Solid Waste Authority of Palm Beach County
Palm Beach Renewable Energy Facility No. 2

Volume III

Petition to Modify Conditions of Certification PA 84-20: Palm Beach Renewable Energy Facility No. 2

July 2010

Prepared By:

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3582056

Volume III (PSD Permit Application)

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May 10, 2010

Ms Trina Vielhauer
Chief, Bureau of Air Regulation
Florida Department of Environmental Protection
Bob Martinez Center
2600 Blair Stone Road
Tallahassee, FL 32399-2400

SOLID WASTE AUTHORITY
YOUR PARTNER FOR SOLID WASTE SOLUTIONS

Re: Solid Waste Authority of Palm Beach County
Palm Beach Renewable Energy Facility No. 2
PSD Permit Application

Dear Ms. Vielhauer,

The Solid Waste Authority of Palm Beach County (the Authority) is pleased to submit four copies of the Prevention of Significant Deterioration (PSD) permit application for its proposed Palm Beach Renewable Energy Facility No. 2 (Proposed Facility). This new 3,000 ton per day mass-burn renewable energy facility is planned to be constructed at the Authority's Palm Beach Renewable Energy Park in West Palm Beach, adjacent to the existing renewable energy facility, the North County Resource Recovery Facility.

In addition to complementing the services provided by the existing renewable energy facility, the Proposed Facility will serve to enhance the Authority's comprehensive solid waste management program as well as achieve objectives established by the Authority's Integrated Solid Waste Management Plan. Among other objectives, this plan specifically calls for expanded combustion capacity in order to extend the life of the Authority's existing Class I landfill beyond its currently anticipated lifespan.

This air quality permit application has been prepared to obtain the issuance of a PSD permit from the Florida Department of Environmental Protection for authorization to construct the Proposed Facility. To address federal and state of Florida air quality permitting requirements, the PSD permit application includes the following information and analyses:

- Project Description (Section 2.0) – presents descriptive information on the Proposed Facility including the MWC units, air pollution control equipment, and ancillary equipment to be installed.
- Emissions Summary (Section 3.0) – provides maximum estimated air pollutant emission rates expected from the MWC units and ancillary equipment.
- Regulatory Assessment (Section 4.0) – identifies and discusses applicable federal and state air quality regulations and permitting requirements.

- Control Technology Analyses (Section 5.0) – presents the required Best Available Control Technology (BACT) determinations for each pollutant subject to review under the PSD permitting provisions.

- FDEP Air Permit Application Form (Appendix A) – includes information on emission units to be installed, applicable air quality requirements, emissions estimates, and other project related information.

- Emission Calculations (Appendix B) – provides detailed emission calculations for the planned MWC units and ancillary equipment.

- Materials Separation Plan Documentation (Appendix C) – presents the preliminary and final draft versions of the Authority's Materials Separation Plan and public review information.

- Air Pollution Control Equipment Cost Estimates (Appendix D) – provides the cost estimates used to evaluate the economic impacts of technically feasible air pollution control alternatives in the BACT analysis.

- RACT/BACT/LAER Clearinghouse Information (Appendix E) – presents summaries of the control technology determinations made by permitting authorities nationwide for recently permitted MWCs and the ancillary equipment planned for the Proposed Facility.

- Air Quality Modeling Report (Appendix F) – describes the atmospheric dispersion modeling analyses completed to demonstrate that the operation of the Proposed Facility will not adversely impact ambient air quality or the local environment.

We look forward to the Department's review of the PSD permit application and discussing this project with you further. If you have any questions concerning the permit application, please contact Ms. Leah Richter with Malcolm Pirnie, Inc. at (954) 525-2499 or via e-mail at lrichter@pirnie.com.

Very truly yours,



Mark Hammond
Executive Director
Solid Waste Authority of Palm Beach County

Enclosures: Four (4) copies, PSD Permit Application, Palm Beach Renewable Energy Facility No. 2

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May 2010

Solid Waste Authority of Palm Beach County

Prevention of Significant Deterioration Permit Application

Palm Beach Renewable Energy Facility # 2

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Palm Beach Renewable Energy Facility # 2

Prevention of Significant Deterioration Permit Application

Palm Beach Renewable Energy Facility # 2

May 2010

INDEPENDENT ENVIRONMENTAL ENGINEERS, SCIENTISTS AND CONSULTANTS

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Prevention of Significant Deterioration (PSD) Permit Application

Palm Beach Renewable Energy Facility No. 2

May 2010

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Acronyms and Abbreviated Terms

Acronyms and abbreviated terms contained in this document are defined below for reference. These acronyms and terms are defined upon initial appearance.

ACI	Activated Carbon Injection
AQRVs	Air Quality Related Values
BACT	Best Available Control Technology
Cd	Cadmium
CEMS	Continuous Emissions Monitoring System
CFR	Code of Federal Regulations
CI	Compression Ignition
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COMS	Continuous Opacity Monitoring System
dscf	Dry standard cubic feet
dscm	Dry standard cubic meter
FAAQS	Florida Ambient Air Quality Standard
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FF	Fabric Filter
FGD_n	Flue Gas Denitrification
FGR	Flue Gas Recirculation
FLM	Federal Land Manager
GCP	Good Combustion Practices
gr	Grains
HAP	Hazardous Air Pollutant
HCl	Hydrogen Chloride
Hg	Mercury
HHW	Household Hazardous Waste
HP	Horsepower
H_2SO_4	Sulfuric Acid Mist
H_2S	Hydrogen Sulfide
ISWM	Integrated Solid Waste Management
kW	Kilowatts
LAER	Lowest Achievable Emission Rate
LEA	Low Excess Air
MACT	Maximum Achievable Control Technology
MCR	Maximum Continuous Rating
mg	Milligram

MMBtu/hr	Million British Thermal Units Per Hour
MSW	Municipal Solid Waste
MW	Megawatts
MWC	Municipal Waste Combustor
NAAQS	National Ambient Air Quality Standards
NCRRF	North County Resource Recovery Facility
NESHAP	National Emission Standards for Hazardous Air Pollutants
ng	Nanogram
NO_x	Nitrogen Oxides
NP	National Park
NNSR	Nonattainment New Source Review
NSPS	New Source Performance Standards
NSR	New Source Review
O_3	Ozone
Pb	Lead
PBREF2	Palm Beach Renewable Energy Facility No. 2
PBREP	Palm Beach Renewable Energy Park
PM	Particulate Matter
PM_{10}	Particulate Matter with a Diameter of 10 Micrometers or Less
$PM_{2.5}$	Particulate Matter with a Diameter of 2.5 Micrometers or Less
ppm	Parts Per Million
ppm_v	Parts Per Million by Volume
ppm_{vd}	Parts Per Million by Volume, Dry Basis
ppm_w	Parts Per Million by Weight
PPSA	Power Plant Siting Act
PSD	Prevention of Significant Deterioration
RACT	Reasonable Available Control Technology
RBLC	RACT/BACT/LAER Clearinghouse
RCRA	Resource Conservation and Recovery Act
RDF	Refuse-Derived Fuel
RSCR™	Regenerative SCR (from Babcock Power Inc.)
SCR	Selective Catalytic Reduction
SDA	Spray Dryer Absorber
SNCR	Selective Non-Catalytic Reduction
SO_2	Sulfur Dioxide
tpd	Tons Per Day
µg	Microgram
µm	Micrometer (or Micron)
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WTE	Waste-to-Energy

Executive Summary

The Solid Waste Authority of Palm Beach County (the Authority) is planning to expand its solid waste processing capacity by constructing a new waste-to-energy (WTE) facility in West Palm Beach, Florida. This new facility will be known as the Palm Beach Renewable Energy Facility Number 2 (PBREF2). The new facility will increase the Authority's solid waste processing capacity and will be constructed adjacent to the Authority's existing renewable energy facility, which is known as the North County Resource Recovery Facility (NCRRF) and is located at the Authority's 1,320-acre Palm Beach Renewable Energy Park (PBREP). PBREF2 will feature three nominal 1,000 ton per day (tpd) mass-burn municipal waste combustor (MWC) units and associated ancillary equipment to provide 3,000 tpd of additional municipal solid waste (MSW) processing capacity. Energy extracted from the combustion of MSW will be converted into electricity by a highly efficient steam turbine generator with an expected power output rating of 90–100 MW. The facility design will also feature an air cooled condenser to provide dry cooling of excess steam from the steam turbine generators, thereby minimizing water demands. State-of-the art air pollution control systems will be implemented on the MWCs to minimize air pollutant emissions and continuous emissions monitoring equipment will be operated as required to demonstrate on-going compliance with federal and state air quality regulations. The operations at the PBREF2 will complement services that are currently provided at the PBREP and will enhance the Authority's 2006 Integrated Solid Waste Management Plan (ISWM Plan) to develop a system of programs and facilities to effectively and economically manage solid waste through source reduction, recycling, composting, combustion and landfilling.

The proposed PBREF2 will be located in an area that is in attainment with all national ambient air quality standards (NAAQS). Based on estimated potential emission levels, the PBREF2 project constitutes a major modification to an existing emission source (i.e., the PBREP) and thereby is subject to Prevention of Significant Deterioration (PSD) permitting requirements under the New Source Review (NSR) pre-construction permitting program. A summary of the potential emission levels associated with the project and identification of pollutants subject to PSD review based on applicable significant emission rate thresholds are presented in Table ES-1. The potential emissions estimates shown in Table ES-1 reflect maximum expected emissions attributed to the operation of the MWCs and ancillary equipment associated with the PBREF2. There are no increases in emissions expected from the existing units at the NCRRF or other existing operations at the PBREP as a result of the planned operation of the PBREF2.

Table ES-1:
Summary of Estimated Emissions and PSD Applicability for PBREF2

Pollutant	Potential Emissions Estimate (tons/yr)	PSD Significant Emission Rate Threshold (tons/yr)	Subject to PSD Permitting?
Nitrogen Oxides (NO_X)	759.4	40	Yes
Carbon Monoxide (CO)	435.0	100	Yes
Sulfur Dioxide (SO_2)	298.7	40	Yes
Particulate Matter (PM)	56.1	25	Yes
Particulate Matter (PM_{10})	56.1	15	Yes
Particulate Matter ($PM_{2.5}$)	56.1	10	Yes
Volatile Organic Compounds (VOCs)	59.8	40	Yes
Lead (Pb)	0.65	0.6	Yes
Fluorides	13.6	3	Yes
Sulfuric Acid Mist (SAM)	95.2	7	Yes
MWC Organics (as Dioxins/Furans)	6.1E-05	3.5E-06	Yes
MWC Metals (as PM)	56.1	15	Yes
MWC Acid Gases (as SO_2 & HCl)	440.4	40	Yes
Mercury [(1)]	0.070	Not applicable	No

[(1)] Mercury is not a regulated pollutant under the federal PSD program. However, mercury emissions are provided in recognition of its importance and that it was formerly a listed pollutant in Florida's PSD regulation.

Pre-construction approval under the PSD permitting program is contingent upon demonstrating compliance with the following criteria:

- A demonstration that Best Available Control Technology (BACT) will be applied on a pollutant-specific basis to each emission unit that will have the potential to emit one or more pollutants subject to PSD review.
- A demonstration that both PSD increments and the NAAQS will not be violated as a result of the proposed facility's operations.
- A demonstration that no adverse impacts associated with the operation of the proposed facility are expected at any nearby Class I area and an analysis that shows that the proposed project will have no adverse impact on soils, vegetation, visibility, and other air quality related values.

For each affected emission unit, a BACT analysis was performed with respect to each pollutant subject to PSD review. Each BACT analysis was performed in accordance with the "top-down" approach recommended by USEPA. With respect to emissions from the MWCs, the applicable New Source Performance Standards (NSPS) under 40 CFR 60,

Subpart Eb establish a baseline for determining BACT. For the MWCs, the air pollution control technologies and emission limits proposed to meet BACT requirements are summarized below and in Table ES-2.

- Selective non-catalytic reduction (SNCR) for control of NO_x emissions
- A spray dryer absorber (SDA) in combination with a fabric filter (FF) for reducing emissions of acid gases, including sulfur dioxide (SO_2), hydrogen chloride (HCl), fluorides, and sulfuric acid mist (SAM)
- Control of MWC metals and particulate matter (PM, PM_{10}, $PM_{2.5}$) emissions by a FF system
- Adherence to good combustion practices (GCP) to minimize products resulting from incomplete combustion including carbon monoxide (CO), volatile organic compounds (VOCs) and MWC organics (dioxins/furans)
- An activated carbon injection (ACI) system with a fabric filter (FF) for control of mercury emissions

The proposed PBREF2 will be relatively unique. It will be the first new WTE facility constructed in the United States in approximately 15 years. More importantly, the proposed emission limits for the new facility's emissions of NO_x, SO_2 and mercury are lower than the most stringent permit limits specified for these pollutants from any MWC unit currently operating in the United States.

Table ES-2:
MWC Emission Limits and BACT Summary

Pollutant	Emission Limit (at 7% oxygen)	Control Technology	Basis
Nitrogen Oxides (NO_x)	100 ppm_{vd} (24-hr); 85 ppm_{vd} (12-month)	Selective Non-Catalytic Reduction	BACT
Sulfur Dioxide (SO_2)	24 ppm_{vd} (24-hr) or 80% reduction	Spray Dryer Absorber (with Fabric Filter)	
Hydrogen Chloride (HCl)	20 ppm_{vd} or 95% reduction		
Fluorides (as HF)	3.5 ppm_{vd}		
Sulfuric Acid Mist (SAM)	5 ppm_{vd}		
Particulate Matter (PM)	12 mg/dscm[(1)]	Fabric Filter	
Particulate Matter (PM_{10},$PM_{2.5}$)	12 mg/dscm[(1)]		
Lead (Pb)	140 μg/dscm		BACT, NSPS[(2)]
Cadmium (Cd)	10 μg/dscm		NSPS[(2)]
Carbon Monoxide (CO)	100 ppm_{vd} (4-hr); 80 ppm_{vd} (30-day)	Good Combustion Practices	BACT, NSPS[(2)]
Volatile Organic Compounds (VOCs as propane)	7 ppm_{vd}		BACT
MWC Organics (as Dioxins/Furans)	13 ng/dscm		BACT, NSPS[(2)]
Mercury	25 μg/dscm or 85% reduction (quarterly test); 15 μg/dscm (12-month)	Activated Carbon Injection (with Fabric Filter)	BACT[(3)]

(1) Compliance with proposed emission limits for PM, PM_{10} and $PM_{2.5}$ are to be demonstrated by testing for PM in accordance with USEPA Method 5.

(2) NSPS refers to the New Source Performance Standards for large MWCs under 40 CFR 60, Subpart Eb.

(3) Although mercury is not a regulated pollutant under the PSD program, a BACT analysis was performed for mercury in recognition of the importance of minimizing mercury emissions. The short-term and annual mercury emission limits are lower than the most stringent mercury emission limit permitted for a MWC in the United States.

BACT analyses were also performed for the affected ancillary equipment including lime and carbon storage silos and emergency (standby) equipment consisting of two diesel fire pumps and an emergency generator. FF dust collection systems were selected as BACT to control PM emissions from the storage silos. For the diesel fire pumps and the emergency generator, BACT was concluded to be good combustion practices and engine design and the use of ultra low sulfur diesel fuel to meet applicable USEPA emission standards for compression ignition stationary internal combustion engines. Since the proposed facility will incorporate an air-cooled condenser to provide dry cooling of steam exiting the steam turbine generator in lieu of a wet cooling tower, PM emissions typically associated with the operation of a wet cooling tower will be avoided. Therefore, a BACT analysis was not required for this equipment.

An air quality analysis was performed based on atmospheric dispersion modeling to evaluate emissions associated with the operation of the proposed facility. A Class II area impact analysis was completed and it indicates that the impacts from the PBREF2 will be less than the established PSD significance levels for all pollutants. The analysis demonstrates that the Class II PSD increments and NAAQS will not be exceeded and a full impact analysis considering other emission sources in the project area is not required. To address impacts at federally protected Class I areas, an analysis was performed to evaluate impacts at the Everglades National Park (Class I area) as requested by the National Park Service (NPS), which serves as the Federal Land Manager (FLM) for the park. Additionally, a dispersion modeling analysis was performed at the Biscayne Bay National Park (Class II area) as requested by the NPS. The analyses performed for both the Everglades National Park and Biscayne Bay National Park demonstrate that the impacts from the PBREF2 will be below Class I area significance levels and will not adversely impact air quality related values (AQRVs) within the parks. Lastly, an additional impact analysis was conducted to determine impacts on soils, vegetation, visibility, and from growth associated with the project. The additional impact analysis indicates that no adverse impacts are expected to result from the proposed project.

1. Introduction

The Solid Waste Authority of Palm Beach County (the Authority) is proposing to expand its waste processing capacity by constructing a new mass-burn waste-to-energy (WTE) facility, the Palm Beach Renewable Energy Facility No. 2 (PBREF2), in West Palm Beach, Florida. This project will increase the Authority's solid waste processing capacity by 3,000 tons per day (tpd) and will be constructed adjacent to the Authority's existing renewable energy facility, which is known as the North County Resource Recovery Facility (NCRRF) and is located at the Authority's 1,320 acre Palm Beach Renewable Energy Park (PBREP). In addition to the NCRRF, which is a refuse-derived fuel (RDF) facility with a nominal design capacity of 2,000 tpd of MSW (approximately 1,800 tpd of RDF), the PBREP presently includes RCRA Subtitle D (Florida Class I and Class III) landfills, a biosolids pelletizer facility, and a compost facility. The planned operations at the PBREF2 will complement services that are currently provided at the PBREP and will enhance the Authority's 2006 Integrated Solid Waste Management Plan (ISWM Plan) to develop a system of programs and facilities to effectively and economically manage solid waste through source reduction, recycling, composting, combustion and landfilling. Further, the ISWM Plan specifically calls for the expanded combustion capacity in order to extend the life of the existing Class I landfill beyond its currently anticipated lifespan.

The construction and operation of the existing NCRRF at the Authority's PBREP has been reviewed and approved pursuant to the Florida Electrical Power Plant Siting Act (PPSA), Sections 403.501 - 403.518, Florida Statutes. The construction and operation of the new PBREF2 also will be reviewed pursuant to the PPSA because, among other things, this new facility will increase the steam electrical generating capacity of the Authority's PBREP.

The PBREF2 will consist of three nominal 1,000 tpd municipal waste combustor (MWC) units and associated ancillary equipment to provide an additional solid waste processing capacity of 3,000 tpd. State-of-the art air pollution control systems will be implemented on the new MWCs to minimize air pollutant emissions and continuous emissions monitoring equipment will be operated to ensure on-going compliance with federal and state air quality regulations. In accordance with state and federal air quality permitting requirements, the PBREP is classified as an existing major source of air pollutant emissions (based on emissions associated with the NCRRF) and potential emissions from the proposed PBREF2 are considered significant with respect to the New Source Review (NSR) permitting program. Consequently, the project is subject to Prevention of Significant Deterioration (PSD) permitting requirements under the NSR program.

1.1. Purpose of This Project

Palm Beach County has experienced substantial population growth and associated growth in waste generation. In 2007, the population of Palm Beach County was approximately 1,295,033 as estimated by the University of Florida Bureau of Economic and Business Research. By 2030, the population is projected to increase by approximately 20 percent to 1,556,800. Building a new 3,000 tpd WTE facility will help address the increased municipal solid waste (MSW) generation associated with the growing population and it will increase the Authority's overall waste processing capacity by an estimated 1 million tons per year of MSW. The planned PBREF2 also will help extend the life of the Authority's Class I landfill because the PBREF2 will reduce the volume of MSW placed in the landfill by approximately 90 percent.

1.2. PSD Permit Application Overview

This air quality permit application has been prepared to obtain approval from the Florida Department of Environmental Protection (FDEP) for the issuance of a PSD permit, which will authorize the Authority to construct the PBREF2. To address federal NSR and state of Florida air quality permitting requirements, this PSD permit application includes the following information and analyses:

- Project Description (Section 2.0) – presents descriptive information on the PBREF2 including the MWC units, air pollution control equipment, and ancillary equipment to be installed.
- Emissions Summary (Section 3.0) – provides maximum estimated air pollutant emission rates expected from the MWC units and ancillary equipment.
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- Emission Calculations (Appendix B) – provides detailed emission calculations for the planned MWC units and ancillary equipment.
- Materials Separation Plan Documentation (Appendix C) – presents the preliminary and final draft versions of the Authority's Materials Separation Plan and public review information.

- Air Pollution Control Equipment Cost Estimates (Appendix D) – provides the cost estimates used to evaluate the economic impacts of technically feasible air pollution control alternatives in the BACT analysis.

- RACT/BACT/LAER Clearinghouse Information (Appendix E) – presents summaries of the control technology determinations made by permitting authorities nationwide for recently permitted MWCs and the ancillary equipment planned for the PBREF2.

- Air Quality Modeling Report (Appendix F) – describes the atmospheric dispersion modeling analyses completed to demonstrate that the operation of the PBREF2 will not adversely impact ambient air quality or the local environment.

