounds per ton of MSW fired results in a projected beryllium emission rate of 1.1 grams over a 24-hour period at design capacity, which is below the

applicable NESHAPS of 10 grams for 24 hours. In addition, as shown in Section 6.6, the proposed Facility maximum 24-hour average ground-level concentration of 2.29×10^{-6} ug/m³ is below the applicable 0.01 ug/m³, 30-day limitation. This standard also applies only to those combustion facilities which would accept beryllium-containing industrial waste, which will not be the case for the proposed Facility.

2.5 FEDERAL AVIATION ADMINISTRATION NOTIFICATION REQUIREMENTS

The Federal Aviation Administration (FAA) requires a Notice of Proposed Construction or Alteration for any proposed structure affecting navigable air space. Structures 200 feet or taller above ground are subject to the FAA notification requirements (CFR Sections 77.13, 77.23). The stack for the Lee County Facility will be at least 275 feet above ground elevation. The Notice of Proposed Construction or Alteration for the Facility was filed with the FAA on April 4, 1990. The FAA acted on the notice on September 10, 1990, and determined that the proposed Facility stack will not be a hazard to air navigation if it is 295 feet tall (or less), and marked and lighted in accordance with FAA Advisory Circular 70/7460-1, Chapters 3, 4, 5, and 9.

2.6 DER AIR POLLUTION CONTROL REGULATIONS

The Florida Administrative Code, Chapter 17-2, for the most part has incorporated federal regulations for each of the air programs previously discussed. Some slight differences which are applicable to this study do exist, however.

2.6.1 EMISSION LIMITATIONS

Florida sets a specific limitation that incinerators emit no objectionable odor. The proposed Facility will comply with this requirement by storing all waste prior to combustion inside the fully enclosed ERF. The building will be kept under negative pressure by withdrawing combustion air from the storage pit area. Odors from the refuse will be drawn into the furnace, and will be destroyed in the combustors, and/or vented through the stack.

The general opacity rule found in Florida Administrative Code (FAC) Rule 17-2.610 does not apply to a source for which either a specific particulate standard or a specific opacity standard is provided elsewhere in the rules. Because the energy recovery facility is subject to the specific particulate standard in FAC 17-2.600(1)(c), the general opacity standard does not apply, although it is anticipated that a specific opacity limit will be a condition of the permit.

2.6.2 AMBIENT AIR QUALITY STANDARDS

The Florida Ambient Air Quality Standards (FAAQS) contained in FAC 17-2.300 are more stringent than the National Ambient Air Quality Standards (NAAQS) for sulfur dioxide. The 24-hour average SO_2 FAAQS is 260 ug/m^3 (versus an NAAQS of 365 ug/m^3), and the annual average FAAQS is 60 ug/m^3 (versus 80 ug/m^3). The predicted maximum ground-level concentration due to the Facility would be less than one percent of either of these standards. When combined with existing background SO_2 concentrations, the maximum concentration would be no more than 22 percent of either standard (see Section 6.6).

2.6.3 PERMIT REQUIREMENTS

Site certification to construct and operate an air pollution source can be obtained from DER by the owner of a new energy recovery facility prior to construction, in accordance with FAC 17-2, Part V, and the Florida Electric Power Plant Siting Act, Section 403.501 et. seq., Florida Statutes. On October 27, 1986, EPA published a notice allowing DER to review applications and issue PSD construction permits to sources subject to the Power Plant Siting Act (PPSA) (51 FR 37972). This notice was effective as of July 1, 1986, when the Florida Legislature amended the PPSA to allow the concurrent issuance of PSD construction permits and site certification.

Section 3



SECTION 3.0
AIR POLLUTANT EMISSIONS

3.0 AIR POLLUTANT EMISSIONS

3.1 INTRODUCTION

The combustion of refuse to produce energy in the boilers of energy recovery facilities results in the emission of some air pollutants as a consequence of several mechanisms and processes. Emissions generated in the system either 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 technology.

The discussion of emission factors and rates presented in this section focuses primarily on those pollutants of public health and regulatory concern. The review compares the proposed Facility's emission rates estimated by the applicant's consultant, CDM, with recently permitted energy recovery facilities in Florida. The emission estimates for the Lee County ERF are based on stack testing data from existing facilities, and are discussed in greater detail in Attachment A.

Emission of acid gases will be minimized through the use of a dry scrubber, while particulate matter will be controlled through the use of a fabric filter. Use of the dry scrubber-fabric filter will also serve to minimize emission of trace metals and organic compounds. Emission of mercury may be further reduced through the injection of a reagent, to be determined by the vendor. Composition-dependent emissions are minimized by controlling the composition of the waste stream (e.g., trace metals, SO₂, HCl, and HF). Identifiable contaminants, such as those found in asbestos-containing construction material and other hazardous waste, will not be accepted at the Facility.

Emissions such as carbon monoxide, oxides of nitrogen, hydrocarbons, and trace organic compounds are principally influenced by the combustion process. Combustion controls and post combustion flue gas NO_x control will be employed to minimize these emissions.

3.2 COMBUSTION OF MUNICIPAL SOLID WASTE

Waste composition is an important consideration in developing emission estimates, especially any unique or unusual aspects that would prohibit the use of emissions data obtained from similar operating facilities. The understanding of combustion chemistry is not always sufficient to allow the calculation of emission rates based on waste composition alone. Reference waste composition is typically used in combustion calculations to predict flue gas flow rates, which are used to calculate pollutant emission rates from empirical flue gas concentrations. Table 3-1 shows an ultimate analysis of refuse expected to be processed at the Lee County ERF.

MSW is a heterogeneous mixture of materials, and the physics and chemistry of its combustion is very complex. Broadly speaking, describing the combustion process involves chemical reaction kinetics and equilibrium, combustor fluid mechanics, and heat transfer rates. The applicant's consultant, CDM, has developed a computer model which performs mass-balance modeling of the combustion process for a "reference waste." Model results can then be used to estimate pollutant emission rates of the particulate and gaseous products of combustion. Emissions of products of combustion include nitrogen oxides, carbon monoxide, volatile organic compounds, hydrogen chloride, and sulfur dioxide. These are calculated using the output from this model. The model output is contained in Attachment D to this Volume. The results are corroborated with monitoring test data from comparable facilities.

Other compounds present in the flue gas are mainly a function of the amount of the compounds or elements present in the waste itself. This is true for trace metals and some trace organic compounds. For these emissions, reasonable upper limit emission factors are predicted on the basis of empirical data obtained from other similar sources.

3.3 COMPARISON TO OTHER PERMITTED FACILITIES

In order to determine the air quality impacts of the Lee County ERF, estimates of pollutant emissions must be established. The emission factors

TABLE 3-1
REFERENCE WASTE ULTIMATE ANALYSIS
(as received)

Waste Category	Nominal Percent by Weight (dry basis)
Total Inerts	26.36
Carbon	35.94
Hydrogen	4.79
Nitrogen	0.63
Sulfur	0.13
Chlorine	0.50
Oxygen	<u>31.65</u>
TOTAL	100.00
Moisture	20.70
Higher Heating Value (HHV)	5,000 Btu/lb

SOURCE: Camp Dresser McKee Inc., 1990.

(in terms of mass of pollutant per mass of refuse burned) contained in this section are based on numerous literature sources which were reviewed to obtain current emission data from representative energy recovery facilities that incorporate similar technology. "Criteria" pollutants are those for which National Ambient Air Quality Standards (NAAQS) have been established. "Non-criteria" pollutants do not have ambient air quality standards. Both "criteria" and "non-criteria" pollutants known to be emitted from energy recovery facilities burning refuse are quantified in this section.

Data have been compiled on emissions from several existing mass-burn MSW energy recovery facilities, and through research activities conducted by such agencies as EPA. These were reviewed to determine their applicability for use in predicting emission factors for various pollutants.

To compare the data presented in these studies and reports, it was necessary to convert all emission rates to uniform units of measure. Usually, data from stack testing activities appear as pollutant concentrations in the stack gas [e.g., parts per million (ppm)]. From the relationship of the flue gas flow rate to the waste burning rate, pounds of pollutant emitted per ton of refuse fired (lb/ton) can be calculated. If the Btu value of the refuse is known, it is also possible to describe pollutant emission rates as pounds of pollutant emitted per million Btu of heat input (lb/MMBtu).

The maximum expected emission factors (expressed as lb/ton of refuse and lb/MMBtu of heat input) for the Lee County ERF are shown in Table 3-2. The numbers presented in Table 3-2 are based in part on the available stack testing data from representative existing facilities. The selected emission factors represent reasonable upper bound estimates projected for the Lee County ERF. A more detailed description of the basis for the emission factors shown in Table 3-2 is presented in Attachment A.

The emission factors for the Lee County ERF are compared to other energy recovery facilities recently permitted in Florida in Table 3-3. Because the Lee County ERF will incorporate acid gas scrubbers and high efficiency fabric filters, the emissions of sulfur dioxide, sulfuric acid mist,

TABLE 3-2
CONTROLLED EMISSION FACTORS
FOR THE LEE COUNTY ENERGY RECOVERY FACILITY

Pollutant	Emission Factor	
	lb/ton Refuse	lb/MMBtu*
Particulate Matter	0.194	0.0194
Sulfur Dioxide (24-hour)	1.49	0.149
(3-hour)	1.86	0.186
Nitrogen Oxides (as NO ₂)		
(24-hour)	2.92	0.292
(1-hour)	3.56	0.356
Carbon Monoxide		
(4-hour)	0.99	0.099
(1-hour)	3.95	0.395
Non-Methane Hydrocarbons		
(1-hour)	0.211	0.0211
Lead	0.006	6.0x10 ⁻⁴
Sulfuric Acid Mist	0.358	0.0358
Hydrogen Chloride	0.643	0.0643
Fluoride (as HF)	0.035	0.0035
Beryllium	1.35x10 ⁻⁶	1.35x10 ⁻⁷
Mercury	6.0x10 ⁻³	6.0x10 ⁻⁴
Inorganic Arsenic	9.1x10 ⁻⁵	9.1x10 ⁻⁶
Asbestos	**	**
Vinyl Chloride	**	**
Total Reduced Sulfur	**	**
Reduced Sulfur Compounds	**	**
Benzene	**	**
Radionuclides	**	**
Dioxin (Total tetra-octa PCDD & PCDF)	2.54x10 ⁻⁷	2.54x10 ⁻⁸

SOURCE: Camp Dresser McKee Inc., 1991 (see Emission Factor Support Document, Attachment A of this volume).

*Based on a higher heating value of 5000 Btu/lb.

**Negligible emission rate, the numerical value of which is strongly dependent on the composition of the refuse incinerated. Lee County municipal solid waste is not expected to contain these compounds.

TABLE 3-3

COMPARISON OF ESTIMATED EMISSION FACTORS TO
PERMITTED VALUES AT OTHER REGIONAL MASS-BURN FACILITIES
(lb/ton of refuse)^a

Pollutants	Lee	Pasco ^b	Hillsborough ^c	North Broward ^d	Pinellas 3 ^e	Palm Beach ^f	Bay County ^b	South Broward ^g
Particulate matter	0.194	0.309	0.42	0.42	0.5	0.33	0.56	—
Sulfur dioxide (24-hr)	1.49	2.15	8.5	2.79*	4.08	7.7	2.8	2.79
Nitrogen oxides (24-hr)	2.92	6.17	6.4	5.04	6.1	4.0	2.2	5.0
Carbon monoxide (4-hr)	0.99	0.470	1.8	0.81	1.58	12.0	11.4	0.8
Hydrocarbons (1-hr)	0.211	0.202	0.2	0.12	0.3	0.20	0.232	—
Lead	0.006	0.0067	0.02	0.018	0.067	0.005	0.0036	0.018
Mercury	0.006	0.0077	0.004	0.0083	0.01	0.003	0.00171	—
Beryllium	1.35×10^{-6}	1.30×10^{-6}	1.31×10^{-5}	8.4×10^{-6}	1.3×10^{-6}	9.0×10^{-6}	48×10^{-6}	—
Arsenic	9.1×10^{-5}	8.74×10^{-5}	—	—	—	—	—	—
Fluorides	0.035	0.077	0.06	0.16	0.1	0.04	—	—
Sulfuric acid mist	0.358	0.344	1.38	0.42	—	0.0004	—	—
Hydrogen chloride	0.643	1.22	4.0	—	4.0	3.5	—	—

^aNote that the heat content (Btu/lb) of the reference waste for each facility differs. Relative emission rates will change if converted to a lb/MMBtu basis.

^bPasco County, Power Plant Site Certification, PA 87-23, August 23, 1988.

^cHillsborough County, Power Plant Site Certification, PA 83-19 - Requested Modification May 1, 1987.

^dNorth Broward, Power Plant Site Certification, February 1, 1986.

^ePinellas County Unit 3, Power Plant Site Certification, PA 83-18 and an August 87, telephone conversation with the DER.

^fPalm Beach, Power Plant Site Certification, February 11, 1986, per telephone conversation with Barry Andrews DER, October 8, 1987.

^gSouth Broward, August 87 telephone conversation with the Florida DER.

*Based on a SO₂ upper limit of 0.31 lb/MMBtu and a refuse heat content of 4,500 Btu/lb, telephone conversation with Barry Andrews of DER, August 26, 1987.

hydrogen chloride, and particulate matter will be the same or lower than those for any other permitted energy recovery facility in Florida. The emission limits for sulfuric acid mist from the Pasco County, Broward County, and Hillsborough County facilities were deleted from the final permits for those facilities because EPA Region IV determined there was no reliable testing method for this pollutant. Because the Lee County ERF will be employing a dry scrubber which will effectively minimize sulfuric acid emissions, an emission limitation for sulfuric acid mist should not be required.

Minor short-term variations in emissions can be expected due to the heterogeneous nature of MSW. Therefore, the short-term emission rates presented in Table 3-4 and expressed in pounds per hour are based on the postulated worst-case operating condition at 110 percent of design heat release: 1,650 tpd at 6,000 Btu per pound waste. The annual emission rates presented in Table 3-4 are higher than the expected annual averages because the Facility will likely operate at less than 100 percent of its design annual capacity due to both scheduled and unscheduled down-time.

TABLE 3-4

ESTIMATED EMISSION RATES FOR THE LEE COUNTY ERF

Pollutant	Single Unit Pounds/Hour (110%) ^a	Whole Facility Controlled Emission Rate	
		Tons/year ^b	Pounds/hour ^a
Particulate Matter (PM)	<u>5.34</u>	<u>64</u>	<u>16.0</u>
Sulfur Dioxide (SO ₂)	<u>40.98^c</u>	<u>490</u>	<u>123^c</u>
Nitrogen Dioxide (NO ₂)	<u>80.3^c</u>	<u>959</u>	<u>241^c</u>
Carbon Monoxide (CO)	<u>27.23^d</u>	<u>324</u>	<u>81.7^d</u>
Hydrocarbons (VOC)	<u>5.80</u>	<u>69</u>	<u>17.4</u>
Lead (Pb)	<u>0.165</u>	<u>2.0</u>	<u>0.495</u>
Arsenic (As)	<u>2.5 x 10⁻³</u>	<u>0.03</u>	<u>7.51x10⁻³</u>
Mercury (Hg)	<u>0.165</u>	<u>1.97</u>	<u>0.495</u>
Beryllium (Be)	<u>3.7 x 10⁻⁵</u>	<u>4.4x10⁻⁴</u>	<u>1.11x10⁻⁴</u>
Fluoride (as HF)	<u>0.96</u>	<u>11.5</u>	<u>2.89</u>
Sulfuric Acid (H ₂ SO ₄)	<u>9.85</u>	<u>118</u>	<u>29.5</u>
Hydrogen Chloride (HCl)	<u>17.68</u>	<u>212</u>	<u>53.0</u>
Dioxin (Total tetra-octa PCDD & PCDF)	<u>7.0 x 10⁻⁶</u>	<u>8.3x10⁻⁵</u>	<u>2.1x10⁻⁵</u>

SOURCE: Camp Dresser McKee Inc., 1991 (see Emission Factor Support Document, Attachment A of this volume, for basis for emission factors).

^a Short-term maximum emission rates based on 110 percent of design heat release rate (lb/MMBtu), 1,650 tpd Facility total throughput of 6,000 Btu/lb waste.

^b Annual emission rate based on 100 percent of the design heat release rate firing 1,800 tpd of reference waste at 5,000 Btu/lb.

^c NO_x and SO₂ lb/hr emission rates based on Table 3-2 24-hour average value for lb/MMBtu.

^d CO lb/hr emission rate based on Table 3-2 4-hour average value for lb/MMBtu.

Section 4



SECTION 4.0

EMISSION CONTROL TECHNOLOGY EVALUATION

4.0 EMISSION CONTROL TECHNOLOGY EVALUATION

4.1 DESCRIPTION OF BACT REVIEW

The proposed Facility is considered a major stationary source and is subject to PSD review since it will emit quantities above the PSD significant emission rate for particulate matter (PM), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen oxides (NO_x), lead (Pb), fluorides (as HF), mercury (Hg), beryllium (Be), volatile organic compounds (VOC), arsenic (As), and sulfuric acid mist (H_2SO_4). Consequently, the Facility will be subject to the Best Available Control Technology (BACT) evaluation for the pollutants which are subject to Prevention of Significant Deterioration (PSD) review.

In accordance with EPA's present policy of determining BACT (EPA, December 1987, May 1989, and March 1990), the analysis involves 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 alternatives are 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" alternative to determine if technical considerations or energy, environmental, or economic impacts justify a conclusion that it is not BACT. If the most stringent or "top" technology is determined not to be BACT using this methodology, then the next most stringent alternative is considered until BACT is determined. If no available control strategy is better than the one which the applicant has proposed, the applicant must still consider countervailing non-air environmental impacts (this point was noted in EPA's 1978 guidelines for determining BACT and 1980 PSD workshop handbook, and was reiterated in a May 1989 EPA draft document on "top down" BACT). Equipment with similar control capabilities do not require an evaluation. For those pollutants which have applicable air pollutant emission standards [e.g., New Source Performance Standards (NSPS)], BACT needs to be at least as stringent.

4.1.1 ENERGY IMPACTS

Where additional control equipment is required (such as scrubbers for SO₂ and HCl control), the cost of the energy consumed by the equipment is determined. If the best method to control a pollutant is proper furnace operation or the hardware design features of the Facility (such as controlling CO by properly distributing the over- and under-fire combustion air, and furnace temperature maintenance), then no additional costs for energy will be incurred to control the pollutant.

As in the economic analysis described below, energy impacts (million Btu or kwh/year) have been determined for applicable pollution control strategies to complete the BACT engineering and economic evaluations in the subsequent subsections. An incremental analysis would not apply in a "top down" BACT analysis if only a single control case has been considered to be the "top" level of control.

4.1.2 ECONOMIC IMPACTS

Where control equipment is required, the capital and annual operating costs, and the total and incremental control effectiveness (in dollars per ton of pollutant removed), were determined. If the best method to control a pollutant is proper furnace operation or the proper design of the Facility, then no additional capital or operating costs would be incurred to control the pollutant.

When performing a "top down" BACT economic analysis, the cost-effectiveness of each control strategy is determined by dividing the total annual cost of each strategy by the amount of emissions controlled by each strategy. Similarly, incremental cost-effectiveness is determined by dividing the incremental annual costs by the incremental emission reductions. This procedure was identified in EPA's 1980 PSD workshop handbook. The incremental cost-effectiveness value is a measure of comparing residual emissions of one control alternative to another control alternative with higher emission reduction potential. This value is especially important when evaluating the reasonableness of emission control costs. The analysis would not apply in a "top down" BACT analysis if the "top" or LATER control is selected.

4.1.3 ENVIRONMENTAL IMPACTS

The applicable environmental impacts for each control alternative were completed using the "top down" BACT approach. The potential environmental impacts considered in the BACT analysis concentrated on those not involving air quality since they are discussed separately as noted below. Both beneficial and adverse impacts were evaluated.

Using the proposed stack parameters, EPA-approved dispersion modeling was performed for the evaluated pollution control strategy. The impacts on air quality are determined by comparing the dispersion modeling results, the ground level concentrations (GLC), to the PSD allowable increments, National Ambient Air Quality Standards (NAAQS), and Florida Ambient Air Quality Standards (FAAQS) where applicable. A refined dispersion modeling analysis was performed for the proposed air pollution control system and is included in Section 6.0 of the permit application.

4.1.4 POLLUTANT APPLICABILITY

The initial Facility will have a throughput capacity of 1,200 tons per day (tpd); however, the site certification, BACT evaluation, and air quality analyses have been performed for an 1,800-tpd Facility in anticipation of future solid waste disposal requirements. The County currently has not contracted a full-service vendor to design the Facility, thus the required BACT analysis evaluates individual emission and throughput capacity differences of the combustor technology design.

The proposed Facility will have a mass-burn stoker waterwall combustor design. The Facility will have two combustors, each with a throughput capacity of 600 tpd, and ultimately an additional combustor of identical capacity (i.e., certification for 1,800 tpd).

On February 11, 1991, EPA published revised New Source Performance Standards (NSPS) for regulating air emissions from Municipal Waste Combustors (MWC) in the Federal Register (56 FR 5488). The intent of the standards is to require new MWCs to control emissions to the level achievable by applying the best demonstrated system. Pollutants regulated

under the proposed standards include: (1) MWC organics which impose a limit for dioxin/furan and CO emissions; (2) MWC trace metals which impose a limit for PM and opacity; (3) MWC acid gases which impose a limit for HCl and SO₂; and (4) Nitrogen Oxides (NO_x). The control level required for these pollutants is differentiated in the proposed rule by the size of the MWC. More stringent control requirements exist for those MWC plants that combust more than 250 tpd of refuse. The emissions limits are described in Section 2.3.

The PSD regulations state, in 40 CFR Part 52.21, that any major source must perform a formal BACT analysis for each PSD pollutant emitted in quantities greater than the PSD significant emission rates. The PSD significant emission rates and the total projected emissions from the Facility are shown in Table 4-1.

BACT requirements apply only to pollutants emitted in areas designated as in attainment with respect to the NAAQS/FAAQs. The proposed Facility site is located in an area that has been designated as being in attainment or unclassified for NO_x, PM, Pb, CO, SO₂, and ozone. PSD regulated pollutants without established NAAQS are also subject to a formal BACT analysis if emissions exceed certain thresholds. From Table 4-1, the following regulated pollutants, with or without established NAAQS, are projected to be emitted in quantities greater than the designated PSD significant emission rates: PM, NO_x, SO₂, CO, Pb, Be, Hg, HF, VOCs, As, and H₂SO₄.

As a result of an EPA ruling promulgated on July 1, 1987, a PSD significant emission level and NAAQS for PM was developed to include only those particles with an equivalent aerodynamic diameter of less than or equal to 10 microns (meter $\times 10^{-6}$) (PM₁₀). Thus, the BACT analysis for PM includes a dual review of PM₁₀ and total suspended particulates (TSP). As shown in Table 4-1, the Facility will emit PM emissions in excess of both the TSP significant emission level, 25 tpy, and the significant emission level for PM₁₀, 15 tpy. For purposes of this BACT analysis, it is conservatively assumed all emitted TSP is PM₁₀.

Control technology reviews using the BACT methodology were performed on several other pollutants specified either in the NSPS, under the PSD

TABLE 4-1

LEE COUNTY ENERGY RECOVERY FACILITY - 3 UNITS, 1800 TPD FACILITY
BACT SUMMARY
COMPARISON OF THE PROJECTED EMISSION RATES
TO PSD SIGNIFICANCE VALUES AND PROPOSED CONTROL TECHNOLOGY

Pollutant	PSD Significant Emission Rate (tpy)	Proposed BACT Emission Rate ^a (lbs/ton) (tpy)		Proposed Control Technology
Carbon Monoxide (CO) ^b (stoker waterwall)	100	0.987	<u>324</u>	Furnace Design & Proper Operation
Nitrogen Oxides (NO _x) ^c	40	<u>2.92</u>	<u>959</u>	<u>Thermal DeNO_x</u>
Sulfur Dioxide (SO ₂) ^d	40	1.49	<u>490</u>	Dry Scrubber/Fabric Filter, least stringent 80% removal by weight or 30 ppmdv @ 7% O ₂ , both over a 24-hour block average
Particulate Matter (PM)	25 (TSP) 15 (PM ₁₀)	0.194	<u>64</u>	Fabric Filter - 0.010 gr/dscf @ 7% O ₂
Ozone (VOC) ^e (stoker waterwall)	40	0.21	<u>69</u>	Furnace Design & Proper Operation
Lead (Pb)	0.6	6.0×10^{-3}	<u>2.0</u>	Dry Scrubber/Fabric Filter
Asbestos ^f	0.007	Nil	<u>Nil</u>	
Beryllium (Be)	0.0004	1.35×10^{-6}	<u>4.4×10^{-4}</u>	Dry Scrubber/Fabric Filter
Fluorides (as HF) ^g	3	0.035	<u>11.5</u>	Dry Scrubber/Fabric Filter
Mercury (Hg)	0.1	<u>6.0×10^{-3}</u>	<u>2.0</u>	Dry Scrubber/Fabric Filter
Vinyl Chloride ^f	1	Nil	<u>Nil</u>	
Sulfuric Acid Mist (H ₂ SO ₄)	7	0.358	<u>118</u>	Dry Scrubber/Fabric Filter

TABLE 4-1
(continued)

Pollutant	PSD Significant Emission Rate (tpy)	Proposed BACT Emission Rate ^a (lbs/ton) (tpy)		Proposed Control Technology
Hydrogen Sulfide ^f	10	Nil	Nil	
Total Reduced Sulfur ^f	10	Nil	Nil	
Hydrogen Chloride (HCl) ^h	NA ⁱ	0.643	<u>212</u>	Dry Scrubber/Fabric Filter, least stringent of at least 95% removal by weight or 25 ppmdv @ 7% O ₂ ; both over an 8-hr average
Arsenic (As)	AER ^j	9.1×10^{-5}	3.0×10^{-2}	Dry Scrubber/Fabric Filter
Total tetra-octa PCDD & PCDF	NA ⁱ	2.54×10^{-7}	8.3×10^{-5}	Furnace Design, Proper Operation, Dry Scrubber and Fabric Filter
Benzene ^f	AER ^j	Nil	Nil	
Radionuclides ^f	AER ^j	Nil	Nil	
Radon 222 ^f	AER ^j	Nil	Nil	
MWC Emissions	— ^k	— ^k	— ^k	Dry Scrubber/Fabric Filter

^a Assumes 100 percent annual facility availability at the design capacity of 1800 tpd; however, the accepted industry standard for on-line availability of an energy recovery facility is 85 percent. The tpy emission rates have been rounded off.

^b The mass-burn stoker waterwall combustor design is the basis of this CO emission rate. The BACT tpy emission rate is based on 100 ppmv @ 7% O₂, 4-hr block average, as required by the NSPS, which differentiates among combustor design with a 400 ppmv @ 7% O₂, maximum 1-hr average allowance.

^c The mass-burn stoker waterwall combustor design is the basis of this NO_x emission rate. The BACT tpy emission rate is based on 180 ppmv @ 7% O₂ over a 24-hr average, as required by the NSPS, with a 220 ppmv @ 7% O₂, maximum 1-hr average allowance.

TABLE 4-1
(continued)

- ^d The proposed BACT tpy emission rate is based on 66 ppmdv @ 7% O₂ over a 24-hr average from a 330 ppmdv @ 7% O₂ scrubber inlet SO₂ concentration with 80% removal; there is a 82.5 ppmdv @ 7% O₂ maximum 3-hr average from 330 ppmdv @ 7% O₂ scrubber inlet SO₂ concentration with 75% removal allowance.
- ^e The mass-burn stoker waterwall combustor is the basis of this VOC emission rate expressed as non-methane hydrocarbons. The BACT tpy emission rate is based on 37.3 ppmdv at 7% O₂ hourly average concentration.
- ^f A negligible emission rate was assigned to these pollutants since they are not typically found in the flue gas of refuse combustors or are not characteristic of a refuse waste stream. Representative stack test data are not available to support their presence in the flue gas of MWCs.
- ^g The BACT tpy emission rate for HF is based on 5 ppmdv at 7% O₂ hourly average concentration.
- ^h The proposed BACT tpy emission rate is based on 50 ppmdv @ 7% O₂ over an 8-hr average from a 1,000 ppmdv @ 7% O₂ scrubber inlet HCl concentration with 95% removal.
- ⁱ Not applicable. These pollutants are not regulated under the PSD regulations, but were provided for review to the Florida Department of Environmental Regulation (FDER). Recently, these pollutants were included in the NSPS with emission limitations assigned to organics (specifically PCDD and PCDF), metals via particulate control, and acid gases (specifically HCl and SO₂). The indicated total dioxins/furans (tetra-octa isomers) BACT emission rate is 30 ng/dscm at 7% O₂.
- ^j Any emission rate (AER). These pollutants (i.e., benzene, radionuclides, arsenic, radon 222) are regulated by the Clean Air Act under NESHAPS, and any emission is considered a significant emission rate. Footnote "f" also applies except for arsenic. In September 1991, EPA plans to propose regulations to implement changes to the PSD/NSR program. According to a March 11, 1991 policy memo prepared by John Seitz, EPA's OAQPS Director, Section 112(b)(6) under Title III of the 1990 CAA Amendments excludes the 189 air toxics listed in the law from PSD/NSR analysis (includes the NESHAPS pollutants). However, pursuant to the 1986 North County remand decision, the BACT analysis should consider all pollutants, including Title III hazardous air pollutants for which national standards have been set (previously subject to PSD), in determining which control strategy is best.
- ^k The NSPS has established new PSD de minimis emission levels for the following MWC regulated pollutants: 40 tpy for MWC acid gases (HCl and SO₂), 15 tpy for MWC metals (measured as particulate matter), and 3.5×10^{-6} tpy for MWC organics (measured as total tetra through octa dioxins and furans). 40 CFR Part 51.166(b)(23)(i) and Part 52.21(b)(23)(i) have been amended accordingly.

Poor Original

regulations, and at the request of FDER, or by EPA Region IV. These pollutants include: hydrogen chloride (HCl), dioxins (PCDD), and furans (PCDF). The HCl review was based on the February 1991 NSPS.

Table 4-1 also lists pollutants, regulated by the Clean Air Act, which have been assigned a negligible emission rate based on the premise that they are typically not found in the flue gas of refuse combustors. Stack test data does not support their existence. These pollutants include: hydrogen sulfide, total reduced sulfur, vinyl chloride, asbestos, benzene, radionuclides, and radon 222. A control technology review using the BACT methodology was not completed for each of these pollutants.

4.1.5 MATERIAL SEPARATION

The projected emissions from the Facility, shown in Table 4-1, were determined from an emission database developed to include emission test data from existing refuse combustion facilities (refer to Emission Factor Support Document in Attachment A of this application) and, as such, the projected emissions do not reflect any potential emission reductions which may result from the recovery of recyclable material. Since there is a lack of current EPA or other reliable data on whether material separation would lead to a demonstrable and quantifiable reduction of pollutant emissions from the Facility, no adjustments or reductions in the projected emissions were made.

4.1.6 SELECTION AND EVALUATION OF ALTERNATIVE CONTROL STRATEGIES

The alternative control strategy analysis for economic impact is based on the following factors: capital equipment cost, bond burden, amortization, and operating and maintenance costs (i.e., power, labor, maintenance, and waste disposal). Capital and operating costs for the proposed air pollution control equipment have been supplied by established manufacturers. Facility design features that affect air pollutant emissions (e.g., carbon monoxide) but are primarily related to the furnace design and operational parameters (e.g., combustor design, excess air level) were not given a direct equipment and operation cost for the purposes of this analysis.

Relative to energy, the Facility would have a positive effect since it would produce steam for electric power generation. Because energy recovery from refuse represents a resource that would be wasted if not used, other sources of energy (e.g., coal, oil, or natural gas) may be conserved as a result of generating electricity from refuse. Based on the same electric power generation rate, the Facility would produce less SO₂ emissions than a coal-fired power plant.

Environmentally, the evaluation and ultimate selection of the air pollution control equipment is based on how effectively it controls certain regulated (criteria and non-criteria) PSD pollutants and non-regulated pollutants. Environmental benefits of the proposed Facility include the reduction of traditional landfilling practices that result in non-productive land use, fugitive dust emissions, odor emissions, toxic landfill off-gases, and potential groundwater pollution. The Facility will also reduce the need for acquiring additional landfill space.

4.2 REGULATORY PERMITTING BASIS FOR THE PROPOSED EMISSION CONTROL STRATEGIES

Lee County is proposing to equip the Facility with dry scrubbers and fabric filters (also referred to as baghouses), and maintain good combustion controls to achieve the BACT determined stack emission limitations.

Each air pollution control train will be equipped with instruments to continuously monitor and record O₂, CO, SO₂, NO_x, opacity, and temperature. The monitors will ensure compliance with the proposed NSPS pollutant emission requirements. The applicable averaging time requirements for each pollutant will be demonstrated by the continuous emission monitors (CEM). The NO_x and O₂ CEMs will be located downstream from the economizer, and the SO₂ CEMs will be located upstream of the dry scrubber and downstream of the fabric filter. Due to the inaccuracy of current HCl monitors, an SO₂ monitor shall be used as a surrogate. The opacity monitor shall be properly mounted and located to measure the light transmission characteristics of the exhaust gas. A thermocouple shall be installed at the PM control device inlet, in accordance with the NSPS.

Development of the proposed control strategies is based on previously selected BACTs for other permitted facilities and the proven capabilities of various control technologies. The EPA's BACT/LAER Clearinghouse (EPA 1984, 1987b, 1988, and 1989) contains a partial list of permitted refuse combustion facilities. The emission rates and control technologies listed in the Clearinghouse (chronologically presented in Attachment C) are those which appeared in the original application for a facility, and do not necessarily represent a system's continuous performance or what control equipment presently exists (other examples of recently permitted facilities not currently in the Clearinghouse are listed in Table 4-2).

Although the Clearinghouse is a principal source of information, it is not always complete. The submittal of information from state permitting agencies to the Clearinghouse is voluntary. The Clearinghouse may not contain information on recently permitted facilities or those permitted before it was established. In addition, not all of the facilities listed as refuse combustion facilities by the Clearinghouse would necessarily be similar to the proposed Facility. A listed facility may use another fuel such as refuse-derived fuel (RDF), employ different combustion or air pollution control technologies, or operate at much lower or higher firing rates. Certain pollutant emission rates vary inversely with one another, (e.g., NO_x and CO), hence automatic reliance on the Clearinghouse for the lowest permitted values for each pollutant could result in an erroneous pollutant composite being applied in a "top down" BACT analysis.

In the past, electrostatic precipitators (ESPs) have been installed on many refuse combustion facilities for particulate control due primarily to their ability to operate at the higher gas temperatures typical of facilities that did not include a dry scrubber. This early trend is supported by Table 4-3 which shows ESPs alone to be the means of controlling particulate emissions prior to 1980. In recent years, the increased use of dry scrubbers which in effect lower flue gas temperatures and technology advancements in higher temperature fabrics have resulted in a greater acceptance of fabric filters to meet the stringent particulate emission limits of state regulations. The fabric filter's acceptance is supported by Attachment C, Table 4-2, and Table 4-3 (after 1980). Of the 40 facilities listed in Attachment C, 16 have been permitted with ESPs, 23 have been permitted with fabric filters, and one has the option of either.

TABLE 4-2

LEE COUNTY ENERGY RECOVERY FACILITY
PERMITTING DATA FOR ADDITIONAL REFUSE COMBUSTION FACILITIES

Location	Size (tpd)	Air Pollution Control Equipment	Particulate Emissions (gr/dscf @ 12% CO ₂)	Projected Emissions (lb/ton of MSW)				BACT for CO, VOC, and NO _x
				SO ₂	NO _x	CO	P _b	
Bristol, CT	650	Dry Scr/FF	0.015	2.881	5.4	1.34	0.006	Furnace design combustion control
Bay County, FL	500	ESP	0.03	2.8	2.2	11.4	0.0036	Furnace design good operation proper excess air flow
Broward County, FL (north)	2,200	Dry Scr/ESP	0.015	4.95	5.0	0.8	0.018	Furnace design good operation
Hillsborough County, FL	1,200	ESP	0.021	8.5	6.4	1.8	0.002	Furnace design combustion control
Pinellas County, FL	3,000	ESP	0.03	4.08 ^a	6.1 ^a	1.6 ^a	0.067 ^a	Furnace design good operation proper excess air flow
Tulsa, OK	750	ESP	0.06	3.23	6.4	1.33	0.0064	Furnace design combustion controls
Millbury, MA	1,726	Dry Scr/ESP	0.03	1.88	5.29	0.79	0.0224	Combustion controls excess air flow

TABLE 4-2
(continued)

Location	Size (tpd)	Air Pollution Control Equipment	Particulate Emissions (gr/dscf @ 12% CO ₂)	Projected Emissions (lb/ton of MSW)				BACT for CO, VOC, and NO _x
				SO ₂	NO _x	CO	P _b	
Claremont, NH	100	Dry Inj Scr/FF	0.02	6.37	6.37	2.88	N/A	Furnace design combustion controls
Gloucester, NJ	575	Dry Scr/FF	0.015	2.14	5.49	3.79	0.023	Furnace design combustion controls
Marion County, OR	550	Dry Scr/FF	0.03	3.19	4.1	2.4	0.023	Furnace design combustion controls
Delaware County, PA	2,688	Dry Scr/FF	0.015	1.22	4.1	4.3	0.003	Furnace design combustion control
San Juan, PR	1,040	Dry Scr/FF	0.010	1.01	3.5	3.5	0.003	Furnace design combustion control

SOURCE: Camp Dresser & McKee Inc., 1991.

^aThe Facility consists of three 1,000-tpd mass-burn units. Permitted emissions are for the third unit.

Scr - Scrubber

FF - Fabric Filter

ESP - Electrostatic Precipitator

Dry Inj Scr - Dry Injection Scrubber

TABLE 4-3

LEE COUNTY ENERGY RECOVERY FACILITY
 PARTIAL LISTING OF ADVANCED PARTICULATE CONTROL EQUIPMENT APPLICATIONS
 TO MSW COMBUSTION FACILITIES
 1970 TO 1988

Facility	Date	Air Pollution Control Equipment ^b	Particulate Test Data ^a gr/dscf
S.W. Brooklyn, NY	1970/71	ESP	.114/.146
South Shore, Brooklyn, NY	1970	ESP	.056
Dade County, FL	1970	ESP	.027
Braintree, MA	1970/78	ESP (1 field)	.108/.083
Montreal, Canada	1970/71	ESP	.013/.08
Chicago (NW), IL	1971/75	ESP	.025/.03
Washington, DC	1972	ESP	.0548
Harrisburg, PA	1974	ESP	.06
Quebec City, Canada	1974	ESP	.095
East Bridgewater, MA	1975	FF	.02
Pasadena, CA (pilot)	1975	FF	.008
Nashville, TN	1978	ESP	.018
Nashville, TN (pilot)	1980	FF	.008
Framingham, MA	1980	Dry Scr/FF	.02
Isogo, Japan	1980	Dry Scr/FF	.026 ^d
Kure, Japan	1981	ESP	.03
Malmo, Sweden	1982	Dry Scr/FF	.02
Saugus, MA	1983	ESP	.025
Saugus, MA (pilot)	1983	FF	.008
Gallatin, TN	1983	FF (Electrostatic)	.029
Susanville, CA	1983	FF	.01
Tsushima, Japan	1983	Dry Scr/FF	.01
Bamberg, Germany	1983	Wet Scr/ESP	.0135
Munich North, Germany	1984	Dry Scr/ESP	.0104
Neustadt, Germany	1984	Dry Scr/ESP	.0084
Lausanne, Switzerland	1984	Elec/Scr/ESP	.0208
Albany, NY-RDF	1984/86/87	3-FIELD ESP	.131/.066/.02
Niagara Falls, NY-RDF	1985/86	4-FIELD ESP	.096/.012
Westchester County, NY	1985	3-FIELD ESP	.016
Avesta, Sweden	1985	Cond. Scr/ESP	.0178 ^c
Ingolstadt, Germany	1985	Wet Scr/ESP	.02264
Quebec City, Canada (pilot)	1985	Dry Scr/FF	.0009
Copenhagen, Denmark (pilot)	1985	Dry Scr/FF	.0078 ^c
Malmo, Sweden	1985	Dry Inj. Scr/FF	.006
Nurnberg, Germany	1985	SDA/ESP	.0028
Kempten, Germany	1985	Dry Inj. Scr/FF	.0025
Hogdalen, Sweden	1985	Dry Scr/FF	.006
Linkoping, Sw	1985	Dry Scr/FF	.0063 ^d
Baltimore, MD	1985	4-FIELD ESP	.003
Wurzburg, Germany	1986	Dry Inj Scr/FF	.004
Tulsa, OK -- Boiler 1	1986	3-FIELD ESP	.0095
-- Boiler 2	1986	3-FIELD ESP	.0049

TABLE 4-3
(continued)

Facility	Date	Air Pollution Control Equipment ^b	Particulate Test Data ^a gr/dscf
Marion, OR — Boiler 1	1986	Dry Scr/FF	.011
— Boiler 2	1986	Dry Scr/FF	.0029
Montauban, France	1986	Scr/FF	.002 ^d
Oneida County, NY	1986	ESP	.0263
Zurich, Switzerland	1986	SDA/Lg. SCA ESP	.0031
Hogdalen, Sweden	1986	Dry Inj.Scr/FF	.0008
Rosenheim, Germany	1986	SDA/FF	.0056
Iserlohn, Germany	1986	Wet Scr/Cycl/ESP	.0084
N.W. Frankfurt, Germany	1986	SDA/ESP	.028
N.W. Frankfurt, Germany	1986	SDA/ESP/FF	.0056
Frankfurt, Osthafen	1986	Wet Scr/Cycl	.0168
Schwandorf, Germany	1986	Dry Inj.Scr/ESP	.021
Leverkusen, Germany	1986/87	Dry Scr/3-FIELD ESP	.0025/.0009 ^c
Commerce, CA	1987	Teller Scr/FF/ DeNO _x	.0043
Bay County, FL — Boiler 1	1987	3-FIELD ESP	.0193
— Boiler 2	1987	3-FIELD ESP	.0243
Manheim, Germany	1987	Wet Scr/ESP ^e	.0012
North Andover, MA	1987	3-FIELD ESP	.005
Rutland, VT	1988	Cond/Wet Scr/ 4-FIELD ESP	.003

SOURCE: Clarke, Marjorie J., "Debating The Virtues of ESPs," Waste Age, June 1988.

FF — Fabric Filter (Baghouse)

DeNO_x — Thermal DeNO_x

Dry Scr — Dry Scrubber^x

Dry Inj — Dry Lime Injection

ESP — Electrostatic Precipitator

Wet Scr — Wet Scrubber

Cycl — Cyclone

SDA — Spray Dryer Absorber

^aAll values are corrected to 12% CO₂ or 7% O₂, "front catch" only unless otherwise noted.

^bUnless otherwise specified, ESPs have two fields.

^cOriginal correction factor assumed to be 11% O₂, corrected to 7% O₂.

^dOriginal correction factor not known.

^eNumber of fields of ESP unknown.

It should be noted that some of the particulate data presented in Table 4-3 may not have been obtained by following EPA Method 5 particulate test procedures. The Lee County Facility will use EPA approved test procedures for compliance testing.

All of the facilities in Attachment C, except for the Long Beach, Stanislaus and Commerce refuse combustion facilities, each of which are in California, have listed combustion control and furnace design as BACT for control of NO_x . The Commerce facility permit has since been updated and is permitted with "Innovative Technology" for controlling NO_x . The Commerce facility is the first U.S. refuse combustion facility to incorporate Exxon's patented Thermal DeNO_x system (ammonia injection into the boiler) to reduce NO_x emissions. The Stanislaus and Long Beach facilities also have incorporated Exxon's ammonia injection system to control NO_x . The Commerce facility is located in a nonattainment area for NO_2 and ozone, while Stanislaus and Long Beach are in a nonattainment areas for PM, NO_2 , and ozone. Recent permit decisions made for the Huntington, NY and Pennsauken, NJ facilities will require the use of a thermal DeNO_x system. The BACT/LAER Clearinghouse compilation is normally updated either annually or bi-annually, thus it does not include some recently permitted facilities.

4.3 BACT REVIEW FOR SO_2 AND ACID GAS COMPOUNDS

4.3.1 PROPOSED CONTROL TECHNOLOGY

A growing number of state permitting agencies in the U.S. are requiring multipollutant, SO_2 , and acid gas control systems on refuse combustion facilities. As with other refuse combustion facilities, Lee County's proposed Facility will generate SO_2 and various other acid gases, including HCl, HF, and H_2SO_4 , during combustion.

The County proposes to use a dry scrubber for each of the Facility's combustors to control SO_2 and other acid gas emissions. The Facility will have three identical dry scrubber systems. Each dry scrubber system will be capable of removing: (1) 95 percent (by weight) of the uncontrolled HCl emissions or reduce HCl to a concentration of 25 ppmv at 7 percent O_2 ,

both over 8-hour averages, whichever is less stringent, and determined by compliance testing; and (2) 80 percent (by weight) of the uncontrolled SO₂ emissions over a 24-hour average (75 percent by weight over a 3-hour average) or reduce SO₂ to a concentration of 30 ppmv at 7 percent O₂ over a 24-hour average, whichever is less stringent. The dry scrubber system shall also reduce significantly the concentrations of H₂SO₄ and HF in the flue gas.

As indicated in Table 4-1, the Facility may emit the following maximum controlled annual SO₂ and other acid gas emissions: SO₂ - 490 tpy; HCl - 212 tpy; HF - 11.5 tpy; and H₂SO₄ - 118 tpy.

4.3.2 COMPLIANCE WITH APPLICABLE EMISSION STANDARDS

The intent of the recently promulgated NSPS requires MWCs to control SO₂ and HCl emissions to the level achievable by applying the best demonstrated system. The emission limitations for these acid gas pollutants as they apply to large MWC plants (those plants that have an aggregate capacity to combust greater than 250 tons per day of refuse) are presented below.

- o Sulfur dioxide (SO₂) emissions shall not exceed 30 ppmv, corrected to 7 percent O₂ on a dry basis; or be reduced 80 percent (by weight) both measured over a daily (block) 24-hour geometric mean basis by CEMs.
- o Hydrochloric acid (HCl) emissions shall not exceed 25 ppmv corrected to 7 percent O₂ on a dry basis; or be reduced 95 percent (by weight). Compliance demonstrated by annual performance stack tests.

It has been determined in this application that 80 percent reduction of SO₂ emissions is BACT.

The Facility shall have CEMs located upstream and downstream from the proposed dry scrubber/fabric filter to ensure that the SO₂ and HCl emission guidelines are met. Due to inaccuracy of HCl monitors, an SO₂ monitor will be used as a surrogate.

The County's planned material separation program, mandated by Florida's Solid Waste Management Act, may produce a beneficial effect on the amount of SO_2 and acid gases produced from the Facility. Since little data currently exists on whether material separation leads to a demonstrable and quantifiable reduction of SO_2 and acid gases, the projected emissions from the Facility do not recognize any potential benefits.

4.3.3 EMISSION OF GASEOUS SULFUR COMPOUNDS AND ACID GASES

Emission of Sulfur Compounds

The sulfur which contributes to pollutant emissions from refuse combustion is chemically bound to other elements in the refuse. During combustion, a fraction of these elements escapes from the furnace as gaseous sulfur compounds while the remainder leaves as bottom or fly ash. The type of sulfur compounds released from the furnace is dependent on the presence of other gaseous compounds, combustion temperatures, and chemical (oxidizing or reducing) conditions in the furnace. Furnace conditions (oxidizing or reducing) directly influence the types of sulfur compounds which may form and exit during combustion. Excess oxygen conditions, typical of a refuse combustor, generally result in the formation of SO_2 and SO_3 , while reducing (oxygen deficient) conditions result in hydrogen sulfide (H_2S), carbonyl sulfide (COS) and elemental sulfur. Since the Facility will be operated under excess oxygen conditions, reduced forms of sulfur are not likely to form and their emissions, as indicated in Table 4-1, will be negligible.

Gaseous SO_2 is the predominate sulfur compound emitted during refuse combustion, with its rate of formation dependent upon the valence state and chemical bonding of the refuse sulfur content. The sulfur in refuse exists as organic sulfur and sulfates and, to a lesser extent, as sulfides. Organically bound sulfur or sulfide sulfur will oxidize to produce gaseous SO_2 . The SO_2 emissions will also produce SO_3 , which will either be gaseous or appear in the fly ash as sulfates.

The fraction and elemental type of sulfur contained in the refuse which is either converted to other compounds or passed through the furnace was

discussed in a technical paper by Kaiser (1968). The paper was based on refractory-wall mass-burn facilities, and states that approximately one-half of the sulfur contained in the refuse appears in the bottom ash as sulfates (expressed as SO_3). Of the remaining fraction available for oxidation to SO_2 and SO_3 , approximately one-half exits the stack as SO_2 (25 percent) and one-half further oxidizes to sulfates found in the fly ash. O'Connel (1982) reported SO_2 net conversion rates for refuse to be between 20 and 60 percent. The refuse combustion industry conservatively assumes that between 50 and 90 percent of the sulfur found in refuse is converted to sulfur emissions (SO_2 and SO_3) which could potentially exit the stack.

Emission of Acid Gases

Acid gases which are found in the flue gas of refuse combustion facilities include H_2SO_4 , HCl , and HF . Reduced visibility, metal corrosion, and the formation of acid rain or fog, have been attributed to the emission of these compounds. H_2SO_4 is produced as an indirect result of the emission of SO_2 .

The pyritic and organic sulfur in the refuse which oxidizes to SO_2 during combustion may further oxidize to SO_3 in the furnace or after exiting the stack. Once formed, a portion of the SO_3 reacts with water vapor in the flue gas or atmosphere to form H_2SO_4 . In addition, the H_2SO_4 may further react to create sulfate salts which form a particulate aerosol.

Hydrogen chloride is the predominant equilibrium chlorine product from the combustion of refuse. The excess quantity of hydrogen present during the combustion process readily reacts with the chlorine in the refuse to form hydrogen chloride. Chlorinated plastic(s) and bleached paper products are major contributors of chlorine in the refuse and, therefore, have been considered as the primary sources of HCl emissions at refuse-burning facilities. The net conversion of chlorine contained in the refuse (organic and inorganic) to HCl , as determined in a study by Kaiser and Carotti (1972) and in a Swedish study with similar findings, is approximately 60 to 65 percent. The remainder of the chlorine from the refuse exits with the bottom ash. Both studies indicate that the net yield

of HCl (percentage of the chlorine in the refuse appearing as HCl) decreases as the chlorine content of the solid waste increases.

Fluoride emissions from refuse combustion are primarily from fluorinated plastics and other fluorocarbon products such as teflons, polyvinyl fluoride films, and fluorinated aerosol propellants. The mechanisms which govern fluorine release and HF formation from refuse combustion are considered much the same as HCl due to the chemical similarities between fluorine and chlorine. Little information, however, is available on the concentration of fluorine in today's refuse.

4.3.4 DESCRIPTION OF SO₂ AND OTHER ACID GAS CONTROL ALTERNATIVES

The emissions of SO₂ and acid gases (e.g., H₂SO₄, HCl, and HF) from refuse combustion can be reduced through the application of acid gas scrubbing devices. There are three general types of acid gas scrubbers offered by the air pollution control industry applicable for waste combustion facilities: wet scrubbers, dry scrubbers, and dry injection scrubbers. Although the specific operation of each of these scrubbers differs significantly, each incorporates the use of an alkaline reagent to react with and neutralize acid gases in the flue gas stream. Wet scrubbers and dry scrubbers subject flue gas to a sorbent water solution while dry injection scrubbers inject completely dry sorbent into the flue gas.

The relative removal efficiencies of these technologies for HCl, HF, and SO₂ are shown below. As the table shows, HCl and HF are generally better controlled than SO₂ because they are highly reactive acids. The higher removal efficiencies of dry scrubbers and wet scrubbers, in contrast to the dry injection scrubber, can be attributed to their lower operating temperatures and to their liquid-gas contact which provides better mass transfer of gaseous pollutants to the absorbing interface.

<u>Scrubber Device</u>	<u>Pollutant (% Removal)</u>		
	<u>HCl</u>	<u>HF</u>	<u>SO₂</u>
Wet Scrubber	95-99	99	80-90
Dry Scrubber	90-99	99	70-90
Dry Injection Scrubber	70-99	98	40-85

The removal efficiencies shown in the above table are based on data contained in several reports including: EPA's report to Congress (USEPA, 1987a); reports by Marjorie Clarke of the New York City Department of Sanitation (Clarke, 1986, 1987a, and 1987b); the California Air Resources Board (Carb 1984); and the USEPA's BACT/LAER Clearinghouse (USEPA, 1984, 1987b, 1988, and 1989). A scrubber's ability to achieve consistent and continuous control of these pollutants is better represented by the values in the lower end of the control efficiency ranges noted above.

These acid gas scrubbing devices were each evaluated on the basis of their technical feasibility and the associated environmental, energy, and economic impacts of controlling SO₂, HCl, and other acid gas emissions. A comprehensive description and technical evaluation of each technology are presented in the following sections.

Wet Scrubbers

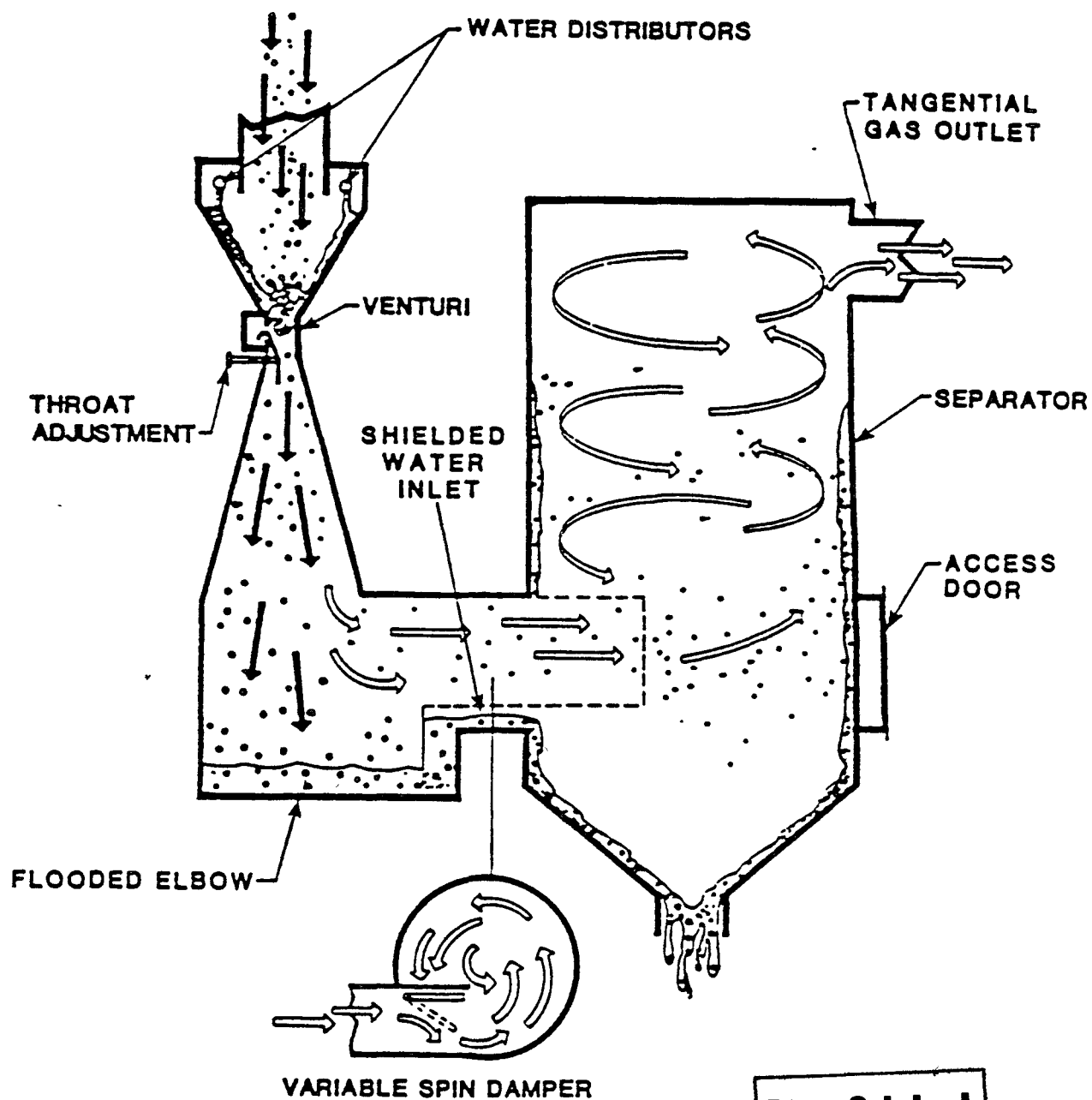
Wet scrubbers have been used on refuse combustion facilities in the past primarily as particulate control devices; however, they can also be designed to provide effective acid gas control. Acid gas wet scrubbers differ from particulate matter removal wet scrubbers in several ways. The dominant mechanism by which particulate is collected in a wet scrubber is inertial impaction of the particulates with the fluid, which is dependent on the pressure drop across the unit. Thus, particulate control wet scrubbers are typically high energy units with large pressure drops. In contrast, the process which governs the overall rate of acid gas absorption and control in a wet scrubber is the diffusion of an acid gas molecule into a liquid alkaline droplet for a reaction to occur. The design of an acid gas wet scrubber reflects this governing process since the emphasis is to increase the contact time of the liquid and gas.

Wet scrubbers for acid gas control use an alkaline liquid which may consist of either caustic soda (sodium) solution or a lime slurry (calcium) to scrub the flue gases. In larger systems, the use of a lime slurry is common since the cost of the alkali favors using the less expensive lime instead of caustic soda in spite of the higher capital costs involved. Lime slurry systems react with the SO_2 and other acid gases to form calcium based salts which require clarifying, thickening, and vacuum filtering to avoid a concentration build-up of precipitated salts in the system. Sodium based systems produce a liquid waste with highly soluble sodium based salts which may require the use of large, carefully contained, holding pond(s) or wastewater treatment plants. The holding pond(s) are used to evaporate and concentrate the dissolved salts, thus they are feasible in warmer climates.

Many types of wet scrubber hardware may be used to remove acid gases. The most common devices in use are the packed tower, impingement tray scrubber, and the venturi scrubber. Figure 4-1 shows a wet venturi which uses Brownian motion, chemical reaction, and inertial impaction to remove acid gas pollutants as well as particulate matter.

Wet scrubbers have been used on a few European refuse combustion facilities to control acid gases, while those used on past U.S. facilities of the 1960s and 1970s were operated as particulate collection devices. European refuse combustion facilities equipped with wet scrubbing systems include the Kiel and Krefeld facilities in Germany. Acceptance testing data for the original wet scrubber at Kiel show HCl and SO_2 control efficiencies of 98.0 percent and 80.9 percent, respectively (Feindler and Grimm, 1982). At the Krefeld facility, control efficiencies of 99.7 percent for HCl and 96.2 to 98.3 percent for SO_2 have been achieved (Beaumont Environmental, 1986).

The major advantage of an acid gas wet scrubber system over either a dry scrubber or a dry injection scrubber system is its high abatement efficiency. Data on a limited number of European installations show that acid gas wet scrubbers are very efficient and can achieve removal rates for SO_2 and acid gases that are greater than or equal to those of dry scrubbers (Ellison, 1988).



SOURCE. Sly Manufacturing Co.

LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Site Certification
Camp Dresser & McKee Inc

FIGURE 4-1
WET VENTURI SCRUBBER

Although wet scrubbers may provide very effective SO₂ and other acid gas control, the technology has several significant disadvantages which discourages its use on refuse combustion facilities. In addition to the extensive and expensive liquid effluent treatment required, wet scrubbers produce a saturated gas which increases the potential for corrosion of wet scrubber internals and downstream equipment. It also creates an aesthetically displeasing visible water vapor plume. The Kiel refuse combustor in West Germany has a wet scrubber which confirms these corrosion problems. The facility has been reported to have experienced severe corrosion of the wet scrubber's internals and the stack.

In addition to the aesthetically displeasing water vapor plume produced by the wet scrubber, localized acid deposition may result in the vicinity of the stack during periods of unfavorable meteorological conditions, such as, cool weather or high relative humidity. Since a wet scrubber system has a lower operating temperature than a dry scrubber or dry injection scrubber, the plume produced is less buoyant. Lower temperature results in reduced plume rise which will increase GLCs at equivalent emission concentrations. Reheating the stack gases prior to their exit will reverse this effect, but will decrease the Facility's net energy production and impose a significant economic disadvantage.

Presently, there are no refuse combustion facilities planned in the U.S. with a wet scrubber for acid gas control. The major reasons cited for this include:

- o High wastewater treatment requirement resulting in increased energy and utility operating costs.
- o Liquid effluent from the wet scrubber which requires pretreatment to meet regulatory requirements before discharge to a municipal sewer.
- o Problems associated with the disposal of wet sludges resulting from the process. Extensive sludge thickening and dewatering equipment is required.

- o Corrosion, scaling, and fouling of scrubber internals. Costly acid corrosion resistant construction materials are required for the scrubber and downstream equipment. These materials include high nickel chromium alloys, such as those in the Hastelloy and Inconel series, which are extremely expensive.
- o Visible water vapor plume under most meteorological conditions, especially during periods of high relative humidity.
- o A relatively low stack gas temperature resulting in reduced buoyancy. This reduced buoyancy results in lower plume rise and poorer plume dispersion of the residual pollutants. Hence, the potential for increased GLCs exists.

Because of these significant technical disadvantages, the wet scrubber alternative is not considered a viable means of acid gas control, and no further analysis of this option was performed. A more detailed analysis of various control options focuses on those technologies with fewer restricting features.

Dry Scrubbers

Dry scrubbers, also referred to as wet-dry, spray dryer, semi-dry, or spray dry scrubbers, offer an effective and practical means of controlling acid gas emissions from refuse combustion facilities. During operation of a dry scrubber system, the flue gases from the boiler are introduced into an absorbing chamber where the gases are contacted by a finely atomized alkaline lime slurry. Acid gases are absorbed by the slurry mixture and the alkaline component reacts with the gases to form salts. Evaporation of the water produces a finely divided particle of mixed salt and unreacted alkali and a flue gas having a lower temperature. A portion of the dry powder drops to the bottom of the scrubber vessel while the flue gases, containing the remaining powder with reacted acid gas salts and the particulates generated during refuse combustion, are delivered to the particulate collector (baghouse or ESP) for removal. A typical dry scrubber system is shown in Figure 4-2.

Poor Original



To form the lime slurry, pebble lime (CaO) is hydrated by slaking with water [$\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$]. The slurry and any additional cooling water which may be required is then pumped to nozzles or to a rotary atomizer located inside the scrubber's contact chamber. The slurry contains greater than the stoichiometric quantity of lime required to neutralize the SO_2 and acid gases in the flue gas.

Most dry scrubbers used to date have employed either a rotary-type atomizer or a dual fluid nozzle with an external or internal mixing design. Experience shows that each system has pros and cons; however, both are capable of meeting performance specifications.

In the absorbing chamber, the water in the slurry droplets is rapidly evaporated by the hot flue gases. The reduction in flue gas temperature provided by the evaporating water has been shown to be a major factor influencing the removal of acid gases. Studies such as the 1986 Environment Canada Study (R. Klicius et al., 1987) have shown that SO_2 and other acid gas removal efficiencies are significantly higher when the scrubber is operated at temperatures approaching the saturation temperature of the flue gas.

As a result of the scrubbing process a dry, free-flowing powder is produced consisting of unreacted lime, salts (most prevalent being CaCl_2 , CaSO_3 , and CaSO_4), and fly ash. The largest of these dry particles are separated by gravity from the gas in the absorbing chamber and fall to the bottom. The smaller particles are carried to a particulate control device for separation from the flue gas. It is imperative that a flue gas cleaning system which uses a dry scrubber for acid gas removal also include a downstream particulate control device to remove suspended fly ash, calcium salts, and unreacted lime which result from the scrubbing process. The collected fly ash from the dry scrubber and particulate control device are combined with the bottom ash or residue from the Facility. The use of lime by a dry scrubber changes the characteristics of the combined bottom ash and fly ash since its alkaline nature increases pH.

Although the use of acid gas controls for refuse combustion facilities in the U.S. is relatively new, European and Japanese regulatory agencies have required acid gas controls for approximately ten years. Many of the acid gas control systems in Europe and Japan use dry scrubbers with lime as the neutralizing reagent. The acceptance of this technology can be seen in Table 4-4 from a report by Craig and O'Connell (1982) and Table 4-6. Table 4-4 lists 29 dry scrubber installations with eight reporting HCl and SO₂ emission and control efficiency data (see Table 4-5) ranging from 75 to 99 percent and 48 to 88 percent, respectively.

Table 4-6 lists nine U.S. facilities with dry scrubber systems which have been tested. Six of these facilities reported HCl control efficiencies ranging from 96.9 to 99.4 percent. SO₂ control efficiencies in the range of 73.2 to 98.5 percent were also reported from these facilities. Other refuse combustion facilities which are permitted and either are operating or would employ dry scrubbers include York County, PA; Kent County, MI; Indianapolis, IN; Babylon, NY; Huntington, NY; Rochester, MA; Millbury, MA; San Marcos, CA; Gloucester County, NJ; Pennsauken, NJ; Marion, OR; Alexandria, VA; Delaware County, PA; and San Juan, PR.

The dry scrubber (see Tables 4-5 and 4-6) has been shown to effectively remove SO₂ and other acid gases (e.g., H₂SO₄, HF, HCl, and SO₃). However, a potential secondary benefit of its use with a particulate control device involves the reduction of various condensable organic emissions, such as dioxins (PCDD), furans (PCDF), chlorobenzenes (CB), polychlorinated biphenyls (PCB), polynuclear aromatic hydrocarbons (PAH), and chlorophenols (CP), beyond that normally achieved by good combustion design and furnace operation.

A 1986 Canadian study by Environment Canada and a leading pollution control vendor was performed at the Quebec City refuse combustor to assess flue gas control technologies. Analysis of a slipstream from one of the four furnaces at the facility showed the secondary benefits of using scrubbers with particulate control devices in addition to their control of SO₂, other acid gases, and particulates. The slipstream was ducted to a large scale "pilot plant" air pollution control system of two possible scrubber systems

TABLE 4-4

LEE COUNTY ENERGY RECOVERY FACILITY
REFUSE COMBUSTION FACILITIES WITH DRY SCRUBBERS

Facility	Manufacturer	Installed Date	Particulate Control Device	Size (tpd)
Dusseldorf, FRG	D.B.	1980	ESP	1-330
Hamburg, Stelling Moor, FRG	D.B.	1979	ESP	2-386
Hamburg, FRG	D.B.	1973	ESP	2-516
Hamburg, FRG	Steinmuller	1978	BH	NA
Oberhausen, FRG	D.B.	1981	BH	600
Munich, FRG	D.B.	1980	NA	NA
Pinneburg, FRG	D.B.	1974	ESP	130
Isogo in Yokohama, Japan	T	1980	ESP	NA
Isogo in Yokohama, Japan	T	1980 (demo)	BH	150
Hokuu in Yokohama, Japan	T	1981	ESP	NA
Sakai, Japan	T	1980	ESP	NA
Kohnan in Yokohama, Japan	T	1980	ESP	NA
Kumamoto, Japan	T	1981	BH	NA
Asahi in Yokohama, Japan	T	1980	ESP	NA
Ohojo in Yokohama, Japan	T	1980	ESP	NA
Minamintosuka in Yokohama, Japan	T	1981	ESP	NA
Sendai, Japan	T	1980	ESP	NA
Framingham, MA	T	1979	BH	250
Malmo, Sweden	F	1981	BH	300

SOURCE: Craig & O'Connell, 1982.

D.B. = D. B. Gas Cleaning
 T = Teller Environmental Systems
 F = Flakt
 ESP = Electrostatic Precipitator
 FRG = "West" Germany
 NA = Not Available
 BH = Baghouse (also known as a Fabric Filter)

TABLE 4-5

LEE COUNTY ENERGY RECOVERY FACILITY
PERFORMANCE OF DRY SCRUBBERS ON REFUSE COMBUSTION FACILITIES

Location	Mfgr.	Particulate Collection Device	HCl			SO ₂			Size Day (Tpd)
			ppm in	ppm out	Control Efficiency %	ppm in	ppm out	Control Efficiency %	
Isogo, Japan	T	BH	650	4.5	99	150	17.5	88	150
Sakai, Japan	T	ESP	280	NA	88	38	NA	71	NA
Kumamoto, Japan	T	BH	700	NA	93	200	NA	88	NA
Ohmojo, Japan	T	ESP	725	NA	75	115	NA	48	NA
Sendai, Japan	T	ESP	700	NA	79	NA	NA	NA	NA
Framingham, MA	T	BH	400	NA	97	NA	NA	NA	250
Framingham, MA	T	BH	NA	29.4	NA	NA	NA	NA	250
Hamburg Stellingner, Moor, DFG	DB	ESP	860	74.0	91	210	80.0	62	2 @ 386
Oberhausen, DFG	DB	BH	850	65.0	92	260	33.0	87	600

SOURCE: Craig & O'Connell, 1982.

DB = DB Gas Cleaning

T = Teller Environmental Systems

ESP = Electrostatic Precipitator

BH = Baghouse (also known as a Fabric Filter)

NA = Not Available

TABLE 4-6

LEE COUNTY ENERGY RECOVERY FACILITY
 PERFORMANCE OF DRY SCRUBBERS ON ADDITIONAL
 UNITED STATES REFUSE COMBUSTION FACILITIES

Facility	Number of Boilers	Total Design Capacity (tpd)	Particulate Collection Device	HCl @ 7% O ₂			SO ₂ @ 7% O ₂		
				ppm in	ppm out	Control Efficiency %	ppm in	ppm out	Control Efficiency %
Commerce, CA ^a	1	400	FF	646	7.3	98.9	111	1.9	98.3
Bridgeport, CT ^b	3	2,250	FF						
Unit 1				708*	9.2	98.7	183*	14.2	92.2
Unit 2				709*	4.0	99.4	213*	3.3	98.5
Unit 3				683*	7.5	98.9	224*	8.1	96.4
Bristol, CT ^c	2	650	FF						
Unit 1				456*	7.0	99.0	NA*	5.0	NA
Unit 2				536*	9.0	98.0	NA*	22.0	NA
Long Beach, CA ^d	3	1,380	FF	NA	24.2	NA	170.5	6.8	96.0
Stanislaus, CA ^e	2	800	FF						
Unit 1				NA*	0.5	NA	65.3*	2.8	95.7
Unit 2				NA*	2.5	NA	33.1*	5.3	84.0
Millbury, MA ^f	2	1,500	ESP						
Unit 1				700	23.30	96.9	205	53.9	73.2
Unit 2				697	6.08	99.2	296	61.5	79.2
Portland, ME ^f	2	500	ESP						
Unit 1				NA	NA	NA	322	31.7	89.3
Unit 2				NA	NA	NA	281	48.9	85.7
Biddeford, ME ^f	2	600 ^g	FF						
Unit 1				582	5.84	98.9	101.3	22.6	77.7
Unit 2				NA	NA	NA	NA	NA	NA

TABLE 4-6
(continued)

Facility	Number of Boilers	Total Design Capacity (tpd)	Particulate Collection Device	HCl @ 7% O ₂			SO ₂ @ 7% O ₂		
				ppm in	ppm out	Control Efficiency %	ppm in	ppm out	Control Efficiency %
Marion Cty, OR ^f	2	550	FF						
Unit 1				571	17.7	97.0	183.0	31.0	82.7
Unit 2				NA	NA	NA	NA	NA	NA

FF = Fabric Filter (also known as a Baghouse)

*ppm_{vdv} @ 12% CO₂

^a "Results of Air Emission Tests During the Waste-To-Energy Demonstration Program at the Commerce Refuse-To-Energy Facility." Volume 1. Technical Report, Energy Systems Associates, December 1988.

^b Bridgeport, Connecticut, Emission Test Results. ENTROPY, August 1988.

^c Environmental Test Report, Bristol Resource Recovery Facility. Ogden Projects, Inc., January 1988.

^d Air Emission Test Results at the Southeast Resource Recovery Facility, Unit 1. TRC Environmental Consultants, October-December 1988.

^e "Hahn and Sofaer, "Air Emission Tests Results from the Stanislaus County, California Resource Recovery Facility," Ogden Projects Inc., 1989.

^f U.S. Environmental Protection Agency, 1989; Municipal Waste Combustors - Background Information for Proposed Standards: Post Combustion Technology Performance, September 1989.

^g RDF fired facility.

(dry scrubber and dry injection scrubber) with a fabric filter. The data indicate that the removal of trace organic emissions (e.g., PCDD, PCDF, PAH, PCB, CB, and CP) by more than 99 percent was possible. The data suggests that the dry scrubber provides the cooling necessary for the adsorption and/or condensation of these trace organic pollutants onto particulates in the flue gas, which are then removed by a particulate control device such as a baghouse or an ESP. Dioxin removal efficiencies for the dry scrubber systems at the Marion County, Stockholm-Hogdalen, and Malmo facilities (see Table 4-7) confirm the results from the Quebec City refuse combustor.

Due to mechanisms believed to be similar to those affecting trace organics, it has been demonstrated that refuse combustion facilities equipped with both a dry scrubber and an efficient particulate control device are capable of reducing heavy metal emissions, except for mercury (Hg), by as much as 99 percent. This removal can be achieved with a dry scrubber and an efficient particulate control device since the condensation temperatures of most metal compounds emitted by refuse combustion facilities are above 392°F (200°C). The Quebec City dry scrubber/fabric filter tests indicate that the removal efficiency for heavy metals, including zinc, cadmium, lead, chromium, nickel, arsenic, and antimony, was approximately 99 percent at a dry scrubber outlet temperature of 284°F (140°C) (Environment Canada, 1986). These results confirm earlier data on removal efficiencies of over 99 percent reported for other dry scrubber/baghouse installations, such as Sysav, Sweden (1983) and Tsushima, Japan (1984). Test results for the Munich North facility (dry scrubber/ESP) indicated greater than 98 percent removal of Cd, Pb, and Zn.

Although the removal efficiency of all heavy metal pollutants is dependent upon flue gas temperature, Hg appears to be the most temperature sensitive of the metals tested. The dry scrubber/fabric filter collection efficiency of Hg from the Quebec City study was found to be up to 95 percent at the fabric filter outlet temperature of 284°F (140°C). However, a lower percent reduction for Hg appears to be a more reasonable expectation based on recent data for facilities equipped with dry scrubbers/fabric filters.

TABLE 4-7

LEE COUNTY ENERGY RECOVERY FACILITY
DIOXIN REDUCTION ACROSS THE DRY SCRUBBER/FABRIC
FILTER SYSTEMS AT REFUSE COMBUSTION FACILITIES*

Facility	Inlet Concentration [ng TCDD-equiv. (Eadon et al)/Nm ³ @12%CO _R]	Outlet Concentration	Removal Efficiency (percentage)
Marion County Boiler #1 (one test) September 1986	3.21	0.123	96.2
Stockholm-Hogdalen Boiler #3 (one test) August 1986	4.98	0.116	97.7
Stockholm-Hogdalen Boiler #3 (two tests) March 1986	2.20 2.60	0.179 < 0.427	91.9 > 83.6
Malmo Boiler #1 (one test) Spring 1986	≥ 3.60	< 0.094	≥ 97.4
Malmo Boiler #2 (one test) Spring 1986	≥ 10.80	< 0.094	≥ 99.1

*Preliminary data from the U.S. EPA and Radian Corporation.

Hahn, Jeffrey L. et al. "Recent Air Emission Test Data From Several Waste-To-Energy Facilities Utilizing Martin GMBH Stoker Combustion Systems and Advanced Air Pollution Control Equipment." APCA 80th Annual Meeting, 1988.

Although lower temperatures may aid mercury capture, other phenomena, such as the carbon present in the flue gas, may influence mercury removal. The mercury removal efficiency data observed in the Quebec City test is believed to be due to the flyash having an unusually high carbon content. Mercury is believed to adsorb onto flyash more readily if it contains carbon.

Thus, the data from the Quebec City study as well as other studies indicate that the use of a dry scrubber with a particulate control device provides positive environmental benefits in addition to the control of SO₂, other acid gases, and particulates. These benefits include the reduction of trace organic and heavy metal emissions.

The major problems incurred by of dry scrubber systems include potential clogging of atomizers or spray nozzles and reagent accumulation on the dry scrubber walls. A dry scrubber system also requires a relatively greater quantity of sorbent and a relatively larger installation space than does a wet scrubber system.

The significant performance advantages of a dry scrubber system far outweigh its disadvantages, and include the following.

- o Dry scrubbers provide effective SO₂ and other acid gas control. With the use of an efficient particulate control device, dry scrubbers also have the ability to reduce emissions of organics and metals.
- o Unlike a wet scrubber, a dry scrubbing system produces a dry waste which is easier to handle and dispose of.
- o Dry scrubber exhaust streams are not saturated; therefore, the potential for corrosion is greatly reduced when compared to a wet scrubber. Flue gas reheating which would increase energy costs is not required to prevent a saturated plume.

- o Unlike a wet scrubber, a dry scrubber system may be easily used with currently available particulate control devices.
- o Unlike a wet scrubber, a dry scrubber uses a small amount of water which evaporates and does not require treatment.

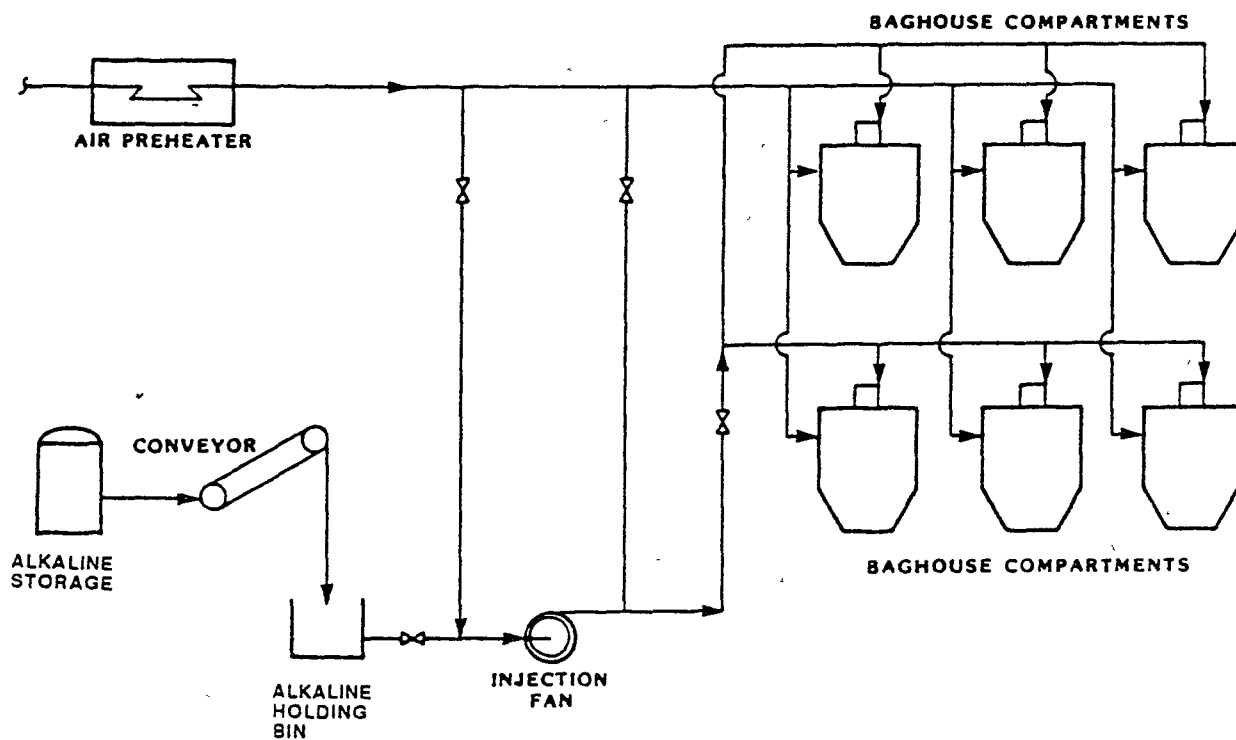
If a dry scrubber is used in conjunction with an efficient downstream particulate control device, its environmental and possible economic advantages, and technical feasibility far outweigh those of a wet scrubber. A dry scrubber is currently the technology accepted by EPA and the refuse combustion industry for controlling acid gases.

Dry Injection Scrubbers

Recently, the concept of injecting a dry alkaline sorbent (without water) into the gas stream duct work to control SO_2 and other acid gases has received some attention. The sorbent reacts with the acidic flue gas pollutants to produce neutral salts which are later collected in a particulate control device. Sorbent injection locations (downstream of the furnace) are selected to provide sufficient residence time for the acid gas adsorption reactions to proceed before the particulate matter is collected. Figure 4-3 is a process diagram of a typical dry injection scrubber.

These dry injection scrubber systems use either sodium (e.g., sodium carbonate, sodium bicarbonate, or nahcolite) or calcium based hydrated lime (calcium hydroxide) alkaline reagents. The test data show that sodium based reagents appear to be more reactive with SO_2 than hydrated lime. However, the sodium based reagents are also more expensive, harder to obtain and exhibit poorer handling characteristics than hydrated lime. Thus, hydrated lime is the preferred sorbent.

Dry injection scrubbers have been installed on refuse combustion facilities in Europe and Japan, and more recently in the U.S. and Canada. Installations in the U.S. have been mostly on smaller sized boilers (those which combust 250 tpd or less of refuse), and are related to lower capital costs. Data from U.S. installations, (e.g., Dayton, OH; Claremont, NH;



Poor Original

SOURCE: Survey of Dry Sulphur Dioxide Control System, EPA
Report 600/7 - 80 - 030, Feb 1980

LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Site Certification
Camp Dresser & McKee Inc

FIGURE 4-3
DRY INJECTION SCRUBBER AND
PARTICULATE MATTER COLLECTION DEVICE

Dutchess County, NY; Springfield, MA; and St. Croix, WI) indicate HCl and SO₂ removal efficiencies in the range of approximately 70 to 99 percent and 40 to 85 percent, respectively.

Because the dry sorbent can be injected directly into existing duct work, capital costs for installation of the system are minimal. Thus, a dry injection scrubber may be ideal for retro-fitting older combustion facilities which have no acid gas control and where control goals are modest.

The disadvantages of a dry injection scrubber system for use on a new refuse combustion unit are as follows.

- o Dry injection scrubbers require the use of large quantities of hydrated lime which is more expensive than the pebble lime used for dry scrubbers. The larger amount of sorbent is necessary in order to meet today's stringent SO₂ removal requirements. Thus, the operating cost differential resulting from the poor reagent utilization for a dry injection scrubber is significant.
- o More scrubber waste is produced by a dry injection scrubber in comparison to a dry scrubber system because of the large quantities of sorbent which must be injected.
- o The high residual alkalinity of the waste from a dry injection scrubber may require special handling.
- o The use of a larger quantity of sorbent than that used in a dry scrubber system results in the need for more frequent fabric filter cleaning which accelerates wear-out of the filter bags.
- o The increased solids loading and altered properties of the particulate matter may result in decreased particulate control device efficiency (Offen, McElroy, and Muzio, 1987).
- o Sorbent injected into the economizer may result in fouling of the convective heat transfer surfaces.

- o Dry injection scrubbers, such as the system used at the Claremont, NH facility, do not decrease the flue gas temperature as much as wet scrubbers and dry scrubbers. Thus, while plume buoyancy (enhanced plume dispersion) is maintained, the secondary benefit of removing condensable trace heavy metals or organic emissions is reduced.
- o With currently available sorbents, dry injection scrubbers provide lower SO₂ removal efficiencies than do wet scrubbers and dry scrubbers.

Variations of the dry injection scrubber are emerging which may increase the efficiency of SO₂ removal when using hydrated lime instead of sodium sorbents as the reagent. One such variation involves the use of a water quench chamber ahead of the dry injection system to cool and humidify the flue gas and possibly increase pollutant removal efficiencies. This was done during the Quebec City refuse combustion facility study with results which came close to those obtained using a dry scrubber. Results from this study indicate that if the quench was used to obtain the same outlet temperature as the dry scrubber, SO₂ removal efficiencies were 13 percent less than with a dry scrubber (58 percent removal) and the removal of trace organic and heavy metal emissions were comparable. If the quench was not used, the dry injection scrubber outlet temperature was 108°F higher than the dry scrubber outlet, and SO₂ removal efficiencies were 57 percent less (29 percent removal). The test was on a pilot scale and further testing on full-scale facilities is necessary.

In addition to the work being done to design new dry injection scrubber processes, work is also being done to develop new, more reactive sorbents. These new technologies hold future promise for enhanced SO₂ removal. However, until such time as these improved sorbents and processes are developed and tested on full-scale refuse combustion facilities, dry injection alone cannot be considered as BACT for control of SO₂ and acid gases because of lower control efficiencies and minimal application to U.S. facilities.

4.3.5 EVALUATION OF SO₂ AND ACID GAS CONTROL

A dry scrubber, from the above evaluation, has the capability of achieving SO₂ and other acid gas control efficiencies which are similar to those of a wet scrubber (see Tables 4-5 and 4-6). A dry injection scrubber presently provides the lowest control efficiency when compared to both a dry scrubber and a wet scrubber. A dry scrubber has numerous advantages which make it more desirable than both a wet scrubber and a dry injection scrubber.

In accordance with the "top down" BACT methodology established by an EPA memorandum and draft guidelines in December 1987, May 1989, and March 1990, a wet scrubber or dry scrubber can both be considered the most stringent or "top" control strategy for controlling acid gases and SO₂. The Facility is proposing to install a dry scrubber instead of a wet scrubber as BACT for these pollutants due to its technical advantages, established operating performance history, and acceptance by EPA as indicated in the recently promulgated NSPS. The current "top down" BACT methodology which updates the 1978 EPA guideline for determining BACT indicates that, since the proposed control technology, a dry scrubber, can provide emission reductions similar to a wet scrubber and no outstanding issues regarding collateral environmental impacts exist, no further analysis is required and the technology should be accepted as BACT. Equipment with similar control capabilities, as stated in the guidelines, need not be presented (e.g., wet scrubber versus dry scrubber). As discussed previously, there appear to be fewer non-air environmental impacts associated with the dry scrubber alternative compared to the wet scrubber alternative.

Although a dry scrubber has been determined to be BACT using a "top down" methodology, an economic, environmental, and energy impact analysis is still necessary to determine what SO₂ and other acid gas emission limitations are BACT. As noted earlier, the NSPS will regulate SO₂ and HCl emissions from MWCs and differentiate the control level required by the amount of refuse combusted. The emission standards would limit SO₂ emissions as not being able to exceed the least stringent of 30 ppmv or a reduction of 80 percent by weight, and HCl emissions as not being able to exceed the least stringent of 25 ppmv or a reduction of 95 percent by weight (both corrected to 7

percent O₂ and on a dry basis). The necessary economic, operating and performance data to complete the BACT analysis were obtained from experienced vendors.

An evaluation of recently permitted refuse combustion facilities in the BACT/LAER Clearinghouse, refuse combustion facility test data (see Tables 4-5 and Table 4-6), and technical data supporting the NSPS for SO₂ and HCl indicate that a potential exists for achieving very high SO₂ pollutant removal on a continuous basis using a dry scrubber. HCl test data and recent BACT determinations indicate that 95% removal can be achieved on a continuous basis. The continuous removal of SO₂ by a dry scrubber is more difficult and variable in refuse combustion applications since HCl is also present in the flue gas. In competing with HCl for lime, SO₂ is less reactive and its removal is adversely effected by an HCl concentration increase in the flue gas. Test data shown in Tables 4-5 and 4-6 support a greater difficulty and variability of removing SO₂ (73 to 98 percent) in the presence of HCl. To determine what continuous SO₂ removal rate is achievable, an impact analysis involving energy, economic, and environmental criteria was completed in accordance with a "top down" methodology. The dry scrubber systems evaluated would also be required to simultaneously control HCl emissions (at least 95 percent removal) and other acid gas emissions.

The impact analysis presented in the following paragraphs is independent of the combustor design used and represents the total impacts of the proposed Facility.

Energy

The total annual amount of energy consumed (kw) was calculated for dry scrubber systems designed to achieve between 75 and 90 percent SO₂ removal, while simultaneously reducing other acid gas emissions, including HCl, by at least 95 percent. The energy required by the systems include: (1) the I.D. fan to overcome the pressure drop across the dry scrubber; (2) the compressed air for the atomizing system; and (3) the motors required for the lime handling and atomizing systems. The power consumption of dry scrubber

systems designed to achieve 90, 85, 80, and 75 percent SO₂ removal, while simultaneously achieving at least 95 percent HCl removal, were calculated to be 693, 543, 512, and 482 kW, respectively. These calculated values represent those of the Facility and, as discussed earlier, are independent of the combustor design selected.

The dry scrubber systems designed to achieve 90 percent SO₂ removal, while simultaneously reducing HCl by at least 95 percent, clearly has the highest energy consumption impact. A higher SO₂ removal rate requires more energy to pump, slake, and atomize the larger amount of lime, and overcome a larger pressure drop across the dry scrubber.

Economic

The annual capital and operating costs for dry scrubbing systems with various SO₂ control levels were calculated and are shown in Table 4-8. These costs include: (1) amortized (20 years at 9 percent) installed capital equipment cost with bond burden included; (2) consumption of power, water, and lime; (3) preventive maintenance; and (4) scrubber related disposal costs. The economic data shown in Table 4-8 indicate that a dry scrubber system's capital and operating costs begin to increase significantly as SO₂ is controlled beyond 80 percent. The operating costs affected the most with increasing SO₂ removal are the chemical cost (pebble lime) and the disposal cost of reacted and spent lime from the scrubber. Greater SO₂ removal requires that a larger stoichiometric ratio of lime to SO₂ and acid gas be used. The total annual cost of dry scrubber systems designed to achieve 90, 85, 80, and 75 percent SO₂ removal, while each simultaneously achieving at least 95 percent HCl removal, are shown in Table 4-8 to be approximately \$2,970,000, \$2,429,000, \$2,137,000 and \$1,937,000 respectively. These annual costs represent those of the Facility and, as discussed earlier, are independent of the combustor design selected.

The dry scrubber system designed to achieve 90 percent SO₂ removal (it should be noted this has not been proven on a continuous basis) while simultaneously removing HCl by at least 95 percent clearly has the highest

TABLE 4-8

LEE COUNTY ENERGY RECOVERY FACILITY
CAPITAL AND OPERATIONS/MAINTENANCE COSTS FOR SO₂ CONTROL STRATEGY
CAPITAL COSTS, ANNUALIZED FIRST YEAR CAPITAL COSTS, POWER REQUIREMENTS AND ANNUAL O&M COSTS (in 1990 1000's \$)

Control Technology	SO ₂ ^a Removal Efficiency (Percent)	Equipment		Operating Cost					Total ¹ Annual Cost
		Capital ^b Cost (Installed)	Annualized ^c Capital Cost	Power ^d Cost	Labor ^e Cost	Materials ^f & Supplies	Chemical ^g Cost	Special ^h Costs	
Dry Scrubber	90	<u>8,301</u>	<u>909.0</u>	<u>364.1</u>	91	<u>179.2</u>	<u>942.8</u>	<u>484.0</u>	<u>2,970</u>
Dry Scrubber	85	<u>6,917</u>	<u>757.4</u>	<u>285.6</u>	91	<u>89.6</u>	<u>781.8</u>	<u>423.5</u>	<u>2,429</u>
Dry Scrubber	80	<u>6,225</u>	<u>681.7</u>	<u>269.2</u>	91	<u>80.6</u>	<u>643.9</u>	<u>370.5</u>	<u>2,137</u>
Dry Scrubber	75	<u>5,534</u>	<u>605.9</u>	<u>252.9</u>	91	<u>71.7</u>	<u>574.9</u>	<u>340.1</u>	<u>1,937</u>

^a Assumed over an annual averaging time.

^b Total capital costs for all scrubber trains, including a 43 percent bond burden.

^c Annualized capital costs assume 20 years amortization and interest rate equals 9% (capital recovery factor = 0.1095).

^d Power costs assume plant operation 24 hours/day, 365 days/year. Power cost = \$0.06/kWh.

^e Labor costs assume two full-time persons at \$45,500/year each.

^f Maintenance costs include atomizer replacements, slaker liners, and other miscellaneous parts.

^g Chemical cost assumes lime at \$70/ton and based on a lime consumption rate ranging from 25 to 41 pounds/ton for the various control levels.

^h Includes landfill disposal costs @ \$23/ton for spent and unreacted lime, and scrubber water costs.

¹ Total annual cost equals the sum of the annualized capital cost and the first-year operating costs.

annual cost of control. The higher SO₂ removal rate requires the systems which store, pump, slake, and atomize the larger lime quantity to have more capacity.

Environmental

The environmental impacts associated with operation of the proposed dry scrubber at the BACT determined control level are expected to be minimal. The lime used by the dry scrubber to control SO₂ will adversely affect available landfill space since its operation requires the disposal of spent lime in addition to ash.

A dry scrubber also has positive environmental impacts associated with its operation. Emissions of unregulated EPA pollutants including certain trace metals and organics, and HCl should decrease from its operation. The dry scrubber operation will also ensure that the Facility will not cause or contribute to a violation of the NAAQS, the PSD allowable increments, and the PSD significance levels for applicable acid gas pollutants and SO₂.

4.3.6 BACT DETERMINATION FOR SO₂ AND OTHER ACID GASES

The dry scrubber has minimal operating disadvantages when compared to a wet scrubber, and significantly more operating experience and pollutant removal efficiency than a dry injection scrubber. Past applications on other refuse combustion facilities in the U.S., as well as numerous others in Europe and Japan, demonstrate confidence in the dry scrubber's ability to effectively control SO₂ and acid gas pollutants. In addition to controlling SO₂ and HCl emissions, the dry scrubber will effectively control other noncriteria pollutants (HF and H₂SO₄). The dry scrubber may also help to control non-regulated pollutants including trace organics (e.g., PCDD, PCDF, and PAH) and trace heavy metals. The dry scrubber may effectively control these pollutants if a highly efficient particulate control device is used in conjunction, as will be the case for the proposed Facility. It should be noted that the dry scrubber is not guaranteed to remove these non-regulated pollutants. Minimal test data do not show

confidence in the removal of the non-regulated pollutants, and additional rigorous testing is needed to confirm the present data and test results. Also, any refuse variations which cause furnace turndown will not effect the operation of the dry scrubbers.

An evaluation of recently permitted refuse combustion facilities and stack test data from refuse combustion facilities indicates a possibility of controlling SO_2 to extremely high levels using a dry scrubber (see Tables 4-5 and 4-6). The current available data, however, is not extensive enough to determine if these higher control levels may be achieved on a consistent and continuous basis, and their effects on the operating equipment. The ability to achieve higher SO_2 control is a function of numerous factors which may not depend on one another (e.g., dry scrubber operating temperature, lime stoichiometric ratio, and HCl concentration). Dry scrubber operation at a specified stoichiometric lime ratio becomes more efficient and effective as the operating temperature approaches the flue gas saturation temperature; however, droplet drying becomes retarded at the lower temperatures and potential dry scrubber and particulate control device corrosion and plugging increases. Higher operating temperatures decrease the potential for dry scrubber corrosion and plugging. If the dry scrubber operating temperature is too high, then the ability to achieve higher SO_2 control becomes more difficult and requires large quantities of lime.

A more in-depth analysis (as indicated in the 1980 PSD workshop handbook) which integrates both economic and environmental criteria was completed to determine BACT for controlling SO_2 and acid gases using the dry scrubber technology. The analysis (shown in Table 4-9) compares the economic impact of a dry scrubbing system designed to achieve varying levels of SO_2 control (between 75 and 90 percent), while simultaneously achieving an HCl removal of at least 95 percent. The possibility of achieving higher SO_2 removal was explored due to current test data and a review of currently permitted (not operational) refuse combustion facilities.

The values in Table 4-9 indicate that the overall and incremental cost per ton of pollutant removed is significantly affected beyond the 80 percent

TABLE 4-9

LEE COUNTY ENERGY RECOVERY FACILITY
FIRST-YEAR SO₂ CONTROL STRATEGY COSTS
(DIFFERENT SO₂ REMOVAL LEVELS CONSIDERED)

Pollutant	System ^a Removal Efficiency (%)	Controlled ^b Exit Emissions (tpy)	Total Removed Pollutant Emissions (tpy)	Incremental Controlled Emissions (tpy)	Annual ^c Control Costs 1,000's (\$/yr)	Incremental Annual Cost 1,000's (\$/yr)	Control ^d Costs (\$/ton) of SO ₂	Incremental Control Costs (\$/ton of SO ₂)	Tipping Fee ^e (\$/ton of refuse)
SO ₂	90	<u>244.5</u>	<u>2,200</u>	<u>122</u>	<u>2,970</u>	<u>541</u>	<u>1,350</u>	<u>4,434</u>	<u>4.52</u>
SO ₂	85	<u>366.7</u>	<u>2,078</u>	<u>122</u>	<u>2,429</u>	<u>292</u>	<u>1,169</u>	<u>2,393</u>	<u>3.70</u>
SO ₂	80	<u>489.0</u>	<u>1,956</u>	<u>122</u>	<u>2,137</u>	<u>200</u>	<u>1,093</u>	<u>1,639</u>	<u>3.25</u>
SO ₂	75	<u>611.2</u>	<u>1,834</u>	—	<u>1,937</u>	—	<u>1,056</u>	—	<u>2.95</u>

^a Assumed over an annual averaging time.

^b Assumes a dry scrubber SO₂ inlet concentration of 330 ppmv (dry) @ 7% O₂. Emissions are the total for all units.

^c From Table 4-8.

^d Control costs (SO₂ controlled) equals the annual control costs in 1990 dollars divided by the total removed pollutant emissions (tpy) (e.g., $1,937 \times 10^3 / 1,834$ equals $\$1,056/\text{ton}$ of pollutant controlled).

^e Tipping fee (\$/ton) equals the annual control costs in 1990 dollars divided by the tons of waste processed ($1,800 \text{ tpd} \times 365 \text{ days/year} = 657,000 \text{ tpy}$) (e.g., $1,937 \times 10^3 / 657,000 = \$2.95/\text{ton}$).

SO₂ removal level. The table demonstrates that 85 percent SO₂ control as opposed to 80 percent SO₂ control will remove an additional 122 tpy; however, the control cost for this incremental removal is \$2,393 per ton. The same comparison for achieving 90 percent control as opposed to 85 percent SO₂ control show the incremental control cost to be \$4,434 per ton. The incremental SO₂ emissions removed for a system designed to achieve 85 and 90 percent removal is not justified by the incremental cost required (no long-term data to verify 85 and 90 percent SO₂ removal on a continuous basis is available). Based on the limited operating data available at the higher SO₂ control levels, and the incremental removal cost associated with 85 and 90 percent SO₂ removal, BACT is determined to be 80 percent control for SO₂.

A dry scrubber system has been determined to be BACT for SO₂ and other acid gases which include HCl, H₂SO₄, and HF. The system proposed for the Facility shall achieve the following.

- o SO₂ controlled to 30 ppmv (dry) corrected to 7 percent O₂ or 80 percent weight reduction, whichever is less stringent, both over a 24-hour (daily) block geometric average; and
- o HCl controlled to 25 ppmv (dry) corrected to 7 percent O₂ or at least 95 percent weight reduction, whichever is less stringent, as determined by compliance testing over an eight-hour average.

The above SO₂ control level was determined to be BACT based on an evaluation of the economic, environmental, and energy impacts, and the lack of extensive operating data at higher SO₂ control levels. Since a full-service contractor and not an equipment supplier would be responsible for the dry scrubber's performance, a greater level of risk and uncertainty exists at the higher SO₂ control levels. Ultimately, the cost of the dry scrubber to the applicant, Lee County, reflects the risk and uncertainty which exists in achieving higher SO₂ control.

4.4 BACT REVIEW FOR PARTICULATE MATTER (PM)

4.4.1 PROPOSED CONTROL TECHNOLOGY

The County proposes to use a fabric filter (baghouse) system with a particulate outlet grain loading of 0.010 gr/dscf corrected to 7 percent O₂ (front half catch), as measured by EPA Method 5 (40 CFR Part 60), to control the emission of particulate matter (PM) from each combustor/boiler train at the Facility. PM is defined for the purpose of this BACT analysis as total suspended particulate matter (TSP) and particulate having an equivalent aerodynamic diameter of less than 10 microns (PM₁₀). The proposed fabric filter control system will effectively and efficiently reduce fly ash generated from refuse combustion and reaction products generated by the dry scrubber system (e.g., calcium sulfate and calcium chloride). The fabric filter will also reduce trace heavy metals and organic compounds which have been theorized to preferentially absorb onto fine PM.

At design operating conditions, the Facility shall emit a maximum controlled annual PM emission of 64 tpy. It was conservatively assumed that all emitted PM from the Facility shall be PM₁₀.

A fabric filter particulate control system will also be used for the dry scrubber lime silo(s), and will be designed to achieve an outlet particulate loading of 0.015 grains per actual cubic foot (gr/acf).

4.4.2 COMPLIANCE WITH APPLICABLE EMISSION STANDARDS

The Facility's fabric filter system shall be more stringent than the current federal emission standards for particulates (NSPS) set at 0.08 gr/dscf @ 12 percent CO₂, and the recently promulgated NSPS for MWCs, which will become effective on August 12, 1991, set at 0.015 gr/dscf @ 7 percent O₂. The fabric filter system for the Facility shall be designed to obtain the BACT determined outlet grain loading for PM of 0.010 gr/dscf corrected to 7 percent O₂.

4.4.3 RATIONALE FOR PROPOSED BACT DETERMINATION

Particulate matter (PM) is emitted as a result of incomplete combustion of fuel as well as the entrainment of noncombustible inert matter in the flue gases. Particulate emissions may be solid or condensable substances. Solid PM generally consists of noncombusted inert matter, inorganic oxides, unburned combustibles, and heavy metals. A fraction of the vapor phase trace organics which were not completely converted to CO_2 and H_2O during the combustion process and the vaporized heavy metals make up the condensable portion of PM. In addition, it has been theorized that trace heavy metals and organic compounds adsorb and/or condense onto the fine particulate fraction since they are very porous and have an extremely large surface area. These gas-solid particulate adsorption reactions have also been postulated as a possible dioxin formation theory; however, the interpretation of recent experimental evidence suggests a different conclusion. In a study by Dickson and Karasek (1987), particle size surface area was not an important factor in producing trace organics such as dioxin. The study involved a series of laboratory experiments with various fly ash samples and pentachlorophenol as the known precursor.

The size and quantity of particulates emitted from refuse combustion depend upon such factors as flue gas residence time, underfire air velocity through the combustor system, oxidizing/reducing conditions within the furnace, temperature, flue gas mixing, boiler tube spacing, boiler configuration, flue gas velocity, and the chemistry of the fuel which is burned. If combustion takes place at higher temperatures and with the proper quantity of oxygen, the result will be more complete combustion of the fuel and a decreased particle mass. High combustion temperatures and long residence times allow for more complete burning of organic particles with a commensurate decrease in particle size. Boiler configuration (180 degree turns) and decreased gas velocity will allow the larger, heavier particles to fall out of the flue gases as they pass through the boiler. The various operating and design parameters cause the particles in the flue gas to have a large distribution range (0.10 micron to more than 500 micron). The submicron range, less than 1.0 micron, may be retained in the

lungs and is of public health concern. EPA has addressed the necessity of controlling those particles which are smaller than 10 microns, referred to as PM_{10} , and requires their review in determining BACT. The PM_{10} emitted from the Facility is difficult to quantify since limited fractional collection efficiency data on refuse combustion facilities exists, thus the air quality modeling and BACT analysis conservatively assumes the particulate emissions to be all PM_{10} .

4.4.4 DESCRIPTION OF PARTICULATE CONTROL TECHNOLOGY ALTERNATIVES

Particulate matter may be removed from the combustion gases by various types of air pollution control devices. Technologies which have been used on refuse combustors include fabric filters (also referred to as baghouses), ESPs, and wet scrubbers. One of the initial particulate control devices used on U.S. refuse combustion facilities was a wet venturi scrubber. During the 1970s and early 1980s, however, ESPs were the more predominantly used particulate control device on refuse combustion facilities. The shift to ESPs was mainly due to the inability of the wet scrubber to meet the stringent particulate emission control requirements initially set by the NSPS (0.08 gr/dscf), and then further decreased by various states.

The recent trend for U.S. refuse combustion facilities is to install fabric filters instead of ESPs. The application of fabric filters has been made possible by the installation of acid gas scrubbers which decrease flue gas temperature excursions to limits which are acceptable for the bag fabric, and make the possibility of a fire due to incandescent particles igniting the fabric negligible. The trend of using a fabric filter rather than an ESP is due to a combination of factors. Although both of these technologies may be designed and operated to achieve the same outlet grain loading, it is theorized that the fabric filter is better able to control the finer PM emitted which have been theorized as a source for trace heavy metal and organic emissions.

Electrostatic Precipitators (ESPs)

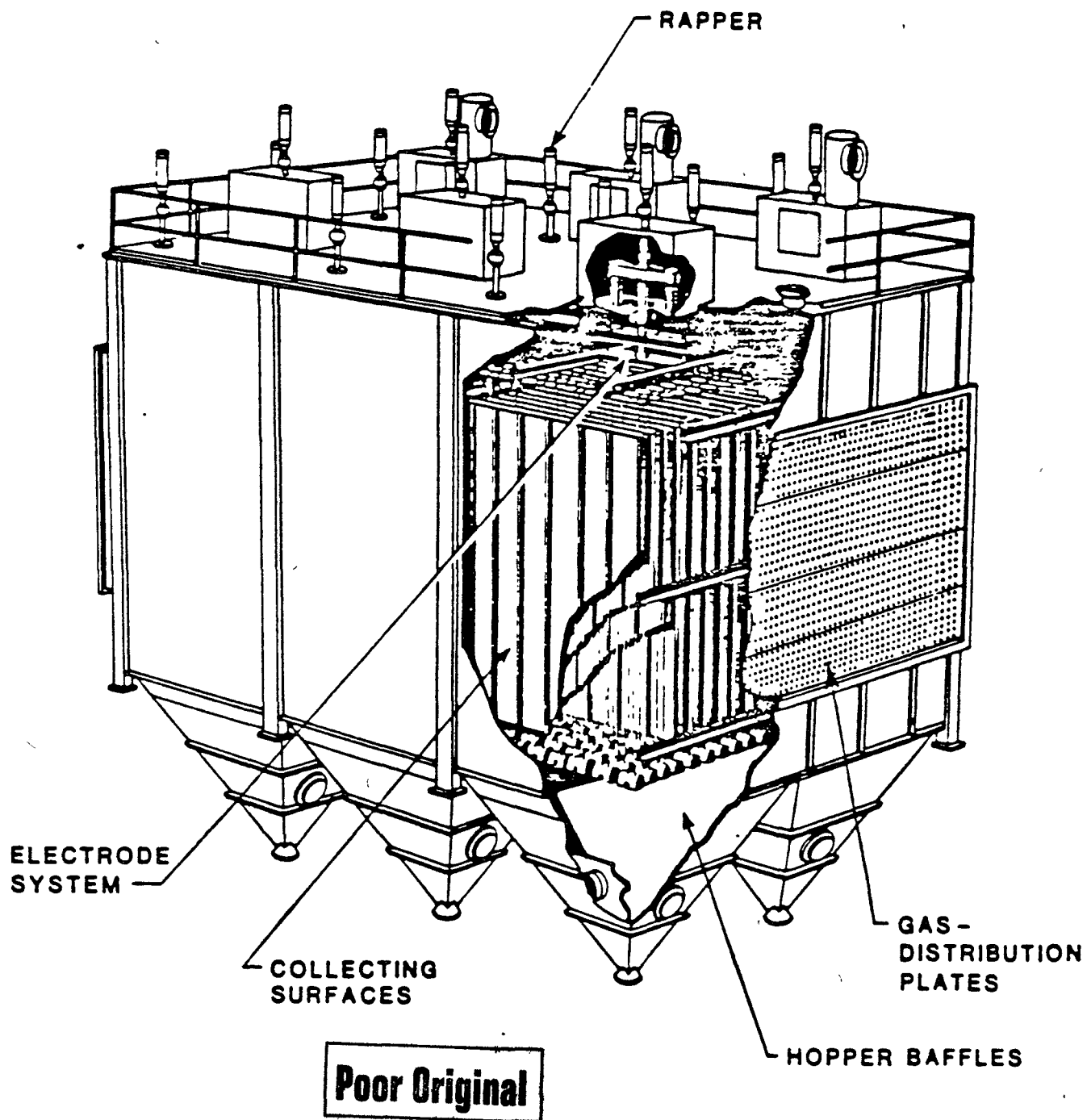
An ESP uses an electrostatic field for precipitating or removing entrained solid or liquid particles from gas streams by particle ionization. An ESP consists of an alternating array of negatively-charged wires or grids and grounded collection plates.

Particulate collection is accomplished by applying a high voltage across the negative electrodes, thereby establishing a corona around it. The corona ionizes the PM entrained in the gas stream, thereby negatively charging the particles. The charged particles precipitate out of the gas stream by migration to the grounded collection plates where they are deposited. Precipitated PM is removed from the collecting electrode plate by "rappers" with a sharp, hammer-like blow or vibration to cause the collected dust to dislodge and fall into the ash hoppers below.

Re-entrainment of the collected PM is inhibited by the electrostatic field, properly designed collection plates, the agglomerated particulate mass, and low flue gas velocities through the ESP. Proper design of the rapping mechanisms and collecting plates, and the maintenance of uniform and sufficient low gas velocities, are also required for optimum ESP operation. A typical ESP is shown in Figure 4-4.

The collection efficiency of ESPs is very high, normally designed to exceed 99 percent, which is primarily a function of flue gas flow rate and humidity, strength of the electrostatic field, residence time of the flue gas in the electrostatic field, resistivity, particle size, inlet grain loading of the particulates being removed, and surface area of the collection electrodes. Collection efficiency may be enhanced by installing additional stages of precipitation in series (fields) and optimizing the gas flow rates, and/or increasing the specific collection plate area (SCA) of the electrodes.

The critical property affecting the performance of ESPs is the resistivity (the reciprocal of conductivity) of the particulate to be collected. If the resistivity is excessive, then the particulate cake acts to reduce the



SOURCE: Joy Manufacturing Co.

LEE COUNTY, FLORIDA
Energy Recovery Project
Application for Power Plant Site Certification
Camp Dresser & McKee Inc

FIGURE 4-4
ELECTROSTATIC PRECIPITATOR

effective field strength within the ESP by retaining its charge, thus building an insulating layer around the collecting plates. The insulating layer decreases current flow from the discharge electrodes to the collection plates, thereby reducing collection efficiencies. If the resistivity is too low, the charge on the dust cake dissipates quickly. Thus, without the cake attraction forces to hold them, the surface particles are re-entrained by the gas, increasing outlet emissions.

Advantages of ESPs are:

- o Demonstrated high collection efficiency.
- o Ability to operate over a wide range of gas temperatures.
- o Minimal gas pressure drop across the ESP results in lower power consumption by the flue gas mover (such as an induced draft fan).
- o No liquid effluents requiring treatment are generated since the PM is, unlike the wet scrubber, collected dry.
- o Longest operating record on refuse combustion facilities.
- o High reliability with low maintenance.
- o Capability to operate in a relatively high humidity gas stream.
- o Efficiency increases if operated at gas flow rates which are lower than design (good response to turndown).

Some of the disadvantages are:

- o Changes in flue gas properties and particle size distributions may adversely affect collection efficiencies.
- o Some particles are not efficiently removed by a precipitator because of extremely high or low resistivity.

- o ESPs cannot effectively remove gaseous heavy metals unless they condense prior to entering the unit.
- o Changes in the chemical composition of the fuel may reduce ESP performance by altering particle resistivity.
- o ESP collection efficiencies decrease in the 0.1 to 1.0 micron range (CARB, 1984). This may be mitigated by increasing the number of fields to three, four, or even five.
- o Special precautions are required to safeguard personnel from the high voltage present in the ESP units. High voltage sparks could cause fires if the collected particulate is combustible or if a combustible gas were to enter the ESP.
- o There is a potential for corrosion of the ESP internals if the flue gas temperature falls below the dew point of the acid gases.

ESPs have been used in the United States for more than 50 years on a wide variety of applications. Many of the modern municipal refuse combustion facilities use ESPs for particulate emission control. Some major refuse combustion facilities equipped with ESPs are located in Harrisburg, PA; Chicago, IL; Nashville, TN; Norfolk, VA; Westchester County, NY;; Hillsborough County, FL; Saugus, MA; Baltimore, MD; Tampa, FL; Dade County, FL; Tulsa, OK; Bay County, FL; and Pinellas County, FL. Throughout the U.S. and the world, refuse combustion facilities are successfully utilizing, with high reliability, ESPs for the efficient control of PM.

An ESP or a fabric filter is technically capable of meeting the recently promulgated NSPS limitation of 0.015 gr/dscf corrected to 7 percent O₂. Although both technologies are capable of meeting stringent particulate control levels, the fabric filter is theorized to better control fine PM, as well as the pollutants which are believed to be found on these

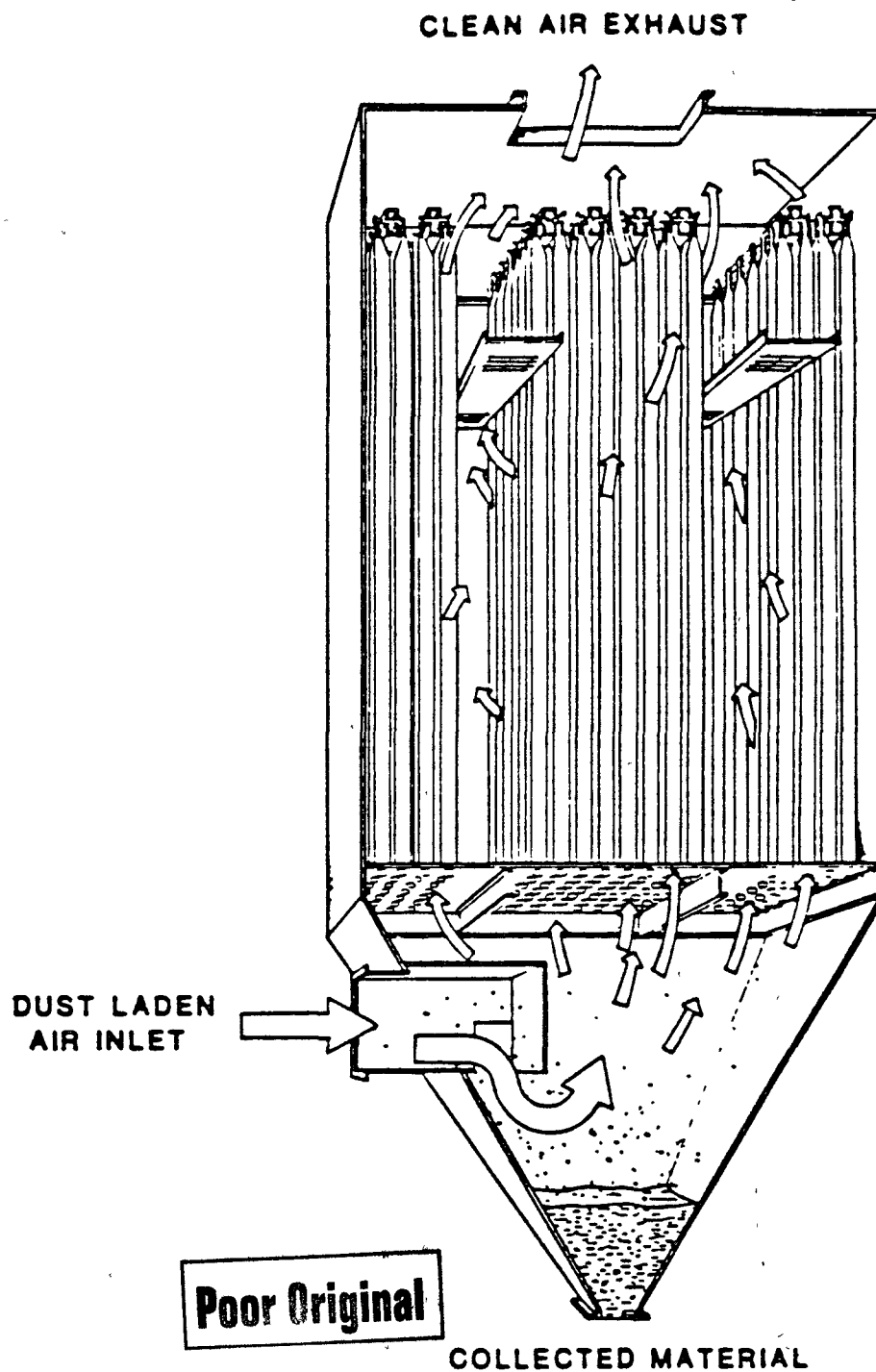
particles. These pollutants, trace heavy metals and organic emissions, are believed to have a preference towards the finer PM as they condense and/or adsorb.

Fabric Filters (Baghouses)

Fabric filters, also referred to as baghouses, have the capability of producing high removal efficiencies under the varying inlet conditions encountered from refuse combustion. The stringent particulate emission limitations of today have had a significant impact on the use of the fabric filter as a particulate control device. Fabric filters have been used for years on a variety of sources and, more recently, have been applied to refuse combustors.

The basic components of a fabric filter include a filter medium (bag) made of various cloth fabrics with special coatings or laminates, bag support systems (cages or rings), a gas tight enclosure or shell, collection hoppers, and a mechanism to remove accumulated particulate. A typical fabric filter is shown in Figure 4-5. Operation involves allowing a particulate laden gas stream to enter the lower portion of the fabric filter near the collection hoppers and then flow upward through the gas-tight enclosure on the inside or outside of the bags, depending upon the fabric filter design used. Cleaning of the bags takes place periodically, and usually incorporates one of three mechanical processes: (1) reverse air cleaning, (2) vibration or shaking of the bags, and (3) pulse air jets. The bags are gently cleaned in a manner that leaves the primary dust cake on the bags after the cleaning process. Particulate matter removed from the bags falls by gravity into a dust hopper for removal and ultimate disposal.

Several parameters used in the design and sizing of a fabric filter include the particular process application, air-to-cloth ratio (A/C), cleaning method, filter media, particulate characteristics, and pressure drop. The A/C ratio is defined as the volumetric flow rate expressed as cubic feet per minute divided by the filter cloth area expressed in square feet, resulting in a velocity value expressed in feet per minute. Higher pressure drops result in increased power consumption by the prime air mover



SOURCE: Micropul Corporation

LEE COUNTY, FLORIDA
Energy Recovery Project
Application for Power Plant Site Certification
Camp Dresser & McKee Inc

FIGURE 4-5
FABRIC FILTER OPERATION

(such as an I.D. fan). To avoid these problems the maximum pressure drop across the filter media is normally limited to between 6.0 and 8.0 inches of H₂O.

There are three fundamental types of fabric filter designs based on the cleaning method: (1) reverse air, (2) shaker, and (3) pulse jet units. A discussion of each type is included herein.

Reverse Air Fabric Filters. Reverse air fabric filters are characterized by low A/C ratios and collect PM on the inside of the filter bags. The flue gas is first introduced through a manifold into the hopper section of the bag compartments. The gas then flows upward and into the inside of the filter bags to the outside. Once the collected material builds up to a point where the flow (pressure drop) is too great, the filter bags are cleaned using a low energy reverse air cleaning process. The air flow is periodically reversed, causing the bag to slightly collapse, thus dislodging the filter cake and allowing the collected particulate to fall into the collection hoppers for disposal.

Shaker Unit Fabric Filters. A second type of fabric filter is a shaker unit which is not typically used on refuse combustion facilities. These units, like reverse air, have low A/C ratios and also collect the PM on the inside of the bags. To clean the filter bags, the top portion of the bag is mechanically shaken to release the dust cake to the hoppers below. The mechanical shaking causes excessive stress on the type of bags employed on fabric filters and could cause short bag life because of reduced structural integrity.

Pulse Jet Unit Fabric Filters. Pulse jet units generally have A/C ratios which are higher than those of reverse air and shaker units. In contrast to reverse air and shaker units, the gas flow in a pulse jet fabric filter flows from the outside of the filter bag to the inside. Consequently, the PM is collected on the outside of the filter bags. When the cleaning process is initiated, a module compartment is taken off-line and bags are cleaned one row at a time with a high pressure burst (pulse jet) of compressed air into

the open end of the bag. This action causes the bag to flex away from the supporting cage releasing the PM from the outside of the bag. The dust then falls into the collection hoppers below.

Lee County will select either a pulse jet or a reverse air fabric filter to control PM at the proposed Facility. The system will be designed to accept flue gases from the proposed scrubbing system at not only the normal operating flue gas temperature of approximately 260°F, but also at temperatures in excess of 500°F. The fabric filter's ability to continuously accept flue gases at the higher temperature ensures that it will not sustain damage in the event of scrubber failure since the boiler gas exit temperature is less than 500°F.

Advantages and Disadvantages

The Facility is proposing to use a fabric filter to control the PM generated during combustion. Some advantages of using this technology are presented below.

The advantages are:

- o The dry collection of particle matter by physical filtration.
- o The ability to attain high collection efficiencies.
- o Because it is a physical filtration device, it is less sensitive to process variations (inlet particulate loading, particle size distribution, variability in waste composition, variability in flue gas flow rates, and particulate resistivity).
- o The ability to perform unit maintenance, such as bag replacement without having to shut down the combustion system.
- o Fabric filters are more easily adaptable should more stringent emission limitations be mandated.

- o The potential for additional SO₂ and other acid gas scrubbing by the unreacted alkaline sorbent (lime) which is removed from the flue gas and builds up on the bag surface.

The disadvantages are:

- o High sensitivity to relative humidity. The formation of a hard crust on the filter fabric, "cementation" of the bags, can occur in a highly humid gas stream with low temperatures. Cemented bags must be replaced which causes down-time and high maintenance costs.
- o Inability to accept high temperature gases. Loss of structural integrity of the bags from temperature surges above 550°F (288°C) can reduce bag life and cause lost operating time and high maintenance costs.
- o Susceptibility of the filters and metal surfaces to chemical attack and corrosion by condensed acid gases should temperatures fall below the acid gas dew point.
- o High gas pressure drop across the fabric filter results in higher energy consumption by the gas mover (induced draft fan).
- o Long-term reliability of fabric filters on U.S. refuse combustors has not been demonstrated.

Wet Scrubbers

Wet venturi scrubbers were discussed in Section 4.3 as an acid gas and SO₂ control technology; however, they had also been used on some of the earlier refuse combustors as a particulate control technology. During the 1970s and early 1980s, ESPs were used instead primarily due to the wet scrubber's inability to meet the more stringent particulate emission control requirements set by the existing NSPS and the individual states.

Currently there are no new refuse combustion facilities being designed in the U.S particulate emissions, as indicated by the following list of disadvantages.

- o High operating costs from electrical consumption (ESPs and fabric filters use less energy).
- o Liquid effluent from the wet scrubber requires pretreatment to meet regulatory requirements before discharge to a municipal sewer.
- o A saturated steam plume visible under most meteorological conditions.

Because of these significant disadvantages, the wet venturi scrubber alternative is not considered a viable means of particulate control, and no further analysis of this option was performed.

Evaluation of PM Control Alternatives

The proposed PM control strategy for the Facility, a fabric filter, offers similar control capabilities to an ESP with both systems being able to meet, at a minimum, the proposed NSPS for particulates. A fabric filter is considered to be better capable of removing finer particulates (PM_{10}) than other technologies and the condensable heavy metals and trace organics which are believed to prefer the finer particulate. In addition, use of a fabric filter should promote additional removal of SO_2 and other acid gases. Particle size fractional removal efficiency studies on fabric filters and ESPs to support these conclusions have primarily come from the combustion of coal and not refuse.

The recently promulgated NSPS conclude that a fabric filter is the best demonstrated technology for controlling particulate emissions from large MWC plants. These standards will require all MWC plants to meet a particulate emission limit of 0.015 gr/dscf corrected to 7 percent O_2 .

An evaluation of recently permitted refuse combustion facilities in the BACT/LAER Clearinghouse, refuse combustion facility test data, and

technical data from the NSPS background documents indicate a potential for achieving a more stringent particulate limitation than that in the NSPS. A fabric filter designed to achieve a limitation of 0.010 gr/dscf corrected to 7 percent O_2 is considered the most stringent or "top" particulate control strategy. In agreement with the current EPA "top down" BACT methodology, since the Facility shall install the "top" particulate control strategy designed at the "top" control level (i.e., 0.010 gr/dscf @ 7 percent O_2), an impact analysis of energy, economic, and environmental criteria was not completed.

4.4.5 BACT DETERMINATION OF TOTAL SUSPENDED PARTICULATE MATTER (TSP)

The NAAQS for TSP has been rescinded and replaced with a standard for particles with an equivalent aerodynamic diameter of less than 10 microns (PM_{10}). However, the PSD increments for TSP remain. To address the requirements for permitting particulate emissions based on two indicators, EPA has established a transition policy. Because both TSP and PM_{10} are regulated under the Clean Air Act, the transition policy requires that the BACT analysis be performed for both.

Past applications on other refuse combustion facilities in the U.S., as well as numerous others in Europe and Japan, and the recent increase in the number of U.S. facilities permitted with fabric filters demonstrate confidence in the fabric filter to effectively control particulates. In addition to controlling inert PM, the fabric filter can also control other non-criteria pollutants which are present in solid or particulate form. As previously discussed, the use of a dry scrubber with the fabric filter has shown the increased possibility of acid gas control and a subsequent decrease in reagent consumptions when compared with an ESP.

The information and analysis presented on the fabric filter is adequate and sufficient to determine that it be BACT in controlling PM. The fabric filter for the Facility shall be designed and guaranteed by the County to achieve an outlet loading of 0.010 gr/dscf @ 7 percent O_2 . This control level is more stringent than the limitation set forth in the NSPS of 0.015 gr/dscf @ 7 percent O_2 .

Secondary Sources

In addition to the PM emitted from the furnace, the Facility will have two secondary sources of particulate emissions. These sources are located at the top of the lime storage silo vent(s) and at the ash handling building vent. The vents are minor particulate emission points and the methods used to control them are discussed below.

Facility design has not yet progressed to the point where the exact number of lime storage silos is known. Depending on the vendor's preferred design, the Facility will likely have either one or two lime silos for pebble lime (CaO) storage. The lime storage capacity will likely be the same and independent of the number of silos used.

The pebble lime silo is a storage vessel for lime and is used by the dry scrubbers to control SO₂ and acid gas emissions. Particulate lime emissions will occur from the silo(s) when lime is loaded by a pneumatic conveying truck equipped with a pneumatic unloading system. The loading of lime causes the air in the silo(s) which contains entrained lime dust emissions to be displaced through a silo roof vent. Each lime silo will have a dedicated vent fabric filter (slaker dust collector) mounted on its roof to control lime dust emissions to 0.015 grains per actual cubic foot (gr/acf) during loading periods. The fabric filter(s) will be designed to discharge collected dust directly back into the storage bin.

The deliveries of lime to the silos will be made approximately every seven days. In normal practice, the truck operator will require about 1 to 1.5 hours to unload the pebble lime and about five minutes to clear the trailer hoppers and piping of any residual lime. The air flow rates during the transfer process are estimated to be between 250 and 1,000 ACF per minute. Assuming that the lime will be unloaded at the higher air flow rate, the maximum total hourly emission is estimated at 0.129 pounds per hour of particulate matter. If a maximum of four truck deliveries, each requiring 2.0 hours of duration, are made per week, the maximum annual emission rate (irrespective of whether one or two silos are used) would be approximately 54 pounds per year of particulate matter (0.027 tpy).

Particulate emissions from the ash handling building vent are expected to be negligible. The ash handling building will be maintained under negative pressure, and a fabric filter will be mounted on the top of the building and vented to the atmosphere to control fugitive particulate emissions. The outlet grain loading from the fabric filter shall be 0.015 grains per actual cubic foot (gr/acf). The fabric filter shall be designed to have a maximum hourly emission rate of 1.6 pounds per hour of particulate matter which calculates to 7.01 tpy assuming continuous operation. Since this represents a conservative design calculation, actual tpy emissions should be considerably lower.

The ash handling practices at the Facility will limit the resuspension of ash residue. Ash residue from the furnace exit (bottom ash) and the air pollution control system (fly ash) are combined and quenched with water (20 to 30 percent by weight H₂O) to prevent fugitive emissions. This ash handling practice is successfully performed at most modern refuse combustion facilities.

4.4.6 BACT DETERMINATION OF PM₁₀

In a July 1987 EPA ruling on PM, the NAAQS for TSP was rescinded and replaced with a standard for particles with an equivalent aerodynamic diameter of less than 10 microns (PM₁₀). This standard was promulgated because it represents the fraction of the emitted PM which is inhalable, and it is a better indicator of a potential impact on human health. The ruling on PM₁₀ requires major stationary sources, such as the Facility, to consider the application of BACT for PM₁₀ emissions.

The regulation seeks to establish an emission limitation, but it is contingent upon the availability of emission factor and control efficiency data. The regulation, however, states "Where a quantifiable PM₁₀ emission limit is not yet feasible, the Administrator intends to allow the use of TSP based emission limitations, provided that the reduction of PM₁₀ emissions—and not just PM emissions—has been considered to the extent possible in the BACT determination."

The amount of PM_{10} expected from the Facility is difficult to quantify due to the limited data available. Published particle size distribution is available, however, from three mass-burn facilities located abroad—Tsushima, Japan; Munich North, West Germany; and Wurzburg, West Germany—and from a refuse-derived fuel (RDF) facility in Biddeford, Maine. The data from these facilities, shown in Table 4-10, are based on cascade impact measurements on acid gas scrubber/fabric filter air pollution control systems except for Munich North which employs an ESP.

An analysis comparing the uncontrolled or controlled PM emissions from mass-burn boilers with RDF fired boilers has not been documented. The particle size data from these processes are not expected to be appreciably different although inlet loading may be greater for RDF firing. The particle size data from RDF would be expected to be of the same or smaller size.

From the limited available particle size data given in Table 4-10, there does not appear to be any distinct advantage to either an ESP or a fabric filter for controlling PM_{10} emissions. Both are considered to be viable PM_{10} control devices. The observed variations in mass fraction by particle size data for the facilities employing fabric filters (Tsushima, Wurzburg, and Biddeford) may be attributed to differences in sampling and analytical methods used at each site or to the operating baghouse conditions during testing. Although the percentage of PM_{10} emitted from the Facility is expected to be similar to the Biddeford, Maine facility, the air quality modeling analysis conservatively assumes that the particulate emissions will be 100 percent PM_{10} .

The control for PM_{10} as well as TSP at the Facility will be through the use of a fabric filter. As discussed in Section 4.4, the past application of fabric filters on refuse combustion facilities in the United States, Canada, Europe, and Japan, and the recent increase in those which are being either permitted or proposed in the U.S. demonstrates confidence in its ability to effectively control PM. An increase in the number of refuse combustion facilities which are proposing to use fabric filters can be partly attributed to the theory that they can more effectively control the emission of submicron particulate PM_{10} . The finer PM is believed to

TABLE 4-10

LEE COUNTY ENERGY RECOVERY FACILITY
PARTICLE SIZE DISTRIBUTION DATA

Tsushima, Japan Particle Mass Size Fraction (Microns) %	Munich, North Germany Particle Mass Size Fraction (Microns) %		Würzburg, Germany Particle Mass Size Fraction (Microns) %		Biddeford, Maine						
					Run 1		Run 2		Run 3		
					Particle Mass Size Fraction (Microns) %	Particle Mass Size Fraction (Microns) %	Particle Mass Size Fraction (Microns) %	Particle Mass Size Fraction (Microns) %	Particle Mass Size Fraction (Microns) %		
<0.6	0.0	<0.4	9.1	<0.47	52.6	<0.63	2.4	<0.63	2.4	<0.63	5.5
0.6	0.0	0.4	10.1	0.58	1.0	1.0	0.8	1.0	2.9	1.0	4.3
1.0	0.0	0.7	16.2	0.9	0.5	1.25	0.5	1.25	1.4	1.25	3.1
1.6	6.3	1.1	10.1	1.7	2.0	2.0	3.9	2.0	4.8	2.0	6.8
3.2	28.7	2.3	8.1	2.9	3.6	2.5	3.9	2.5	3.8	2.5	1.8
5.0	15.0	3.7	6.0	4.3	1.5	6.0	26.3	6.0	49.9	6.0	33.9
7.3	23.7	5.4	4.8	6.3	1.0	10.0	21.5	10.0	30.6	10.0	22.6
10.8	17.5	8.0	7.4	>12.0	37.8	15.0	23.1	15.0	4.2	15.0	14.7
17.5	8.8	12.9	9.1	—	—	20.0	17.6	20.0	0.0	20.0	7.3
>17.5	0.0	>12.9	19.1	—	—	>20.0	0.0	>20.0	0.0	>20.0	0.0
% Mass Fraction PM ₁₀	% Mass Fraction PM ₁₀		% Mass Fraction PM ₁₀		% Mass Fraction PM ₁₀		% Mass Fraction PM ₁₀		% Mass Fraction PM ₁₀		
87.2 ^a	75.5 ^a		61.8 ^a		59.3		95.8		78.0		

SOURCE: Combustion Engineering, Inc., 1989.

^aApproximation based on linear interpolation.

contain a greater concentration of heavy metals and trace organics. This theory is shared by many state regulatory agencies which require its use on refuse combustion facilities.

Consequently, the information and BACT analysis presented on the fabric filter is adequate and sufficient to determine that it also be BACT in controlling PM_{10} . The fabric filter for the Facility shall be designed and guaranteed to achieve an outlet loading of 0.010 gr/dscf corrected to 7 percent O_2 . This control level is more stringent than the limitation set forth in the recently promulgated NSPS of 0.015 gr/dscf @ 7 percent O_2 . A review of the EPA's BACT/LAER Clearinghouse shows currently permitted particulate control limits for refuse combustion facilities to be in agreement with the proposed control level for the Facility.

4.5 BACT REVIEW FOR TRACE HEAVY METAL EMISSIONS

4.5.1 PROPOSED CONTROL TECHNOLOGY

Lee County proposes that a fabric filter and a dry scrubber be BACT for regulated and non-regulated trace heavy metals. The Facility's fabric filter shall be designed and guaranteed to achieve an outlet loading of 0.010 gr/dscf corrected to 7 percent O_2 . The maximum projected emission rates for these pollutants are listed in Table 4-1 of this document.

4.5.2 COMPLIANCE WITH THE APPLICABLE STANDARDS

The Facility's emissions of regulated heavy metals (e.g., Hg, Pb, Be, and As) shall be below their applicable NAAQS or NESHAPS federal requirements, and pose no adverse potential health risks.

The NSPS require the control of metal emissions from MWCs by limiting particulate emissions to 0.015 gr/dscf @ 7 percent O_2 . The standards conclude that this would ensure good control of metals, and would be a more practical approach than setting individual limits for every metal.

The County's planned material separation program, mandated by Florida's Solid Waste Management Act, may produce a beneficial effect on the amount

of heavy metal emissions emitted from the Facility. Since little data currently exists on whether material separation leads to a demonstrable and quantifiable reduction of trace heavy metal emissions, the projected emissions from the Facility do not recognize any potential benefits.

The Facility will have an additional reagent injection control system, which may further reduce the mercury emissions. The reagent to be used has not been determined, but could be activated carbon, sodium sulfide, or some other compound. Mercury vapor which is not condensed onto particulate matter in the dry scrubber can be adsorbed onto the injected reagent particles, which are removed downstream by the fabric filter. This is an innovative technique currently being developed and tested and for which little reliable data on removal efficiencies exist. Therefore, this additional mercury control system is not being proposed as BACT, and the projected mercury emissions from the Facility do not include any additional reductions beyond what can be achieved by the dry scrubber/fabric filter system alone.

4.5.3 RATIONALE FOR PROPOSED BACT DETERMINATION

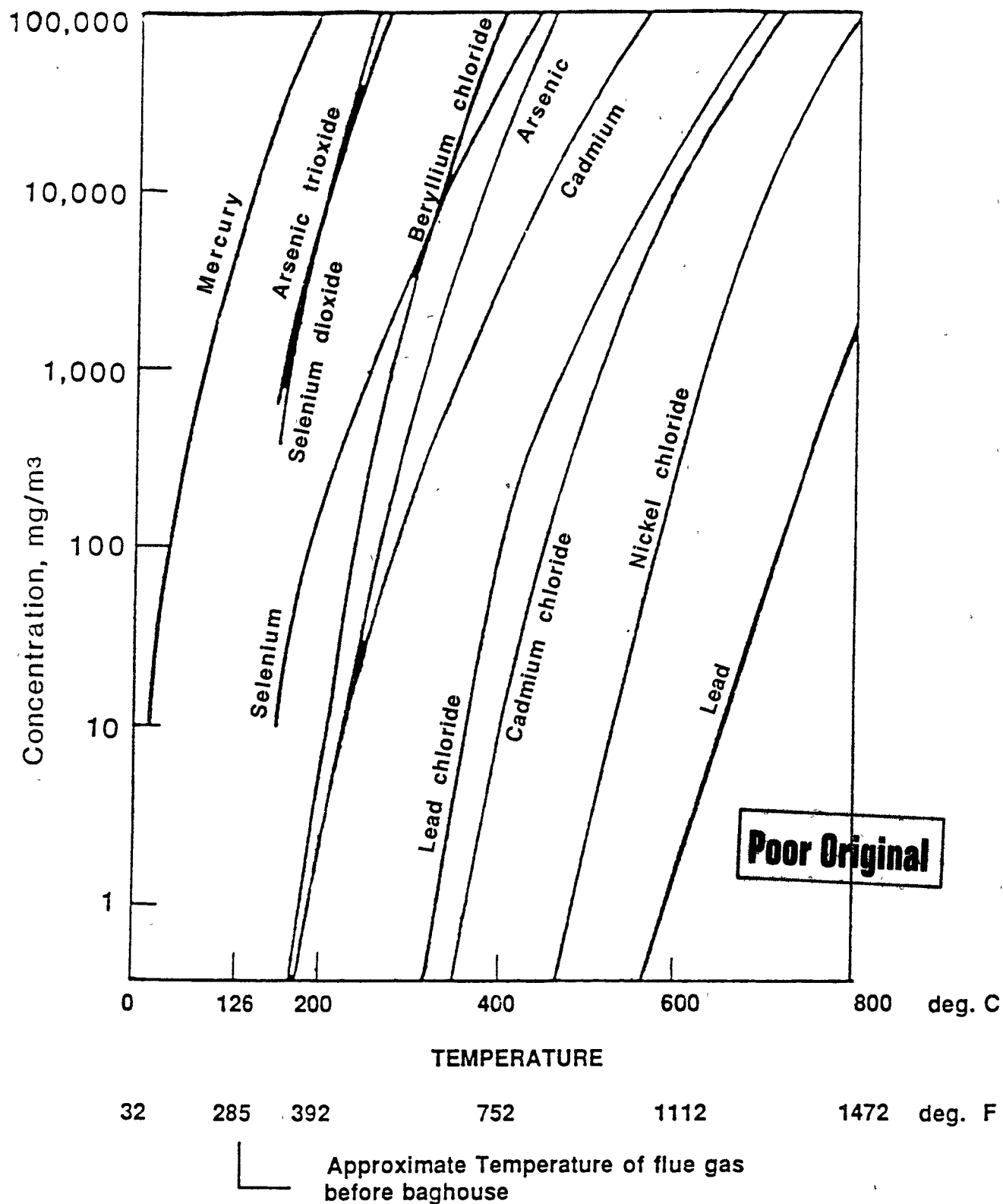
Many metals and metallic compounds are found throughout municipal refuse in various forms. Metals such as silver (Ag), chromium (Cr), lead (Pb), tin (Sn), and zinc (Zn) are used in metallic surface coatings and processes including electroplating, galvanizing, and soldering, and as stabilizers in plastics. Inks and paint pigments used for color on paper, fabric, and plastic substrates may also include such metals as cadmium (Cd), Cr, and Pb. Discarded batteries could be primary sources of mercury (Hg) and may also be a source of Pb, nickel (Ni), and Cd.

The combustion of refuse at the Facility will result in the trace emission of various metals. The quantity and characteristics of these pollutants depend on the composition of the waste, chemical and physical properties of the trace metals, operational features of the combustion process, and performance of the particulate and acid gas control devices. Trace heavy metals and their compounds found in the incombustible (inert) waste fraction may change phase, volatilize in their elemental forms, or form new compounds (e.g., sulfates, oxides, and chlorides) during the combustion

process. These compounds are not, however, destroyed by the combustion process and may leave the furnace as particulate (adsorbed and/or condensed onto fly ash), vapor, or in the bottom ash residue.

The metals and metallic compounds in the flue gas will enter the proposed particulate control device (baghouse) as solids, liquids, or vapors, depending on what temperature the flue gas has been cooled to by the proposed dry scrubber. The vaporized metal portion, if cooled to its saturation temperature, will condense and form a collectible liquid or solid. Figure 4-6 illustrates various heavy metals as they would appear in the flue gas and their relative theoretical concentrations as a function of saturation temperature. The Facility's dry scrubber will be designed to lower the flue gas temperature to approximately 260°F (127°C) before entering the fabric filter. Figure 4-6 suggests that most metal and metal compounds shall have condensed before reaching this temperature and will likely be collected by the Facility's fabric filter. The more volatile Hg, As, and selenium (Se) metal and metal compounds will be more difficult to control at this temperature.

Test data from a slipstream at the Quebec City, Canada, and Marion County, Oregon refuse combustion facilities confirm the arguments that flue gas temperature and an efficient air pollution control system (dry scrubber/particulate control device) are critical in the removal of heavy metals. Test reports from the Quebec City study, discussed earlier in the dry scrubber description of Section 4.3, indicate that over 99 percent removal (with the exception of Hg) of heavy metals [e.g., Zn, Cd, Pb, Cr, Ni, antimony (Sb), and As] by a dry scrubber/fabric filter control system was achieved. These tests indicated that Hg removal was approximately 95 percent, however, a lower percent reduction appears to be a more reasonable based on recent data evaluation. The high Hg removal efficiency data observed from the Quebec City test is believed to be due to the ash having an unusually high carbon content. Mercury is believed to adsorb onto fly ash more readily if it contains carbon. Table 4-11 presents heavy metal removal efficiency test data across the dry scrubber/baghouse system at the Marion County, Oregon refuse combustion facility. The Tsushima, Japan refuse combustion facility is also equipped with a scrubber/baghouse and



SOURCE: Moeller, J.T., Jorgenson, C, And Fallenkamp, F., Feb 1983
 "Dry Scrubbing Of Toxic Incinerator Flue Gas By Spray Adsorption"

LEE COUNTY, FLORIDA
 Energy Recovery Project
 Application for Power Plant Site Certification
 Camp Dresser & McKee Inc

FIGURE 4-6
 SATURATION TEMPERATURE OF
 METAL COMPOUNDS

TABLE 4-11

LEE COUNTY ENERGY RECOVERY FACILITY
INLET AND OUTLET HEAVY METAL EMISSION DATA
ACROSS THE DRY SCRUBBER/FABRIC FILTER AIR POLLUTION
CONTROL SYSTEM AT THE MARION COUNTY FACILITY

Substance	Inlet Concentration ($\mu\text{g}/\text{Nm}^3$)	Outlet Concentration ($\mu\text{g}/\text{Nm}^3$)	Removal Efficiency (percent)
Pb	21,408	25	99.88
Cd	1,170	3.4	99.71
Cr	465	0.2	99.96
Ni	93	3.2	96.56

SOURCE: APCA Paper: Annual Meeting June 21-26, 1987.

^aThese concentrations have been corrected to 12 percent CO_2 and are from testing at the economizer outlet.

NOTE: Average of three tests for TSP were 0.011 and 0.003 gr/dscf at 12 percent CO_2 excluding condensibles for units 1 and 2, respectively, during source testing from December 5, 1987.

has demonstrated a removal efficiency of over 99 percent for a total of 12 heavy metals at a baghouse outlet temperature of about 410°F (210°C) (also with the exception of Hg).

The trace heavy metals from the proposed Facility which are being reviewed include Pb, Hg, Be, and As. The EPA PSD regulated pollutants, Pb, Hg, and Be, are subject to the BACT requirements of the PSD regulations since their maximum projected annual emissions are greater than the PSD significant emission limits. The pollutant As is regulated by the Clean Air Act under the NESHAPS regulations. Thus, under the PSD requirements, any emission is considered significant and subject to the BACT requirements.

Of those metals which are being reviewed, As and Hg are two of the more volatile metals and are more difficult to control after being volatilized by combustion. The volatility of these metals results from the low boiling point temperatures of many of their compounds. As discussed, portions of these as well as other trace metals are expected to condense and/or adsorb onto PM as the flue gas temperature decreases. The dry scrubber will aid in their removal by cooling the gas stream, thus allowing for condensation and/or adsorption to occur. The fabric filter will then be able to remove a portion of these condensed metals.

4.5.4 BACT DETERMINATION

A fabric filter designed with an outlet loading of 0.010 gr/dscf corrected to 7 percent O₂ is proposed as BACT for PM (TSP and PM₁₀), and is proposed as BACT for trace heavy metals from the Facility when used in conjunction with a dry scrubber.

The maximum Pb emission rate from the Facility is estimated to be 6.0×10^{-3} pounds per ton of refuse which equates to 2.0 tpy with 100 percent availability. From the air quality analysis, this emission rate results in an incremental GLC of 0.012 $\mu\text{g}/\text{m}^3$ for a 24-hour average. Since the NAAQS for Pb is $1.5 \mu\text{g}/\text{m}^3$ for a 3-month period, the Facility 24-hour maximum GLC for Pb, being a more conservative measure, is approximately 0.8 percent of the standard. Therefore, the Facility is expected to have a minimal impact on ambient air quality with respect to Pb.

The maximum Be emission rate from the Facility is estimated to be 1.35×10^{-6} pounds per ton of refuse which equates to 4.4×10^{-4} tpy. The resulting incremental GLC of Be from the Facility is estimated to be $2.79 \times 10^{-6} \mu\text{g}/\text{m}^3$ for a 24-hour averaging time. Although no NAAQS exists for Be, the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Be is based on an acceptable concentration of $0.01 \mu\text{g}/\text{m}^3$ for a 30-day averaging period (40 CFR 61.32) for facilities combusting beryllium containing industrial waste, which does not apply to the Facility. Therefore, the Facility is expected to have a minimal impact on ambient air quality with respect to Be since its more conservative GLC, with respect to average time, is substantially less than the NESHAP requirement.

The Hg emissions are typically not well controlled by particulate control devices. As indicated in the recently promulgated NSPS, observed Hg removal efficiencies vary widely among MWCs. The maximum expected Hg emission rate from the Facility is estimated to be 6.0×10^{-3} pounds per ton of refuse which equates to 2.0 tpy of Hg with 100 percent availability. From the air quality analysis, this emission rate results in an incremental GLC of $0.012 \mu\text{g}/\text{m}^3$ for a 24-hour average. The NESHAP for mercury (when co-firing with sludge which is not the case for this Facility) is based on an acceptable concentration of $1.0 \mu\text{g}/\text{m}^3$ for a 30-day averaging period (40 FR 48302, October 14, 1975). The Facility is expected to have a minimal impact on ambient air quality for Hg since its more conservative GLC, with respect to averaging time, is less than the NESHAP requirement.

The maximum As emission rate from the Facility is estimated to be 9.1×10^{-5} pounds per ton of refuse which equates to 3.0×10^{-2} tpy. The pollutant, As, does not have a NAAQS and, although it is regulated by the Clean Air Act under NESHAP, it is applicable only to glass manufacturing plants, primary copper smelters, and metallic arsenic production facilities. The Facility's emission of As is expected to have a minimal impact on ambient air quality, and the control of particulate to 0.010 gr/dscf corrected to 7 percent O_2 is determined to be BACT.

BACT for these heavy metals is a dry scrubber/fabric filter with the fabric filter having a maximum outlet grain loading of 0.010 gr/dscf corrected to 7 percent O_2 .

4.6 BACT REVIEW FOR BY-PRODUCTS OF COMBUSTION (CO, VOCS, NO_x)

As a part of EPA's Report to Congress on the Municipal Waste Combustion Study (EPA, 1987a), a set of combustion strategy elements termed "good combustion practices" were developed to minimize emissions of trace hydrocarbons which include PCDD and PCDF from MWCs. The report identified the components of good combustion practices and made "preliminary recommendations" on the values (i.e., combustion, temperature, overfire air, flue gas oxygen, and CO concentration) of these individual components. The following practices have been reviewed by trade and professional organizations such as the American Society of Mechanical Engineers and the American Boiler Manufacturers Association.

<u>Practice</u>	<u>Mass-Burn Preliminary Target</u>
Design temperature	1,800°F at fully mixed height.
Underfire air control	At least four separately adjustable plenums. One each under the drying and burnout zones, and at least two separately adjustable plenums under the burning zone.
Overfire air capacity	40 percent of total air.
Overfire air injector design	That required for penetration and coverage of furnace cross-section.
Auxiliary fuel capacity	That required to meet start-up temperature and 1,800°F criteria under part-load operations.
Excess Air	6 to 12 percent excess oxygen (dry basis).
Turndown restrictions	80 to 110 percent of design; lower limit may be extended with verification tests.

Practice

Mass-Burn Preliminary Target

Start-up procedures	On auxiliary fuel to design temperature.
Use of auxiliary fuel	On prolonged high CO or low furnace temperature.
Carbon monoxide in flue gas (continuous monitor)	50 ppm on four-hour average corrected to 12 pursuant CO ₂ .
Furnace temperature (continuous monitor)	Minimum of 1,800°F (mean) at fully mixed height across furnace.
Adequate air distribution	Verification test.

Although the combustion optimization strategy recommends preliminary values for carbon monoxide and hydrocarbon compounds, combustion optimization is expected to have little beneficial impact on acid gas and particulate matter emissions, and may increase emissions of NO_x and metals. EPA's recently promulgated NSPS recognizes emission levels for specific pollutants (e.g., CO) that differentiate among combustion technology designs, as opposed to the preliminary levels determined in EPA's 1987 Report to Congress.

4.6.1 BACT DETERMINATION FOR NITROGEN OXIDES (NO_x)

Proposed Control Technology

BACT for NO_x depends, in part, on combustor design. The recently promulgated NSPS recognize this by identifying several different control technology bases for the NO_x emissions limitation, such as use of post-combustion control and/or combustor design. Because the County has chosen a mass-burn stoker waterwall design, it will include Selective Non-Catalytic Reduction (SNCR) flue gas technology, consistent with the NSPS, to remove 45 percent of the NO_x emissions from the flue gas. This control level is based on short-term testing and continuous emission monitoring data from three MWC plants in California with SNCR as indicated

in the proposed NSPS background documents. The recently promulgated NSPS indicate that SNCR at 45 percent NO_x removal is the best demonstrated flue gas control technology for stoker waterwall units.

The County's planned material separation program, mandated by Florida's Solid Waste Management Act, may reduce the amount of NO_x emissions emitted from the Facility. Data to demonstrate any potential benefits is currently limited and not sufficient, thus no adjustment or reduction was made to the Facility's projected NO_x emissions (see Table 4-1).

Compliance with Applicable Emission Standards

The Facility's NO_x emissions will be below the applicable NAAQS/FAAQS requirements, and will meet the final promulgated NSPS requirements for MWCs. The NSPS gives daily average a NO_x emission limitation of 180 ppmdv @ 7 percent O_2 . Properly located and installed NO_x CEMs will comply with the NO_x monitoring requirements established in the NSPS.

4.6.2 EMISSION OF NITROGEN OXIDES

Nitrogen oxides (NO_x) are products of all air-oxidized combustion processes including refuse combustion. The predominant form of NO_x which is produced during combustion is nitric oxide (NO); nitrogen dioxide (NO_2) is also produced in lesser amounts. Upon exiting the stack essentially all of the NO formed during combustion is further oxidized to form NO_2 . The resulting NO_2 is a brownish-red gas which, in the presence of sunlight and hydrocarbons, can react to form ozone (photochemical smog) and other secondary pollutants.

NO_x emissions are classified according to the source of the nitrogen from which the NO_x is formed. Nitrogen from combustion air produces "thermal NO_x ," while that which originates from organically bound components in refuse produces "fuel NO_x ." Though the precise mechanisms involved in converting fuel nitrogen to NO_x are not completely understood, the relative quantities of fuel NO_x and thermal NO_x produced are known to be functions of furnace design, refuse composition, and plant operating conditions.