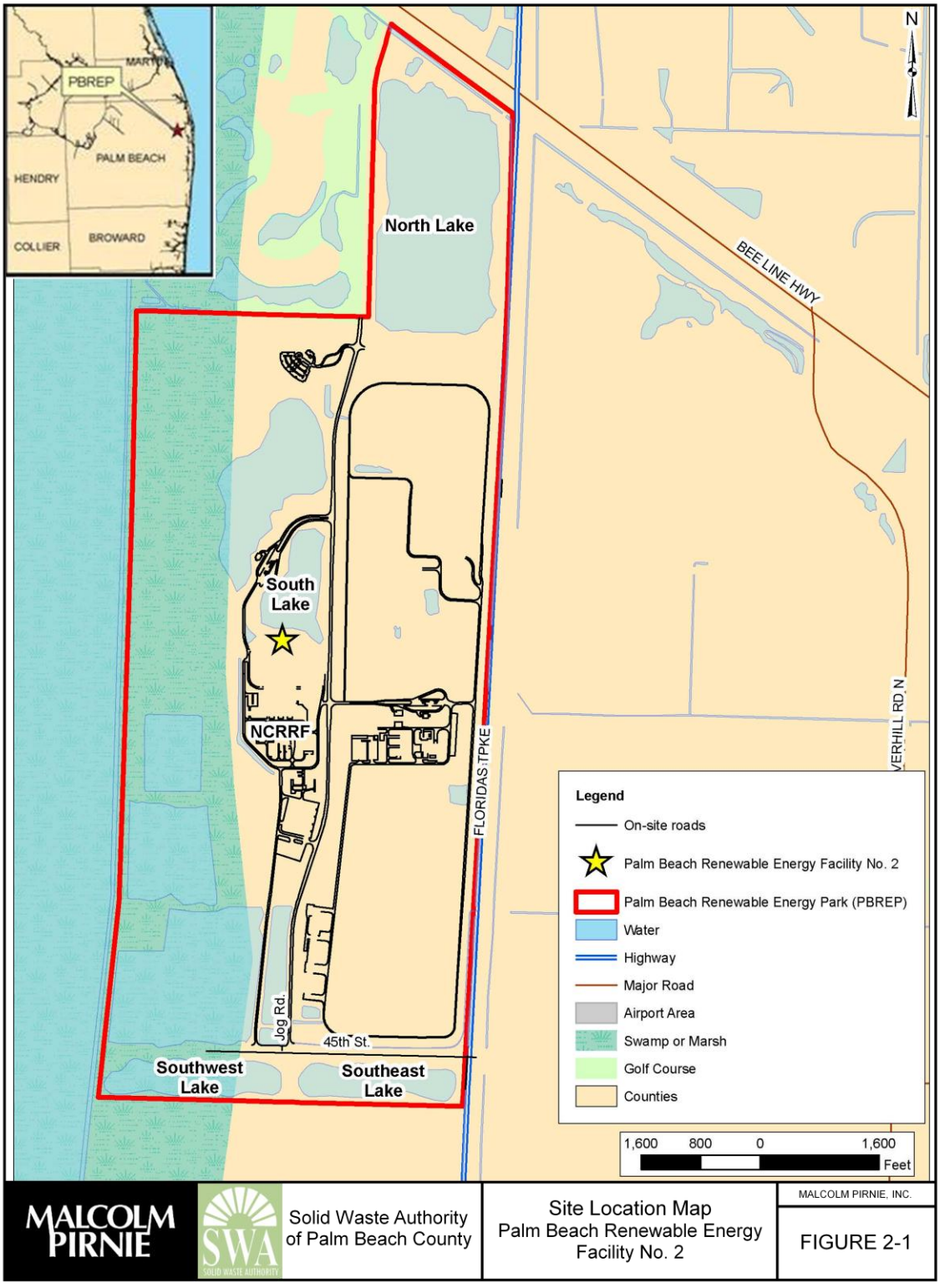
2. Project Description

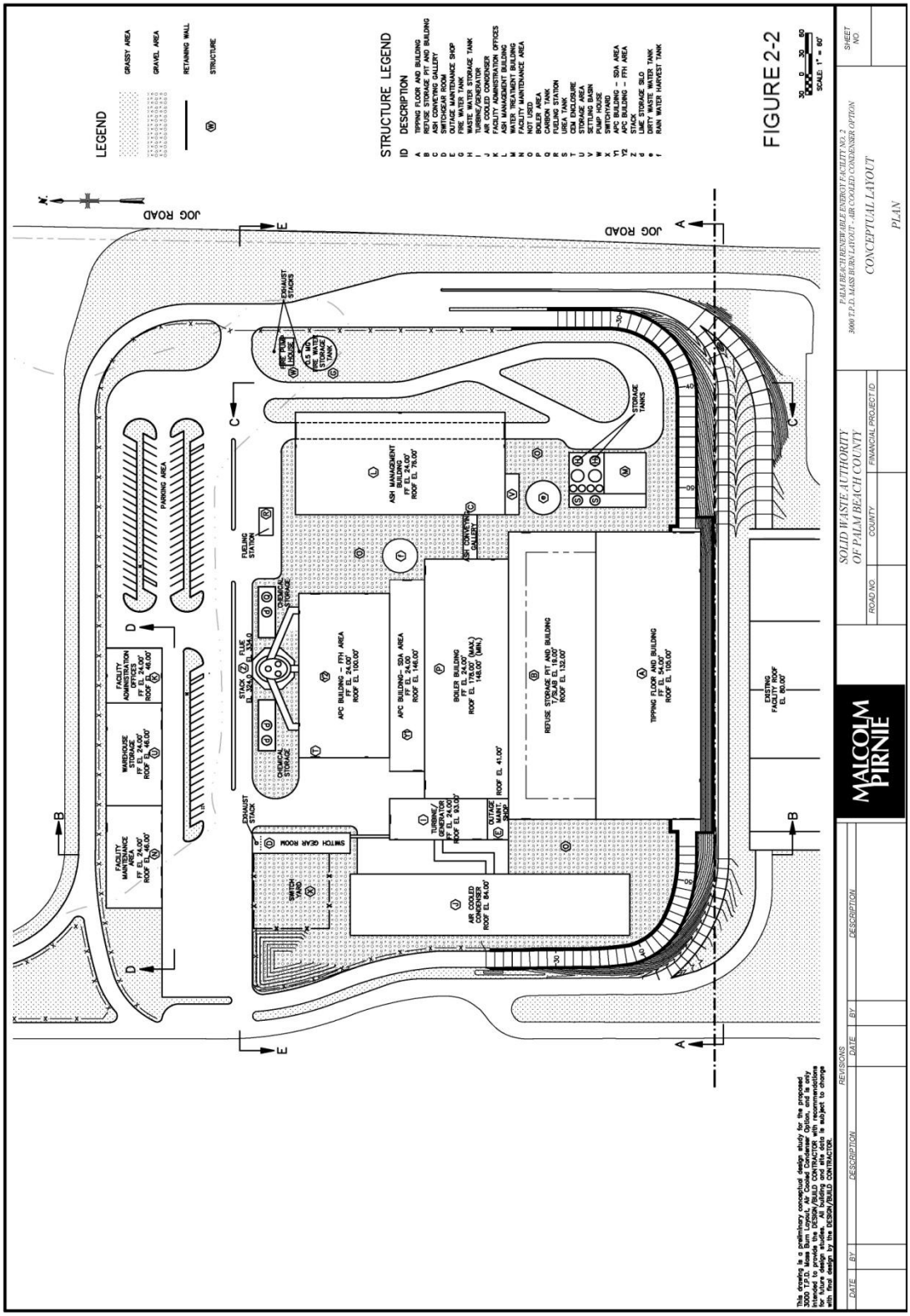
This project involves the construction of a new WTE facility, the PBREF2, at the Authority's existing PBREP in West Palm Beach, Florida. New MWC units with a combined waste processing capacity of 3,000 tpd, associated air pollution control systems, and ancillary equipment to support facility operations will be installed. The PBREF2 will use mass-burn technology, which will require very minimal front-end processing of the MSW other than to separate and remove large objects that could impair the feed system. This section provides descriptions of the site location as well as the MWC units, associated air pollution control systems, and ancillary equipment planned for the PBREF2.

2.1. Site Description

The PBREF2 is planned for location within the Authority's existing PBREP near 6501 Jog Road in West Palm Beach. Figure 2-1 is a site location map for the planned facility and it shows that the PBREF2 will be located directly north of the existing NCRRF. Direct access to the project site is provided along Jog Road, a north-south highway, which can be reached via 45th Street (State Road 705) from the south, and via Bee Line Highway (State Road 710) from the north. Developed and undeveloped land owned by the Authority provides sizeable buffers around the project site to the north, south, east and west.

A site plan for the PBREF2 showing the major buildings and features expected to be constructed is presented as Figure 2-2. As depicted in Figure 2-2, the major structures to be constructed at the site include tipping and refuse storage pit areas, as well as boiler, air pollution control, ash management, air cooled condenser and turbine-generator buildings. Additionally, the facility is expected to include an ash conveyor enclosure, chemical storage area, maintenance and administrative buildings, warehouse/spare parts storage building, an electrical switchyard and switch gear room. The MWCs and other emissions generating equipment planned for the facility are described in the sections below.


PBREP
MARTIN
PALM BEACH
HENDRY
COLLIER
BROWARD
N
North Lake
BEE LINE HWY
South Lake
NCRRF
FLORIDAS TPKE
VERHILL RD N
Jog Rd.
45th St.
Southwest Lake
Southeast Lake
Legend
On-site roads
Palm Beach Renewable Energy Facility No. 2
Palm Beach Renewable Energy Park (PBREP)
Water
Highway
Major Road
Airport Area
Swamp or Marsh
Golf Course
Counties
1,600 800 0 1,600
Feet
MALCOLM PIRNIE
Solid Waste Authority of Palm Beach County
Site Location Map
Palm Beach Renewable Energy Facility No. 2
MALCOLM PIRNIE, INC.
FIGURE 2-1


LEGEND
GRASSY AREA
GRAVEL AREA
RETAINING WALL
STRUCTURE
STRUCTURE LEGEND
ID DESCRIPTION
TIPPING FLOOR AND BUILDING
REFUSE STORAGE PIT AND BUILDING
ASH CONVEYING GALLERY
SWITCHGEAR ROOM
CUSTODIAL/STORAGE SHOP
FIRE WATER TANK
WASTE WATER STORAGE TANK
TURBINE/GENERATOR
AIR COOLED CONDENSER
FACILITY ADMINISTRATION OFFICES
ASH MANAGEMENT BUILDING
WATER TREATMENT BUILDING
FACILITY MAINTENANCE AREA
NOT USED
BOILER AREA
CAUSTIC TANK
FUELING STATION
UREA TANK
CEM ENCLOSURE
STACK
SETTLING BASIN
PUMP HOUSE
SWITCHYARD
APC BUILDING – SDA AREA
APC BUILDING – FFH AREA
STACK
LIME STORAGE SILO
DEMIN WATER STORAGE TANK
RAIN WATER HARVEST TANK
FIGURE 2-2
SCALE: 1" = 60'
JOG ROAD
PARKING AREA
FUELING STATION
CHEMICAL STORAGE
STACK EL 334.0 FLUE
EXHAUST STACK
SWITCH GEAR ROOM
SWITCH YARD
FACILITY ADMINISTRATION OFFICES FF EL 24.00' ROOF EL 48.00'
WAREHOUSE STORAGE FF EL 24.00' ROOF EL 48.00'
FACILITY MAINTENANCE AREA FF EL 24.00' ROOF EL 48.00'
ASH MANAGEMENT BUILDING FF EL 24.00' ROOF EL 78.00'
ASH CONVEYING GALLERY
APC BUILDING – FFH AREA FF EL 24.00' ROOF EL 100.00'
APC BUILDING – SDA AREA FF EL 24.00' ROOF EL 148.00'
BOILER BUILDING FF EL 24.00' ROOF EL 178.00' (MAX.) ROOF EL 148.00' (MIN.)
TURBINE/ GENERATOR FF EL 24.00' ROOF EL 93.00'
OUTAGE MAINT. SHOP
ROOF EL 41.00'
REFUSE STORAGE PIT AND BUILDING TIPPING FF EL 24.00' ROOF EL 132.00'
TIPPING FLOOR AND BUILDING FF EL 24.00' ROOF EL 105.00'
AIR COOLED CONDENSER ROOF EL 64.00'
EXISTING FACILITY ROOF EL 80.00'
STORAGE TANKS
FIRE PUMP HOUSE
A.G.S. NO. 2 FIRE WATER STORAGE TANK
EXHAUST STACKS
SOLID WASTE AUTHORITY OF PALM BEACH COUNTY
ROAD NO. COUNTY FINANCIAL PROJECT ID
PALM BEACH RENEWABLE ENERGY FACILITY NO. 2
3000 T.P.D. MASS BURN LAYOUT - AIR COOLED CONDENSER OPTION
CONCEPTUAL LAYOUT
PLAN
SHEET NO.
MALCOLM PIRNIE
DATE BY DESCRIPTION
REVISIONS
DATE BY DESCRIPTION
This drawing is a preliminary conceptual design study for the proposed 3000 T.P.D. Mass Burn Logistic, Air Cooled Condenser Option, and is only intended to illustrate the concepts discussed herein. It is not to be used for future design studies. All building and site data is subject to change with final design by the DESIGN/BUILD CONTRACTOR.

2.2. Municipal Waste Combustors (MWCs) and Air Pollution Control Systems

Multiple MWC units will be installed at the PBREF2 to provide a total MSW throughput capacity of 3,000 tpd. Three identical MWC units, each with a nominal rated MSW processing capacity of 1,000 tpd, are planned for installation at the facility. The MWCs will be mass-burn, continuous feed, stoker/grate type combustion units. Each MWC will be designed to have a maximum continuous heat input rating of 416.7 MMBtu/hr and a maximum peak (short-term) heat input rating of approximately 458.3 MMBtu/hr. An overhead bridge crane located above the refuse storage pit will mix, stack, and convey the MSW to the charging hoppers, which will subsequently feed the MWC stokers. Combustion will occur in a controlled furnace combustion system that automatically adjusts the waste feed rate and combustion air to optimize conditions for obtaining the desired steam flows. Air from the tipping floor will be maintained under negative pressure and will be used as makeup air for the combustion process, thereby minimizing odors and fugitive emissions. A natural gas-fired auxiliary burner system will be included as part of the combustion system to be used on a limited basis during periods of start-up and shutdown operations and to maintain good combustion conditions.

Each combustor will be followed by a steam-generating system consisting of a water wall radiant section, a superheater and a convection section, as well as an economizer. Steam generated by the MWCs will be directed to a highly efficient steam turbine generator set and an air-cooled condenser assembly. The turbine generator will have an estimated power output rating in the range of 90-100 megawatts (MW). The electricity generated will provide the internal electricity required for facility operations and the excess electricity will be exported for sale to the utility grid.

Air pollutant emissions from the MWCs will be minimized through a combination of good combustion practices (GCP) and air pollution control systems. Separate air pollution control systems will be installed for each MWC and the treated exhaust gas streams will discharge to the atmosphere through identical sized flues, which will be co-located in an enclosed outer concrete stack. Nitrogen oxides (NO_x) emissions will be controlled by selective non-catalytic reduction (SNCR). Emissions of acid gases, including sulfur dioxide (SO_2) and hydrogen chloride (HCl), will be reduced by a spray dryer absorber (SDA) in combination with a fabric filter (FF) baghouse. Additionally, metals and other particulate matter (PM) emissions will be controlled by the FF device. An activated carbon injection (ACI) system will be operated for control of mercury emissions. GCP will be utilized to minimize products resulting from incomplete combustion such as carbon monoxide (CO), volatile organic compounds (VOCs) and trace organic compounds. The air pollution control systems planned for the facility are considered state-of-the-art air pollution control systems and have been proven to be

effective in reducing air pollutant emissions from MWCs at WTE facilities located throughout the United States.

A simplified process flow diagram for the proposed facility is presented as Figure 2-3. A single MWC and associated air pollution control equipment train is shown in this figure. As discussed above, the facility will include three identical 1,000 tpd MWC units with dedicated air pollution control systems to process a combined 3,000 tpd of MSW throughput.

2.3. Ancillary Equipment

In addition to the new MWC units and associated air pollution control systems described above, supporting equipment will be installed as part of the project. This ancillary equipment includes a dry cooling tower (air-cooled condenser), lime and carbon storage silos, ash handling equipment, two diesel fire water pumps and an emergency generator. This equipment is further described in the sections below.

2.3.1. Air-Cooled Condenser

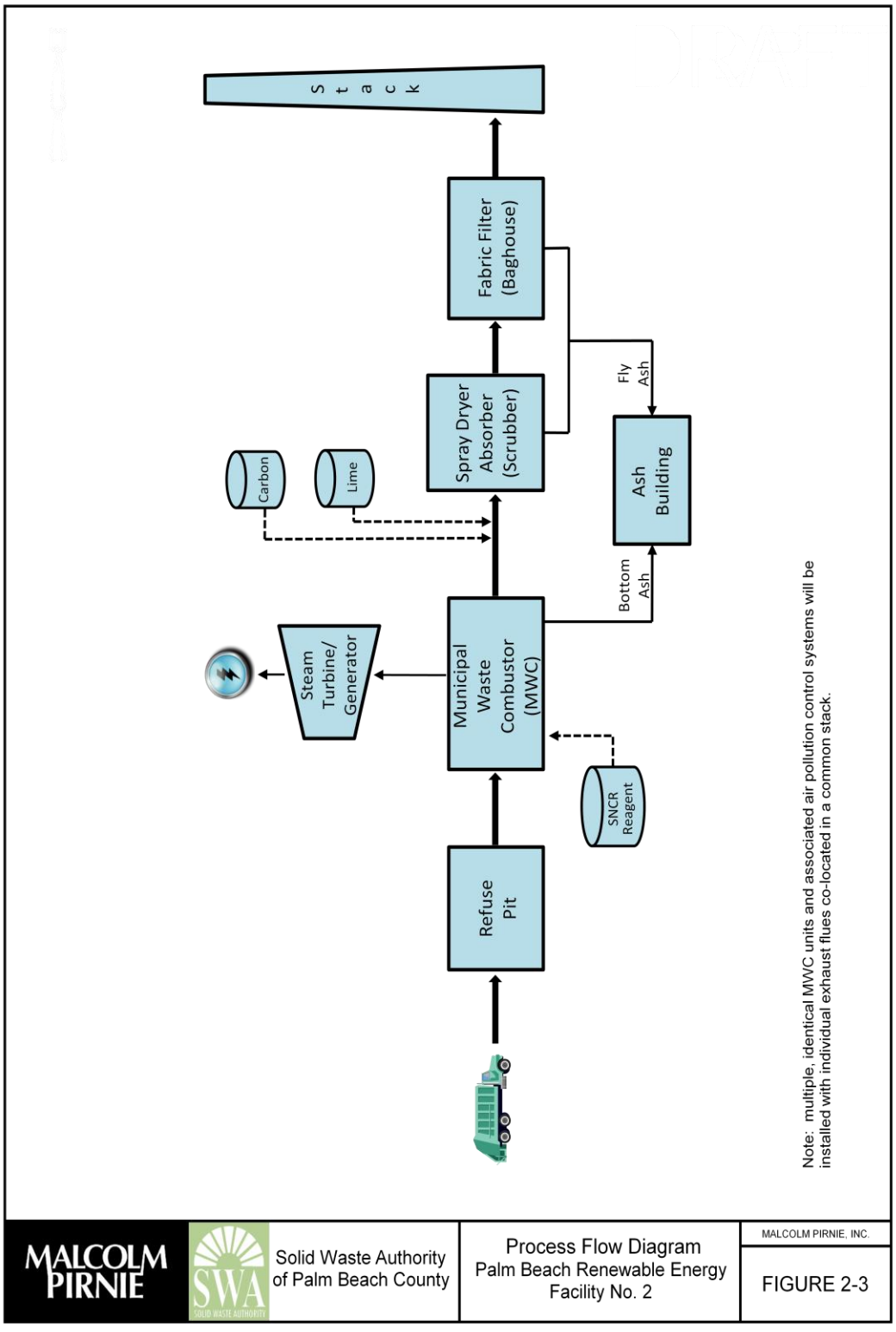
An air-cooled condenser will be installed at the PBREF2 to provide dry cooling of the exhaust steam from the turbine generators. The air-cooled condenser will convert steam exiting the turbine generator to the liquid phase. The condensed water will be collected and recycled back to the boiler water feed stream. Dry cooling in an air-cooled condenser provides significant environmental related advantages compared with wet cooling tower systems, including elimination of issues often associated with makeup water supply and blowdown disposal. Further, particulate matter emissions attributed to drift from a wet cooling tower (in which direct contact water is used as the cooling medium) are avoided in an air-cooled condenser.

2.3.2. Lime Silos

Lime will be used as the reagent in the SDA systems for control of acid gas emissions. To provide storage of the lime at the PBREF2, three lime silos will be installed. Lime will be delivered to the facility via truck shipment. Particulate matter emissions from the lime silos will be reduced by a fabric filter.

2.3.3. Carbon Silo

Carbon will be used as the reagent in the ACI systems to reduce mercury emissions from the MWCs. A single carbon silo will be installed to store the carbon at the proposed PBREF2. Similar to lime as indicated above, carbon will be delivered to the facility by truck shipment. The carbon silo will be equipped with a fabric filter to minimize particulate matter emissions.