The two major factors affecting the formation of thermal NO_x are the oxygen concentration present in the combustion zone and the flame temperature. The rate of NO_x formation has been shown to be linearly dependent on the oxygen concentration when temperature is constant. Additionally, NO_x formation tends to increase significantly with increasing temperature (at temperatures approximately above $2,100^\circ\text{F}$) in the presence of O_2 . In addition to these characteristics, NO_x formation increases linearly with increasing residence time at temperatures conducive to thermal NO_x formation (Russell and Roberts, 1984).

The mechanisms involved in the formation of fuel NO_x appear to be very complex and are not yet well understood. Studies have correlated the rate of fuel nitrogen conversion with the fuel oxygen-to-nitrogen ratio (Singer, 1981). In addition, fuel NO_x formation is dependent on underfire and overfire combustion air, total excess air rates, and mixing of the fuel and combustion air (CARB, 1984).

Local combustion conditions in the combustor, specifically how and at what temperature combustion air and refuse are mixed, directly affect the levels of thermal and fuel NO_x produced. NO_x levels from various refuse combustors are given in Table 4-12. The data summarize test results from recently constructed refuse combustion facilities which employ mass-burn stoker waterwall and mass-burn rotary waterwall design (EPA, August 1989). Average NO_x emissions from mass-burn waterwall facilities were approximately 236 ppm corrected to 7 percent O_2 .

Current combustion practices emphasize furnace operation at high temperatures with thorough mixing to minimize emission of organic compounds (PCDD/PCDF). Consequently, NO_x emissions tend to be higher from modern facilities (EPA, May 1987). Also, NO_x is one of the more difficult and expensive pollutants to control from the combustion process because of the low reactivity and low solubility of NO which comprises 95 percent or more of the total uncontrolled NO_x (Brna et al., 1988).

TABLE 4-12

LEE COUNTY ENERGY RECOVERY FACILITY
AVERAGE NO_x EMISSIONS FROM RECENTLY CONSTRUCTED
REFUSE COMBUSTION FACILITIES

Facility ^a	Unit Size, tpd	Test Date	Percent O ₂	NO _x ppm	NO _x ppm @ 7% O ₂
<u>Mass-Burn Rotary Waterwall:</u>					
Gallatin	100	02/81	9.1	124.2	146.1
Kure	165	11/80	12.0	105.6	164.9
<u>Mass-Burn Stoker Waterwall:</u>					
Peekskill	750	11/85	11.7	156.7	236.3
Hampton 2	100	06/88	9.5	194.7	238.6
Marion County 2	275	06/87	9.6	196.9	244.3
Long Beach (deNO _x off)	460	11/88	10.2	52.4	68.2
Commerce (deNO _x off)	300	06/87	10.0	121.0	154.3
Baltimore 3	750	01/85	11.1	136.3	193.7
Baltimore 2	750	01/85	12.1	122.3	193.9
Alexandria	325	12/87	9.4	171.3	207.8
Claremont 2	100	05/87	11.4	144.9	210.2
Peekskill	750	04/85	NR	NR	218.3
Hampton 1	100	06/88	11.0	156.3	219.2
Nashville Thermal	360	NR	10.6	164.0	221.4
Baltimore 1	750	01/85	12.0	141.8	222.0
Millbury 2	750	02/88	10.5	169.3	225.7
Millbury 1	750	02/88	10.3	177.5	233.7
Claremont 1	100	05/87	12.2	161.0	258.8
Wurzburg	330	12/85	NR	NR	260.7
Marion County 2	275	09/86	10.6	211.8	284.9
Pinellas County	1,000	02/87	9.2	240.8	285.7
Stanislaus 1 (deNO _x off)	400	12/88	NR	NR	297.0 ^b
Stanislaus 2 (deNO _x off)	400	12/88	NR	NR	304.0 ^b
Quebec City	250	03/85	11.6	205.4	314.0
Tulsa 1	375	06/86	9.2	308.5	367.7
Tulsa 2	375	06/86	8.6	328.2	372.2

SOURCE: EPA NSPS Background Document, Control of NO_x Emissions, August 1989.

^a The number following the site name indicates the combustor train number. It is provided if different combustor trains were evaluated as part of the same test. (Presume data from the other combustor trains were not available to report.)

^b ppm NO_x at 12 percent CO₂.

NR = Not Reported

4.6.3 DESCRIPTION OF NO_x CONTROL TECHNIQUES

Emissions of NO_x from refuse combustion can potentially be reduced by three methods: reducing the refuse nitrogen content (material separation); minimizing the quantity of NO_x produced during combustion (combustion modification); and reducing the quantity of NO_x in the post combustion flue gas stream (flue gas controls).

Table 4-13 is a summary of the potential NO_x control techniques which may be used at refuse combustion facilities. The information also presents the current status and the projected control efficiency of each method.

Summarizing, since current EPA or other data on material separation is not sufficient, combustion modifications and flue gas controls for minimizing NO_x emissions were the only NO_x controlling methods evaluated. Each method was evaluated using "top down" BACT methodology. A comprehensive description and technical evaluation of each technology is presented in the following paragraphs.

Flue Gas NO_x Controls

Flue gas controls appear to offer the greatest potential for reducing NO_x emissions from combustion processes, though their application on refuse combustion facilities has been limited. The controls which have been applied to combustion processes are selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR). The SNCR process involves the intimate contact of a nitrogen containing reagent such as ammonia (NH₃) or urea with flue gas NO_x in the boiler through the use of injectors located in the boiler's wall. Like SNCR, the SCR technology also injects NH₃ into the flue gas, however, the reaction of NH₃ with NO_x occurs at a lower temperature and is enhanced by using a catalyst bed.

SCR - The SCR process reduces NO to water and elemental nitrogen by injecting anhydrous NH₃ into the flue gas and then passing the flue gas through a catalyst bed. The function of the catalyst is to effectively lower the activation energy of the NO in its decomposition reaction to N₂.

TABLE 4-13

LEE COUNTY ENERGY RECOVERY FACILITY
ALTERNATE NO_x CONTROL TECHNIQUES

Control Method	Percent Reduction	Status
<u>Flue Gas Controls:</u>		
1) Selective catalytic reduction	25-80	Not yet applied successfully on a refuse combustion facility in the U.S., and significant technical disadvantages associated with application.
2) Selective non-catalytic reduction (SNCR, for example Thermal DeNO _x)	30-50	Somewhat successful, but with limited application, as explained in text.
3) Wet flue gas denitrification (FGDn)	Unknown	Not yet applied successfully to refuse combustion facility.
<u>Combustion Modification:</u>		
1) Staged combustion/low excess air	30-60	Effective. The percent reduction values in the high end of the range represent those of a mass-burn rotary waterwall combustor.
2) Gas (pilot program) reburning	10-60	Has shown considerable promise on pilot programs. Not yet applied to a full-scale refuse combustion facility.
3) Flue gas recirculation	10-20	Somewhat effective.
Material Separation	Unknown	Not demonstrated.

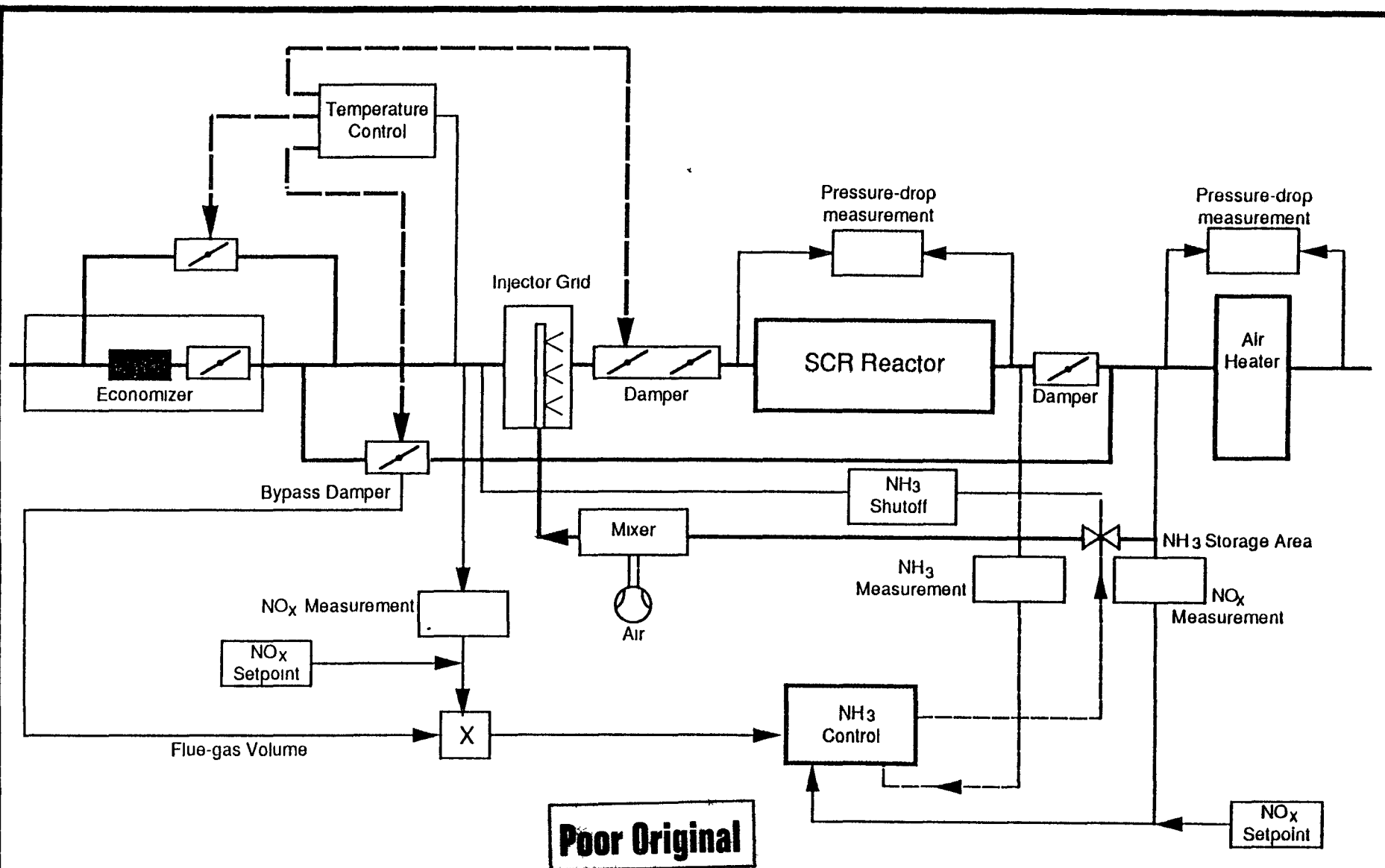
This lower energy allows the reaction to proceed in a lower and broader temperature range than would otherwise be possible. The optimum temperature for NO_x reduction using SCR is between 288 and 399°C (550 and 750°F) (Hahn, 1986). Lower temperatures yield slow reaction rates; higher temperatures result in a shortened catalyst life.

In a typical SCR system, anhydrous NH_3 is injected into the flue gas stream and allowed to pass through a catalyst bed located, depending on the application, just downstream of the economizer or after the air pollution control equipment. Figure 4-7 presents a typical SCR process which would likely be applied on a fossil fuel boiler. Important parameters for successful NO_x removal using the SCR technology include adequate mixing of the flue gas with NH_3 , as well as control of the NH_3 injected based on inlet NO_x concentration and removal rate (Makansi, 1988).

Currently, there is considerable worldwide commercial experience with SCR technology on oil, gas, and coal-fired boilers. Depending on the application, removal efficiencies of up to 90 percent have been achieved (Makansi, 1988). SCR experience on refuse combustors, on the other hand, is extremely limited with no applications in the United States.

Application of SCR technology to refuse combustors is difficult mainly due to the acid gas content and relatively high particulate grain loading of the flue gas. These flue gas components erode the catalyst and substrate material as well as poison or blind the catalyst rendering the bed ineffective for NO_x removal. If these problems are to be avoided, then the SCR reactor must be located downstream of the air pollution control equipment, however, the gas is then below the optimal SCR temperatures. Therefore, SCR operation with the catalyst bed after the pollution control equipment would have significant economic disadvantages since it would require reheating of the flue gas prior to entering the bed (Radian, 1989).

Although there are no refuse combustors in the United States which employ SCR technology, it is currently being used to control NO_x emissions from two refuse combustors in Japan and is being installed at a facility in West Germany. The Tokyo-Hikarigaoka facility was retrofitted with an SCR system



Makansi, J *Reducing NO_x Emissions* Power September 1988

LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Site Certification
Camp Dresser & McKee Inc

FIGURE 4-7
SCHEMATIC OF A TYPICAL SCR PROCESS

designed to achieve a NO_x removal efficiency of 51 percent. The system, operating since December of 1986, has not always been able to meet its design removal efficiency. Test data (see Table 4-14) show control efficiencies ranging from 25 to 57 percent. The Twatsuki refuse combustor was equipped with SCR technology in February of 1987. This system was designed for a control efficiency of 80 percent but has performed with an average efficiency of 77 percent (Mitsubishi, 1987). The first West German SCR installation associated with a refuse combustor is currently under construction on the Martin Munich-South plant.

The SCR technology currently offers the greatest potential for controlling NO_x emissions from refuse combustion facilities; however, its application has been limited due mainly to technical difficulties. A more detailed discussion of the technical disadvantages associated with the SCR technology are presented as follows.

- o Emission of Unreacted NH_3 - A small amount of residual ammonia will be emitted as the result of SCR operation. This "ammonia slip" is likely to increase over time as the catalyst loses activity, thus increasing quantities of NH_3 must be injected into the boiler to maintain the desired NO_x removal. If the SCR system is installed downstream of the air pollution control (APC) system, the APC system cannot be relied on to remove residual NH_3 .
- o Potential for Undesirable Side Reactions - The catalyst used to enhance the conversion of NO to nitrogen and water tends to convert SO_2 to SO_3 which may further react with residual NH_3 and water to form ammonium bisulfate and ammonium sulfate. These solids can foul and plug downstream equipment (if the catalyst is installed upstream of pollution control equipment) or create a blue haze plume (Makansi, 1988). Also, in refuse combustion applications there exists the potential for ammonium chloride formation which is difficult to remove with current air pollution control technologies and has caused a visible plume (Russell and Roberts, 1986).

TABLE 4-14

LEE COUNTY ENERGY RECOVERY FACILITY
OBSERVED CONTROL EFFICIENCY ASSOCIATED WITH SCR
INSTALLATIONS AT TWO REFUSE COMBUSTORS IN JAPAN

Facility	Reactor Inlet Temp (°C)	No. Emissions (ppm) ^a		Removal Efficiency(%)
		Inlet	Outlet	
Twatsuki	196	123	30.2	75.4
	198	129	25.6	80.2
	204	129	29.4	77.2
	198	195	38.0	70.2
	202	173	26.2	84.9
	205	138	41.2	70.2
	202	110	15.0	86.4
	205	100	16.0	84.0
	200	130	30.0	76.9
	207	120	45.0	62.5
	200	160	36.0	77.5
	203	130	29.0	77.7
Tokyo-Hikarigaoka	248	96	63.0	34.4
	248	95	47.0	50.5
	246	106	79.0	25.5
	244	104	60.0	42.3
	245	93	42.0	57.1
	246	101	47.0	53.5

SOURCE: Mitsubishi, 1987.

^aCorrected to 12 percent CO₂.

- o Poisoning and Degradation of the Catalyst by Particulate - Particulate matter in the flue gas generated by refuse combustors will erode the catalyst and substrate material. In addition, constituents of particulate matter, particularly the metals, may poison the catalyst. Both catalyst erosion and poisoning dramatically reduce the life of the catalyst resulting in lower NO_x removal efficiencies and high catalyst replacement costs. These problems are avoided if the catalyst bed is installed after the pollution control equipment; however, flue gas reheating is necessary at a significant economic disadvantage.
- o Disposal of Toxic Catalysts - Most of the catalysts which are currently available for SCR applications are made of various metals including copper, chromium, nickel, molybdenum, cobalt, platinum, and vanadium, and may be considered hazardous waste (Makansi, 1988).
- o High Cost of SCR Technology - Both initial capital cost and annual operating costs for SCR technology are high. The available catalysts are extremely expensive, and when replaced can cost 50 percent or more of the initial total capital cost (Russell and Roberts, 1986). In addition, because the application of SCR on a refuse combustor requires locating the catalyst bed downstream of the air pollution control system, reheating of the flue gas stream is required. This reheat is a significant economic disadvantage and can account for as much as eight percent of the heat released from the furnace (Clarke, 1989).

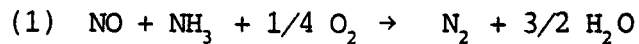
Currently, new and improved catalysts are being studied to remedy the major disadvantages of applying the SCR technology to refuse combustors. Until the time when such catalysts are introduced, SCR will remain a very impractical and expensive NO_x control method for refuse combustors.

In conclusion, due to the significant disadvantages, the SCR technology can not be considered as a viable means of controlling NO_x emissions from refuse combustors. Therefore, in accordance with the "top down" BACT

methodology, the technology is determined not to be feasible on MWCs and no further analysis on this technology was performed.

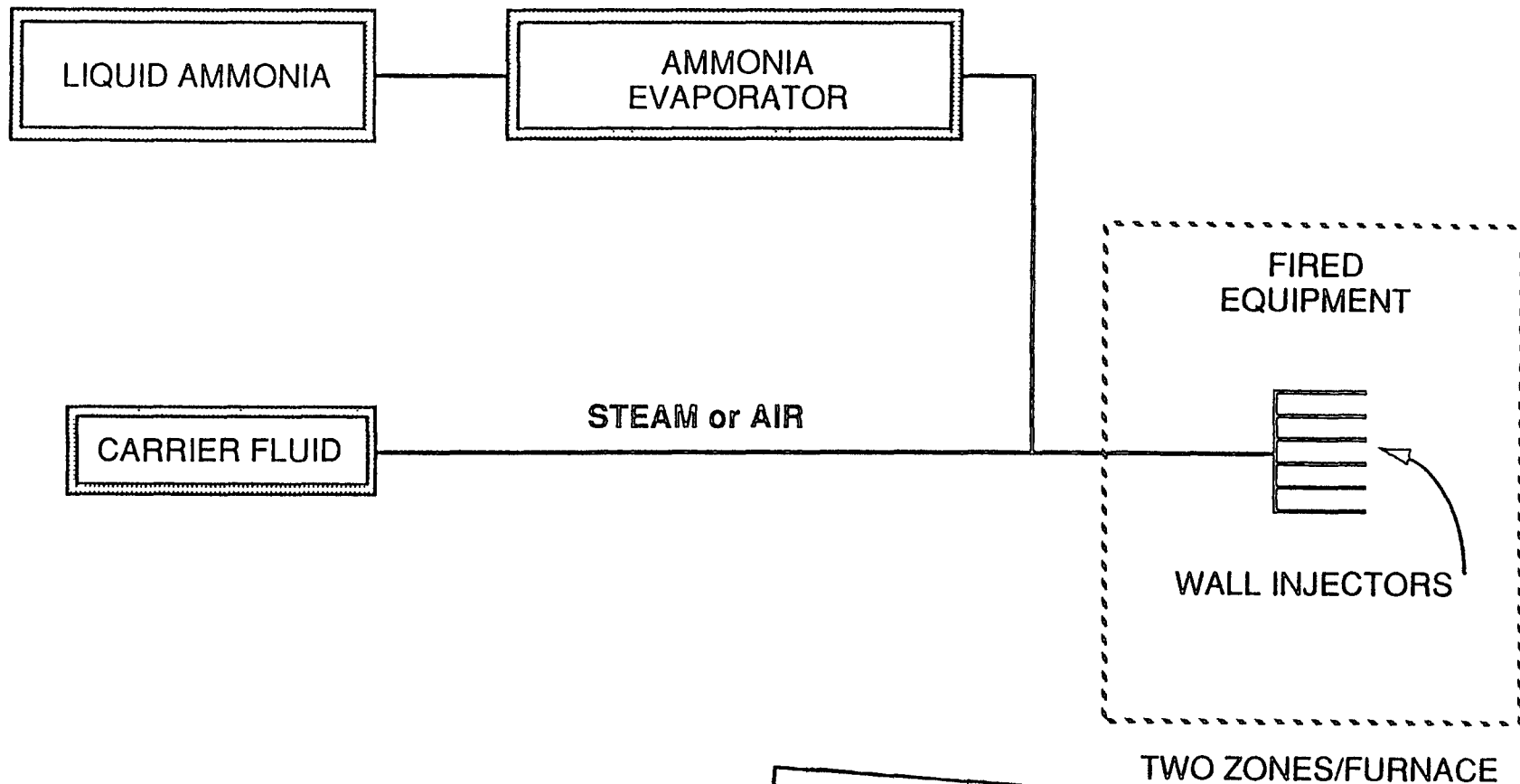
SNCR - The SNCR technology is currently the only other commercially available NO_x flue gas control technology. The process involves the contact and reaction of flue gas NO_x with NH₃ or another nitrogen based compound such as urea. Currently, commercially available SNCR processes are offered by Exxon and Fuel Tech under the tradenames of "Thermal DeNO_x" and "NOxOUT," respectively. The proposed NSPS technical support document on NO_x identifies these SNCR processes; however, the EPA focused only on Thermal DeNO_x.

In Exxon's Thermal DeNO_x process, anhydrous NH₃ is injected into the hot flue gas with either air or steam acting as a carrier gas (see Figure 4-8). The following two reactions govern the NO_x control process:



Critical to the success of the SNCR process is the prevailing flue gas temperature at the point of NH₃ injection. Over the optimum temperature range of approximately 870 to 980°C (1,600 to 1,800°F), the first reaction dominates and NO is reduced without any further NO production. At temperatures above 980°C (1,800°F), the second reaction becomes more significant, and at temperatures above 1,200°C (2,200°F), the second reaction dominates creating more NO than is reduced. In addition, at flue gas temperatures below 870°C (1,600°F), the rate of both reactions slows down such that NH₃ does not react, and instead passes through the system and potentially into the ambient atmosphere.

Fuel Tech's NOxOUT is a relatively new technology in which urea, instead of NH₃, is fed to the boiler as a 50 percent-by-weight solution cut with water to maintain the required volumetric flow rate to give adequate distribution across the boiler. NO_x control is affected using essentially the same net chemistry as Exxon's Thermal DeNO_x. The overall reaction between urea and NO can be expressed as follows:

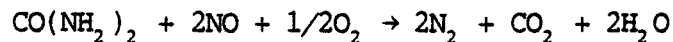


Poor Original

Makansi, J Traditional Control Processes Handle New Pollutants.
Power October, 1987.

LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Site Certification
Camp Dresser & McKee Inc

FIGURE 4-8
GENERAL SCHEMATIC OF THE THERMAL DeNO_x PROCESS



The NOxOUT reaction takes place at a temperature range similar to that of Thermal DeNO_x (i.e., approximately 870 to 980°C); however, NOxOUT's technology manufacturer claims to be able to expand the temperature range to 700°C (1,300°F) with the use of a proprietary urea additive.

While the chemistry of the urea reaction with NO_x is not understood as well as the NH₃ reactions, some experts feel that the mechanics of the urea injection process may have some advantages over NH₃ injection. Urea/water injection parameters such as droplet size and concentration can be more easily matched to furnace temperature, thus this method may have better load-following capability.

The manufacturer of the NOxOUT technology claims to achieve NO_x removal efficiencies similar to, if not greater than, those achieved by Exxon's Thermal DeNO_x process, and to operate at a wider flue gas temperature range without effecting efficiency. To date, the NOxOUT process has been only tested on a limited number of MWCs worldwide. The Millbury, MA mass-burn stoker waterwall combustor was tested in August of 1989 for only one week with the NOxOUT technology and obtained removal efficiency results comparable to the Thermal DeNO_x process. The purpose of the test was to determine overall NO_x removal efficiencies, and no data was obtained to support the manufacturer's claim of being able to operate over a wider flue gas temperature range without effecting efficiency. Claims made by the NOxOUT manufacturer can not be supported without long-term operating data on full-scale and representative MWCs. Since Fuel Tech's NOxOUT technology has not been installed and proven on a refuse combustor and only limited short-term data exists, the remainder of the SNCR analysis concentrates on Thermal DeNO_x.

Thermal DeNO_x has been commercially applied to both utility and industrial boilers burning fuels such as wood waste, oil, coal, and used tires. Virtually all of the installations are located in the United States (California), Japan, and West Germany. The process was installed on an oil-fired utility boiler rated at 230 MW in Los Angeles, California during

1985 and showed varying removal efficiency with boiler load. NO_x concentration reductions from 28 to 45 percent were observed at 160 MW, while higher efficiencies of 30 to 53 percent were observed at the maximum boiler load of 230 MW (ESA, 1986). Below 160 MW, temperatures at the NH_3 injection zones were too low to support the NH_3 -NO reaction, and resulted in unacceptably high ammonia emissions. Therefore, NH_3 was injected into the boiler at loads above 160 MW.

Thermal DeNO_x has been installed on several refuse combustion facilities in Japan and recently on three facilities in southern California—Commerce, Stanislaus, and Long Beach. All three California facilities are located in nonattainment areas for NO_2 and/or ozone and Thermal DeNO_x represents lowest achievable emission rate (LAER) technology. The Commerce facility was the first U.S. refuse combustor installation to use the SNCR technology and was permitted as an "Innovative Technology."

In many applications, and especially refuse combustion, the major limitation of the SNCR technology is the fact that the chemistry works well only in a very narrow temperature range. While the chemistry is capable of achieving very high NO_x reductions at its ideal optimum temperature, in application it must be used on a flue gas whose temperature varies. In practice, flue gas temperature variations make the NO_x reduction that the SNCR technology can provide significantly less than could be achieved at optimum temperatures.

The adverse effect of temperature variations on NO_x removal is of particular concern in the application of SNCR on refuse combustion. The BTU content of refuse is far more variable than that of fossil fuels. If a fossil fuel fired unit is operated at a constant fuel rate, then the rate at which heat is released is also constant, and the temperature in the unit is more uniform than that observed from refuse combustors. A refuse combustor operated at a constant feed rate will have a variable rate of heat release, and therefore the temperature at any given point will vary considerably. In short, temperature variations will adversely affect the NO_x reduction achieved by the SNCR process.

The BTU content of refuse varies from one ton to the next, and even within a single ton of refuse there are regions of varying BTU content. Thus, when the refuse burns, it does not produce a combustion gas of uniform temperature, but rather a random mixture of hot and cool gases. As combustion gases pass the point at which NH_3 or other nitrogen containing reactant is injected from the SNCR process, temperature variations from one point in the injection plane to another continuously occur.

The composition of the gas stream also determines the effectiveness of the SNCR process. 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/NH_3 reaction temperature range. The CO interference adversely effects the NO_x percent reduction that would have otherwise been expected. Further, the presence of injected NH_3 in the combustion gas can retard and/or inhibit the final oxidation of CO to CO_2 , thereby potentially leading to increased CO stack emissions. This phenomenon occurs because the critical step in CO oxidation, $\text{CO} + \text{OH} \rightarrow \text{CO}_2 + \text{H}$, is retarded because NH_3 competes effectively for OH via the reaction $\text{NH}_3 + \text{OH} \rightarrow \text{NH}_2 + \text{H}_2\text{O}$ (Lyon, 1987).

Although the SNCR technology was installed, due to nonattainment conditions, at three refuse combustion facilities in California, the technology presents several environmental and technical disadvantages for use on a refuse combustion system. These disadvantages are as follows.

- o Residual NH_3 or other nitrogen containing reactant may react with acid gases in the boiler to form by-product ammonium salts. Two of the salts formed, ammonium sulfate and ammonium bisulfate, could potentially cause fouling and corrosion problems in the boiler. A third salt, ammonium chloride, forms a visible blue-white plume downstream of the facility stack and has been witnessed at all three facilities in California (EPA, August 1989). The formation of a visible ammonium chloride plume has also been reported at Japanese refuse combustion facilities, particularly at the Kawasaki facility.

- o The process inhibits and/or halts the oxidation of CO emissions. During testing at the Commerce facility, increased CO emissions were observed during operation of the Thermal DeNOx system.
- o Residual reactant emissions (ammonia or other nitrogen containing compounds) are emitted as a result of the SNCR process.
- o Achieving and maintaining the required reaction temperature is difficult in refuse combustion applications. If the temperature range is not maintained, then efficiency is effected.
- o Storage of large amounts of anhydrous ammonia, which is a hazardous substance, on the site.

Wet Flue Gas Denitrification (FGDn) - FGDn systems may be divided into at least four major process systems: (1) absorption-reduction, (2) oxidation-absorption, (3) absorption-oxidation, and (4) oxidation-absorption-reduction (OAR). Absorption-reduction has only been bench-scale or pilot-scale tested on emissions from oil-fired units. Oxidation-absorption and absorption-oxidation are even less developed than absorption-reduction. Therefore, OAR, a derivative of an already established flue gas desulfurization system, shall be the only FGDn technique examined further.

OAR operates by injecting oxidizing agents such as ozone (CARB, 1984) into the flue gas upstream of wet scrubbers. The relatively insoluble NO oxidizes to the more soluble NO₂ which, when in solution, reduces to N₂ by consuming some of the absorbed SO₂.

It is possible to modify conventional flue gas desulfurization systems that use water soluble SO₂ absorbents by adding oxidizing agents which circulate with the scrubber fluid. Simultaneous NO_x and SO₂ removal efficiencies as high as 90 percent may be achieved (CARB, 1984). Such modified flue gas desulfurization systems may be applicable to refuse-fired boilers (Beaumont, 1986). For example, a municipal refuse/sewage sludge combustor at the Krefield Plant in West Germany is equipped with a two-field ESP upstream of a multi-stage acid gas wet scrubbing tower. As reported by

Beaumont, test results have shown 97.0 percent SO_2 removal and 63.9 percent NO_2 removal using Na_2CO_3 as the reagent. Other performance data are scarce because few commercial scale refuse-fired boilers are equipped with these systems.

Disadvantages of these systems stem from the cost of the oxidizing agents, wastewater treatment associated with wet scrubber effluent, and flue gas reheat requirements. The oxidation-absorption-reduction processes have not been demonstrated on a wide-scale to be technically reliable nor economically sound, and therefore cannot be considered BACT.

Combustion Modifications

Combustion modification techniques can be used to reduce the conversion rate of fuel nitrogen to NO_x and suppress thermal NO_x formation as well. Three methods—staged combustion/low excess air, flue gas recirculation (FGR), and natural gas reburning—are means to reduce NO_x emissions.

Staged Combustion/Low Excess Air - These techniques may be used separately or together to control NO_x emissions. During staged combustion, air and fuel mixtures are combusted in two separate zones. In one zone, the fuel is fired with less than a stoichiometric amount of air thereby preventing the oxidation of fuel bound nitrogen. This creates a fuel rich local zone in the regions of the primary flame. The second zone is an air rich zone where the remainder of the combustion air is introduced to complete the combustion of the fuel. The heat in the primary flame zone is not as intense as with normal firing because combustion is incomplete. The air mixed with fuel is sub-stoichiometric in the NO_x forming region of the flame, thus creating a low NO_x condition (Joseph and Beachler, 1981).

Similar to staged combustion, combustor operation at low excess air reduces the oxygen available in the NO_x forming region of the flame, thereby inhibiting the formation of thermal NO_x .

Staged combustion reduces NO_x emissions by a combination of several factors. First, a lack of available oxygen for NO_x formation in the fuel

rich stage is due to off-stoichiometric firing. Second, the flame temperature may be lower in the first stage than with single-stage combustion. Third, the peak temperature in the second stage (air rich) is lower. This slow combustion air and fuel (refuse) mixing process assists in converting fuel bound nitrogen to molecular nitrogen rather than NO_x .

A mass-burn rotary waterwall design incorporates staged combustion techniques along with low excess air to achieve NO_x emissions which are much lower than those from a mass-burn stoker waterwall design. The overfire air in the rotary combustor enters with very low radial velocity and slowly mixes with hot fuel gases coming up from the burning bed. The volatile fuel fragments, including volatile fuel nitrogen components, are driven from the bed early—near the entrance to the barrel—and then must flow down the barrel toward the radiant chamber. The overfire air mixes slowly and the more slowly evolving fuel fragments are constantly being added to the gases, giving an opportunity for the fuel-bound nitrogen to be converted to N_2 .

The County has selected a vendor which designs and builds stoker waterwall combustor systems, rather than rotary waterwall combustor systems. Therefore, the inherent NO_x -reducing features of the rotary waterwall design will not be incorporated into the proposed Facility.

FGR - In FGR, a portion of the flue gas stream is extracted and returned to the furnace. The system consists of an FGR fan assembly, air apportioning and mixing system, and necessary ductwork. Because the recirculated flue gas is relatively cool, the bulk furnace temperature decreases, resulting in a reduced thermal NO_x formation. FGR reduces NO_x emissions by lowering the flame temperature and reducing available oxygen. Although FGR is a technique designed to reduce thermal NO_x , the system can also aid in slightly reducing fuel NO_x by providing a means of staging the combustion process.

To date, FGR has been employed on a limited basis on refuse combustion facilities in the United States; however, FGR has been applied on refuse combustion facilities in Japan and Europe by ducting cool flue gas from a

point after the air pollution control device back to the underfire air fan. Results from tests conducted at the 660-tpd Volund refractory wall furnace at the Kita refuse combustion facility in Japan indicated that 10 to 25 percent NO_x emission reductions were achievable (Radian, 1989). This level of NO_x reduction was achieved by recirculating an amount of flue gas equivalent to 20 percent of the combustion air. Other full-scale applications of FGR technology include the Copenhagen Amager and Copenhagen West facilities, where flue gases from 293 to 349°C (560 to 660°F) are recirculated to the furnace from the exit of the ESPs with successful results (Clarke, 1989).

The disadvantages of using FGR technology for controlling of NO_x emissions from refuse combustion facilities include the following.

- o Recirculation of the cooled flue gas stream reduces the boiler efficiency by decreasing the furnace gas temperature, and could cause unstable combustion.
- o Reduced flame temperature and dilution of available oxygen may result in conditions which are conducive to higher emissions of incomplete combustion.

Little data is available to support that FGR will substantially improve NO_x control when used in conjunction with the proposed combustion technologies. Thus, FGR is not considered BACT for this Facility.

Natural Gas Reburning - Gas reburning is a NO_x control technique that overlaps combustion modification techniques. Low excess air (LEA) is provided at the combustor grate, 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.

Natural gas reburning is a new technology being evaluated by the Gas Research Institute for possible use on refuse combustors. The goal of gas

reburning is to achieve up to 75 percent NO_x reduction. To date, most of the data on natural gas reburning are for pulverized coal-fired boilers. (Radian, 1989).

Gas reburning has achieved 10 to 60 percent reduction of NO_x emissions on a pilot facility. This new technique has not been demonstrated on a full-scale refuse combustor at this time. Although the technology is promising, it can not be considered as BACT.

4.6.4 EVALUATION OF NO_x CONTROL TECHNIQUES

The NO_x control techniques discussed earlier indicate that the SCR technology can be considered the "top" control method; however, it is not considered to be a viable BACT alternative. An evaluation of the SCR technology revealed that it has not been applied and demonstrated successfully on a refuse combustion facility in the U.S., and its application presents significant technical and economic disadvantages as stated in the proposed NSPS. Hence, the SCR is not considered BACT.

The application of SNCR can be considered the next "top" or most stringent NO_x control technique. The SNCR thermal DeNOx technology has been operating on several refuse combustion facilities in Japan and on three in Southern California. As discussed in the SNCR description above, the technology has certain operating limitations and the potential for operating problems, such as temperature variability sensitivity, formation of corrosive salts, and increased CO emissions. However, the technology has been shown to achieve approximately 45 percent reduction on refuse combustors. The technology has also been determined by the EPA, as discussed in the NSPS, to be the best demonstrated technology for meeting the NSPS NOx emission level of 180 ppmdv (24-hour average). SNCR is determined to be BACT for NOx emissions from the proposed Facility.

[NOTE: Eleven pages of material have been deleted here.]

4.6.5 BACT DETERMINATION FOR NO_x

The analysis presented on the different NO_x control techniques and technologies indicates that SCR has the potential of achieving LAER, however, its application on MWCs has significant operating and economic disadvantages. As stated in this analysis and reiterated in the recently promulgated NSPS, the performance of SCR technology on MWCs, as opposed to oil or gas fired combustors, is detrimentally effected by catalyst "poisoning." The flue gases from MWCs contain acid gases, metals, and high particulate loadings which poison the expensive catalyst causing it to be less effective and to require frequent replacement. SCR technology is not considered BACT.

As concluded by EPA in issuing the final NSPS (see Federal Register, February 11, 1991, p. 5490), SNCR or achievement of NO_x emission levels comparable to the use of SNCR represents best demonstrated technology for reducing NO_x emissions. The evaluation of the different NO_x control techniques and technologies presented herein concurs with the NSPS conclusion. The County has decided that for its mass-burn stoker waterwall design, the best demonstrated technology, SNCR, would be installed at the LAER emission control level of 45 percent.

In accordance with the "top down" BACT methodology established by an EPA draft memorandum in December 1987 and May 1989, since the proposed Facility shall implement "top" determined NO_x control techniques and no outstanding issues regarding collateral environmental impacts exist, no further analysis is required. As stated, these NO_x control techniques, as they apply to the specified combustor design, are determined to be BACT.

The Facility's NO_x emissions will be below the applicable NAAQS/FAAQS requirements, and will meet applicable final promulgated NSPS requirements for MWCs. The Facility's NO_x emissions will be monitored through the use of properly located and installed CEMs.

4.6.6 BACT DETERMINATION FOR CARBON MONOXIDE (CO)

Proposed Control Technology

As discussed in Section 4.1 under Pollutant Applicability, the Facility will have a mass-burn stoker waterwall design consisting of three units each of 600 tpd.

The combustors will be designed to minimize CO emissions. In agreement with the recently promulgated NSPS, the BACT emission rate for a mass-burn stoker waterwall design is 100 ppm_{dv}, corrected to 7 percent O₂ and based on a four-hour block average as measured by CEMs. Table 4-1 lists the CO emission concentration and its respective tpy emission rate.

The Facility's combustor design shall have a combustion air control system which provides the necessary oxygen and turbulence to allow the combustible gases to mix thoroughly with oxygen and prevent stratification of the unburned gases. In addition to combustion air control, furnace temperatures will be maintained at a minimum of 1,800°F to provide for optimum burn-out of combustion gases.

The Facility shall be equipped with properly located thermocouples and CEMs for CO and O₂ to monitor and record the combustion conditions for optimizing combustion efficiency and ultimately controlling CO.

Compliance with Applicable Emission Standards

The Facility's CO emissions, regardless of which combustor technology is selected, will be below the applicable NAAQS/FAAQs requirements and shall meet the recently promulgated NSPS requirements for MWCs.

Rationale for Proposed BACT Determination

Carbon monoxide (CO) is formed by incomplete oxidation of carbon compounds during combustion. The source of carbon compounds during combustion are the refuse, pyrolysis products formed near the fuel bed, or intermediate

combustion products. The emission of relatively high concentrations of CO is largely dependent on the underfire air dispersion to the combustor, the underfire/overfire air ratio, the design of the overfire air jets, and furnace combustion temperature. Careful operation of the furnace is essential to maintain good combustion conditions. Thus, furnace operators will be fully trained to avoid potential combustion problems. A low CO concentration is a good indication that the furnace is achieving a high combustion efficiency, while a high CO concentration may indicate poor combustion and a potential increase in the level of trace organic emissions.

Specific add-on technologies for controlling CO in the flue gas have not been incorporated into any present-day refuse combustion designs. CO emissions are controlled in modern refuse combustion facilities using commonly employed combustion control measures (i.e., control of the combustion air to obtain a furnace temperature high enough to achieve a good burn-out of volatilized hydrocarbons, optimal placement of the overfire air grates jets, the use of high-pressure air to promote good mixing, and turbulence of unburned furnace gases with overfire air). Using these control measures, while continuously monitoring CO and O₂ to ensure good combustion, provides adequate control of CO, and no additional controls are normally employed. In addition, oxidation of CO to CO₂ increases the heat released by combustion; thus allowing CO to exit the combustion system is a loss of energy. Economically, a modest incentive exists to maintain CO at a minimum.

BACT Determination

Since no add-on CO control technologies have been incorporated into present-day refuse combustion facilities, the combustors' design and combustion control techniques are determined to be BACT for CO emissions.

4.6.7 BACT DETERMINATION FOR VOLATILE ORGANIC COMPOUNDS (VOCs)

Proposed Control Technology

The mass-burn technology proposed for the Facility shall be designed to minimize emissions of VOCs. The combustor's combustion air control system

will provide the necessary oxygen and turbulence to allow the combustible gases to mix thoroughly with oxygen and prevent stratification of the unburned gases. In addition to combustion air control, the furnace will be designed to maintain the combustion temperature at a minimum of 1,800°F to provide for optimum burn-out of organic compounds in the combustion gases.

The Facility shall be equipped with properly located and mounted thermocouples and CEMS to monitor and record the combustion conditions for optimum combustion efficiency and ultimately VOC control.

4.6.8 COMPLIANCE WITH APPLICABLE EMISSION STANDARDS

The Facility's combustor design and operation is proposed as BACT. Because the area in which the Facility is to be located is in attainment of the ambient air quality standards for ozone, an emission limitation more stringent than BACT is not warranted.

Rationale for Proposed BACT Determination

Like carbon monoxide, VOCs are the products of incomplete combustion and consist of a wide variety of organic compounds. The furnace combustor and combustion air control systems of modern refuse combustion facilities are designed to maintain elevated oxygen levels, and therefore provide for a near complete burn-out of combustible organic compounds, thus limiting the formation of VOCs. As discussed in the BACT determination for CO, VOCs will be controlled by ensuring that adequate excess air and furnace temperature are maintained, and overfire air jets are properly located to produce adequate mixing of overfire air (O_2) with VOCs.

BACT Determination

Based on the design and past operation of mass-burn combustor technologies, the Facility will emit a maximum (100 percent availability) of 69 tpy of VOCs. The proposed tpy emission rate is conservatively based on a maximum hourly average concentrations of 37.3 ppm_{dv} of non-methane hydrocarbons (NMHC) expressed as CH_4 corrected to 7 percent O_2 .

Since no add-on control system to reduce VOC emissions is currently available or has been incorporated in a refuse combustion facility, it is proposed that good furnace design and combustion control be employed at the Facility for the control of VOCs.

4.7 BACT REVIEW FOR TRACE ORGANIC COMPOUNDS

There are a number of organic compounds which have been measured in the flue gas from refuse combustion facilities as a result of incomplete or inefficient combustion of carbon compounds. Compounds measured include dioxins, furans, and polynuclear aromatic hydrocarbons (PAHs). These compounds may exit from the stack either in the vapor phase or condensed and/or adsorbed onto particulate matter. Although dioxins and furans comprise only a small portion of the many types of organics emitted from refuse combustion facilities, environmental concern is currently focused on these compounds.

Dioxin and furan are used as generic terms for two groups of closely related chemical compounds called polychlorinated dibenzo-p-dioxins (PCDD or dioxin) and polychlorinated dibenzofurans (PCDF or furan).

Structurally, they are similar with each composed of two benzene rings, joined by either two oxygen atoms (PCDD) or one oxygen atom (PCDF). Their release into the environment is of particular concern because of the potentially high toxicity of certain isomers. Tests data indicates that of the 75 PCDD and 135 PCDF isomers, 45 and 71, respectively, have been detected in refuse combustion emissions. The chemical, physical, and toxicological properties of each isomer vary according to their chemical structure. In general, the most toxic isomers are those with four chlorine atoms located at the lateral positions in the molecule. Consequently, attention and research have focused on 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD).

PAHs are a class of pollutants emitted as products of incomplete combustion, and are characterized by multiple-fused benzene rings. These pollutants include both non-carcinogenic compounds, such as naphthalene,

and carcinogenic compounds, such as benzo-a-pyrene. Data on PAH emissions from mass-burn waterwall combustion facilities are limited. However, data from other types of combustion facilities suggests more than 90 percent of the total PAHs emitted are low toxicity compounds such as naphthalene. Thus, the remainder of this discussion will focus on PCDD and PCDF emissions.

Numerous quantitative emission tests have been conducted for PCDD and PCDF from refuse combustion since 1977 when Olie reported their occurrence in the fly ash of three refuse combustion facilities in the Netherlands. Tests on refuse combustion facilities have been conducted mainly in the United States, Canada, Italy, France, West Germany, Sweden, and Japan, with results showing considerable emission variations. These variations have been attributed to a variety of factors including sampling protocol, analytical techniques, furnace design, and control technology design. Differences in furnace operation, control technology performance, and waste composition are also considered to have contributed to variations in PCDD/PCDF emissions. The exact affects of these design and operating parameters on PCDD/PCDF emissions have yet to be determined.

In an attempt to quantify the affects of design and operating parameters on PCDD/PCDF emissions, many studies have been performed to explain the mechanisms involved in the formation of PCDDs and PCDFs from combustion sources. Currently, four theories have been detailed in the literature explaining the mechanism for PCDD/PCDF emissions. The first theory suggests that PCDD and PCDF enter the refuse combustion process as trace components of the waste stream. This mechanism would require any dioxins entering the processing system to pass through the combustor unchanged. Because the flame temperatures found in refuse combustion facilities are capable of destroying 99 percent or more of PCDD/PCDF, this scenario is considered unlikely. Thus, the primary source of PCDD/PCDF emissions from refuse combustion facilities is most likely not the waste stream, rather, it is believed the compounds are formed during the combustion process. (Daly, 1985).

The second theory hypothesizes the production of PCDDs and PCDFs from precursors with similar structures such as PCBs and chlorophenols which undergo a modest chemical change during combustion. Although this theory is supported by laboratory studies, no evidence exists to support this for full-scale combustion facilities (Daly, 1985).

A third theory proposes that dioxins and furans are formed via "de novo" synthesis when a variety of unrelated organic materials become chlorinated during the combustion process. Synthesis from materials which are closely related to PCDD and PCDF, such as PAHs, would have simple reaction mechanisms. However, a full spectrum of plausible combustion intermediate chemistry could be proposed which would eventually lead to the synthesis of PCDD and PCDF.

The fourth and most recent theory explaining the formation of PCDD/PCDF was first suggested by Eiceman in 1982 and was supported by Vogg, Metsger, and Stieglitz in 1986. The theory presumes that dioxin and furan synthesis occurs between chemical precursors and chlorine donors on the fly ash surface rather than in the gaseous phase as suggested by the "de novo" theory. PCDD/PCDF precursors are believed to adsorb onto elemental carbon in the fly ash. Oxidation of the elemental carbon may then serve as a basis for the mechanism of PCDD/PCDF formation which is believed to be catalyzed by CuCl_2 found in the fly ash matrix. Because these reactions are expected to occur in the cooler downstream temperatures, this theory has been used to explain elevated PCDD/PCDF concentrations at the stack outlet of facilities such as the Pinellas County, Florida municipal waste combustor. Emission tests performed in 1987 measured an average uncontrolled PCDD/PCDF concentration of 69 ng/dscm and an average stack concentration of 132 ng/dscm (EER, 1988). The average ESP inlet temperatures for the Pinellas facility ranged from 523°F to 553°F. The Vogg studies indicate PCDD/PCDF formation at temperatures between 428°F and 752°F with a peak at 572°F.

In summary, theories on the mechanism of PCDD/PCDF formation include escape of PCDD/PCDF from the refuse during combustion, synthesis from structurally related precursors in the gas phase, and low temperature catalytic

formation from precursors in the fly ash matrix. Thus, control of dioxin and furan emissions should focus not only on the maximum destruction of PCDD/PCDF in the furnace, but also on the destruction of their precursors, including PCBs, PAHs, and Chlorophenols.

Currently, the most effective means of PCDD/PCDF emission control is the optimization of combustion conditions to minimize formation and to maximize destruction of PCDD/PCDF and their precursors. Well operated modern facilities have achieved PCDD/PCDF emissions levels which approach or are below the detection limit. Recent studies on facilities such as Hamilton, Ontario; Issy, France; and Pittsfield, Massachusetts have produced a data base from which correlations between combustion parameters and PCDD/PCDF emissions are being developed. In two studies prepared for EPA (May 1987 and August 1988), Seeker, Lanier, and Kilgroe analyzed the existing emission data base, and interviewed the major furnace designers in the United States and Europe. They then combined this information with trace organic formation and destruction theory to define combustion control strategies for PCDD/PCDF and other trace organics. The initial strategy which has been developed addresses three elements of combustion practice: design, operation, and verification.

The strategy for optimization of refuse combustor design requires consideration of combustion temperatures, air flow, and mixing. In their good combustion practices, EPA recommends a mean temperature of 1,800°F and a minimum temperature of 1,650°F at the fully mixed height of the furnace (May 1987). These temperatures were selected not only to ensure destruction of PCDD/PCDF, but also to ensure destruction of organic precursors which can undergo chlorination downstream of the combustor. An additional temperature recommendation of less than 450°F at the economizer exit was added in the most recent EPA document (September 1988). This economizer exit temperature is intended to minimize PCDD/PCDF formation via the low temperature catalytic mechanism. In addition to the two temperature requirements, EPA has made recommendations for the design of underfire and overfire air streams to ensure an even distribution of oxygen in the refuse stream and optimal mixing of combustion gases.

Verification recommendations are used to alert operators to possible operation and control problems. Parameters which should be continuously monitored include flue gas oxygen and carbon monoxide levels, as well as furnace and economizer exit temperatures. In 1987, EPA issued an operational guidance document for new refuse combustors which was intended to serve as an interim tool to be used in BACT determinations. This guidance specifies that combustion controls are a necessary part of BACT for new refuse combustors.

It has been suggested that a dry scrubber and a highly efficient particulate control device may be used to remove the small concentrations of PCDD/PCDF which form in spite of efficient combustion controls. Studies show condensed PCDD/PCDF and other trace organics bind to the high surface areas of fine particulates in the flue gas. Thus, PCDD/PCDF emissions should be reduced by maximizing particulate control. Use of a dry scrubber results in the reduced flue gas temperatures required for condensation of toxic organics onto the fly ash. A high efficiency ESP or fabric filter will then remove any PCDD/PCDF with the collected particulate matter.

Data on full scale tests have shown the effectiveness of a high efficiency baghouse with a dry scrubber (Martin, 1986) in removing PCDD and PCDF from the flue gas. A recent study performed by Environment Canada at the Quebec City refuse combustion facility showed high pollutant capture using a dry scrubber/fabric filter system. The Quebec City slipstream test data indicate that the removal of PCDD and PCDF approached 100 percent for a fabric filter inlet gas temperature of 284°F (140°C). The overall removal efficiencies for other trace organics (chlorobenzenes, chlorophenols, PCBs, and PAHs) were 99 percent or more at 284°F (140°C). Table 4-18 shows similar dioxin removal efficiencies at the Marion County, Stockholm-Hogdalen, and Malmo facilities.

In addition to removing particulates on which PCDD/PCDF have formed, use of a high efficiency particulate control device will also aid in the control of dioxin and furan emissions by removing particles on which precursors have bound and other particulate matter, thus preventing the possibility of PCDD/PCDF formation reactions taking place downstream of the fabric filter. The dry scrubber/baghouse control scheme proposed for the Facility will be

TABLE 4-18

LEE COUNTY ENERGY RECOVERY FACILITY
DIOXIN REDUCTION ACROSS THE DRY SCRUBBER/FABRIC
FILTER SYSTEMS AT THE MARION COUNTY, STOCKHOLM-HOGDALEN
AND MALMO FACILITIES*

Facility	Inlet Concentration [ng TCDD-equiv. (Eadon et al)/Nm ³ @12%CO ₂]	Outlet Concentration	Removal Efficiency (percentage)
Marion County Boiler #1 (one test) Sept. 1986	3.21	0.123	96.2
Stockholm-Hogdalen Boiler #3 (one test) August 1986	4.98	0.116	97.7
Stockholm-Hogdalen Boiler #3 (two tests) March 1986	2.20 2.60	0.179 < 0.427	91.9 > 83.6
Malmo Boiler #1 (one test) Spring 1986	≥ 3.60	< 0.094	≥ 97.4
Malmo Boiler #2 (one test) Spring 1986	≥ 10.80	< 0.094	≥ 99.1

*Preliminary data from the U.S. EPA and Radian Corporation.

Hahn, Jeffrey L. et.al. "Recent Air Emission Test Data From Several Waste-To-Energy Facilities Utilizing Martin GMBH Stoker Combustion Systems and Advanced Air Pollution Control Equipment." APCA 80th Annual Meeting, 1988.

used in conjunction with combustion control techniques to minimize the quantity of PCDD/PCDF which is transferred to the ash.

A final PCDD/PCDF control strategy which has been suggested is the source separation of chlorinated plastic products from the waste stream. This strategy assumes that a reduction of HCl levels in the flue gas will reduce the chlorination of PCDD/PCDF precursors. Studies have been performed which specifically examine the effect of chlorinated plastics on PCDD/PCDF emissions. A study done by Karasek in Paris found no increase in fly ash levels of PCDDs when three times the normal level of PVC was fed to a well operated refuse combustor (Steisel et al., 1985). Results of a similar test on the Pittsfield, Massachusetts facility also found no correlation between quantities of PVC fed with the refuse and PCDD/PCDF formation. The studies conclude that in well designed facilities, operated under optimal combustion conditions, the quantity of chlorine in the refuse is far in excess of the quantity of chlorine required to produce the very small concentrations of PCDD/PCDF which are emitted. Thus, although removal of all plastics would amount to a 50 percent reduction in the chlorine fed, the quantity of chlorine remaining would still be far greater than the concentrations of PCDD/PCDF formed (Visalli, 1987).

At this time, material separation of chlorinated plastics as a method of PCDD/PCDF control has been neither scientifically validated nor demonstrated on a refuse combustion facility in the United States. For this reason, material separation will not be considered further in this analysis.

The emissions of PCDD, PCDF, and other trace organics will be controlled by proper design and operation of the furnace and combustion control system. The furnaces at the Facility will be designed to maintain the combustion gases at or above 1,800°F (982°C). Overfire air will be added in the quantities, locations, and velocities sufficient to cause turbulent mixing of the combustion gases. Finally, flue gas constituents, such as CO, O₂, and CO₂, as well as the combustion temperature will be continuously monitored to maximize the combustion efficiency of the furnaces. If PCDD/PCDF emissions are not destroyed in the furnace, they will be further

controlled by lowering the flue gas temperature with a dry scrubber, allowing the dioxins and furans to condense and/or adsorb onto particulate and then capturing the particulate with a highly efficient particulate control device (fabric filter). A proposed BACT emission rate of 30 ng/dscm corrected to 7 percent O₂ for total dioxin (total tetra-octa PCDD/PCDF) has been determined. The emission of PCDD and PCDF from the Facility will meet the final promulgated NSPS requirements for MWCs.

In summary, BACT for PCDD, PCDF, and other trace organics shall be the optimization of combustion conditions by proper design and operation of the furnace. In addition to combustion controls, a dry scrubber and a highly efficient fabric filter will be installed. The fabric filter will be designed to meet the outlet grain loading requirement of 0.010 gr/dscf corrected to 7 percent O₂. It has been estimated that 8.3 x 10⁻⁵ tpy of total PCDD/PCDF will be emitted from the Facility.

4.8 SUMMARY OF BACT DETERMINATIONS

Following EPA's current policy, the preceding "top down" BACT analysis was completed for site certification of an 1,800-tpd Energy Recovery Facility in Lee County, Florida.

A dry scrubber was determined to be BACT (as supported by the NSPS "best demonstrated technology") following the "top down" methodology for acid gases. The BACT control level for SO₂ was determined to be 80 percent removal by weight or 30 ppm_{dv} corrected to 7 percent O₂ (whichever is less stringent), both over a 24-hour average. The BACT control level for HCl was determined to be 95 percent removal by weight or 25 ppm_{dv} corrected to 7 percent O₂ (whichever is less stringent), both over an 8-hour average. Additional references to these pollutants and other acid gases are found in Section 4.3.

Using the same methodology, the analysis concluded for PM that either an ESP or a fabric filter was BACT; however, the County has decided to use a fabric filter at the outlet grain loading of 0.010 gr/dscf corrected to 7 percent O₂, which is considered equivalent to a LAER particulate control

level. The fabric filter is considered by the EPA in the NSPS to be the "best demonstrated technology."

The application of a dry scrubber in conjunction with a fabric filter was determined to be BACT for metals, in particular, Hg, Be, and Pb.

Numerous NO_x control technologies were identified in the analysis involving both flue gas add-on controls and combustion modification controls. For the mass-burn stoker waterwall combustor design, SNCR was determined to be BACT at a 45 percent control level.

BACT for VOCs, CO, and organics was determined to be proper furnace design and operation, and combustion control techniques.

A comparison and summary of the BACT determined control technologies and emission rates to the PSD significant emission values is presented in Table 4-1. Supporting emission data and calculations are also presented in the Emissions Factor Support Document (Attachment A).

Section 5



SECTION 5.0
EXISTING AMBIENT AIR QUALITY
AND
METEOROLOGY

5.0 EXISTING AMBIENT AIR QUALITY AND METEOROLOGY

5.1 NATIONAL AND FLORIDA AMBIENT AIR QUALITY STANDARDS

The U.S. Environmental Protection Agency (EPA) has established ambient standards for certain criteria pollutants as mandated by the Clean Air Amendments of 1970 (P.L. 91-604). These standards, known as the National Ambient Air Quality Standards (NAAQS), are set at two levels. Primary standards define levels that are necessary to protect the public health. Secondary standards define levels that are intended to protect the public welfare. The pollutants regulated under NAAQS are sulfur dioxide (SO_2), particulate matter (as particles with an equivalent aerodynamic diameter of less than 10 microns, PM_{10}), carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), and lead (Pb).

On July 1, 1987, EPA promulgated final rules that replaced the TSP ambient air quality standards with standards for PM_{10} as an indicator of potential impacts to the public health and welfare from particulate matter (52 FR 24634). The PM_{10} ambient air quality standards were promulgated because they represent a direct measure of inhalable particulate matter and relate more closely than TSP to potential impacts on human health. A reference method for sampling ambient concentrations of PM_{10} was established and included in the regulations as Appendix J. EPA also promulgated Appendix K which describes the rule for applying the statistically-based PM_{10} standard. The new particulate standard became effective on July 31, 1987. On October 5, 1989, EPA proposed new Prevention of Significant Deterioration (PSD) PM_{10} increments that would replace the existing TSP increments; however, the implementation date for this change has not been established and the current TSP increments are still in effect. (A more detailed discussion of PSD increments for particulate matter is presented in Section 6.8.)

The Florida Ambient Air Quality Standards (FAAQS) are a single set of standards that incorporate both the federal primary and secondary standards. The FAAQS for SO_2 annual and 24-hour averaging periods are more stringent than the national standards. The Florida standards for

particulate matter are expressed as TSP. The demonstration of compliance with ambient air quality standards was based on the more stringent of the NAAQS or FAAQS for each pollutant. The NAAQS and the corresponding FAAQS, as defined in the Florida Administrative Code (F.A.C.) 17-2.300, are presented in Table 5-1.

Each state has been given the primary responsibility for maintaining air quality by submitting a State Implementation Plan (SIP) to EPA. The state has defined geographic areas as attainment or nonattainment for the NAAQS based on ambient monitoring data in those areas. Areas that cannot be defined due to the lack of ambient air data are designated as unclassifiable. Areas designated unclassifiable are treated as attainment until further information becomes available.

To implement the PM_{10} standard, EPA has promulgated a transition policy. To avoid disruption of the existing particulate control program, the existing State Implementation Plan for TSP will remain in effect until a PM_{10} SIP is approved by EPA. The existing regulations will continue to be enforced during the transition period. The area designations of attainment or nonattainment for TSP will also remain. When the EPA approves the state control strategy sufficient to attain or maintain the PM_{10} NAAQS, it will also approve area redesignations based on PM_{10} attainment. An area designation for particulate matter based on TSP must be retained until EPA promulgates PM_{10} increments because the PSD increments depend on the existence of attainment area designations.

5.1.1 ATTAINMENT STATUS FOR CRITERIA POLLUTANTS

The NAAQS attainment status for portions of Lee, Hendry, Glades, and Charlotte counties within 30 km of the site is summarized in Table 5-2 (other regional counties are included for comparison). Florida as a whole is in attainment of the standards for sulfur dioxide (SO_2) and total suspended particulate (TSP). For ozone (O_3), carbon dioxide (CO), and nitrogen dioxide (NO_2), counties in the 30-km area cannot be classified or are in attainment of the standards. The standard for lead (Pb) has also been met at all lead monitoring stations in the state.

TABLE 5-1

STATE AND FEDERAL AIR QUALITY GUIDELINES AND STANDARDS
(Units: $\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Period	NAAQS/FAAQS ^a		De Minimis ^b Monitoring	Significant Impact Level ^c	PSD Increments ^b	
		Primary	Secondary			Class II	Class I
Sulfur Dioxide	3-hour	—/1,300	1,300	—	25	512	25
	24-hour	365/260	—	13	5	91	5
	Annual	80/60	—	—	1	20	2
Total Suspended Particulate Matter	24-hour	—	—	10	—	37	10
	Annual	—	—	—	—	19	5
PM ₁₀	24-hour	150	150	10	5	30 ^e	8 ^e
	Annual ^d	50	50	—	1	17 ^e	4 ^e
Nitrogen Dioxide	Annual ^d	100	100	14	1	25	2.5
Carbon Monoxide	1-hour	40,000	40,000	—	2,000	—	—
	8-hour	10,000	10,000	575	500	—	—
Lead	Quarterly	1.5	1.5	0.1	—	—	—
Ozone	1-hour	235	235	—	—	—	—

^a 17-2.300, FAC, as last officially amended in July 1990. Where standards are not shown with a "/", the NAAQS and FAAQS are the same.

^b 40 CFR 52.21(1)(8).

^c 40 CFR 51.151.

^d Annual arithmetic mean.

^e Proposed EPA standard (54 FR 41218; October 5, 1989).

REVISED 6/11/91

TABLE 5-2

NAAQS ATTAINMENT STATUS FOR SELECT COUNTIES WITHIN
THE SOUTHWEST FLORIDA INTRASTATE AQCR

County	SO ₂	PM	NO ₂	CO	O ₃
Charlotte	A	A	U/A	U/A	U/A
Collier	A	A	U/A	U/A	U/A
De Soto	A	A	U/A	U/A	U/A
Glades	A	A	U/A	U/A	U/A
Hendry	A	A	U/A	U/A	U/A
Highlands	A	A	U/A	U/A	U/A
Lee	A	A	U/A	U/A	U/A
Sarasota	A	A	U/A	U/A	U/A

SOURCE: FAC 17-2.410 (September 13, 1990) 40 CFR 81.310 (revised February 1, 1990).

Abbreviations: A = In attainment status for the specific pollutant.
U = Cannot be classified for the specific pollutant.

5.2 AVAILABLE AMBIENT MONITORING DATA

This application uses available Florida ambient air monitoring reports for 1988 through 1990 to develop background concentrations of PSD criteria pollutants in the vicinity of the Facility. This period represents the most recent three-year period for which complete ambient monitoring data is available. Because there are few monitoring stations within Lee County, monitors outside of the county are also considered for determining background concentrations for some pollutants.

Monitoring sites are typically selected:

- o To determine the highest concentration expected in a given area,
- o To determine representative concentrations in areas of high population densities,
- o To determine ambient pollutant impacts of significant sources, and
- o To determine general background concentration levels.

For these reasons, most available monitoring sites in southern Florida are located in areas of heavy urban or industrial growth such as Broward, Dade, and Hillsborough counties. Therefore, many sites in the Florida monitoring network will be overly conservative when used to estimate background levels at the Facility site, which is more rural. Table 5-3 shows the monitoring stations used in this analysis by county and criteria pollutant. A map showing the associated counties is presented on Figure 5-1.

Preliminary background concentrations from representative monitors are listed in Table 5-4. The criteria pollutants TSP, SO₂, and O₃ are measured in Lee County at the Fort Myers Water Storage Tank on Princeton Street. This monitoring station's purpose is to measure maximum concentrations and population exposures. For the remaining criteria pollutants without local monitoring data (CO, PM₁₀, Pb, and NO₂), background concentration monitors from the nearest areas were used as available.

TABLE 5-3

AMBIENT AIR MONITORS SPECIFIED BY
COUNTY AND CRITERIA POLLUTANTS
(1988-1990)

County	Pollutant						
	SO ₂	TSP	NO _x	CO	O ₃	Pb	PM ₁₀
Broward				X		X	X
Dade						X	
Hillsborough			X	X		X	X
Lee	X ^a	X			X		
Manatee	X						
Pinellas				X			
Sarasota	X						

SOURCE: "Comparison of Air Quality Data with National Ambient Air Quality Standards," Florida Department of Environmental Regulation, 1988-1990.

^a Discontinued in 1988.

TABLE 5-4

AMBIENT MONITORING DATA USED TO DERIVE
BACKGROUND CONCENTRATIONS FOR THE LEE COUNTY
ENERGY RECOVERY FACILITY

Pollutant	Monitoring Site	Averaging Time	Maximum Measured Concentration		
			1988	1989	1990
CO	Hillsborough County/ Davis Island	1-hr High (ppm)	4	4	5
		2nd High (ppm)	4	4	5
		8-hr High (ppm)	2	2	3
		2nd High (ppm)	2	2	2
	Pinellas County/ Largo	1-hr High (ppm)	6	5	6
		2nd High (ppm)	5	5	5
		8-hr High (ppm)	4	3	3
		2nd High (ppm)	3	3	3
	Broward County/ Pompano Beach	1-hr High (ppm)	6	9	5
		2nd High (ppm)	5	8*	5
		8-hr High (ppm)	3	4	3
		2nd High (ppm)	2	4*	3
Pb	<u>Broward County/ Ft. Lauderdale</u>	Max Qtr (ug/m ³)	0	0	0
	<u>Dade County/ Miami</u>	Max Qtr (ug/m ³)	<u>0.1</u>	<u>0.1*</u>	0
NO ₂	Hillsborough County/ Ybor City	Annual Arithmetic Mean (ug/m ³)	40	<u>42*</u>	—
TSP	Lee County/Fort Myers Water Storage Tank, Princeton Street	24-hr High (ug/m ³)	55	71	57
		2nd High (ug/m ³)	49	58	52
		Annual Arithmetic Mean	30	<u>31*</u>	<u>31</u>
		Annual Geometric Mean	29	<u>29</u>	<u>30</u>
	Lee County/Fort Myers Backup Monitor, Water Storage Tank, Princeton Street	24-hr High (ug/m ³)	63	74	58
		2nd High (ug/m ³)	60*	58	48
		Annual Arithmetic Mean	31	<u>31</u>	<u>30</u>
		Annual Geometric Mean	29	<u>29</u>	<u>29</u>
SO ₂	Lee County/Fort Myers Water Storage Tank, Princeton Street	3-hr High (ug/m ³)	86 ^a	—	—
		2nd High (ug/m ³)	75 ^a	—	—
		24-hr High (ug/m ³)	24 ^a	—	—
		2nd High (ug/m ³)	24 ^a	—	—
		Annual Mean (ug/m ³)	5 ^a	—	—

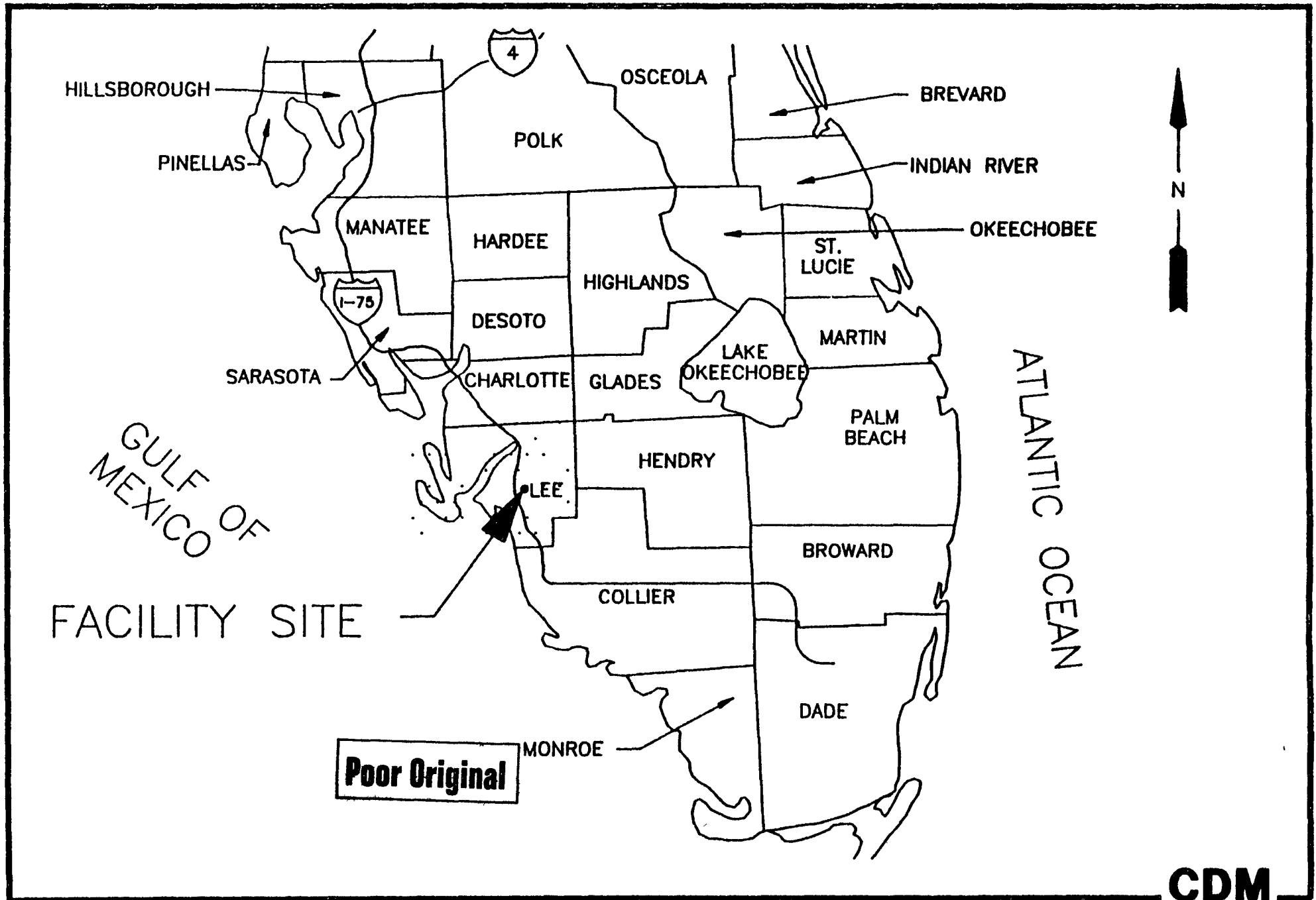


FIGURE 5-1

Study Area Location Map

CDM

TABLE 5-4
(continued)

Pollutant	Monitoring Site	Averaging Time	Maximum Measured Concentration		
			1988	1989	1990
SO ₂	Manatee County/ County Dam	3-hr High (ug/m ³)	—	—	—
		2nd High (ug/m ³)	—	—	—
		24-hr High (ug/m ³)	54	25	—
		2nd High (ug/m ³)	42	24	—
		Annual Mean (ug/m ³)	9*	6	—
	Sarasota County/ Verna Well Field	3-hr High (ug/m ³)	396	182	103
		2nd High (ug/m ³)	199*	145	98
		24-hr High (ug/m ³)	68	48	45
		2nd High (ug/m ³)	54*	46	43
		Annual Mean (ug/m ³)	8	8	8
O ₃	Lee County/Fort Myers Water Storage Tank, Princeton Street	1-hr High (ppm)	.102 ^b	.104	.088
		2nd High (ppm)	.101*	.097	.080
PM ₁₀	Hillsborough County/ Davis Island	24-hr High (ug/m ³)	64	60	50
		2nd High (ug/m ³)	58*	51	46
		Annual Arithmetic Mean	30*	30	30
	Broward County/ 500 SW 14th Court #12 Ft. Lauderdale	24-hr High (ug/m ³)	—	40	34
		2nd High (ug/m ³)	—	36	29
		Annual Arithmetic Mean	—	21	16

SOURCE: "Comparison of Air Quality Data with National Ambient Air Quality Standards,"
Florida Department of Environmental Regulation, 1988-1990.

^aDiscontinued during the year.

^bOzone monitoring site relocated from the water storage tank to Cape Coral about
October/November 1988.

*Represents maximum long-term or maximum second-highest short-term concentration to be
used as background in modeling analyses.

REVISED 6/11/91

5.3 SELECTION OF BACKGROUND POLLUTANT CONCENTRATIONS

The criteria pollutant background concentrations proposed for use in the refined modeling analysis for the Facility are summarized in Table 5-5. The methodology employed to calculate representative pollutant background concentrations is described below.

For each pollutant, the annual average background concentration has been set equal to the highest annual average concentration observed during the last three years. For each pollutant and each short-term averaging period, the background concentration has been set equal to the highest of the second-highest concentrations observed during the last three years, pursuant to EPA guidance. Values from monitors closest to the Facility site were chosen as representative of background concentrations at the Facility site.

The CO monitors closest to Lee County designated as background or population exposure monitors (and not near major roadways) are Hillsborough County/Davis Island Coast Guard Station, Pinellas County/Largo, and Broward County/Pompano Beach. Maximum second-highest concentrations, shown for CO on Table 5-5, are 8 ppm and 4 ppm for averaging times of one hour and eight hours, respectively. These ambient concentrations are approximately 23 percent of the one-hour CO standard (35 ppm) and 44 percent of the eight-hour CO standard (9 ppm).

Like CO, lead monitoring is concentrated near areas of major vehicular traffic outside Lee County. However, the Broward County/Ft. Lauderdale and Dade County/Miami sites are designated as background lead monitoring sites. Of the data for these two sites, given on Table 5-4, only Dade County/Miami recorded a maximum quarterly average of 0.1 ug/m³. This concentration is less than 7 percent of the quarterly lead standard of 1.5 ug/m³. Since the recent trend for lead concentrations is distinctly downward due to the phase-out of lead additives in gasoline, 1989 concentration data should conservatively represent current conditions.

TABLE 5-5

PROPOSED BACKGROUND CONCENTRATIONS FOR CRITERIA POLLUTANTS
EMITTED BY THE LEE COUNTY ENERGY RECOVERY FACILITY

Pollutant	Averaging Period	Monitor Site	Background Concentration ($\mu\text{g}/\text{m}^3$)	AAQS ^a ($\mu\text{g}/\text{m}^3$)	Background Concentration as Percent of NAAQS
PM ₁₀ ^b	24-Hour	<u>Davis Island, Hillsborough County</u>	<u>58</u>	150	<u>38.7</u>
	Annual	<u>Davis Island, Hillsborough County</u>	<u>30</u>	50	<u>60.0</u>
SO ₂	3-Hour	<u>Verna Wellfield, Sarasota County</u>	<u>199</u>	1,300	<u>15.3</u>
	24-Hour	<u>Verna Wellfield, Sarasota County</u>	<u>54</u>	260	<u>20.8</u>
	Annual	<u>County Dam, Manatee County</u>	<u>9</u>	60	<u>15.0</u>
NO ₂	Annual	<u>Ybor City, Hillsborough County</u>	<u>42</u>	100	<u>42.0</u>
CO (ppm)	1-Hour	<u>Pompano Beach, Broward County</u>	<u>9200</u>	<u>40,000</u>	<u>23.0</u>
	8-Hour	<u>Davis Island, Hillsborough County</u>	<u>4600</u>	<u>10,000</u>	<u>46.0</u>
Pb	3-Month	<u>Miami, Dade County</u>	<u>0.1</u>	1.5	<u>6.7</u>

REVISED 6/28/91

TABLE 5-5
(continued)

SOURCE: "Comparison of Air Quality Data with National Ambient Air Quality Standards," Florida Department of Environmental Regulation, 1988-1990.

^aMore stringent of federal or state standard (see Table 5-1).

^bTSP standard has been replaced with PM_{10} standard (52 FR 24634, July 1987). The State of Florida adopted these PM_{10} standards in May 1988 (17-2.300, FAC).

REVISED 6/28/91

The nearest continuous NO₂ monitoring station is in Hillsborough County at Ybor City designated as maximum concentration monitor. The maximum annual measurement for 1988 through 1990 at the two continuous Hillsborough County monitoring sites, given on Table 5-5, is 42 ug/m³. This concentration is 42 percent of the annual NO₂ standard of 100 ug/m³.