Stack
Fabric Filter (Baghouse)
Spray Dryer Absorber (Scrubber)
Fly Ash
Ash Building
Carbon
Lime
Bottom Ash
Steam Turbine/ Generator
Municipal Waste Combustor (MWC)
SNCR Reagent
Refuse Pit
Note: multiple, identical MWC units and associated air pollution control systems will be installed with individual exhaust flues co-located in a common stack.
MALCOLM PIRNIE
SWA
Solid Waste Authority of Palm Beach County
Process Flow Diagram
Palm Beach Renewable Energy Facility No. 2
MALCOLM PIRNIE, INC.
FIGURE 2-3

2.3.4. Ash Handling

Ash handling equipment will be installed at the PBREF2 to manage the ash residue from the combustion process (bottom ash) and the fly ash collected by the air pollution control equipment. The collected ash will be transferred from the boiler and air pollution control buildings to the ash management building via an enclosed conveyor. The collected ash will be combined and quenched with water. The ash management building will contain ash processing equipment including ferrous and non-ferrous recovery systems. Since the ash will be wetted to a moisture content level in the approximate range of 20 to 25 percent, fugitive particulate matter emissions from the ash handling equipment are expected to be negligible. To further minimize particulate matter emissions from the ash handling equipment, exhaust air from the ash management building will be routed to a fabric filter control device prior to discharge to the atmosphere.

2.3.5. Diesel Fire Pumps

Two diesel fire pumps will be installed at the planned facility. These fire pumps will be standby units and will serve to provide power to pump water for fire suppression purposes in the event of an emergency situation. The fire water pumps are each expected to be powered by a nominal 250 horsepower (HP) diesel-fired engine.

2.3.6. Emergency Generator

To provide limited back-up power to the facility in the event of an electrical power failure, a diesel-fired emergency generator will be installed. The generator will be operated in emergency situations to provide safe shutdown of the facility and to provide power to the control room and administration building. The emergency generator is planned to have a nominal 250 kilowatt (kW) power output rating.

3. Emissions Summary

Emissions of regulated air pollutants will result from the operation of the MWC units and ancillary equipment to be installed at the PBREF2. There will be no increases in emissions from the existing MWCs at the NCRRF or other emission units at the PBREP as a result of the planned operations of the proposed facility. Emission estimates have been prepared for the emissions generating equipment and are summarized at the end of this section in Table 3-1. Detailed emission calculations are provided in Appendix B and each emissions unit and emissions generating activity is described below.

3.1. Municipal Waste Combustors (MWCs)

The operation of the MWCs will be the primary source of emissions at the PBREF2. Three identical MWC units, each with a nominal MSW processing capacity of 1,000 tpd will be installed. Emissions of regulated pollutants resulting from the combustion of municipal solid waste in a MWC include NO_x, SO_2, VOCs, CO, PM, and MWC organics, acid gases and metals. Maximum annual emissions were calculated based on 100 percent of the maximum continuous rating (MCR) anticipated for the MWCs (corresponding to a maximum continuous heat input rate of 416.7 MMBtu/hr) and conservatively assuming 8,760 hours per year of operation at the maximum expected emission concentrations. To account for short-term peak operations, maximum hourly emissions were conservatively calculated based on 110 percent of the MCR (corresponding to a maximum peak heat input rate of 458.3 MMBtu/hr). Detailed emission calculations for the MWCs are provided in Appendix B and the MWC emission estimates (provided as combined annual totals for all units) are summarized at the end of this section in Table 3-1.

The maximum emission levels proposed for the MWCs reflect the latest advancements in air pollution control technologies demonstrated to effectively reduce emissions from MWCs and have been reviewed as design criteria by qualified WTE facility contractors. Further, the proposed emission levels are either equivalent to or are more stringent than the applicable New Source Performance Standards (NSPS) for large MWCs and are based on the pollutant-specific control technology analyses completed to satisfy Best Available Control Technology (BACT) requirements. The NSPS for large MWCs and the BACT analyses are addressed in Sections 4.3 and 5.0, respectively.

3.2. Ancillary Equipment

In addition to the MWC units, ancillary equipment will be installed at the planned facility. Maximum expected emissions from the ancillary equipment are summarized at

the end of this section in Table 3-1 and detailed emissions calculations are provided in Appendix B.

3.2.1. Lime Silos

Three lime silos will be installed to provide storage of the lime reagent for the SDA air pollution control systems associated with the MWCs at the PBREF2. PM emissions will result during the intermittent filling of the silos during truck delivery events. However, PM emissions from the lime silos are expected to be very low since the exhaust air from each silo will be vented through a fabric filter. Maximum expected emissions from the lime silos were calculated based on a projected lime delivery frequency as shown in the emission calculations presented in Appendix B.

3.2.2. Carbon Silo

A carbon silo will be installed at the proposed facility to store the carbon required for the activated carbon injection systems, which will be used to reduce mercury emissions from MWC operations. PM emissions will be generated from the intermittent filling of the carbon silo during truck delivery events. To reduce PM emissions, the storage silo will be equipped with a fabric filter. Maximum expected emissions from the carbon silo were calculated based on a projected carbon delivery frequency as indicated in the emission calculations presented in Appendix B.

3.2.3. Diesel Fire Pumps

Two diesel fire pumps each with a nominal 250 HP rating will be installed at the PBREF2 to provide water for fire suppression purposes in emergency situations. The fire pump engines will exclusively use ultra low sulfur diesel fuel and will be certified by the manufacturer to meet applicable federal emission standards for compression ignition internal combustion engines. Maximum annual emissions were calculated on the basis that the fire pumps would use ultra low sulfur diesel fuel (sulfur content of 15 ppm_w) and would each operate 100 hours per year for purposes of maintenance and readiness testing.

3.2.4. Emergency Generator

A diesel-fired emergency generator with a nominal 250 kW rating will be installed at the PBREF2 to be used in emergency situations. Similar to the diesel fire pumps as described above, the emergency generator will use only ultra low sulfur diesel fuel and will be certified by the manufacturer to meet applicable federal emission standards for compression ignition internal combustion engines. Maximum annual emissions for the emergency generator were calculated assuming the generator would operate an estimated 100 hours per year for maintenance purposes and readiness testing.

Table 3-1:
Summary of Emission Estimates for PBREF2

Pollutant	Maximum Annual Emissions (tons/yr)				
	MWCs	Silos	Diesel Fire Pumps	Emergency Generator	Total
Nitrogen Oxides (NO_X)	759.06	---	0.140	0.146	759.4
Carbon Monoxide (CO)	434.86	---	0.066	0.088	435.0
Sulfur Dioxide (SO_2)	298.66	---	2.75E-04	2.04E-04	298.7
Hydrogen Chloride (HCl)	141.72	---	---	---	141.7
VOCs	59.79	---	3.42E-03	5.77E-03	59.8
Particulate Matter (PM)*	56.08	0.036	6.12E-03	3.28E-03	56.1
Particulate Matter (PM_{10}, $PM_{2.5}$)*	56.08	0.036	6.12E-03	3.28E-03	56.1
Lead (Pb)	0.65	---	---	---	0.65
Fluorides (as HF)	13.59	---	---	---	13.6
Sulfuric Acid Mist (SAM)	95.22	---	---	---	95.2
MWC Organics (as Dioxins/Furans)	6.08E-05	---	---	---	6.08E-05
Mercury (Hg)	0.070	---	---	---	0.070
Cadmium (Cd)	0.047	---	---	---	0.047
Ammonia Slip	49.50	---	---	---	49.5

* PM, PM_{10} and $PM_{2.5}$ maximum annual emissions from the MWCs are based on emissions of PM as measured in accordance with USEPA Method 5.

4. Regulatory Assessment

The proposed construction and operation of the PBREF2 is subject to both federal and state air quality regulations. These regulations impose pre-construction permitting requirements on the proposed facility and prescribe emission standards relative to the air pollutant emissions anticipated from the facility's operations. The air quality standards and regulations that are applicable to this project include the following:

- National Ambient Air Quality Standards (NAAQS) established by the U.S. Environmental Protection Agency (USEPA) for criteria pollutants.
- New Source Review (NSR) permitting requirements for major sources under the federal Prevention of Significant Deterioration (PSD) regulations. The PSD regulations under 40 CFR §52.21 and Florida Administrative Code (F.A.C.) 62-212.400 are applicable on a pollutant-specific basis to new major sources and to major modifications at existing sources located in areas which are in attainment with one or more of the NAAQS.
- New Source Performance Standards (NSPS) which impose emission standards on new facilities (Clean Air Act Section 111, 40 CFR Part 60).
- National Emission Standards for Hazardous Air Pollutants (NESHAP) which impose control technology standards on major sources of hazardous air pollutant (HAP) emissions (40 CFR Part 63).
- State of Florida air quality requirements under F.A.C. Chapter 62.

Detailed discussions of these regulations as they pertain to the proposed facility are provided in the sections below.

4.1. National Ambient Air Quality Standards

The Clean Air Act Amendments of 1970 mandated that USEPA establish National Ambient Air Quality Standards (NAAQS) for six criteria pollutants. NAAQS have been established by USEPA for nitrogen oxides (as NO_2), carbon monoxide (CO), sulfur oxides (as SO_2), particulate matter (PM), ozone (O_3), and lead. With respect to PM emissions, NAAQS have been established for particle size categories less than or equal to 10 micrometers in diameter (PM_{10}) and less than or equal to 2.5 micrometers in diameter ($PM_{2.5}$).

Primary and secondary NAAQS have been established and each standard has a specified averaging period that coincides with public health and general welfare criteria. The

currently applicable NAAQS, as codified in 40 CFR Part 50, are summarized below in Table 4-1.

Table 4-1.
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary NAAQS	Secondary NAAQS	Averaging Period
Nitrogen Dioxide (NO_2)	0.053 ppm (100 μg/m^3)	0.053 ppm (100 μg/m^3)	Annual
	0.100 ppm (189 μg/m^3)	---	1-hour
Carbon Monoxide (CO)	9 ppm (10,000 μg/m^3)	---	8-hour
	35 ppm (40,000 μg/m^3)	---	1-hour
Sulfur Dioxide (SO_2)	0.030 ppm (80 μg/m^3)	0.030 ppm (80 μg/m^3)	Annual
	0.14 ppm (365 μg/m^3)	0.14 ppm (365 μg/m^3)	24-hour
	---	0.5 ppm (1300 μg/m^3)	3-hour
Particulate Matter (PM_{10})	150 μg/m^3	150 μg/m^3	24-hour
Particulate Matter ($PM_{2.5}$)	15 μg/m^3	15 μg/m^3	Annual
	35 μg/m^3	35 μg/m^3	24-hour
Ozone[(1)]	0.075 ppm (2008 std.)	0.075 ppm	8-hour
	0.08 ppm (1997 std.)	0.08 ppm	8-hour
	0.12 ppm	0.12 ppm	1-hour
Lead (Pb)	0.15 μg/m^3	0.15 μg/m^3	3-month rolling avg.
	1.5 μg/m^3	1.5 μg/m^3	Quarterly avg.

(1) The 1997 standard (and the implementation rules for that standard) will remain in place for implementation purposes as USEPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard. Also, USEPA is in the process of reconsidering the ozone standards with new standards expected to be promulgated in 2010. USEPA has revoked the 1-hour ozone standard in all areas, although some areas have continuing "anti-backsliding" obligations under the 1-hour ozone standard.

Primary NAAQS were established to protect public health, including the health of sensitive populations, such as the young, the elderly, and those with respiratory ailments. The primary NAAQS are intended to protect public health with an adequate margin of safety. Secondary NAAQS were established to protect public welfare, and the adoption of secondary NAAQS includes an evaluation of impacts to animals, crops and vegetation, visibility, and economic interests. Both the primary and secondary NAAQS are updated periodically to ensure that they are fully protective and based on the latest scientific information. Through the New Source Review (NSR) permitting program, proposed sources of air pollutant emissions must demonstrate that their potential emissions will not directly result in an exceedance of a NAAQS or contribute significantly to any violation of a NAAQS.

4.2. New Source Review Requirements

USEPA's pre-construction permitting program for proposed new sources and modifications to existing sources of air pollutant emissions is the New Source Review

(NSR) program. A primary objective of the NSR program is to create a permitting framework that supports compliance with the NAAQS. The USEPA tracks compliance with the NAAQS for each criteria pollutant by designating each air quality management area within a given state (and in some cases multi-state metropolitan areas) as either "attainment" if the area meets the NAAQS or "nonattainment" if the area does not meet the NAAQS. Thus, a separate determination of attainment status is made for each criteria pollutant. Consequently, a given area may have attainment status for some pollutants and nonattainment status for others. NSR includes two major source permitting programs, Prevention of Significant Deterioration (PSD) and Nonattainment NSR (NNSR). On a pollutant specific basis, PSD requirements apply in areas that are in attainment with the NAAQS, while NNSR permitting applies in areas not meeting the NAAQS. The PBREF2 is proposed for location in an area that is presently recognized as an attainment area for all pollutants (Palm Beach County and all of Florida is designated as attainment for all air pollutants as established by F.A.C. Section 62-204.340). Consequently, the proposed project is potentially subject only to PSD permitting requirements under the NSR program.

Pre-construction review under the PSD program applies on a pollutant-specific basis for major sources of air pollutant emissions. For the proposed project in recognition that the PBREP is presently classified as an existing major source (having emissions of a regulated pollutant equal to or greater than 100 tons per year based on emissions from the existing NCRRF), PSD review is required for each regulated pollutant with a net emissions increase (equivalent to potential emissions for new emission units) equal to or exceeding the applicable significant emission rate threshold. If one or more pollutant emission rates associated with the PBREF2 are equal to or exceed an applicable significant emission rate threshold, the project qualifies for review under the PSD program as a major modification to an existing source (i.e., the PBREP). The significant emission rates are defined in the federal PSD regulations under 40 CFR §52.21(b)(23)(i). Significant emission rate thresholds have been established for both criteria and noncriteria pollutants. Hazardous air pollutants (HAPs) previously regulated by the Section 112 National Emissions Standards for Hazardous Air Pollutants (NESHAP) program are now exempt from PSD applicability because these HAPs are now specifically regulated under Title III of the 1990 Clean Air Act Amendments.

4.2.1. PSD Applicability

As discussed above, PSD applicability is established based on an assessment of emissions associated with a given project and the existing status (major or minor source) of the subject emission source as defined by the PSD regulations. Table 4-2 shown below presents a summary of PSD pollutant applicability for the PBREF2 project. Table 4-2 is based on the emission estimates for the PBREF2, and it recognizes that the proposed project is not expected to result in any increases in the emissions from existing operations at the PBREP. Given the applicable significant emission rate thresholds, Table 4-2

indicates that the proposed facility is subject to PSD review for the following criteria and noncriteria pollutants:

- Nitrogen oxides (NO_x)
- Carbon monoxide (CO)
- Sulfur dioxide (SO_2)
- Particulate matter (PM, PM_{10} and $PM_{2.5}$)
- Volatile organic compounds (VOCs)
- Lead (Pb)
- Fluorides
- Sulfuric acid mist (SAM)
- MWC organics (as dioxins/furans), MWC metals (as PM) and MWC acid gases (as SO_2 & HCl)

Table 4-2.
PSD Pollutant Applicability Summary

Pollutant	Significant Emission Rate Threshold (tons/yr)	Net Emissions Increase [1] (tons/yr)	Subject to PSD Permitting?
Nitrogen Oxides (NO_x)	40	759.4	Yes
Carbon Monoxide (CO)	100	435.0	Yes
Sulfur Dioxide (SO_2)	40	298.7	Yes
Particulate Matter (PM)	25	56.1	Yes
Particulate Matter (PM_{10})	15	56.1	Yes
Particulate Matter ($PM_{2.5}$)	10	56.1	Yes
Volatile Organic Compounds (VOCs)	40	59.8	Yes
Lead (Pb)	0.6	0.65	Yes
Fluorides	3	13.6	Yes
Sulfuric Acid Mist (SAM)	7	95.2	Yes
Hydrogen Sulfide (H_2S)	10	Negligible[2]	No
Total Reduced Sulfur	10	Negligible[2]	No
Reduced Sulfur Compounds	10	Negligible[2]	No
MWC Organics (as Dioxins/Furans)	3.5E-06	6.1E-05	Yes
MWC Metals (as PM)	15	56.1	Yes
MWC Acid Gases (as SO_2 & HCl)	40	440.4	Yes

(1) The net emissions increase values shown are the estimated potential emissions associated with the proposed PBREF2. No increases in emissions are expected from existing operations at the PBREP.

(2) Emissions of hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds from the MWC units are expected to be negligible due to oxidizing conditions in the combustors.

4.2.2. PSD Requirements

The PBREF2 is subject to PSD permitting requirements as indicated above. To satisfy the requirements under the applicable PSD regulation, various analyses must be performed relative to control technology requirements and to ensure that the project will not have an adverse impact on ambient air quality. The following analyses are required under the PSD permitting program:

- Control technology analyses are required on a pollutant-specific basis to define Best Available Control Technology (BACT) for the project related emission units.
- An evaluation of ambient impacts is required with respect to PSD increments and the NAAQS resulting from the project related emissions increases. If

results from dispersion modeling analyses demonstrate that the proposed facility's impacts are below established PSD significance levels, then "full impact" (multi-source) PSD increment and NAAQS analyses considering emissions from other sources in the vicinity of the project site are not required.

- An evaluation of project related impacts with respect to PSD increments and Air Quality Related Values (AQRVs) at any Class I area within close proximity to the site is required. The federal land manager (FLM) for the closest Class I areas to the site is the National Park Service (NPS). The NPS was contacted and based on potential emissions levels and the distances to the Class I areas, the NPS indicated that analyses would be required for the Everglades National Park (NP). Consequently, Class I area impact analyses are required to demonstrate that no adverse impacts associated with the operation of the proposed facility are expected at the Everglades NP. In addition, the NPS has requested that dispersion modeling analyses be performed to evaluate impacts at Biscayne Bay National Park (a Class II area).

- An evaluation of project impacts on soils, vegetation, and visibility and an analysis of the air quality impacts relative to general commercial, residential, industrial and other growth associated with the proposed PBREF2 are required.

4.3. New Source Performance Standards

The New Source Performance Standards (NSPS) codified under 40 CFR Part 60 are national emission standards promulgated pursuant to Section 111 of the Clean Air Act for criteria and other designated pollutants. These provisions are applicable to new, modified, or reconstructed sources. NSPS regulations are adopted by reference as part of Florida's air quality rules under F.A.C. Section 62-204.800. The NSPS of primary importance for the PBREF2 project are the 40 CFR 60, Subpart Eb provisions applicable to new, large MWC units. In addition, the 40 CFR 60, Subpart IIII requirements for compression ignition internal combustion engines are applicable with respect to the emergency standby equipment (diesel fire pumps and emergency generator). The requirements associated with these regulations as applicable to the proposed project are summarized in the sections below.

4.3.1. New Source Performance Standards for Large MWCs Constructed after September 20, 1994 (40 CFR 60, Subpart Eb)

The 40 CFR 60, Subpart Eb provisions are applicable to large MWC units with a combustion capacity greater than 250 tons per day of municipal solid waste for which construction is commenced after September 20, 1994, or for which modification or reconstruction is commenced after June 19, 1996. Consequently, the Subpart Eb provisions are applicable to the MWC units to be installed at the PBREF2. Emission standards for various air pollutants, standards for operating practices and operator training, siting requirements (materials separation plan and siting analysis), and extensive

testing, monitoring, recordkeeping and reporting requirements are prescribed by the Subpart Eb regulation. The siting requirements under 40 CFR §60.57b specify that a materials separation plan and a siting analysis be prepared for the affected facility. Relative to these requirements, the draft materials separation plan and associated public review documentation are provided in Appendix C. The siting analysis component is satisfied by the completion of the various air quality (dispersion modeling) and air pollution control technology (BACT) analyses documented in this permit application and the pending public review process.

Emission standards under Subpart Eb are specified for metals, acid gases, organics, and nitrogen oxides and an emissions limit for carbon monoxide is included as an operating practice. A summary of these emission standards is provided in Table 4-3.

Table 4-3.
Emission Standards for New MWCs (40 CFR 60, Subpart Eb)

Pollutant	Emission Standard (corrected to 7% oxygen, dry basis) (1)
Particulate Matter (PM)	20 mg/dscm
Opacity	10%; 6-minute average
Cadmium (Cd)	10 μg/dscm
Lead (Pb)	140 μg/dscm
Mercury (Hg)	50 μg/dscm (or 85% reduction)
MWC Acid Gases - SO_2	30 ppm_v (or 80% reduction); 24-hour geometric average
MWC Acid Gases – HCl	25 ppm_v (or 95% reduction)
MWC Organics (as total dioxins/furans)	13 ng/dscm
Nitrogen Oxides (NO_x)	150 ppm_v; 24-hour arithmetic average (180 ppm_v for 1st year)
Carbon Monoxide (CO)	100 ppm_v; 4-hour average (for non-rotary, mass burn MWCs)
Fugitive Ash	Visible emissions from ash conveying system not to exceed 5% of the observation period (by EPA Method 22)

(1) Standards under 40 CFR 60.52b for units constructed after December 19, 2005, are listed as applicable to the new MWC units to be installed at the PBREF2.

Subpart Eb also provides that a MWC is not to be operated at a unit load level greater than 110 percent of the maximum load level that was attained during the most recent successful dioxin/furan performance testing. This unit load level restriction is applicable at all times except during the annual dioxin/furan or mercury performance testing and the two weeks preceding the annual dioxin/furan or mercury testing, provided that the load limit is waived in writing by the Administrator (FDEP) during these periods.

In recognition that the MWC emission standards can only be met under normal (steady-state) operating conditions with appropriate combustion control, the 40 CFR §60.58b(a) compliance provisions address periods of startup, shutdown, and malfunction (SSM).

During SSM events, the above emission standards do not apply for a duration limited to three hours per event. With respect to the CO emission limit, if a malfunction occurs due to a loss of boiler water level control or a loss of combustion air control, the duration is limited to 15 hours per event. During SSM periods, monitoring data is to be recorded for reporting purposes, but is to be excluded from compliance calculations.

As indicated above, the Subpart Eb provisions require extensive testing and monitoring to demonstrate that affected MWCs are operating in compliance with all applicable emissions standards. For certain pollutants, the operation of continuous emissions monitoring systems (CEMS) or continuous opacity monitoring systems (COMS) are required. For other pollutants, the facility has the option of either conducting annual performance tests or operating CEMS. Table 4-4 presents an overview of the testing and monitoring requirements prescribed under 40 CFR §60.58b.

Table 4-4.
Overview of Testing & Monitoring Requirements (40 CFR 60, Subpart Eb)

Parameter/Pollutant	Testing & Monitoring Requirements [(1)]
Oxygen (O_2) or Carbon Dioxide (CO_2)	• CEMS • Initial performance evaluation (Method 3, 3A, or 3B)
Particulate Matter (PM)	• Initial performance test (Method 5) • Annual performance tests (or CEMS)
Opacity	• COMS (6-minute average) • Initial performance test (Method 9) and annual performance tests
Cadmium (Cd), Lead (Pb), and Mercury (Hg)	• Initial performance test (Method 29) • Annual performance tests (or CEMS)
Sulfur Dioxide (SO_2)	• CEMS (24-hr daily geometric average of 1-hr average concentrations) • Initial performance test (Method 6, 6A, or 6C)
Hydrogen Chloride (HCl)	• Initial performance test (Method 26 or 26A) • Annual performance tests (or CEMS)
Dioxins/Furans	• Initial performance test (Method 23) • Annual performance tests
Nitrogen Oxides (NO_x)	• CEMS (24-hr daily average of 1-hr average concentrations) • Initial performance test (Method 7, 7A, 7C, 7D, or 7E)
Carbon Monoxide (CO)	• CEMS (4-hr block average of 1-hr average concentrations) • As an alternate to CEMS, can request use of CO_2 measurements
Fugitive Ash	• Initial performance test (Method 22) • Annual performance tests
MWC Load Level	• Establish highest 4-hour average unit load from most recent dioxin/furans performance testing • Continuously monitor steam flow or feed water flow
Temperature (at inlet to PM control device)	• Establish highest 4-hour average temperature from most recent dioxin/furans performance testing • Continuously monitor PM control device inlet temperature

Parameter/Pollutant	Testing & Monitoring Requirements [1]
Carbon Mass Feed Rate for Activated Carbon Injection (ACI) System	• Estimate average carbon feed rates during Hg and dioxin/furans performance testing from ACI system operating parameters (screw feeder speed, hopper volume/refill frequency, or other parameter) • Each quarter, estimate total carbon usage based on weight of carbon deliveries received and from ACI system parameters • Continuously monitor pneumatic injection pressure or other operational indicator (with audible and/or visual alarm) as an additional means to verify proper system operation

[1] Each CEMS must comply with applicable performance specifications and quality assurance procedures (initial performance evaluations, periodic relative accuracy tests, etc.) as specified under 40 CFR §60.58b.

4.3.2. Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (40 CFR 60, Subpart IIII)

The 40 CFR 60, Subpart IIII provisions are applicable to compression ignition (CI) internal combustion engines for which construction, modification or reconstruction commenced after July 11, 2005. Consequently, the Subpart IIII requirements are applicable to the standby diesel fire pumps and the emergency generator to be installed at the PBREF2. In accordance with §60.4205(c) of the Subpart IIII regulation, fire pump engines must comply with the prescribed emission standards in Table 4 of Subpart IIII. As specified by §60.4205(b) and §60.4202(a), the emergency generator must meet the applicable emission standards for new non-road CI engines. The compliance requirements specified by §60.4211(c) require purchasing an engine that is certified to meet the applicable emission standards. In addition, starting on October 1, 2010, diesel fuel meeting the applicable 40 CFR 80.510 fuel specifications for non-road diesel fuel is required. This fuel requirement specifies the use of diesel fuel with a maximum sulfur content of 15 ppm_w (ultra low sulfur diesel fuel).

The affected diesel engines are to be operated and maintained according to the manufacturer's written instructions or alternative procedures that are approved by the manufacturer. As affected emergency internal combustion engines, operation of the diesel fire pumps and emergency generator for maintenance and readiness checks is limited to 100 hours per year in accordance with the compliance provisions of §60.4211(e). However, the engines can be used for unlimited hours during emergency situations. To monitor engine usage, §60.4209(a) of the regulation specifies that a non-resettable hour meter must be installed on new engines prior to initial operation. Additionally, the recordkeeping provisions under §60.4214(b) require that records of engine operation recorded by the non-resettable hour meter are to be kept for all periods of emergency and non-emergency service for affected emergency engines that do not meet the emission standards applicable to non-emergency engines. If required, these records are to include the time of engine operation and operating purpose (emergency or non-emergency use) for each period of engine operation.

4.4. National Emission Standards for Hazardous Air Pollutants

The National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations were promulgated under Section 112 of the Clean Air Act in 1977 to identify and regulate specific listed substances including asbestos, benzene, beryllium, inorganic arsenic, mercury, radionuclides, and vinyl chloride. These original NESHAP regulations are included in 40 CFR Part 61. In 1990, the NESHAP program was amended. The amendments included designation of 189 substances as HAPs (subsequently amended to 187 substances), identification of source categories subject to control of HAPs, and establishment of control technology standards for HAPs. The control standards included in 40 CFR Part 63 are based on maximum achievable control technology (MACT) performance.

The NESHAP regulations promulgated by USEPA under 40 CFR Part 63 cover over 80 industrial source categories and are applicable to major sources of HAPs. A major source of HAP emissions is a source with emissions greater than 10 tons per year of any single HAP or 25 tons per year of combined HAPs. The proposed PBREF2 is considered a major source of HAP emissions based on potential emissions above major source HAP levels (due primarily to emissions of hydrogen chloride from the MWCs). In recognition that emission standards for MWCs have been promulgated under the 40 CFR Part 60, Subpart Eb and Subpart Cb provisions (as Section 111 standards for new units and Section 129 emission guidelines for existing units) reflecting MACT levels, there are no 40 CFR Part 63 NESHAP regulations applicable to the MWC units associated with the PBREF2 project.

The diesel fire pumps and emergency generator to be installed at the proposed facility are subject to the NESHAP provisions under 40 CFR 63, Subpart ZZZZ for Reciprocating Internal Combustion Engines (RICE). The 40 CFR 63, Subpart ZZZZ NESHAP regulation is commonly known as the RICE MACT rule. As emergency units each with a site rating of less than 500 brake HP, the diesel fire pumps and emergency generator must comply with the RICE MACT rule requirements by meeting the applicable 40 CFR 60, Subpart IIII requirements for compression ignition internal combustion engines (as discussed above in Section 4.3.2). In accordance with §63.6590(c), no further requirements contained in the RICE MACT rule beyond those prescribed by 40 CFR 60, Subpart IIII are applicable to the diesel fire pumps and emergency generator.

4.5. State Air Quality Requirements

The PBREF2 project is subject to State of Florida air quality standards and permitting regulations established by the FDEP under Chapter 62 of the Florida Administrative Code (F.A.C.). The provisions under F.A.C. Section 62-204.800 incorporate (by reference) the federal air quality regulations discussed above and general requirements for stationary sources are prescribed by F.A.C. Chapter 62-210. In accordance with the

pre-construction review requirements of F.A.C. Section 62-212.400, a PSD permit must be secured from the FDEP for approval to construct the PBREF2. Additionally, certain state air quality standards are applicable to the planned operations at the PBREF2. Descriptions of the applicable state air quality requirements are provided in the sections below.

4.5.1. Florida Ambient Air Quality Standards

In addition to the NAAQS, which are incorporated in the Florida regulations by reference under F.A.C. Section 62-204.800, state ambient air quality standards are applicable as specified by F.A.C. Section 62-204.240. Ambient standards have been established in Florida for SO_2, PM_{10}, CO, NO_2, ozone and lead. The Florida ambient air quality standards (FAAQS) are summarized in Table 4-5 below.

Table 4-5:
Florida Ambient Air Quality Standards (FAAQS)

Pollutant	FAAQS	Averaging Time
Sulfur Dioxide (SO_2)	60 µg/m^3 (0.02 ppm)	Annual
	260 µg/m^3 (0.1 ppm)	24-hour
	1300 µg/m^3 (0.5 ppm)	3-hour
PM_{10}	50 µg/m^3	Annual
	150 µg/m^3	24-hour
Carbon Monoxide (CO)	9 ppm (10 mg/m^3)	8-hour
	35 ppm (40 mg/m^3)	1-hour
Ozone	0.12 ppm (235 µg/m^3)	1-hour
Nitrogen Dioxide (NO_2)	100 µg/m^3 (0.05 ppm)	Annual
Lead	1.5 µg/m^3	Quarterly

4.5.2. Pre-Construction Review

Pre-construction air quality permitting requirements applicable in Florida are prescribed under F.A.C. Chapter 62-212. These rules establish pre-construction review requirements for proposed new emission sources and modifications at existing emission sources. Florida's PSD rule is codified in F.A.C. Section 62-212.400 and applies to the construction of new major sources and to major modifications at existing major sources located in areas meeting ambient air quality standards (i.e., attainment areas). Consistent with the federal PSD program, PSD review applies under Florida regulations to each regulated pollutant based on significant emission rate thresholds, which are defined by F.A.C. Section 62-210.200. For projects subject to PSD review, the F.A.C. Section 62-212.400 provisions specify that various air quality and control technology related analyses be completed as prescribed by the federal PSD regulations. Consequently, the

analyses described above in Section 4.2.2 relative to federal PSD permitting requirements are also required by the state PSD program for the proposed project.

A permit application containing the PSD analyses and supporting information in accordance with FDEP Form 62-213.900(1) is required to be submitted to FDEP for the proposed project. A permit authorizing construction of the PBREF2 will be issued only after FDEP has completed the appropriate technical review of the permit application and has determined that the project will not adversely impact ambient air quality or violate any applicable air quality regulation, and after the requisite public review procedures have been satisfied.

4.5.3. Title V Operating Permit Program

FDEP's Title V operating permit program applicable to major sources of air pollutant emissions is codified under F.A.C. Chapter 62-213. As an existing major source of air pollutant emissions, the PBREP currently operates under a Title V operating permit issued by FDEP. To incorporate the requirements associated with PBREF2 into the existing PBREP Title V permit, the submittal of an operating permit application will be required. In accordance with F.A.C. Section 62-213.420, an operating permit application for PBREF2 is to be submitted within 180 days after commencing operation of the new emission units at the proposed facility.

4.5.4. Emission Standards for Stationary Sources

Emission standards for various types of emission sources are prescribed in F.A.C. Chapter 62-296. For WTE facilities, mercury emission standards are specified by F.A.C. Section 62-296.416. These standards apply to WTE facilities with charging rates greater than or equal to 40 tpd. As such, the MWC units to be installed at the PBREF2 will be subject to these provisions. For facilities using mercury control equipment, mercury emissions are limited to 70 µg/dscm (corrected to 7 percent oxygen) or an emissions reduction standard of 80 percent (by weight) must be achieved. Also for sources with mercury controls, these provisions require annual stack testing in accordance with USEPA Method 29 and the annual test results are to be reported to FDEP. Additionally, flue gas temperature and carbon feed rate monitoring is required under F.A.C. Section 62-296.416(4) and (5) consistent with the monitoring requirements specified by the 40 CFR 60, Subpart Eb federal provisions.

Provisions for unconfined particulate matter emissions are specified by F.A.C. Section 62-296.320(4)(c). Reasonable precautions will be taken during construction and operation of PBREF2 to prevent and/or minimize unconfined emissions of particulate matter. Dust control measures will include paving and on-going maintenance (e.g., periodic sweeping) of facility roadways and parking areas, application of water as a dust suppressant during construction and as needed during operations, and appropriate landscaping and maintenance of unpaved areas. Additionally, the tipping floor will be

maintained under negative pressure during active periods, ash will be transferred via an enclosed conveyor system, ash will be wetted prior to storage and processing, and ash processing equipment will be located inside an enclosed building.

4.5.5. Emissions Monitoring for Stationary Sources

F.A.C. Chapter 62-297 defines applicable compliance test methods and performance specifications for continuous monitors operating at stationary emission sources in Florida. Since periodic stack testing will be required for the MWC units at the PBREF2 and CEMS will be used to monitor compliance with applicable emission standards for various pollutants, these provisions are applicable to the proposed facility. With respect to compliance testing procedures, USEPA test methods are adopted by reference as indicated by F.A.C. Section 62-297.401. Similarly, F.A.C. Section 62-297.520 prescribes performance specifications for continuous monitors in accordance with federal standards under 40 CFR 60, Appendix B. Procedures, training and certification requirements relative to visible emission (opacity) observations are specified under F.A.C. Section 62-297.320.

5. Control Technology Analyses

5.1. Control Technology Analyses Introduction

This section presents the Best Available Control Technology (BACT) analyses for the proposed PBREF2. In accordance with USEPA and FDEP guidelines, BACT analyses were completed for those pollutants determined to be subject to Prevention of Significant Deterioration (PSD) permitting requirements. The control technology analyses presented in this section were conducted for the MWC units and ancillary equipment associated with the proposed project. As discussed in Section 4.2, the proposed project is subject to BACT requirements for the pollutants identified below:

- Nitrogen oxides (NO_x)
- Carbon monoxide (CO)
- Sulfur dioxide (SO_2)
- Particulate matter (PM, PM_{10} and $PM_{2.5}$)
- Volatile organic compounds (VOCs)
- Lead (Pb)
- Fluorides
- Sulfuric acid mist (SAM)
- MWC organics (as dioxins/furans)
- MWC metals (as PM)
- MWC acid gases (as SO_2 & HCl)

Although it is not regulated under the PSD program, mercury is an important pollutant and methods/control systems for minimizing mercury emissions should be evaluated. Accordingly, a control technology analysis was also performed for mercury emissions.

5.2. Approach for Conducting a BACT Analysis

Under the PSD program, newly constructed and modified major sources located in areas in attainment with the NAAQS must implement BACT. The BACT review process is

outlined in the USEPA draft document New Source Review Workshop Manual (USEPA, 1990). The five major steps involved in a BACT analysis are:

- Identify available control options with practical potential for application to the specific emission unit for the regulated pollutant under evaluation.
- Evaluate the technical feasibility of each APC technology and eliminate options that are not technically feasible or are unavailable control technology options.
- Rank the technically feasible alternatives based on effectiveness in reducing emissions.
- Evaluate the economic, environmental and energy impacts of alternatives, starting with the top control option and continuing until the option being evaluated cannot be ruled out based on excessive (economic, environmental or energy) impacts.
- Select BACT.

Best Available Control Technology (BACT) is defined in F.A.C. Section 62-210.200 (see 42 U.S. Code §7479) as follows: "an emission limitation, including a visible emission standard, based on the maximum degree of reduction of each pollutant emitted which the Department, on a case-by-case basis, determines is achievable through application of production processes and available methods, systems and techniques (including fuel cleaning or treatment or innovative fuel combustion techniques) for control of each such pollutant, taking into account:

1. Energy, environmental and economic impacts, and other costs;
2. All scientific, engineering, and technical material and other information available to the Department; and
3. The emission limiting standards or BACT determinations of Florida and any other state."

Economic, energy and environmental impacts are considered in a "top-down" BACT analysis. The "top-down" BACT approach looks not only at the most stringent emission limits previously approved, but also evaluates all demonstrated and potentially applicable technologies, including innovative controls, and lower polluting processes identified through a review of EPA's RACT/BACT/LAER Clearinghouse (RBLC). Summaries of permit determinations contained in the RBLC relative to the emission units addressed in this BACT analysis are provided in Appendix E. If the proposed BACT is lower than or equivalent to the most stringent emission limit, no further analysis normally is necessary. However, if the most stringent emission limit is not selected, additional analyses are required.

Once the most stringent emission limit has been identified, its technical feasibility is determined. A technology that is available and is applicable to the source under review is considered technically feasible. A control technique is considered available if it has reached the licensing and commercial sales stage of development. If a control technique is not applicable or if it is technically or economically infeasible for the source in question, the next most stringent technology is evaluated. The process continues until an emission control technology cannot be eliminated. If a control technology is technically and economically feasible and provides the most stringent emission level, that control is considered BACT unless energy or environmental impacts preclude its use.

When evaluating the economic impact of a technically feasible control option, primary consideration is given to the average cost-effectiveness of a control option and as applicable, to the incremental cost-effectiveness between dominant control options (USEPA, 1990). Cost-effectiveness is expressed as the total annualized cost of the option per ton of pollutant removed. USEPA has recommended that to derive these costs, the applicant should follow the procedures for estimating the total controlled costs that are described in the USEPA Air Pollution Control Cost Manual (USEPA, 2002). Additionally, the beneficial or adverse environmental impacts associated with each control option are assessed in the BACT analysis. The environmental impact analysis includes the effect of the control technology on other regulated and unregulated pollutants. Environmental impacts other than air quality, such as the control option's impact on water quality, solid waste disposal and other environmental impacts, are also considered in the BACT analysis. Control alternatives can be ruled out based on documented adverse environmental impacts. The energy impact analysis considers the direct energy impact of the control alternatives. The energy requirements of a particular control option are estimated in terms of units of energy (as associated cost) per ton of pollutant removed.

The determination of what constitutes BACT is ultimately made by the permitting authority, which is usually the state regulatory agency in which the emission unit will operate. This allows the state regulatory agency to consider the weight or emphasis to be placed on the economic, environmental, and energy impacts of control. The state agency may consider the size of the plant, the increment of air quality that will be absorbed by any particular major emitting facility and other considerations such as anticipated and desired economic growth for the area. For this project, FDEP will determine BACT as part of the permitting process. With respect to emissions from the MWCs, the applicable NSPS (40 CFR 60, Subpart Eb standards) reflect MACT performance and establish a baseline for determining BACT.

5.2.1. BACT Analysis Emission Unit and Pollutant Categories

For purposes of conducting the BACT analyses for this project, emission unit and pollutant categories were defined. The emission unit and pollutant categories are

summarized in Table 5-1 and the pollutant-specific BACT analyses are presented in the sections below.

Table 5-1:
BACT Analysis Emission Unit and Pollutant Categories

Emission Units	BACT Analysis Pollutant Categories
Municipal Waste Combustors (MWCs)	NO_x
	MWC Acid Gases (SO_2, HCl), Fluorides, SAM
	$PM^{(1)}$, Pb, MWC Metals
	CO
	VOCs, MWC organics
	Mercury
Storage Silos	$PM^{(1)}$
Diesel Fire Pumps	NO_x
	SO_2
	$PM^{(1)}$
	CO
	VOC
Emergency Generator	NO_x
	SO_2
	$PM^{(1)}$
	CO
	VOC

(1) PM category includes total PM, PM_{10}, and $PM_{2.5}$.

5.2.2. Materials Separation

Recycling, waste diversion, and other materials separation programs are beneficial components of an integrated waste management program because they reduce the quantity of waste that must be disposed of with a WTE facility or landfill, thus reducing the overall emissions from the disposal facility. Materials separation programs also can be used to remove some of the specific materials in the waste stream (e.g., mercury-containing devices; lead-acid batteries) before those materials enter a WTE facility. Although such programs may reduce the uncontrolled emissions from a WTE facility, it has been difficult to determine whether materials separation programs provide any meaningful reductions in a WTE facility's actual emissions. The potential benefits of materials separation programs are overshadowed by the benefits provided by the air pollution control systems used at modern WTE facilities. Consequently, it is not possible to quantify the effectiveness of materials separation efforts in reducing emissions from WTE facilities. A qualitative discussion of materials separation is provided below, but materials separation programs alone are normally not proposed to satisfy BACT requirements in the control technology analyses for the MWCs.

The Authority has established extensive materials separation and recycling programs as part of its Integrated Solid Waste Management System. According to published solid waste management data from FDEP, the Authority recycled 36 percent of its MSW in 2007, thereby effectively diverting waste away from landfills and the existing WTE facility. Highlights of the Authority's recycling and waste reduction efforts are identified below and more detailed information is provided in the Authority's Materials Separation Plan (see Appendix C for the Authority's latest Materials Separation Plan documents). The Authority undertakes the following activities:

- Residential recycling of commingled materials (such as aluminum cans and foil, glass, and plastic containers) and fiber materials (newspapers, brown paper bags, magazines, catalogs, corrugated cardboard and telephone books).
- Voluntary commercial recycling of paper and cardboard.
- Promotion and assistance with institutional and industrial recycling efforts.
- Composting of mulch produced with the vegetative debris obtained from curbside collection.
- Separation of ferrous and non-ferrous metals for recycling.
- Collection of household hazardous wastes (including paints, pesticides, solvents, cleaners, used motor oil, antifreeze, auto batteries, household batteries, etc.) at designated locations. Mercury-containing devices such as fluorescent lamps, thermostats, and electrical switches, also are collected.
- Collection of waste tires for disposal (by Wheelabrator Technologies).
- Acceptance of white goods (large appliances such as refrigerators and stoves) for handling and recycling by a scrap metal processor.
- Collection of electronic products (E-waste) such as computers, monitors, printers, cell phones and televisions that are sorted and then hauled away by a private contractor for processing and recycling.
- Promotion of the Authority's recycling programs to county residents, schools, and businesses by designated education staff and field representatives and through distribution of educational and promotional materials that support and encourage recycling and waste reduction efforts.