Most particulate monitoring data up to this time has been measured as total suspended particulates (TSP). TSP measurements are available from several monitoring stations in the Lee County area. The two Fort Myers monitors nearest the site, at the water storage tank on Princeton Street and the back-up monitor at the same location, are shown.

The TSP standard, however, has been replaced with the PM₁₀ standard (July 1987). The state of Florida adopted these PM₁₀ standards in May 1988. Florida started PM₁₀ monitoring at three stations in 1986, increased the network to 15 stations in 1988, and currently has a network of 31 stations. The Broward County/Ft. Lauderdale and Hillsborough County/Davis Island monitoring sites are nearest to the Lee County site.

The maximum second-highest 24-hour concentration shown on Table 5-5 is 58 ug/m³ which is 38.7 percent of the standard of 150 ug/m³. The maximum annual arithmetic mean is 30 ug/m³ which is 60 percent of the annual standard of 50 ug/m³ for PM₁₀.

The SO₂ monitoring station in the immediate Facility site area, located at the Fort Myers water storage tank on Princeton Street, was discontinued in 1988, probably due to the consistently low SO₂ concentrations monitored there. The next closest background sites shown are the Manatee County/Manatee County Dam and Sarasota County/Verna Well Field, over 100 km from the proposed Facility. Even though the Sarasota County/Verna Well Field monitoring station is over 100 km away, it is the nearest location with the latest three consecutive years (1988-1990) of SO₂ monitoring data. Sarasota County is just south of the Tampa Bay metropolitan area, which contributes to SO₂ concentrations 1.5 times as high as those previously recorded in Lee County. Therefore, it very conservatively represents the ambient SO₂ concentrations at the Facility site.

Maximum second-highest 3-hour and 24-hour and maximum annual SO₂ concentrations used to represent Ft. Myers, given in Table 5-5, are 199 ug/m³, 54 ug/m³, and 9 ug/m³, respectively. These concentrations are 15.3 percent, 20.8 percent, and 15.0 percent of the 3-hour, 24-hour, and annual SO₂ standards of 1300 ug/m³, 260 ug/m³, and 60 ug/m³, respectively.

Ozone is not directly emitted into the atmosphere, but results from a series of complex photochemical reactions. Ozone measurements are available from the Ft. Myers water treatment plant. The maximum second-highest one-hour concentration, shown on Table 5-4 for this site, is 0.101 ppm (198 ug/m³). This concentration is 84 percent of the one-hour O₃ standard of 235 ug/m³.

Arsenic, beryllium, fluorides, and mercury are PSD-regulated pollutants which the Facility is expected to emit in quantities exceeding the review threshold for a formal PSD analysis (see Table 2-1, Section 2.0 of this Volume). Identification of background concentrations is required as part of a formal PSD analysis. Because ambient air quality standards have not been established for these pollutants, the state and local air monitoring station network does not include monitoring of background concentrations of these pollutants. On the basis of pollutant emission inventory data provided by DER (Tom Rogers, DER, letter dated August 29, 1988, and subsequent conversation with Max Linn, DER, June 19, 1990), there are no industrial sources within 10 kilometers of the site likely also to be sources of arsenic, beryllium, fluorides, or mercury. Therefore, it is assumed that background concentrations of these pollutants are comparable to normal rural backgrounds.

5.4 AVAILABLE METEOROLOGICAL DATA

Mr. Thomas Rogers, Environmental Administrator for the Bureau of Air Monitoring and Assessment of DER, has indicated that surface wind, temperature, and cloud cover information from the National Weather Service (NWS) station at the Fort Myers Page Field Airport is most representative for the site. He has also indicated that upper air data from the NWS station at Tampa International Airport in Tampa, Florida should be used to

estimate mixing heights. The Fort Myers station is about 10 miles southwest of the Facility site. The Tampa station, which is the closest upper air NWS station, is about 90 miles northwest of the Facility. The Fort Myers/Tampa data are the most representative data that are available of conditions at the Facility site.

Accordingly, the hourly meteorological data from these two weather stations for recent available years (1982 to 1986) have been provided by Mr. Rogers for use in this permit application (Thomas Rogers, 1989). The climatology and local meteorology of the Fort Myers area are discussed in Section 2.3.7 of Volume I, and wind roses for all years (1982 to 1986) and seasons, as well print-outs of the meteorological data, are provided in Attachment B of this volume.

Section 6

SECTION 6.0
AIR QUALITY ANALYSIS

6.0 AIR QUALITY ANALYSIS

6.1 OVERVIEW

The purpose of this section is to present the predicted air quality impacts for the Lee County Energy Recovery Facility (ERF) in accordance with the protocol sent to DER on May 9, 1990. These pollutant concentrations were estimated using EPA guideline dispersion models and techniques discussed with and approved of by the Florida Department of Environmental Regulation prior to starting the analyses. The results obtained from the detailed modeling analysis have demonstrated that impacts from the Lee County ERF:

- o Will not violate any Florida or National Ambient Air Quality Standards (FAAQS or NAAQS);
- o Will not significantly consume total suspended particulate (TSP), sulfur dioxide (SO₂), or nitrogen oxide (NO_x) PSD Class II increments;
- o Will not significantly consume TSP, SO₂, or NO_x PSD Class I increments at the Everglades National Park; and
- o Will not significantly impact or prevent reasonable further progress toward attainment of NAAQS and FAAQS in SO₂ and TSP nonattainment areas elsewhere in the state.

Therefore, the proposed Facility will be in compliance with all applicable Florida and federal guidelines and standards regulating air quality impacts from energy recovery facilities.

Section 6.0 is organized to provide a logical progression from the development of emissions source characteristics to the presentation of modeled pollutant impacts associated with the Facility.

A summary of source parameters for potential operating conditions including stack parameters, exhaust gas conditions, and pollutant emission rates is

presented in Section 6.2. The selection of a dispersion model and presentation of the screening modeling protocol used to evaluate impacts from potential operating conditions is included in Section 6.3.

Two levels of air quality impact assessment were conducted: a screening modeling analysis, and a detailed modeling analysis. Section 6.4 presents the results of the screening analysis, and identifies the operating conditions (i.e., 110 percent of design thermal load for short-term impact, and 100 percent of design thermal load for annual average impacts) that result in the highest ground-level impacts. Air quality impacts from these worst-case operating conditions are then evaluated using more detailed modeling techniques that require five years of hourly meteorological data and an extensive receptor grid. The results of the detailed analysis are presented in Section 6.5, and include a comparison of predicted impacts to the de minimis pre-construction monitoring levels. A demonstration of compliance with the FAAQS and NAAQS, based on the results for the detailed modeling analysis, is presented in Section 6.6. Section 6.7 assesses the potential impacts from non-criteria pollutants (i.e., those pollutants not regulated under the FAAQS and NAAQS). Section 6.8 provides a demonstration of facility compliance with PSD Class I and Class II increments.

6.2 SOURCE CHARACTERISTICS

The Lee County ERF will have a design capacity of 1,800 tons per day (tpd) of reference waste with a higher heating value (HHV) of 5,000 Btu per pound of waste (which was modeled in this application). The primary source of pollutant emissions is the Facility stack, from which combustion process gases and particulate matter are emitted to the atmosphere. Potential secondary sources of pollutant emissions include the ash residue handling building and a lime silo servicing the acid gas scrubbers. These minor secondary sources of emissions will be enclosed and controlled through the use of particulate control devices. Secondary source emissions and impacts are discussed in Section 7.6. No significant quantifiable fugitive emissions will be generated from the proposed Facility.

The refuse received at the Facility will be combusted in three mass-burn stoker waterwall combustor units of 600 tpd each. At the design charging rate for reference waste, each 600-tpd combustor unit will have a heat release of 250 million Btu/hr (MMBtu/hr). Combustion temperatures will be in excess of 1,800°F. The exhaust gases from the boiler of each unit will pass through a dry scrubber and a fabric filter to collect particulate matter.

Each combustor unit (furnace and boiler) will be equipped with a separate acid gas scrubber followed by a fabric filter to collect particulate matter. The dry scrubber will be designed to remove sulfur dioxide (SO_2) at an efficiency of 80 percent or 30 ppm_{dv} corrected to 7 percent O_2 , whichever is less stringent (24-hour average). Hydrogen chloride (HCl) will likewise be removed at an efficiency of 95 percent or 25 ppm_{dv} corrected to 7 percent O_2 , whichever is less stringent (eight-hour average). The baghouse will be designed to result in a particulate emission not to exceed 0.010 grains per dry standard cubic foot corrected to 7 percent O_2 (gr/dscf @ 7% O_2).

The stack flues from each of the three units will be co-located and enclosed in a single stack shell (hereinafter referred to as the "stack"). The stack is assumed, for the dispersion modeling, to be 275 feet above the stack base elevation. This stack height is equal to the good engineering practice (GEP) stack height defined for a squat building with a building height of 110 feet. These are the minimum stack and building heights, respectively, of the designs under consideration. The proposed stack will be sufficiently high to avoid building aerodynamic wake and cavity effects. The method for determining the GEP stack height is outlined in Section 1.3.

Each flue for the stoker waterwall design facility will have an inside diameter of approximately six feet and two inches. An effective flue diameter of 10 feet and eight inches was calculated from the total volumetric flow rate that maintains an exit velocity (of 65 feet per second) in the effective flue equal to that of the single six-foot, two-inch flue.

These "equivalent diameter" calculations are in accordance with U.S. EPA stack regulation provisions contained in 40 CFR 51.100 in that the stack is being originally designed to have merged flues. The combining of flue gas streams from a stack with multiple flues to form a single larger plume is also a real and observable phenomenon. The calculation of an effective diameter is thus allowable and correct because it accounts for this phenomenon without artificially increasing flue gas velocities and plume height.

While the Facility will have a design capacity of 1,800 tpd, the actual throughput will vary depending upon the season and planned maintenance activities. Each unit at the Facility could process waste at a rate between 50 and 110 percent of the nominal charging rate. The refuse heat content will also vary to some degree throughout the year. Operating conditions representing a broad range of possible refuse throughput for each of the combinations are presented in Table 6-1 and were modeled (Section 6.4) for their potential air quality impacts. The two postulated worst cases (those which produced the highest normalized ground-level concentrations) were then modeled for a range of possible waste heat contents. The source parameters for these cases are shown in Table 6-1.

The emission rates presented in Table 6-2 are based on the design heat release of the Lee County ERF. The emission rates used in the detailed air quality modeling analyses are normalized and adjusted relative to the design heat release. Thus, the ground-level concentration for any pollutant can be obtained by multiplying the emission rate (in grams per second) from Table 6-2 by the normalized ground-level concentrations (i.e., the X/Q values) predicted by the air quality dispersion model and presented in later sections.

TABLE 6-1

SOURCE PARAMETERS OF 14 POTENTIAL
OPERATING CONDITIONS FOR THE LEE COUNTY ERF

Facility Throughput (tpd)	Number of Units ^a	Total Heat Content (Btu/lb)	Total Heat Release (MMBtu/hr)	Normalized Emission Rate ^b (g/s)	Stack Height (m)	Exit Temp. (K)	Exit Velocity (m/s)	Effective Stack Diameter ^c (m)
1,980	3	5,000	825	1.10	83.82	388.7	21.8	3.26
1,800	3	5,000	750	1.00	83.82	388.7	19.8	3.26
1,350	3	5,000	563	0.75	83.82	388.7	14.9	3.26
900	3	5,000	375	0.50	83.82	388.7	9.9	3.26
1,200	2	5,000	500	0.67	83.82	388.7	19.8	2.66
600	1	5,000	250	0.33	83.82	388.7	19.8	1.88
1,650	3	6,000	825	1.10	83.82	388.7	21.6	3.26
1,500	3	6,000	750	1.00	83.82	388.7	19.7	3.26
1,125	3	6,000	563	0.75	83.82	388.7	14.7	3.26
750	3	6,000	375	0.50	83.82	388.7	9.8	3.26
2,604	3	3,802	825	1.10	83.82	388.7	23.3	3.26
2,367	3	3,802	750	1.00	83.82	388.7	21.2	3.26
1,775	3	3,802	563	0.75	83.82	388.7	15.9	3.26
1,183	3	3,802	375	0.50	83.82	388.7	10.6	3.26

SOURCE: Camp Dresser & McKee Inc., 1991.

^aNumber of combustor units assumed to be in operation for this case.

^bNormalized with respect to the nominal operating case (i.e., 1,800 tpd at 5,000 Btu/lb = 750 MMBtu/hr).

^cSample calculations of effective diameter for three flues of equal diameter: Define the effective stack diameter for three flues as $D = (3A/3.14159)^{0.5}$, where A is the combined area for three 6'2" diameter flues (e.g., $D = 3.26$ m for $A = 119.79$ ft²). The gas exit velocity for the effective diameter stack is equal to that for each individual flue.

TABLE 6-2

ANNUAL AVERAGE EMISSION RATE OF POLLUTANTS FOR THE
LEE COUNTY ENERGY RECOVERY FACILITY

Pollutant ^c	Controlled Emission Rate ^a	
	(lb/hr)	(g/s)
Particulate Matter (as TSP or PM ₁₀)	<u>14.6</u>	<u>1.83</u>
Sulfur Dioxide (SO ₂)		
(annual)	<u>112</u>	<u>14.08</u>
(24-hour)	<u>112</u>	<u>14.08</u>
(3-hour)	<u>140</u>	<u>17.6</u>
Nitrogen Dioxide (NO ₂)	<u>219</u>	<u>27.59</u>
Carbon Monoxide (CO)		
(8-hour)	<u>74</u>	<u>9.33</u>
(1-hour)	<u>296</u>	<u>37.3</u>
Hydrocarbons (VOC)	<u>15.8</u>	<u>1.98</u>
Lead (Pb)	<u>0.45</u>	<u>0.057</u>
Fluoride (as (HF))	<u>2.63</u>	<u>0.331</u>
Sulfuric Acid (H ₂ SO ₄)	<u>26.9</u>	<u>3.38</u>
Hydrogen Chloride (HCl)	<u>48.2</u>	<u>6.08</u>
Mercury (Hg)	<u>0.45</u>	<u>5.67x10⁻²</u>
Beryllium (Be)	<u>1.01x10⁻⁴</u>	<u>1.28x10⁻⁵</u>
Arsenic (As)	<u>6.83x10⁻³</u>	<u>8.6x10⁻⁴</u>
Dioxin (Total tetra-octa PCDD & PCDF)	<u>1.91x10⁻⁵</u>	<u>2.40x10⁻⁶</u>

SOURCE: Camp Dresser & McKee Inc., 1991.

^a Emission rates are based on 100% of the nominal capacity (i.e., 1,800 tpd at 5,000 Btu/lb) and continuous operation of the air pollution control system during reference waste firing. System availability is rated 100% (8,760 hrs/yr) for the modeling exercise. The lb/hr emission rates shown are rounded and may not convert precisely to the g/s emission rates shown. See Tables 3-2 and 3-3.

^b Assumes total NO_x emissions are emitted as NO₂.

^c Dioxins and hydrogen chloride are not PSD regulated pollutants (40 CFR 52.21).

NOTE: g/s conversion is calculated without using rounded numbers.

6.3 MODELING METHODOLOGY

Computer-based mathematical dispersion models approved by DER and EPA were used to evaluate air quality impacts due to emissions from the Lee County ERF. Input data to these dispersion models were conservatively specified in order to prevent an under-estimation of impacts. A screening modeling analysis was used to simulate plume dispersion under a variety of possible meteorological and operating conditions, thereby identifying maximum pollutant ground-level concentrations. A detailed modeling analysis was performed to determine the maximum pollutant concentrations for the worst-case operating condition using recorded meteorological and site terrain data.

6.3.1 INDUSTRIAL SOURCE COMPLEX MODEL

The UNAMAP Version Date 90346 of EPA's Industrial Source Complex Short-Term Model (ISCST) was the sole model used in the air quality impact analysis. It was developed for EPA for the purpose of estimating impacts from industrial sources which may have complex geometries and multiple emission sources. It is the EPA-recommended impact assessment technique for regions comprised of "flat terrain," that is, where all terrain within the modeled site region is below stack-top elevation. Within 30 kilometers of the site, no terrain was found to exceed stack-top elevation. Therefore, ISCST was selected as the model most appropriate for the characteristics of the proposed source and surrounding site dispersion environment.

The ISCST model is a steady-state Gaussian plume dispersion model which can be used to assess pollutant concentrations from a wide variety of sources associated with an industrial complex. For this study, the ISCST model was used to calculate ground-level concentrations for all regulated pollutant concentration averaging periods. ISCST uses sequential hourly meteorological data to compute one-hour average concentrations. Average concentrations (for 3-hour, 8-hour, 24-hour, and annual periods) are computed as arithmetic averages of blocks of successive hourly concentrations.

6.3.2 ISC MODEL OPTIONS

An ISCST simulation of the Lee County ERF air quality impacts required an input of source parameters, receptor coordinates with terrain heights, and representative meteorological data. The ISCST model includes options or switches which may be selected to simulate the impacts from the Lee County ERF. The modeling options used in the dispersion analysis conformed to DER procedures and EPA modeling guidance as presented in the "Guideline on Air Quality Models — Revised" (EPA, 1986) and included:

- o Final plume rise. The ISC program is capable of evaluating the dispersion of a plume based on either final plume rise or transitional plume rise with distance. Final plume rise is the preferred option unless building wake effects are a possibility [i.e., if the stack height is not equal to a good engineering practice (GEP) stack height] or terrain above stack-tip occurs closer to the stack than the distance at which final plume height is realized.

The stack elevation included in the Lee County ERF design is a GEP stack height, and the terrain elevation does not exceed stack-top within the study area. Therefore, plume dispersion was evaluated based on final plume rise.

- o Stack-tip downwash. This option was selected to allow modification of the stack height to account for downwash induced by the stack tip (Briggs, 1974) when the ratio of gas exit velocity to stack-top wind speed is less than 1.5.
- o Buoyancy induced dispersion. The ISC model was programmed to increase the dispersion coefficients at the point of plume release to account for buoyancy enhancement of the plume from turbulent mixing and air entrainment, hence greater initial dispersion volume than without buoyancy. This option was selected as representative of actual conditions.

- o Calm-processing. The model employed an EPA calm-processing routine (CALMPRO) to calculate blocked concentrations when there are "calm" hours of preprocessed data with wind speeds of 1 meter per second occurring with directional persistence. Calm hours are assigned a 1 m/s wind speed by the RAMMET preprocessor when the observed wind speed is less than 2 knots and the wind direction persists from the previous hour. Calm hours are treated as missing hours by CALMPRO. Short-term and long-term concentrations are estimated in an EPA prescribed manner to account for calms (EPA, 1986).
- o Pollutant Half-Life. Recent EPA guidance suggests including a half-life of four hours for modeling of SO₂ dispersion in urban areas. This pollutant half-life option was not included in the present analysis because the study area is categorized as rural. Conservative estimates of SO₂ impacts will result.

These assumptions and conditions established the basis for evaluating air quality impacts from the Lee County ERF.

Land Use Classification

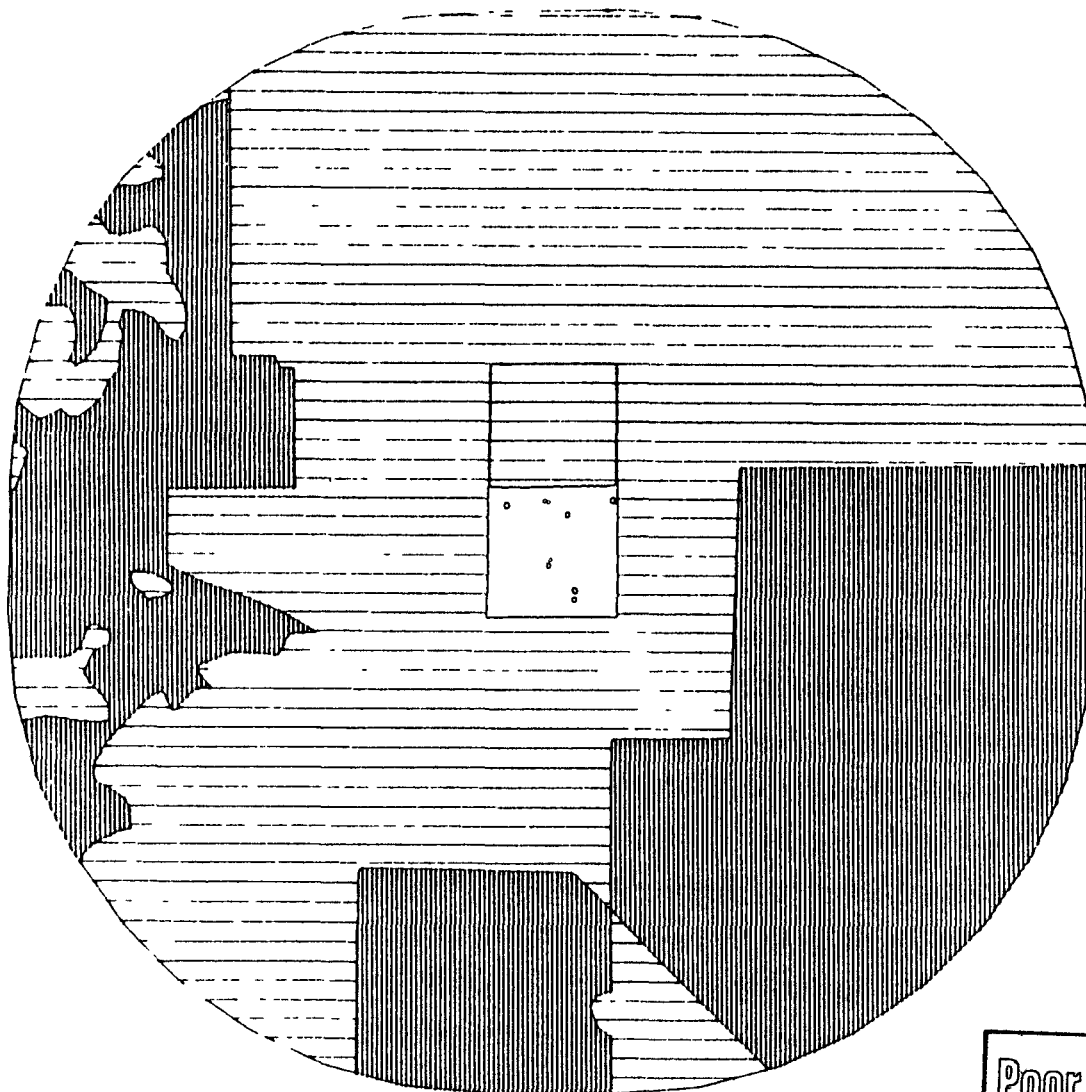
The dispersion environment was classified as rural based on a quantitative review of land use designations within a three-km (1.9 miles) radius of the proposed stack, and a comparison of the land use with Auer (1978) land use criteria. The Lee County land use map was used as the basis for calculation of total "urban" and "rural" areas in the three-km study area. This map shows existing land use designations, as well as areas where future development is permitted, but is not currently intensively developed. Use of this map, therefore, tends to favor inclusion of some currently "rural" areas into "urban" classifications, and is a very conservative approach. The map was digitized, using ARC/INFO geographic information systems (GIS) software. ARC/INFO computes total area for each designated land use type. The digitized version of the Lee Plan Future

Land Use Map (adopted by the Board of County Commissioners, January 31, 1989, effective March 1, 1989) is shown in Figure 6-1. The following land use categories were assigned the "urban" designation, in accordance with Auer (1978): intensive development, central urban, urban community, industrial, general commercial, and industrial commercial. The following land use categories were designated "rural": rural, open lands, resource protection areas, new community, suburban, outlying suburban, and park. ARC/INFO computed the total resulting land use areas to be 37 percent urban and 63 percent rural. Therefore, the dispersion models were executed in the rural mode, incorporating dispersion coefficients developed by Turner (1970) and recommended by EPA for regulatory applications in rural areas (EPA, 1986).

Dispersion Meteorology

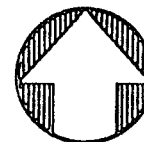
The rate of plume dispersion as defined with the ISCST model is determined by a set of atmospheric variables including wind speed, wind direction, ambient temperature, depth of the mixing layer, and the ambient turbulence level (i.e., atmospheric stability). These variables vary as functions of space and time. The selection of acceptable meteorological data representative of the site dispersion environment is necessary to correctly characterize downwind concentrations from the proposed source.

Digitized meteorological data are available from the National Climatic Data Center (NCDC) which archives regular observations made at National Weather Service (NWS) stations. The refined modeling analysis used a recent five-year period of meteorological data provided by Mr. Thomas Rogers of DER (DER, 1989) as representative of the Lee County site. Surface data are from Ft. Myers (Page Field), and upper air data are from Tampa International Airport—both for the years 1982 to 1986. Surface data consist of hourly observations of wind speed, wind direction, temperature, cloud cover, and several other parameters. Mixing height is calculated from twice daily upper air soundings which measure atmospheric temperature profiles. Rural mode wind profile exponents and mixing heights were applied based on the above discussion on land use classification.

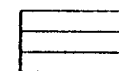


Poor Original

NORTH



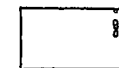
LEGEND



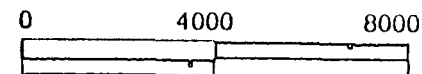
RURAL (61%)



URBAN (37%)



SITE (2%)



Scale in Feet

LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Certification
Camp Dresser & McKee Inc

FIGURE 6-1
AUER LAND USE CLASSIFICATION

6.4 SCREENING ANALYSIS

An air quality screening analysis was conducted to identify the Facility operating condition from Table 6-1 that produced the worst-case ground-level pollutant concentrations in the vicinity of the proposed Facility. The screening dispersion modeling is performed on the basis of simplified meteorology, and a single wind direction over composite worst-case terrain. EPA-approved dispersion modeling options and inputs for screening analyses are presented in Table 6-3. The modeling procedures are consistent with the "Guideline on Air Quality Models — Revised" (EPA, 1986) and "Guideline for Air Quality Maintenance Planning and Analysis, Volume 10 (Revised): Procedures for Evaluating Air Quality Impacts of New Stationary Sources" (EPA, 1977).

A total of 14 operating conditions for waste throughput and waste heat content were identified for screening dispersion modeling in two steps. In the first step, waste heat content was held constant (at the design reference waste value of 5,000 Btu/lb), and a range of throughput levels was analyzed for the combustor technology under consideration. The range consisted of 50, 75, 100, and 110 percent of the design waste throughput for the Facility.

Dispersion model parameters for these conditions are listed in Table 6-1 in Section 6.2. The two worst cases (those which produced the highest normalized ground-level concentrations in this first round of screening dispersion modeling) were then selected for analysis of the effects on flue gas flow rate of varying the waste heat content. The dispersion model parameters for these cases are shown in Table 6-1. The screening results for the 110 and 100 percent cases are shown in Table 6-4 by stability class. (Results for the 75 and 50 percent cases were much lower and therefore have not been shown.)

Table 6-4 shows that the operating condition which produces the greatest impacts is a Facility throughput of 1,650 tpd of waste with a higher heating value of 6,000 Btu/lb. Since the heat release for this case can only be tolerated by the combustors for short periods, and is only expected

TABLE 6-3

LEE COUNTY ENERGY RECOVERY FACILITY
SCREENING MODELING OPTIONS ISCST

Option Description	EPA Dispersion Model ISCST
1. Land Use Classification	Rural
2. Wind Profile Exponents	Rural Default
3. Vertical Potential Temperature Gradient	Default
4. Stack-Tip Downwash	Yes
5. Gradual Plume Rise	No
6. Bouyancy-Induced Dispersion	Yes
7. Pollutant Half-Life	No/Infinite
8. Decalm	NA
9. Meteorology	PTPLU-based Meteorological Conditions ^a
10. Receptors	(footnote ^b)
11. Receptor Elevation	(A) <u>Worst-case elevation</u>
12. Sector Averaging	No
13. Terrain Adjustment Factor	Full
14. Anemometer Height (ft)	20
15. Non-stable Mixing Height (m)	5,000

SOURCE: Camp Dresser & McKee Inc., 1991.

NA = Not Applicable

^a Meteorology Stability Class	Wind Speed (m/s)
A	0.5,0.8,1.0,1.5,2.0,2.5,3.0
B	0.5,0.8,1.0,1.5,2.0,2.5,3.0,4.0,5.0
C	1.0,2.0,2.5,3.0,4.0,5.0,7.0,10.0,12.0,15.0
D	1.0,1.5,2.0,2.5,3.0,4.0,5.0,7.0,10.0,12.0,15.0,20.0
E	2.0,2.5,3.0,4.0,5.0
F	2.0,2.5,3.0,4.0,5.0

^b ISCST Receptors x (km)	Increment (km)
0.1-2.0	0.1
2.2-4.0	0.2
4.5-10	0.5
11-15	1.0

TABLE 6-4

LEE COUNTY ERF SCREENING ANALYSIS RESULTS
FOR VARIOUS OPERATING LOADS
(Concentrations in $\mu\text{g}/\text{m}^3$ using Normalized Emission Rate)

Stoker Waterwall Design Cases						
Throughput (tpd)	<u>1,650^a</u>	<u>1,980</u>	<u>2,604</u>	<u>1,500</u>	<u>1,800^b</u>	<u>2,367</u>
Heat Content (Btu/lb)	6,000	5,000	3,802	6,000	5,000	3,802
Normalized ^c Emission rate (g/s)	1.1	1.1	1.1	1.0	1.0	1.0
Stability Class	Maximum Normalized ^c 1-Hour-Average Concentrations and Downwind Distance (km) from Stack					
A	<u>1.130</u> (0.8)	<u>1.126</u> (0.8)	<u>1.088</u> (0.8)	<u>1.105</u> (0.7)	<u>1.100</u> (0.7)	<u>1.044</u> (0.7)
B	<u>0.750</u> (1.4)	<u>0.747</u> (1.4)	<u>0.716</u> (1.4)	<u>0.727</u> (1.3)	<u>0.724</u> (1.3)	<u>0.692</u> (1.3)
C	<u>0.630</u> (2.0)	<u>0.628</u> (2.0)	<u>0.602</u> (2.0)	<u>0.606</u> (2.0)	<u>0.604</u> (2.0)	<u>0.581</u> (2.0)
D	<u>0.338</u> (3.2)	<u>0.336</u> (3.2)	<u>0.321</u> (3.2)	<u>0.326</u> (3.2)	<u>0.324</u> (3.2)	<u>0.311</u> (3.2)
E	<u>0.297</u> (15.0)	<u>0.296</u> (15.0)	<u>0.285</u> (15.0)	<u>0.283</u> (15.0)	<u>0.282</u> (15.0)	<u>0.273</u> (15.0)
F	<u>0.089</u> (15.0)	<u>0.088</u> (15.0)	<u>0.083</u> (15.0)	<u>0.087</u> (15.0)	<u>0.086</u> (15.0)	<u>0.082</u> (15.0)

SOURCE: Camp Dresser & McKee Inc., 1991.

^a Selected for short-term (24 hours and less) refined analysis.

^b Selected for long-term (annual) refined analysis.

^c Normalized to 1,800 tpd at 5,000 Btu/lb. Assumes a dry scrubber and baghouse.

to exist for short periods of time, this operating condition was applied to dispersion modeling for pollutants with averaging time standards of 24 hours and less. An additional operating case was selected to represent the worst case for pollutants with annual average standards: 1,800 tpd of waste at 5,000 Btu/lb (the design condition). The location of maximum impacts for the individual atmospheric stability classes are provided in Table 6-4.

6.5 DETAILED MODELING ANALYSIS

A detailed dispersion modeling analysis was conducted for the Lee County facility worst-case operating conditions (with the emission rate normalized to the design operating condition) to resolve the maximum impacts over a 1,681-receptor rectangular grid for each year of the 1982 to 1986 sequential hourly meteorological data base. EPA's ISCST dispersion model was used to model Facility impacts for 1-, 3-, 8-, 24-hour, and annual average concentrations. All average concentrations are computed as block averages of 1-hour concentrations. The ISCST detailed modeling options are listed in Table 6-5. All high and highest, second high impacts for each averaging period were included in a "refined analysis" in which they were analyzed with fine resolution grids to further resolve the location and magnitude of the predicted pollutant concentrations for the five-year period. These concentrations were compared to the NAAQS and FAAQS. The modeling results demonstrate that the Facility has a less than significant impact for all criteria pollutants.

6.5.1 RECEPTOR GRIDS

A rectangular "coarse" grid with 500-meter spacing for detailed modeling was developed based on the screening modeling results, and on guidance contained in Guidelines on Air Quality Models (EPA, 1986). The grid was extended outward from the stack location to 10 km in each of the four directions. Screening modeling had indicated that maximum impacts were likely to occur within five km (see Table 6-4). Half-kilometer spacing of gridlines in each direction was initially used. Receptor points were placed at each gridline crossing, for a total of 1,681 receptors. Terrain

TABLE 6-5

LEE COUNTY ENERGY RECOVERY FACILITY
DETAILED MODELING OPTIONS FOR ISCST

Option Description	ISCST
1. Land Use Classification	Rural
2. Wind Profile Exponents	0.07, 0.07, 0.10, 0.15, 0.35, 0.55 (rural default)
3. Vertical Potential Temperature Gradient	Default
4. Stack-tip Downwash	Yes
5. Gradual Plume Rise	No
6. Buoyancy-Induced Dispersion	Yes
7. Half-Life	Infinite
8. Decalm (CALMPRO) ^a	Yes (internal)
9. Meteorology	1982-1986 Sequential-hourly
10. Receptors 21 km x 21 km 500-m spacing	Rectangular Grid
11. Terrain	Yes: all terrain is below stack-top elevation
12. Terrain Adjustment Factors	NA
13. Anemometer Height (m)	6.10

NA = Not Applicable

^aThe CALMPRO algorithm is either "hardwired" within the model (i.e., internal) or it is manually applied to the modeled concentrations (i.e., external).

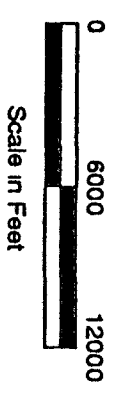
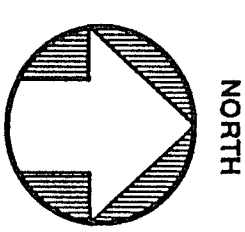
elevations were selected for each receptor point from the appropriate U.S. Geologic Survey (USGS) topographic maps (7.5-minute quadrangles) of the area. The maximum terrain within 250 meters of each receptor was assigned to that receptor. The coarse grid study area and receptor points are shown in Figure 6-2.

Fine resolution grids (with 100-meter resolution) were centered around the receptor locations where the highest, and the highest of the second-highest normalized ground-level impacts for each pollutant averaging period occurred for each of the five years. The purpose of this exercise was to account for the possibility that the highest and highest, second-highest impacts may "flip-flop" when going from a coarse to a fine grid. Fine grids spanned at least a 1.1-km square area centered on each coarse-grid receptor. Terrain corresponding to the fine grid spacing (i.e., highest within 50 meters of each receptor) was employed in the analysis. All five years of meteorological data were re-run for the modeling of each grid. The resultant predicted highest, second highest short-term and maximum long-term modeled fine resolution grid concentrations were used in the comparison of Facility impacts to ambient standards and increments for regulated pollutants.

Additional discrete receptors were positioned at the nearest boundary of the nearest PSD Class I area, the Everglades National Park, 88 km from the Lee County facility. At the request of the National Park Service (NPS, 1990), receptors were also placed at the nearest boundary of the Big Cypress National Preserve, 61 km from the Lee County facility. The Big Cypress National Preserve is considered sensitive to air quality impacts because of its pristine nature and the presence of unusual or endangered plant species (NPS, 1990). Four receptors were placed along the nearest boundary of each area. A detailed discussion of Class I area impacts is presented in Section 7.4.

6.5.2 DETAILED MODELING RESULTS

Results of the ISCST detailed coarse-grid modeling results are tabulated in Table 6-6. These are the highest and the highest of the second-highest



LEGEND

- STACK LOCATION

Poor Original

LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Certification
Camp Dresser & McKee Inc

FIGURE 6-2
COURSE GRID RECEPTOR ARRAY

TABLE 6-6

MAXIMUM COARSE GRID GROUND-LEVEL CONCENTRATIONS
FOR THE LEE COUNTY ENERGY RECOVERY FACILITY

	Averaging Period	Rank ^a	Normalized Ground-Level Concentrations (ug/m ³)				
			1982	1983	1984	1985	1986
<u>ISCST</u>	1-hour ^b	H	<u>1.45</u>	<u>1.33</u>	<u>1.22</u>	<u>1.30</u>	<u>1.20</u>
		HSB	<u>1.05</u>	<u>1.18</u>	<u>1.20</u>	<u>1.14</u>	<u>1.09</u>
	3-hour ^b	H	<u>0.679</u>	<u>0.626</u>	<u>0.664</u>	<u>0.640</u>	<u>0.820</u>
		HSB	<u>0.499</u>	<u>0.531</u>	<u>0.596</u>	<u>0.586</u>	<u>0.556</u>
	8-hour ^b	H	<u>0.339</u>	<u>0.395</u>	<u>0.497</u>	<u>0.528</u>	<u>0.459</u>
		HSB	<u>0.302</u>	<u>0.311</u>	<u>0.401</u>	<u>0.334</u>	<u>0.342</u>
	24-hour ^b	H	<u>0.142</u>	<u>0.162</u>	<u>0.197</u>	<u>0.197</u>	<u>0.173</u>
		HSB	<u>0.101</u>	<u>0.125</u>	<u>0.178</u>	<u>0.150</u>	<u>0.130</u>
	Annual	H	<u>0.0099</u>	<u>0.0125</u>	<u>0.0127</u>	<u>0.0100</u>	<u>0.0117</u>

SOURCE: Camp Dresser & McKee Inc., 1991.

^aAbbreviations: H = Highest
HSB = Highest, Second-Highest

^bThe short-term (24 hours and less) average normalized ground-level concentrations were computed with a 1.1 g/s normalized emission rate, thereby already including the 110% load factor assumed for short-term emissions (1.0 g/s was used for the annual average case). Therefore, to compute actual ground-level concentrations for each pollutant, select the 100% load emission rate for each pollutant from Table 6-2 for all applicable averaging times to multiply with the normalized concentrations shown above.

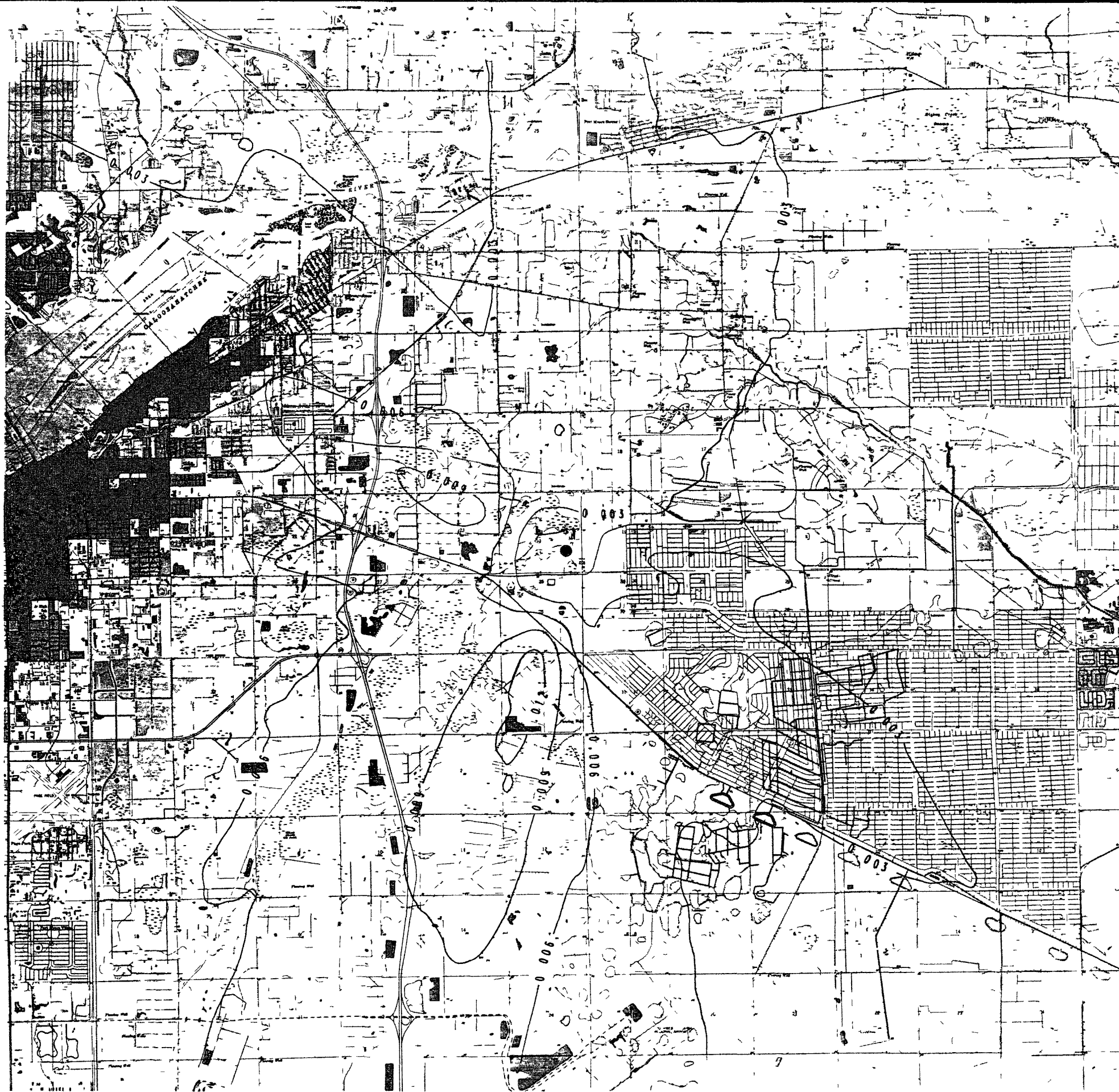
NOTE: All values for each averaging period were resolved further in the fine grid analyses.

predicted concentrations for the two worst-case operating conditions: (1) 110 percent of design thermal load for all short-term (24 hours and less) averaging times; and (2) 100 percent of design thermal load for annual averages. The predicted normalized impacts for the Facility stack emissions have been plotted to illustrate their distribution in the vicinity of the proposed site. Figures 6-3, 6-4, and 6-5 show the normalized unitized impacts predicted for annual, 24-hour, and 3-hour block-averaged periods, respectively. In each case, the distribution of impacts shown is based upon the specific year in which the limiting impact (highest annual average concentration or highest, second-highest short-term concentrations) was predicted.

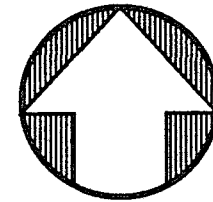
The results of the fine grid analyses are summarized in Table 6-7. Comparisons to the significant impact levels, de minimis monitoring guidelines, and air quality standards are based on the results of the fine grid modeling. The limiting short-term (i.e., 1-, 3-, 8-, and 24-hour) impacts are based on the highest, second-highest (HSH) concentrations for comparisons to the significant impact levels, NAAQS and FAAQS, and PSD increments. However, the highest concentrations were used conservatively for comparison to the de minimis monitoring guidelines (although EPA Region IV and DER do allow the use of HSH concentration). Limiting annual average impacts are based on the highest concentration predicted for the five years of meteorological data. The highest 24-hour concentration was also used as a conservative estimate of the quarterly lead impact and the 30-day average beryllium impact.

Predicted Air Quality Impacts

Ground-level concentrations were modeled for the pollutants anticipated to be emitted by the Lee County facility. The predicted pollutant ground-level concentrations are compared to PSD de minimis monitoring levels and significant impact levels (SIL) in Table 6-8. The predicted concentrations are determined by multiplying the 100 percent load pollutant emission rate (in grams per second) in Table 6-2 by the normalized ground-level concentration estimates (which include the load adjustment factors for the short-term averaging periods) presented in Table 6-7 for



NORTH



0 6000 12000



Scale in Feet

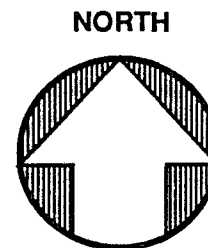
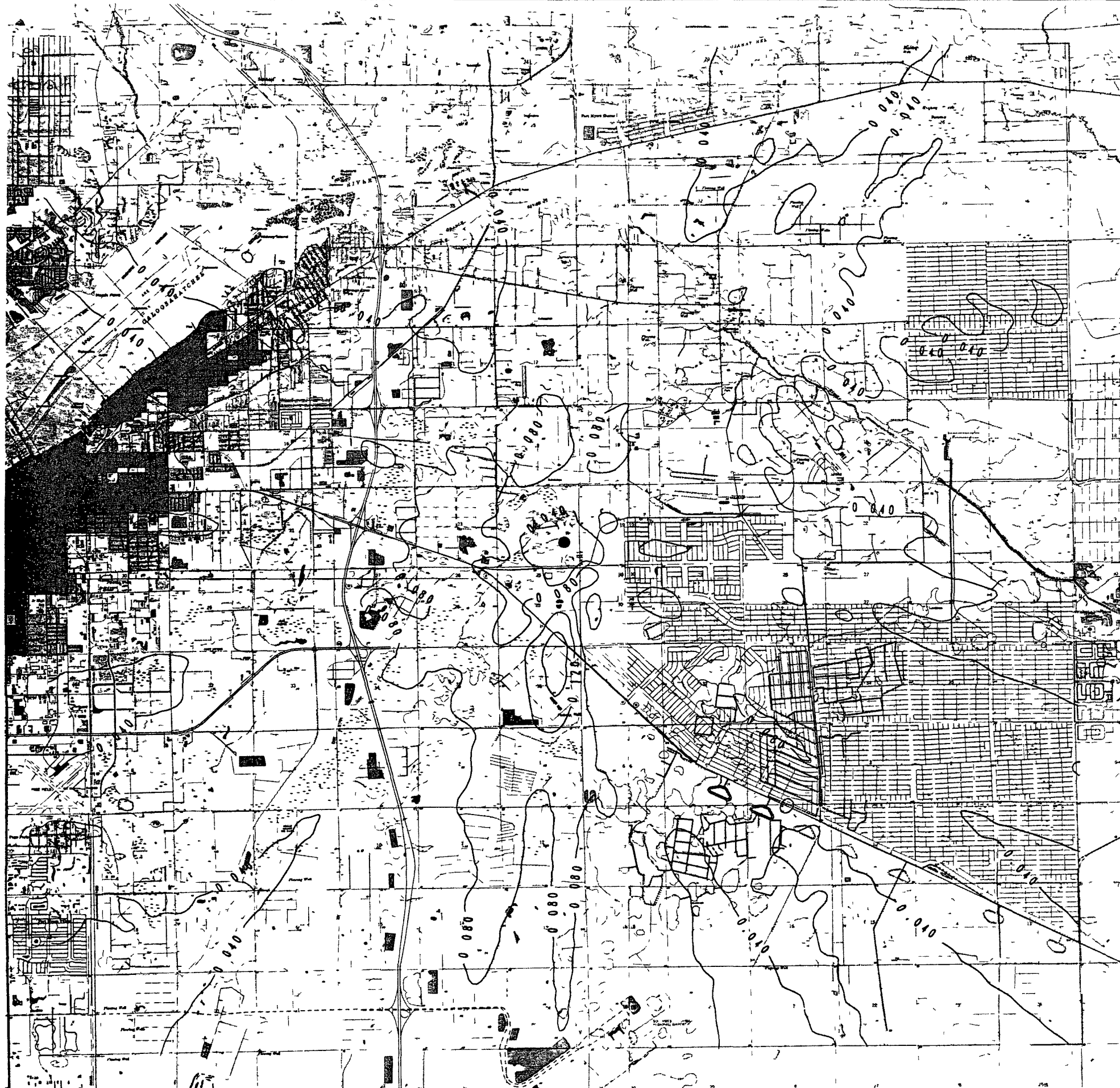
LEGEND

0.000 NORMALIZED
CONCENTRATIONS
IN MICROGRAMS
PER CUBIC METER

Poor Original

LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Certification
Camp Dresser & McKee Inc

FIGURE 6-3
NORMALIZED GROUND-LEVEL
CONCENTRATION ISOPLETHS:
HIGHEST ANNUAL AVERAGE (1984)



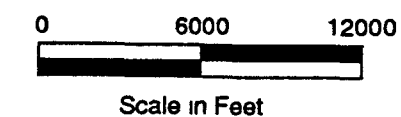
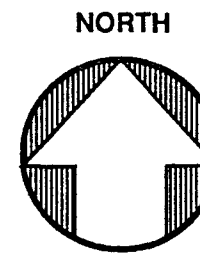
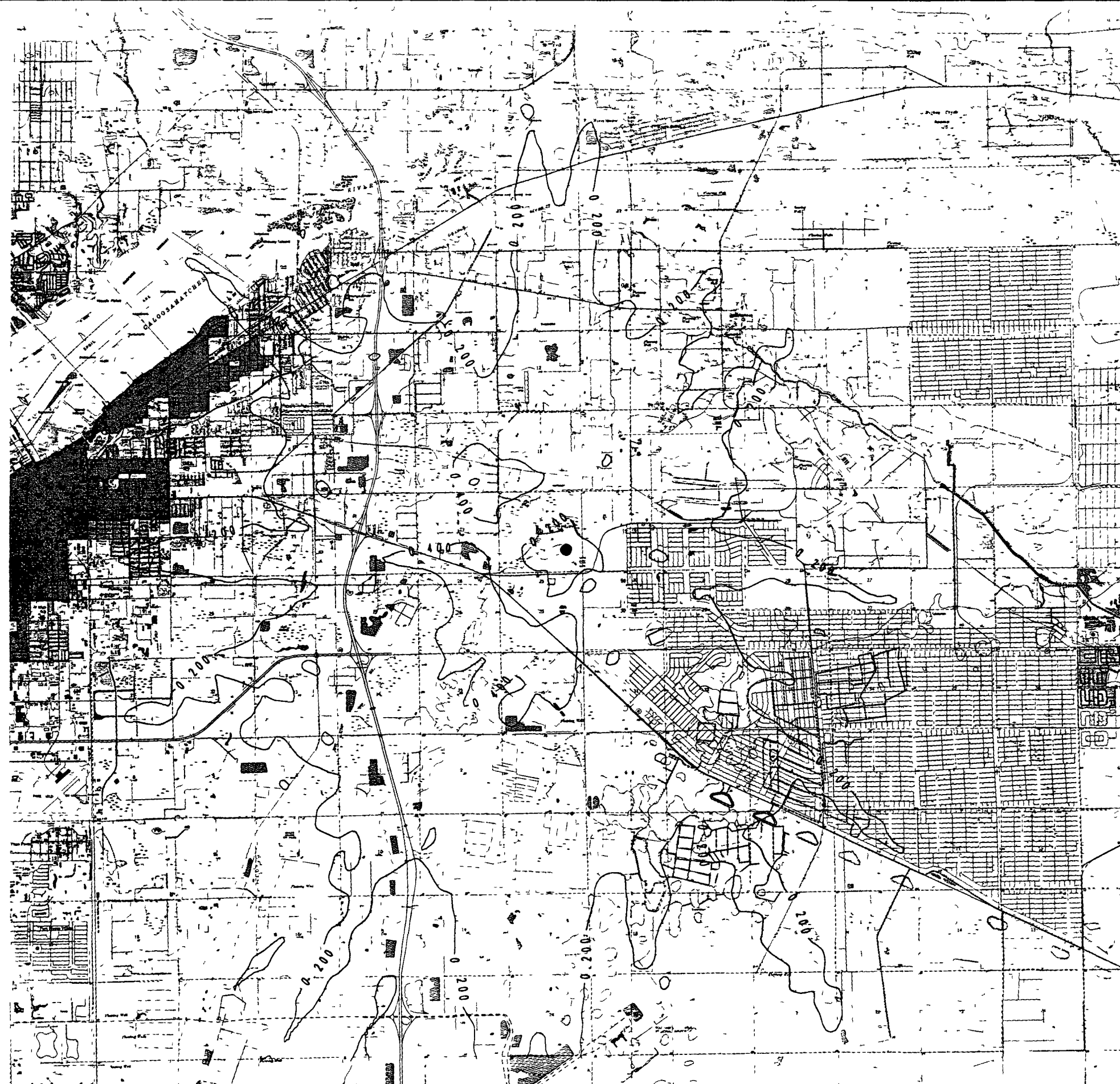
LEGEND

0.000 NORMALIZED
CONCENTRATIONS
IN MICROGRAMS
PER CUBIC METER

Poor Original

LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Certification
Camp Dresser & McKee Inc

FIGURE 6-4
NORMALIZED GROUND-LEVEL
CONCENTRATION ISOPLETHS:
HIGH, SECOND HIGH 24-HOUR AVERAGE



LEGEND

0.000 NORMALIZED
CONCENTRATIONS
IN MICROGRAMS
PER CUBIC METER

Poor Original

LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Certification
Camp Dresser & McKee Inc

**FIGURE 6-5
NORMALIZED GROUND-LEVEL
CONCENTRATION ISOPLETHS:
HIGH, SECOND HIGH 3-HOUR AVERAGE**

TABLE 6-7

- MAXIMUM NORMALIZED GROUND-LEVEL CONCENTRATIONS
 BASED ON THE FINE GRID ANALYSES
 FOR THE LEE COUNTY ENERGY RECOVERY FACILITY

Averaging X/Q Period	Rank ^a	Normalized Ground Level Concentration ($\mu\text{g}/\text{m}^3$)	Receptor Location, Grid Coordinates		Meteorological Period		
			Distance East (m)	Distance North (m)	Year	Day	Period Ending
1-hour	H	1.928	700	500	1982	200	13
	HS	<u>1.258</u>	300	-700	1986	195	13
						120	12
3-hour	H	0.896	0	800	1986	121	5
	HS	<u>0.708</u>	-600	<u>500</u>	<u>1986</u>	<u>161</u>	4
8-hour	H	0.535	-100	-1,800	1984	229	2
	HS	<u>0.433</u>	-100	<u>-1,800</u>	1984	228	2
24-hour	H	0.218	-100	-1,800	1984	229	1
	HS	<u>0.179</u>	0	-2,100	1984	230	1
Annual	H	<u>0.0132</u>	-700	-2,700	1984	N/A	N/A

SOURCE: Camp Dresser & McKee Inc., 1991.

^a Abbreviations: H = Highest
 HSH = Highest, Second-Highest
 N/A = Not Applicable

^b Receptor grid coordinates in meters north and east (south and west are presented as negative numbers) relative to Lee County facility stack.

NOTE: The short-term (24 hours and less) average normalized ground-level concentrations were computed with a 1.1 g/s normalized emission rate, thereby already including the 110% load factor assumed for short-term emissions (1.0 g/s was used for the annual average case). Therefore, to compute actual ground-level concentrations for each pollutant, select the 100% load emission rate for each pollutant from Table 6-2 for all applicable averaging times to multiply with the normalized concentrations shown above.

TABLE 6-8

LEE COUNTY ENERGY RECOVERY FACILITY
COMPARISON OF MAXIMUM PREDICTED CONCENTRATIONS OF
REGULATED POLLUTANTS TO SIGNIFICANT IMPACT AND
DE MINIMIS MONITORING LEVELS
(concentrations in $\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Period	Rank ^a	Maximum Predicted Concentration ^b	Significant Impact Level	PSD De Minimis Monitoring Level
Sulfur Dioxide (SO_2)	Annual	H	<u>0.19</u>	1	—
	24-hour	H	3.1	—	13
		HSH	<u>2.52</u>	5	—
	3-hour	H	15.8	—	—
		HSH	<u>12.5</u>	25	—
Nitrogen Dioxide (NO_2)	Annual	H	<u>0.36</u>	1	14
Particulate Matter (as TSP or PM_{10})	Annual	H	<u>0.024</u>	1	—
	24-hour	H	0.40	—	10
		HSH	<u>0.33</u>	5	—
Carbon Monoxide (CO)	8-hour	H	5.0	—	575
		HSH	<u>4.0</u>	500	—
	1-hour	H	71.9	—	—
		HSH	<u>46.9</u>	2,000	—
Lead (Pb)	3-month	H	<u>0.012^c</u>	—	0.1
Mercury (Hg)	24-hour	H	<u>0.012</u>	—	0.25
Beryllium (Be)	24-hour	H	<u>2.79×10^{-6}</u>	—	1×10^{-3}
Fluorides (as HF)	24-hour	H	<u>0.072</u>	—	0.25

SOURCE: Camp Dresser & McKee Inc., 1991.

^aAbbreviations: H = Highest concentration
HSH = Highest, second-highest concentration

^bLocation and time-of-occurrence for maximum impacts (by rank) are provided in Table 6-7.

^cThe de minimis monitoring level for lead is a quarterly-averaged value. The 24-hour highest average concentration was substituted as a conservative estimate of the quarterly value.

NOTE: No significance guideline level is exceeded.

the appropriate averaging time. The highest predicted impacts are below the de minimis monitoring levels. Therefore, in accordance with 40 CFR 52.21(i)(8), the DER may exempt the Facility from pre-construction monitoring requirements. In light of the modeling results shown in Table 6-8, DER concurred (December 5, 1990) that pre-construction monitoring is not required.

The significant impact levels (SIL) are concentrations below which a Facility would not be considered to cause or contribute to a violation of the NAAQS (40 CFR 51.165(b)(2)). Table 6-8 shows that maximum predicted impacts for all regulated pollutants emitted by the Lee County facility are below the corresponding SILs. Therefore, no further impact analysis of predicted cumulative effects of this Facility with other nearby major sources is required, based on U.S. EPA guidance.

6.6 COMPARISON WITH AMBIENT AIR QUALITY STANDARDS

The purpose of the following analysis is to demonstrate that the proposed Facility will not cause or contribute to an exceedance of NAAQS/FAAQS. As shown in Section 6.5, the Facility has an insignificant impact for all criteria pollutants based on the modeling period 1982 to 1986. To conservatively demonstrate compliance with the NAAQS/FAAQS, the highest second-highest short-term, or highest annual modeled impacts of the Facility are added to the ambient background concentrations derived in Table 5-5. The comparison, presented in Table 6-9, is made with the more stringent of the federal or state standard.

The Facility impacts alone are very small in comparison to the ambient air quality standards. All Facility impacts consume less than 1.0 percent of the corresponding NAAQS/FAAQS. The highest 24-hour average lead impact is 0.012 ug/m³, or 0.8 percent of the Florida quarterly standard. This percentage is inherently conservative because the highest 24-hour average concentration was used to estimate the quarterly impact. The highest, second-highest 3-hour and 24-hour SO₂ concentrations represent only 0.96 percent and 0.97 percent of the respective FAAQS. The highest annual SO₂ impact is only 0.3 percent of the FAAQS. The highest second-highest total

TABLE 6-9

COMPARISON OF PREDICTED IMPACTS FROM THE LEE COUNTY ENERGY RECOVERY FACILITY
AND AMBIENT BACKGROUND CONCENTRATIONS TO THE NAAQS/FAAQs
(concentration in $\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Time	Rank ^a	NAAQS/FAAQs ^b	Facility Impact	Facility Impact as Percent of Standard	Ambient Background Concentration	Total Impact	Total Impact as Percent of Standard
Sulfur Dioxide	3-Hour	HSH	1,300 (1300)	12.5	0.96	199	211.5	16.3
	24-Hour	HSH	260	2.52	0.97	54	56.52	21.7
	Annual	H	60	0.19	0.3	9		15.3
Nitrogen Dioxide	Annual	H	100 (100)	0.36	0.4	42	42.4	42.4
Particulate Matter (as PM_{10})	24-Hour	HSH	150 (150)	0.33	0.2	58	58.3	38.9
	Annual	H	50 (50)	0.024	0.05	30	30.0	60.0
Carbon Monoxide	1-Hour	HSH	40,000	47.0	0.12	9200	9247	23.1
	8-Hour	HSH	10,000	4.0	0.04	4600	4604	46.0
Lead	3-Month	H	1.5 (1.5)	0.012 ^c	0.8	0.1	0.11	7

SOURCE: Camp Dresser & McKee Inc., 1991.

^aAbbreviations: H = Highest
HSH = Highest Second-Highest

^bThe more stringent of federal or state standard is given. Secondary standards are shown in parentheses.

^cHighest 24-hour average concentration used to conservatively estimate 30-day or 3-month average concentration.

PM₁₀ 24-hour concentration is 0.2 percent of the 150 ug/m³ ambient standard, whereas the highest annual PM₁₀ concentration is 0.05 percent of the annual ambient standard of 50 ug/m³. The modeled highest annual NO₂ concentration is 0.4 percent of the FAAQS. Predicted highest second-highest carbon monoxide concentrations for one- and eight-hour averaging periods consume only 0.12 and 0.04 percent of their respective NAAQS/FAAQS.

The tabulated total impacts shown in Table 6-9 suggest that the NAAQS/FAAQS will be maintained by substantial margins. The largest estimated total concentration as a percent of its NAAQS/FAAQS is obtained by adding the estimated PM₁₀ annual impact and the monitored background concentration. The total annual PM₁₀ impact is 60 percent of the FAAQS; however, the impact from the Facility alone is only 0.05 percent of the standard. While the total highest second-highest 24-hour PM₁₀ impact is 39 percent of the FAAQS, the impact from the Facility alone is 0.33 ug/m³, or 0.2 percent of the FAAQS.

The highest total annual impact for nitrogen dioxide is 42 percent of the standard, whereas the impact for the Facility alone is only 0.4 percent of the FAAQS. The 3-hour, 24-hour, and annual total impacts for sulfur dioxide are all less than 22 percent of their respective NAAQS/FAAQS. The total three-month lead impact consumes only seven percent of the lead standard, while the total carbon monoxide one- and eight-hour impacts consume less than 46 percent of their respective NAAQS/FAAQS.

6.7 ASSESSMENT OF NON-CRITERIA POLLUTANT IMPACTS

In the context of this discussion the term "non-criteria pollutant" is used as a general term for all pollutants listed in Table 6-10. These pollutants do not have FAAQS or NAAQS, and the Florida Department of Environmental Regulation has not officially adopted a set of Acceptable Ambient Levels (AALs) applicable to energy recovery facilities for the assessment of acceptable ground-level concentrations.

TABLE 6-10

MAXIMUM PREDICTED CONCENTRATION OF NON-CRITERIA POLLUTANTS
RESULTING FROM LEE COUNTY ERF EMISSIONS

Pollutant ^a	Averaging Period	Highest Concentration (ug/m ³)	ACGIH TLV ^b (ug/m ³)	North Carolina AAL ^c (ug/m ³)	Kentucky AAL ^d (ug/m ³)
Mercury (Hg)	8-hour	3.0×10^{-2}	50	—	2.38
	24-hour	1.2×10^{-2}	—	0.6	—
	Annual	7.5×10^{-4}	—	—	—
Beryllium (Be)	8-hour	6.85×10^{-6}	2.0	—	BR
	24-hour	2.79×10^{-6}	—	—	—
	Annual	1.69×10^{-7}	—	4.1×10^{-3}	—
Fluorides (as HF)	1-hour	0.638	—	250	—
	8-hour	0.177	2,000	—	—
	24-hour	0.072	—	30	49,070
	Annual	4.37×10^{-3}	—	—	—
Sulfuric Acid Mist (H ₂ SO ₄ aqueous)	1-hour	6.52	—	100	—
	8-hour	1.81	1,000	—	23.8
	24-hour	0.737	—	12	—
	Annual	0.045	—	—	—
Arsenic (As)	8-hour	4.6×10^{-4}	200	—	BR
	24-hour	1.87×10^{-4}	—	—	—
	Annual	1.14×10^{-5}	—	2.3×10^{-4}	—
Hydrogen Chloride ^e	1-hour	11.7	—	700	167
	8-hour	3.25	7,000	—	—
	24-hour	1.33	—	—	—
	Annual	0.083	—	—	—
Dioxins ^e (Total tetra-octa TCDD & PCDF)	Annual	3.17×10^{-8}	—	3.0×10^{-6}	BR

REVISED 8/5/91

TABLE 6-10
(continued)

SOURCE: Camp Dresser & McKee Inc., 1991.

^aAsbestos, vinyl chloride, and hydrogen sulfide are regulated (40 CFR 52.21) pollutants with nil emission rates from the proposed Lee County RRF. Therefore, the resulting ambient impacts are nil, and are not listed.

^bAmerican Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1989-1990.

^cAcceptable Ambient Levels, North Carolina Administrative Code, Title 15A, Chapter 2, Subchapter 2D, effective May 1, 1990. 15-minute averaging times for the standards of acid gases have been applied to one-hour average facility concentrations.

^d"Y" values from Kentucky Air Regulation 401KAR63:022, "New or Modified Sources Emitting Toxic Air Pollutants." The "Y" values are a function of the number of Facility operating hours per week, assumed, in this case, to be 168. The fluoride standard shown is an approximation of the actual standard, 60 ppm for a 2-month averaging period, from Appendix A of Regulation 401KAR53:010.

^eHydrogen chloride and dioxins are not regulated under the Clean Air Act or NESHAPS, and thereby are not PSD regulated pollutants.

^fNot specified as 2,3,7,8 - TCDD toxic equivalents. Standard applicable after May 1, 1991.

BR - BACT required if emission rate exceeds review threshold.

6.7.1 ASSESSMENT METHODS

Guideline concentrations for short- and long-term periods, including industrial toxicological limits (eight-hour time-weighted averages) and threshold levels (24-hour and annual averages), from states which have air toxics management programs as part of their air pollution control regulations are listed in Table 6-10. These are compared with modeled ground-level concentrations of mercury, beryllium, hydrogen fluoride, sulfuric acid mist, arsenic, and hydrogen chloride.

Threshold limit values (TLVs) adopted by the American Conference of Governmental Industrial Hygienists (ACGIH) are presented for comparison with eight-hour average concentrations from the Facility. These limits are normally intended for use in the practice of industrial hygiene for eight-hour work day and 40-hour work week exposures, and not for estimating the toxic potential of continuous, uninterrupted exposures. It is believed that nearly all workers may be repeatedly exposed day after day to a TLV without adverse effects (Plunkett, 1976). The ACGIH TLV values are the most complete listing of quantified acceptable exposure levels available. Of the eight states in the U.S. EPA Region IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee), only North Carolina and Kentucky have toxic air pollutant acceptable ambient levels (AALs) adopted into their state air pollution control regulations (Sam Amersum and Sandra Burckhead North Carolina Division of Environmental Management, June 11, 1991) (Marjorie Mullen, Environmental Engineering Technologist, Principal, Kentucky Department of Environmental Protection, June 11, 1991). South Carolina has revised draft AALs, which were adopted year (1991) (John Hursey, Environmental Engineer, South Carolina Department of Health and Environmental Control, June 11, 1991).

Tennessee is currently in the process of reviewing EPA 1990 CAA list of 189 air toxics to update their air toxic guidelines. These guidelines will assess impacts based on 5 to 10 percent of the ACGIH TLVs as an eight-hour standard which should be adopted by July, 1991. (Ron Redus, Environmental Specialist, Tennessee Air Pollution Control Division, June 11, 1991). Alabama uses guidelines based on the ACGIH TLVs. The predicted one-hour

screening concentrations are compared to the TLV divided by a factor of 40. The annual average concentrations, using the ISCLT model, are compared to TLV divided by a safety factor of 420. Each pollutant must comply with at least one of these guidelines (Jeff Walker, Alabama Department of Environmental Management, June 11, 1991). Georgia has air toxic guidelines which compare most pollutant impacts to acceptable ambient concentrations (AACs), based on the standards set forth by the Occupational Safety and Health Administration (OSHA). Any values not specifically shown as AACs are compared to ACGIH standards. Both sets of guideline values are a function of the number of hours per week emissions would occur, and are divided by a safety factor of 300 for known human carcinogens, or by 100 for non-carcinogens. The Georgia AACs are set as 24-hour averages (Jean Drew, Chemical Engineer, Georgia Department of Natural Resources, June 11, 1991).

Mississippi uses toxic air pollutant guidelines which compare annual predicted ambient concentrations to one percent of the TLVs. Proposed new guidelines would change this approach to compare the 24-hour predicted concentrations to one percent of the TLVs. For pollutants which are known carcinogens, a risk assessment is also required. Where carcinogenic pollutant concentrations are found to be within a certain risk value range, permit approval is assessed on a case-by-case basis, taking into consideration actual population exposure (Eliot Berkerstaff, Environmental Engineer, Air Planning Division, Mississippi Department of Natural Resources, June 12, 1991).

Florida is in the process of developing draft "no-threat" levels for toxic air pollutants. It is expected that these will become policy guidelines within the next month (July, 1991) (John Glunn, DER, June 6, 1991), although it is the Applicant's understanding that DER does not intend them to be applied to energy recovery facilities. Table 6-10 shows modeled maximum Facility ground-level concentrations of non-criteria pollutants in comparison with the ACGIH TLVs, and with the adopted standards established in North Carolina and Kentucky.

6.7.2 COMPARISON WITH ACGIH TLVs AND AALs

Highest impacts of non-criteria pollutants listed in Table 6-10 are substantially less than the ACGIH TLVs and the two sets of AALs. The proposed Lee County ERF emissions will not likely pose a health significant risk to the surrounding population because the ground-level concentrations do not exceed acceptable levels for short- or long-term periods, as established by agencies with established regulations and air toxics research and management programs.

6.8 COMPARISON WITH PSD INCREMENTS

The Lee County energy recovery facility is a major source of SO₂, NO₂, and TSP emissions as defined in 40 CFR 52.21(b)(1)(i), and as presented in this application in Table 2-1. As such, it is subject to a PSD increment consumption analysis to ensure compliance with all PSD increments. Lee County and all adjacent counties are designated as PSD Class II areas (FAC 17-2.440), except for the southwestern tip of Collier County, which is occupied by part of the Everglades National Park. The Everglades is the only PSD Class I area within 100 km of the proposed Facility. The closest border of this Class I Area is 88 km (or 55 miles) to the south-southeast. At the request of the National Parks Service (NPS, 1990), the Big Cypress National Preserve, 61 km (about 38 miles) southeast of the proposed Facility, was treated as an air quality-sensitive area. Estimated maximum ground-level pollutant concentrations from the Facility were modeled for receptors along the nearest boundaries of both parks, and compared to Class I area significant impact levels (SILs) and PSD increments.

The following sections discuss impacts on these areas, classified as in attainment of the FAAQS and NAAQS. A discussion of Facility impacts in non-attainment areas is presented in Section 7.7.

6.8.1 PSD CLASS II AREAS

The baseline date for TSP and SO₂ was triggered for the entire state of Florida on December 27, 1977 [FAC 17-500(4)(b)(2.c)]. The major source

baseline data for NO_2 was set nationally on February 8, 1988 (53 FR 4061, October 17, 1988). All new sources and modifications subject to PSD review after these dates are assumed to be PSD-increment consuming sources. On October 5, 1989, EPA proposed to revise the maximum allowable increases for particulate matter (54 FR 41218). The proposed increments would define maximum allowable increments in concentrations of PM_{10} for Class I, II, and III areas. These changes are proposed because EPA believes that the increments for particulate matter should be measured by the same pollutant indicator as the NAAQS. The implementation date for this change from TSP to PM_{10} based increments has not been set, and may take 21 to 25 months to become effective once the date is set. Therefore, the TSP increments currently in effect will be used; comparison with proposed PM_{10} increments will be discussed.

Ground-level impacts predicted for the Lee County energy recovery facility are shown in Table 6-8 to be below the significant impact levels for each applicable averaging period at all modeled receptors within PSD Class II areas for the 1982 to 1986 period. Therefore, additional modeling to determine the effect of other PSD sources on the available Class II increments is not required. However, as a post-baseline source of SO_2 , NO_2 , and TSP, the Facility is considered to consume PSD increments for these pollutants for the applicable averaging periods.

All dispersion modeling for the PSD Class II area was based on five years (1982 to 1986) of hourly meteorological data, and on the worst-case operating conditions and Cartesian receptor grid discussed in Section 6.5.

Modeling Results

No PSD Class II increment is exceeded by any of the modeled pollutants. Each pollutant consumes less than three percent of its PSD increment. The highest annual SO_2 impact, shown in Table 6-11, is 1.0 percent of the allowable increment. The highest, second-highest SO_2 impacts are 2.4 and 2.8 percent of the 3-hour and 24-hour increments, respectively. The highest annual TSP impact is 0.13 percent of the allowable increment, and the highest, second-highest 24-hour impact is 0.9 percent of the TSP

TABLE 6-11

COMPARISON OF IMPACTS FROM THE LEE COUNTY ENERGY RECOVERY FACILITY
TO PSD CLASS II INCREMENTS

Pollutant	Averaging Period	Rank ^a	Maximum Impacts from Facility (ug/m ³)	PSD Class II Increment	Maximum Impact as a Percent of Increment
Sulfur Dioxide (SO ₂)	Annual	H	0.19	20	1.0
	24-hour	HSB	2.52	91	2.8
	3-hour	HSB	12.5	512	2.4
Total Suspended Particulate Matter (TSP)	Annual	H	0.024	19	0.13
	24-hour	HSB	0.33	37	0.9
Particulate ^b Matter (PM ₁₀)	Annual	H	0.024	17 ^c	0.14
	24-hour	HSB	0.33	30 ^c	1.1
Nitrogen Dioxide (NO ₂)	Annual	H	0.36	25	1.4

SOURCE: Camp Dresser & McKee Inc., 1991.

^aAbbreviations: H = Highest
HSB = Highest, Second-Highest^bConservative estimate assuming all TSP is in the form of PM₁₀.^cProposed EPA standard (54 FR 41218; October 5, 1989).

allowable increment. The highest annual nitrogen dioxide impacts are 1.4 percent of the PSD increment.

The highest annual PM_{10} ground-level impact for the Class II areas is 0.024 ug/m^3 , or 0.14 percent, of the proposed Class II PSD increment of $17 ug/m^3$. The highest, second-highest 24-hour PM_{10} impact is 0.33 ug/m^3 , or 1.1 percent, of the proposed increment of $30 ug/m^3$.

6.8.2 PSD CLASS I AND SPECIAL RECEPTOR AREAS

The Federal PSD regulations, FAC Section 17-2.440, and 40 CFR 52.21, require that a proposed source subject to PSD review conduct a dispersion modeling analysis of its impacts on any PSD Class I areas located within a 100 km radius. In this case, there is one applicable formal Class I area, the Everglades National Park, located 88 km south-southeast of the proposed Facility. At the request of the National Park Service (NPS, 1990), impacts at Big Cypress National Preserve, a Class II area located 61 km southeast of the Facility, are also modeled. As a conservative comparison, highest annual and highest short-term impacts at both areas are compared to Class I area SILs and PSD increments.

The air quality impact analysis was conducted using ISCST to demonstrate that the proposed Lee County Facility would not have a significant impact, or produce an exceedance of an allowable PSD increment. The modeling is consistent with the procedure outlined in Section 6.5, except for the use of the receptor grid. A set of discrete receptors, shown on Table 6-12 and in Figure 6-6, was placed along each park boundary closest to the proposed Facility. Receptors were spaced at a resolution of between two and five azimuth degrees from the Facility stack, and each was assigned a ground-level elevation of five feet (msl).

Modeling Results

The special receptor modeling results are presented in Table 6-13. The highest annual and highest 24-, 8-, 3-, and 1-hour normalized concentrations are given along with the date, time, and specific receptor point at which the impact occurred.