Materials separation has the potential to result in lower emissions of various air pollutants by removing certain materials from the waste stream to be combusted in a MWC. For example, reducing the waste stream's nitrogen content by recycling high nitrogen content materials including grass clippings and other vegetative waste may potentially reduce

uncontrolled NO_x emissions. Similarly, reducing the amount of mercury in the waste stream through source separation of batteries and recycling of mercury-containing devices will result in lower uncontrolled mercury emissions. However, as noted above, such programs are not expected to produce any meaningful reductions in the actual emissions of a modern WTE facility (i.e., after the flue gas has been treated in the air pollution control system). Given the effectiveness of the air pollution controls, it is not possible to quantify the amount of emissions reductions to be achieved through a materials separation program. Therefore, materials separation is not further considered as BACT for the MWCs in the control technology analyses presented in the sections below.

5.3. BACT Analysis for NO_x Emissions from the MWCs

The operation of the MWCs will generate NO_x emissions. These emissions are formed during the combustion process. The sections below describe the BACT analysis performed to identify and evaluate control alternatives for reducing NO_x emissions from the MWCs.

5.3.1. Description of NO_x Emissions from MWCs

The primary mechanisms for NO_x formation during the combustion process are fuel-bound NO_x and thermal NO_x. Fuel-bound NO_x is created by the gas-phase oxidation of elemental nitrogen contained within the fuel. For MWC units, formation of fuel-bound NO_x is a function of the nitrogen content of the waste and the amount of oxygen in the combustion chamber. Thermal NO_x is created by a high temperature reaction in the combustion chamber between atmospheric nitrogen and oxygen. The amount of NO_x formed is a function of time, turbulence, temperature, and fuel-to-air ratios within the combustion flame zone.

Since the formation of NO_x is largely dependent on fuel-bound NO_x and thermal NO_x, several control technologies that employ techniques to reduce the precursors of NO_x formation or use catalytic or non-catalytic systems to treat the post combustion emissions have been developed. The sections presented below discuss the technologies evaluated to reduce NO_x emissions from the MWCs to be installed at the PBREF2.

5.3.2. Candidate Control Alternatives

Various candidate control alternatives were identified for reducing NO_x emissions from the MWC units. Generally, NO_x emissions from MSW combustion can be reduced by three methods as listed below:

- Materials separation - to reduce the average nitrogen content of the waste stream. As indicated above in Section 5.2.2, materials separation alone will not satisfy BACT requirements and is not further considered in this BACT analysis.

- Combustion optimization techniques - to minimize the quantity of NO_x produced during the combustion process.
- Flue gas controls - for removal of NO_x from the post-combustion exhaust gas stream.

The above combustion optimization techniques and flue gas control alternatives are described and evaluated for technical suitability for reducing NO_x emissions from a MWC in the sections below.

5.3.2.1. Combustion Optimization Techniques

Combustion techniques, which reduce the conversion rate of nitrogen from the waste stream to NO_x and suppress thermal NO_x formation, are listed below and discussed in the ensuing paragraphs:

- EcoTube
- Prism
- Water Cooled Grates
- Good Combustion Practices (GCP)
  - Staged Combustion
  - Low Excess Air (LEA)
- Natural Gas Reburning
- Flue Gas Recirculation (FGR)

EcoTube

The EcoTube system is a staged combustion optimization process developed by a Swedish company, ECOMB AB. It consists of retractable tubes (lances) located just above the primary combustion zone. The lances are equipped with injection nozzles to introduce high velocity air into the upper combustion zone of the furnace, which creates turbulence in the gas flow and improves mixing of combustion gases. Various reagents, such as ammonia or urea, can also be introduced through the lances into the combustion zone. Based on limited information available from ECOMB AB, NO_x reductions of approximately 30 - 60 percent are being achieved on MWC installations in Europe. The EcoTube system has not been applied to a MWC unit in the United States.

A major disadvantage of the EcoTube system is that it requires a high level of maintenance based on information from a MWC installation at the Coventry & Solihull WDC in England. Reported maintenance issues include slag buildup on the lances and

blinding of the camera port from deposits requiring frequent cleaning. Also, reliability of the system in meeting permitted NO_x emission levels with an adequate safety margin was expressed as an issue by the facility in England. In addition to these issues, the EcoTube system would interfere with staged combustion and other enhanced combustion control features inherent in newly designed MWCs (good combustion practices/staged combustion are discussed below as combustion optimization techniques for reducing NO_x formation). Consequently, EcoTube is not part of the overall design concept for combustion and NO_x control currently offered by MWC vendors. For these reasons, this technology is not considered further in this analysis for meeting BACT requirements.

Prism

Prism is offered by Keppel Seghers (a subsidiary of Keppel Corporation Limited) and it is a prism-shaped, water-cooled structure which can be located just above the grate of a MWC. The flue gas must travel on one or the other side of this prism structure. Secondary air is injected into the split gas stream from the four corners of the combustor. The potential benefit is that better mixing is achieved because the secondary air only needs to penetrate one fourth of the furnace depth. As a result, the flue gas temperature and oxygen concentrations are more uniform, resulting in lower maximum temperature at the furnace outlet. When this technology is used in conjunction with SNCR, ammonia consumption is lowered.

In practice, the overall improvement in reducing NO_x emissions is limited. Other furnace modifications, such as FGR, can accomplish similar results. Further, the principal application of Prism has been as a retrofit on existing units to reduce CO emissions. Therefore, this technology is not given additional consideration as a technically feasible alternative in this BACT analysis.

Water Cooled Grates

Water cooled grates, which are supplied by Vølund, Martin and Von Roll, have been used for a number of years. The primary role of water cooled grates is to increase the service life of grates when processing very high calorific waste and not specifically for purposes of NO_x reduction. However, these grates reduce the combustion zone temperature and thereby can reduce baseline NO_x emissions. When combined with SNCR for NO_x reduction, water cooled grates can have an added benefit of reducing ammonia usage. Currently, there are no data demonstrating a benefit to applying both water cooled grates and flue gas recirculation (FGR) for NO_x control. Although water cooled grates can enhance SNCR, there are no data available that quantify the amount of baseline NO_x emissions reductions that can be expected with water cooled grates. There also are no data demonstrating that water cooled grates outperform FGR, either alone or in combination with FGR. Further, a main disadvantage is that water cooled grates can interfere with combustion process optimization and they reduce combustion efficiency.

For these reasons, water cooled grates are not considered further as BACT for the MWCs in this analysis.

Good Combustion Practices - Staged Combustion and Low Excess Air (LEA)

Staged Combustion and Low Excess Air (LEA) are two control techniques that are similar and are often used in concert. The primary function of the technology is to reduce the amount of nitrogen present in the combustion air. Staged combustion has two separate combustion zones. In the first zone, a less than stoichiometrically complete amount of air (typically about 60-70 percent) is injected below the combustion grate (underfire air). Consequently, the primary flame zone cannot completely oxidize the nitrogen in the waste. Instead, it effectively reduces the waste stream's nitrogen component to molecular nitrogen, N_2. In this way, the nitrogen in the fuel is prevented from oxidizing to form NO_x. The oxygen-starved condition keeps the combustion temperature down. Lower combustion temperatures generate less NO_x from the nitrogen in the combustion air. The second stage has additional air injected through over-fire air ports above the grate. The second stage becomes an oxidizing region, completing the fuel combustion process. Because of the additional air, the peak temperature is kept low and generates less thermal NO_x.

A drawback of staged combustion technology is the difficulty of maintaining proper combustion control in both zones. Improper control will increase generation of carbon monoxide (CO), hydrocarbons (HC), and products of incomplete combustion (PIC). In LEA combustors, less air is supplied to the combustor, lowering the amount of oxygen available to react with nitrogen. Without an adequate supply of oxygen, flame temperature is decreased, resulting in less NO_x formation. Staged combustion and LEA have demonstrated they are an effective technique for reducing NO_x emissions and are inherent in the design of modern MWCs. Good combustion practices are further evaluated for meeting BACT in the sections below.

Natural Gas Reburning

Natural gas reburning is a NO_x control technique that works in conjunction with good combustion practices. LEA is provided in the combustor, with recirculated flue gas introduced above the combustion grate. Natural gas is injected into the LEA zone to generate a fuel-rich condition. This reduces NO and other fixed nitrogen species from the main combustion zone into molecular N_2 without increasing the formation of CO. Air is then supplied (above the fuel-rich zone) to complete the combustion. The process effectively reduces NO_x without increasing CO emissions.

Some tests of the control technique have shown effective results (Abbasi, et al., 1991). However, there is no long term operational data on natural gas reburning for MWCs. Furthermore, natural gas reburning has primarily been applied to fossil fuel-fired boilers as a retrofit NO_x control technique or for seasonal NO_x reductions, and has not been used

as a NO_x control method on MWCs. Therefore, this control technique would require additional engineering and testing, and is not considered further as BACT in this analysis.

Flue Gas Recirculation (FGR)
FGR is a system that recirculates a portion of the partially cooled flue gas back into the combustion air for the MWC. FGR requires a fan assembly, an air apportioning and mixing system, and duct work. Typically, the combustion air will then contain up to 20 percent flue gas. As a result, the oxygen content is lessened, thereby reducing flame temperature, which leads to a reduction in the formation of NO_x.

NO_x reduction results through the use of FGR have been modest, but FGR can achieve a reduction in NO_x emissions of approximately 10 to 20 percent. As a result of reducing the baseline NO_x emission level, the consumption of reagents (ammonia or urea) in flue gas control systems is also reduced. FGR is considered an available control technique and is further evaluated in the sections below.

5.3.2.2. Flue Gas Controls

The following flue gas control techniques for reducing NO_x were identified as candidate control alternatives for potential application to the MWCs:

- Wet Flue Gas Denitrification (FGDn)
- Electron Beam
- EM_x ($SCONO_x^{TM}$) technology
- Selective Non-Catalytic Reduction (SNCR)
- Selective Catalytic Reduction (SCR)
- Regenerative SCR ($RSCR^{TM}$)

Of the control technologies listed above, only SNCR and SCR systems have been successfully demonstrated on MWCs or show significant potential for effective NO_x control on MWCs in the United States. To date, SCR has not been used to control NO_x emissions from a MWC in the United States and its use has been primarily limited to European MWCs. Discussions of each of the above control technologies are presented in the sections below.

Wet Flue Gas Denitrification (FGD_n)
There are four primary categories of FGD_n as listed below:

- Oxidation-absorption-reduction

- Oxidation-absorption
- Absorption-reduction
- Absorption-oxidation

Oxidation-absorption-reduction is the most advanced type of FGD_n because it is an improvement to already existing FGD_n technologies. This technology involves spraying an oxidant, such as ozone, into the flue gas upstream of wet scrubbers. The relatively insoluble NO oxidizes to the more soluble NO_2, which when in solution, consumes some of the absorbed SO_2 and is itself reduced to nitrogen, N_2. Some flue gas desulfurization systems may be modified by incorporating oxidizing agents. The advantage is high removal efficiencies for both NO_x and SO_2 and the ability to accommodate changes in inlet flue gas conditions. However, major drawbacks to the technology include the use of expensive oxidation chemicals and waste treatment system requirements.

Oxidation-absorption adds an oxidizer, such as sodium chlorite ($NaClO_2$) to the flue gas, normally through an upstream venturi (HCl) scrubber. This drops the pH to 3-4, which oxidizes a portion of the NO to NO_2. The NO_2 is removed partially in a first scrubber and removed along with SO_2 in a second scrubber.

Absorption-reduction uses ferrous ions (Fe^{2+}) to tie up NO in the liquid phase by the formation of ethylene diamine tetra-acetic acid (EDTA) complexes. These react with HSO_3^- and SO_3^{-2} ions to generate nitrogen and sulfate (SO_4^{-2}). The technology was implemented at a MWC in Bremerhaven, West Germany, but has proven to be cost-prohibitive in both operation and chemical usage, relative to less expensive, more effective technologies. Absorption-oxidation processes are not as developed as the other wet NO_x control systems discussed above.

Wet FGDn systems produce adverse environmental impacts by producing a liquid effluent that requires treatment. In addition, if combustion is necessary for flue gas reheating, secondary pollutants will be generated as well as additional energy consumption to reheat the flue gas. Wet FGD_n systems have the following disadvantages:

- Adverse environmental impacts are associated with wet FGD_n systems, including the generation of liquid effluents which are expensive to treat.
- Trace contaminants in the flue gases of MWCs may inhibit the NO_x reduction reactions taking place in the scrubber.
- The required oxidizing agents are expensive.

- The technology has not yet been demonstrated on modern MWCs in the United States and has shown limited effectiveness and associated operational disadvantages based on limited use in other countries.

In summary, wet FGD_n technology has substantial disadvantages and not been proven to be a reliable control option for reducing NO_x emissions from MWC units. Therefore, wet FGD_n technology is not considered further as BACT in this analysis.

Electron Beam

Electron Beam is a control technique in which the flue gas is exposed to a high energy electron beam that ionizes the molecules in the gas stream. The reaction occurs with added ammonia (NH_3) or lime in a steel vessel, shielded from radiation by a concrete shell. NO_x and SO_2 are converted into an aerosol mist, which is collected by an electrostatic precipitator (ESP) or a fabric filter baghouse. Ammonium nitrate (NH_4NO_3), a dry powder salt, is formed and potentially can be sold as fertilizer. There have been no tests or demonstrations of the Electron Beam's effectiveness on large scale, modern MWCs. Furthermore, the method is not expected to remove NO_x as efficiently as other control technologies.

EM_x ($SCONO_x^{TM}$)

EmeraChem, LLC (formerly, Goalline Environmental Technologies, LLC) developed EM_x™, the newest generation of $SCONO_x$™, a catalytic absorption system. $SCONO_x$™ uses a potassium carbonate (K_2CO_3) coated catalyst to reduce emissions of nitrogen oxides from natural gas-fired, water injected turbines. The catalyst oxidizes carbon monoxide (CO) to carbon dioxide (CO_2), and nitric oxide (NO) to nitrogen dioxide (NO_2). CO_2 is exhausted while NO_2 absorbs onto the catalyst to form potassium nitrites (KNO_2) and potassium nitrates (KNO_3). Dilute hydrogen gas is passed periodically across the surface of the catalyst to regenerate the K_2CO_3 coating. The regeneration cycle converts KNO_2 and KNO_3 to K_2CO_3, water, and elemental nitrogen. The K_2CO_3 is thereby made available for further absorption and the water and nitrogen are exhausted.

$SCONO_x$™ has not been applied to combustion sources that use waste as fuel. Instead, EmeraChem, LLC markets this ammonia free reduction technology for clean fuel fired combustion equipment like gas turbines, reciprocating engines, and industrial/utility boilers. Therefore, the technology has not been demonstrated to be a technically feasible option for application to MWCs.

Selective Non-Catalytic Reduction (SNCR)

SNCR, also called Thermal $DeNO_x$, is a flue gas treatment for NO_x removal involving injection of an amine-based compound into the flue gas stream to reduce NO_x to elemental nitrogen (N_2). The amine-based compound can be either ammonia (NH_3) or urea ($(NH_2)_2CO$). The ammonia can be either anhydrous or aqueous. Anhydrous ammonia is extremely dangerous and requires a vaporizer to convert the compressed

liquid ammonia into a gaseous vapor. Aqueous ammonia is stored in liquid form at a concentration in the range of 20 percent by weight. Using aqueous ammonia is advantageous because it is more readily mixed in the flue gas stream and thus achieves higher NO_x removal efficiencies.

When ammonia is injected into the flue gas stream at an appropriate temperature (1,600 to 1,800°F), the ammonia reduces NO_x to N_2. However, if the injection occurs above that temperature window, ammonia will be oxidized to NO. As a result, NO is formed rather than reduced. The competing reactions are indicated below:

$$4NO + 4NH_3 + O_2 \rightarrow 4N_2 + 6H_2O$$

$$4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$$

If the temperature falls below 1,600°F, the NO_x reduction rate becomes lower and unreacted ammonia may slip through and be emitted from the stack. Excess ammonia emissions can result in plume visibility issues and odorous emissions because ammonia odors are detectable at very low concentrations. Although SNCR technology using aqueous ammonia has been successfully applied to modern MWCs, there are certain potential operating challenges associated with ammonia injection:

- Residual ammonia may react with acid gases in the boiler to form byproduct ammonium salts like ammonium sulfate and ammonium bisulfate. These can cause fouling and corrosion problems in the boiler, particularly in the economizer section.

- CO concentrations above 100 ppm_v can adversely impact the efficiency of SNCR by affecting process chemistry and lowering the effective temperature range for the desired NO reduction reaction. In the presence of too much CO, excess hydroxyl (OH) radical is formed resulting in NO formation rather than reducing NO to N_2 as desired (USEPA, 1994).

- Residual ammonia emissions are produced and a visual plume can result from the reaction of ammonia and any chlorides present in the flue gas to form ammonium chloride.

An alternative to ammonia injection is the urea injection technique developed by Fuel-Tech. Inc., NO_xOUT technology. The process utilizes a 50 percent by weight solution of urea to water that is fed to the boiler. NO control is maintained by the reduction of NO to N_2, water and CO_2. The reaction is as follows:

$$(NH_2)_2CO + 2NO + ½O_2 \rightarrow 2N_2 + 2H_2O + CO_2$$

The temperature range of the reaction for optimum performance of the SNCR unit is similar to that for aqueous ammonia, but the temperature boundary can be widened to 1,300 to 1,800°F with the use of a proprietary urea additive. Fuel-Tech NO_xOUT technology has been successfully used on several MWCs in Europe. In the United States, the NO_x reductions achieved at facilities with urea injection have been similar to ammonia-based SNCR systems. Further, NO_xOUT proponents claim their NO_x removal is at least as high as ammonia based reagents while operating at lower ammonia slip levels.

Recent advances in combustion design feature enhanced combustion control, which in conjunction with a SNCR control system, can result in lower NO_x emissions in comparison with a typical combustion unit with SNCR. An enhanced combustion control design feature is being implemented for the MWC expansion unit at the Hillsborough County, Florida facility. Enhanced combustion control is effective in limiting the formation of NO_x through design modifications in the combustion chamber to optimize the location and amount of air introduced for combustion. In units featuring enhanced combustion design, combustion air is introduced through three sets of nozzles. The primary nozzles are located in the underfire region of the combustion chamber. Secondary nozzles are located in the overfire region of the combustion region and air flow is reduced as compared to a typical combustor. A third set of nozzles introduces air at a higher elevation in the furnace. The air from the third set of nozzles completes combustion and ensures thorough mixing of combustion gases within the chamber. Computational Fluid Design (CFD) is utilized to balance nozzle location and air flow through the three nozzles to achieve optimal combustion and temperature control in order to minimize NO_x formation. An added feature of SNCR with enhanced combustion control is the use of less reagent and reduction of ammonia slip while maintaining the level of NO_x control achieved with a more traditional combustion unit and SNCR system.

SNCR systems are capable of reducing NO_x emissions from MWCs by approximately 40-65 percent and have been well established as BACT for MWCs at WTE facilities throughout the United States. In fact, performance data from the newly installed expansion unit at the Hillsborough County Resource Recovery Facility in Florida suggests even lower NO_x levels are achievable from the application of SNCR in conjunction with advancements in combustion optimization and furnace design. During performance testing of the new Hillsborough unit in August-September 2009, NO_x emissions averaged 84.9 ppm_v (at 7 percent oxygen) as measured by the unit's CEMS. Further, SNCR is the basis for the NO_x emission limit reflecting MACT performance in the NSPS for large MWCs. In summary, SNCR has been widely used to reduce NO_x emissions from MWCs and is further evaluated below as a technically feasible control alternative.

Selective Catalytic Reduction (SCR)

SCR reduces NO_x to elemental N_2 and water through a catalytic process where aqueous ammonia (NH_3) is injected into the flue gas stream downstream of the boiler. The resulting reactions between NO_x and NH_3 are as follows:

$$4NO + 4NH_3 + O_2 \rightarrow 4N_2 + 6H_2O$$

$$2NO_2 + 4NH_3 + O_2 \rightarrow 3N_2 + 6H_2O$$

The catalyst lowers the activation energy of NO_x as it is reduced to N_2, allowing the reaction to proceed at temperatures from 375 to 750°F, depending on the catalyst and composition of the contaminants in the flue gas stream. The advantage of a lower temperature reaction is a prolonged catalyst life; higher temperatures can shorten catalyst life. The typical catalyst used consists of an inert ceramic structure with the active portion comprised of vanadium oxide and a mixture of other trace elements, such as molybdenum and tungsten oxides. With respect to the use of aqueous ammonia as the reducing reagent, a SCR control system has an operating advantage over a SNCR system. As indicated above relative to a SNCR system, potential fouling and corrosion problems can occur in the boiler as a result of residual ammonia reacting with acid gases to form ammonium salts. Since the point of ammonia injection in a SCR system is downstream of the boiler, this potential fouling and corrosion issue is not a concern. Additionally, a SCR system requires less ammonia reagent and has a lower potential for residual ammonia emissions in comparison to a SNCR system.