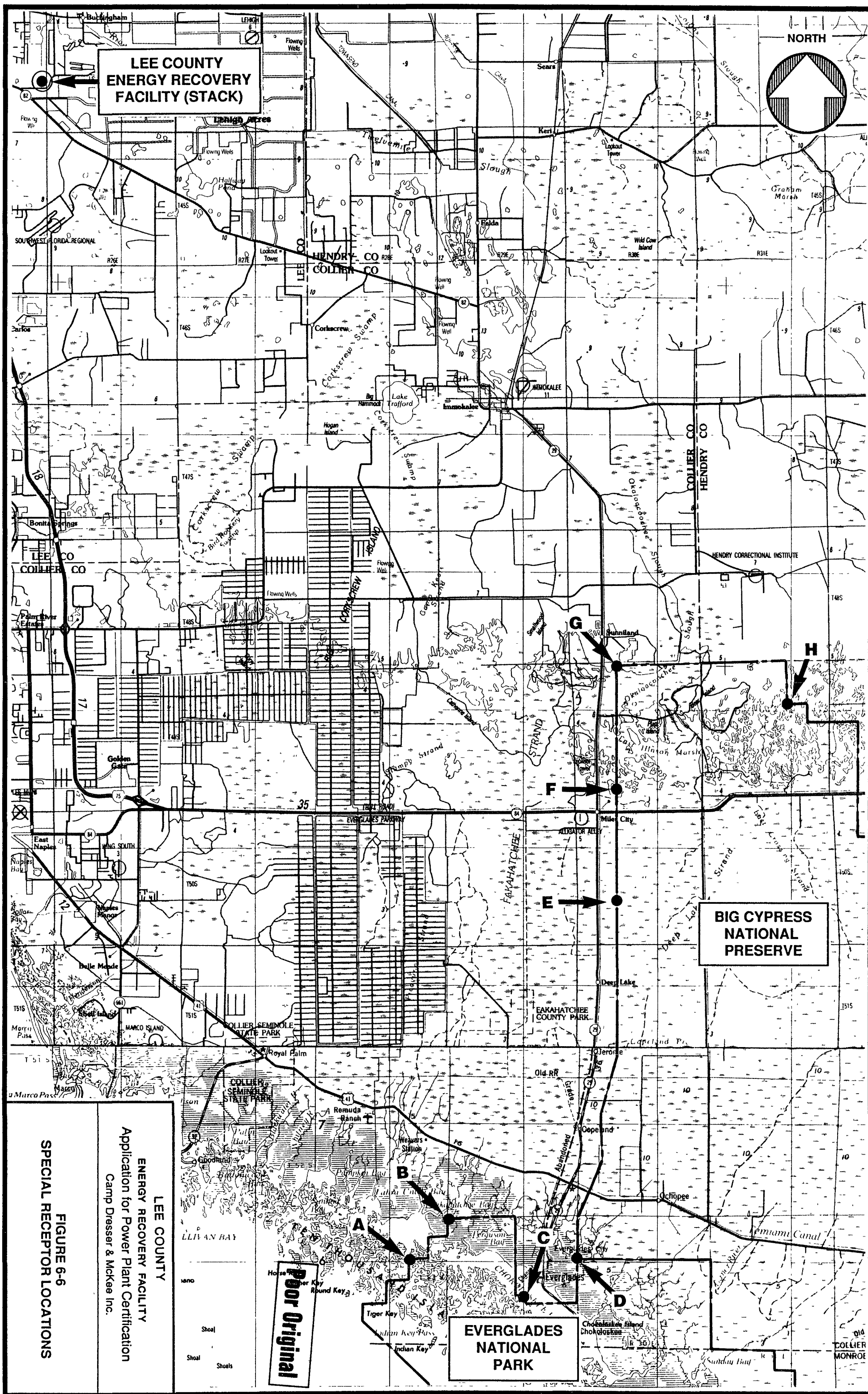


TABLE 6-12

SPECIAL DISCRETE RECEPTOR LOCATIONS
USED IN THE PSD INCREMENT CONSUMPTION ANALYSIS

Special Receptor	Distance Relative to Facility (km)	Receptor Coordinates		Assigned Elevation (ft, msl)	Reference Letter
		UTM-East (km)	UTM-North (km)		
Everglades	90	452	2,860	5	A
National Park	88	454	2,863	5	B
(Class I Area)	95	460	2,858	5	C
	95	464	2,860	5	D
Big Cypress	74	467	2,886	5	E
National	67	467	2,894	5	F
Preserve	61	467	2,903	5	G
	72	480	2,901	5	H

SOURCE: Camp Dresser & McKee Inc., 1991

Maximum predicted concentrations for the Everglades and Big Cypress National Preserve are compared to significant impact levels and Class I PSD increments in Table 6-14. All of the impacts are below the corresponding SILs. The impacts are also well below the Class I PSD increments.

At the Everglades National Park, the maximum 3- and 24-hour SO_2 impacts are 3.2 and 2.4 percent of their PSD increments, respectively. The maximum annual SO_2 , TSP, PM_{10} , and NO_2 impacts are all less than 0.5 percent of their allowable increments, and the maximum 24-hour impacts for TSP and PM_{10} are each approximately 0.2 percent of the PSD increments.

At Big Cypress National Preserve, the SO_2 maximum impacts are 4.4 and 3.6 percent of the 3- and 24-hour Class I PSD increments, respectively. The maximum annual SO_2 , TSP, PM_{10} , and NO_2 impacts are each less than 1.0 percent of the corresponding Class I PSD increments. The maximum 24-hour TSP and PM_{10} impacts are 0.2 and 0.3 percent of their corresponding Class I PSD increments.

TABLE 6-13
SPECIAL RECEPTOR MODELING RESULTS

Averaging Period	Receptor	Reference Letter	Maximum Normalized Concentration ^a (ug/m ³)	Day	Period	Year
Annual	Everglades ^b	B	0.00042	—	—	1986
	Big Cypress ^c	H	<u>0.00057</u>	—	—	1983
24-hour	Everglades	A	0.00849	7	1	1984
	Big Cypress	G	<u>0.01290</u>	11	1	1983
8-hour	Everglades	A	0.02279	123	1	1986
	Big Cypress	G	<u>0.03158</u>	157	3	1986
3-hour	Everglades	A	0.04558	123	1	1986
	Big Cypress	G	<u>0.06191</u>	154	3	1985
1-hour	Everglades	A	0.08313	47	19	1984
	Big Cypress	H	<u>0.12636</u>	16	19	1984

SOURCE: Camp Dresser & McKee Inc., 1991.

^aHighest annual and highest short-term values shown.

^bThe Everglades National Park, Class I area, 88 km south-southeast of the proposed Lee County Facility at the nearest point.

^cBig Cypress National Preserve, 61 km southeast of the proposed Lee County Facility at the nearest point.

TABLE 6-14

COMPARISON OF MAXIMUM CONCENTRATIONS
AT SPECIAL RECEPTOR LOCATIONS
TO CLASS I SIGNIFICANT IMPACT LEVELS AND PSD INCREMENTS
(concentrations in $\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Time	Maximum Predicted Concentration		Class I Significant Impact Level ^c	PSD Class I Increments	Impact as % of PSD Increment	
		Everglades ^a	Big Cypress ^b			Everglades	Big Cypress
SO ₂	Annual	0.006	0.008	(1) ^d	2	0.3	0.4
	24-hour	0.120	0.182	1	5	2.4	3.6
	3-hour	0.802	1.090	(25) ^d	25	3.2	4.4
TSP	Annual	0.0008	0.001	(1) ^d	5	0.02	0.02
	24-hour	0.016	0.024	1	10	0.2	0.2
PM ₁₀	Annual	0.0008	0.001	(1) ^d	4 ^e	0.02	0.03
	24-hour	0.016	0.024	1	8 ^e	0.2	0.3
NO ₂	Annual	0.012	0.016	(1) ^d	2.5	0.5	0.6

SOURCE: Camp Dresser & McKee Inc., 1991.

^aEverglades National Park, Class I area.

^bBig Cypress National Preserve, Class II area.

^cFAC 71-2.100(170)

^dClass II value is given. Class I value is not available.

^eProposed EPA Standard (54 FR 41218; October 5, 1989).

NOTE: No Class I Significant Impact Level is exceeded.

REVISED 6/28/91

Section 7

SECTION 7.0
ADDITIONAL IMPACT ANALYSES

deposition velocity is greater than that determined in the field for SO_2 deposition on grass (0.8 cm/sec), and therefore provides a conservative estimate of potential impacts. The deposition rates were calculated by multiplying the deposition velocities by the annual ground-level concentrations at the point of maximum impact, and used to assess pollutant impacts throughout the study area.

Incremental soil concentrations were predicted by assuming that accumulation of pollutants within the first centimeter of soil would occur over the 30-year lifespan of the Facility, and that an average soil density is $1,500 \text{ kg/m}^3$.

7.5.2 SPECIFIC POLLUTANTS

The potential impacts to soil and vegetation resulting from the Facility's pollutant emissions are discussed for the following specific compounds and materials: total suspended particulates (TSP), carbon monoxide (CO), sulfuric acid (H_2SO_4), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), fluoride (F), lead (Pb), mercury (Hg), beryllium (Be), arsenic (As), and hydrogen chloride (HCl).

Total Suspended Particulates (TSP)

Particulates can adversely impact vegetation by coating foliage, thus blocking sunlight required for photosynthesis and/or interfering with gas exchange. The projected addition of particulates to ambient air by the Facility will consist entirely of relatively fine particles that will not be deposited in significant amounts. Based on the maximum concentration for TSP of 0.024 ug/m^3 , deposition over a 30-year period would be 0.451 g/m^2 and would contribute less than 31 mg/kg to the top centimeter of soil. This is a small fraction of the settleable particulate matter that naturally occurs. The predicted particulate emissions from the Facility are less than one percent of the NAAQS, and are not expected to have a significant impact either on soils or on vegetation. Chemical species attached to particulates are generally recycled as nutrients or fixed in a form unavailable to vegetation. No significant coating of foliage,

blockage of sunlight, or interference with plant gas exchange processes is expected. Particulate contribution to soils via settling from the air will be very minor, and no increase in soil depth, appearance, or texture is anticipated.

Carbon Monoxide (CO)

Plants appear to be resistant to high levels of CO. In most species tested, exposure to 115 mg/m^3 for up to three weeks did not produce visible injury (Zimmerman et al., 1983).

The proposed Facility will contribute a maximum annual average CO concentration of 0.12 ug/m^3 . Total concentrations, as a result of Facility operations, will thus be far below concentrations which would cause visible injury to vegetation.

Sulfuric Acid (H_2SO_4)

H_2SO_4 is formed when gaseous SO_3 produced by the Facility reacts with atmospheric water vapor to form acidified water vapor which can create acidic (low-pH) precipitation. The Facility will add an estimated maximum annual average of $4.45 \times 10^{-2} \text{ ug/m}^3$ of H_2SO_4 . It is not anticipated that this concentration will contribute significantly to acidic precipitation. It is very small when compared to existing concentrations from other sources such as fossil-fuel power plants. However, it is not possible to precisely predict the amount of acid deposition on plant surfaces, because: (1) H_2SO_4 aerosols are neutralized by the presence of ammonia in the atmosphere (Huntzicher et al., 1980); (2) observed effects of acid precipitation on vegetation may be positive due to fertilization impacts of sulfur, or negative due to the leaching of leaf surfaces; and (3) the impact of emissions of H_2SO_4 from a single facility on vegetation cannot be differentiated from the impacts of acid rain from background sources.

Sulfur Dioxide (SO_2)

A maximum annual ground-level concentration for SO_2 of 0.19 ug/m^3 is predicted from the Facility. This value, when added to a background level

of 6 ug/m^3 , is far below the $200\text{--} \text{ug/m}^3$ threshold concentration which could cause a reduction in the relative growth rate of a pine species.

Sensitivity of plant species to SO_2 appears to vary not only with the climate of an area, but with the duration of exposure. Garsed and Rutter (1982) reported that various species of conifer (Pinus sp.) had markedly differing sensitivities to levels of SO_2 , ranging from 200 ug/m^3 for 11 months to $8,000 \text{ ug/m}^3$ for six hours. A 14 percent reduction in relative growth rate was seen in one pine species at prolonged exposures to the 200 ug/m^3 dosage level. A number of oak and pine species (e.g., black and red oak, white pine) have been reported to develop visible injury when exposed to concentrations of SO_2 between 786 and $1,572 \text{ ug/m}^3$ for three hours (Jones et al., 1974).

Nitrogen Dioxide (NO_2)

Direct deposition of nitrogen oxides from the atmosphere to soils adds nitrogen to the soil, which is beneficial to plant growth. However, some nitrogen dioxide in the atmosphere can also be converted to nitric acid, and contribute to acid precipitation. It is estimated that the impacts on increased acid deposition due to the Facility will be negligible. The Facility will produce a maximum annual NO_2 concentration of 0.36 ug/m^3 . The maximum annual ambient NO_2 concentration monitored for the project area was 40 ug/m^3 (to which the Facility would contribute less than one percent). Total concentrations will thus be far below the estimated threshold level (120 ug/m^3) of injury to certain plants, as discussed below.

The short-term injury threshold for NO_2 -tolerant species, such as corn and sorghum, has been found to be $24,400 \text{ ug/m}^3 \text{ NO}_2$ for a one-hour exposure when grown in a controlled environment (Thompson et al., 1974). Continuous exposure throughout the growth period to $470 \text{ ug/m}^3 \text{ NO}_2$ reduced size and productivity and increased senescence in tomatoes and navel oranges (Taylor et al., 1975). The concentration of NO_2 has been found to be a greater influence on the extent of injury than the length of exposure.

The greater-than-additive effect of NO_2 and SO_2 in combination on crops has been shown to vary between crop species and varieties. In a study of yield reduction in soybeans, no adverse effects were observed at atmospheric concentrations of 481 ug/m^3 SO_2 in combination with 155 ug/m^3 of NO_2 (Amundson, 1983). The results of these investigations indicate that the presence of elevated levels of NO_2 in the atmosphere in combination with SO_2 above a threshold level can lead to adverse crop response. NO_2 concentrations below 120 ug/m^3 have not been reported to produce injury in the absence of other pollutants (Thompson et al., 1974).

Fluoride (F Compounds)

Fluorides include a group of compounds such as HF , NaF , and Ca_2F formed through combination of fluorine with several elements. Fluoride emissions from high temperature furnaces can be either in the form of particulates or in a gaseous form, generally HF . The use of air pollution control equipment such as fabric filters acts to remove most particulates, and hence most fluoride emissions are as gases.

The maximum 24-hour ground-level concentration resulting from operation of the proposed Facility is estimated to be 0.072 ug/m^3 . The annual average ground-level concentration to be produced by the Facility is estimated to be $4.36 \times 10^{-3} \text{ ug/m}^3$, which is many times less than the concentration found to produce 40 ppm of fluoride in grass (discussed below). The deposition of fluorides as particulate from the Facility would result in an estimated accumulation of 0.08 gm/m^2 , which would produce a concentration in the top centimeter of soil of about 5.5 mg/kg over the 30-year lifespan of the Facility. These concentrations are not anticipated to produce adverse impacts to vegetation or grazing animals.

Fluoride is the most phytotoxic of the common air pollutants. Susceptible species can be injured at atmospheric concentrations 10 to 100 times lower (0.8 ug/m^3) than those of other major pollutants (Weinstein and Alscher-Herman, 1982). It accumulates in plants and can cause disease in herbivores which consume vegetation.

Fluorides can produce toxic side effects for vegetation and grazing animals which ingest such vegetation. Fluorosis has been shown to occur in dairy cows fed a diet containing 40 to 50 ppm of fluoride over a period of months to years. Hence, several states (Florida and New York, for example) have established standards that limit the level of fluoride in forage grown during the growing season (six months) to 40 ppm.

Exposures to high levels of fluorides generate no ill effects if the period of exposure is less than two months for young heifers, or four to six months for older animals. In Florida, cattle grazed on fields adjacent to fluoride emission sources such as phosphate plants show no ill effects if herds are routinely rotated to other fields on a monthly or bimonthly basis. The ground-level fluoride concentrations which produce a 40 ppm fluoride level in grasses will vary depending on the season, temperature, and grass species composition. Rainfall can act to wash off deposited particulate fluorides, reducing the concentration available for uptake during grazing. Canadian Forest Service data indicate that long-term ground-level fluoride concentrations in air of $0.90\text{--}1.0\text{ ug/m}^3$ can produce fluoride concentrations in grasses of approximately 40 ppm (Sidhu, 1978).

Lead (Pb)

$4.2 \times 10^{-5}\text{ lb/m}^2$
 $3.9 \times 10^{-6}\text{ lb/acre ft}$

Poor Original

Lead toxicity has not been observed in plants growing under natural conditions, except in areas adjacent to heavy emission sources. The maximum annual predicted incremental ground-level concentration of lead resulting from the Facility is 0.001 ug/m^3 . That is a low concentration when compared to heavy emission sources, such as freeway traffic, which can produce ground-level lead concentrations in the range of $0.1\text{ to }1\text{ ug/m}^3$ on a quarterly average. Deposition as particulate is estimated at 0.019 g/m^2 , with soil concentrations in the top centimeter estimated at 1.26 mg/kg . These levels are not significant in comparison to naturally-occurring levels in soils.

Studies have shown that soils are capable of fixing large additions of lead compounds absorbed from the atmosphere (Chapman, 1966). Natural soils typically contain 2 to 200 ppm of lead (Allaway, 1968). Lead is strongly

adsorbed in soils, therefore only minor amounts are available for uptake by vegetation.

Although lead in soils is largely unavailable to plants, the primary entry-way of lead into vegetation is through the root system (Zimdahl, 1976). Lagerwerff (1971) found that in radishes grown in an area contaminated by auto emissions, nearly all of the lead in the roots and 60 percent of the lead in the leafy growth was attributable to soil, not air.

Mercury (Hg)

Mercurial compounds emitted to the atmosphere may affect plants by either foliar adsorption or by uptake and translocation from soils (CAST, 1976). In the study cited above, the environmental concentrations of mercury which result in elevated levels in soils and vegetation are considerably greater than the 7.5×10^{-4} ug/m³ annual average predicted for the Facility. Deposition as particulate would result in a maximum of 0.014 g/m² over the 30-year life of the Facility. The resulting soil concentration of mercury is conservatively estimated to be 0.95 mg/kg. Vegetative impacts are not expected to occur, nor is bioaccumulation due to this source expected to be a problem.

The accumulation of mercury by plants is more of concern due to bioaccumulation in the food chain than due to phytotoxic effects. An experiment to evaluate the uptake of Hg by bromegrass by applying 10 mg/kg of Hg to soils indicated that considerable accumulation of Hg was found in the plant root system, and only small amounts were translocated to the above-ground portions of the plant (Hogg et al., 1978). The environmental hazards associated with high levels of mercury deposition to soils at waste application sites have previously been identified as those related to ingestion of soil and plant parts by grazing animals.

Beryllium (Be)

Beryllium is toxic to plants due to poisoning of plant metabolic functions and nutrient depletion. Visible toxicity and decreases in growth rates

have been observed in bean plants grown in nutrient solutions of 3 to 5 ppm. Since Be is more strongly immobilized in calcareous soils, the sensitivity of vegetation to Be is reduced as soil pH is increased (Lisk, 1972). Beryllium content in typical soils ranges from 0.5 to 10 mg/kg (Bohn et al., 1977).

The predicted maximum annual average Be ground-level concentration resulting from the Facility's emissions is 1.69×10^{-7} ug/m³. The resulting deposition on study area soils is estimated to be 3.20×10^{-6} gm/m² over a 30-year period, which would produce a beryllium soil concentration of 2.13×10^{-4} mg/kg. This is so small compared to naturally occurring levels (0.5 to 10 mg/kg) that no toxic effects to vegetation are anticipated.

Arsenic (As)

The predicted maximum annual average arsenic ground-level concentration resulting from the Facility's emissions is 1.13×10^{-5} ug/m³. The resulting deposition on study area soils is estimated to be 2.14×10^{-4} gm/m² over a 30-year period, which would produce an arsenic soil concentration of 1.43×10^{-2} mg/kg. This is so small compared to naturally occurring levels (a mean of 4.8 mg/kg) (Shacklette, H.T., and T.G. Boerngen, 1984) that no toxic effects to vegetation are anticipated.

Hydrogen Chloride (HCl)

Gaseous HCl will be emitted from the Facility as a result of the combustion of certain chlorine containing materials contained in the refuse. HCl fallout onto soil does not pose a serious risk to vegetation. HCl disassociates in soil and the Cl which occurs in a dissolved form is generally leached from the soil with precipitation. Since it is therefore unavailable for uptake through plant roots, indirect injury to vegetation through the soil is unlikely.

The Facility would increase HCl concentrations by a 24-hour maximum of 1.3 ug/m³ and an annual average of 0.080 ug/m³. Peak and long-term concentrations are well below levels specifically documented to cause injury and those proposed as adequate for vegetation protection.

Therefore, HCl emissions are not expected to adversely impact local vegetation.

Studies of plant growth in an environment containing gaseous HCl have reported that exposures on the order of $10,000 \text{ ug/m}^3$ for one to two hours will produce plant injury. Intermittent exposure to concentrations of approximately 50 ug/m^3 was found to pose minimal risk to sensitive vegetation. It was suggested that concentrations ranging from approximately $6,000 \text{ ug/m}^3$ for 1.5 hours to 372 ug/m^3 for 120 hours or below would provide for adequate protection from HCl injury.

7.6 ASSESSMENT OF SECONDARY SOURCES

There are two secondary sources of particulate emissions associated with the Lee County facility. The vent on the top of the lime storage silo is a potential source of lime dust. The ash handling building vent is a potential source of ash residue emissions. These vents are minor point sources whose emissions are small compared to the particulate emissions from the stack and whose ambient impacts are expected to be insignificant. The nature of these sources and the manner in which they will be controlled is described below.

7.6.1 LIME SILO ROOF VENT

A lime silo(s) is included in the Facility to store the pebble lime used in the dry scrubber to control acid gas emissions. Lime is delivered in enclosed tractor-trailer trucks equipped with a dense phase pneumatic unloading system. Ambient air is used to fluidize and convey lime through pneumatic piping into the lime silo. The displaced air in the silo and air flow associated with the unloading operation are released through a roof vent into a fabric filter, which will be designed to have a particulate outlet loading of no more than 0.015 gr/acf for particles larger than one micron. The fabric filter will discharge the collected dust directly back into the storage bin.

The deliveries of lime are typically made every seven days. In normal practice, the truck operator will require about 1 to 1.5 hours to unload the lime, and about five minutes to clear the trailer hoppers and piping of any residual lime. The air flow rates during the transfer process range from 250 to 1,000 actual cubic feet per minute (ACFM). Assuming that the lime will be unloaded at the higher air flow rate, the maximum hourly emission is estimated at 0.129 pounds of particulate matter per hour. If a maximum of four deliveries each requiring 2.0 hours in duration are made per week, the annual emission rate would be approximately 54 pounds of particulate matter per year.

7.6.2 ASH HANDLING BUILDING VENT

Particulate emissions from the ash handling building are expected to be negligible. Ash from the end of the combustor grate or air pollution control equipment is quenched in a water tank and wetted to 15 to 25 percent moisture by weight. From the quench tank, the ash is conveyed to an ash handling building where the ash will enter a magnetic separator to remove ferrous material. The conveyor between the main building and the ash handling building is fully enclosed. Within the ash handling building, the ash is kept in bins until it can be taken to the ash landfill. The moisture content of the residue is maintained throughout the ash handling process to reduce resuspension of residue material. Any material that may become suspended is controlled through the use of a fabric filter on the ash handling building vent. Based on an airflow rate of 1,000 ACFM, the maximum hourly emission rate is estimated to be 0.015 gr/acf of particulate matter. This calculation represents a design value; actual emissions are expected to be considerably lower.

7.7 IMPACT WITHIN POLLUTANT NON-ATTAINMENT AREAS

In order to demonstrate that a new source will not prevent reasonable further progress toward attainment of the NAAQS, a source located outside a pollutant non-attainment area must show that it will have a less than significant impact within the non-attainment area. The Lee County ERF is not located within an area designated as non-attainment for any of the

criteria pollutants. The nearest pollutant non-attainment areas (for ozone) are located in Palm Beach, Broward, and Dade counties. Palm Beach County is located 75 km to the east, while Broward and Dade counties are 80 and 110 km to the southeast, respectively. Pinellas County, 180 km northwest from the proposed site, is designated non-attainment for SO_2 .

The ground-level concentrations for SO_2 , PM_{10} , CO, and NO_x at the points of maximum impact, 0.7 to 3.0 km from the Lee County ERF, are well below their respective significant impact levels. Pollutant impacts at locations 75 km or more from the proposed Facility would be far less.

Section 8

SECTION 8.0
REFERENCES

Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

8.0 REFERENCES

- Allaway, W.H. 1968. Advances in Agronomy v. 20 (1968), pp. 235-272.
- Alter, H. 1979. Resource Recovery from a Chemical Viewpoint. Materials and National Policy, American Chemical Society, Washington, D.C., pp. 35-43.
- Amundson, R.G. and L.H. Weinstein. 1980. Effects of Airborne F on Forest Ecosystems. Proc. Symp. on Effects of Air Pollutants on Mediterranean and Temperature Forest Ecosystems. Riverside, CA. USDA Gen. Tech. Report, PWS-43:63-78.
- Amundson, R.G. 1983. Yield Reduction of Soybean Due to Exposure to Sulfur Dioxide and Nitrogen Dioxide in Combination. JEQ 12(4):454-459.
- Auer, A.H. 1979. Correlation of Land Use and Cover with Meteorological Anomalies. Journal of Applied Meteorology, Vol. 17:636-643.
- Bahor, B. 1987. Emissions Abatement and Process Control, An Interactive Relationship. Belco Pollution Control Corporation.
- Beachler, D.S. 1984. APTI Course SI:428A Introduction to Boiler Operation. EPA 450/2-84-010.
- Beachler, D.S. and Hirko. 1989. Nitrogen Oxide (NOx) Emission Rates from Wastes-to-Energy Plants Using Westinghouse-O'Connor Combustors. Draft Report.
- Beaumont Environmental Inc. 1986. An Environmental Review of Air Pollution Control for Resource Recovery Facilities. Vol. 1. State of New Jersey, Department of Environmental Protection. Revised Edition, February, 1986.
- Bohn, H.L., B.L. McNeal, O'Connor, G.A. 1979. Soil Chemistry. Wiley Interscience Pub., John Wiley & Sons, New York.
- Briggs, G.A. 1974. Diffusion Estimation for Small Emissions. In: ERL, ARL USAEC Report ATDL-106; U.S. Atomic Energy Commission, Oak Ridge, TN.
- Briggs, G.A. 1975. Plume Rise Predictions. In Lectures on Air Pollution and Environmental Impact Analysis. American Meteorological Society, Boston, MA.
- Brna, T.G., W. Ellison, and C. Jorgenson. 1988. Cleaning of Municipal Waste Incinerator Flue Gas in Europe. Proceedings of the 1988 National Waste Processing Conference, ASME, New York, NY.
- Bump, R.L. 1977. Electrostatic Precipitators Industry. Chemical Engineering, pp. 129-136.
- California ARB. 1984. Air Pollution Control at Resource Recovery Facilities. California Air Resources Board, May 24, 1984.

- Camp Dresser & McKee Inc. 1987. Trends in the Regulation of Polyvinyl Chloride. Prepared by Camp Dresser & McKee Inc. June, 1987.
- Camp Dresser & McKee Inc. June, 1985. Final Environmental Impact Statement For the Proposed Resource Recovery Program at the Brooklyn Navy Yard. Technical Appendix D-2 "Emission Criteria," prepared for the City of New York, Department of Sanitation.
- Camp Dresser & McKee Inc. December, 1989. Waste-to-Energy Facility Consolidated Permit Application. Prepared for Oakland County, Michigan.
- Carr, R.C. and W.B. Smith. 1984. Fabric Filter Technology for Utility Coal-Fired Power Plants. JAPCA, Vol. 34, No. 1: 79-89.
- CAST. 1976. Application of Sewage Sludge to Cropland: Appraisal of Potential Hazard of Heavy Metals to Plants and Animals. CAST Report. No. 64.
- Chapman, H.O. 1966. Diagnostic Criteria for Plants and Soils. University of California Press, Riverside, CA.
- Clarke, Marjorie J. 1986. Emission Control Technologies for Resource Recovery. New York City Department of Sanitation. March 15, 1986.
- Clarke, Marjorie, J. 1987a. Emission Control Technologies. Resource Recovery, Number 1:21-35.
- Clarke, Marjorie J. 1987b. How Plant Operators Can Minimize Emissions. Waste Age, December 1987, pp. 156-170.
- Clarke, Marjorie J., 1987c. Issues, Options and Choices for Control of Emissions from Resource Recovery Plants. New York City Department of Sanitation, March 26-27, 1987.
- Clarke, Marjorie J., 1987d. Minimizing Emissions from Resource Recovery. New York City Department of Sanitation, October 1-2, 1987.
- Clarke, Marjorie J. 1987e. Air Pollution Control Status Report. Waste Age, November 1987, pp. 102-117.
- Clarke, Marjorie J. 1988. Debating the Virtues of ESPs. Waste Age, June, 1988.
- Clarke, Marjorie J. 1989. Technologies for Minimizing the Emission of NOx from MSW Incineration. Internal Conference on Municipal Waste Combustion, Hollywood, Florida, April 1989.
- Combustion Engineering, Inc. 1981. Combustion Fossil Power Systems. Third Edition, Rand McNally, 1981.
- Combustion Engineering, Inc. 1989. City of Chester, PA, Materials and Energy Recovery Project, Air Quality Permit Application. June, 1989.

Cooper Engineers, Inc. 1983. Verification of CO, NOx and NMHC Emissions from a Reciprocating Grate Refuse Combustion Facility, the Chicago Northwest Waste-to-Energy Facility. September 1983. Prepared by Cooper Engineers, Inc., 1301 Canal Boulevard, Richmond, California 94504.

Cooper Engineers, Inc. 1985. Air Emissions Tests of a Deutsche Babcock Anlagen Dry Scrubber System at the Munich North Refuse-Fired Power Plant. Prepared by Cooper Engineers, Inc., 1301 Canal Boulevard, Richmond, California 94804.

Craig, C.G., and W.L. O'Connell. 1982. Report on Acid Gas Control From Waste Incinerators. New Jersey Department of Environmental Protection. Prepared by Battelle Columbus Laboratories, Columbus Ohio.

Daly, John B. 1985. Resource Recovery in New York State: The Dioxin Controversy. Prepared by the Joint Legislative Commission on Solid Waste Management, Office of the Vice-Chairman. November, 1985.

Davis, J.S. and G.C. Dupontail. 1986. Using SCR for NO_x Control Affects HRS Design, Operation. Power, October 1986, pp. 59-60.

Dickson, L.C. and Karasek, F.W. 1987. Mechanism of Formation of Polychlorinated Dibenzo-p-Dioxins Produced on Municipal Incinerator Fly Ash from Reactions of Chlorinated Phenols. J. Chromatography.

Dvirka, et. al. 1987. The William F. Cosulich Associates' Process for the Removal of Noxious Acid Gases and Prevention of Dioxin and Furan Formation in the Flue Gas from Municipal Refuse Resource Recovery and Incineration Facilities. Prepared by William F. Cosulich Associates, September, 1987.

Dvirka, M. 1981. Technology of Dry and Wet Scrubbing of Gases from MSW Incinerators. Prepared for the Port Authority of New York and New Jersey by William F. Cosulich Associates, P.C.

Eiceman, G.A., H.O. Rghei. 1982. Chlorination Reactions of 1,2,3,4-Tetrachlorodibenzo-p-Dioxin on Fly Ash with HCl in Air. Chemosphere, Vol. 11, No. 9. Pergamon Press Ltd., Great Britain.

Environment Canada. 1986. The National Incineration Testing and Evaluation Program: Air Pollution Control Technology Report No. EPS 3/UP/2. September, 1986.

ESA. 1986. Haynes Thermal DeNO_x Demonstration Evaluation: Long-Term Demonstration Tests for Oil Fuel. City of Los Angeles Department of Water and Power. January, 1986.

Flynn, B.L. 1979. Fabric Filters for Small Incinerators. Speech presented to ASME at United Engineering Center, New York, New York.

Frink, C.R., G.K. Voigt, and M.K. Musser. 1976. Potential Effects of Acid Precipitation on Soils in the Humid Temperature Zone. L.S. Dochinger, T.A. Seliga (eds.). Proceedings of the 1st International Symposium on Acid Precipitation and the Forest Ecosystem, Ohio State University. USDA for Serv. Gen. Technical Report. No.-23, pp. 685-709.

Garsed, S.G., and A.J. Rutter. 1982. The Relative Sensitivities of Conifer Populations to SO₂ In Screening Tests with Different Concentrations of Sulfur Dioxide. Effects of Gaseous Air Pollution in Agriculture and Horticulture, Butterworth Scientific, London, pp. 474-475.

Gas Research Institute. T.M. Mally, G.C. England, W.R. Seeker, and N.R. Soleberg. Results of the July 1988 Wilmarth Boiler Characterization Tests, Topical Report GRI-89/0109.

Glassman, Irwin. 1977. Combustion. Academic Press, New York, New York.

Golembiewski, M.A., K.P. Anath, and H.M. Freeman. June 24-29, 1979. Assessment of Emissions from a Waterwall Incinerator Fired with Municipal Solid Waste. Proceedings of 72nd Annual Meeting of the Air Pollution Control Association, Cincinnati, Ohio, June 24-29, 1979.

Hahn, J.L. et al. 1985. Air Emissions Tests of a Deutsche Babcock Anlagen Dry Scrubber System at the Munich North Refuse-Fired Power Plant. Proceedings of 78th Annual Meeting of the Air Pollution Control Association, June, 1985.

Hahn, J.L. 1986. Innovative Technology for the Control of Air Pollution at Waste-To-Energy Plants. Proceedings of the 1986 National Waste Processing Conference, ASME, New York, New York.

Hahn, J.L. et al. 1987. Recent Air Emission Test Data from Several Waste-to-Energy Facilities Utilizing Martin Gmlott Stoker Combustion Systems and Advanced Air Pollution Control Equipment. Proceedings of the 80th Annual Meeting of ARCA, 87-94.4, New York, New York.

Hahn, J.L. et al. 1989. Recent Air Emission Data from Three New Odgen Martin Systems, Inc. Resource Recovery Facilities. Presented at the AWMA Conference, Atlantic City, New Jersey, October 4, 1989.

Hasselris, 1985. Technical Guidance Relative to MSW Incineration. Prepared for Task Force on Municipal Waste Incineration, NYSDEC, August 18, 1985.

Hogg T.J., J.R. Bettany, and J.W.B. Stewart. 1978. The Uptake of ²⁰³Hg - Labeled Mercury Compounds by Bromegrass from Irrigated, Undisturbed Soil Columns. JEQ, Vol. 7, No. 3, pp. 445-450.

Hollander, H.J., et al. 1980. A Comprehensive Municipal Waste Characterization Program. 9th National Waste Processing Conference, ASME, New York, New York.

Holzworth, G.C. 1972. Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States. USEPA Office of Air Programs, Research Triangle Park, North Carolina; Pub. No. AP-101, January, 1972.

Huntzicher, J.J., R.R. Cary, and C-S Ling. 1980. Neutralization of H₂SO₄ Aerosol by Ammonia. ES & T Vol. 14, No. 7, pp. 819-824; 1980.

- Itoh, H. and Kajibata. 1980. Countermeasures for Problems in NOx Removal Process for Coal-Fired Boiler. Proceedings of the Joint Symposium on Stationary NOx Control. Kawasaki Heavy Industries, Ltd., October, 1980.
- Jaasund, Steven. 1987. Electrostatic Precipitators: Better Wet than Dry. Chemical Engineering, November 28, 1987.
- Johnston, Mike, and Walt Stevenson. Personal Communication. U.S. Environmental Protection Agency, Office of Air Quality and Planning and Standards Division, Durham, North Carolina, October, 1989.
- Jones, H.C., F.P. Weatherford, J.C., Noggle, N.T. Lee and J.R. Cunningham. 1979. Power Plant Siting: Assessing Risks of Sulfur Dioxide Effects on Agriculture. Proceedings of the 72nd Annual Meeting of the Air Pollution Control Association, Cincinnati, Ohio, 1979.
- Jones, H.S., D. Weber, and D. Basillie. 1974. Acceptable Limits for Air Pollution Dosages and Vegetation Effects: Sulfur Dioxide. Proceedings of the 67th Annual Meeting of the Air Pollution Control Association, Denver, Colorado.
- Joseph, G.T. and D.S. Beachler. 1981. APTI Course 415 Control of Gaseous Emissions. EPA 450/2-81-005.
- Kaiser, E.R. and A.A. Carotti. 1972. Municipal Incineration of Refuse with 2 Percent and 4 Percent Addition of Four Plastics; Polyethylene, Polyurethane, Polystyrene, and Polyvinyl Chloride. Proceedings of the 1972 National Waste Processing Conference, ASME, New York, New York.
- Kaiser, E.R. 1968. The Sulfur Balance of Incinerators. JAPCA, 18(3), March, 1968.
- Kerckhoff, Brian. Personal Communication. Florida Department of Environmental Resources, Tallahassee, Florida, March 7, 1990 and June 18, 1990.
- Klieius, R., D.J. Hay, A. Finkelstein and L. Marentette. 1987. Canada's National Incinerator Testing and Evaluation Program Air Pollution Control Technology Assessment. Waste Management & Research, Vol 5, pp. 301-310.
- Krause, H.H., P. D. Miller and D.A. Vaughan. 1974. Corrosion and Deposits from Combustion of Solid Waste Part 2: Chloride Effects on Boiler Tubes and Scrubber Metals. Transactions of the ASME Journal of Engineering for Power, ASME, New York, New York.
- Lagerwerff, J.V. 1978. Uptake of Cadmium, Lead and Zinc by Radish from Soil and Air. Soil Science, Vol. 111, pp. 129-133.
- Last F.T. 1982. Towards an Understanding of Plant Responses to Pollutants. Effects of Gaseous Air Pollution in Agriculture and Horticulture, Butterworth Scientific, London, pp. 437-446.

- Latimer and Ireson. 1980. Workbook for Estimating Visibility Impairment, United States Environmental Protection Agency, EPA-450/4-80-031, Research Triangle Park, North Carolina.
- Lear, G.L. June 19-24, 1983. Pennsylvania Power and Light Company Brunner Island Unit 1 Bagfilter Operating and Maintenance Problems. Proceedings of the 76th Annual Meeting of APCA, Atlanta, GA, June 19-24, 1983.
- Lindberg S.E., J.W. Huckabee, D.R. Jackson, S.A. Janzen, M.J. Levin, and J.R. Lund. 1979. Atmospheric Uptake of Mercury from Agricultural Soils Near the Almaden Mercury Mine. Journal of Environ. Quality, Vol. 8, No. 4, p. 572.
- Lisk, D.J. 1972. Trace Metals in Soils, Plants and Animals. Adv. Agronomy, Vol. 24, pp. 257-325.
- Lyon, R.K. 1979. Thermal DeNO_x: How It Works. Hydrocarbon Processing 58, 109, 1979.
- Lyon, R.K. and J.E. Hardy. 1986. Discovery and Development of the Thermal DeNO_x Process. Ind. Eng. Chem. Fundamentals, 25, 19, 1986.
- Lyon, R.K., 1987. Thermal DeNO_x. Environmental Science & Technology, Vol. 21, No. 3, March, 1987.
- Lyon, R.K. Reducing the Nitric Oxide Content of Combustion Effluents. U.S. Patent 3, 900, 559.
- Makansi, Jason. 1982. SO₂ Controls Optimizing Today's Processes for Utility and Industrial Power Plants. Power, pp. S.1-S.22, October, 1982.
- Makansi, Jason et. al. 1986. Particulate Control Optimizing Precipitators and Fabric Fillers for Today's Power Plants. Power, pp. S.1-S.16, December, 1986.
- Makansi, Jason et. al. 1987. Traditional Control Processes Handle New Pollutants. Power, pp. 11-18, October, 1987.
- Martin, GmbH. 1986. Data presented to W.R. Seeker and W.R. Niessen, Munich, July 1986.
- McCaln, et. al. 1984. Electrostatic Enhancement at Fabric Filter Performance. Environ. Sci. Technol. Vol. 18, No. 9, pp. 635-641.
- McLean, R.A.N. 1981. The Relative Contributions of Sulfuric and Nitric Acids in Acid Rain to the Acidification of the Ecosystem: Implication for Control Strategies. JAPCA. Vol. 31, No. 11, pp. 1184-1187.
- Meyer, Joe. Personal Communication. National Park Service, Southeast Region, Atlanta, Georgia, May 7, 1990.

- Mitsubishi Heavy Industries, LTD. 1987. Mitsubishi SCR System for Municipal Refuse Incinerator (NOx Removing System). Company Literature issued April 14, 1987.
- Moller, J.T. and O. Christiansen. 1985. Dry Scrubbing of MSW Incinerator Flue Gas by Spray Dryer Absorption. Proceedings of the 77th Annual Air Pollution Control Association Meeting, June, 1985.
- Moller, J.T., C. Jorgensen, and F. Fallenkamp. 1983. Dry Scrubbing of Toxic Incinerator Flue Gas by Spray Absorption. Presented at ENVITEC 83, Dusseldorf, West Germany, February 21-24, 1983.
- Mull, E.B., and H.P. Bentner. 1988. Dry Additive Process for Control of Acid Gas and Particulate Emission. ASME Solid Waste Division - Western Chapter Meeting, Salt Lake City, Utah, April 14, 1988.
- Nagler, Lew. 1990. Personal Communication. U.S. Environmental Protection Agency Region IV, Atlanta, January 26, 1990.
- Niessen, Walter R. and S.H. Charsky. 1970. The Nature of Refuse. Proceedings of the 1970 National Incinerator Conference, ASME, New York.
- Niessen, Walter R. 1978. Combustion and Incineration Processes - Applications in Environmental Engineering, Vol. 7, of Pollution Engineering and Technology Series, R. Young and P. Cheremisinoff, Editors, pp. 371, Marcel Dekker, Inc. New York, New York.
- NIOSH. 1985. NIOSH Pocket Guide to Chemical Hazards. U.S. Department of Health and Human Services, Publication No. 78-210, 5th printing, September, 1985.
- O'Connell, W.L., G.C. Stotler, and R. Clark. 1982. Emissions and Emission Control in Modern Municipal Incinerators. 19th National Waste Processing Conference, ASME, New York, New York.
- Offen, G.R., and L.J. Muzio. 1987. Dry Sorbent Emission Control Technologies. JAPCA, pp. 642, 1987.
- Oglesby, S., et. al. 1973. A Manual of Electrostatic Precipitator Technology, Part I - Fundamentals. Stanford Research Institute, California, EPA 22-69-73, August 1973.
- Olie, K.J., et. al. 1984. Formation and Fate of PCDD and PCDF from Combustion Processes. Chemosphere, 12(415):627-636.
- Olie, K.J., W.A. Lustenhouwer, and O. Hutzinger. 1982. Polychlorinated Dibenzo-p-Dioxins and Related Compounds in Incinerator Effluents. Pergamon Science Series, Env. Sci. 5, pp. 227-244.
- Plunkett, E.R., M.D. 1976. Handbook of Industrial Toxicology, Industrial Health Services, Barberton, Ohio. Chemical Publishing Co., Inc., New York, New York.

- Power. 1986. Flue Gas Treatment Aims for Process Simplicity, NO_x Controls. Power, May, 1985, pp. 31-32.
- Power. 1986. Baghouse or ESP: Which is Best for Resource Recovery? Power, October, 1986, p. 121.
- Radian Corporation. 1989. Control of NO_x Emissions from Municipal Waste Combustor. EPA Contract No. 68-02-4378, May, 1989.
- Reason, John. 1986. Next Step for Waste-to-Energy: Better Availability, Efficiency. Power. July, 1986, pp. 17-24.
- Redford, D., C.H. Haile and R.M. Lucas. 1981. Emissions of PCDDs and PCDFs from Combustion Sources. Proceedings of the 2nd International Symposium on Chlorinated Dioxins and Related Compounds, Arlington, Virginia, October 25-29, 1981.
- Rich, G.A. 1987. PM-10 Regulations. Pollution Engineering. November, 1987, p. 60.
- Rigo, H.G. et al. 1982. Consolidated Data Base for Waste-to-Energy Plant Emissions. Proceedings of the 1982 National Waste Processing Conference, ASME, New York, New York.
- Rogers, Tom. 1990. Personal Communication. Environmental Administrator, Bureau of Air Monitoring and Assessment, Florida Department of Environmental Regulation, Tallahassee, Florida, April 13, 1990.
- Rolofson, Bud. 1990. Personal Communication. National Park Service, Air Quality Division, Denver Service Center, Denver, Colorado, April 19, 1990 and June 7, 1990.
- Russell, S.H. and J.E. Roberts. 1984. Oxides of Nitrogen: Formation and Control in Resource Recovery Facilities. Proceedings of the 1984 National Waste Processing Conference, ASME, New York, New York.
- Shacklette, H.T., and J.G. Boerngen. 1984. Element Concentrations in Soils and Other Surficial Materials of the Conterminous U.S., Prepared for the U.S. Geological Survey.
- Sidhu, S.S. 1977. Fluoride Levels in Air, Vegetation and Soil in the Vicinity of a Phosphorus Plant. Proceedings of the 70th Annual Meeting of APCA, Toronto, Canada, Vol. 77-30, No. 2, pp. 1-16.
- Sidhu, S.S. 1978. Patterns of Fluoride Accumulation in Forest Species as Related to Symptoms and Defoliation. Proceedings of the 71st Annual Meeting of APCA, Houston, Texas, Vol. 78-24, No. 7, pp. 1-16.
- Steisel, N., R. Morris, and M.J. Clarke. The Impact of the Dioxin Issue on Resource Recovery in the United States. Waste Management & Research, Vol. 5, 1987, pp 381-394.
- Tarnok, T.D. 1986. Fabric Filter Concepts and Types for Resource Recovery Plants. Joy Manufacturing Company Seminar, November, 1986.

- Taylor, O.C., C.R. Thompson, D.T. Tingey, R.A. Reinert. 1975. Oxides of Nitrogen. J.B. Mudd and T.T. Koslowski (eds.). Responses of Plants to Air Pollution, New York Academic Press, Inc.
- Teller Environmental Systems, Inc. 1983. Incinerator Emissions Problem and Solution. Manufacturer's Literature, Shrewsbury, Massachusetts, October, 1983.
- Thomas, Julie. Personal Communication. 1990. National Park Service, Southeast Region, Atlanta, Georgia, April 20, 1990 and April 25, 1990.
- Thompson, C.R., D.T. Tingey, and R.A. Reinert, 1974. Acceptable Limits for Air Pollution Dosages and Vegetation Effects: Nitrogen Dioxide. Proceedings of the 67th Annual Meeting, APCA, Denver, Colorado.
- Turner, D.B. 1970. Workbook of Atmospheric Dispersion Estimates (PB-191-482). U.S. Department of Health, Education and Welfare, Cincinnati, Ohio.
- U.S. Environmental Protection Agency. 1977a. Compilation of Air Pollutant Emission Factors, EPA No. AP-42. August, 1977. Research Triangle Park, North Carolina.
- U.S. Environmental Protection Agency. 1977b. Guidelines for Air Quality Maintenance Planning and Analysis Volume 10 (revised): Procedures for Evaluating Air Quality Impact of New Stationary Sources, EPA-450/4-77-001. October, 1977. Research Triangle Park, North Carolina.
- U.S. Environmental Protection Agency. 1978. Guidelines for Evaluation of BACT, December, 1978.
- U.S. Environmental Protection Agency. 1979. Industrial Source Complex (ISC) Dispersion Model Users Guide, Publication No. EPA-450/4-79-030. USEPA, July, 1979. Research Triangle Park, North Carolina 27111.
- U.S. Environmental Protection Agency. 1984. BACT/LAER Clearinghouse, Office of Air Quality Planning and Standards, USEPA. May, 1984. Research Triangle Park, North Carolina.
- U.S. Environmental Protection Agency. 1986a. Dioxin Emissions from Resource Recovery Facilities and Summary of Health Effects. Prepared for U.S. Environmental Protection Agency Office of Solid Waste by Camp Dresser & McKee Inc., November, 1986.
- U.S. Environmental Protection Agency. 1986b. Procedures for Estimating Probability of Non-attainment of a PM₁₀ NAAQS using Total Suspended Particulate or PM₁₀ Data, (EPA-450/4-86-017). Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina.
- U.S. Environmental Protection Agency. 1987a. Municipal Waste Combustion Study, Combustion Control of Organic Emissions. U.S. Environmental Protection Agency Office of Research and Development, PB87-206090, May, 1987.

- U.S. Environmental Protection Agency. 1987b. Municipal Waste Combustion Study Report to Congress, Publication No. EPA/530-SW-87-021. Radian Corporation, Research Triangle Park, North Carolina.
- U.S. Environmental Protection Agency. 1987c. BACT/LAER Clearinghouse - A Compilation of Control Technology Determinations, Publication No. 450/3-85-016. PEI Associates, Inc., Cincinnati, Ohio, June 1987.
- U.S. Environmental Protection Agency. 1988a. BACT/LAER Clearinghouse: A Compilation of Control Technology Determinations, Third Supplement to 1984, Summary Tables and Appendices A-G. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, PB89-109060, July, 1988.
- U.S. Environmental Protection Agency. 1988b. Combustion Control Memorandum: New Municipal Waste Combustors. U.S. Environmental Protection Agency Office of Air Quality Planning and Standards, Office of Research and Development; Prepared by Energy and Environmental Research Corporation, September 28, 1988.
- U.S. Environmental Protection Agency. 1988c. Combustion Practice for Control of Organic Emissions from Municipal Waste-To-Energy Plants, PB88-250840, August, 1988.
- U.S. Environmental Protection Agency. 1989a. Top-Down Best Available Control Technology: A Summary. Office of Air Quality Planning and Standards, Air Management Division, May, 1988.
- U.S. Environmental Protection Agency. 1989b. Municipal Waste Combustors Background Information for Proposed Standards: Control of NO_x Emissions, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, August, 1989.
- U.S. Environmental Protection Agency. 1990. "Top Down" Best Available Control Technology Draft Guidance Document. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, March 15, 1990.
- Viner, A., et. al. 1987. Advanced Electrostatic Stimulation of Fabric Filtration Performance and Economics. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, EPA/600/D-87/174, May, 1987.
- Visalli, Joseph R. 1987. A Comparison of Dioxin, Furan and Combustion Gas Data from Test Programs at Three MSW Incinerators. JAPCA, Vol. 37, No. 12, December, 1987, pp. 1451-1463.
- Vogg, H., M. Metzger, and L. Stieglitz. 1987. Recent Findings on the Formation and Decomposition of PCDD/PCDF in Municipal Solid Waste Incineration. Waste Management & Research, Vol. 5, pp. 285-294, 1987.
- Weinstein, L.H. and R. Alscher-Herman. 1982. Physiological Responses of Plants to Fluorine. Effects of Gaseous Air Pollution in Agriculture and Horticulture, Butterworth Scientific, London, 139:167.

Wheless and Selna. 1988. Air Pollution Control System Performance for the Commerce Refuse-To-Energy Facility. Proceedings of the 13th Biennial National Waste Processing Conference, ASME Philadelphia, Pennsylvania, March, 1988.

Zimdahl, R.L. 1976. Entry and Movement in Vegetation of Lead Derived from Air and Soil Sources. Journal of APCA, Vol. 26, No. 7, pp. 655-660.

Zimmaman, P.W. et al. 1983. The Effect of Carbon Monoxide on Plants. Contribs. Boyce Thompson Institute, 5(2):195-211, Ithaca, New York.

Section 9

SECTION 9.0
ATTACHMENTS

ATTACHMENT A
EMISSION FACTOR SUPPORT
DOCUMENT

ATTACHMENT A

EMISSION FACTOR SUPPORT DOCUMENT

A.1 INTRODUCTION

In this attachment, the emission factors for the Lee County Energy Recovery Facility (ERF) are derived based on stack testing data from existing facilities. Although several energy recovery facilities have recently received site certification, only three (Hillsborough County, Bay County, and the third unit in Pinellas County) have begun operation. Dade County has refurbished its existing facility which differs from the mass-burn technology to be employed by Lee County. Lake and Broward County facilities are still under construction. Therefore, the emission factors selected represent a reasonable upper limit of emissions based on the data available from other representative facilities.

The flue gas flow rates and composition used to calculate the following pollutant emission factors are based on the output of the BURN combustion model. BURN is a CDM proprietary mathematical model used to analyze combustion systems by specifying the operational parameters and waste characteristics. The output for this analysis, shown in Attachment D, is based on the combustion of 600 tons per day (tpd) of reference waste in a single combustor unit (furnace and boiler) with a higher heating value of 5,000 Btus per pound (Btu/lb) of refuse. The Facility would have three of these units, for a total design throughput of 1,800 tons of refuse per day.

A.2 PARTICULATE MATTER

Particulate matter generated during solid waste combustion is comprised of both unburned combustible material and inert material that was present in the solid waste. Because of the turbulent conditions in the combustor,

this material becomes entrained in the flue gas stream as fly ash. Some of this fly ash settles from the flue gas as the gas passes through the heat recovery equipment. The remainder of the fly ash is carried to the air pollution control equipment.

A.2.1 TOTAL SUSPENDED PARTICULATE MATTER

It is expected that typical particulate loadings to the air pollution control equipment will average approximately 3.0 grains per dry standard cubic foot (gr/dscf) corrected to 7 percent O_2 with transient peak loadings of up to 5.0 gr/dscf corrected to 7 percent O_2 . The proposed Facility shall have a fabric filter system dedicated to each mass-burn combustor, independent of design, to control particulate emissions. The guaranteed outlet particulate loading from the baghouse is 0.010 gr/dscf @ 7 percent O_2 . Emission rates and factors based on this emission limitation are calculated as follows for each combustor unit.

Basis: 0.010 grains per dry standard cubic foot
corrected to 7 percent oxygen (gr/dscf @ 7% O_2)

1. Adjust to actual O_2 as calculated by BURN

$$0.010 \text{ gr/dscf } \left(\frac{21\% - 10.0\% O_2}{21\% - 7.0\% O_2} \right) = 0.0079 \text{ gr/dscf actual}$$

2. Calculate the dry volumetric flow rate for the unit

$$187 \frac{\text{moles of flue gas}}{\text{min}} (385.3 \frac{\text{dry std cu ft}}{\text{mole}}) = 72,051 \frac{\text{dscf}}{\text{min}}$$

3. Calculate particulate emission rate per unit

$$0.0079 \frac{\text{gr/dscf}}{\text{actual}} (72,051) \frac{\text{dscf}}{\text{min}} \left(\frac{\text{lb}}{7,000 \text{ gr}} \right) \left(\frac{60 \text{ min}}{\text{hr}} \right) =$$

$$4.85 \frac{\text{lb PM}}{\text{hr}} = 21 \frac{\text{tons PM}}{\text{yr}}$$

4. Calculate particulate emission factors

$$4.85 \frac{\text{lb PM}}{\text{hr}} \left(\frac{\text{day}}{600 \text{ tons}} \right) \left(\frac{24 \text{ hr}}{\text{day}} \right) = 0.194 \frac{\text{lb PM}}{\text{ton refuse}}$$

$$0.194 \frac{\text{lb PM}}{\text{ton refuse}} \left(\frac{\text{lb}}{5,000 \text{ Btu}} \right) \left(\frac{\text{ton}}{2,000 \text{ lb}} \right) = 0.0194 \frac{\text{lb PM}}{\text{MMBtu}}$$

The Facility would consist of three 600-tpd combustor units, and so have a Facility total annual particulate matter emission rate of about 64 tons/yr.

Due to the low particulate outlet grain loading, the exhaust gases will comply with applicable state and federal opacity requirements. A continuous opacity monitor will be installed, calibrated, maintained, and operated in all of the stack's flues during Facility operation.

A.2.2 RESPIRABLE PARTICULATE MATTER

On July 1, 1987, EPA promulgated new standards for particulate matter having an effective diameter of less than 10 microns. This size range represents the respirable fraction of particulate matter and is referred to as PM_{10} . This standard is a better indicator of potential impacts to the public health and welfare from particulate matter than TSP.

Particulate size data is collected using an Anderson cascade impactor which expresses particle sizes as equivalent aerodynamic diameters. An

equivalent aerodynamic diameter is defined as the diameter of a unit density sphere with the same settling velocity as the actual particle. This allows particles of varying sizes, shapes, and densities to be evaluated on the basis of their actual aerodynamic behavior.

The distribution of particulate mass by particle size is not certain since only a limited number of samples have been taken. For this analysis, particle size data from the Biddeford, Maine waste-to-energy facility will be used to characterize particulate emissions from the Lee County facility (see Table A-1). The Biddeford, Maine data was selected because Biddeford is a modern facility employing air pollution control equipment similar to the proposed Lee County facility. Three particle size distribution analyses were conducted at Biddeford.

As presented in Table A-1, particle size data from the Biddeford, Maine Facility, which is equipped with dry scrubbers and fabric filters, shows that PM_{10} emissions ranged from 59 percent to 96 percent of total particulate matter measured. Therefore, it was assumed that all of the particulate matter from the boiler stack would be PM_{10} for the calculation of mass emission rates.

A.2.3 LIME SILO VENT EMISSIONS

The lime storage silo at the proposed Facility will receive lime from delivery trucks. Lime will be pneumatically conveyed from the delivery truck to the storage silo. During this process, particulate emissions will be generated. The lime silo will be equipped with a baghouse filter, designed for 0.015 gr/acf, to control particulate emissions. Based on the expected delivery frequency, the estimated annual emissions would be approximately 54 pounds; therefore, this intermittent source was not included in the air quality modeling for the Facility.

A.2.4 ASH HANDLING BUILDING VENT EMISSIONS

The ash handling building ventilation exhaust system will be equipped with a fabric filter designed to achieve an outlet grain loading of 0.015

TABLE A-1

LEE COUNTY ENERGY RECOVERY FACILITY
 PARTICLE SIZE DISTRIBUTION DATA FROM
 BIDDEFORD, MAINE

Run 1 Particle Mass Size Fraction (Microns) %		Run 2 Particle Mass Size Fraction (Microns) %		Run 3 Particle Mass Size Fraction (Microns) %	
<0.63	2.4	<0.63	2.4	<0.63	5.5
1.0	0.8	1.0	2.9	1.0	4.3
1.25	0.5	1.25	1.4	1.25	3.1
2.0	3.9	2.0	4.8	2.0	6.8
2.5	3.9	2.5	3.8	2.5	1.8
6.0	26.3	6.0	49.9	6.0	33.9
10.0	21.5	10.0	30.6	10.0	22.6
15.0	23.1	15.0	4.2	15.0	14.7
20.0	17.6	20.0	0.0	20.0	7.3
>20.0	0.0	>20.0	0.0	>20.0	0.0
% Mass Fraction PM ₁₀		% Mass Fraction PM ₁₀		% Mass Fraction PM ₁₀	
59.3		95.8		78.0	

SOURCE: Combustion Engineering, Inc., 1989.

gr/acf. Fugitive particulate emissions will be controlled to levels not to exceed 7.01 tpy (based on the 0.015 gr/acf design emission rate, actual tpy emissions should be considerably lower). Due to the minor nature of the particulate emissions from this source, emissions from the ash handling building were not included in the air quality modeling.

A.3 SULFUR DIOXIDE

Sulfur dioxide (SO_2) formation is a function of the sulfur content of the fuel and the chemical form in which it occurs. Sulfur in solid waste occurs in several forms, as organic sulfur found in foods (proteins), rubber, leather, and textiles, and as inorganic sulfur found chiefly in coated papers as sulfides, sulfate, and sulfite. All of these compounds except sulfate, which typically accounts for two to three percent of the fuel sulfur content, can be converted to SO_2 during combustion. Sulfates generally do not disassociate and tend to remain in the bottom ash. During combustion, sulfur is oxidized to SO_2 , with small amounts of the SO_2 being further oxidized to sulfur trioxide (SO_3). SO_3 will combine with water droplets to form sulfuric acid. Sulfuric acid emissions are discussed separately.

A dry scrubber system will be incorporated into each of the air pollution control trains dedicated for each of the Facility's combustors to control SO_2 and other acid gases. As discussed in the BACT analysis for SO_2 , each air pollution control system will be designed to maintain an average stack outlet SO_2 concentration of 30 ppmdv @ 7 percent O_2 or reduce SO_2 emissions by 80 percent (whichever is least stringent), both over a 24-hour block average as determined by CEMs.

The uncontrolled inlet SO_2 concentration of ³³⁰30 ppmdv corrected to 7 percent O_2 is roughly equivalent to an upper bound refuse sulfur content of 0.25 percent with 75 percent conversion of sulfur to SO_2 . The control system will reduce this inlet concentration by 80 percent to achieve an outlet SO_2 concentration of 66 ppmdv at 7 percent O_2 over a 24-hour average. Emission rates and factors based on the SO_2 emission limitation are calculated as follows for each combustor unit.

Poor Original

Basis: 30 parts per million on a dry volume basis
corrected to 7 percent oxygen (ppmdv @ 7% O₂)

1. Adjust to actual O₂ calculated by BURN

$$\frac{30 \text{ ppmdv } (21\% - 10.01\% \text{ O}_2)}{\text{@ } 7\% \text{ O}_2 \text{ } (21\% - 7.0\% \text{ O}_2)} = \frac{23.6 \text{ ppmdv}}{\text{actual}}$$

2. Calculate sulfur dioxide emission rate for the unit

$$\frac{23.6 \text{ moles SO}_2}{1 \times 10^6 \text{ moles}} \left(\frac{187 \text{ moles flue gas}}{\text{min}} \right) (64.07 \frac{\text{lb SO}_2}{\text{mole SO}_2})$$

$$\left(\frac{60 \text{ min}}{\text{hr}} \right) = \frac{16.9 \text{ lb SO}_2}{\text{hr}} = 74 \frac{\text{tons SO}_2}{\text{yr}}$$

3. Calculate sulfur dioxide emission factor

$$\frac{16.9 \text{ lb SO}_2}{\text{hr}} \left(\frac{\text{day}}{600 \text{ tons}} \right) \left(\frac{24 \text{ hr}}{\text{day}} \right) = 0.677 \frac{\text{lb SO}_2}{\text{ton refuse}}$$

$$\frac{0.677 \text{ lb SO}_2}{\text{ton refuse}} \left(\frac{\text{lb}}{5,000 \text{ Btu}} \right) \left(\frac{\text{ton}}{2,000 \text{ lb}} \right) = 0.0677 \frac{\text{lb SO}_2}{\text{MMBtu}}$$

Basis: 330 parts per million on a dry volume basis
corrected to 7 percent oxygen (ppmdv @ 7% O₂)

1. Apply 80 percent control efficiency

$$\frac{330 \text{ ppmdv SO}_2}{\text{@ } 7\% \text{ O}_2 \text{ } \text{uncontrolled}} (100\% - 80\%) = \frac{66.0 \text{ ppmdv SO}_2}{\text{@ } 7\% \text{ O}_2 \text{ } \text{controlled}}$$

2. Adjust to actual O₂ calculated by BURN

$$67.0 \text{ ppmdv SO}_2 \text{ (21\% - 10.01\% O}_2\text{)} = 51.8 \text{ ppmdv SO}_2 \text{ actual}$$

$$\text{ @ 7\% O}_2 \text{ (21\% - 7.0\% O}_2\text{)}$$

3. Calculate sulfur dioxide emission rate for each unit

$$\frac{51.8 \text{ moles SO}_2}{1 \times 10^6 \text{ moles}} \left(\frac{187 \text{ moles flue gas}}{\text{min}} \right) (64.07 \frac{\text{lb SO}_2}{\text{mole SO}_2})$$

$$\left(\frac{60 \text{ min}}{\text{hr}} \right) = 37.2 \frac{\text{lb SO}_2}{\text{hr}} = 163 \frac{\text{tons SO}_2}{\text{yr}}$$

4. Calculate sulfur dioxide emission factor

$$37.2 \frac{\text{lb SO}_2}{\text{hr}} \left(\frac{\text{day}}{600 \text{ tons}} \right) \left(\frac{24 \text{ hr}}{\text{day}} \right) = 1.49 \frac{\text{lb SO}_2}{\text{ton refuse}}$$

$$1.49 \frac{\text{lb SO}_2}{\text{ton refuse}} \left(\frac{\text{lb}}{5,000 \text{ Btu}} \right) \left(\frac{\text{ton}}{2,000 \text{ lb}} \right) = 0.149 \frac{\text{lb SO}_2}{\text{MMBtu}}$$

Because SO₂ emission rates and factors using the percent removal efficiency approach result in higher calculated values, the SO₂ emission factor of 0.149 lb SO₂/MMBtu and annual emission rate of 163 tons per year are proposed for each unit in estimating impacts for averaging periods equal to or greater than 24 hours. The proposed Facility, which would consist of three 600-tpd combustor units, would have total annual SO₂ emission rate of about 490 tons/yr.

Due to variation in combustor operating conditions and refuse sulfur content, a short-term peak SO₂ concentration is projected to be 82.5 ppmdv corrected to 7 percent O₂. This short-term SO₂ outlet concentration is

used to estimate air quality impacts for a three-hour average, and is based on a control system SO_2 reduction of 75 percent. Therefore, a short-term SO_2 emission factor of 0.186 lb/MMBtu is proposed for estimating impacts for the three-hour averaging period.

A.4 PRODUCTS OF COMBUSTION

Emissions of nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC) are primarily a function of combustion conditions. The quantity of pollutant produced is dependent upon the design and operation of the furnace. Modern refuse combustors are designed to maximize air and fuel mixing effectiveness and combustion completion through proper furnace design and the ability to control the combustion process. Proper design of the overfire air jets, combustion temperature, and overfire air ratio promotes oxidation of the products of incomplete combustion.

A.4.1 NITROGEN OXIDES

Nitrogen oxides (NO_x) are products of all conventional combustion processes. Nitric oxide (NO) is the predominant form of NO_x produced, with lesser amounts of nitrogen dioxide (NO_2). However, once emitted into the atmosphere, NO converts rapidly to NO_2 . Hence, NO and NO_2 are referred to collectively as NO_x . The state and federal air quality standards are based on NO_2 . The generation of NO_x from the combustion of refuse is a result of two formation mechanisms, thermal NO_x and fuel NO_x .

The NO_x produced by the nitrogen contained in the combustion air supply (ambient air contains 79 percent nitrogen by volume) due to the high temperatures of combustion is referred to as thermal NO_x . Thermal NO_x formation is primarily a function of furnace temperature and excess air (oxygen availability).

Fuel NO_x , on the other hand, is formed when the nitrogen in the refuse is oxidized to NO. Fuel NO_x formation is strongly affected by the local oxygen concentration present in the flame, and also by the mixing rate of

the refuse and combustion air. While the precise mechanism by which combustion air and fuel nitrogen are converted to NO_x (a function of furnace design, refuse composition, and facility operating parameters) is not completely understood, most of the NO_x emissions from modern municipal waste combustors are believed to result from the oxidation of fuel nitrogen.

Emission rate projections for NO_x are based on recent stack test data at existing stoker waterwall combustors. For example, the Tulsa, Oklahoma facility incorporates two stoker waterwall combustors each with a throughput capacity of 375 tpd of refuse. A total of ten one-hour tests, five per boiler, were completed using CEMs in June 1986. The flue gas concentration of NO_x observed from the ten tests ranged from 347 to 390 ppmdv corrected to 7 percent O_2 .

NO_x emissions were measured at the Marion County, Oregon facility in October 1986 as part of an emission compliance test program. The facility has two stoker waterwall combustors each with a throughput capacity of 275 tpd. Three one-hour tests were completed for each boiler using CEMs. Data from these tests indicated NO_x emissions ranging from 240 to 349 ppmdv corrected to 12 percent CO_2 .

Recently, uncontrolled NO_x emissions data from the Stanislaus, California facility were obtained in December 1988 as part of an emission compliance test program. The facility has two 400-tpd stoker waterwall combustors, each with selective non-catalytic reduction (SNCR) flue gas NO_x control technology. Three NO_x emission tests, each approximately one hour long, were completed for each boiler with the SNCR system shut off prior to testing. The uncontrolled NO_x emissions data ranged from 290 ppmdv to 308 ppmdv corrected to 12 percent CO_2 . The emissions projected for the stoker waterwall design take into consideration operation of the BACT determined SNCR technology having a control efficiency of up to 45 percent. Therefore, the proposed NO_x emission limitation for a stoker waterwall combustor is 180 ppmdv @ 7 percent O_2 on a 24-hour average using SNCR technology to reduce uncontrolled emissions.

The proposed Facility's NO_x emissions will be required to meet applicable final promulgated NSPS requirements for municipal waste combustors. Emission rates and factors based on the NO_x emission limitations are calculated as follows for each combustor unit.

Basis: 180 ppm_{dv} @ 7% O₂, 24-hour average

1. Adjust to actual O₂ calculated by BURN

$$\frac{180 \text{ ppm}_{dv} (21\% - 10.01\% \text{ O}_2)}{\text{@ } 7\% \text{ O}_2 (21\% - 7.0\% \text{ O}_2)} = \frac{141.3 \text{ ppm}_{dv}}{\text{actual}}$$

2. Calculate nitrogen oxides emission rate for the unit

$$\frac{141.3 \text{ moles NO}_x}{1 \times 10^6 \text{ moles}} \left(\frac{187 \text{ moles flue gas}}{\text{min}} \right) \left(\frac{46.01 \text{ lb NO}_x}{\text{mole NO}_x} \right) \left(\frac{60 \text{ min}}{\text{hr}} \right) = 72.9 \frac{\text{lb NO}_x}{\text{hr}} = 319.5 \frac{\text{tons NO}_x}{\text{yr}}$$

3. Calculate nitrogen oxides emission factors

$$72.9 \frac{\text{lb NO}_x}{\text{hr}} \left(\frac{\text{day}}{600 \text{ tons}} \right) \left(\frac{24 \text{ hr}}{\text{day}} \right) = 2.292 \frac{\text{lb NO}_x}{\text{ton refuse}}$$

$$2.92 \frac{\text{lb NO}_x}{\text{ton refuse}} \left(\frac{\text{lb}}{5,000 \text{ Btu}} \right) \left(\frac{\text{ton}}{2,000 \text{ lb}} \right) = 0.292 \frac{\text{lb NO}_x}{\text{MMBtu}}$$

The Facility, which would have three combustor units, would have a total annual NO_x emission rate of about 959 tons/yr.

Compliance with the above emission limitations through the use of continuous emission monitors may show peak short-term concentrations that are greater than the 24-hour average levels. Therefore, a one-hour allowance of 220 ppm_{dv} @ 7 percent O₂ is requested to account for these intermittent emission levels. For stoker waterwall combustors, this short-term allowance would correspond to an uncontrolled NO_x concentration of 400 ppm_{dv} @ 7 percent O₂ and a SNCR removal efficiency of 45 percent. The short-term emission factor allowance is 0.356 lb NO_x/MMBtu.

A.4.2 CARBON MONOXIDE

Formation of carbon monoxide (CO) in the combustor results from the inability of the combustion system to complete the burnout of the combustible gases emitted from the burning refuse bed. The admission of overfire air provides for adequate oxygen levels and gas turbulence in the combustor which promotes oxidation of CO to CO₂, thereby minimizing emissions of CO. As discussed in the BACT analyses, proper combustor design combined with careful operation will promote good combustion conditions and thereby minimize emissions of CO.

O'Connell et al. (1982) reports that a modern stoker waterwall combustor incorporating overfire air and temperature monitoring can achieve an emission rate of 1.9 pounds of CO per ton of refuse. A four-day testing program conducted by Cooper Engineers (September 1983) at the older Chicago NW facility indicates an average emission factor from all the tests of 0.67 pounds of CO per ton of refuse. The proposed CO stack concentration for stoker waterwall combustors is 100 ppm_{dv} @ 7 percent O₂, which corresponds to a emission factor of approximately 1.0 pound of CO per ton of refuse which is typical of these observed values.

Emission rates and factors based on the NO_x emission limitations for both the rotary waterwall and stoker waterwall combustors are calculated as follows.

Basis: 100 ppm_{dv} @ 7% O₂, 4-hour average

1. Adjust to actual O₂ calculated by BURN

$$\frac{100 \text{ ppm}_{dv} (21\% - 10.01\% \text{ O}_2)}{\text{@ } 7\% \text{ O}_2 (21\% - 7.0\% \text{ O}_2)} = \frac{78.5 \text{ ppm}_{dv}}{\text{actual}}$$

2. Calculate carbon monoxide emission rate for the unit

$$\frac{78.5 \text{ moles CO} (187 \text{ moles flue gas}) (28.01 \text{ lb CO})}{1 \times 10^6 \text{ moles} \quad \text{min} \quad \text{mole CO}}$$

$$\left(\frac{60 \text{ min}}{\text{hr}} \right) = 24.7 \frac{\text{lb CO}}{\text{hr}} = 108 \frac{\text{tons CO}}{\text{yr}}$$

3. Calculate carbon monoxide emission factors

$$24.7 \frac{\text{lb CO}}{\text{hr}} \left(\frac{\text{day}}{600 \text{ tons}} \right) \left(\frac{24 \text{ hr}}{\text{day}} \right) = 0.99 \frac{\text{lb CO}}{\text{ton refuse}}$$

$$0.99 \frac{\text{lb CO}}{\text{ton refuse}} \left(\frac{\text{lb}}{5,000 \text{ Btu}} \right) \left(\frac{\text{ton}}{2,000 \text{ lb}} \right) = 0.099 \frac{\text{lb CO}}{\text{MMBtu}}$$

The Facility, which would have three combustor units, would have a total annual CO emission rate of 324 tons/yr.

Compliance with the above emission limitations through the use of continuous emission monitors may show peak short-term concentrations that are greater than the four-hour average levels. Therefore, a one-hour allowance of 400 ppm_{dv} @ 7 percent O₂ is requested to account for these intermittent emission levels. The short-term emission factor allowance is 0.395 lb CO/MMBtu.

A.4.3 HYDROCARBONS

Volatile organic compound (VOC) emissions are also a function of the combustion conditions rather than solid waste composition. They result from poor combustion at low temperatures with insufficient oxygen, turbulence, and residence time. Burnout of VOCs are accomplished through proper mixing of overfire air with the VOC at high temperatures for an adequate residence time.

Testing performed at the Bay County, Florida facility, which incorporates combustion controls, indicated hourly average flue gas concentrations of VOC in the range of 3 to 15 ppm_{dv} @ 7 percent O₂, although recent tests from the Dutchess County, New York, facility indicated levels as high as 53 ppm_{dv} at 7 percent O₂. Stoker waterwall combustors have consistently reported lower concentrations with most values falling below 10 ppm_{dv} @ 7 percent O₂. Therefore, a one-hour average VOC stack concentration of 37.3 ppm_{dv} @ 7 percent O₂ is proposed.

Emission rates and factors based on the hourly VOC emission limitations for a single stoker waterwall combustor unit is calculated as follows.

Basis: 37.3 ppm_{dv} @ 7% O₂, 1-hour average

1. Adjust to actual O₂ calculated by BURN

$$\frac{37.3 \text{ ppm}_{dv} (21\% - 10.01\% \text{ O}_2)}{\text{@ } 7\% \text{ O}_2 (21\% - 7.0\% \text{ O}_2)} = \frac{29.3 \text{ ppm}_{dv}}{\text{actual}}$$

2. Calculate total hydrocarbons emission rate for the unit

$$\frac{29.3 \text{ moles VOC}}{1 \times 10^6 \text{ moles}} (187 \frac{\text{moles flue gas}}{\text{min}}) (16.04 \frac{\text{lb VOC}}{\text{mole VOC}})$$

$$(\frac{60 \text{ min}}{\text{hr}}) = 5.3 \frac{\text{lb VOC}}{\text{hr}} = 23 \frac{\text{tons VOC}}{\text{yr}}$$

3. Calculate total hydrocarbon emission factors

$$5.3 \frac{\text{lb VOC}}{\text{hr}} \left(\frac{\text{day}}{600 \text{ tons}} \right) \left(\frac{24 \text{ hr}}{\text{day}} \right) = 0.211 \frac{\text{lb VOC}}{\text{ton refuse}}$$

$$0.212 \frac{\text{lb VOC}}{\text{ton refuse}} \left(\frac{\text{lb}}{5,000 \text{ Btu}} \right) \left(\frac{\text{ton}}{2,000 \text{ lb}} \right) = 0.0211 \frac{\text{lb VOC}}{\text{MMBtu}}$$

The Facility, which would have three combustor units, would have a total annual VOC rate of 69 tons/yr.

A.5 ACID GASES

The presence of acid gases in the combustion process is primarily a function of the composition of the refuse. Sulfides, chlorides, and fluorides in the flue gas stream are assumed to be emitted entirely as acidic compounds (i.e., sulfuric acid, hydrogen chloride, and hydrogen fluoride). Emissions of acidic compounds will be controlled through the use of a dry scrubber followed by fabric filter.

A.5.1 HYDROGEN CHLORIDE

Production of HCl depends on the quantity of chlorine in the solid waste and on the species of chlorine present. Not all of the chlorine in the solid waste will react to form gaseous HCl during combustion. Chlorine that is not volatilized or converted to HCl remains in the ash residue. The plastic component of solid waste, specifically polyvinyl chloride (PVC), is a major contributor to the generation of HCl in the stack gases. Plastics account for approximately 36 percent of the total chlorine content in solid waste (EPA, 1975). PVC, which contains 46 percent chlorine by weight, accounts for about five percent of the plastics found in solid waste. Essentially all of the PVC chlorine is converted to HCl. In addition to plastics, rubber and paper are significant sources of chlorine in solid waste.

Unabated HCl emissions vary depending on the composition of MSW. HCl emissions have been reported to vary from 100 to 1,100 ppm. The average of 18 unabated HCl flue gas concentrations from the Westchester County, New York, facility is 575 ppm_{dv} @ 7 percent O₂. The average of six runs conducted during the compliances tests for the Tulsa, Oklahoma, facility is 420 ppm_{dv} @ 7 percent O₂.

The dry scrubbing system will be designed to maintain an average outlet HCl flue gas concentration of 25 ppm_{dv} @ 7 percent O₂ or reduce uncontrolled HCl emissions by 95 percent, whichever is least stringent on an eight-hour average basis. Peak uncontrolled HCl emissions of 1,000 ppm_{dv} at 7 percent O₂ is roughly equivalent to an upper bound MSW chlorine content of 0.8 percent with a 90 percent conversion of chlorine to HCl. Emission rates and factors that correspond to these emission limitations are calculated below for each unit.

Basis: 25 parts per million on a dry volume basis
corrected to 7 percent oxygen (ppm_{dv} @ 7% O₂)

1. Adjust to actual O₂ calculated by BURN

$$\frac{25 \text{ ppm}_{dv} (21\% - 10.01\% \text{ O}_2)}{\text{@ } 7\% \text{ O}_2 (21\% - 7.0\% \text{ O}_2)} = \frac{19.6 \text{ ppm}_{dv}}{\text{actual}}$$

2. Calculate hydrogen chloride emission rate for the unit

$$\frac{19.6 \text{ moles HCl}}{1 \times 10^6 \text{ moles}} \left(\frac{187 \text{ moles flue gas}}{\text{min}} \right) \left(\frac{36.47 \text{ lb HCl}}{\text{mole HCl}} \right)$$

$$\left(\frac{60 \text{ min}}{\text{hr}} \right) = 8.0 \frac{\text{lb HCl}}{\text{hr}} = 35 \frac{\text{tons HCl}}{\text{yr}}$$

- ### 3. Calculate hydrogen chloride emission factor

$$8.0 \frac{\text{lb HCl}}{\text{hr}} \left(\frac{\text{day}}{600 \text{ tons}} \right) (24 \text{ hr}) = 0.320 \frac{\text{lb HCl}}{\text{ton refuse}}$$

$$0.320 \frac{\text{lb HCl}}{\text{ton refuse}} \left(\frac{\text{lb}}{5,000 \text{ Btu}} \right) \left(\frac{\text{ton}}{2,000 \text{ lb}} \right) = 0.0320 \frac{\text{lb HCl}}{\text{MMBtu}}$$

Basis: 1,000 parts per million on a dry volume basis
corrected to 7 percent oxygen (ppmdv @ 7% O₂)

1. Apply 95 percent control efficiency

$$\begin{array}{ccc} 1,000 \text{ ppm dv HCl } (100\% - 95\%) = 50.0 \text{ ppm dv HCl} & & \\ @ 7\% O_2 & & @ 7\% O_2 \\ \text{uncontrolled} & & \text{controlled} \end{array}$$

2. Adjust to actual O2 calculated by BURN

$$\frac{50.0 \text{ ppm dv HCl}}{\text{@ 7\% O}_2} \left(\frac{21\% - 10.01\% \text{ O}_2}{21\% - 7.0\% \text{ O}_2} \right) = 39.3 \text{ ppm dv HCl actual}$$

3. Calculate hydrogen chloride emission rate for the unit

$$\frac{39.3 \text{ moles HCl}}{1 \times 10^6 \text{ moles}} (187 \frac{\text{moles flue gas}}{\text{min}}) (36.47 \frac{\text{lb HCl}}{\text{mole HCl}})$$

$$\frac{(60 \text{ min})}{\text{hr}} = 16.1 \frac{\text{lb HCl}}{\text{hr}} = 70.6 \frac{\text{tons HCl}}{\text{yr}}$$

4. Calculate hydrogen chloride emission factor

$$16.1 \frac{\text{lb HCl}}{\text{hr}} \left(\frac{\text{day}}{600 \text{ tons}} \right) \left(\frac{24 \text{ hr}}{\text{day}} \right) = 0.643 \frac{\text{lb HCl}}{\text{ton refuse}}$$

$$0.644 \frac{\text{lb HCl}}{\text{ton refuse}} \left(\frac{\text{lb}}{5,000 \text{ Btu}} \right) \left(\frac{\text{ton}}{2,000 \text{ lb}} \right) = 0.0643 \frac{\text{lb HCl}}{\text{MMBtu}}$$

The Facility, which would have three combustor units, would have a total annual HCl emission rate of about 212 tons/yr.

A.5.2 SULFURIC ACID MIST

Trace amounts of sulfur trioxide (SO_3) gas are associated with the production of SO_2 . The formation of SO_3 during combustion is dependent upon the SO_2 concentration and the combustion conditions supportive of oxidation of SO_2 to SO_3 . In the moist flue gases, gaseous SO_3 reacts with water droplets to form sulfuric acid (H_2SO_4). Emissions of sulfuric acid mist are controlled through the use of a dry scrubber and fabric filter.

The stack test data from the Tulsa, Oklahoma facility shows the ratio of the uncontrolled H_2SO_4 to SO_2 emission rates for a three-hour average were 0.168 and 0.165 for units 1 and 2, respectively. Peak one-hour $\text{H}_2\text{SO}_4/\text{SO}_2$ ratios were 0.26 and 0.22 for units 1 and 2, respectively. Using a peak one-hour $\text{H}_2\text{SO}_4/\text{SO}_2$ conversion ratio of 0.24 and the SO_2 emission rate based on a control efficiency of 80 percent, the controlled H_2SO_4 emission factor is 0.0358 lb/MMBtu or 0.358 lb/ton of refuse. This corresponds to an annual emission rate of 118 tons of H_2SO_4 per year for the total Facility.

A.5.3 FLUORIDES

Production of fluorides from solid waste combustion facilities is a function of the fluorine (F) content of the waste as well as facility operation. Production of fluorides occur primarily as a result of the combustion of fluorinated plastics and other fluorocarbon products.

The average of nine sampling runs conducted at the Westchester County, New York facility resulted in an average HF concentration of 16.4 ppm_{dv} @ 7 percent O₂. The peak HF concentration was 22 ppm_{dv} @ 7 percent O₂. Compliance testing at the Tulsa, Oklahoma facility showed that the average uncontrolled concentration from the three runs conducted on each of the two units was 6.91 ppm_{dv} @ 7 percent O₂. Controlled HF concentrations reported at the Marion County, Oregon facility were 0.51 ppm_{dv} @ 7 percent O₂.

Limited information on the removal efficiency of HF in dry scrubbing systems is available. However, if the uncontrolled HF concentrations at the Tulsa facility were representative of inlet concentrations to the scrubber at the Marion County facility, a removal efficiency of at least 90 percent, similar to that of HCl would be achieved.

As a reasonable upper limit, uncontrolled HF concentrations are estimated to be 50 ppm_{dv} @ 7 percent O₂. Assuming that the dry scrubber will remove 90 percent of the uncontrolled emissions, an outlet gas concentration of 5.0 ppm_{dv} @ 7 percent O₂ is projected. This is equivalent to 0.0035 lb HF per MMBtu or 0.035 lb per ton of MSW and an annual total Facility emission rate of 11.5 tons per year.

A.6 TRACE METALS

Because metals are present in solid waste, trace quantities of some metals will be emitted in the flue gases of the Facility. The amount of each metal emitted is a function of the quantity of the metal, in the waste stream, the properties of the metal, combustion characteristics of the Facility, and the performance of the air pollution control equipment. The concentrations of trace metals in the waste stream may vary widely over short periods of time. Emission factors used to estimate trace metal emissions for the Lee County Energy Recovery Facility are based on stack tests conducted at recently permitted facilities because combustion conditions (high temperatures and long retention times) and air pollution control equipment (dry scrubber and fabric filters) employed at these facilities affect the mechanisms of volatilization, condensation, and agglomeration which will differ from those of older facilities.

Because of the high condensation temperatures, the volatilization and condensation of elemental metals and their compounds are expected to occur primarily in the furnace. Except for metals with low boiling points, such as mercury and arsenic, any further movement of metals from the gas phase to the particulate phase is expected to be negligible. Thus, a spray dryer followed by a baghouse provides for a high degree of metals removal from incinerator exhaust gas streams (NITEP, 1986).

Emission projections of trace metals presented in Table A-2 were derived from published tests of existing municipal waste combustors equipped with similar air pollution control technology. As can be seen from the data listed in Table A-3, considerable variability is present in the data base. Because of this variability and the fact that emission limits are established on a not-to-exceed basis, maximum expected emission factors developed for the Lee County facility represent a reasonable upper limit based on the available data and engineering judgment.

A.6.1 LEAD

Lead (Pb) is widespread as a trace metal in most components of the combustible fraction of solid waste and also appears in more concentrated metallic forms in ferrous cans, general solderings, and batteries. Lead is readily volatilized during combustion. The lead vapor will later solidify in the cooler areas of the heat recovery equipment by condensing on the surface of particles in the gas stream or will form particulate itself by self-nucleation. These particles are carried in the gas stream and delivered to the air pollution control equipment. Therefore, the capture of particulate matter in the control equipment results in the capture of lead. A fraction of the lead remains as a fine particulate and will escape capture in the control devices.

A few years ago, lead was assumed to make up 9 to 11 percent of the particulate emissions. Recent stack tests of facilities with high efficiency particulate control devices have shown lead making up a much smaller fraction of the total particulate emissions. The highest

TABLE A-2

LEE COUNTY ENERGY RECOVERY FACILITY
EMISSION RATE CALCULATIONS FOR TRACE METALS

Pollutant	Emission Factor (lb/ton MSW)	Emission Factor (lb/MMBTu)	Total Facility Emission Rate (lb/hr) ^a	Total Facility Emission Rate (tons per year) ^a
Lead	6.0×10^{-3}	6.0×10^{-4}	<u>0.45</u>	<u>2.0</u>
Beryllium	1.35×10^{-6}	1.35×10^{-7}	<u>1.01×10^{-4}</u>	<u>4.4×10^{-4}</u>
Mercury	<u>6.0×10^{-3}</u>	<u>6.0×10^{-4}</u>	<u>0.45</u>	<u>2.0</u>
Arsenic	9.1×10^{-5}	9.1×10^{-6}	<u>6.83×10^{-3}</u>	<u>0.03</u>

^aEmission rates are based on 100 percent availability at nameplate design capacity (1,800 tpd at 5,000 Btu/lb reference waste), operating 8,760 hours per year.

REVISED 8/5/91

proportion of lead found in the Westchester County, New York, facility sampling runs was 3.66 percent. Testing conducted on boiler number 1 at the Hillsborough County, Florida, facility showed the fraction of lead in the particulate was 2.8 percent.

The emission factors proposed for the Lee County Facility are 0.0006 pounds of Pb per MMBtu or 0.006 pound of Pb per ton of refuse. These factors are about three percent of the total particulate emission factor, and provide adequate margin compared to emission factors from other representative facilities presented in Table A-3. The estimated Facility total annual emission rate for lead is 2.0 tons per year.

A.6.2 BERYLLIUM

Municipal solid waste is not a "beryllium containing waste" as described by the federal regulations for hazardous air pollutants. Beryllium (Be) is present only in trace quantities in refuse. Therefore, beryllium emissions are expected to be minimal.

Beryllium is much less volatile than lead and mercury; therefore, most of this metal will be retained in the ash. Emission of beryllium from energy recovery facilities are associated with particulate emissions and will be efficiently controlled through the use of a fabric filter. Beryllium emissions from existing facilities, if detected at all, are present only in small quantities. The emission data for beryllium presented in Table A-3 show emission factors which vary over three orders of magnitude. This variation is directly related to the amount of beryllium in the waste at the time testing was conducted.

The proposed emission factor for beryllium is 1.35×10^{-7} lb of Be per MMBtu or 1.35×10^{-6} lb of Be per ton of refuse, which corresponds to an annual Facility total emission rate of Be of 4.4×10^{-4} tons per year.

A.6.3 MERCURY

Only trace quantities of mercury (Hg) and its compounds are evident in municipal solid waste. Usually only a small portion of Hg is retained in

TABLE A-3

EMISSION FACTORS IN LB/TON OF WASTE FIRED FOR SELECTED RESOURCE RECOVERY FACILITIES

Facility (name/location)	Type (Type of Comb. & Controls)	Size (tpd)	Test Date (year)	Be	Hg	As	Pb
Munich, N. Germany	MB/DS-ESP	1,060	1984	3.9×10^{-9}		3.6×10^{-6}	6.9×10^{-4}
Wurzburg, Germany	MB/DS-BH	662	1985			4.0×10^{-8}	7.8×10^{-5}
Bristol, CT	MB/DS-BH	650	1988	6.6×10^{-8}	9.0×10^{-4}	3.0×10^{-5}	2.2×10^{-4}
Biddeford, ME	RDF/DS-BH	600	1987		3.8×10^{-4}		6.6×10^{-4}
Marion Co., OR	MB/DS-BH	550	1986	2.1×10^{-8}	2.9×10^{-3}		2.9×10^{-4}
Commerce, CA	MB/DS-BH	380	1987	1.5×10^{-6}	3.2×10^{-4}	1.5×10^{-6}	1.6×10^{-5}
Mid-CT, CT	RDF/DS-BH	2,027	1988	ND	5.6×10^{-4}	ND	4.0×10^{-4}
Millbury, MA	MB/DS-ESP	1,500	1988	3.7×10^{-6}	1.2×10^{-2}	2.5×10^{-5}	2.8×10^{-3}
Bridgeport, CT	MB/DS-BH	2,250	1988	1.1×10^{-5}	3.0×10^{-3}	1.2×10^{-5}	2.3×10^{-5}
Tsushima, Japan	MB/DS-BH	330	1983	2.0×10^{-6}	9.0×10^{-4}	2.0×10^{-6}	1.1×10^{-4}
Stanislaus, CA	MB/DS-BH	800	1988	4.9×10^{-9}	5.0×10^{-3}	1.3×10^{-5}	3.0×10^{-4}
Kent Co., MI	MB/DS-BH	625	1989	ND	1.7×10^{-3}	3.8×10^{-6}	ND
York Co., PA	MB(rotary)/ DS/BH	1,344	1990	ND	7.3×10^{-5}	ND	1.2×10^{-5}
Maximum Expected Value				1.35×10^{-6}	8.0×10^{-3}	9.1×10^{-5}	6.0×10^{-3}

* Generally based on the highest mass-burn/dry scrubber-baghouse (MB/DS-BH) stack test data to provide adequate margin (if such representative data were available to make a determination). Additional test data for other facilities also provided for specific pollutants. Conservative values determined for As and Pb to account for waste stream variations and the fact that compliance with any permitted emission rates will be based on short-term emission tests. Long-term average emission rates are expected to be lower than the maximum expected values. Results from recent stack tests indicate that the maximum expected emission factor noted above for beryllium should be achievable despite the test value reported for Bridgeport, CT; the factor selected for Hg should also be achievable.

the grate residue, as Hg is volatilized into the flue gas. As vaporized Hg passes through the boiler and air pollution control system, some Hg vapor condenses onto suspended particulate matter in the flue gas stream. Because fine particles have a high surface area to volume ratio, the fraction of Hg vapor that does condense would be preferentially associated with fine particulate matter.

Because of the lower outlet temperatures and the additional retention times between boiler outlet and fabric filter inlet, facilities incorporating a dry scrubber are assumed to have lower Hg emissions. However, a sufficient long-term data base does not exist to verify or quantify the degree of reduction that may be achieved. Some facilities equipped with just ESP particulate control have tested within the same range as those equipped with scrubber-baghouses; however, waste stream variations may have affected such tests.

The proposed emission factors for mercury are 6.0×10^{-4} lb Hg per MMBtu or 6.0×10^{-3} lb Hg per ton of refuse. These values represent some anticipated reduction of emissions compared to facilities using particulate control alone, while still representing an upper bound estimate of potential Hg emissions. The estimated annual Facility total emission rate for Hg is 2.0 tons per year.

A.6.4 ARSENIC

As with mercury emissions, arsenic (As) is expected to be emitted both as a vapor and particle. The St. Louis Demonstration (Gorman, 1977) calculated vapor metal emissions of arsenic. The study indicated that the fraction of metal in the vapor phase to metal in the particulate phase is 0.30. Because dry scrubbers are assumed to promote additional condensation and agglomeration, the vapor to particle ratio is expected to be lower and the fraction of arsenic controlled is expected to be greater.

The proposed emission factors for arsenic are 9.1×10^{-6} lb As per MMBtu or 9.1×10^{-5} lb As per ton of refuse. This value represents some anticipated reduction of emissions over facilities that do not have a dry scrubber,

while still representing an upper bound estimate of potential As emissions. The estimated annual Facility total emission rate for As is 0.03 tons per year.

A.7 DIOXINS AND FURANS

PCDD and PCDF are two groups of structurally similar chemical compounds. Each is composed of two benzene rings which are connected by either one oxygen atom (PCDF) or two oxygen atoms (PCDD). There are 75 PCDD and 135 PCDF group members (or isomers). The chemical, physical, and toxicological properties of each isomer vary relative to its chemical structure. Generally, the most toxic isomers are those which have four chlorine atoms located in the lateral positions in the molecule (attached to the carbon atoms numbered 2, 3, 7, and 8).

The total tetra-through-octa-isomer PCDD and PCDF emission rate for the Facility is based on meeting the recently promulgated NSPS of 30 ng/dscm corrected to 7% O₂. The annual emission rate and emission factors are calculated below for a single combustor unit.

Basis: 30.0 nanograms per dry standard cubic meter
corrected to 7 percent O₂ (ng/dscm @ 7% O₂)
(total tetra-octa PCDD and PCDF)

1. Adjust to actual O₂ as calculated by BURN

$$\begin{aligned} 30.0 \text{ ng/dscm } (21\% - 10.0\% \text{ O}_2) &= 23.6 \text{ ng/dscm} \\ @ 7\% \text{ O}_2 (21\% - 7.0\% \text{ O}_2) &\text{ actual} \end{aligned}$$

2. Calculate the dry volumetric flow rate for the unit

$$\frac{187 \text{ moles of flue gas}}{\text{min}} \left(\frac{385.3 \text{ dry std cu ft}}{\text{mole}} \right) = \frac{72,051 \text{ dscf}}{\text{min}}$$

$$\frac{72,051 \text{ dscf}}{\text{min}} (0.0283 \text{ dscm}) = \frac{2,039 \text{ dscm}}{\text{min}}$$

3. Calculate the total tetra-octa PCDD and PCDF emission rate for each unit

$$\frac{23.6 \text{ ng/dscm}}{\text{actual}} \left(\frac{2,039 \text{ dscm}}{\text{min}} \right) \left(\frac{1 \times 10^{-9}}{\text{ng}} \right) \left(\frac{60 \text{ min}}{\text{hr}} \right)$$

$$\left(\frac{0.002205 \text{ lb}}{\text{gm}} \right) = 6.37 \times 10^{-6} \frac{\text{lb}}{\text{hr}} = 2.7 \times 10^{-5} \frac{\text{tons}}{\text{yr}} \text{ total PCDD and PCDF}$$

4. Calculate total PCDD and PCDF emission factors

$$6.37 \times 10^{-6} \frac{\text{lb}}{\text{hr}} \left(\frac{\text{day}}{600 \text{ tons}} \right) \left(\frac{24 \text{ hr}}{\text{day}} \right) = 2.54 \times 10^{-7} \frac{\text{lb}}{\text{ton refuse}} \text{ total PCDD and PCDF}$$

$$\frac{2.55 \times 10^{-7} \text{ lb}}{\text{ton refuse}} \left(\frac{\text{lb}}{5,000 \text{ Btu}} \right) \left(\frac{\text{ton}}{2,000 \text{ lb}} \right) = 2.54 \times 10^{-8} \frac{\text{lb}}{\text{MMBtu}} \text{ total PCDD and PCDF}$$

The Facility, which would have three combustor units, would have a total annual tetra-octa PCDD and PCDF emission rate of 8.3×10^{-5} tons/yr.

REFERENCES

- Beachler, D. S., D. M. Pompelia, and J. Weldon, 1988, "Bay County, Florida Waste-To-Energy Facility Air Emission Tests." Proceedings of the 1988 National Waste Processing Conference, ASME, New York, NY, May 1988.
- California Air Resources Board (CARB), 1984, "Air Pollution Control at Resource Recovery Facilities," May 1984.
- City of Chester, Pennsylvania Materials and Energy Recovery Project PSD Permit Application, Combustion Engineering Resource Recovery Systems, June 1989.
- Cooper and Clark - Consulting Engineers, 1981, "Air Emissions Tests of Solid Waste Combustion in a Rotary Combustor/Boiler System at Kure, Japan."
- Cooper Engineers, Inc., 1984, "Air Emissions Tests of Solid Waste Combustion in a Rotary Combustor/Boiler System at Gallatin, Tennessee."
- Cooper Engineers, Inc., 1984, "West County Agency of Contra Costa County Waste Co-Disposal/Energy Recovery Project - Emission Data from Tsushima, Japan."
- EPA, 1975, Resource Recovery and Waste Reduction: Third Report to Congress, Report SW-161, EPA, Washington, D.C.
- Gorman, P. G., L. J. Shannon, M. P. Schrag, and D. E. Fiscus. 1977. St. Louis Demonstration Project Final Report: Power Plant Equipment, Facilities, and Environmental Evaluations. U.S. EPA Contract No. 68-02-1871.
- Hasselris, F., 1986, "Minimizing Trace Organic Emissions from Combustion of Municipal Solid Waste by the Use of Carbon Monoxide Monitors," Proceedings of the 1986 National Solid Waste Processing Conference, ASME, Denver, CO, June 1986.
- Hay, D. J., A. Finkelstein, and R. Klicius. "The National Incinerator Testing and Evaluation Program (NITEP): An Assessment of A) Two-Stage Incineration B) Pilot Scale Emission Control". Presented at the 79th Annual Meeting of APCA, June 22-27, 1986. Minneapolis, Minnesota.
- Russel, S. H., and J. E. Roberts, 1984, "Oxides of Nitrogen: Formation and Control in Resource Recovery Facilities," Proceedings of the 1984 National Waste Processing Conference, ASME, New York, NY, June 1984.

ATTACHMENT B
METEOROLOGICAL DATA

ATTACHMENT B
METEOROLOGICAL DATA

This attachment presents wind roses and wind speeds by stability class for each year (1982 to 1986) from National Weather Service Station Number 12835 at the Fort Myers Page Field Airport. These five years of surface wind data were used in the dispersion modeling analysis. The upper air data from National Weather Service Station Number 12842 at Tampa (Tampa International Airport) were used to estimate mixing heights during this period. The Fort Myers/Tampa data are the most representative data that are available of conditions at the Facility site. They were provided by Mr. Thomas Rogers of DER for use in this permit application (Thomas Rogers, 1989).

IMAGE QUALITY

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

B
-
2

B
-
2



B
-
2

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX A

FROM JAN. 1 1982 THROUGH DEC. 31 1982

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.01	0.08	0.00	0.00	0.00	0.00	0.09	2.31
NNE	0.00	0.02	0.00	0.00	0.00	0.00	0.02	2.31
NE	0.01	0.06	0.00	0.00	0.00	0.00	0.07	2.06
ENE	0.03	0.10	0.00	0.00	0.00	0.00	0.14	1.97
E	0.00	0.02	0.00	0.00	0.00	0.00	0.02	2.57
ESE	0.01	0.03	0.00	0.00	0.00	0.00	0.05	1.67
SE	0.00	0.02	0.00	0.00	0.00	0.00	0.02	2.31
SSE	0.00	0.01	0.00	0.00	0.00	0.00	0.01	2.06
S	0.00	0.05	0.00	0.00	0.00	0.00	0.05	2.31
SSW	0.00	0.03	0.00	0.00	0.00	0.00	0.03	2.40
SW	0.00	0.06	0.00	0.00	0.00	0.00	0.06	2.06
WSW	0.01	0.03	0.00	0.00	0.00	0.00	0.05	2.19
W	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WNW	0.00	0.01	0.00	0.00	0.00	0.00	0.01	2.57
NW	0.00	0.05	0.00	0.00	0.00	0.00	0.05	2.19
NNW	0.00	0.02	0.00	0.00	0.00	0.00	0.02	2.31
TOTAL	0.08	0.61	0.00	0.00	0.00	0.00	0.69	2.15
AVG SPD	0.88	2.32	0.00	0.00	0.00	0.00	2.15	2.15

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX B

FROM JAN. 1 1982 THROUGH DEC. 31 1982

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.02	0.09	0.20	0.00	0.00	0.00	0.31	3.09
NNE	0.02	0.10	0.22	0.01	0.00	0.00	0.36	3.04
NE	0.06	0.11	0.25	0.00	0.00	0.00	0.42	2.95
ENE	0.03	0.07	0.40	0.00	0.00	0.00	0.51	3.18
E	0.02	0.07	0.26	0.00	0.00	0.00	0.36	3.19
ESE	0.01	0.13	0.42	0.00	0.00	0.00	0.56	3.25
SE	0.02	0.11	0.40	0.00	0.00	0.00	0.54	3.10
SSE	0.01	0.07	0.23	0.01	0.00	0.00	0.32	3.29
S	0.02	0.10	0.22	0.01	0.00	0.00	0.36	3.12
SSW	0.01	0.10	0.24	0.00	0.00	0.00	0.36	3.37
SW	0.00	0.03	0.36	0.02	0.00	0.00	0.41	3.54
WSW	0.00	0.05	0.17	0.01	0.00	0.00	0.23	3.47
W	0.00	0.05	0.29	0.06	0.00	0.00	0.39	3.81
WNW	0.01	0.09	0.17	0.01	0.00	0.00	0.29	3.15
NW	0.02	0.05	0.20	0.02	0.00	0.00	0.29	3.40
NNW	0.01	0.07	0.16	0.00	0.00	0.00	0.24	3.16
TOTAL	0.29	1.30	4.19	0.16	0.00	0.00	5.94	3.25
AVG SPD	1.09	2.35	3.59	5.44	0.00	0.00	3.25	3.25

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX C

FROM JAN. 1 1982 THROUGH DEC. 31 1982

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.02	0.08	0.24	0.16	0.01	0.00	0.52	4.07
NNE	0.03	0.09	0.42	0.42	0.00	0.00	0.98	4.45
NE	0.09	0.08	0.84	0.51	0.00	0.00	1.52	4.21
ENE	0.08	0.15	0.55	0.53	0.01	0.00	1.32	4.20
E	0.03	0.10	0.41	0.55	0.00	0.00	1.10	4.49
ESE	0.07	0.17	0.68	0.44	0.00	0.00	1.36	4.00
SE	0.03	0.21	0.55	0.40	0.00	0.00	1.19	4.00
SSE	0.02	0.09	0.41	0.10	0.00	0.00	0.63	3.82
S	0.03	0.15	0.41	0.30	0.01	0.00	0.91	4.05
SSW	0.03	0.09	0.31	0.37	0.08	0.00	0.88	4.91
SW	0.03	0.05	0.51	0.45	0.00	0.00	1.03	4.60
WSW	0.01	0.11	0.49	0.25	0.01	0.00	0.88	4.24
W	0.00	0.03	0.26	0.41	0.00	0.00	0.71	4.75
WNW	0.01	0.06	0.20	0.17	0.00	0.00	0.44	4.35
NW	0.00	0.03	0.26	0.17	0.00	0.00	0.47	4.39
NNW	0.01	0.10	0.18	0.10	0.00	0.00	0.40	3.69
TOTAL	0.53	1.61	6.74	5.34	0.13	0.00	14.34	4.27
AVG SPD	0.85	2.36	3.96	5.48	8.65	0.00	4.27	4.27

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX D

FROM JAN. 1 1982 THROUGH DEC. 31 1982

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.03	0.18	0.61	1.34	0.09	0.00	2.26	5.27
NNE	0.03	0.38	1.03	1.70	0.13	0.00	3.27	5.02
NE	0.09	0.40	1.52	2.06	0.15	0.00	4.21	4.92
ENE	0.06	0.40	1.14	1.60	0.16	0.00	3.35	4.86
E	0.06	0.30	0.91	1.26	0.02	0.01	2.56	4.77
ESE	0.07	0.46	0.94	1.16	0.08	0.00	2.71	4.62
SE	0.06	0.29	0.96	1.36	0.06	0.01	2.73	4.91
SSE	0.03	0.24	0.61	0.51	0.06	0.01	1.46	4.50
S	0.01	0.24	0.56	0.79	0.13	0.01	1.75	5.11
SSW	0.01	0.15	0.44	1.02	0.08	0.00	1.70	5.43
SW	0.00	0.15	0.61	1.06	0.09	0.01	1.92	5.24
WSW	0.00	0.13	0.31	0.44	0.03	0.00	0.91	4.70
W	0.00	0.11	0.24	0.32	0.01	0.00	0.69	4.42
WNW	0.00	0.08	0.22	0.59	0.07	0.00	0.95	5.51
NW	0.01	0.08	0.30	0.62	0.10	0.00	1.11	5.51
NNW	0.00	0.11	0.32	0.80	0.09	0.00	1.33	5.50
TOTAL	0.47	3.71	10.71	16.62	1.36	0.06	32.92	4.99
AVG SPD	0.54	2.34	3.80	6.14	8.81	11.94	4.99	4.99

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX E

FROM JAN. 1 1982 THROUGH DEC. 31 1982

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.03	0.21	0.57	0.33	0.00	0.00	1.15	3.88
NNE	0.06	0.49	1.19	0.24	0.00	0.00	1.99	3.45
NE	0.17	0.86	1.76	0.20	0.00	0.00	2.99	3.23
ENE	0.15	0.76	1.23	0.17	0.00	0.00	2.31	3.17
E	0.13	0.52	1.15	0.22	0.00	0.00	2.01	3.39
ESE	0.08	0.80	0.99	0.11	0.00	0.00	1.99	3.11
SE	0.13	0.67	0.41	0.02	0.00	0.00	1.23	2.61
SSE	0.03	0.25	0.18	0.01	0.00	0.00	0.48	2.73
S	0.03	0.29	0.22	0.02	0.00	0.00	0.56	2.72
SSW	0.01	0.13	0.30	0.07	0.00	0.00	0.51	3.55
SW	0.02	0.11	0.36	0.05	0.00	0.00	0.54	3.44
WSW	0.02	0.09	0.08	0.00	0.00	0.00	0.20	2.57
W	0.01	0.06	0.16	0.01	0.00	0.00	0.24	3.28
WNW	0.01	0.18	0.40	0.05	0.00	0.00	0.64	3.42
NW	0.01	0.15	0.30	0.09	0.00	0.00	0.55	3.56
NNW	0.01	0.08	0.37	0.11	0.00	0.00	0.57	4.02
TOTAL	0.92	5.65	9.67	1.71	0.00	0.00	17.95	3.27
AVG SPD	0.57	2.34	3.73	5.19	0.00	0.00	3.27	3.27

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

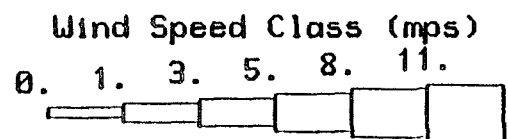
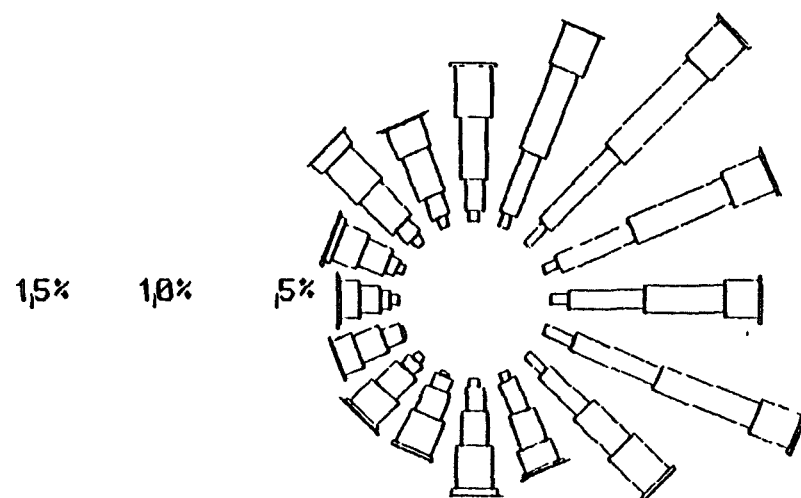
STABILITY INDEX F

FROM JAN. 1 1982 THROUGH DEC. 31 1982

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.32	0.32	0.22	0.00	0.00	0.00	0.86	1.70
NNE	0.95	1.34	0.72	0.00	0.00	0.00	3.02	1.86
NE	1.75	2.32	1.15	0.01	0.00	0.00	5.23	1.86
ENE	1.26	1.73	0.98	0.00	0.00	0.00	3.97	1.85
E	1.16	1.23	0.73	0.00	0.00	0.00	3.12	1.79
ESE	1.46	1.62	0.46	0.01	0.00	0.00	3.55	1.64
SE	1.22	1.00	0.25	0.00	0.00	0.00	2.47	1.46
SSE	0.63	0.55	0.09	0.00	0.00	0.00	1.27	1.49
S	0.52	0.36	0.06	0.00	0.00	0.00	0.93	1.24
SSW	0.34	0.34	0.08	0.00	0.00	0.00	0.77	1.46
SW	0.20	0.16	0.13	0.00	0.00	0.00	0.48	1.67
WSW	0.20	0.06	0.05	0.00	0.00	0.00	0.30	1.13
W	0.16	0.15	0.09	0.00	0.00	0.00	0.40	1.69
WNW	0.23	0.20	0.10	0.00	0.00	0.00	0.53	1.54
NW	0.28	0.22	0.14	0.00	0.00	0.00	0.63	1.70
NNW	0.23	0.30	0.09	0.00	0.00	0.00	0.62	1.65
TOTAL	10.90	11.90	5.34	0.02	0.00	0.00	28.16	1.71
AVG SPD	0.35	2.32	3.10	6.43	0.00	0.00	1.71	1.71

SITE 01 FROM 01/01/83 TO 12/31/83

WIND SPEED AND DIRECTION ROSE



NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX A

FROM JAN. 1 1983 THROUGH DEC. 31 1983

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.01	0.06	0.00	0.00	0.00	0.00	0.07	1.01
NNE	0.02	0.04	0.00	0.00	0.00	0.00	0.05	1.62
NE	0.02	0.06	0.00	0.00	0.00	0.00	0.08	1.13
ENE	0.03	0.11	0.00	0.00	0.00	0.00	0.14	1.16
E	0.01	0.03	0.00	0.00	0.00	0.00	0.04	1.48
ESE	0.02	0.05	0.00	0.00	0.00	0.00	0.07	1.36
SE	0.01	0.04	0.00	0.00	0.00	0.00	0.05	1.57
SSE	0.01	0.02	0.00	0.00	0.00	0.00	0.03	1.63
S	0.00	0.05	0.00	0.00	0.00	0.00	0.05	1.57
SSW	0.00	0.03	0.00	0.00	0.00	0.00	0.03	1.41
SW	0.00	0.03	0.00	0.00	0.00	0.00	0.03	0.69
WSW	0.01	0.03	0.00	0.00	0.00	0.00	0.04	1.34
W	0.00	0.02	0.00	0.00	0.00	0.00	0.02	2.06
WNW	0.00	0.01	0.00	0.00	0.00	0.00	0.01	2.57
NW	0.00	0.03	0.00	0.00	0.00	0.00	0.03	1.14
NNW	0.00	0.04	0.00	0.00	0.00	0.00	0.04	2.09
TOTAL	0.13	0.64	0.00	0.00	0.00	0.00	0.77	1.36
AVG SPD	0.26	1.34	0.00	0.00	0.00	0.00	1.36	1.36

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX B

FROM JAN. 1 1983 THROUGH DEC. 31 1983

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.03	0.09	0.20	0.00	0.00	0.00	0.32	1.70
NNE	0.03	0.09	0.22	0.01	0.00	0.00	0.35	1.60
NE	0.06	0.10	0.28	0.00	0.00	0.00	0.45	1.67
ENE	0.04	0.07	0.41	0.01	0.00	0.00	0.52	1.82
E	0.04	0.06	0.34	0.00	0.00	0.00	0.44	2.03
ESE	0.02	0.14	0.46	0.00	0.00	0.00	0.63	1.86
SE	0.04	0.11	0.33	0.00	0.01	0.00	0.48	1.59
SSE	0.01	0.06	0.16	0.01	0.00	0.00	0.24	1.28
S	0.02	0.07	0.16	0.01	0.00	0.00	0.25	1.06
SSW	0.01	0.06	0.14	0.02	0.00	0.00	0.23	1.19
SW	0.01	0.04	0.25	0.01	0.00	0.00	0.31	1.33
WSW	0.00	0.07	0.18	0.01	0.00	0.00	0.26	2.00
W	0.00	0.02	0.18	0.04	0.00	0.00	0.24	1.02
WNW	0.01	0.05	0.15	0.01	0.00	0.00	0.22	1.28
NW	0.01	0.05	0.19	0.02	0.00	0.00	0.26	1.83
NNW	0.01	0.07	0.15	0.01	0.00	0.00	0.23	1.67
TOTAL	0.32	1.16	3.81	0.13	0.01	0.00	5.43	1.62
AVG SPD	0.42	1.16	1.77	2.54	9.77	0.00	1.62	1.62

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX C

FROM JAN. 1 1983 THROUGH DEC. 31 1983

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.03	0.08	0.27	0.21	0.02	0.00	0.61	2.67
NNE	0.07	0.12	0.47	0.30	0.00	0.00	0.95	2.03
NE	0.12	0.13	0.83	0.41	0.01	0.00	1.49	2.06
ENE	0.10	0.13	0.57	0.41	0.01	0.00	1.22	1.95
E	0.05	0.13	0.48	0.48	0.00	0.00	1.14	2.28
ESE	0.11	0.23	0.71	0.53	0.02	0.00	1.60	2.52
SE	0.06	0.14	0.42	0.44	0.01	0.00	1.07	2.17
SSE	0.04	0.07	0.33	0.14	0.01	0.00	0.60	2.11
S	0.04	0.09	0.31	0.26	0.02	0.00	0.72	1.99
SSW	0.04	0.07	0.27	0.31	0.04	0.00	0.73	2.04
SW	0.02	0.04	0.42	0.37	0.01	0.00	0.86	2.10
WSW	0.01	0.11	0.44	0.26	0.01	0.00	0.83	2.18
W	0.02	0.04	0.25	0.29	0.00	0.00	0.60	2.02
WNW	0.02	0.03	0.16	0.17	0.01	0.00	0.39	2.43
NW	0.01	0.04	0.24	0.17	0.02	0.01	0.47	2.67
NNW	0.02	0.06	0.22	0.12	0.01	0.00	0.42	2.38
TOTAL	0.75	1.50	6.39	4.88	0.17	0.01	13.70	2.20
AVG SPD	0.27	1.22	2.05	2.81	6.22	11.83	2.20	2.20

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX D

FROM JAN. 1 1983 THROUGH DEC. 31 1983

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.05	0.14	0.62	1.29	0.10	0.00	2.19	2.79
NNE	0.10	0.31	1.01	1.45	0.07	0.00	2.94	2.26
NE	0.17	0.40	1.34	1.58	0.14	0.00	3.63	2.05
ENE	0.13	0.37	1.06	1.33	0.13	0.01	3.02	2.22
E	0.11	0.31	0.77	0.95	0.06	0.01	2.21	2.06
ESE	0.14	0.44	1.04	0.96	0.07	0.00	2.66	2.17
SE	0.11	0.26	0.78	1.24	0.08	0.01	2.48	2.40
SSE	0.06	0.19	0.54	0.56	0.09	0.01	1.45	2.64
S	0.04	0.17	0.54	1.02	0.17	0.01	1.95	3.31
SSW	0.04	0.10	0.47	1.01	0.11	0.00	1.72	3.02
SW	0.01	0.11	0.51	0.93	0.12	0.01	1.68	2.68
WSW	0.02	0.14	0.28	0.44	0.06	0.00	0.93	2.78
W	0.02	0.07	0.23	0.39	0.07	0.01	0.78	3.47
WNW	0.01	0.07	0.29	0.64	0.14	0.04	1.20	4.02
NW	0.02	0.11	0.35	0.96	0.31	0.01	1.76	4.45
NNW	0.02	0.13	0.40	0.77	0.07	0.01	1.40	2.79
TOTAL	1.05	3.30	10.23	15.51	1.78	0.12	32.00	2.66
AVG SPD	0.26	1.15	1.98	3.14	5.86	10.53	2.66	2.66

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX E

FROM JAN. 1 1983 THROUGH DEC. 31 1983

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.05	0.22	0.58	0.28	0.00	0.00	1.13	1.95
NNE	0.11	0.45	0.99	0.15	0.00	0.00	1.71	1.41
NE	0.24	0.77	1.49	0.19	0.00	0.00	2.70	1.49
ENE	0.21	0.67	1.04	0.14	0.00	0.00	2.06	1.37
E	0.17	0.44	0.92	0.15	0.00	0.00	1.68	1.36
ESE	0.19	0.65	0.95	0.11	0.00	0.00	1.89	1.46
SE	0.15	0.52	0.42	0.07	0.00	0.00	1.16	1.48
SSE	0.06	0.22	0.26	0.02	0.00	0.00	0.56	1.77
S	0.06	0.25	0.26	0.03	0.00	0.00	0.59	1.60
SSW	0.05	0.12	0.24	0.04	0.00	0.00	0.45	1.33
SW	0.03	0.09	0.25	0.02	0.00	0.00	0.39	1.06
WSW	0.03	0.09	0.11	0.01	0.00	0.00	0.24	1.74
W	0.02	0.05	0.14	0.01	0.00	0.00	0.22	1.56
WNW	0.03	0.12	0.32	0.06	0.00	0.00	0.52	1.55
NW	0.04	0.14	0.46	0.14	0.00	0.00	0.78	2.51
NNW	0.03	0.10	0.46	0.17	0.00	0.00	0.76	2.51
TOTAL	1.47	4.90	8.90	1.59	0.00	0.00	16.86	1.58
AVG SPD	0.22	1.11	1.85	2.64	0.00	0.00	1.58	1.58

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

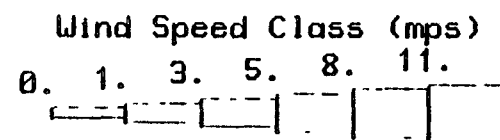
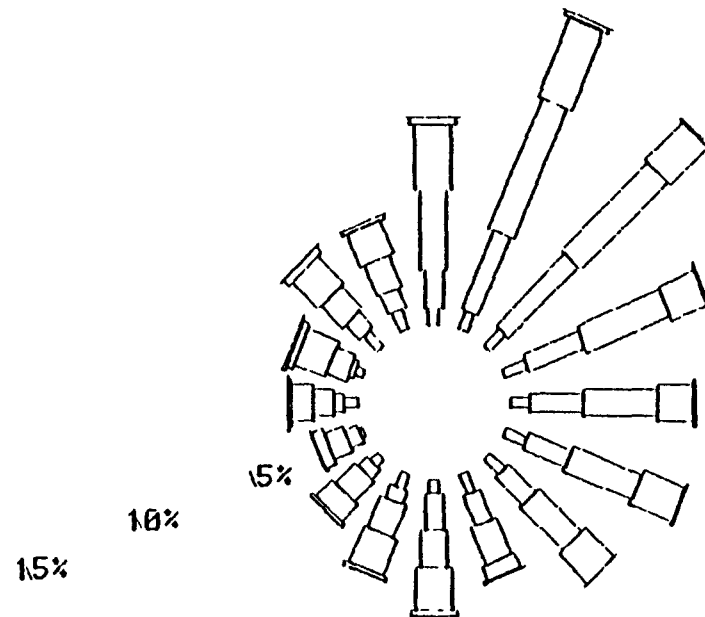
STABILITY INDEX F

FROM JAN. 1 1983 THROUGH DEC. 31 1983

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.61	0.35	0.32	0.01	0.00	0.00	1.27	1.00
NNE	1.46	1.13	0.65	0.00	0.00	0.00	3.25	0.74
NE	2.51	1.88	0.83	0.01	0.00	0.00	5.23	0.60
ENE	1.94	1.44	0.83	0.00	0.00	0.00	4.21	0.69
E	1.74	1.20	0.61	0.00	0.00	0.00	3.55	0.74
ESE	2.11	1.46	0.44	0.01	0.00	0.00	4.02	0.65
SE	1.62	0.82	0.27	0.00	0.00	0.00	2.71	0.56
SSE	0.91	0.52	0.09	0.00	0.00	0.00	1.52	0.63
S	0.72	0.35	0.09	0.00	0.00	0.00	1.16	0.62
SSW	0.48	0.23	0.07	0.00	0.00	0.00	0.77	0.39
SW	0.31	0.15	0.07	0.00	0.00	0.00	0.52	0.44
WSW	0.33	0.08	0.03	0.00	0.00	0.00	0.45	0.50
W	0.24	0.13	0.07	0.00	0.00	0.00	0.44	0.61
WNW	0.33	0.17	0.10	0.00	0.00	0.00	0.60	0.65
NW	0.38	0.20	0.14	0.00	0.00	0.00	0.73	0.73
NNW	0.41	0.27	0.14	0.00	0.00	0.00	0.82	0.87
TOTAL	16.10	10.38	4.76	0.02	0.00	0.00	31.25	0.67
AVG SPD	0.13	1.10	1.51	3.86	0.00	0.00	0.67	0.67

SITE 01 FROM 01/01/84 TO 12/31/84

WIND SPEED AND DIRECTION ROSE



NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX A

FROM JAN. 1 1984 THROUGH DEC. 31 1984

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.01	0.06	0.00	0.00	0.00	0.00	0.07	0.91
NNE	0.02	0.04	0.00	0.00	0.00	0.00	0.06	0.83
NE	0.03	0.06	0.00	0.00	0.00	0.00	0.09	0.57
ENE	0.03	0.08	0.00	0.00	0.00	0.00	0.11	0.35
E	0.03	0.03	0.00	0.00	0.00	0.00	0.05	0.69
ESE	0.03	0.03	0.00	0.00	0.00	0.00	0.06	0.21
SE	0.02	0.03	0.00	0.00	0.00	0.00	0.04	0.44
SSE	0.01	0.02	0.00	0.00	0.00	0.00	0.04	0.76
S	0.00	0.04	0.00	0.00	0.00	0.00	0.04	0.71
SSW	0.00	0.02	0.00	0.00	0.00	0.00	0.02	0.57
SW	0.00	0.03	0.00	0.00	0.00	0.00	0.03	0.76
WSW	0.00	0.03	0.00	0.00	0.00	0.00	0.03	0.72
W	0.00	0.01	0.00	0.00	0.00	0.00	0.01	1.16
WNW	0.00	0.01	0.00	0.00	0.00	0.00	0.01	1.71
NW	0.00	0.04	0.00	0.00	0.00	0.00	0.04	1.16
NNW	0.00	0.04	0.00	0.00	0.00	0.00	0.04	1.07
TOTAL	0.20	0.56	0.00	0.00	0.00	0.00	0.76	0.68
AVG SPD	0.08	0.76	0.00	0.00	0.00	0.00	0.68	0.68

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX B

FROM JAN. 1 1984 THROUGH DEC. 31 1984

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.02	0.10	0.23	0.00	0.00	0.00	0.36	1.43
NNE	0.04	0.11	0.22	0.01	0.00	0.00	0.37	1.21
NE	0.06	0.08	0.26	0.00	0.00	0.00	0.41	0.96
ENE	0.04	0.07	0.30	0.00	0.00	0.00	0.41	0.62
E	0.04	0.06	0.30	0.00	0.00	0.00	0.40	1.02
ESE	0.04	0.11	0.39	0.00	0.00	0.00	0.54	0.87
SE	0.04	0.10	0.30	0.00	0.00	0.00	0.44	0.98
SSE	0.02	0.07	0.15	0.01	0.00	0.00	0.25	1.24
S	0.02	0.07	0.15	0.00	0.00	0.00	0.24	1.08
SSW	0.01	0.06	0.12	0.02	0.00	0.00	0.21	1.21
SW	0.01	0.04	0.18	0.01	0.00	0.00	0.24	0.62
WSW	0.00	0.06	0.13	0.01	0.00	0.00	0.20	0.68
W	0.00	0.03	0.13	0.03	0.00	0.00	0.18	0.73
WNW	0.01	0.04	0.11	0.01	0.00	0.00	0.17	0.74
NW	0.01	0.04	0.15	0.01	0.00	0.00	0.21	0.80
NNW	0.01	0.06	0.11	0.01	0.00	0.00	0.20	0.90
TOTAL	0.37	1.09	3.24	0.11	0.00	0.00	4.82	0.96
AVG SPD	0.12	0.85	1.04	1.94	9.77	0.00	0.96	0.96

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX C

FROM JAN. 1 1984 THROUGH DEC. 31 1984

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.04	0.08	0.35	0.22	0.01	0.00	0.70	1.89
NNE	0.09	0.11	0.56	0.38	0.01	0.00	1.16	2.08
NE	0.15	0.12	0.70	0.39	0.00	0.00	1.36	1.22
ENE	0.12	0.11	0.53	0.33	0.00	0.00	1.09	1.12
E	0.09	0.09	0.46	0.41	0.00	0.00	1.05	1.30
ESE	0.13	0.16	0.62	0.51	0.01	0.00	1.43	1.32
SE	0.09	0.12	0.45	0.39	0.01	0.00	1.05	1.48
SSE	0.06	0.05	0.31	0.14	0.01	0.00	0.56	1.40
S	0.06	0.08	0.25	0.26	0.03	0.00	0.69	1.57
SSW	0.04	0.05	0.25	0.30	0.04	0.00	0.68	1.71
SW	0.03	0.04	0.35	0.31	0.01	0.00	0.73	1.35
WSW	0.02	0.08	0.31	0.20	0.00	0.00	0.61	0.70
W	0.02	0.04	0.20	0.25	0.00	0.00	0.50	1.27
WNW	0.02	0.02	0.15	0.15	0.01	0.00	0.35	1.64
NW	0.02	0.04	0.21	0.15	0.03	0.00	0.45	1.62
NNW	0.02	0.06	0.19	0.12	0.00	0.00	0.40	1.47
TOTAL	0.97	1.24	5.90	4.52	0.17	0.00	12.80	1.44
AVG SPD	0.09	0.64	1.36	1.95	3.44	11.83	1.44	1.44

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX D

FROM JAN. 1 1984 THROUGH DEC. 31 1984

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.07	0.14	0.61	1.34	0.15	0.01	2.32	2.34
NNE	0.16	0.30	1.07	1.56	0.09	0.00	3.19	2.11
NE	0.25	0.37	1.19	1.39	0.10	0.00	3.29	1.37
ENE	0.19	0.34	0.92	1.13	0.09	0.01	2.69	1.30
E	0.17	0.28	0.76	0.85	0.06	0.00	2.11	1.48
ESE	0.21	0.31	0.86	0.90	0.06	0.00	2.34	1.31
SE	0.15	0.21	0.62	1.06	0.05	0.00	2.10	1.26
SSE	0.08	0.17	0.47	0.46	0.07	0.01	1.26	1.20
S	0.07	0.20	0.49	0.96	0.17	0.01	1.90	1.87
SSW	0.05	0.11	0.41	0.91	0.11	0.00	1.59	1.83
SW	0.02	0.09	0.42	0.75	0.11	0.01	1.40	1.46
WSW	0.04	0.11	0.26	0.35	0.04	0.00	0.80	1.26
W	0.02	0.07	0.22	0.41	0.08	0.01	0.82	2.29
WNW	0.02	0.05	0.22	0.69	0.16	0.05	1.20	2.62
NW	0.04	0.08	0.32	0.92	0.26	0.01	1.62	2.06
NNW	0.04	0.12	0.34	0.78	0.09	0.01	1.38	2.10
TOTAL	1.57	2.94	9.19	14.47	1.70	0.12	29.99	1.71
AVG SPD	0.05	0.76	1.24	2.16	3.29	5.38	1.71	1.71

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX E

FROM JAN. 1 1984 THROUGH DEC. 31 1984

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.08	0.22	0.63	0.27	0.00	0.00	1.20	1.51
NNE	0.18	0.48	1.10	0.17	0.00	0.00	1.93	1.48
NE	0.33	0.71	1.33	0.17	0.00	0.00	2.54	0.97
ENE	0.26	0.56	0.96	0.11	0.00	0.00	1.90	0.89
E	0.22	0.38	0.75	0.10	0.00	0.00	1.45	0.71
ESE	0.25	0.48	0.77	0.08	0.00	0.00	1.58	0.64
SE	0.20	0.40	0.43	0.06	0.00	0.00	1.09	0.84
SSE	0.10	0.19	0.24	0.02	0.00	0.00	0.54	0.88
S	0.09	0.24	0.23	0.04	0.00	0.00	0.60	1.00
SSW	0.06	0.11	0.25	0.03	0.00	0.00	0.46	1.18
SW	0.05	0.07	0.21	0.02	0.00	0.00	0.35	0.88
WSW	0.04	0.09	0.12	0.00	0.00	0.00	0.25	1.01
W	0.03	0.05	0.16	0.01	0.00	0.00	0.25	1.36
WNW	0.04	0.08	0.28	0.06	0.00	0.00	0.45	1.05
NW	0.05	0.12	0.41	0.11	0.00	0.00	0.69	1.06
NNW	0.05	0.08	0.40	0.13	0.00	0.00	0.67	1.03
TOTAL	2.04	4.25	8.28	1.37	0.00	0.00	15.94	1.01
AVG SPD	0.03	0.71	1.32	1.54	0.00	0.00	1.01	1.01

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

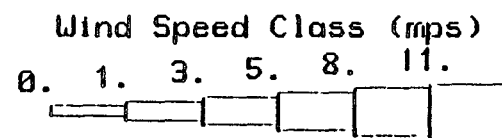
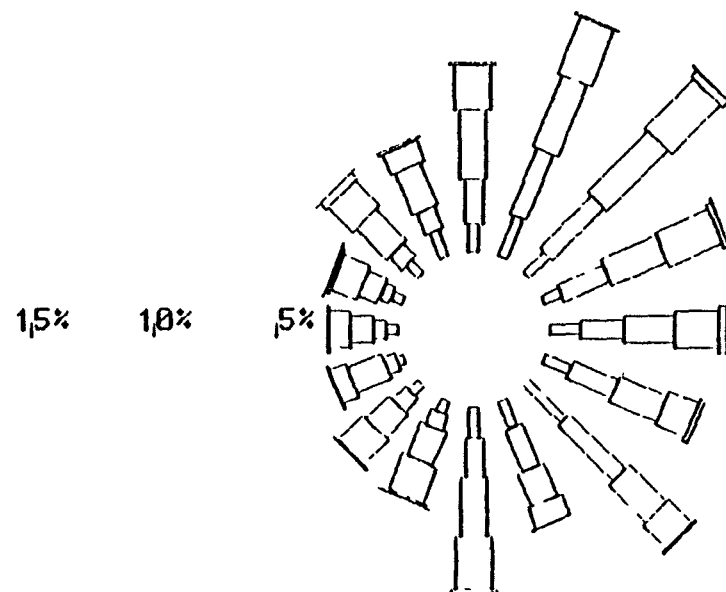
STABILITY INDEX F

FROM JAN. 1 1984 THROUGH DEC. 31 1984

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.90	0.36	0.28	0.00	0.00	0.00	1.55	0.43
NNE	2.09	1.17	0.69	0.00	0.00	0.00	3.95	0.53
NE	3.42	1.74	0.81	0.00	0.00	0.00	5.97	0.41
ENE	2.65	1.19	0.70	0.00	0.00	0.00	4.54	0.31
E	2.28	1.04	0.49	0.00	0.00	0.00	3.80	0.30
ESE	2.81	1.18	0.40	0.00	0.00	0.00	4.39	0.27
SE	2.07	0.71	0.24	0.00	0.00	0.00	3.02	0.25
SSE	1.20	0.50	0.11	0.00	0.00	0.00	1.81	0.35
S	1.01	0.34	0.10	0.00	0.00	0.00	1.46	0.32
SSW	0.64	0.18	0.08	0.00	0.00	0.00	0.90	0.24
SW	0.45	0.14	0.06	0.00	0.00	0.00	0.64	0.30
WSW	0.47	0.09	0.05	0.00	0.00	0.00	0.61	0.36
W	0.33	0.11	0.06	0.00	0.00	0.00	0.50	0.27
WNW	0.43	0.14	0.09	0.00	0.00	0.00	0.66	0.28
NW	0.55	0.23	0.11	0.00	0.00	0.00	0.89	0.39
NNW	0.59	0.25	0.17	0.00	0.00	0.00	1.01	0.48
TOTAL	21.89	9.37	4.43	0.01	0.00	0.00	35.70	0.35
AVG SPD	0.02	0.78	1.09	2.25	0.00	0.00	0.35	0.35

SITE 01 FROM 01/01/85 TO 12/31/85

WIND SPEED AND DIRECTION ROSE



NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX A

FROM JAN. 1 1985 THROUGH DEC. 31 1985

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.01	0.05	0.00	0.00	0.00	0.00	0.06	0.35
NNE	0.03	0.04	0.00	0.00	0.00	0.00	0.07	0.40
NE	0.05	0.04	0.00	0.00	0.00	0.00	0.09	0.13
ENE	0.04	0.06	0.00	0.00	0.00	0.00	0.10	0.01
E	0.04	0.02	0.00	0.00	0.00	0.00	0.06	0.18
ESE	0.04	0.03	0.00	0.00	0.00	0.00	0.07	0.29
SE	0.03	0.03	0.00	0.00	0.00	0.00	0.05	0.30
SSE	0.02	0.02	0.00	0.00	0.00	0.00	0.04	0.29
S	0.01	0.03	0.00	0.00	0.00	0.00	0.04	0.47
SSW	0.01	0.03	0.00	0.00	0.00	0.00	0.03	1.06
SW	0.00	0.03	0.00	0.00	0.00	0.00	0.03	0.87
WSW	0.00	0.02	0.00	0.00	0.00	0.00	0.03	0.57
W	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.83
WNW	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.86
NW	0.01	0.03	0.00	0.00	0.00	0.00	0.04	0.46
NNW	0.01	0.04	0.00	0.00	0.00	0.00	0.05	0.70
TOTAL	0.30	0.49	0.00	0.00	0.00	0.00	0.79	0.37
AVG SPD	0.01	0.54	0.00	0.00	0.00	0.00	0.37	0.37

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX B

FROM JAN. 1 1985 THROUGH DEC. 31 1985

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.03	0.10	0.19	0.00	0.00	0.00	0.32	0.64
NNE	0.05	0.09	0.20	0.01	0.00	0.00	0.35	0.71
NE	0.08	0.08	0.23	0.00	0.00	0.00	0.39	0.66
ENE	0.06	0.06	0.25	0.00	0.00	0.00	0.37	0.56
E	0.05	0.05	0.23	0.00	0.00	0.00	0.33	0.35
ESE	0.06	0.09	0.30	0.00	0.00	0.00	0.44	0.40
SE	0.05	0.09	0.25	0.00	0.00	0.00	0.39	0.61
SSE	0.03	0.07	0.14	0.01	0.00	0.00	0.24	0.80
S	0.03	0.08	0.17	0.00	0.00	0.00	0.29	1.24
SSW	0.01	0.04	0.14	0.01	0.00	0.00	0.21	1.08
SW	0.01	0.05	0.18	0.01	0.00	0.00	0.25	1.16
WSW	0.01	0.05	0.16	0.01	0.00	0.00	0.23	1.36
W	0.00	0.03	0.13	0.02	0.00	0.00	0.18	1.10
WNW	0.01	0.03	0.10	0.01	0.00	0.00	0.15	0.76
NW	0.01	0.04	0.15	0.01	0.00	0.00	0.21	1.03
NNW	0.02	0.06	0.11	0.00	0.00	0.00	0.20	0.88
TOTAL	0.50	1.01	2.92	0.10	0.00	0.00	4.53	0.78
AVG SPD	0.08	0.67	0.91	1.33	9.77	0.00	0.78	0.78

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX C

FROM JAN. 1 1985 THROUGH DEC. 31 1985

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.06	0.07	0.35	0.21	0.01	0.00	0.70	1.25
NNE	0.13	0.12	0.47	0.31	0.00	0.00	1.05	0.78
NE	0.20	0.11	0.57	0.34	0.01	0.00	1.22	0.75
ENE	0.16	0.09	0.41	0.29	0.00	0.00	0.95	0.69
E	0.12	0.09	0.37	0.33	0.00	0.00	0.91	0.68
ESE	0.17	0.14	0.50	0.39	0.01	0.00	1.20	0.54
SE	0.12	0.12	0.42	0.31	0.01	0.00	0.98	0.91
SSE	0.08	0.06	0.29	0.12	0.01	0.00	0.55	0.97
S	0.08	0.10	0.27	0.25	0.02	0.00	0.72	1.30
SSW	0.04	0.06	0.24	0.26	0.03	0.00	0.63	1.17
SW	0.03	0.04	0.31	0.30	0.01	0.00	0.68	1.22
WSW	0.03	0.06	0.29	0.18	0.00	0.00	0.56	1.09
W	0.02	0.03	0.18	0.22	0.00	0.00	0.45	1.17
WNW	0.02	0.02	0.13	0.15	0.01	0.00	0.33	1.27
NW	0.03	0.04	0.19	0.13	0.02	0.00	0.41	0.98
NNW	0.03	0.05	0.20	0.11	0.00	0.00	0.40	1.15
TOTAL	1.33	1.20	5.20	3.88	0.13	0.00	11.75	0.93
AVG SPD	0.03	0.73	0.94	1.25	1.52	11.83	0.93	0.93

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX D

FROM JAN. 1 1985 THROUGH DEC. 31 1985

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.10	0.16	0.59	1.12	0.12	0.00	2.09	1.14
NNE	0.22	0.28	0.87	1.37	0.08	0.00	2.82	1.05
NE	0.34	0.33	0.96	1.28	0.13	0.00	3.05	1.19
ENE	0.26	0.28	0.73	1.08	0.10	0.01	2.46	1.23
E	0.22	0.22	0.61	0.82	0.10	0.00	1.98	1.30
ESE	0.27	0.26	0.69	0.78	0.08	0.00	2.08	0.95
SE	0.20	0.21	0.51	0.89	0.04	0.00	1.87	0.92
SSE	0.12	0.16	0.40	0.43	0.05	0.00	1.17	1.08
S	0.10	0.19	0.47	0.95	0.15	0.00	1.86	1.59
SSW	0.06	0.09	0.35	0.83	0.10	0.00	1.42	1.35
SW	0.04	0.09	0.36	0.68	0.09	0.00	1.27	1.30
WSW	0.05	0.09	0.25	0.32	0.04	0.00	0.74	1.21
W	0.03	0.07	0.19	0.37	0.07	0.01	0.74	1.28
WNW	0.04	0.05	0.18	0.61	0.13	0.04	1.05	1.40
NW	0.05	0.08	0.28	0.84	0.24	0.01	1.50	1.58
NNW	0.06	0.12	0.31	0.64	0.08	0.00	1.21	1.12
TOTAL	2.17	2.68	7.75	13.02	1.61	0.10	27.33	1.21
AVG SPD	0.02	0.63	0.79	1.60	2.61	2.63	1.21	1.21

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX E

FROM JAN. 1 1985 THROUGH DEC. 31 1985

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.11	0.20	0.57	0.23	0.00	0.00	1.11	0.86
NNE	0.25	0.42	0.94	0.19	0.00	0.00	1.81	0.78
NE	0.44	0.58	1.14	0.20	0.00	0.00	2.36	0.70
ENE	0.33	0.44	0.82	0.13	0.00	0.00	1.72	0.66
E	0.28	0.33	0.63	0.10	0.00	0.00	1.34	0.63
ESE	0.34	0.39	0.61	0.07	0.00	0.00	1.41	0.45
SE	0.25	0.38	0.38	0.06	0.00	0.00	1.07	0.65
SSE	0.13	0.19	0.22	0.02	0.00	0.00	0.56	0.71
S	0.13	0.21	0.26	0.03	0.00	0.00	0.63	0.85
SSW	0.08	0.10	0.23	0.03	0.00	0.00	0.44	0.78
SW	0.06	0.07	0.17	0.01	0.00	0.00	0.31	0.47
WSW	0.06	0.08	0.11	0.01	0.00	0.00	0.25	0.69
W	0.04	0.05	0.14	0.01	0.00	0.00	0.24	0.85
WNW	0.05	0.06	0.25	0.06	0.00	0.00	0.42	0.85
NW	0.07	0.10	0.37	0.09	0.00	0.00	0.63	0.78
NNW	0.07	0.08	0.37	0.11	0.00	0.00	0.64	0.93
TOTAL	2.69	3.71	7.20	1.36	0.00	0.00	14.95	0.71
AVG SPD	0.01	0.54	0.87	1.68	0.00	0.00	0.71	0.71

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

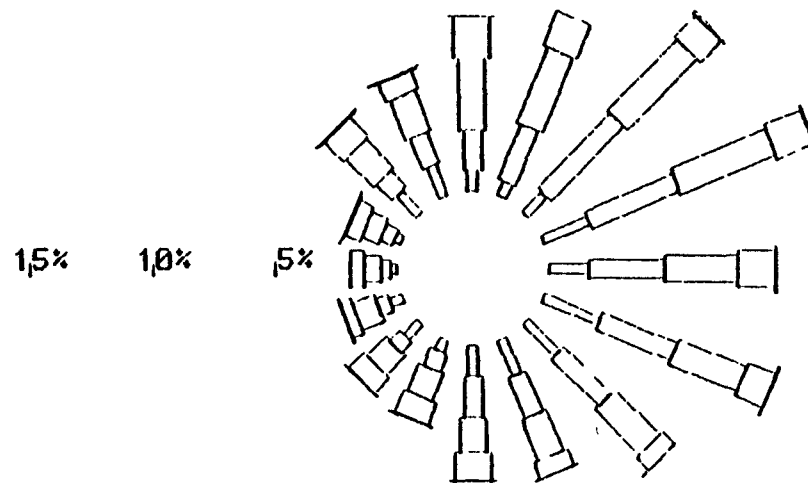
STABILITY INDEX F

FROM JAN. 1 1985 THROUGH DEC. 31 1985

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	1.25	0.37	0.25	0.00	0.00	0.00	1.89	0.30
NNE	2.82	1.04	0.55	0.00	0.00	0.00	4.42	0.21
NE	4.45	1.43	0.64	0.00	0.00	0.00	6.53	0.15
ENE	3.45	1.00	0.53	0.00	0.00	0.00	4.99	0.14
E	2.92	0.86	0.38	0.00	0.00	0.00	4.16	0.14
ESE	3.58	0.97	0.33	0.00	0.00	0.00	4.88	0.13
SE	2.69	0.77	0.21	0.00	0.00	0.00	3.67	0.24
SSE	1.58	0.49	0.09	0.00	0.00	0.00	2.16	0.21
S	1.36	0.32	0.10	0.00	0.00	0.00	1.77	0.17
SSW	0.82	0.16	0.07	0.00	0.00	0.00	1.06	0.15
SW	0.59	0.12	0.04	0.00	0.00	0.00	0.76	0.10
WSW	0.62	0.09	0.04	0.00	0.00	0.00	0.75	0.11
W	0.44	0.11	0.05	0.00	0.00	0.00	0.60	0.18
WNW	0.55	0.14	0.07	0.00	0.00	0.00	0.77	0.21
NW	0.73	0.21	0.13	0.00	0.00	0.00	1.06	0.29
NNW	0.80	0.23	0.16	0.00	0.00	0.00	1.20	0.25
TOTAL	28.66	8.32	3.65	0.02	0.00	0.00	40.65	0.18
AVG SPD	0.01	0.57	0.59	2.85	0.00	0.00	0.18	0.18

SITE 01 FROM 01/01/86 TO 12/31/86

WIND SPEED AND DIRECTION ROSE



NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX A

FROM JAN. 1 1986 THROUGH DEC. 31 1986

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.02	0.04	0.00	0.00	0.00	0.00	0.06	0.33
NNE	0.04	0.03	0.00	0.00	0.00	0.00	0.08	0.21
NE	0.07	0.03	0.00	0.00	0.00	0.00	0.10	0.12
ENE	0.05	0.05	0.00	0.00	0.00	0.00	0.10	0.21
E	0.05	0.03	0.00	0.00	0.00	0.00	0.07	0.46
ESE	0.05	0.03	0.00	0.00	0.00	0.00	0.08	0.22
SE	0.04	0.03	0.00	0.00	0.00	0.00	0.06	0.34
SSE	0.02	0.02	0.00	0.00	0.00	0.00	0.05	0.54
S	0.02	0.03	0.00	0.00	0.00	0.00	0.05	0.51
SSW	0.01	0.02	0.00	0.00	0.00	0.00	0.03	0.40
SW	0.01	0.02	0.00	0.00	0.00	0.00	0.03	0.19
WSW	0.01	0.02	0.00	0.00	0.00	0.00	0.03	0.28
W	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.34
WNW	0.00	0.01	0.00	0.00	0.00	0.00	0.02	1.10
NW	0.01	0.03	0.00	0.00	0.00	0.00	0.04	0.37
NNW	0.01	0.04	0.00	0.00	0.00	0.00	0.05	0.55
TOTAL	0.41	0.45	0.00	0.00	0.00	0.00	0.86	0.33
AVG SPD	0.03	0.58	0.00	0.00	0.00	0.00	0.33	0.33

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX B

FROM JAN. 1 1986 THROUGH DEC. 31 1986

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.03	0.08	0.19	0.00	0.00	0.00	0.30	0.68
NNE	0.06	0.08	0.17	0.01	0.00	0.00	0.32	0.45
NE	0.10	0.09	0.21	0.00	0.00	0.00	0.40	0.66
ENE	0.07	0.05	0.23	0.00	0.00	0.00	0.35	0.62
E	0.06	0.06	0.22	0.00	0.00	0.00	0.33	0.75
ESE	0.07	0.09	0.27	0.00	0.00	0.00	0.43	0.67
SE	0.06	0.08	0.23	0.00	0.00	0.00	0.37	0.62
SSE	0.04	0.07	0.13	0.01	0.00	0.00	0.24	0.77
S	0.04	0.08	0.15	0.00	0.00	0.00	0.27	0.62
SSW	0.02	0.05	0.12	0.01	0.00	0.00	0.19	0.69
SW	0.01	0.04	0.15	0.00	0.00	0.00	0.22	0.51
WSW	0.01	0.05	0.14	0.01	0.00	0.00	0.20	0.53
W	0.01	0.02	0.11	0.02	0.00	0.00	0.16	0.76
WNW	0.01	0.03	0.08	0.01	0.00	0.00	0.13	0.60
NW	0.01	0.04	0.13	0.01	0.00	0.00	0.19	0.62
NNW	0.02	0.06	0.10	0.00	0.00	0.00	0.19	0.67
TOTAL	0.62	0.97	2.62	0.08	0.00	0.00	4.30	0.64
AVG SPD	0.05	0.64	0.76	0.98	9.77	0.00	0.64	0.64

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX C

FROM JAN. 1 1986 THROUGH DEC. 31 1986

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.08	0.07	0.29	0.18	0.01	0.00	0.63	0.65
NNE	0.17	0.10	0.42	0.25	0.00	0.00	0.94	0.56
NE	0.26	0.11	0.50	0.27	0.01	0.00	1.14	0.59
ENE	0.20	0.10	0.42	0.25	0.00	0.00	0.97	0.89
E	0.16	0.08	0.35	0.31	0.00	0.00	0.89	0.90
ESE	0.21	0.12	0.46	0.34	0.01	0.00	1.12	0.73
SE	0.15	0.12	0.39	0.25	0.01	0.00	0.93	0.70
SSE	0.09	0.06	0.28	0.12	0.00	0.00	0.56	0.98
S	0.09	0.09	0.24	0.22	0.02	0.00	0.65	0.70
SSW	0.05	0.05	0.22	0.22	0.02	0.00	0.57	0.81
SW	0.04	0.04	0.27	0.26	0.01	0.00	0.61	0.84
WSW	0.03	0.06	0.25	0.14	0.00	0.00	0.50	0.69
W	0.02	0.03	0.16	0.18	0.00	0.00	0.39	0.73
WNW	0.03	0.03	0.13	0.12	0.01	0.00	0.31	0.94
NW	0.04	0.04	0.17	0.13	0.01	0.00	0.40	1.05
NNW	0.05	0.05	0.18	0.09	0.00	0.00	0.37	0.78
TOTAL	1.66	1.14	4.74	3.33	0.11	0.00	10.98	0.76
AVG SPD	0.03	0.62	0.88	0.97	1.18	13.72	0.76	0.76

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX D

FROM JAN. 1 1986 THROUGH DEC. 31 1986

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.13	0.16	0.52	0.95	0.09	0.00	1.85	0.82
NNE	0.28	0.24	0.75	1.11	0.06	0.00	2.45	0.61
NE	0.43	0.31	0.84	1.03	0.10	0.00	2.71	0.57
ENE	0.34	0.26	0.68	0.91	0.08	0.00	2.28	0.78
E	0.28	0.22	0.54	0.70	0.07	0.00	1.82	0.74
ESE	0.34	0.23	0.60	0.63	0.06	0.00	1.87	0.58
SE	0.26	0.21	0.46	0.69	0.03	0.00	1.66	0.54
SSE	0.15	0.14	0.35	0.36	0.04	0.00	1.05	0.64
S	0.14	0.17	0.41	0.77	0.12	0.00	1.61	0.68
SSW	0.08	0.09	0.31	0.67	0.07	0.00	1.22	0.71
SW	0.05	0.08	0.31	0.54	0.07	0.00	1.06	0.62
WSW	0.06	0.08	0.22	0.27	0.03	0.00	0.66	0.73
W	0.04	0.06	0.16	0.30	0.05	0.00	0.62	0.57
WNW	0.05	0.05	0.15	0.49	0.10	0.03	0.87	0.67
NW	0.07	0.07	0.26	0.68	0.18	0.01	1.27	0.73
NNW	0.08	0.11	0.28	0.53	0.06	0.00	1.07	0.81
TOTAL	2.78	2.48	6.87	10.64	1.21	0.08	24.06	0.67
AVG SPD	0.02	0.57	0.76	0.82	0.54	0.96	0.67	0.67

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX E

FROM JAN. 1 1986 THROUGH DEC. 31 1986

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	0.15	0.18	0.54	0.18	0.00	0.00	1.05	0.69
NNE	0.33	0.36	0.80	0.16	0.00	0.00	1.64	0.48
NE	0.54	0.50	0.93	0.15	0.00	0.00	2.12	0.35
ENE	0.41	0.43	0.70	0.10	0.00	0.00	1.63	0.45
E	0.34	0.31	0.52	0.08	0.00	0.00	1.25	0.41
ESE	0.41	0.37	0.51	0.06	0.00	0.00	1.36	0.41
SE	0.31	0.35	0.33	0.04	0.00	0.00	1.04	0.42
SSE	0.18	0.18	0.18	0.02	0.00	0.00	0.55	0.38
S	0.16	0.20	0.19	0.02	0.00	0.00	0.58	0.31
SSW	0.10	0.09	0.18	0.02	0.00	0.00	0.39	0.29
SW	0.07	0.07	0.14	0.01	0.00	0.00	0.29	0.39
WSW	0.07	0.07	0.09	0.01	0.00	0.00	0.23	0.32
W	0.05	0.05	0.11	0.01	0.00	0.00	0.22	0.35
WNW	0.06	0.05	0.19	0.05	0.00	0.00	0.35	0.28
NW	0.09	0.09	0.32	0.07	0.00	0.00	0.57	0.56
NNW	0.09	0.08	0.34	0.10	0.00	0.00	0.61	0.72
TOTAL	3.36	3.36	6.07	1.08	0.00	0.00	13.87	0.44
AVG SPD	0.01	0.53	0.60	0.59	0.00	0.00	0.44	0.44