Although SCR appears to be a technically viable alternative, it has not been established in the United States as a proven technology for MWCs. SCR has been successfully employed in coal, oil and natural gas combustion facilities in the United States. However, these combustion sources have lower concentrations of acid gases and particulate matter in their pre-controlled flue gases in comparison with pre-controlled MWC flue gases. Acid gases and particulate matter erode the catalyst and substrate, reducing their useful life and effectiveness, and cause fouling of the catalyst. As a result, the SCR unit for a MWC should be located downstream of the acid gas and particulate/dust control equipment (referred to as a "clean-side" or "cold-side" SCR design). Acid gas control equipment operates at a lower temperature than the SCR unit, so after the acid gases and particles are removed from the flue gas stream, the temperature is below the threshold of optimal performance for the SCR. Consequently, the flue gas must be reheated, thereby increasing energy consumption. Therefore, a reduction in electrical energy available for export is associated with the application of a "cold-side" SCR control system to a MWC.

Notwithstanding the above discussion of "cold-side" SCR systems, there have been recent advancements in "hot-side" ("dirty-side") SCR design for MWCs. This design incorporates a small SCR system (SCR "trim") located within the economizer section in

conjunction with a SNCR system and has shown NO_x reductions approaching those achieved by a "cold-side" SCR system. This SCR/SNCR hybrid design has been implemented at a WTE facility located in Brescia, Italy to reduce NO_x emissions from a single MWC unit. While initial results from the Brescia unit were promising, the facility has needed to install a second catalyst layer and increase reagent use to maintain the desired NO_x reductions. As part of the procurement process for the PBREF2, a SCR "trim" design similar to the Brescia design was proposed as a possible design option for consideration by the qualified respondents (WTE facility contractors). All of the qualified respondents engaged in the design-build-operate procurement process for the PBREF2 including Babcock & Wilcox, Wheelabrator Technologies Inc., and Covanta Energy Corporation indicated that they would not be able to guarantee the operating performance and reliability of a SCR "trim" system. Given the very limited operating experience and the responses obtained from the prospective contractors associated with the PBREF2, this type of SCR design is not further considered below in this BACT analysis.

As indicated above, SCR technology has not been used at MWC facilities in the United States; however, many European WTE facilities are currently using SCR systems for NO_x control. A survey of European facilities was conducted to obtain operating performance data relative to SCR systems and MWC operations. Seven responses to the survey were obtained and the data provided for these facilities is summarized below in Table 5-2. As indicated in Table 5-2, the permitted NO_x emissions levels for the European facilities using SCR control systems vary from 50 ppm_{vd} to 135 ppm_{vd}. This wide range in permitted NO_x emissions levels among the European facilities makes it difficult to reliably predict SCR system performance for application to a MWC in the United States. Also noteworthy is that the midpoint of this range is approximately 90 ppm_{vd}, which is equivalent to the NO_x level most recently permitted for a new MWC unit with a SNCR control system in the United States (i.e., the Hillsborough County, Florida facility (FDEP, 2006a)).

Table 5-2.
SCR Operating Data from European Facilities

Facility	MWC Size (tpd)	NO_X Emissions			NO_X Permit Limit (ppm_v at 7% oxygen, dry basis)
		Uncontrolled (mg/Nm^3)*	Permit Limit (mg/Nm^3)*	Averaging Period	
Arnoldstein, Austria	250	475	70	30-min	50
WtE Spittealu, Austria	420	350	100	30-min	70
Ivago Ghent, Belgium	310	425	200	24-hr	135
Essen-Karnap, Germany	530	250	200	N/A	135
Stellinger Moor Hamburg, Germany	550	350	100	24-hr	70
Rotteram, Netherlands	450	500	200 70	24-hr monthly	135 50
Rozenburg, Netherlands	1,200	500	200 70	24-hr monthly	135 50

* NO_x emissions and permit limits are at 11 percent O_2, dry basis.

Regenerative SCR (RSCR™)

A new type of SCR design is a regenerative SCR (RSCR™) system offered by Babcock Power Inc. The RSCR™ system is designed for "clean-side" installations at the outlet of the acid gas and particulate control devices. According to information from Babcock Power Inc., RSCR™ can achieve NO_x reduction efficiencies greater than 70 percent. The RSCR™ system design features a multi-chamber reaction vessel with each chamber containing catalyst mounted above a ceramic bed. The chambers are arranged for vertical gas flow with the gas flow direction controlled by valves integrated with the ductwork. The ceramic bed is used for heat recovery purposes and serves to minimize energy loss associated with a traditional SCR system. Reagent (aqueous ammonia) is added to the gas stream as it enters the device.

To date, no pilot test or full-scale operating data are available from Babcock Power Inc. for a RSCR™ system applied to control NO_x emissions from a MWC unit. The operating history for RSCR™ is limited to a few wood/biomass fired boilers in the Northeast. In summary, RSCR™ has not been successfully demonstrated for use on a MWC at a WTE facility and therefore is not further considered in this analysis.

5.3.3. Evaluation of Technically Feasible Control Technologies

A summary of the candidate control technologies identified in the above section for reducing NO_x emissions from the new MWC is presented in Table 5-3 below.

Table 5-3.
Summary of Candidate NO_x Control Technologies

Control Technology	Expected NO_x Control Efficiency	MWC Operating Experience	Widely Used on MWCs for NO_x Control
EcoTube	30-60 percent	Limited use on MWCs in Europe with reported maintenance and reliability issues	No
Prism	Data Not Available	Principal use as a retrofit to reduce CO emissions	No
Water Cooled Grates	Data Not Available	Reduced combustion efficiency is expected	No (used for high calorific waste to increase grate life)
Good Combustion Practices	Data Not Available	Maintaining combustion control is used in conjunction with flue gas control systems	Yes
Natural Gas Reburning	Data Not Available	Primarily applied to fossil-fuel fired boilers	No
Flue Gas Recirculation	10-20 percent	Used in conjunction with flue gas control systems but can be problematic	Yes
Wet-flue Gas Denitrification (FGD_n)	Data Not Available	Contaminants in flue gas may inhibit NO_x reductions; liquid effluent that must be treated is produced	No
Electron Beam	Data Not Available	No relevant experience	No
EMx ($SCONO_x^{TM}$)	Data Not Available	Developed for use in utility boilers, reciprocating engines, and turbines	No
Selective Non-Catalytic Reduction (SNCR)	40-65 percent	Widely used on MWCs globally	Yes
Selective Catalytic Reduction (SCR)	50-90 percent	Not used in U.S.; used elsewhere	Yes (in Europe)
Regenerative SCR ($RSCR^{TM}$)	70 percent	No experience on MWCs; limited use on wood/biomass boilers	No

Several of the candidate control technologies will not be considered further in this BACT evaluation because of technical feasibility issues or because they have not been successfully demonstrated on MWCs. These include the following:

- Natural Gas Reburning

- EcoTube
- Prism
- Water Cooled Grates
- Wet Flue Gas Denitrification (FGD_n)
- Electron Beam (E-Beam)
- EMx ($SCONO_x^{TM}$)
- Regenerative SCR ($RSCR^{TM}$)

The remaining NO_x control alternatives further evaluated in this BACT analysis are:

- Selective Non-Catalytic Reduction (SNCR)
- Selective Catalytic Reduction (SCR)
- Good Combustion Practices (GCP) - Staged Combustion and LEA
- Flue Gas Recirculation (FGR)

SNCR - SNCR technology has been very successfully used domestically on modern MWCs and is the control system specified for NO_x emissions control at recently permitted MWC facility expansions including the Hillsborough County and Lee County, Florida facilities. Information in the RACT/BACT/LAER Clearinghouse (RBLC) indicates that SNCR systems have been required for NO_x emissions control for most new and modified MWC units over the last 10 years. Further, the emission limit for NO_x in the NSPS for MWCs is based on the application of SNCR control technology. Consequently, a SNCR system with ammonia or urea injection is a candidate control system for reducing NO_x emissions from the proposed WTE facility. SNCR with enhanced combustion control features the latest improvements in combustion design. The benefits of SNCR with enhanced combustion control include increased furnace efficiency, reduced ammonia slip, and reduction in reagent use while reducing NO_x emissions to levels which are equivalent to or possibly lower than levels achieved by traditional combustion units with SNCR.

SCR - Experience with SCR systems on MWC units is entirely limited to facilities located outside the United States. As indicated above in Table 5-2, these facilities using SCR have widely varying permitted NO_x emissions levels. While SCR systems are capable of reducing NO_x emissions to levels lower than achievable by SNCR systems, the application of SCR technology to a MWC unit has associated operating challenges which render it difficult to assign a performance level to be achieved continuously. Prior to

emission controls, MWC exhaust streams contain acid gases and substantial amounts of particulate matter. These flue gas components can erode the catalyst and substrate material and cause fouling of the catalyst if temperature controls are not tightly maintained. Consequently, an SCR system would have to be installed downstream of the acid gas and particulate control devices ("cold-side" application) to avoid these problems. Due to SCR operating temperature requirements in the 375 to 750°F range, the implementation of a "cold-side" SCR module would require installation of a heating system and the consumption of energy to re-heat the flue gas for NO_x reduction.

In recognition of the above factors, it is difficult to accurately establish a NO_x emission limit for a MWC in the United States using a SCR control system. Nonetheless, SCR cannot be ruled out as a technically feasible control option in this BACT analysis given its successful application for reducing NO_x emissions from MWCs in other countries.

GCP – Combustion controls alone are not sufficient for a NO_x removal system to satisfy BACT requirements. Nonetheless, proper combustion control has been shown to significantly reduce NO_x emissions and is typically used in conjunction with other control technologies.

FGR - Similar to GCP, FGR has a limited effectiveness in reducing NO_x emissions and is not sufficient alone in meeting BACT requirements. The application of FGR can be an effective method to enhance NO_x removal in combination with a traditional combustor design. However, FGR is typically not being used in modern combustors featuring enhanced combustion control because it would interfere with the combustion air optimization feature. Further, the use of FGR may result in increased emissions of CO and organics from incomplete combustion (if the flame zone becomes unstable) and the potential for corrosion/fouling in the furnace may increase. In recognition of these disadvantages, the latest MWC design trends often do not incorporate FGR. Nonetheless, some current MWC designs are including variations of FGR as a component of an integrated furnace design for reducing NO_x emissions. Therefore, FGR is not further considered as BACT in this analysis, but is a design option that may be used as part of an integrated furnace design to meet the permitted NO_x emission limit at the discretion of the selected combustion unit vendor.

5.3.4. Ranking of Technically Feasible Control Alternatives

The candidate control options not eliminated from consideration as BACT based on technical deficiencies are ranked below in descending order of control effectiveness:

- Selective Catalytic Reduction (SCR) in conjunction with Good Combustion Practices (GCP).
- Selective Non-Catalytic Reduction (SNCR) in conjunction with Good Combustion Practices (GCP).

The above control options are further evaluated below with respect to economic, energy, and environmental impacts following the "top-down" BACT analysis approach.

5.3.5. Evaluation of Technically Feasible Control Alternatives

This section presents the "top-down" evaluation of SCR and SNCR which are the technically feasible control alternatives identified above for controlling NO_x emissions from the MWCs. The top-down analysis takes into account the economic, environmental, and energy impacts of the technically feasible add-on control technologies. In evaluating the economic impact of a technically feasible control option, primary consideration is given to the average cost-effectiveness of the option and in cases where more than one dominant control option is available, to the incremental cost effectiveness of the control option as compared to the next most stringent control option (USEPA, 1990). USEPA has recommended that to derive these costs, the procedures for estimating total controlled costs described in the USEPA Air Pollution Control Cost Manual (USEPA, 2002) should be followed. Ultimately, based on the top-down BACT criteria, a BACT determination can be made (i.e., an emission limit can be established), based on the use of the control technology that represents BACT.

5.3.5.1. Economic Impact of SCR

For the SCR economic impact analysis, capital and operating cost components were estimated following the general cost estimating approach described in the USEPA Air Pollution Control Cost Manual (USEPA, 2002). The specific capital cost factors presented in the NO_x control chapter of the USEPA cost manual were not used in this analysis because the cost factors and cost estimating equations presented in the manual were developed for high-dust ("hot side") SCR systems for NO_x control on coal-fired boilers. Consequently, to assist with determining the costs associated with the application of a SCR system to reduce NO_x emissions from the proposed MWC operations, various control system equipment vendors were contacted. Requests for estimates of SCR system capital costs and operating costs were made to the following companies:

- Alstom Power
- Babcock Power Inc.
- Haldor Topsoe, Inc.
- Johnson Matthey
- Siemens

None of the above listed vendors provided the requested cost information for a SCR control system. Only limited information was provided by Babcock Power relative to a

RSCR™ system which is an emerging control technology (as discussed above in Section 5.2.2.2, no pilot test or full-scale operating data are available from Babcock Power Inc. for a RSCR™ system applied to control NO_x emissions from a MWC; therefore this technology was eliminated from further consideration in this BACT analysis). Since the U.S. based vendor representatives did not provide the requested SCR cost information, a European engineering firm, Rambøll Denmark A/S (Rambøll), was contacted to obtain SCR cost data. Rambøll has extensive experience with SCR control systems for reducing NO_x emissions from MWCs at WTE facilities located throughout Europe and provided a technical document with the requested SCR cost data and supporting technical information (Rambøll, 2009).

SCR capital and operating cost components were determined on the basis of applying a SCR control system to a single 1,000 tpd MWC unit and achieving an annual average NO_x outlet concentration of 50 ppm_{vd} at 7 percent oxygen. The capital costs include estimated direct costs (purchased equipment costs and installation costs) as well as indirect costs. The estimated cost associated with expanding the air pollution control building to accommodate the SCR system components was included separately as a direct installation cost item. Annual (direct) operating costs were also estimated and major items include future catalyst replacement costs, SCR reagent costs, and costs associated with lost power generation revenue attributed to the use of steam required for raising the flue gas temperature to the SCR operating temperature. In addition to the direct operating costs, indirect operating costs were calculated and include a conservative capital recovery cost based on a 20-year equipment life and a 7 percent interest rate, as suggested in the USEPA cost manual for NO_x control systems.

An itemized breakdown of the estimated SCR capital and operating cost components is shown in Table D-1 in Appendix D. The Rambøll technical document, which serves as the basis for the key equipment and operating cost items, is also provided in Appendix D. A summary of the economic impact analysis for SCR is provided below in Table 5-4.

As shown in Table 5-4, the analysis indicates that the economic impact of SCR on an average cost-effectiveness basis is $6,585 per ton of NO_x reduced. In recognition that a SNCR control system can also achieve a high level of NO_x emissions reduction, the incremental cost effectiveness of SCR as compared to SNCR was also calculated (estimated costs for a SNCR system were calculated as described in Section 5.3.5.5 below and assume an annual average outlet NO_x concentration of 85 ppm_{vd} at 7 percent oxygen). As shown in Table 5-4, the incremental cost effectiveness of SCR as compared to SNCR is calculated to be $30,818 per ton of NO_x reduced.

5.3.5.2. Environmental Impact of SCR

SCR produces a direct beneficial environmental impact by reducing NO_x emissions. However, an adverse impact on the environment results from the use of ammonia as the

reagent in a SCR system. Excess ammonia in the flue gas, commonly referred to as ammonia slip, can result in the formation of a visible plume from the reaction of ammonia with remaining chlorides present in the flue gas to form ammonium chloride. Since SCR suppliers typically guarantee a low ammonia slip concentration, this impact is expected to be minimal. Another adverse environmental impact is a solid waste disposal impact relative to disposal of the catalyst material after its useful lifetime. This impact is also expected to be minimal since the catalyst will have an estimated lifetime of approximately 5 years. An additional adverse environmental impact of SCR relates to the presence of rare earth metals in the catalyst. Rare earth metals are typically extracted by surface mining approaches (e.g., strip and open pit mining). Environmental impacts associated with mining for rare earths include soil and water loss from the mining process which strips land of all vegetation and displaces soil. If the mined land is not remediated, rainfall can wash displaced soil into waterways, causing silt build-up in rivers and reservoirs, thereby resulting in polluted waters and eroded soils. Further, chemicals used in the mining process (such as ammonium sulfate and oxalic acid) mix with the displaced mining soil and unless properly managed, can be found in nearby waterways (Xu, 1999). The refining of rare earths with various physical and chemical processes to remove impurities also produces waste streams that must be properly managed. The environmental impacts associated with the mining and refining of rare earth metals will likely receive increased attention as demand for rare earths increases in a variety of current and emerging technology related applications.

The adverse environmental impacts identified above are important considerations. However, they are not considered unusual or severe, and therefore do not eliminate SCR as BACT in this analysis.

5.3.5.3. Energy Impact of SCR

The main energy impacts of SCR are increased electricity requirements for the ID fan attributed to pressure drop across the SCR system components and steam demand for heating the flue gas stream to the SCR operating temperature. The steam demand will result in a loss in power generated by the facility because a portion of the steam generated from the combustion of MSW will be used to heat the flue gas stream. These energy "penalties" are factored into the economic impact analysis as direct operating costs. The estimated energy impact is summarized below in Table 5-4 on a kWh per ton of NO_x reduced basis. Although not included as part of the estimated economic impact of SCR, an additional impact will occur relative to the loss in power generation identified above for heating the flue gas stream. To produce the same net electricity for the grid, this loss in power generation will need to be offset by burning additional fuel (most likely fossil-fuel) at a power generating facility.

Table 5-4:
Summary of Economic, Environmental & Energy Impacts of NOx Control Alternatives (SCR & SNCR)

Item	SCR	SNCR
Economic Impacts		
NO_x Emission Reduction, tons/year	595.3	491.2
Total Annualized Cost, $/year	3,920,044	711,908
Cost Effectiveness, $/ton	6,585	1,449
Incremental Cost Effectiveness, $/ton	30,818	---
Environmental & Energy Impacts		
Environmental Impacts	Ammonia slip, catalyst disposal, water/soil impacts from mining rare earths	Ammonia slip
Energy Impacts, kWh/ton	12,876	803

5.3.5.4. SCR Conclusion

The suitability of SCR as BACT is not validated on the basis of economic impacts, which are in excess of those typically associated with acceptable BACT alternatives. In particular, the $30,818 per ton of NO_x incremental cost effectiveness calculated for SCR (as compared to SNCR) is excessive in consideration that SCR has not been established to reduce NO_x emissions from a MWC in the United States. Therefore, the next most stringent control alternative, SNCR, is considered below as BACT.

5.3.5.5. Economic Impact of SNCR

To determine the economic impact for SNCR, capital and operating cost components were estimated following the general cost estimating methodology described in the USEPA Air Pollution Control Cost Manual (USEPA, 2002). SNCR capital and operating cost components were determined on the basis of applying a SNCR control system to a single 1,000 tpd MWC unit and reducing NO_x emissions to achieve an annual average outlet concentration of 85 ppm_{vd} at 7 percent oxygen. The capital costs include estimated direct costs (purchased equipment costs and installation costs) as well as indirect costs. The specific SNCR cost factors and equations found in the USEPA cost manual, which are based on cost data for SNCR systems applied to coal-fired boilers, were not relied upon for estimating the SNCR capital costs. The purchased equipment cost for a SNCR system reflects an engineering estimate based on available cost information from a recent MWC control project at the Authority's existing NCRRF and includes costs for major system components. The major SNCR system components include a reagent storage tank, reagent circulation module and SNCR injector distribution module.

Annual (direct) operating costs were also estimated and include chemical reagent costs required for the SNCR control system. In addition to the direct operating costs, indirect operating costs were calculated and include a conservative capital recovery cost based on a 20-year equipment life and a 7 percent interest rate as suggested in the USEPA cost manual for NO_x control systems.

An itemized breakdown of the estimated SNCR capital and operating cost components is shown in Table D-1 in Appendix D. A summary of the economic impact analysis for SNCR is provided above in Table 5-4. As shown in Table 5-4, the analysis indicates that the economic impact of SNCR on an average cost-effectiveness basis is $1,449 per ton of NO_x reduced.

5.3.5.6. Environmental Impact of SNCR

A direct beneficial environmental impact of SNCR is reduced NO_x emissions to the atmosphere. However, an adverse impact on the environment results from the use of a chemical reagent, ammonia (or urea), in a SNCR system. Excess ammonia in the flue gas, commonly referred to as ammonia slip, can result in the formation of a visible plume. This potential impact is expected to be minimal since the ammonia feed rate in a modern SNCR system is optimized and controlled to produce low ammonia slip concentrations. SNCR does not result in water quality or solid waste disposal related environmental impacts. The adverse environmental impact identified is not considered unusual or severe, and therefore does not eliminate SNCR as BACT in this analysis.

5.3.5.7. Energy Impact of SNCR

The primary energy impact of a SNCR system is an increased electricity requirement to provide power for the reagent feed and injection system. This energy "penalty" is factored into the economic impact analysis as a direct operating cost. The estimated energy impact for SNCR is summarized above in Table 5-4 on a kWh per ton of NO_x reduced basis.

5.3.5.8. SNCR Conclusion

An analysis of economic, environmental and energy impacts was completed for a SNCR control system. The estimated economic impact of SNCR is not considered excessive in comparison with the costs typically associated with acceptable BACT alternatives. The environmental and energy impacts associated with SNCR are also not determined to be excessive. Consequently, SNCR is considered an acceptable BACT alternative to reduce NO_x emissions from the proposed MWC units.

5.3.6. Selection of BACT for NO_x Emissions

The proposed control system to satisfy BACT requirements for the MWCs is SNCR in conjunction with GCP on the basis of technical feasibility and an evaluation of economic, energy, and environmental impacts. This control system represents the top-level of NO_x

control that has been demonstrated to be technically feasible and reliable for application to a MWC in the United States. The proposed BACT limits (corrected to 7 percent oxygen, dry basis) for NO_x are a concentration of 85 ppm_v as a 12-month average and a concentration of 100 ppm_v as a 24-hour average. These proposed NO_x emission levels are lower than the most stringent permit limits for any mass-burn MWC operating in the United States.