NWS SURFACE METEOROLOGICAL DATA
STATION # 12835

STABILITY WIND ROSE

STABILITY INDEX F

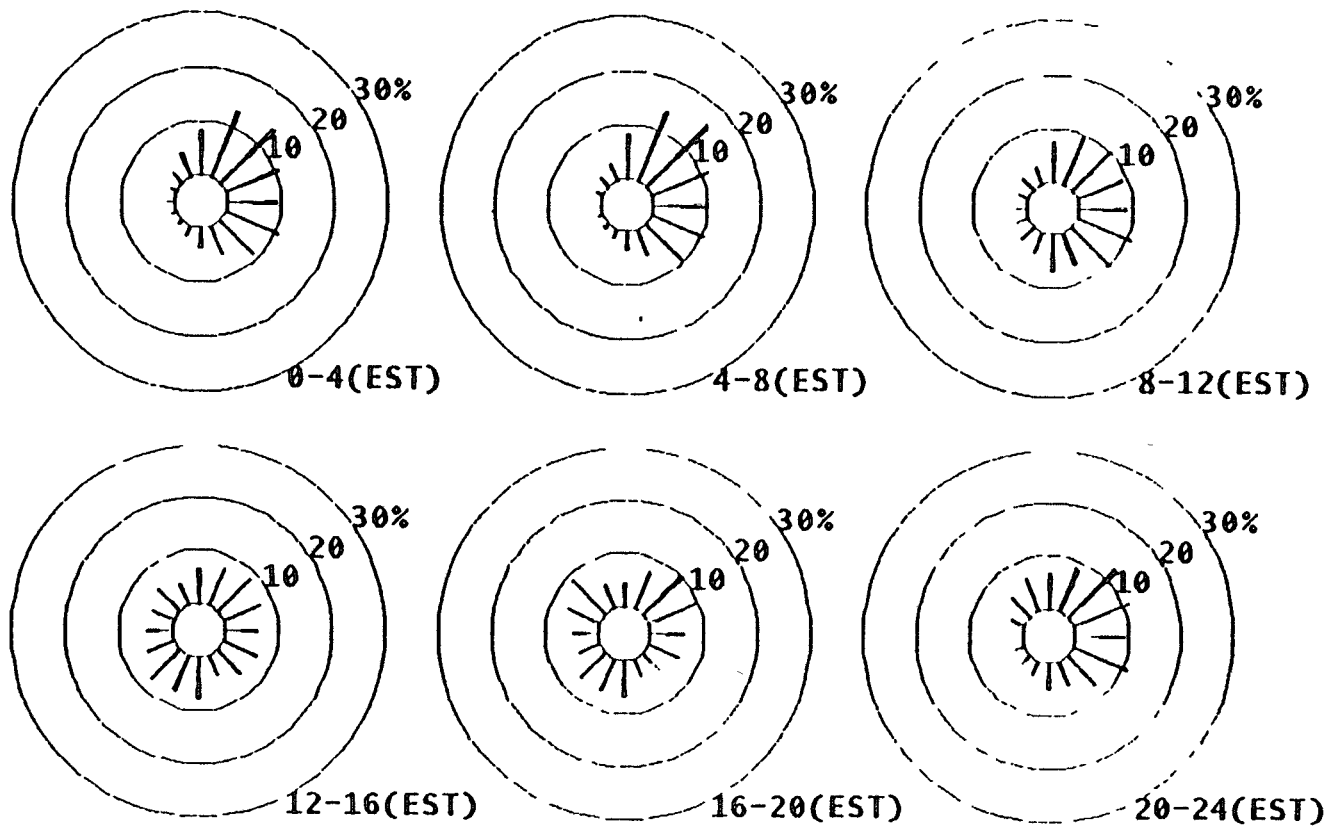
FROM JAN. 1 1986 THROUGH DEC. 31 1986

DIRECTION	+-----WIND SPEED CLASSES (MPS)-----+						TOTAL	AVERAGE WIND SPEED
	0-2	2-3	3-5	5-8	8-11	>11		
N	1.60	0.34	0.22	0.00	0.00	0.00	2.16	0.15
NNE	3.52	0.88	0.44	0.00	0.00	0.00	4.85	0.11
NE	5.48	1.27	0.55	0.00	0.00	0.00	7.30	0.13
ENE	4.25	0.94	0.47	0.00	0.00	0.00	5.66	0.16
E	3.56	0.79	0.34	0.00	0.00	0.00	4.69	0.15
ESE	4.37	0.88	0.27	0.00	0.00	0.00	5.51	0.11
SE	3.30	0.66	0.17	0.00	0.00	0.00	4.14	0.10
SSE	1.94	0.45	0.08	0.00	0.00	0.00	2.47	0.12
S	1.71	0.28	0.08	0.00	0.00	0.00	2.07	0.08
SSW	1.01	0.15	0.06	0.00	0.00	0.00	1.22	0.08
SW	0.74	0.11	0.03	0.00	0.00	0.00	0.88	0.08
WSW	0.76	0.07	0.03	0.00	0.00	0.00	0.86	0.02
W	0.54	0.09	0.04	0.00	0.00	0.00	0.67	0.05
WNW	0.67	0.12	0.07	0.00	0.00	0.00	0.85	0.10
NW	0.90	0.20	0.12	0.00	0.00	0.00	1.22	0.17
NNW	1.02	0.25	0.13	0.00	0.00	0.00	1.40	0.19
TOTAL	35.38	7.46	3.09	0.01	0.00	0.00	45.93	0.12
AVG SPD	0.01	0.50	0.51	0.89	0.00	0.00	0.12	0.12

Diurnal Wind Roses for the Five-Year
Meteorological Database

0100/ SITE 01 FROM 01/01/82 TO 12/31/86

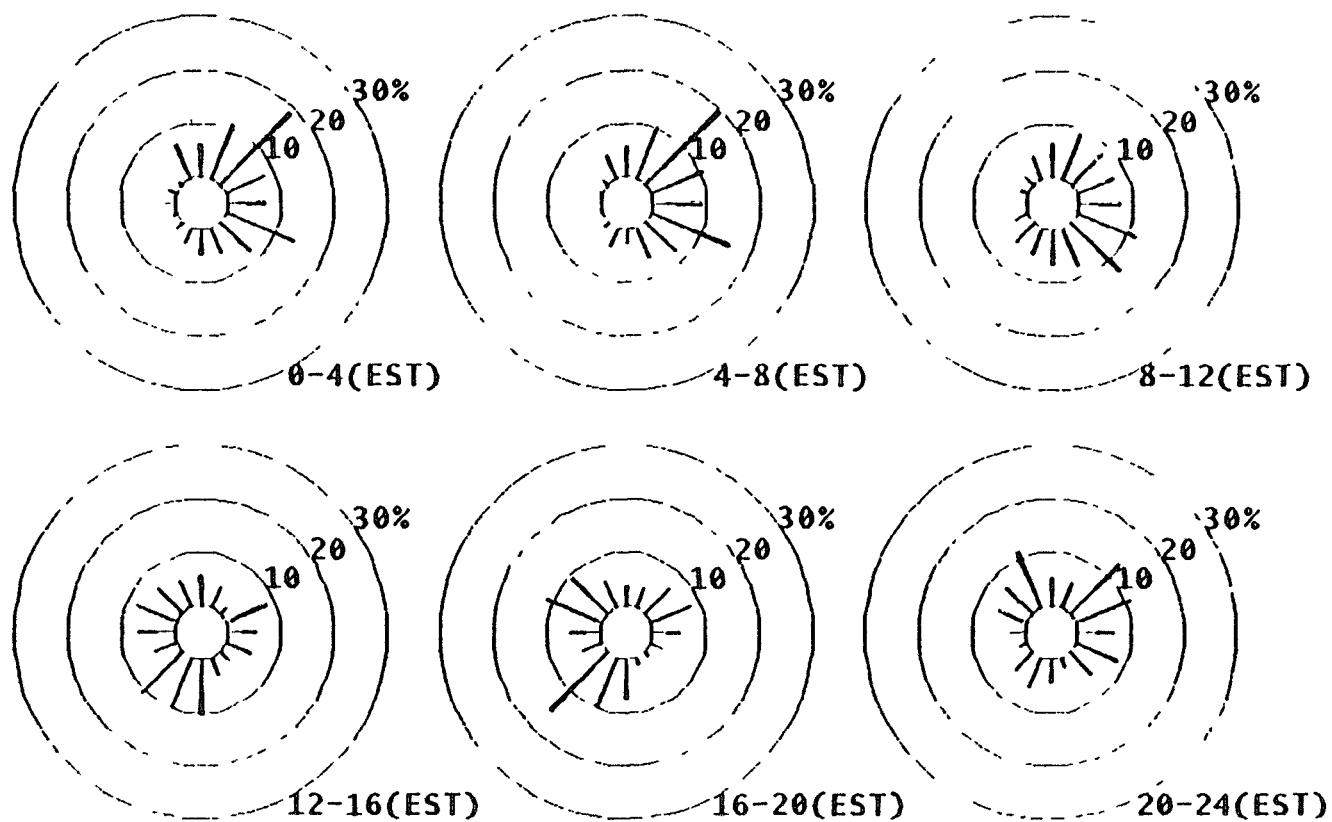
DIURNAL WIND DIRECTION ROSES



Seasonal Diurnal Wind Roses

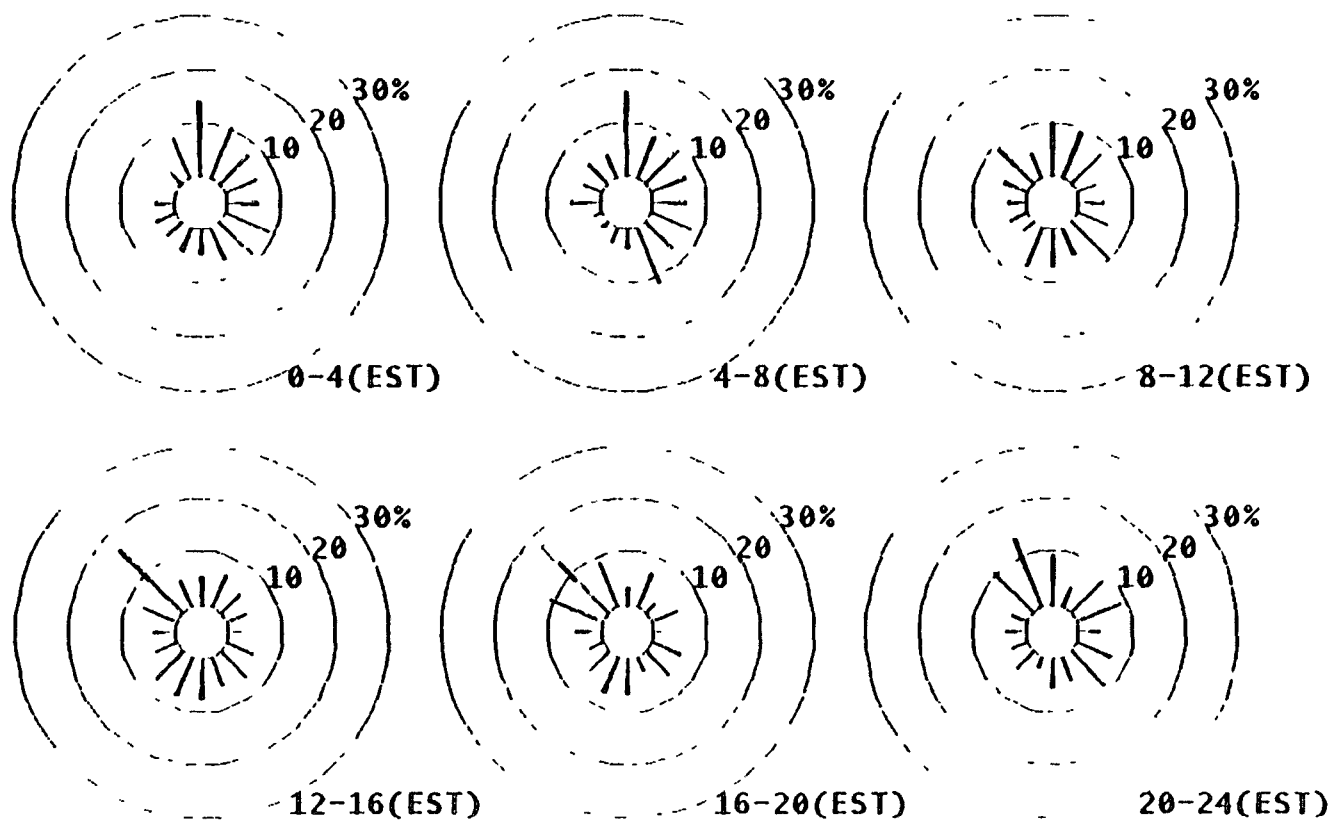
0100/ SITE 01 FROM 01/02/82 TO 03/31/82

DIURNAL WIND DIRECTION ROSES



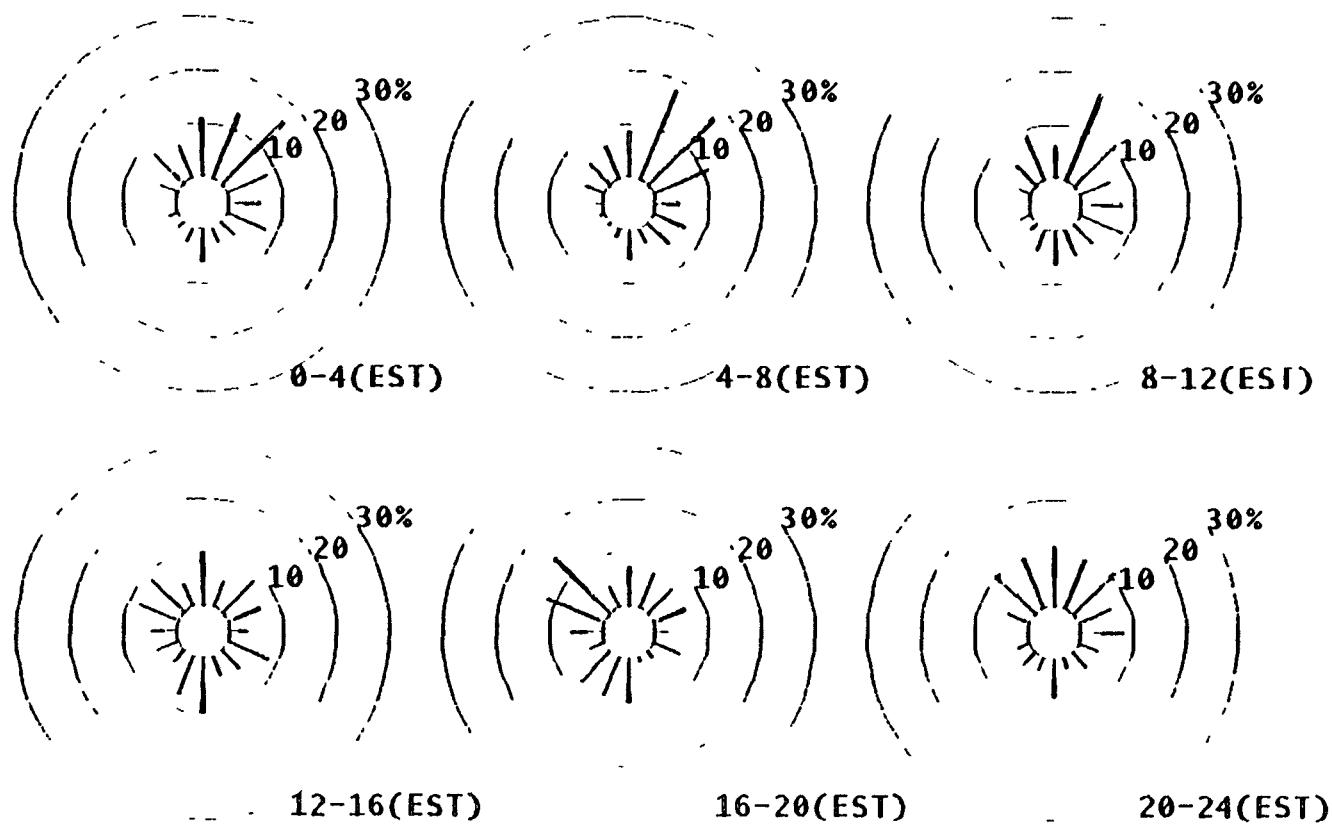
0100/ SITE 01 FROM 01/01/83 TO 03/31/83

DIURNAL WIND DIRECTION ROSES



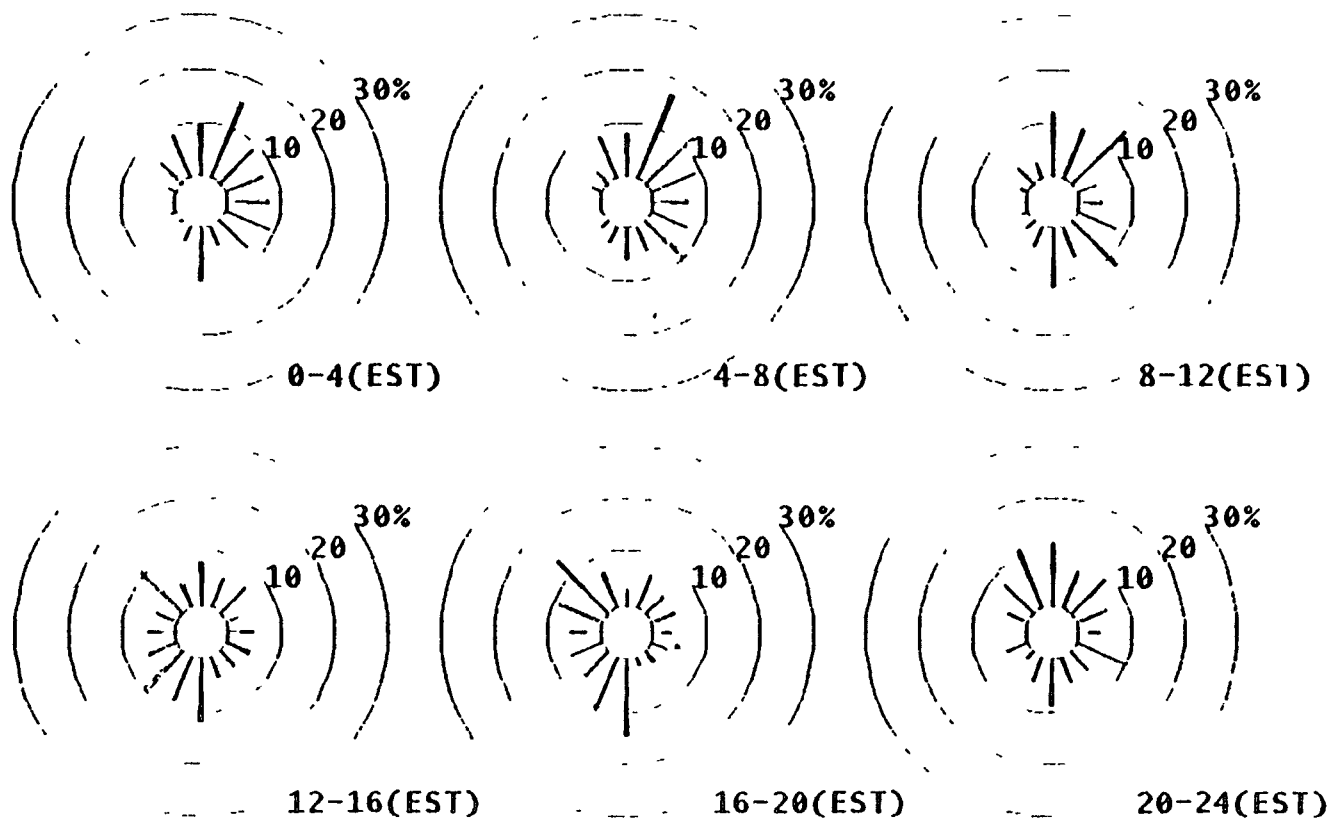
0100/ SITE 01 FROM 01/01/84 TO 03/31/84

DIURNAL WIND DIRECTION ROSES



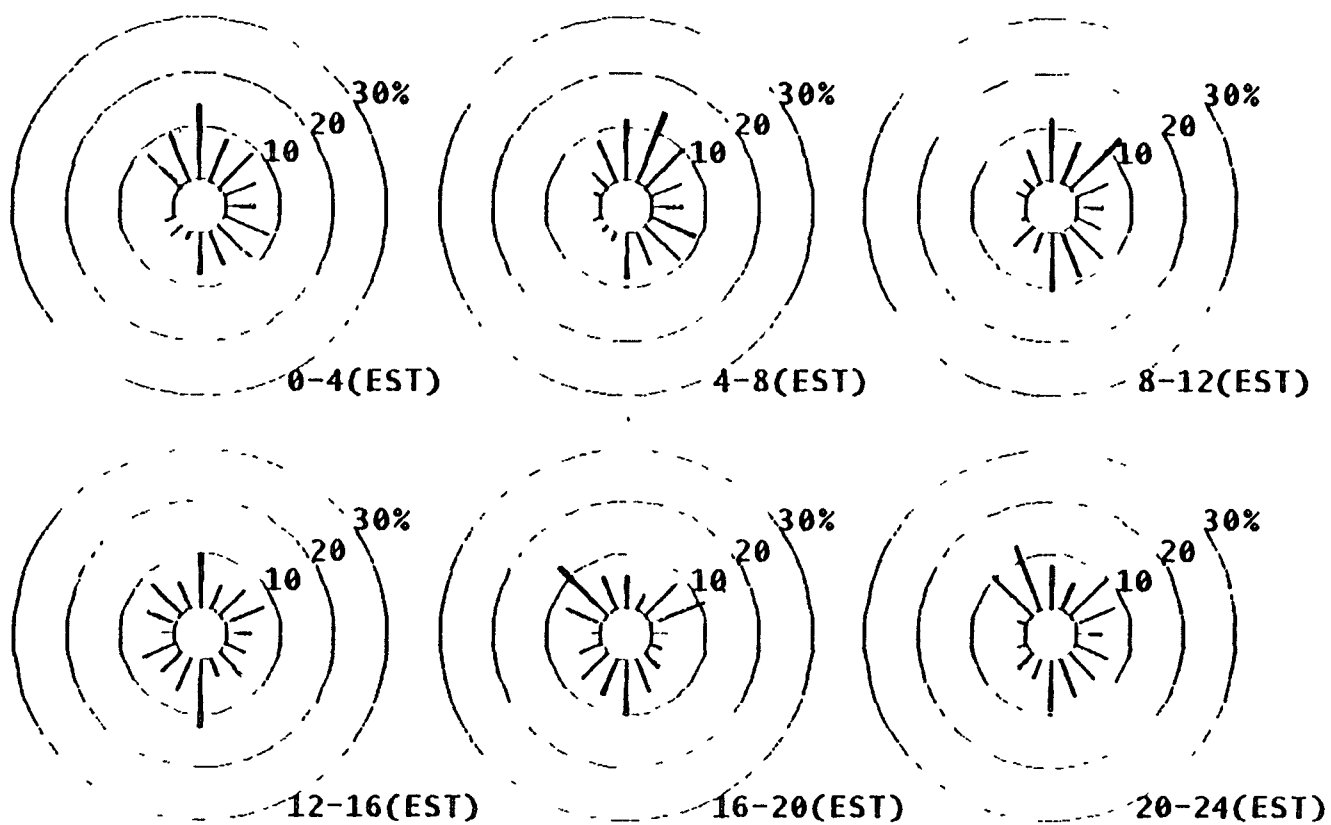
0100/ SITE 01 FROM 01/01/85 TO 03/31/85

DIURNAL WIND DIRECTION ROSES



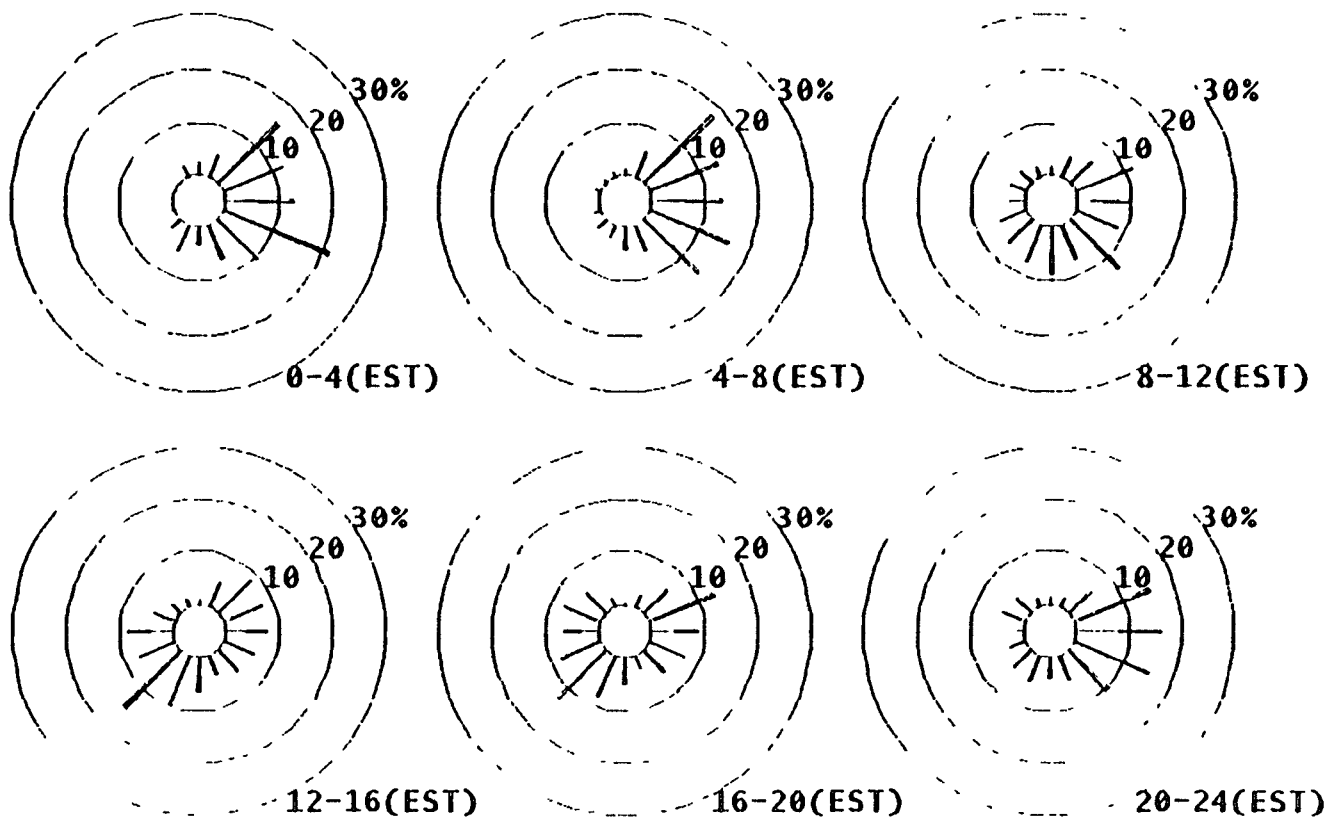
0100/ SITE 01 FROM 01/01/86 TO 03/31/86

DIURNAL WIND DIRECTION ROSES



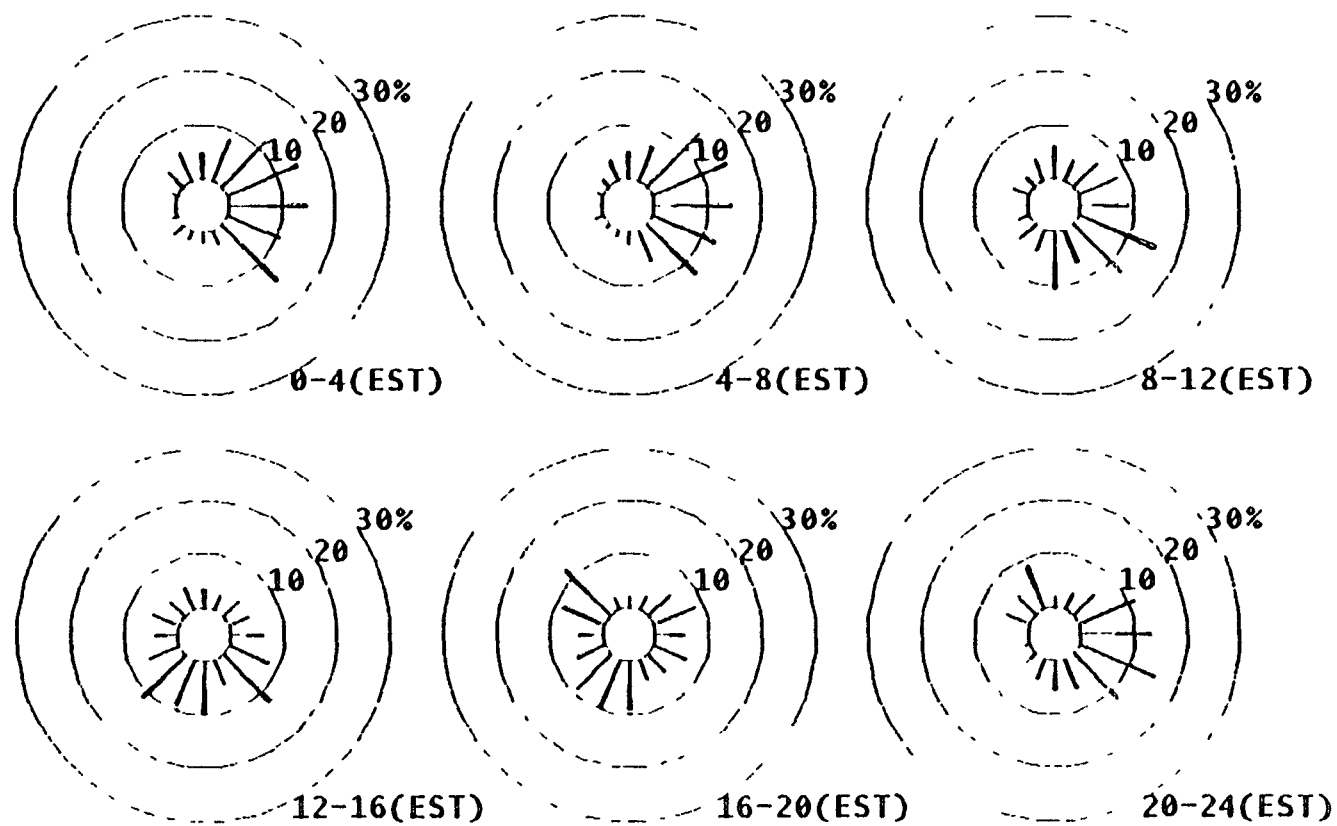
0100/ SITE 01 FROM 04/01/82 TO 06/30/82

DIURNAL WIND DIRECTION ROSES



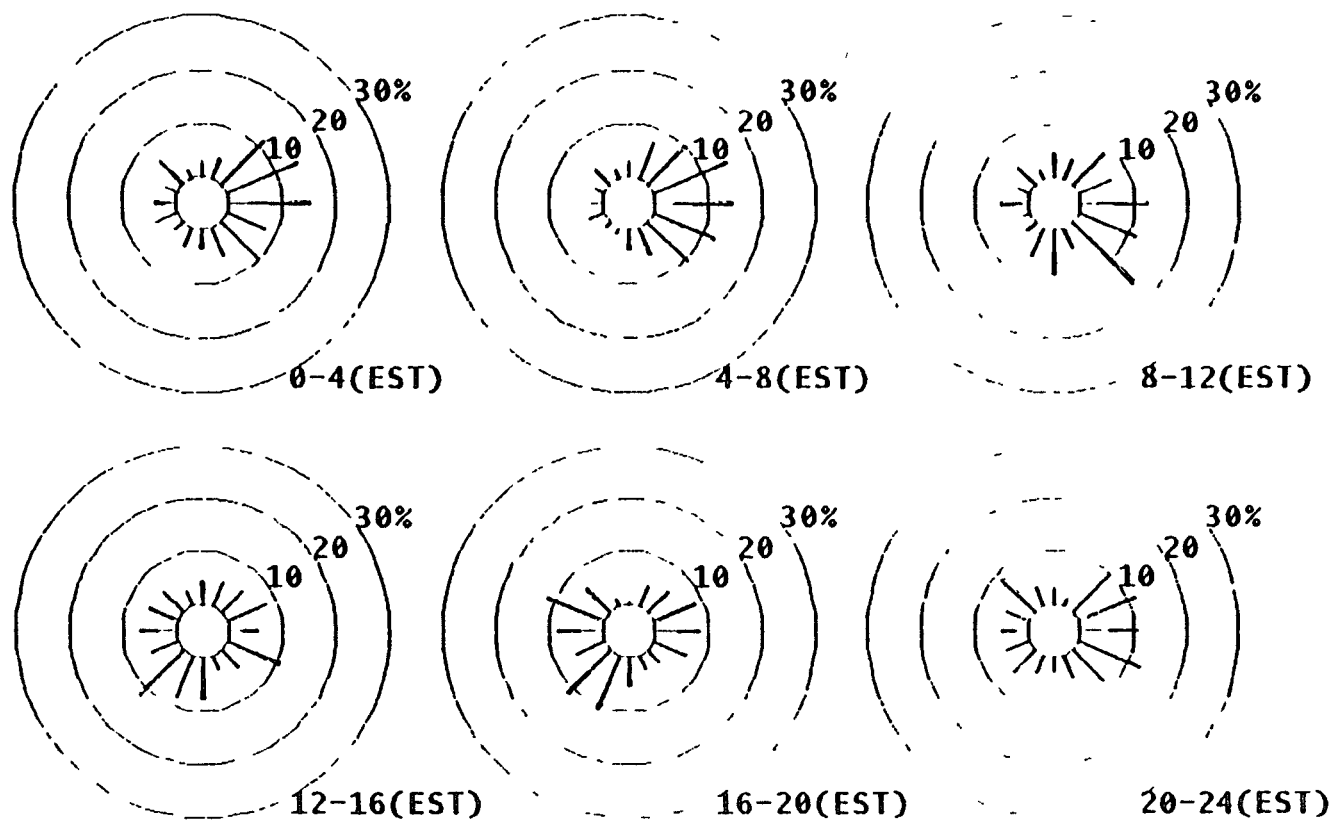
0100/ SITE 01 FROM 04/01/83 TO 06/30/83

DIURNAL WIND DIRECTION ROSES



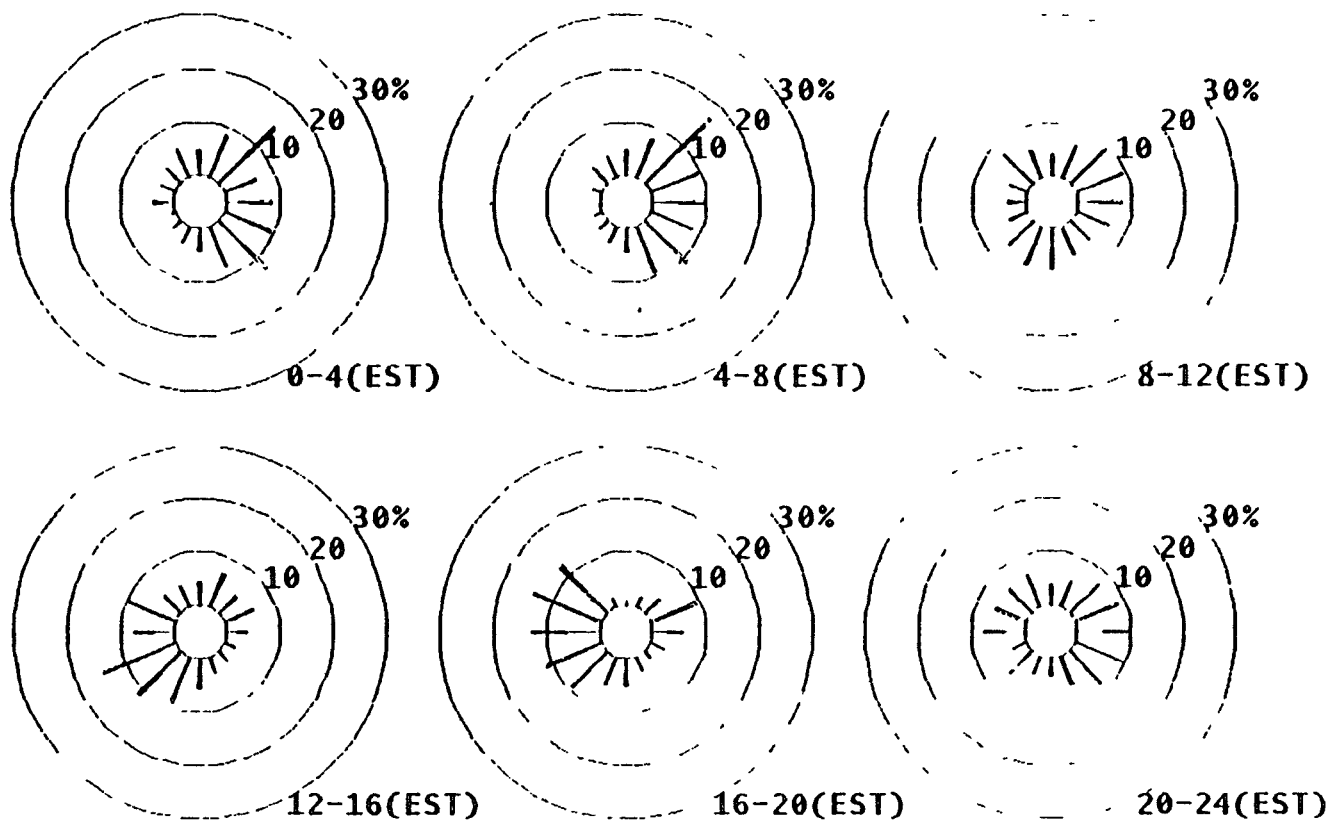
0100/ SITE 01 FROM 04/01/84 TO 06/30/84

DIURNAL WIND DIRECTION ROSES



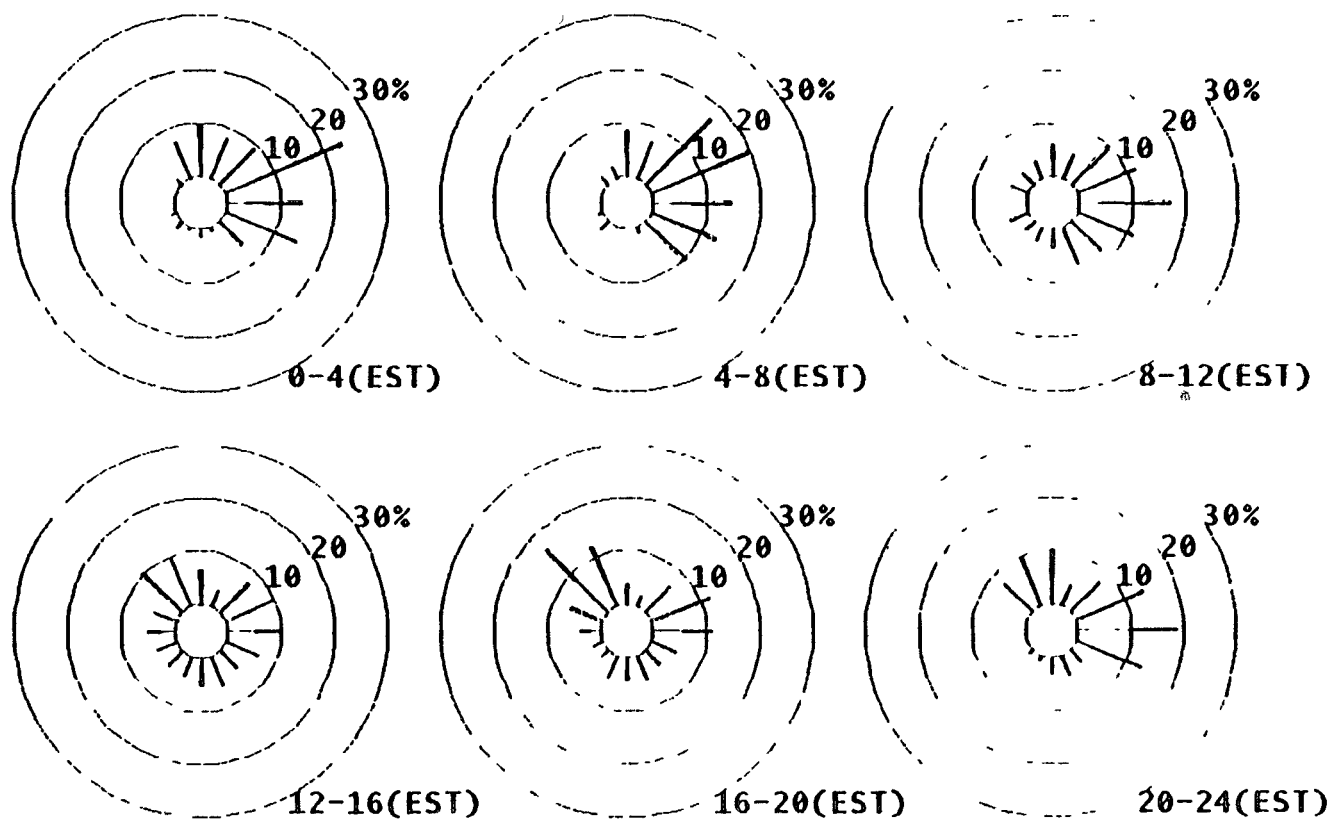
0100/ SITE 01 FROM 04/01/85 TO 06/30/85

DIURNAL WIND DIRECTION ROSES



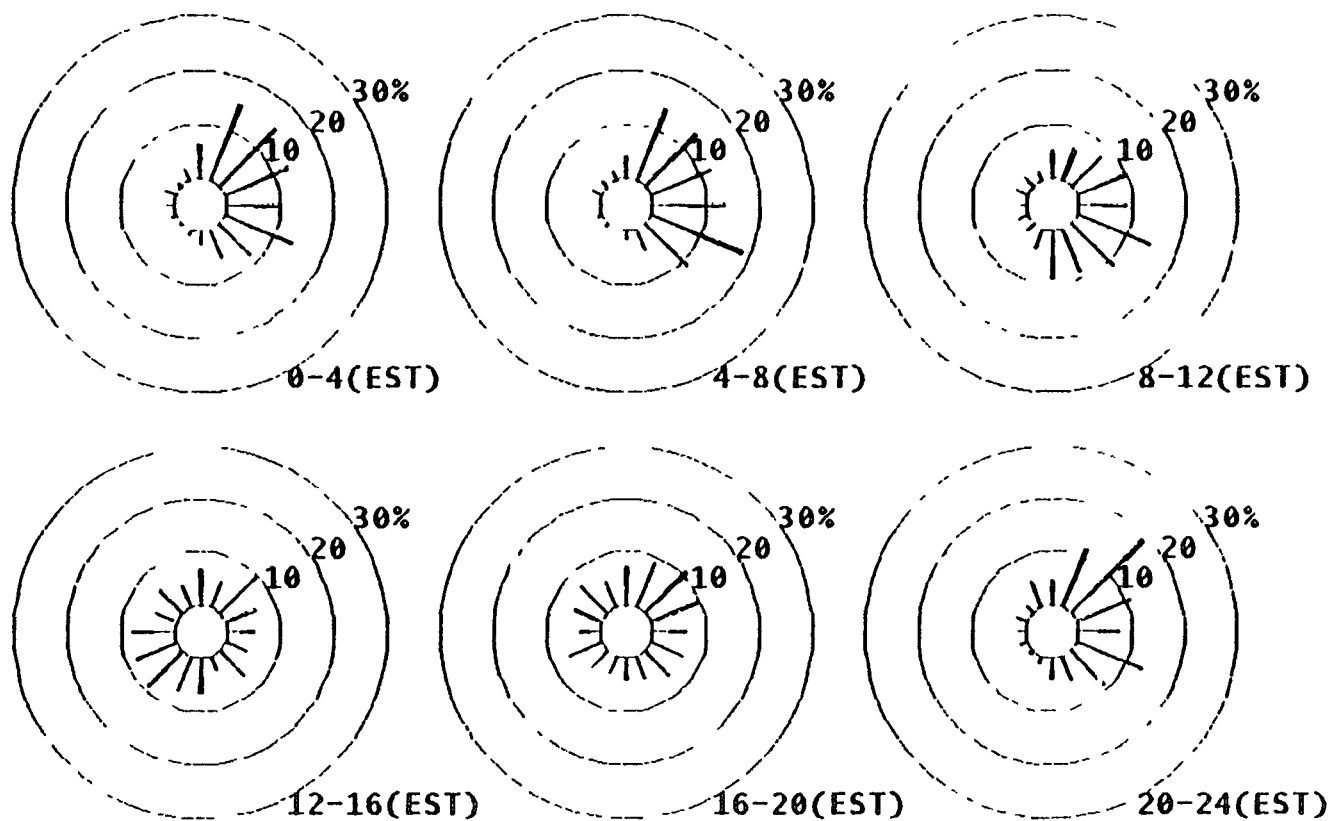
0100/ SITE 01 FROM 04/01/86 TO 06/30/86

DIURNAL WIND DIRECTION ROSES



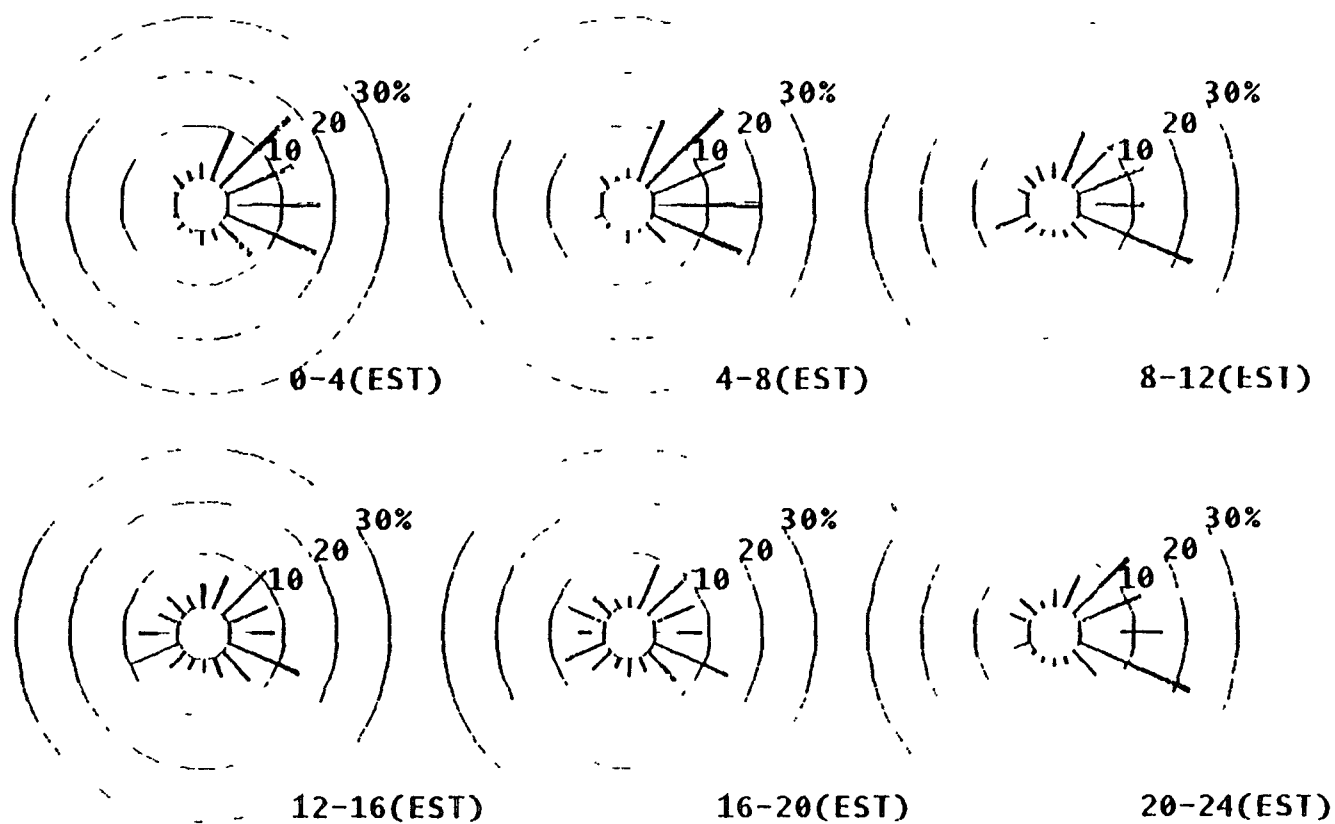
0100/ SITE 01 FROM 07/01/82 TO 09/30/82

DIURNAL WIND DIRECTION ROSES



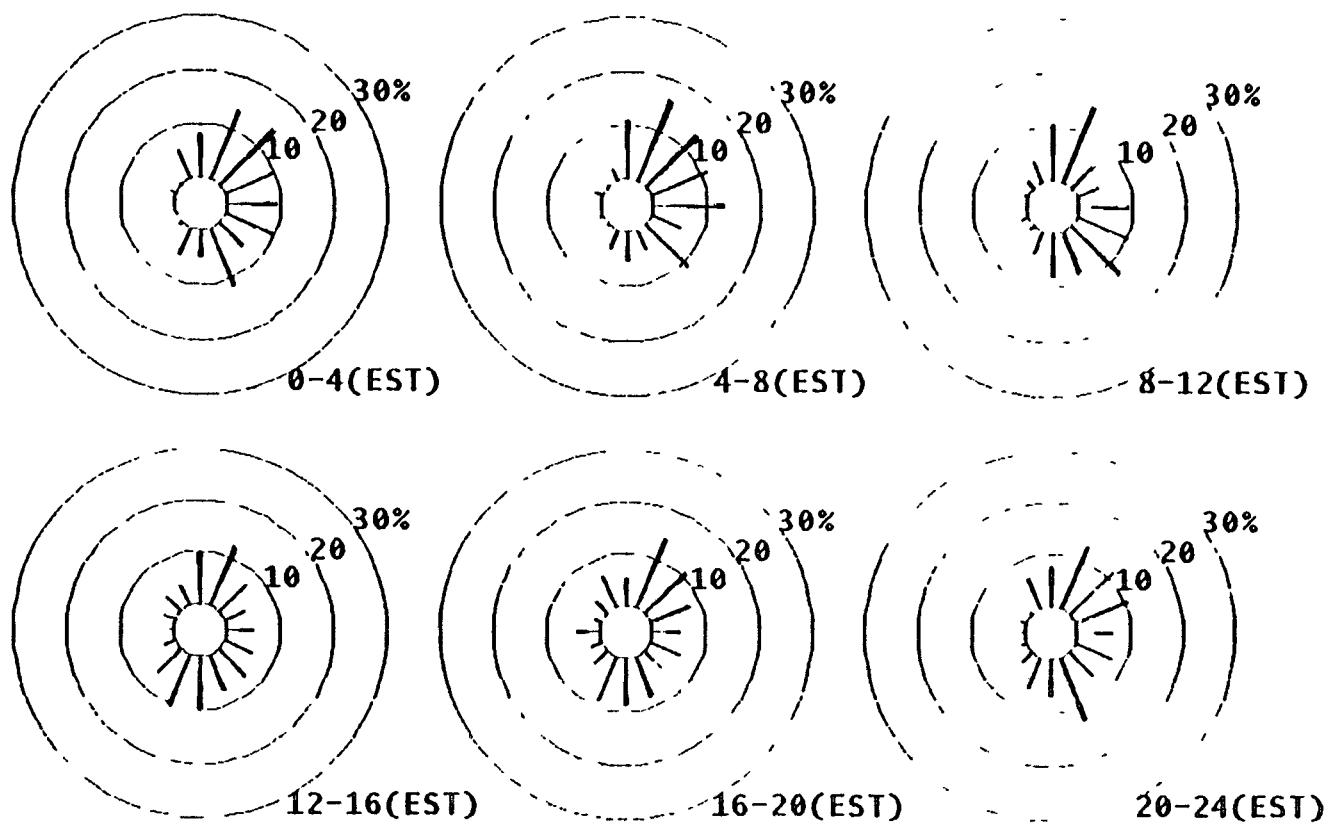
0100/ SITE 01 FROM 07/02/83 TO 09/30/83

DIURNAL WIND DIRECTION ROSES



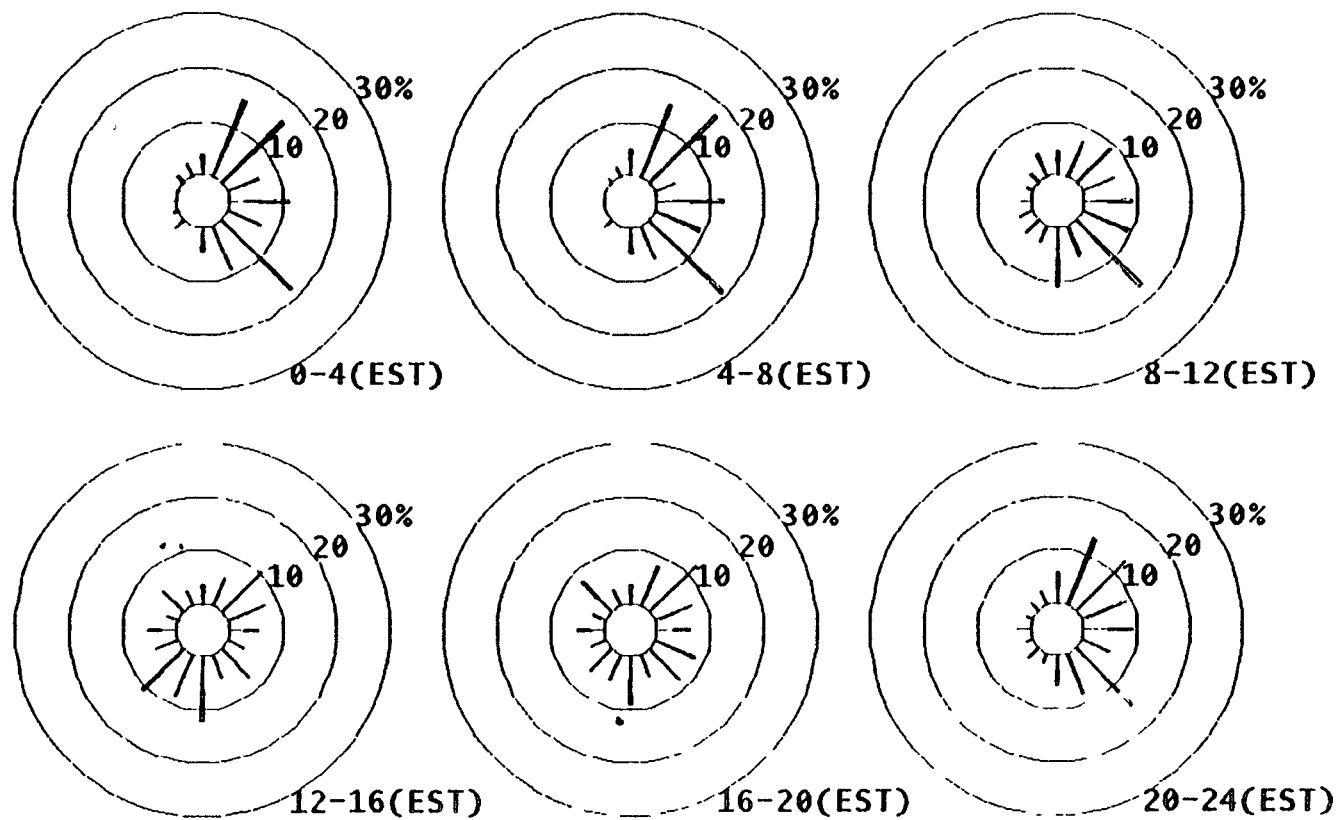
0100/ SITE 01 FROM 07/01/84 TO 09/30/84

DIURNAL WIND DIRECTION ROSES



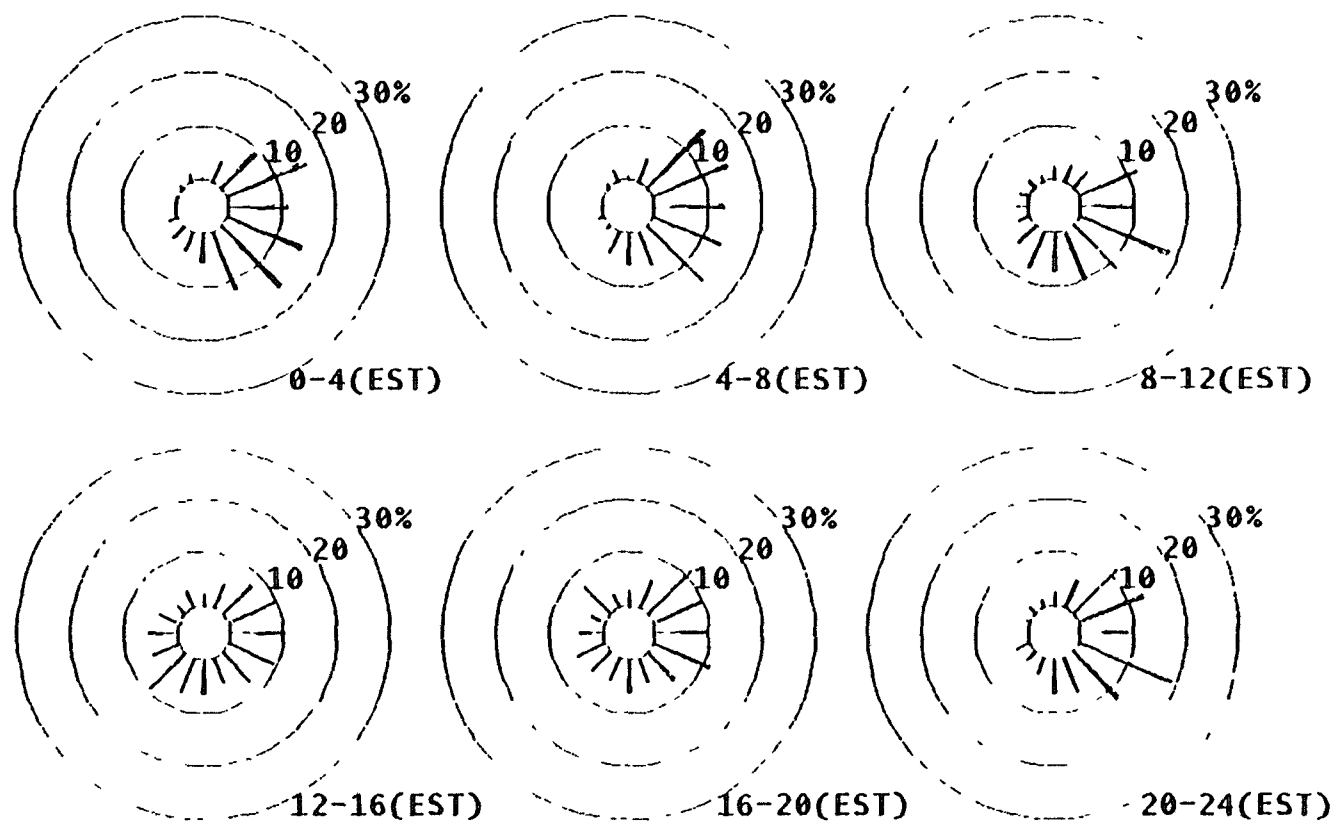
0100/ SITE 01 FROM 07/05/85 TO 09/30/85

DIURNAL WIND DIRECTION ROSES



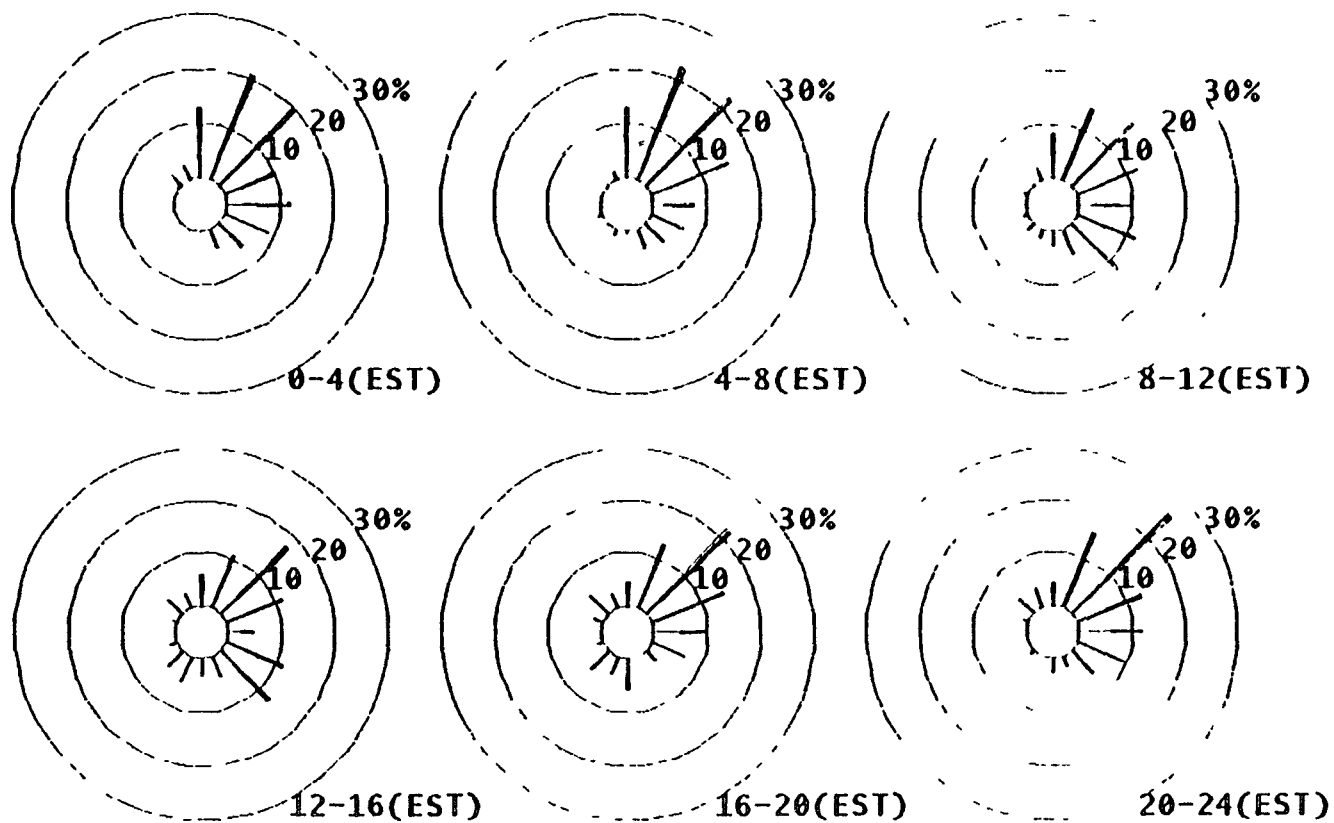
0100/ SITE 01 FROM 07/01/86 TO 09/30/86

DIURNAL WIND DIRECTION ROSES



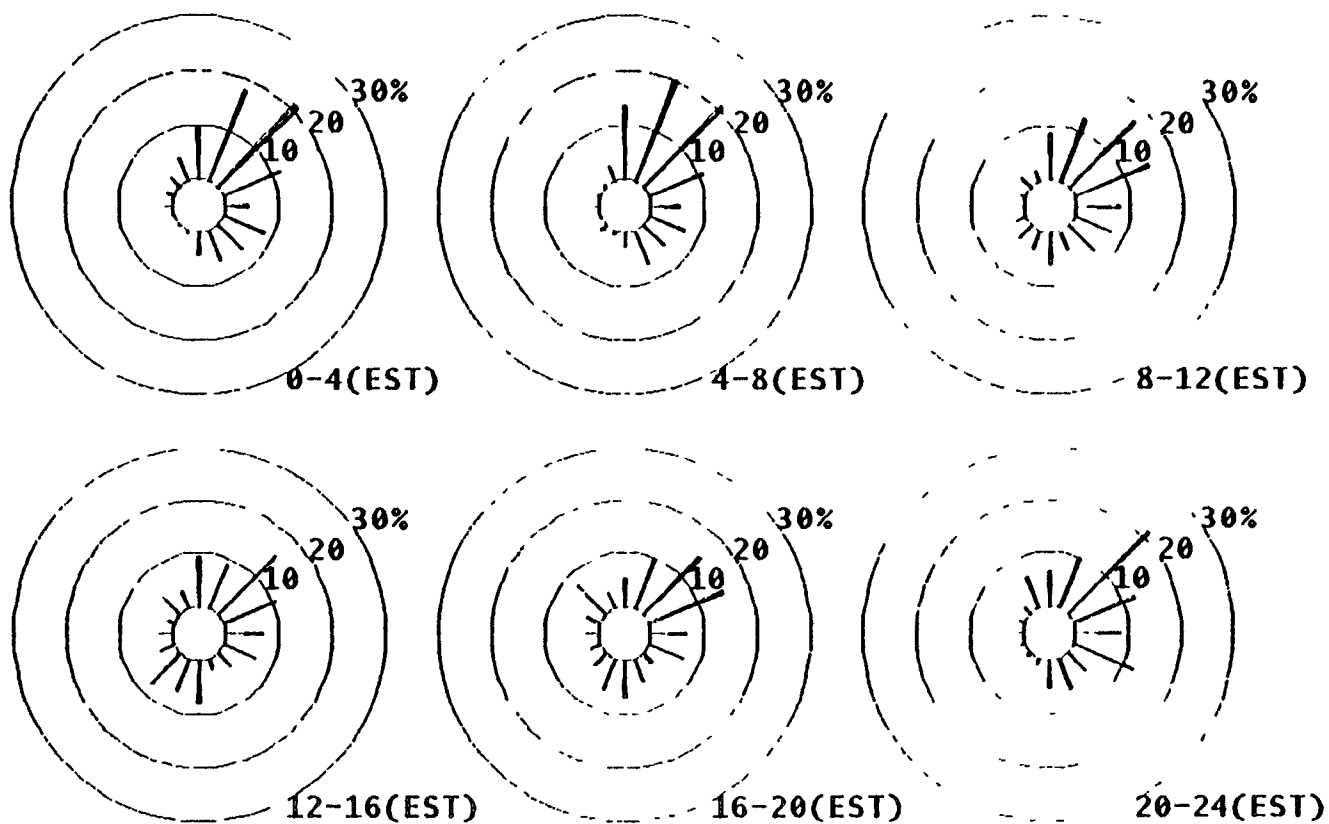
0100/ SITE 01 FROM 10/01/82 TO 12/31/82

DIURNAL WIND DIRECTION ROSES



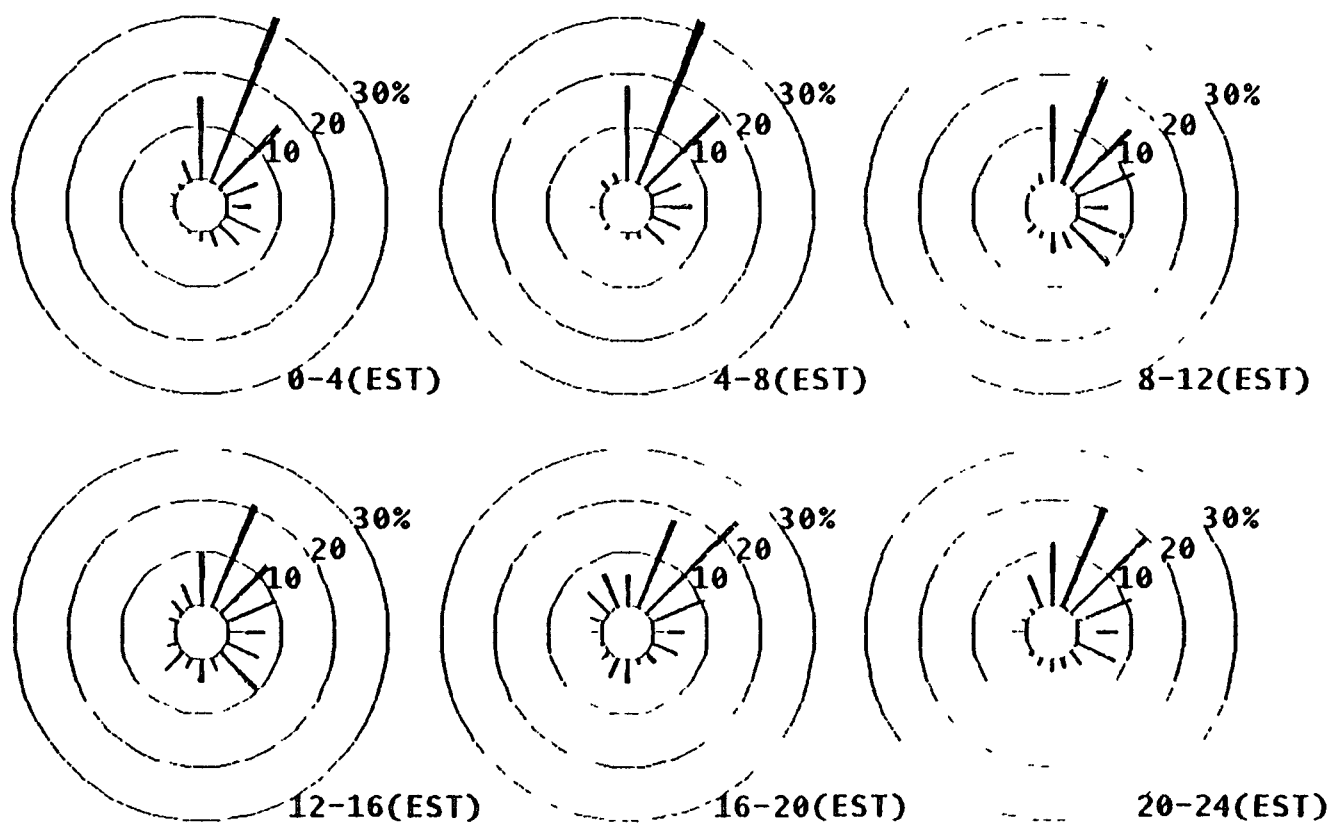
0100/ SITE 01 FROM 10/01/83 TO 12/31/83

DIURNAL WIND DIRECTION ROSES



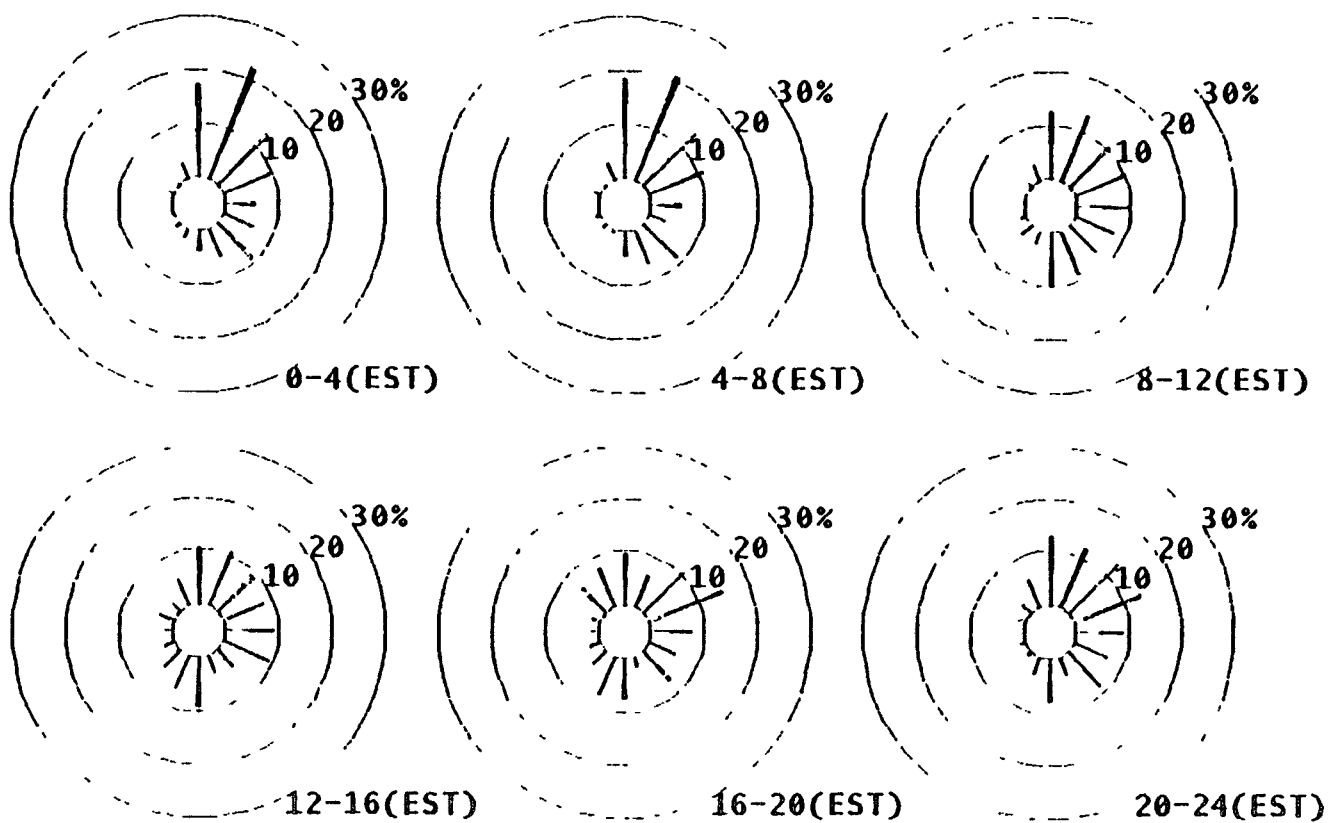
0100/ SITE 01 FROM 10/02/84 TO 12/31/84

DIURNAL WIND DIRECTION ROSES



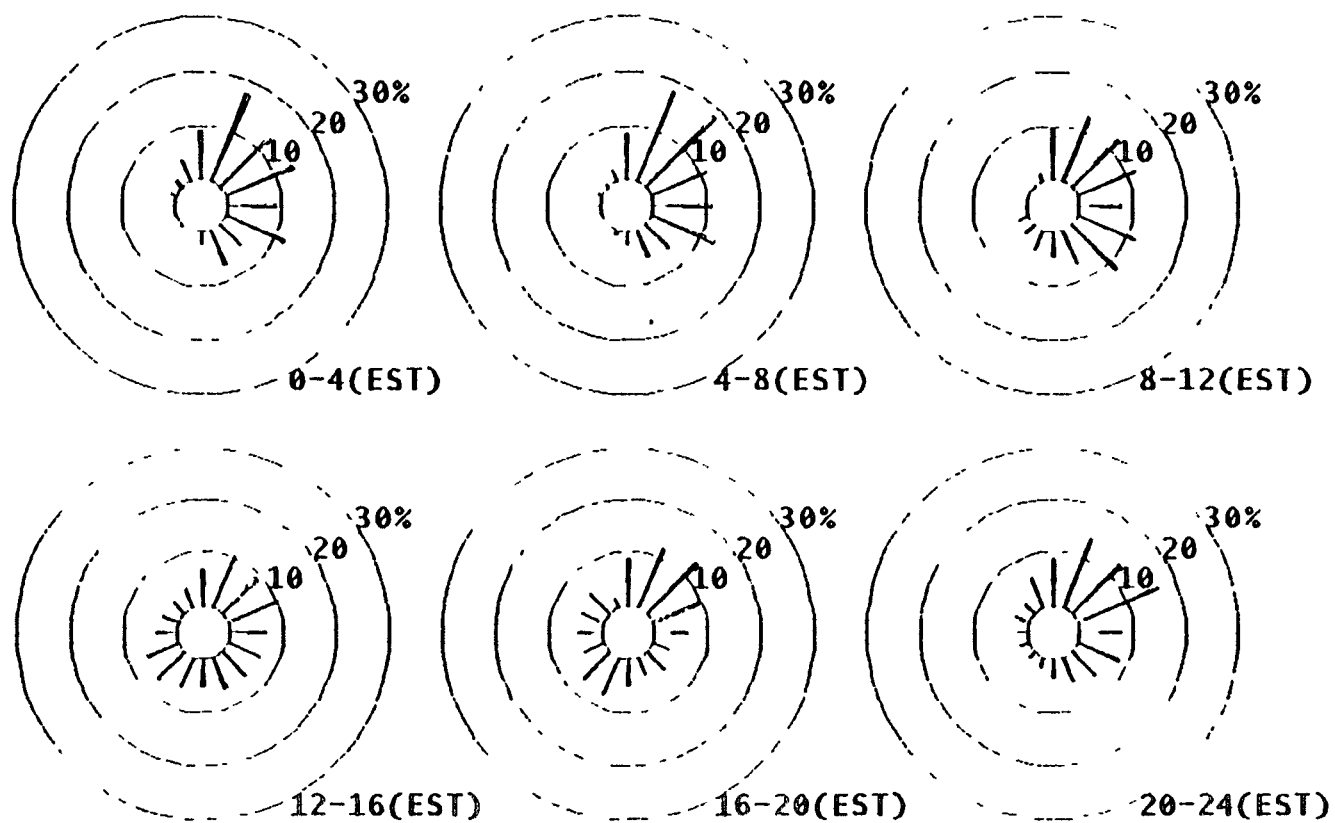
0100/ SITE 01 FROM 10/01/85 TO 12/31/85

DIURNAL WIND DIRECTION ROSES



0100/ SITE 01 FROM 10/01/86 TO 12/31/86

DIURNAL WIND DIRECTION ROSES



ATTACHMENT C

BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE

Image Quality

**As you review the next group of images,
Please note that the original documents
were of poor quality.**

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY
RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 1 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/Energy Resources of Henrico, Inc. Henrico County, VA/50979 12/29/89	Two (2) RDF fired boilers with total capacity of 186.48 MMBTU/hr	Baghouse	PM: 0.0100 gr/dscf @ 12% CO ₂
		Dry Scrubber	SO ₂ : 17.2 lb/hr max 70% reduction HCl: 2.94 lb/hr 70% reduction HF: 0.09 lb/hr 70% reduction HBr: 0.4 lb/hr 70% reduction
		Combustion Controls/Low Excess Air	NOx: 0.4140 lb/MMBTU CO: 38.7 lb/hr Hb: 0.03 lb/hr As: 7.9 EE-4 lb/hr Be: 1.6 EE-5 lb/hr Cd: 1.4 EE-3 lb/hr Cr: 5.2 EE-3 lb/hr Ni: 5.0 EE-4 lb/hr Hg: 0.033 lb/hr TOD: 2.37 EE-5 lb/hr TODF: 5.25 EE-5 lb/hr PCDD: 1.10 EE-5 lb/hr PCDF: 3.50 EE-5 lb/hr BEN: 0.001 lb/hr