The proposed use of SNCR for this project is appropriate, given the near equivalency of SNCR and SCR in reducing NO_x emissions and the excessively high incremental cost of SCR as compared to SNCR. The high incremental cost clearly illustrates that the substantially higher capital cost ($20.5 million for SCR versus $1.3 million for SNCR for a 1,000 tpd MWC unit) and total annualized cost for SCR are not commensurate with the less impressive amount of potential additional NO_x emission reductions. In addition to the excessive incremental cost impacts associated with SCR, it is also important to consider solid waste disposal trends that have occurred during the past 15 years. During this time there have been no new, large-scale WTE facilities constructed in Florida while landfill disposal of MSW has become more prominent. Relative to social impacts and the waste disposal hierarchy, FDEP noted in the BACT determination summary for the expansion unit at the Lee County Resource Recovery Facility that WTE is preferable to landfill disposal as it is a form of energy recycling (FDEP, 2003). FDEP further expressed the importance of achieving a better balance in Florida between landfilling and MSW combustion.

Of growing importance is the issue of greenhouse gas emissions. WTE reduces greenhouse gas emissions by avoiding methane emissions from landfill disposal and avoids carbon dioxide (CO_2) emissions resulting from the generation of electricity by fossil-fuel fired power plants. Additionally, the recovery of ferrous and nonferrous metals from the MSW stream by WTE saves energy and avoids CO_2 emissions generated during the manufacturing of metals from raw materials. WTE is globally recognized by the International Panel on Climate Change (IPCC) as a greenhouse gas emission mitigation technology and the World Economic Forum has presented WTE as one of eight renewable energy sources expected to meaningfully contribute in the future low-carbon energy system (World Economic Forum, 2009). In life-cycle analyses of various waste management options using the USEPA's Municipal Solid Waste Decision Support Tool, it has been shown that WTE yields the most beneficial results with respect to carbon emissions and other environmental impacts among various combinations of recycling with landfilling and WTE (Thorneloe, 2006).

Impacts on "tipping fees" are also an important consideration when assessing the NO_x control systems. For the proposed PBREF2, the estimated costs for SCR equate to an impact of $10.74/ton of waste, while the costs for SNCR would only marginally impact the tipping fee with an estimated cost of $1.95/ton of waste. In FDEP's technical

evaluation for the expansion of the Hillsborough County Resource Recovery Facility, an assessment of tipping fee impacts was presented (FDEP, 2006b). In this assessment, tipping fee impacts for SCR and SNCR were interpolated for a 600 tpd MWC based on data from a 1995 USEPA report with costs indicated to be in the range of $11/ton of waste for SCR and $1.30 to $2.00/ton of waste for SNCR (USEPA, 1995). It was also added that the potential tipping fee impact and additional capital cost for SCR can be important factors when determining whether to expand WTE capacity or use landfill disposal with a lower tipping fee. With respect to the PBREF2 project, the potential tipping fee impact is estimated to be over five times higher for SCR than SNCR. This potential tipping fee impact associated with SCR is substantial and further supports the proposed use of SNCR for this project.

Governor Crist and the Florida Legislature have promoted the use of renewable energy sources, such as WTE technology, to meet Florida's need for energy and fuel diversity. The Governor's Commission on Energy and Climate Change promoted the use of WTE as a means of accomplishing the state's goals for increasing its use of renewable energy. Section 403.702(2), Florida Statutes, specifically encourages local governments to consider the use of WTE technology, instead of landfills, for the disposal of their solid waste. Notwithstanding these directives promoting WTE technology, new WTE facilities will not be built if the cost of SCR or other requirements makes WTE too expensive to be economically competitive with landfills. In the current economic climate, the public will demand that their local government officials use the lowest cost alternative (landfills) for the disposal of the public's solid waste if the cost differential is too great.

5.4. BACT Analysis for Emissions of MWC Acid Gases (SO_2 and HCl), Fluorides, and SAM from the MWC

Emissions of acid gases including SO_2 and HCl, fluorides (HF), and sulfuric acid mist (SAM) will be generated from the operation of the MWC units. Acid gases are produced in the combustion unit from chemical reactions between sulfur, chlorine, fluorine, and other compounds in MSW and combustion air. The sections which follow discuss the technologies evaluated to reduce acid gas emissions from the MWC units to be installed at the PBREF2.

5.4.1. Description of Acid Gas Emissions from MWCs

Elemental sulfur chemically bound to other compounds in municipal solid waste (MSW) is a primary contributor to pollutant emissions from solid waste combustion. During combustion in the MWC a fraction of the sulfur is converted to various gaseous sulfur compounds, the rest leaves the MWC as bottom ash and fly ash. The specific sulfur compounds released from the MWC are dependent on the presence of other gaseous compounds, combustion temperatures, and chemical (oxidizing or reducing) conditions in

the combustion chamber. The oxidizing or reducing conditions directly influence the types of sulfur compounds that form.

Excess oxygen (oxidizing) conditions, typical of a MWC, produce SO_2 and SO_3. Conversely, deficient oxygen (reducing) conditions produce hydrogen sulfide (H_2S), carbonyl sulfide (COS) and elemental sulfur. Since the new unit will be operated under excess oxygen conditions, reduced forms of sulfur are not likely to form and will be negligible.

SO_2 is the predominant sulfur compound produced as a result of MSW combustion. When released into the air, some of the SO_2 reacts with atmospheric water vapor to form sulfuric acid (H_2SO_4). Sulfuric acid and emitted sulfuric acid mist (SAM) may further react in the atmosphere to form sulfate salts (particulate aerosols), which are a significant fraction of measured $PM_{2.5}$ concentrations.

Similar to sulfur, chlorine and fluorine are also chemically bound to compounds in MSW. During combustion in the MWC, fractions of the chlorine and fluorine are converted to various gaseous compounds. Subsequently, chlorine and fluorine react with atmospheric water vapor to form HCl and HF. These resultant pollutants can cause reduced visibility, material corrosion, and contribute to acid rain formation.

5.4.2. Candidate Control Alternatives

Emissions of SO_2 and acid gases from a MWC are typically controlled by one of three types of scrubbing systems. All three use an alkaline reagent to neutralize acid gases in the flue gas stream. Two of these scrubber systems employ a water solution as the sorbent. These systems are wet scrubbers and spray dryer absorbers, also referred to as semi-dry absorption and which typically work in concert with fabric filters. The third type of scrubbing system, dry sorbent injection (or limestone injection), scrubs by injecting a completely dry sorbent into the flue gas. A description of the three technologies is presented in subsequent sections of this analysis.

5.4.2.1. Wet Scrubbers

Wet scrubbers have been designed primarily for particulate control and secondly for acid gas control in refuse combustion facilities. A wet scrubber designed for acid gas control diffuses acid gas molecules into liquid alkaline droplets thereby initiating a neutralizing chemical reaction. The scrubber is designed for efficient gas/liquid contact with maximum contact time. Wet scrubber systems are capable of achieving acid gas removal efficiencies in the range of 95 percent or higher.

There are two typical alkaline reagents: lime slurry (calcium based), and caustic soda (sodium based). The lime/slurry systems benefit from less expensive media, but at a higher capital cost. The lime/acid gas reaction produces calcium based salts, which must

then be clarified, thickened, and vacuum filtered. Systems using the caustic soda/acid gas reaction produce a liquid waste that requires large, impervious holding ponds to evaporate and concentrate the dissolved sodium salts. Otherwise, the by-products of the reaction require a wastewater treatment plant.

Although wet scrubbers are frequently used domestically for high sulfur, fuel-fired power plants, municipal sludge combustors, and hazardous waste combustors, they have not been used in the waste-to-energy industry. Domestic MWC facilities have predominantly used dry or semi-dry flue gas desulfurization (FGD) systems in combination with a fabric filter (FF) baghouse. These systems minimize water use and enhance control of fine particulate matter relative to wet scrubbers.

5.4.2.2. Spray Dryer Absorber (SDA) with Fabric Filter (FF)

There are several terms used for spray dryer absorber (SDA) technologies, including dry scrubbers, wet-dry, spray dry absorbers, semi-dry absorption, or spray dry scrubbers. These scrubber technologies offer an effective and practical means of controlling acid gas emissions from MWCs. Consequently, SDAs have been applied to the majority of MWC domestic units in the past 15 years and for retrofit of existing MWCs to meet USEPA emission guidelines for acid gas emissions. Some design variations of semi-dry absorption have also been successfully used in Europe for approximately a similar period of time.

In a SDA system, acid-laden flue gases from the boiler contact finely atomized, alkaline lime slurry droplets in an absorbing chamber. The typical residence time is 10 to 15 seconds. The lime slurry droplets absorb the gases and react to form salts. Flue gas heat evaporates the water, leaving tiny particles of mixed salt and unreacted alkali. Cooling the gas has been proven to be a major factor influencing the removal of acid gases. SO_2 and other acid gas removal efficiencies are significantly higher when the scrubber is operated at reduced temperatures.

The scrubbing process generates a dry, free-flowing powder consisting of unreacted lime, calcium salts (mostly $CaCl_2$, $CaSO_3$, and $CaSO_4$), and fly ash. The heavier portion of the dry particles drops out onto the bottom of the scrubber vessel. The lighter portion is entrained by the flue gas and enters the particulate collection device for removal, which is usually a fabric filter (FF) or less typically an electrostatic precipitator (ESP) with respect to MWC applications.

For purposes of this permit application, SDA technology also includes functionally equivalent, recirculating-type, semi-dry scrubbing technology. This technology is a design variation of semi-dry absorption and consists of a reactor/quench in which the temperature of the flue gas is controlled by water injection. The water injection promotes reaction and removal of the strong acids (HCl and HF). Dry hydrated lime (or sodium

bicarbonate, if needed) is added in a requisite amount to control SO_2 emissions. After passing the reactor, the fly ash and other particulates are collected in the FF similar to the collection of particulates in the basic SDA process. The residues from the FF are recirculated several times multiplying contact time to ensure a high control efficiency is maintained.

FF versus ESP

Fabric filters are generally preferred over an ESP in combination with SDA because of their greater secondary reaction capability and inherent high control efficiency. Specifically, the porous filter cake formed on the FF bags contains both spent and unspent reagent. The filter cake has several advantages. It serves to control pressure drops, dampens surges or pollutant spikes, provides a site for increased reagent utilization, and increases equipment reliability. For these reasons, FFs have been the predominant particulate control device selected for MWC applications.

Lime Slurry Prep and Injection

Lime slurry ($Ca(OH)_2$) is prepared by hydrating pebble lime (CaO). The slurry and any needed additional cooling water are pumped into the scrubber's contact chamber and out via either nozzles or a rotary atomizer. The slurry contains stoichiometric quantities greater than the amount of lime necessary to neutralize SO_2 and acid gases in the flue gas. There are two dominant equipment designs that meet performance specifications for lime slurry injection; rotary-type atomizers and dual fluid nozzles.

Performance Results

To optimize acid gas removal by SDA/FF systems, several factors must be controlled. These factors include maintaining a lime-to-acid stoichiometric ratio typically exceeding three-fold and controlling the SDA outlet temperature (FF inlet) through the moisture content of the slurry, slurry droplet size, and inlet SO_2 concentration to the SDA. Operational information indicates that SDA/FF systems are capable of reducing acid gas emissions at efficiencies in the range of 95 percent or higher.

5.4.2.3. Dry Sorbent Injection (DSI)

DSI is an acid gas removal process, whereby dry sorbent powder reacts with SO_2 and the resulting solids are removed in a particulate collector. Four general approaches are available:

- Furnace sorbent injection
- Economizer sorbent injection
- Duct sorbent injection
- Hybrid sorbent injection

Furnace sorbent injection is the simplest technology. A dry sorbent is injected into the upper part of the furnace to react with SO_2 in the flue gas. The finely grained sorbent is distributed quickly and evenly over the entire cross section of the furnace in the upper part where the temperature is approximately in the 1400 to 2300 °F range. The sorbent is either commercially available limestone ($CaCO_3$) or hydrated lime ($Ca(OH)_2$). While the sorbent flows through the convective pass, the sorbent reacts with SO_2 and oxygen to form $CaSO_4$ that is later collected in the particulate collection system along with unused sorbent and fly ash. The removal efficiency is approximately 50 percent. Disadvantages are potential fouling and erosion of convective heat transfer surfaces.

Economizer sorbent injection has not been proposed or demonstrated on modern MWCs. In this approach, hydrated lime is injected into the flue gas stream near the economizer zone where the temperature is approximately in the range of 600 to 1200 °F. Because of the lack of available operational data, this experimental control option cannot be entirely assessed. Therefore, the approach is not considered a valid control option for the MWCs to be installed at the PBREF2.

Duct sorbent injection is an approach where the sorbent is evenly distributed in the flue gas duct following the preheater where the temperature is about 300 °F. The flue gas is humidified as necessary. SO_2 in the flue gas reacts with the sorbent, and the byproduct is collected downstream in the particulate collection system. The approach is more efficient than furnace sorbent injection with an 80 percent SO_2 removal efficiency in actual commercial installations. Factors influencing the performance of the system include:

- Sorbent reactivity
- Quantity of injected sorbent
- Relative humidity of the flue gas
- Gas and solids residence time in the duct
- Quantity of recycled, unreacted sorbent from the particulate control device
- Design quality of the ductwork for proper flow conditions allowing sufficient reaction time.

Hybrid sorbent injection combines furnace sorbent injection with any of several post furnace treatments, usually duct sorbent injection. The benefits achieved are higher sorbent utilization and greater SO_2 removal. Two examples of post furnace treatments are injection of secondary sorbents such as sodium compounds into the duct, and humidification in a specially designed vessel. Humidification reactivates unreacted CaO and can boost SO_2 removal efficiency up to 90 percent. The hybrid process has some very promising advantages including relatively high SO_2 removal, low capital cost, low

operating cost, easy to retrofit, easy operation and maintenance with no slurry handling, reduced installation area requirements due to compact equipment, and no wastewater treatment requirements. To date, the hybrid process has not been proposed or demonstrated on modern MWC facilities.

DSI/FF Combination

Greater acid gas control can be achieved by supplementing DSI with fabric filters (FF) as opposed to electrostatic precipitators (ESP) because fabric filters collect particulates and builds up a filter cake. The filter cake contains some unreacted sorbent. As gas passes through, further acid absorption takes place. FFs may also provide additional control of metals through effective control of fine particulate matter. An analysis of the performance of several DSI/FF facilities (Dutchess County, New York; Claremont, New Hampshire; Quebec City, Canada; and Wurzburg, West Germany) showed up to 90 percent SO_2 and 95 percent HCl removal efficiency. However, consistently achieving such removal levels has not been documented.

5.4.3. Evaluation of Technically Feasible Control Alternatives

The technically feasible candidate control alternatives identified above are further evaluated below.

SDA/FF Summary

SDA/FFs have many advantages over the other control technologies discussed, with few disadvantages. The performance advantages of a SDA/FF system include the following:

- SDA/FF systems provide effective SO_2 and other acid gas control. The systems also reduce emissions of organics and metals.
- The dry waste product from an SDA/FF system is much easier to handle and less costly to dispose of than the liquid waste from a wet scrubber.
- SDA/FF exhaust streams are not saturated, so the potential for corrosion is greatly reduced when compared to a wet scrubber. Furthermore, flue gas reheating, which would increase energy costs, is not required to prevent a saturated vapor plume.
- SDA/FF systems consume a small supply of water that evaporates and does not require treatment.

Two main disadvantages of SDA/FF systems are potential clogging of atomizers or spray nozzles and reagent accumulation on the dry scrubber walls; however, these potential operational issues have not been found to pose major operating challenges in practice. A SDA system also typically requires a larger quantity of sorbent and more installation space than a wet scrubber.

Wet Scrubber Summary

There are a number of significant disadvantages of wet scrubbers in MWC applications. These performance and operational disadvantages are identified below:

- High water consumption.
- Extensive and expensive effluent pretreatment system requirements.
- Generation of a sludge waste that requires thickening/dewatering and expensive disposal.
- Potential corrosion, scaling, and fouling of scrubber internal components and downstream equipment results from the saturated gas produced. High nickel chromium alloys, which are extremely expensive, are often specified.
- Production of an aesthetically displeasing visible water vapor plume.
- Poor plume dispersion of residual pollutants because of reduced buoyancy and lower plume rise resulting from lower stack gas temperatures.
- When used alone, wet scrubbers have limited effectiveness in controlling heavy metals and organic emissions. Typically, wet scrubbers are used jointly with ESPs. Fabric filters are not suitable in conjunction with wet scrubbers because of the detrimental effect of moisture on the filter bag material (Davis, W.T., 2000).
- Not effective in controlling submicron aerosol mists, including SAM.
- Relatively undemonstrated in modern MWCs in the United States.

Also relevant and noteworthy is that USEPA, in specifying the initial and amended emission guidelines and NSPS for large MWCs, has not given consideration to wet scrubbers for reducing acid gas emissions from MWCs.

DSI Summary

There are a number of disadvantages and operational challenges associated with the application of a dry injection scrubber system to a MWC unit. These disadvantages are listed below:

- Large quantities of hydrated lime that is more expensive than the pebble lime used in SDA/FFs are required. A large amount is needed to meet NSPS requirements for SO_2 removal. As a result, DSI's operational costs significantly exceed that of SDA.
- More scrubber waste is generated with DSI than with SDA because of higher sorbent usage.

- High residual alkalinity of the waste from DSI may require special handling.
- Fabric filters wear out more quickly because of more frequent cleaning necessitated by higher sorbent usages.
- Particulate control efficiency is decreased because of increased solids loading and altered properties of the particulate matter.
- Fouling may occur on convective heat transfer surfaces from sorbent injected into the economizer.
- Removal of condensable trace metals and organics is reduced because DSIs do not decrease the flue gas temperature as much as either wet scrubbers or SDAs.
- SO_2 removal efficiency is lower in DSIs than in either wet scrubbers or SDAs.

DSI may be ideal for retrofitting older combustion facilities that have no acid gas control and where control goals are only modest. For such applications, installation capital costs are minimal because dry sorbent can be injected directly into the existing furnace or duct work. However, DSI alone cannot be considered BACT for control of SO_2 and acid gases, because of lower control efficiency and minimal application to MWC facilities. Only when improved sorbents and processes are developed and tested on full-scale MWCs, should DSI systems be considered as BACT.

5.4.4. Ranking of Technically Feasible Control Alternatives

The top two acid control technologies are wet scrubbers and SDA, both technically feasible with essentially equivalent control efficiencies. DSI systems rank below these control alternatives with a lower expected control level. The candidate control technologies are ranked below according to their expected control efficiency levels:

- SDA/FF 85-95% SO_2 and 95-99% acid gas
- Wet Scrubber 85-95% SO_2 and 95-99% acid gas
- DSI 50-90% SO_2 and 90-95% acid gas

SDA and wet scrubbers both offer similar control efficiencies. However, there are many operational disadvantages associated with the use of wet scrubbers in MWC applications. Consequently, SDA/FF systems are the preferred control systems for reducing SO_2 and other acid gases from MWC units. Further, SDA/FF systems also are expected to provide a higher level of control of fine particulate matter (metals) and trace organics relative to the other candidate control alternatives. Table 5-3 below gives a summary of the acid gas control technologies considered in the BACT analysis.

Table 5-5:
Summary of Candidate Acid Gas Control Technologies

Control Technology	Expected Acid Gas Control Efficiency	Primary Operational Issues	Widely Used on Large MWCs
Spray Dryer Absorber/ Fabric Filter	95-99 percent	Although not a major operating challenge, atomizers or spray nozzles can clog and reagent can accumulate on the dry scrubber walls.	Yes
Wet Scrubber	95-99 percent	High water consumption and produces an effluent that must be treated. Corrosion, scaling and fouling of scrubber internal components can occur.	No (used in Europe; not in U.S.)
Dry Scrubber Injection	90-95 percent	Uses large quantities of lime, which causes more waste than other methods and results in shorter fabric filter life.	No

5.4.5. Selection of BACT for MWC Acid Gases, Fluorides, and SAM

BACT for control of SO_2 and other MWC acid gases for the MWC is determined to be a SDA/FF system. This conclusion is based on the ability of a SDA/FF system to provide the most effective control of acid gas emissions and is in agreement with permit determinations listed in the RBLC for recently permitted new MWC units. In addition, this conclusion is further supported by the NSPS for large MWCs. In determining appropriate emission standards for the NSPS, which was most recently amended in 2006, USEPA indicated that the best demonstrated technology for reducing emissions of acid gases from large MWCs is a SDA/FF system (70 Federal Register 75351, 2005).

5.5. BACT Analysis for Emissions of PM, Lead and MWC Metals from the MWC

The operation of the MWC unit will result in emissions of particulate matter ($PM/PM_{10}/PM_{2.5}$), lead and MWC metals. An evaluation of control alternatives to reduce these emissions from the MWCs is provided in the sections below. For simplicity, the pollutants addressed by this BACT analysis, which include PM, PM_{10}, $PM_{2.5}$, lead and MWC metals, are collectively referred to as PM emissions.

5.5.1. Description of PM Emissions

The main sources of PM emissions from a MWC include the dust generated in the tipping hall and combustion of the solid waste in the furnace. Dust is generated in the tipping hall by the movement of trucks and equipment, the mixing and movement of refuse, the dumping of refuse into the pit area, the loading of refuse and other activities. Air intakes

for the combustion unit create a negative pressure environment in the tipping hall area, entraining particulate matter and odors in the combustion air. Air is directed from the tipping floor through screened vents into the combustor, preventing the escape of odors and dust into the environment.