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 2 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/Lancaster County Solid Waste Management Conoy Township, PA/36-340-001 02/22/89	Three (3) mass burn boilers with total capacity of 1,200 tpd	Baghouse	PM: 0.012 gr/dscf @ 7% O ₂ PM ₁₀ : 0.01 gr/dscf @ 7% O ₂
		Dry Scrubber Furnace Inj.	SO ₂ : 29 ppmv 3Hr avg 30 ppmv 1Hr avg 90% reduction HCl: 30 ppmv 1Hr avg 90% reduction
		Combustion Control	CO: 50 ppmv 8Hr avg 200 ppmv 1Hr avg NOx: 300 ppmv daily avg PCDD: 2 ng/cubic meter
Refuse Incineration/Signal Brooklyn, New York, NY	Four (4) mass burn boilers with total capacity of 3,000 tpd	Baghouse	PM ₁₀ : 0.013 gr/dscf @ 12% CO ₂ VE: 10% opacity
		Dry Scrubber	SO ₂ : 75% reduction HF: 90% reduction

ATTACHMENT C

**LEE COUNTY ENERGY RECOVERY FACILITY
RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 3 of 21)**

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/Chester Solid Waste Associates Chester, PA/23-340-002 09/23/88	Six (6) mass burn furnace with total capacity of 2,688 tpd (rotary)	Baghouse	PM: 0.015 gr/dscf
		Dry Scrubber	HCL: 30 ppw 90% reduction SO ₂ : 30 ppw 70% reduction
		Combustion Control	CO: 100 ppw NOx: 235 ppw PCDD: 2 ng/cu meter
Refuse Incineration/Ogden- Martin Systems of Alexandria Alexandria, VA/71895 07/26/88	Three (3) MSW furnace with total capacity of 325 tpd	ESP	PM: 0.03 gr/dscf @ 12% CO ₂
		Dry Injection Scrubber	SO ₂ : 34 lb/hr HCL: 61 lb/hr HBr: 7.3 lb/hr HF: 1.7 lb/hr
		Combustion Control	VOC: 0.67 lb/hr NOx: 79.0 lb/hr CO: 68.5 lb/hr PB: 0.53 lb/hr PCDD: 2.0 ng/AM ₃ @ 12% CO ₂ Cd: 3.25 lb/hr Sb: 0.04 lb/hr As: 0.0093 lb/hr Hg: 0.22 lb/hr

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 4 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/Ogden Martin Systems of San Bernardino Ontario, CA/1A87-01 03/29/88	Three (3) mass burn boilers with a total capacity of 1600 tpd	Baghouse	PM: 0.01 gr/dscf @ 12% CO ₂
		Dry Scrubber	SO ₂ : 42 ppm @ 12% CO ₂ 80% reduction
		Dry Scrubber/ Baghouse	Hg: 0.0057 lb/hr each
Refuse Incineration/Signal Environmental Services Concord, NH/EPA-037-121NH03 12/09/87	Two (2) mass burn boilers with a total capacity of 500 tpd	Baghouse	PM: 0.02 gr/dscf @ 12% CO ₂
		Dry Lime Injection System	HCl: 50 ppmdv @ 7% O ₂ or 90% reduction SO ₂ : 21 lb/hr max
		Combustion Controls	NO _x : 0.61 lb/MMBtu CO: 0.11 lb/MMBtu 4 day average 0.25 lb/MMBtu 8 hour average
			Pb: 0.0034 lb/MMBtu

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 5 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/City & County of Honolulu/Oahu, HI/HI84-01 11/19/87	Two (2) RDF fired furnaces having a total capacity of 1700 tpd	ESP	PM: 0.015 gr/dscf @ 12% CO ₂
		Dry Scrubber	SO ₂ : 30 ppmv @ 12% CO ₂ 84% reduction HF: 0.036 lb/ton
		Combustion Control	NO _x : 260 ppmv @ 12% CO ₂ CO: 377 ppmv @ 12% CO ₂ VOC: 21 ppmv @ 12% CO ₂
			Pb: 0.0028 lb/ton Hg: 0.0022 lb/ton Be: 1.3 x 10 ⁻⁵ lb/ton
Refuse Incineration/Huntsville Solid Waste Authority Huntsville, AL/7-09-1104-X001 thru X006 10/06/87	Two (2) RDF furnaces with total capacity of 258.8 MMBtu/hr	Baghouse	PM: 0.015 gr/dscf @ 12% CO ₂
		Dry Scrubber	SO ₂ : 50 ppm @ 7% O ₂ 70% reduction HCl: 90% reduction HF: 90% reduction H ₂ SO ₄ : 70% reduction
		Combustion Design	NO _x : 0.46 lb/MMBtu 59.2 lb/hr CO: 50 ppm @ 12% CO ₂ 7.6 lb/hr Hg: 320 GPD

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 6 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Incineration/Kent Co. Department of Public Works Grand Rapids, MI/375-87 09/15/87	Two (2) solid waste furnaces with total capacity of 250 MBTU/hr (625 tpd)	Baghouse	PM: 0.01 gr/dscf @ 12% CO ₂
		Dry Scrubber	SO ₂ : 50 ppm or 75% reduction
			HCl: 50 ppm or 90% reduction
			F1: 2.5 MG/DSCM
			SO ₃ : 39 MG/DSCM
		Combustion Controls	NOx: 400 ppmv 1 hr avg 350 ppmv 3 hr avg
			CO: 200 ppmv 1 hr avg 50 ppmv 4 hr avg
			VOC: 8.3 MG/DSCM
			Pb: 0.87 MG/DSCM
			Hg: 0.61 MG/DSCM
			Ar: 6.2 UG/DSCM
			Be: 0.16 UG/DSCM
			Cd: 37.0 UG/DSCM
			Cr: 4.2 UG/DSCM
			PCDD: 3.0 NG/DSCM
			VE: 10% opacity

ATTACHMENT C

**LEE COUNTY ENERGY RECOVERY FACILITY
RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 7 of 21)**

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/Dravo Energy Resources Montgomery, PA 46-340-002 07/23/87	Mass burn waterwall refuse fired boilers with a total capacity of 1200 tpd	ESP Spray Dryer	PM: 0.0150 gr/dscf 99% removal HCl: 30.0 ppm 90% reduction SO ₂ : 30.0 ppm 70% reduction NO _x : 300.0 ppmv CO: 100.0 ppmv PCDD: 2.0 ng/Nm ³
Refuse Incineration/Wicon Recovery Systems Manchester NH/EPA-036-121NH03 05/22/87	Four (4) mass burn furnaces with a total capacity of 560 tpd	Baghouse Dry Lime Injection System Combustion Controls	PM: 0.035 gr/dscf @ 12% CO ₂ SO ₂ : 10.25 lb/hr (max) 65% removal HCl: 3.39 lb/hr NO _x : 17.5 lb/hr (max) CO: 5.73 lb/hr (max) Pb: 1.77 lb/hr (max) TCDD: 1.6 x 10 ⁻⁷ lb/hr TCDF: 5 x 10 ⁻⁸ lb/hr

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 8 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/South Broward County Resource Recovery/ Broward County/PSD-FL-105 05/15/87	Three (3) mass burn waterwall furnaces with a total capacity of 2590 tpd	ESP	PM: 0.015 gr/dscf @ 12% CO ₂
		Scrubber	SO ₂ : 0.31 lb/MMBtu 65% reduction HF: 0.004 lb/MMBtu 90% reduction
		Furnace Operation	NO _x : 0.56 lb/MMBtu CO: 0.09 lb/MMBtu Pb: 0.0015 lb/MMBtu Be: 9.3 x 10 ⁻⁷ lb/MMBtu Hg: 7.5 x 10 ⁻⁴ lb/MMBtu VE: 15% opacity
Refuse Incineration/Dravo Energy Resources Montgomery, EA 46-340-002 07/23/87	Mass burn waterwall refuse fired boilers with a total capacity of 1200 tpd	ESP	PM: 0.0150 gr/dscf 99% removal
		Spray Dryer	HCl: 30.0 ppm 90% reduction SO ₂ : 30.0 ppm 70% reduction NO _x : 300.0 ppm CO: 100.0 ppm PCDD: 2.0 ng/Nm ³

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY
RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 9 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/Vicon Recovery Systems Manchester NH/EPA-036-121NH03 05/22/87	Four (4) mass burn furnaces with a total capacity of 560 tpd	Baghouse	PM: 0.035 gr/dscf @ 12% O ₂
		Dry Lime Injection System	SO ₂ : 10.25 lb/hr (max) 65% removal HCl: 3.39 lb/hr
		Combustion Controls	NO _x : 17.5 lb/hr (max) CO: 5.73 lb/hr (max)
			Hb: 1.77 lb/hr (max) TOD: 1.6 x 10 ⁻⁶ lb/hr TODF: 5 x 10 ⁻⁶ lb/hr
Refuse Incineration/York County Solid Waste and Refuse Authority York County, PA/67-340-001 05/13/87	Mass burn rotary combustor with a total capacity of 1344 tpd	Baghouse	PM: 0.015 gr/dscf @ 7% O ₂ VE: 10% capacity
		Spray Dryer	HCl: 30.0 ppmv 90% reduction SO ₂ : 30.0 ppmv 70% reduction CO: 100.0 ppmv PCDD: 2.0 ng/Nm ³ @ 7% O ₂ Dry

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY
RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 10 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/ERIE Energy Resources, Inc. Erie, PA/ 25-340-001 02/05/87	RDF with a total capacity 710 tpd	Baghouse	PM: 0.015 gr/dscf @ 7% O ₂ Dry VE: 10% opacity
		Limestone Injection	HCl: 30.0 ppmv 90% reduction SO ₂ : 50.0 ppmv 70% reduction CO: 32.0 lb/hg PCDD: 2.0 ng/Nm ³ @ 7% O ₂ Dry
Refuse Incineration/Hennepin Energy Resource Co. Minneapolis, MN/2125 01/27/87	Two (2) mass burn water wall refuse fired boilers with a total capacity of 1212 tpd	Baghouse	PM: 0.02 gr/dscf @ 12% CO ₂
		Spray Dryer	SO ₂ : 0.55 lb/ton (100 ton/yr limit) HCl: 50 ppmv @ 12% CO ₂ or 90% reduction
		Combustion Control	NO _x : 250 ppmv @ 12% CO ₂ CO: 100 ppmv @ 12% CO ₂ Hb: 0.007 lb/ton Hg: 0.002 lb/ton VOC: 0.12 lb/ton (40 ton/yr limit) PCDD: 3.0 ng/dscm @ 12% CO ₂

ATTACHMENT C

**LEE COUNTY ENERGY RECOVERY FACILITY
RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 11 of 21)**

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/I-95 Energy Resource Recovery Facility/ Fairfax, VA/71960 01/12/87	Four (4) mass burn units having a total capacity of 3000 tpd	ESP	PM: 0.010 gr/dscf @ 12% CO ₂ 7.500 lb/hr 99.0% removal
		Partial control by ESP	Hg: 0.33 lb/hr Pb: 1.7 lb/hr 99.0% removal Be: 2.0 EE-4 lb/hr Cd: 4.70 EE-2 lb/hr Sb: 0.1400 lb/hr As: 7.3 EE-3 lb/hr
		Acid Gas Control Device	HCl: 28.53 lb/hr 90% reduction SO ₂ : 44.4 lb/hr 70% reduction
		Combustion Controls	NO _x : 151.3 lb/hr CO: 158.1 lb/hr VOC: 1.70 lb/hr TCDD: 2.3 EE-6 lb/hr

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY
RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 12 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/American REF-Fuel of Hempstead, NY 11/06/86	Three (3) mass burn waterwall refuse fired boilers with a total capacity of 2250 tpd	Baghouse	PM: 0.015 gr/dscf @ 12% CO ₂
		Spray Dryer	SO ₂ : 70% reduction HCl: 50 ppmdv @ 12% CO ₂ or 90% reduction
		Furnace Design	NO _x : 255 ppmdv @ 12% CO ₂ CO: 100 ppmdv @ 12% CO ₂ VOC: 36 ppmdv @ 12% CO ₂
Refuse Incineration/Vicon Recovery Systems Rutland, VT 09/11/86	Two (2) MSW furnaces with total capacity of 240 tpd	ESP	PM: 0.01 gr/dscf @ 12% CO ₂
		Packed Tower Adsorber/ Scrubber	SO ₂ : 12 lb/hr HCl: 9.4 lb/hr HF: 0.3 lb/hr
		Combustion Controls	CO: 300 ppm @ 12% CO ₂ 1 hr avg 50 ppm @ 12% CO ₂ 24 hr avg NO _x : 36 lb/hr PCDD: 6.3 lb/hr PB: 0.4 lb/hr Hg: 0.0045 lb/hr

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 13 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/Stanislaus Waste Energy Co. Stanislaus County, CA/SJ 86-03 08/11/86	Two (2) mass burn waterwall with a total capacity of 800 tpd	Baghouse	PM: 0.01 gr/dscf @ 12% CO ₂ , 99% removal Hg: 0.083 lb/hr
		Dry Scrubber	SO ₂ : 42.0 ppm @ 12% CO ₂ , 80% removal
		Ammonia Injection	NO _x : 175.0 ppm @ 12% CO ₂ , 40% removal
		Combustion Control	CO: 400.0 ppm @ 12% CO ₂
Refuse Incineration/Ogden Martin Systems of Indianapolis Indianapolis, IN/11065 03/24/86	Three (3) mass burn waterwall furnaces with a capacity of 2178 tpd	Baghouse	PM: 0.010 gr/dscf @ 12% CO ₂ subject to LAER not BACT VE: 10% opacity Hb: 1.0 EE-3 gr/dscf @ 12% CO ₂
		Dry Scrubber/ Baghouse	SO ₂ : Subject to LAER not BACT 80% removal HCl: 80% removal
		Combustion Control	NO _x : 272.0 ppmv @ 12% CO ₂ CO: 135.0 ppmv @ 12% CO ₂ VOC: 3.3 lb/hr

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY
RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 14 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/Jackson County Board of Public Works Jackson, MI/451-85 03/18/86	Two (2) mass burn boilers with a total capacity of 400 tpd	Baghouse	PM: 0.015 gr/dscf @ 12% CO ₂
		Dry Scrubber	SO ₂ : 86 ppmv @ 12% CO ₂ or 70% reduction
			HCl: 90% reduction
			NOx: 311 ppmv @ 12% CO ₂
			CO: 113 ppmv @ 12% CO ₂
			Cl: 63 ug/dscm @ 12% CO ₂
			Cr: 47 ug/dscm @ 12% CO ₂
			As: 12 ug/dscm @ 12% CO ₂
			PCDD: 0.52 ug/dscm @ 12% CO ₂
			PCDF: 0.5 ug/dscm @ 12% CO ₂
Refuse Incineration/Babylon Resource Recovery Facility 01/31/86	Two (2) mass burn furnaces having a total capacity of 750 tpd	Baghouse	PM: 0.02 gr/dscf @ 12% CO ₂
		Dry Scrubber	SO ₂ : 70% reduction HCl: 50 ppmv @ 12% CO ₂ or 90% reduction
		Combustion Control	NO _x : 6.6 lb/ton CO: 99.8% minimum combustion efficiency

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY
RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 15 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/American Ref-Fuel of Essex County Newark, NJ 12/11/85	Three (3) mass burn waterwall furnaces with a total capacity of 2274 tpd	ESP	PM: 0.015 gr/dscf @ 7% O ₂ Subject to LAER not BACT VE: 20% opacity
		Dry Scrubber/ ESP	SO ₂ : 100.0 ppmv @ 7% O ₂ HCl: 50 ppmv @ 7% O ₂ 90% control HF: 0.820 lb/hr Hb: 0.50 lb/hr Hg: 0.053 lb/hr Be: 2.5 EE-4 lb/hr As: 5.10 EE-3 lb/hr Cd: 0.043 lb/hr Cr: 0.012 lb/hr Ni: 3.3 EE-3 lb/hr
		Aux Burners #2 Oil	CO: 126.0 lb/hr
		Automatic Air/ Fuel Control	NHC: 6.3 lb/hr FHC: 0.29 lb/hr NO _x : 95.0 lb/hr
Refuse Incineration/City of Long Beach Long Beach, CA/1A 83-01 10/23/85	Three (3) mass burn waterwall furnaces with a total capacity of 1350 tpd	Baghouse/ Dry Scrubber	SO ₂ : 26.0 ppm @ 12% CO ₂ , 80% removal Hb: 0.080 lb/hr Hg: 0.130 lb/hr
		Dry Scrubber	HF: 3.3 lb/hr 90% removal

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 16 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/Katy Seghers Clearfield, UT 02/24/84	500 tpd Incinerator & Waste Heat Boiler	ESP	PM: 0.025 gr/dscf @ 12% CO ₂ 98.0% removal VE: 20% opacity F: 1.1 lb/hr Hg: 0.12 lb/hr Pb: 0.22 lb/hr
		Lime Scrubber/ Injection	SO ₂ : 22.4 lb/hr 50% removal HCl: 31.8 lb/hr 50% removal
		Combustion Control	NO _x : 29.9 lb/hr CO: 35.5 lb/hr
Refuse Incineration/HMR Wallace, New Castle, DE APC 84/633-636 01/01/84	Five (5) furnaces with total capacity of 600 tpd	ESP	PM: 0.05 gr/dscf VE: 20% opacity
		Combustion Control	CO: 50 ppm

ATTACHMENT C

**LEE COUNTY ENERGY RECOVERY FACILITY
RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 17 of 21)**

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/Trans Energy Brooks, OR 24-5398 12/19/83 Scrubber	2 Incinerators, 312 tpd total	Baghouse or ESP	PM: 0.03 gr/dscf @ 12% CO ₂ VE: 10% Opacity HCl: 23.0 lb/hr 80% removal
		Equipment Design & Operation	NO _x : 94.0 lb/hr SO ₂ : 73.0 lb/hr CO: 55.0 lb/hr Hg: 0.17 lb/hr VOC: 3.1 lb/hr Hb: 0.52 lb/hr F: 1.6 lb/hr
Refuse Incineration/Dutchess Resource Recovery Poughkeepsie, NY/134601-0024 10/14/83	Waterwall combustion 200 tpd total	Baghouse	PM: 0.015 gr/dscf 99.5% removal
		Low S Fuel	SO ₂ : 25.0 lb/hr
		Lime Coating for Baghouse	HCl: 33.0 lb/hr, 80% removal
		Proper Boiler Design	NO _x : 25.0 lb/hr
		Good Combustion Control	CO: 13.0 lb/hr

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 18 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/NESWC North Andover, MA/029-121MA16 05/27/82	2 new mass burn waterwall refuse fired boilers with a total capacity of 1500 tpd	ESP Low S Fuel Incinerator Design	PM: 0.05 gr/dscf @ 12% CO ₂ SO ₂ : 0.34 lb/MMBTU NO _x : 0.32 lb/MMBTU CO: 0.07 lb/MMBTU 98% efficiency SO ₂ : 0.02 lb/MMBTU
Refuse Incineration/McKay Bay Tampa, FL PSD-FL-086 07/02/82	4 new refuse fired mass burn furnaces with a total capacity of 1000 tpd	ESP designed to comply with LAER Low S Fuel Combustion Technique	PM: Subject to LAER not BACT 99.0% efficiency VE: Continuous opacity monitor Be: 5.0 gr/day Hg: 0.6 lb/hr Pb: 3.1 lb/hr SO ₂ : 170 lb/hr NO _x : 300 lb/hr VOC: 9.0 lb/hr F: 6.0 lb/hr

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 19 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/Energy Answers Corp. SEMASS Project Rochester, MA/025-12MA14 03/15/82	3 new waterwall boilers rated at 600 tpd each firing refuse derived fuel	3 stage ESP with overall PM collection efficiency of 96%	PM: 0.05 gr/dscf @ 12% CO ₂
		Dry Scrubbers	SO ₂ : 0.34 lb/MMBtu
		Boiler Design	NO _x : 0.5 lb/MMBtu
Refuse Incinerator/Westchester County, NY 02/22/82	New mass burn waterwall refuse fired boilers with a total capacity of 2250 tpd	ESP	PM: 0.03 gr/dscf @ 12% CO ₂ 98.5% efficiency
			Pb: 0.03 gr/dscf @ 12% CO ₂ 98.5% removal
			Hg: 0.03 gr/dscf @ 12% CO ₂ 98.5% removal
			Be: 0.03 gr/dscf @ 12% CO ₂ 98.5% removal
		Design, high excess air, good combustion	CO: 0.62 lb/ton
		Design, proper operation	NO _x : 3.0 lb/ton

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 20 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/N.E. Maryland Waste Disposal Authority Baltimore, MD/81MD01 09/01/81	3 waterwall incinerators 2010 tpd total	ESP	PM: 0.019 gr/dscf @ 12% CO Being considered as LAER SO ₂ : 335.0 lb/hr CO: 109.0 lb/hr NO _x : 227.0 lb/hr F: 4.2 lb/hr
Refuse Incineration/Refuse Fuels, Inc. Lawrence, MA/023-121MA12 03/23/81	New RDF waterwall furnace with a total capacity of 960 tpd	5 field ESP Low S Fuel Boiler Design	PM: Subject to LAER 0.25 gr/dscf @ 12% CO ₂ 98.0 efficiency SO ₂ : 1.2 lb/MMBTU NO _x : 0.7 lb/MMBTU
Refuse Incinerator/Resource Authority Gallatin, TN 08/01/80	2 new refuse mass burning waterwall boilers at 75 tpd each	Scrubber and fabric filters Note: Due to problems encountered with the existing scrubber/ fabric filter system, they have been replaced with ESPs.	PM: 0.04 gr/dscf NSPS 99.0% removal

ATTACHMENT C

LEE COUNTY ENERGY RECOVERY FACILITY RECENT BACT DETERMINATIONS FOR FACILITIES BURNING REFUSE (Page 21 of 21)

SOURCE TYPE/COMPANY NAME LOCATION/PERMIT NUMBER DATE OF ISSUE	SOURCE SIZE PROCESS DESCRIPTION	PROPOSED CONTROL TECHNOLOGY	BACT EMISSION LIMITATION DETERMINATION
Refuse Incineration/Municipal Incinerator Pulaski Highway Baltimore, MD/78MD-09 1/25/80	600 tpd municipal incinerator	ESP Proper combus- tion techniques	PM: per SIP 0.03 gr/dscf @ 12% CO ₂ 98.0% removal SO ₂ : 35.1 lb/hr CO: 30.0 lb/hr VOC: 1.3 lb/hr NO _x : 2.6 lb/hr

Source: EPA BACT/LAER Cleaninghouse (USEPA 1984, 1987b, 1988)

PM - Particulate Matter	BACT - Best Available Control Technology
ESP - Electrostatic Precipitator	MMBTU - Million BTU
VOC - Volatile Organic Compounds	LAER - Lowest Achievable Emission Rate
NO _x - Nitrogen Oxides	F - Hydrogen Fluorides
SO ₂ - Sulfur dioxide	CO - Carbon Monoxide
CO ₂ - Carbon Dioxide	Hg - Mercury
Be - Beryllium	Pb - Lead
Cd - Cadmium	Cr - CHROMIUM
HCl - Hydrogen Chloride	VE - Visible Emissions
Sb - Antimony	As - Arsenic
TODD - Tetrachlorodibenzo-p-dioxins	PAH - Polynuclear Aromatic Hydrocarbons
SIP - State Implementation Plan	NSPS - New Source Performance Standards
	NMHC - Non-methane Hydrocarbons

BURN MODEL OUTPUT

ATTACHMENT D

BURN - Version 3.0 COMBUSTION ANALYSIS: Lee County ERF
One Unit (600tpd)
at 5000 BTU/lb

6/28/91

WASTE FEED STREAMS

WEIGHT FIRED		PERCENT (DRY BASIS)					
NAME	in Wet LB/Hr	Carbon	Hydrogen	Sulfur	Fe(OH)3	Al(OH)3	Oxygen
STOKER_GRADE	50000.0	35.940	4.790	.130	00.000	00.000	31.650
COMPOSITE (LB)	50000.	14250.21	1899.23	51.54	.00	.00	12549.23
COMPOSITE MOLS	0.	1186.53	942.08	1.61	.00	.00	392.16
COMPOSITE (% DRY BASIS)		35.94	4.79	.13	.00	.00	31.65

PERCENT (DRY BASIS)

NAME	Nitrogen	Chlorine	CaCO3	Inert	Iron	Aluminum	Pct.H2O	BTU /LB
STOKER_GRADE	.630	.500	00.000	26.360	00.000	00.000	20.700	6305.2
COMPOSITE (LB)	249.79	198.25	.0010451.74	.00	.00	.00	10350.0	5000.0
COMPOSITE MOLS	8.92	5.59	.0010451.74	.00	.00	.00	575.0	
COMPOSITE (% DRY)	.63	.50	.00	26.36	.00	.00		

DRY BASIS

WET BASIS

THE MODIFIED DULONG HEATING VALUE IS:	6293.2 BTU/LB	4990.5 BTU/LB
THE MODIFIED CHANG HEATING VALUE IS:	6392.5 BTU/LB	5069.2 BTU/LB
THE BOIE HEATING VALUE IS:	6385.0 BTU/LB	5063.3 BTU/LB
THE INPUT WASTE HEATING VALUE IS:	6305.2 BTU/LB	5000.0 BTU/LB

DAILY CHARGE RATE EQUALS: 600.0 TONS PER DAY.

RUN CONDITIONS AS INPUT

=====

AMBIENT AIR: 60.0 DEG. F ; PRESSURE 1.0 ATM; ABSOLUTE HUMIDITY .007500
 AVAILABLE PREHEATED AIR .0 ACFM AT .0 DEG. F
 OPERATING TEMPERATURES: MINIMUM OF 1800.0, MAXIMUM OF 2200.0 DEG. F
 FURNACE WATER COOLED, 100.00 % OF AREA; BOILER WATER COOLED, 100.00 % OF AREA
 TEMPERATURES MODERATED WITH AIR AND ELEVATED WITH GAS
 STEAM CONDITIONS: PRESSURE - 865. PSIA ; TEMPERATURE - 830. DEG. F
 ENTHALPY CHANGE FROM FEEDWATER TO STEAM: 1196.0 BTU/LB
 TEMPERATURE (DEG. F): PROCESS WATER 60. FEEDWATER 290.
 FLUE GASES LEAVE THE BOILER AT: 425.0 DEG. F , QUENCHER AT 241.0 DEG. F
 FLUE GASES LEAVE THE SUBCOOLER AT: .0 DEG. F
 MAXIMUM SUBCOOLER WATER DISCHARGE TEMPERATURE IS: 95.0 DEG. F
 STACK DIAM. IS 1.0 FT, HEIGHT 275.0 FT, VELOCITY = 65.0 FT/SEC
 .00 % OF FEED ENTHALPY IS ABSORBED IN PRIMARY
 RESIDUE IS WATER QUENCHED AND LEAVES SYSTEM AT 350.0 DEG. F
 UNBURNED PERCENTAGES OF FEED - CARBON 1.5, IRON 00.0, ALUMINUM 00.0
 AFTERBURNER TEMPERATURE: .0 DEG. F ; OPERATING FACTOR: 100.00 % OF DESIGN
 ATMOSPHERIC STABILITY CLASS IS: 0; DESIGN % EXCESS AIR IS: 90.0

***** NOTE *****
 GAS FLOW RATES EXPRESSED IN SCFM ARE AT 60 Deg. F AND 1.0 Atm.

SUMMARY OF FURNACE OPERATIONS

Furnace Flue Gas Sensible Heat Content (SENH) as a Function of Tgas

$$SENH = A + B \cdot T + C \cdot T^2 + D \cdot T^3$$

A = -.5494215E+07 C = .8599385E+01
 B = .9105703E+05 D = -.7614848E-03

At Tgas = 2097.44 DEG. F , SENH = .2162975E+09 BTU/HR

GAS ANALYSIS AFTER FURNACE

COMPONENT	VOLUME % DRY BASIS	VOLUME % WET BASIS	MOLS PER MINUTE	LB/HR	
CO2	10.41	9.076	19.48	51435.8	
SO2	.1435E-01	.1251E-01	.2685E-01	103.2	125. PPMV - WET
N2	79.52	69.33	148.8	250129.3	
O2	10.00	8.721	18.72	35937.2	
HCl	.4980E-01	.4342E-01	.9319E-01	203.9	434. PPMV - WET
H2O		12.81	27.50	29698.9	
TOTAL	100.0	100.0	214.6	367508.4	

	PERCENT SO2 TO SO3	DEWPOINT DEG. F
SULFURIC ACID	1	248.83
DEWPOINT FROM	3	266.88
OXIDATION OF	5	275.58
SO2 TO SO3	8	283.78
AFTER FURNACE	10	287.73
	15	295.03

PREHEATED AIR	.00 ACFM	
	.00 SCFM	.00 LB/HR
COMBUSTION AIR	72251.39 ACFM	
	72251.39 SCFM	328178.20 LB/HR
BURNER AIR	.00 ACFM	
	.00 SCFM	.00 LB/HR
COOLING AIR	.00 ACFM	
	.00 SCFM	.00 LB/HR
COOLING WATER	.00 GAL/MIN	.00 LB/HR

WITHOUT COOLING OR FUEL USE BUT USING 0. ACFM OF PREHEATED AIR, THE FURNACE TEMPERATURE IS: 2097. DEG. F ; A TEMPERATURE OF 1993.DEG. F WAS USED TO JUDGE POTENTIAL DISSOCIATION OF CaCO_3 , $\text{Fe}(\text{OH})_3$, AND $\text{Al}(\text{OH})_3$.

FLUE GAS 400488.60 ACFM AT 2097.4 DEG. F
 81430.54 SCFM AT 60.0 DEG. F

BURNER FUEL USE .00 CFM (.00 FT³/HR) GAS

QUENCH TANK MAKEUP 7.10 GAL/MIN

RESIDUE ASSUMED TO LEAVE HOT ZONE AT 350.0 DEG. F
 RESIDUE WEIGHT (75.00 % SOLIDS) 14220.66 LB/HR
 (DRY) 10665.49 LB/HR

UNBURNED CARBON IN ASH: 2.002 PERCENT OF TOTAL ASH (INCLUDING CARBON)
 HEATING VALUE OF RESIDUE (DRY BASIS): 282.5 BTU/LB

HEAT LOSSES	BTU/HR	PERCENT OF FEED HEAT CONTENT	PERCENT OF TOTAL HEAT RELEASE
RADIATION	1188667.	.48 PERCENT	.47 PERCENT
MOISTURE	31470790.	12.59 PERCENT	12.46 PERCENT
DRY GAS	216297500.	86.52 PERCENT	85.63 PERCENT
RESIDUE	3877637.	1.55 PERCENT	1.54 PERCENT

DESIGN EXCESS AIR (ON FEED) IS 90.00 PERCENT
 ACTUAL EXCESS AIR (ON FEED) IS 90.01 PERCENT
 ACTUAL EXCESS AIR (ON TOTAL COMBUSTIBLE) IS 90.01 PERCENT

EQUILIBRIUM THERMAL NOX CONCENTRATION IS 526.2 PPM (VOLUME)
 PERCENT FUEL NITROGEN CONVERTED TO NO_x= 69.666 PERCENT
 FUEL NITROGEN NO_x (Estimated by Soete) = 964.754 PPM (VOLUME)

SO₂ UNCONTROLLED EMISSION RATE IS 13.01 GM/SEC EQUAL TO 103.07 LB/HR
 HCl UNCONTROLLED EMISSION RATE IS 25.71 GM/SEC EQUAL TO 203.64 LB/HR

WITH ACID GAS CONTROL AT .0 PERCENT,
 SO₂ CONTROLLED EMISSION RATE IS 13.01 GM/SEC EQUAL TO 103.07 LB/HR
 HCl CONTROLLED EMISSION RATE IS 25.71 GM/SEC EQUAL TO 203.64 LB/HR

SUMMARY OF BOILER OPERATION CALCULATIONS

BOILER STEAM PRODUCTION 150843.7 LB/HR
PRESSURE 865.0 PSIA
TEMPERATURE 830.0 DEG. F

FEEDWATER TEMPERATURE: 290.0 DEG. F
FEEDWATER ENTHALPY: .0 BTU/LB
PRODUCT STEAM ENTHALPY: .0 BTU/LB
ENTHALPY CHANGE: 1196.0 BTU/LB

SATURATION TEMPERATURE AT PRODUCT STEAM PRESSURE: .0 DEG. F
THE STEAM CARRIES: 830.0 DEG. F OF SUPERHEAT

FLUE GAS TEMPERATURE AT BOILER EXIT 425. DEG. F

RADIATION LOSS 1188667. BTU/HR OR .55 % OF SENSIBLE HEAT AT BOILER INLET

WITH REFERENCE TO NET ENTHALPY INPUT TO THE COMBUSTION SYSTEM,
THE BOILER EFFICIENCY IS: 73.04 PERCENT

WITH REFERENCE TO FEED ENTHALPY INPUT TO THE COMBUSTION SYSTEM,
THE BOILER EFFICIENCY IS: 72.16 PERCENT

MEAN MOLECULAR WEIGHT OF GASES
(DRY BASIS) 30.09
(WET BASIS) 28.54

TOTAL GAS FLOW RATE	LB/MIN	LB/HR	ACFM
(DRY BASIS)	5630.16	337809.50	--
(WET BASIS)	6125.58	367534.80	138591.3

EFFLUENT GAS HUMIDITY .0880 (MASS H2O/MASS BONE DRY GAS)

GAS DEW POINT IS 121.4 DEG. F

SUMMARY OF DRY SCRUBBER OPERATIONS

 DRY SCRUBBER EXIT TEMPERATURE 241.0 DEG. F

DRY SCRUBBER OPERATIONS SUMMARY

=====

CONTROL EFFICIENCY: 95.00 PERCENT HCL REMOVAL
 80.00 PERCENT SO2 REMOVAL

LIME ASSAY: 90.00 PERCENT ACTIVE CaO
 SLURRY FEED STOICHIOMETRY: 170.00 PERCENT OF HCL + SO2
 SLURRY FEED AT: 8.00 PERCENT SOLIDS

LIME FEED RATE AT: 466.77 LB/HR
 SLURRY FEED RATE AT: 44794.49 GAL/HR

SUPPLEMENTAL WATER USE 20. GAL/MIN

GAS ANALYSIS AFTER DRY SCRUB

COMPONENT	VOLUME % DRY BASIS	VOLUME % WET BASIS	MOLS PER MINUTE	LB/HR	
CO2	10.42	8.507	19.48	51435.8	
SO2	.2871E-02	.2345E-02	.5369E-02	20.6	23. PPMV - WET
N2	79.57	64.98	148.8	250129.3	
O2	10.01	8.174	18.72	35937.2	
HCL	.2492E-02	.2035E-02	.4659E-02	10.2	20. PPMV - WET
H2O		18.33	41.97	45330.5	
TOTAL	100.0	100.0	229.0	382863.8	

	PERCENT SO2 TO SO3	DEWPOINT DEG. F
SULFURIC ACID	1	230.79
DEWPOINT FROM	3	247.23
OXIDATION OF	5	255.15
SO2 TO SO3	8	262.59
AFTER QUENCHER	10	266.18
	15	272.79

SUMMARY OF STACK CALCULATIONS AFTER SYSTEM

STACK DIAMETER OF 6.18 FEET USED FOR CALCULATIONS

NATURAL DRAFT 1.039E+00 IN H2O
FRICTION LOSS 2.149E+00 IN H2O
VELOCITY HEAD 7.244E-02 IN H2O
MINIMUM FAN PRESSURE 1.182E+00 IN H2O
EXIT VELOCITY 64.9 FT/SEC

TOTAL FLOW @ STACK CONDITIONS 116850.3 CFM
STACK TEMPERATURE IS: 239.4 DEG. F

FLOW CORRECTED TO 12% CO2 (DRY, 1 ATM, 68 F/20 C)) 62537.0 CFM
FLOW CORRECTED TO 7% O2 (DRY, 1 ATM, 68 F/20 C)) 56557.4 CFM

MEAN MOLECULAR WEIGHT OF GASES
(DRY BASIS) 30.08
(WET BASIS) 27.87

TOTAL GAS FLOW RATE	LB/MIN	LB/HR	ACFM
(DRY BASIS)	5625.55	337533.30	--
(WET BASIS)	6381.73	382904.10	117123.9

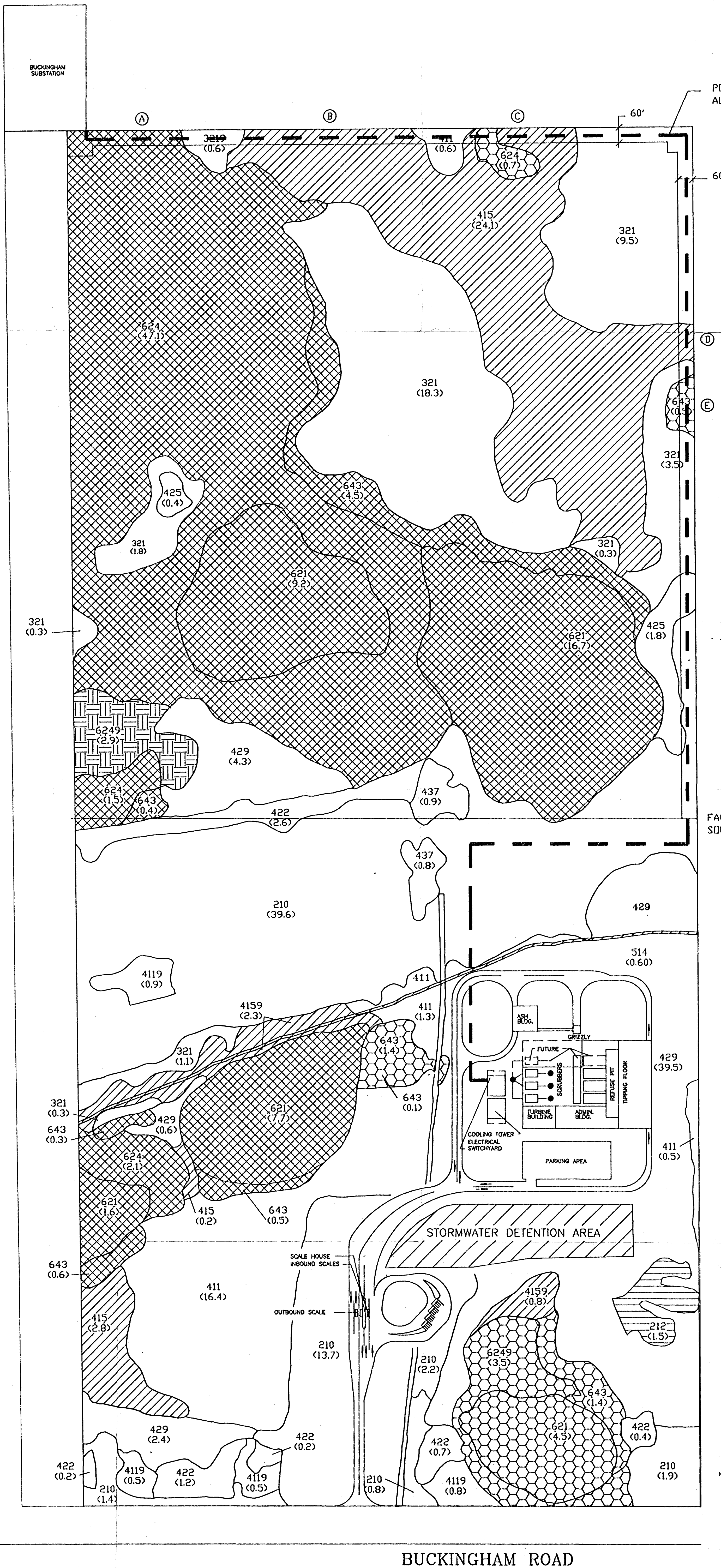
EFFLUENT GAS HUMIDITY .1344 (MASS H2O/MASS BONE DRY GAS)

GAS DEW POINT IS 134.9 DEG. F

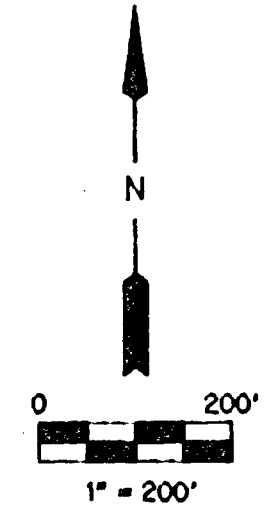
	PERCENT SO2 TO SO3	DEWPOINT DEG. F
SULFURIC ACID	1	230.79
DEWPOINT FROM	3	247.23
OXIDATION OF	5	255.15
SO2 TO SO3	8	262.59
AFTER STACK FOLLOWING	10	266.18
ALL PROCESSES	15	272.79

CALCULATIONS COMPLETE

POWER LINE EASEMENT



POWER LINE TRANSMISSION CORRIDOR
ALONG EXISTING, UNIMPROVED ROAD (NOT SHOWN)



POTENTIAL IMPACTS TO WETLANDS
ALONG POWER LINE TRANSMISSION CORRIDOR
ROAD SECTION ACREAGE OF FILL

(A)	0.6
(B)	1.0
(C)	0.6
(D)	0.2
(E)	0.3
TOTAL:	2.7

FACILITY SITE
SOUTH OF THIS LINE

--- POWER LINE
TRANSMISSION
CORRIDOR

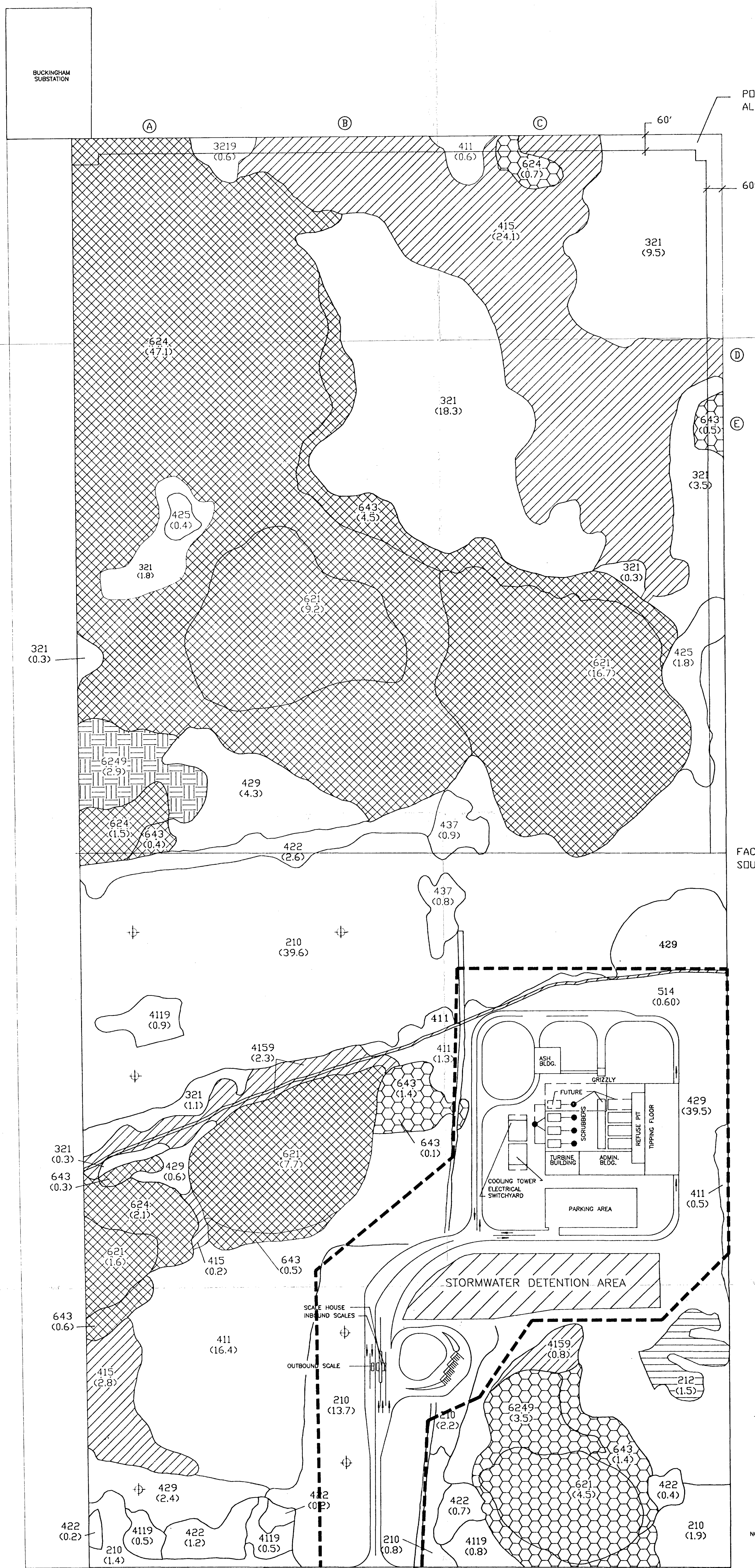
(1) LAYOUT SHOWN IS FOR STOKER WATER WALL TECHNOLOGY. FOR ROTARY WATERWALL TECHNOLOGY, THE LAYOUT SHALL BE MODIFIED APPROPRIATELY TO ACCOMMODATE THE INITIAL INSTALLATION OF FOUR PROCESSING UNITS.
(2) AREA DEPICTED REPRESENTS PROPOSED LAND PURCHASE BOUNDARY (155 ACRES).
(3) REFER TO WETLAND SHEET FOR EXPLANATION OF NUMBERS IN REFERENCE TO TYPE OF WETLAND OUTLINED.

LEE COUNTY ENERGY RECOVERY
POWER LINE TRANSMISSION CORRIDOR

CAMP DRESSER & McKEE INC.

DESIGNED BY: _____
DRAWN BY: _____
CHECKED BY: _____
APPROVED BY: _____
DATE: JUNE 1990

REV. NO.	DATE	DRWN	CHKD.	REMARKS



POTENTIAL IMPACTS TO WETLANDS ALONG POWER LINE TRANSMISSION CORRIDOR	
ROAD SECTION	ACREAGE OF FILL
(A)	0.6
(B)	1.0
(C)	0.6
(D)	0.2
(E)	0.3
TOTAL:	2.7

FACILITY SITE
SOUTH OF THIS LINE

LEGEND

----- FENCE LINE

⊕ APPROXIMATE LOCATIONS OF
SANDSTONE AQUIFER WELLS
FOR EMERGENCY WATER SUPPLY

NOTES:

- (1) LAYOUT SHOWN IS FOR STOKER WATER WALL TECHNOLOGY FOR ROTARY WATERWALL TECHNOLOGY, THE LAYOUT SHALL BE MODIFIED APPROPRIATELY TO ACCOMMODATE THE INITIAL INSTALLATION OF FOUR PROCESSING UNITS.
- (2) AREA DEPICTED REPRESENTS PROPOSED LAND PURCHASE BOUNDARY (155 ACRES).
- (3) REFER TO WETLAND SHEET FOR EXPLANATION OF NUMBERS IN REFERENCE TO TYPE OF WETLAND OUTLINED.

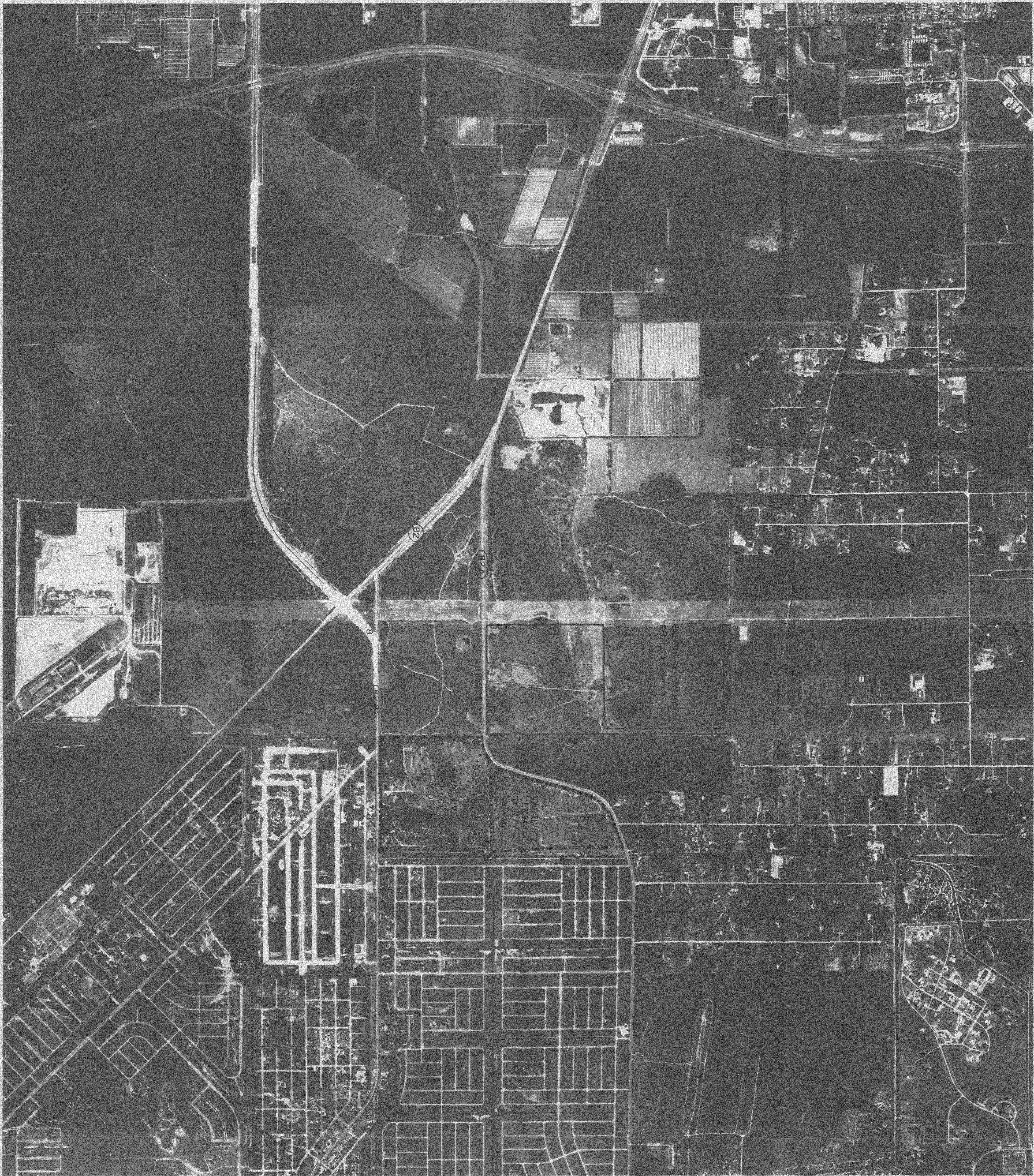
BUCKINGHAM ROAD

LEE COUNTY ENERGY RECOVERY PROPOSED WELL LOCATIONS

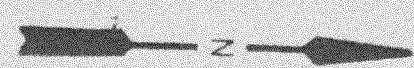
CAMP DRESSER & McKEE INC.

DESIGNED BY: _____
DRAWN BY: _____
CHECKED BY: _____
APPROVED BY: _____
DATE: JUNE 1990

REV. NO.	DATE	DRWN	CHKD.	REMARKS



- L-728 USGS MONITORING WELL
- P-4 LANDFILL MONITORING WELL



0 1000'

APPROX. SCALE

$T^* = 1000'$

PHOTO: 2/24/90

REV NO	DATE	DRWN	CHKD	REMARKS

DESIGNED BY _____
DRAWN BY: _____
CHECKED BY _____
APPROVED BY: _____
DATE: _____

CAMP DRESSER & McKEE INC.

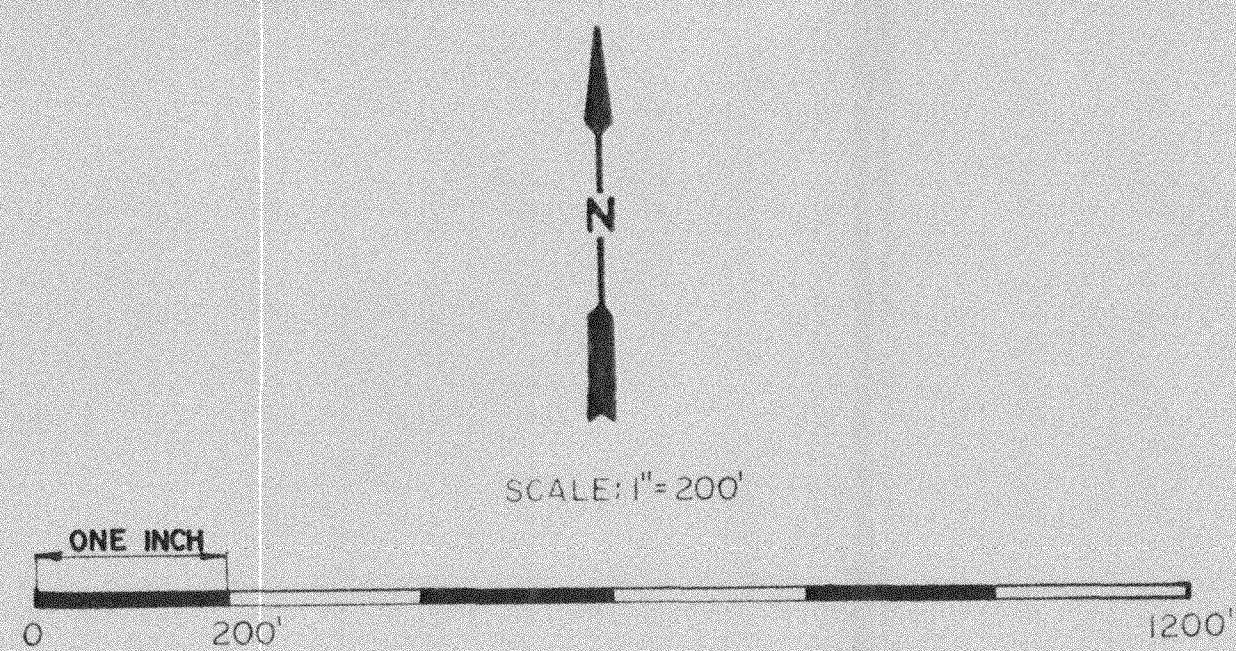
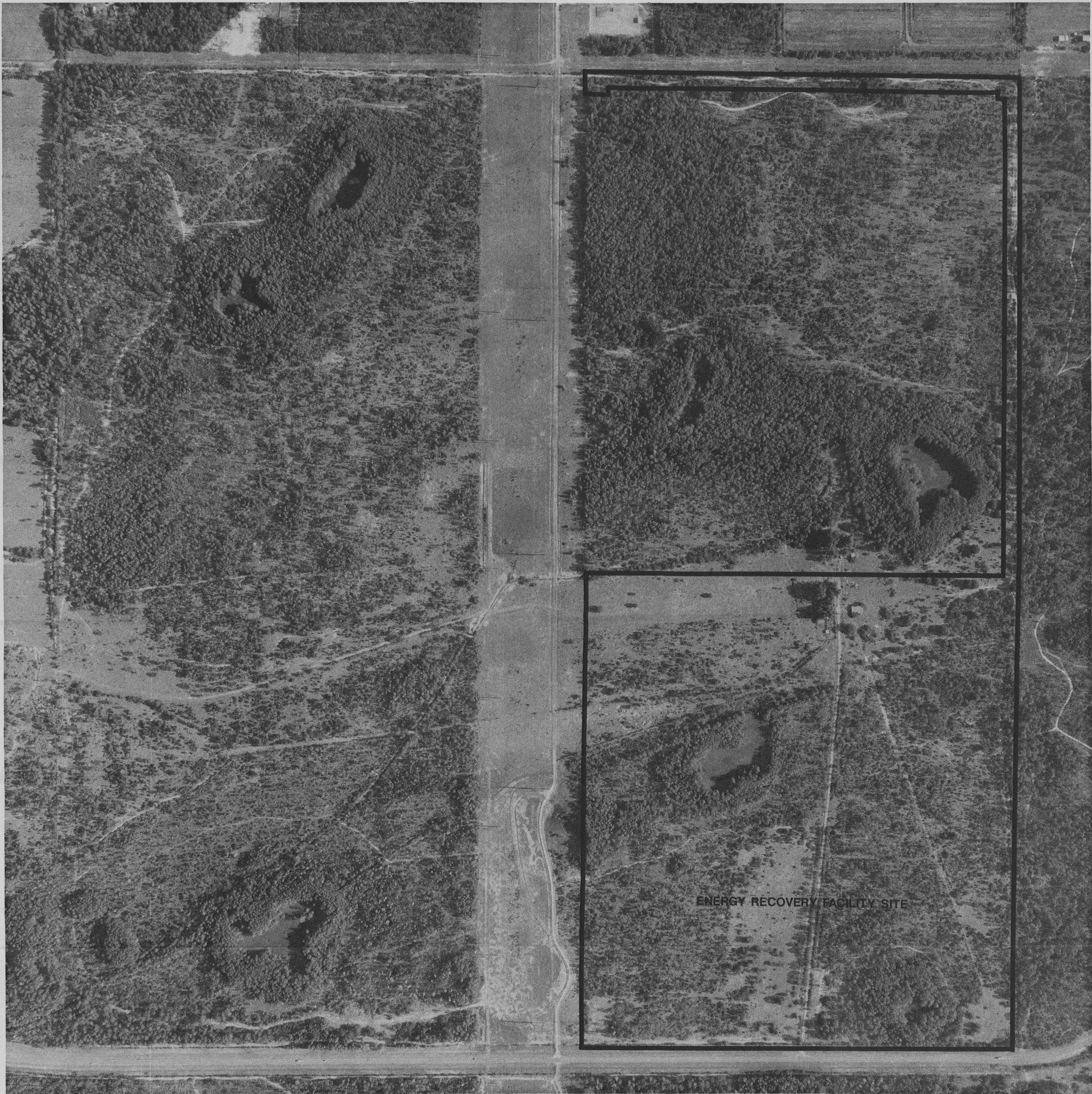
environmental engineers, scientists,
planners, & management consultants

CDM

UPGRADIENT POLLUTION SOURCES

PROJECT NO
6685-38

SHEET NO



NO.	DATE	REMARKS	BY
		REVISIONS	

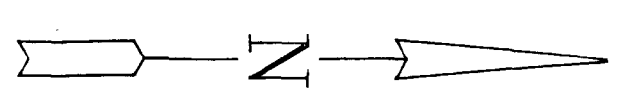
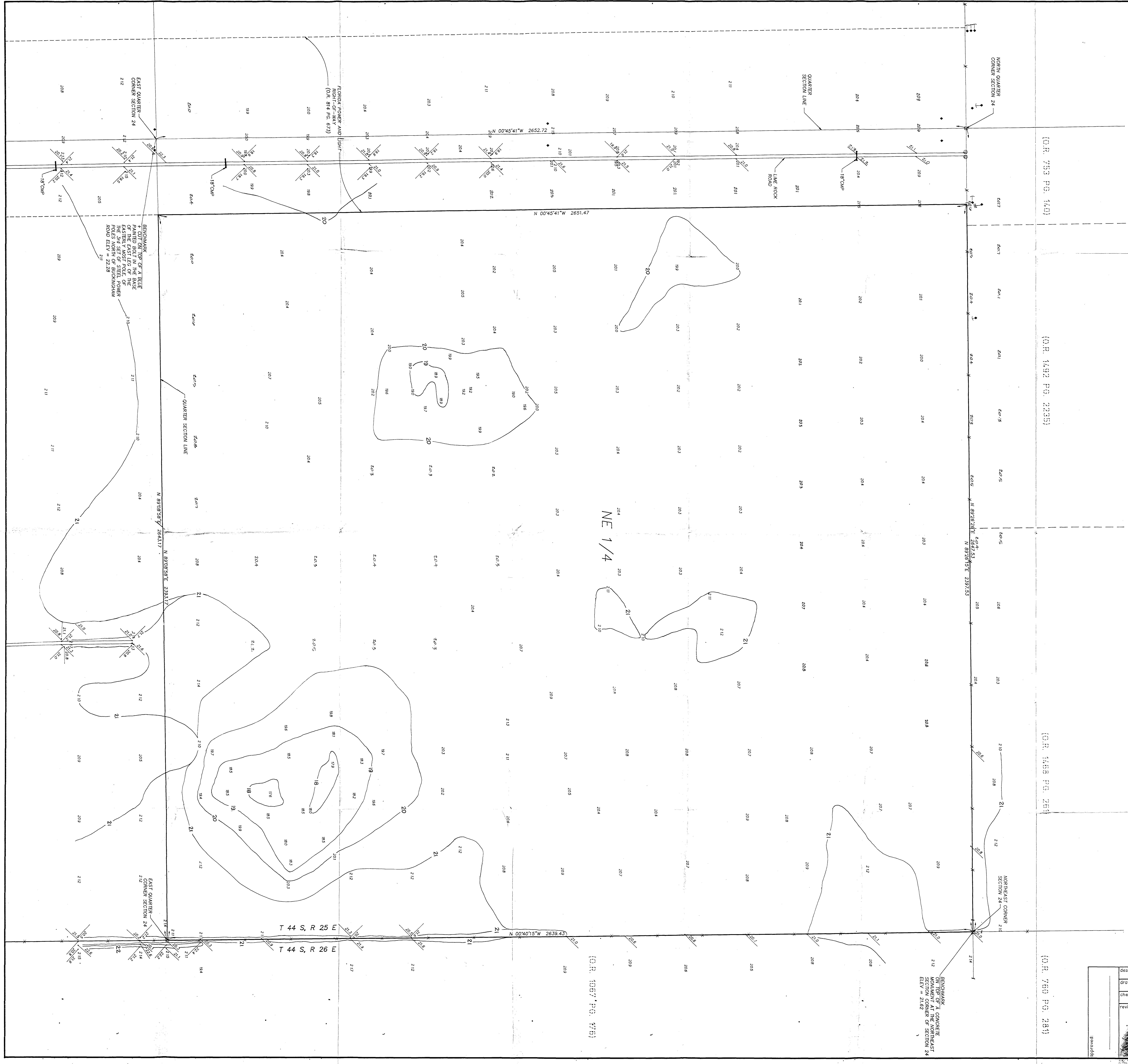
APPROVED BY		SCALE	FIELD WORK
NAME	DATE		
DRAWN BY			
TRACED BY			
CHECKED BY			
NOTEBOOK NO.		SHEET	OF SHEETS

CAMP DRESSER & MCKEE INC.

environmental engineers, scientists,
planners, & management consultants

CDM

SITE LOCATION:
AERIAL SURVEY



SCALE: 1" = 100'

Description of Lands Surveyed

The Northeast Quarter 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.

CERTIFICATE:
WE HEREBY CERTIFY to LEE COUNTY BOARD OF COUNTY COMMISSIONERS, that a TOPOGRAPHIC SURVEY of a part of Section 24, Township 44 South, Range 25 East, Lee County, Florida, was completed under our direction on June 28, 1990.
This TOPOGRAPHIC SURVEY meets the minimum technical standards set forth by the Florida Board of Land Surveyors in Chapter 21HH-6, Florida Administrative Code, pursuant to Section 472.027, Florida Statutes.

AGNOLI, BARBER & BRUNDAGE, INC.
Professional Engineers, Planners & Land Surveyors

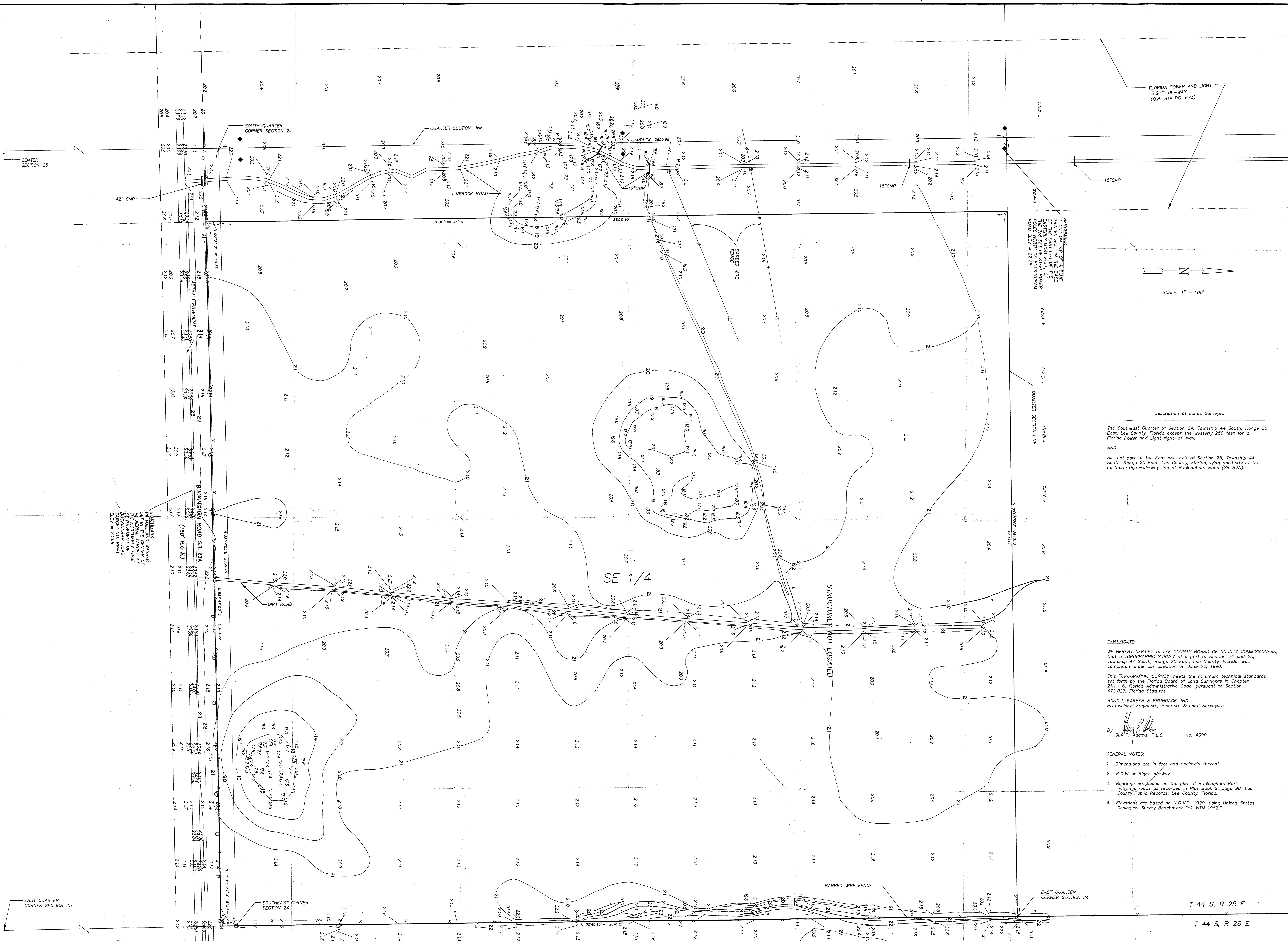
By *[Signature]*
Guy P. Adams, P.L.S. No. 4390

- GENERAL NOTES:**
1. Dimensions are in feet and decimals thereof.
 2. R.O.W. = Right-of-Way.
 3. Bearings are based on the plot of Buckingham Park entrance road as recorded in Plat-Book 4, page 98, Lee County Public Records, Lee County, Florida.
 4. Elevations are based on N.G.V.D. 1929, using United States Geological Survey Benchmark "51 WTM 1952."

- LEGEND**
- FOUND CONCRETE MONUMENT
 - CORRUGATED METAL PIPE
 - TELEPHONE POLE
 - POWER POLE
 - GATE POST
 - ANCHOR

design: date: JUNE 28, 1990		for: LEE COUNTY, FLORIDA	
drawn: MMB	scale: 1" = 100'	title: MAP OF TOPOGRAPHIC SURVEY	
checked: book: 273, 297	page: 6	PART OF SECTION 24, T44S, R25E	
revision: 295	1	LEE COUNTY, FLORIDA	
project no: 4657		sheet no: 2902	
date: 2902-11		of 2902	

agnoli, barber & brundage, inc.
professional engineers, planners, & land surveyors
7400 tamiami trail, n. naples, florida 33963 (813)597-3111
2077 bayview parkway, fort myers, florida 33901 (813)337-3111



FLORIDA POWER AND LIGHT
RIGHT-OF-WAY
(O.R. 814 PG. 673)

SCALE: 1" = 100'

Description of Lands Surveyed

The Southeast Quarter 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 824).

CERTIFICATE:

WE HEREBY CERTIFY TO LEE COUNTY BOARD OF COUNTY COMMISSIONERS, that a TOPOGRAPHIC SURVEY of a part of Section 24 and 25, Township 44 South, Range 25 East, Lee County, Florida, was completed under our direction on June 20, 1990.

This TOPOGRAPHIC SURVEY meets the minimum technical standards set forth by the Florida Board of Land Surveyors in Chapter 21HH-6, Florida Administrative Code, pursuant to Section 472.027, Florida Statutes.

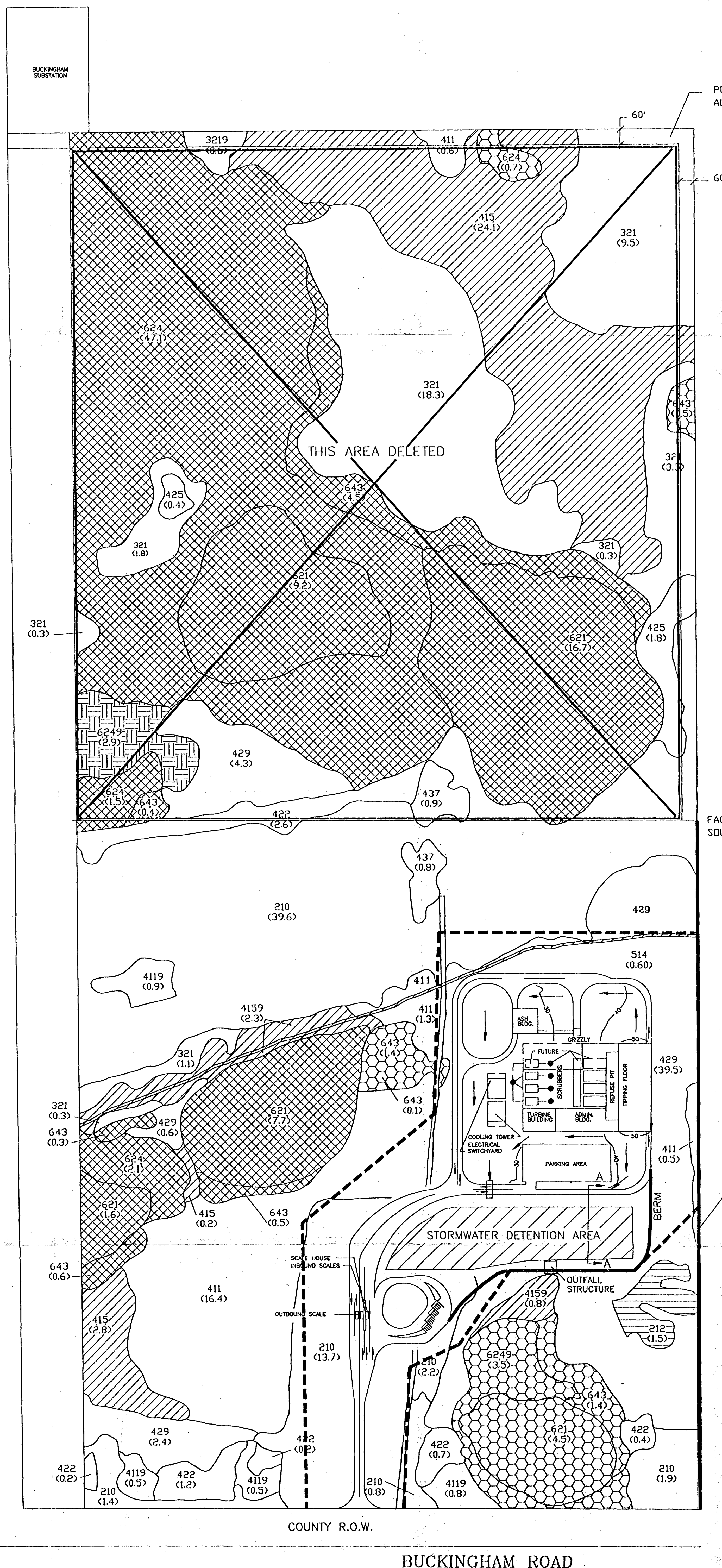
AGNOLI, BARBER & BRUNDAGE, INC.
Professional Engineers, Planners & Land Surveyors

By *[Signature]*
Guy P. Adams, P.L.S. No. 4390

GENERAL NOTES:

- Dimensions are in feet and decimals thereof.
- R.C.W. = Right-of-Way.
- Bearings are based on the plat of Buckingham Park entrance roads as recorded in Plat Book 9, page 98, Lee County Public Records, Lee County, Florida.
- Elevations are based on N.G.V.D. 1929, using United States Geological Survey Benchmark "51 WTM 1952."

Design: _____		Date: JUNE 20, 1990	For: LEE COUNTY, FLORIDA
Drawn: RLC		Scale: 1" = 100'	Title: MAP OF TOPOGRAPHIC SURVEY
Checked: _____		Book: 297	PART OF SECTIONS 24 & 25, T44S, R25E
Revision: 1/12/90		Page: 6	LEE COUNTY, FLORIDA
agnoli, barber & brundage, inc. Professional Engineers, Planners, & Land Surveyors 7400 tamiami trail, n. naples, florida 33963 (813)567-3111 2077 bayview parkway, fort myers, florida 33901 (813)337-3111			
Project No.: 4657	Sheet No.: 2902	Title No.: 2902	



LEGEND

← FLOW PATH

- EXISTING BERM

NOTES:

- (1) MINIMUM BUILDING FLOOR ELEVATION -25 NGVD
- (2) MINIMUM SERVICE ROAD ELEVATION -24 NGVD
- (3) SITE GRADING AND ELEVATIONS ARE CONCEPTUAL PLANS TO BE DEVELOPED AND PERMITTED BY SELECTED VENDOR
- (4) LAYOUT SHOWN IS FOR STOKER WATERWALL TECHNOLOGY FOR ROTARY WATERWALL TECHNOLOGY, THE LAYOUT SHALL BE MODIFIED APPROPRIATELY ACCORDING TO THE INITIAL INSTALLATION OF FOUR PROCESSING UNITS.
- (5) AREA DEPICTED REPRESENTS PROPOSED LAND PURCHASE BOUNDARY. ACTUAL ENERGY RECOVERY FACILITY SITE IS DEPICTED BY FENCELINE
- (6) REFER TO WETLAND SHEET FOR EXPLANATION OF NUMBERS IN REFERENCE TO TYPE OF WETLAND OUTLINED.