Incomplete combustion of fuel and entrainment of noncombustible inert matter in flue gas results in PM emissions in the solid or condensable form. Condensable PM is composed of vapor phase trace organics that were not completely converted to CO_2 and H_2O during combustion as well as vaporized heavy metals. Non-combusted inert matter, inorganic oxides, unburned combustibles and metals comprise most of the solid PM fraction. Many factors influence the size and quantity of particulates in the pre-controlled exhaust from a MWC. These factors include the following:

- Flue gas residence time and velocity
- Underfire air velocity through the combustor system
- Oxidizing/reducing conditions within the furnace
- Temperature
- Flue gas mixing
- Type of fuel burned
- Boiler configuration and boiler tube spacing.

At high temperatures and appropriate oxygen levels, more complete combustion occurs, which results in lower particulate mass. With proper boiler configuration and low gas velocity, heavier particles fall out of the flue gas as they pass the boiler or they move downstream to the SDA/FF unit. Particulates that fall out of the gas stream prior to the boiler outlet are collected and transported by enclosed conveyors for collection and conditioning if needed, and then are combined with the bottom ash collection system.

5.5.2. Candidate Control Alternatives

Air pollution control devices that have been used for control of PM emissions from MWCs include fabric filters (FF), electrostatic precipitators (ESP), cyclones, and wet scrubbers. FF and ESP control systems provide the highest level of PM emissions control and can typically achieve removal efficiencies over 99 percent. Cyclones remove approximately 60-95 percent of PM and wet scrubbers remove 50-99 percent of PM with removal efficiencies for these control systems decreasing below 50 percent as particle sizes decrease.

5.5.3. Ranking and Evaluation of Technically Feasible Control Technologies

As indicated above, the two most effective means of control of PM emissions from MWCs are FFs and ESPs, with both offering a similar level of PM emissions reduction. A review of the RBLC indicates that fabric filters are widely used for the control of PM from MWC exhaust streams. Only one entry in the RBLC indicates that an ESP is used for PM emissions control for a MWC unit. FF systems located downstream of an acid gas absorber (as discussed above in Section 5.4 for a SDA/FF combination) provide a secondary benefit of additional removal of acid gases due to the presence of filter cake on the FF bags which provides a site for increased reagent utilization. In addition, FFs have been shown to more effectively remove fine particulates including trace heavy metals and organic emissions.

5.5.4. Selection of BACT for PM Emissions

A FF (baghouse) system to control particulate matter (both PM and MWC metals) is proposed as BACT for the MWC units. The FF system will provide the top level of control among the technically feasible control alternatives, so no further evaluation is necessary. BACT for the MWC is concluded to be a FF system with maximum emission rates (at 7 percent oxygen) of 12 mg/dscm for PM, PM_{10} and $PM_{2.5}$. The selected BACT is supported by the NSPS for large MWCs which are based on SDA/FF control systems and reflect the best performing control technology from USEPA's latest review of MWC test data in developing the 2006 amended NSPS/EG for large MWCs (70 Federal Register, 2005).

5.6. BACT Analysis for CO Emissions from the MWC

Incomplete oxidation of carbon compounds during combustion will result in the generation of CO emissions from the MWCs. Control of CO emitted from the combustion unit can be achieved through good combustion practices (GCPs) that utilize good chamber design to maximize oxidation of CO to CO_2, or by flue-gas controls that reduce CO emissions from the exiting flue gas stream. Control alternatives evaluated as BACT to reduce CO emissions from the MWCs are discussed in the sections below.

5.6.1. Description of CO Emissions from MWCs

CO is formed by incomplete oxidation of carbon compounds, such as solid waste and pyrolysis compounds near the fuel bed, during combustion. Emissions can be controlled either by GCPs or flue gas controls. The level of CO emissions is generally dependent on the underfire air dispersion to the combustor, the design of the overfire air jets, the under/overfire air ratio, and furnace combustion temperature. Maintaining GCPs requires careful operation of the furnace. A high concentration of CO in the flue gas stream is typically a sign of poor combustion control, while a low CO concentration is an indicator of high combustion efficiency.

5.6.2. Evaluation of Candidate Control Alternatives

As indicated in the RBLC, thermal oxidizers, oxidation catalyst systems and other post combustion controls have not been used on MWCs for reducing CO emissions in the flue gas streams. Thermal oxidizers as a post-combustion control cannot be installed on sulfur-containing exhaust streams as they produce secondary pollutants. Further, these systems consume electrical energy. Oxidation catalysts are constructed of precious and semi-precious metals that are easily fouled by contaminants in the flue gas stream, such as sulfur, phosphorus, and trace metals. Consequently, post combustion controls are not considered BACT for the MWCs.

The primary objective of GCPs is to completely oxidize CO through proper operation of the combustor. Because of temperature variations in the furnace, MWC facilities must be designed and operated such that all combustion products are exposed for sufficient residence times at a minimum combustion temperature.

5.6.3. Selection of BACT for CO Emissions

GCPs is the selected control alternative for reducing CO emissions from the MWC units. Emission levels of 100 ppm_v (4-hour) and 80 ppm_v (12-month) are proposed as BACT for CO emissions. BACT will be achieved through the advanced design and proper operation of the combustor unit along with continuous monitoring of CO emissions and unit load level to ensure on-going adherence to GCP principles.

5.7. BACT Analysis for Emissions of VOCs and MWC Organics from the MWC

Emissions of VOCs and MWC organics, which are formed by incomplete oxidation of carbon compounds during the combustion process, are addressed in this section. Control alternatives evaluated as BACT to reduce organic emissions from the MWC units are discussed in the sections below.

5.7.1. Description of MWC Organic Emissions

VOCs and MWC organics (measured as chlorinated dibenzo-p-dioxins and dibenzofurans) are formed by incomplete oxidation during combustion of carbon compounds, such as solid waste and pyrolysis compounds near the fuel bed. Reduction of MWC organics emitted from the combustion unit can potentially be achieved through good combustion practices (GCPs) that utilize good chamber design to maximize oxidation of CO to CO_2, or by flue-gas controls that reduce the quantity of MWC organics in the exiting flue gas stream.

5.7.2. Evaluation of Candidate Control Alternatives

GCPs are effective in minimizing VOC emissions and preventing formation of dioxin through complete oxidation of organic compounds and carbonaceous solids which are

dioxin precursors. The important operating parameters associated with GCPs are time, temperature and turbulence. Dioxin synthesis occurs in the temperature range of 250-600°F, while combustion temperatures in a MWC unit approach 1800°F. A residence time in the combustor of 1 to 2 seconds at 1,800°F will destroy most gas-phase compounds. Effective GCPs can achieve the required dioxin/furan emissions level prescribed in the applicable NSPS for new MWCs.

Thermal oxidizers, oxidation catalyst systems and other post combustion controls are not listed in the RBLC because they have not been used on MWCs for reducing VOCs and MWC organics in flue gas streams. These post-combustion controls have not been used because they would have only a marginal or negligible effectiveness in reducing the very low level of organic emissions (less than 10 ppm_v) expected from a properly designed and operated MWC unit. Thermal oxidizers as a post-combustion control cannot be installed on sources that have sulfur-containing exhaust streams. In addition, thermal oxidation systems produce secondary combustion related pollutants and consume electrical energy. Oxidation catalysts are constructed of precious and semi-precious metals that are easily fouled by contaminants in the flue gas stream, such as sulfur, phosphorus, and trace metals. Consequently, post combustion controls are not considered BACT for the MWCs. Notwithstanding this conclusion, the use of acid gas, particulate and carbon injection air pollution control systems have an additional benefit of reducing emissions of VOCs and MWC organics.

5.7.3. Selection of BACT for VOCs and MWC Organics

As supported by a review of the RBLC, the implementation of GCPs is considered BACT for emissions of VOCs and MWC organics. An emissions limit of 13 ng/dscm (at 7 percent oxygen) is proposed as BACT for dioxin/furan emissions. For VOC emissions, an exhaust concentration of 7 ppm_v (at 7 percent oxygen, dry basis) is proposed to satisfy BACT requirements. BACT will be achieved through the advanced design and proper operation of the MWCs along with continuous monitoring of CO emissions and unit load level to ensure adherence to the principles of GCPs.

5.8. Control Technology Analysis for Mercury Emissions from the MWC

Mercury emissions from MWCs result from the presence of mercury containing materials in the waste stream. Although mercury is not a federally regulated PSD pollutant, a control technology analysis was completed for mercury in recognition of the importance of minimizing the amount of mercury released to the atmosphere. The control technology analysis performed for mercury emissions was conducted by following the same approach that was used for the PSD-BACT analysis.

5.8.1. Description of Mercury Emissions from MWCs

MSW consists of a broad range of materials, and consequently various metals. Mercury emissions arise from mercury containing materials (including discarded batteries). Most metals emissions are easily collected by the PM control system as the vapors condense on particles in the gas stream. However, mercury (Hg) has a higher vapor pressure and is not as easily collected. Mercury can also react with HCl in the flue gas stream to form mercuric chloride ($HgCl_2$) that is then collected by the PM control device. The PM control device needs to:

- Operate at temperatures below 400°F to promote adsorption
- Use an effective mercury sorbent, such as a high carbon fly ash
- Have the means to collect the spent sorbent

5.8.2. Candidate Control Alternatives

Various mercury control options were considered for the MWCs. These control alternatives evaluated in the sections below include activated carbon injection upstream of the particulate control device, wet scrubbers, and carbon filter beds.

5.8.2.1. Activated Carbon Injection (ACI) with Fabric Filter (FF)

ACI involves the injection of powdered activated carbon into the flue gas upstream of a PM control device. Mercury adsorbs onto the carbon particles, which are subsequently collected with other PM in the fabric filter (FF) device. Important mercury control factors are as follows:

- The temperature of the flue gas should be less than 400°F
- The type and amount of carbon injected
- The concentration and species of mercury in the flue gas
- The extent of the mercury-carbon contact

According to the USEPA, ACI used in conjunction with FFs can achieve at least an 85 percent reduction of mercury emissions. As an added benefit, an ACI/FF control system increases the collection of chlorinated dioxins, furans and potentially other semi-volatile organics.

5.8.2.2. Wet Scrubber Systems

Wet scrubbers can be used to control acid gases, metals, particulates, dioxins and furans. Although wet scrubbers have been applied in Europe for enhanced mercury control, they have not been applied on MWCs in the United States for that purpose. A scrubber can remove 90 percent of soluble species of mercury compounds, such as $HgCl_2$, and

mercuric oxide (HgO). However, the removal of elemental mercury is limited with a scrubber system. Another important disadvantage is that wet scrubbers generate a wastewater discharge that requires treatment. This treatment involves the use of chemical additives to precipitate out the captured mercury from the wastewater.

5.8.2.3. Carbon Filter Beds

Carbon filter beds can be used to control mercury emissions from MWC flue gases. Activated carbon enters at the top of the system via a funnel that diverts activated carbon into adsorber segments. The activated carbon moves vertically down the bed and exits at the bottom, while the flue gas stream flows through the bed horizontally. Activated carbon has an extremely large surface area that traps particles as they pass by in the gas stream. However, with a carbon filter bed it is very important to ensure a proper carbon feed rate to prevent 'hot spots' from developing. 'Hot spots' result when carbon does not evenly fill all the adsorber segments while the gas stream flows through the bed. The carbon bed develops areas with uneven gas flow that in turn cause some areas of the bed to get hotter than others where it is possible for the carbon to auto-ignite. Prevention of a fire requires that the gas flow through the beds be closely monitored. A low gas flow through the bed causes bed temperature to rise. As the bed ages, the porosity of the bed decreases as the pores collect pollutants from the gas stream, which in turn also reduces gas velocity.

5.8.3. Evaluation of Technically Feasible Control Alternatives

For the purposes of this analysis, wet scrubbers are not deemed a feasible control technology because of the necessity of a water treatment facility to treat the effluent from the scrubbers. The remaining technologies, ACI and carbon filter beds are discussed in subsequent paragraphs.

Although carbon filter beds can be an effective control alternative under certain circumstances, this alternative has not been applied on MWCs in the United States and there are several factors that make activated carbon beds an undesirable choice. The most compelling reason is the risk of 'hot spots' developing, either due to poor particle size distribution or porosity of the activated carbon, and potential for fires. Secondly, pushing air through a packed carbon bed increases the pressure drop across the bed and increases electrical cost to maintain gas velocity. Thirdly, the spent carbon must be disposed of regularly to prevent build up of obstacles in the carbon bed. For these reasons, carbon filter beds will not be further considered in this analysis.

ACI injected upstream of the SDA/FF system adsorbs mercury in the gas stream. The gas stream then enters the SDA/FF system, where the mercury is removed from the gas stream as particulate matter. ACI employed in conjunction with SDA/FF has been shown to reduce mercury emissions by 85 percent. A review of the RBLC indicates that ACI is

widely considered the control system of choice for reducing mercury emissions from MWCs.

5.8.4. Selection of BACT for Mercury

ACI in conjunction with a FF is chosen to represent BACT for the purpose of reducing mercury emissions from the MWCs. On a short-term basis (three test average from a quarterly test event), mercury emissions will be controlled to a maximum concentration of 25 µg/dscm corrected to 7 percent O_2 or an 85 percent reduction in mercury emissions will be achieved, whichever is less stringent. Annual mercury emissions (average of all test results from four quarterly test events) will be limited to 15 µg/dscm corrected to 7 percent O_2. The proposed mercury emission levels are more stringent than any emission limitation currently established for a MWC in the United States.

5.9. Control Technology Analyses for Ancillary Equipment

In addition to the MWCs, the PBREF2 will include the installation of ancillary equipment. BACT analyses are required to address potential air pollutant emissions from the following ancillary equipment:

- Storage silos for lime and carbon
- Diesel fire pumps
- Emergency generator

For the lime and carbon storage silos, the only pollutant to address is PM (including PM_{10} and $PM_{2.5}$). Consequently, a BACT analysis addressing PM emissions from this equipment is provided below. For the emergency fuel burning equipment, which includes diesel fire water pump engines and a diesel-fired emergency generator, BACT analyses for NO_x, SO_2, CO, PM and VOC emissions are required and are presented in the sections below.

5.9.1. BACT Analysis for PM Emissions from the Storage Silos

Lime and carbon will be used in the air pollution control systems for the MWC and stored at the facility in storage silos. Lime will be kept in storage silos for use in the SDA systems for control of SO_2 and other acid gases. Similarly, carbon will be stored in a storage silo for use in controlling mercury emissions by the ACI system. The lime and carbon silos will be filled on an intermittent basis and PM emissions will be limited to the periods when the silos are being filled. Each silo will be equipped with a FF (dust collector) mounted on the roof of the silo to control PM emissions. The FFs will be designed to discharge collected dust directly back into the storage silos. Emissions of PM are expected to be very low (less than 0.05 tons per year) due to the operation of the FFs and the limited number of filling events.

Proposed BACT for the storage silos is the use of FF dust collection systems. These control systems provide a top-level of PM emissions reduction and reflect BACT for the storage silos.

5.9.2. BACT Analysis for Diesel Fire Pumps

As part of the planned facility, two nominal 250 HP diesel-fired emergency fire pumps will be installed. These units will be used in the event of an emergency situation at the facility to provide power to pump water for fire suppression purposes. In non-emergency situations, the fire pumps will be operated intermittently for purposes of maintenance and readiness testing. The fire pumps will be subject to emission standards for compression ignition internal combustion engines in accordance with 40 CFR 60, Subpart IIII.

5.9.2.1. BACT Analysis for NO_x for Diesel Fire Pumps

A review of the RBLC indicates that add-on NO_x controls have not been installed on diesel fire pumps. This is expected in recognition of the emergency use purpose of these units and intermittent operation which is not conducive to effective operation of add-on air pollution control systems. The proposed BACT for the fire pumps is good combustion practices and engine design and compliance with the applicable NO_x emission limit for fire pump engines prescribed by 40 CFR 60, Subpart IIII.

5.9.2.2. BACT Analysis for SO_2 for Diesel Fire Pumps

The only SO_2 control technique required for use on emergency fire pumps is the use of low sulfur fuel. Add-on control systems have not been implemented on these units in recognition of the limited and intermittent operation associated with this equipment. Consequently, BACT for SO_2 emissions for the fire pumps is proposed to be the use of ultra low sulfur fuel (in accordance with 40 CFR 60, Subpart IIII requirements) and good combustion practices and engine design.

5.9.2.3. BACT Analysis for PM for Diesel Fire Pumps

Emergency diesel-fired engines can emit low levels of particulate from incomplete combustion. A review of the RBLC shows that add-on pollution control equipment to further reduce the low levels of PM emissions from a fire pump engine has not been required. Consequently, BACT is proposed to be good combustion control and engine design and compliance with the applicable PM emission limit for diesel fire pumps prescribed by 40 CFR 60, Subpart IIII.

5.9.2.4. BACT Analysis for CO for Diesel Fire Pumps

According to a review of the RBLC, the use of add-on control technologies for reducing CO emissions from emergency diesel engines has not been required. In light of the limited use and intermittent operation and low CO emissions associated with diesel fire pumps, add-on controls are not considered suitable and would have limited effectiveness. Therefore, good combustion practices and engine design and compliance with the

applicable CO emission limit prescribed by 40 CFR 60, Subpart IIII is proposed as BACT for the fire pumps.

5.9.2.5. BACT Analysis for VOCs for Diesel Fire Pumps

A review of the RBLC indicates that add-on control technologies have not been required to reduce VOC emissions from emergency diesel engines. In light of the limited/intermittent operation and low VOC emissions associated with diesel fire pumps, add-on controls are not considered suitable and would have limited effectiveness. Therefore, good combustion practices and engine design and compliance with the applicable VOC (non-methane hydrocarbon) emission limit prescribed by the 40 CFR 60, Subpart IIII standards is proposed as BACT for the diesel fire pumps.

5.9.3. BACT Analysis for Emergency Generator

As part of the planned facility, a nominal 250 kW diesel-fired emergency generator will be installed. The generator will provide limited backup power in the event of an emergency or during a power outage. This generator will not be used for peak shaving purposes or other revenue generating purposes. In non-emergency situations, the generator will be operated intermittently for purposes of maintenance operations and for routine testing. The generator will be subject to emission standards for compression ignition internal combustion engines in accordance with 40 CFR 60, Subpart IIII.

5.9.3.1. BACT Analysis for NO_x for Emergency Generator

A review of the RBLC indicates that add-on controls have not been required for diesel-fired emergency generators. Add-on control systems have not been implemented on emergency generators in recognition of the limited/intermittent operation associated with this equipment which is not conducive to effective operation of air pollution control systems. As such, the proposed BACT for the emergency generator is good combustion practices and engine design to achieve compliance with the applicable NO_x emission limit prescribed by the 40 CFR 60, Subpart IIII emission standards.

5.9.3.2. BACT Analysis for SO_2 for Emergency Generator

A review of the RBLC indicates that the only SO_2 control technique required for use on emergency generators is the use of low sulfur fuel. Add-on control systems have not been implemented on these units in recognition of the limited and intermittent operation associated with this equipment. Consequently, BACT for SO_2 emissions for the emergency generator is proposed to be the use of ultra low sulfur fuel (in accordance with 40 CFR 60, Subpart IIII requirements) and good combustion practices and engine design.

5.9.3.3. BACT Analysis for PM for Emergency Generator

The emergency generator planned for use at the PBREF2 is expected to generate very low levels of PM emissions. A review of the RBLC shows that add-on pollution control equipment to further reduce the low levels of PM emissions from an emergency generator

has not been required. Therefore, good combustion control and engine design and compliance with the applicable PM emission limit prescribed by 40 CFR 60, Subpart IIII is proposed as BACT for the emergency generator.

5.9.3.4. BACT Analysis for CO for Emergency Generator

A review of the RBLC indicates that the use of add-on control technologies for reducing CO emissions from emergency diesel engines has not been required. In light of the limited use and intermittent operation associated with emergency engines, add-on controls are not considered suitable and would have limited effectiveness. Therefore, good combustion practices and engine design and compliance with the applicable CO emission limit prescribed by 40 CFR 60, Subpart IIII is proposed as BACT for the emergency generator.

5.9.3.5. BACT Analysis for VOCs for Emergency Generator

A review of the RBLC indicates that add-on control technologies have not been required to reduce VOC emissions from emergency diesel engines. In light of the limited/intermittent operation and low VOC emissions associated with emergency diesel engines, add-on controls are not considered suitable and would have limited effectiveness. Therefore, good combustion practices and engine design and compliance with the applicable VOC (non-methane hydrocarbon) emission limit prescribed by the 40 CFR 60, Subpart IIII standards is proposed as BACT for the emergency generator.

5.10. Control Technology Analysis Summary

Control technology analyses have been completed to determine BACT requirements for the PBREF2 project. Tables 5-6 and 5-7 presented below provide a summary of the applicant's proposed BACT determinations and emission limits for the MWCs and ancillary equipment associated with the proposed facility.

Table 5-6:
BACT Summary for MWCs

Pollutant	Proposed Emission Limit (at 7% oxygen)	Proposed Control Technology
NO_x	100 ppm_{vd} (24-hr); 85 ppm_{vd} (12-month)	Selective Non-Catalytic Reduction
SO_2	24 ppm_{vd} (24-hr) or 80% reduction	Spray Dryer Absorber (with Fabric Filter)
HCl	20 ppm_{vd} or 95% reduction	
Fluorides (as HF)	3.5 ppm_{vd}	
Sulfuric Acid Mist	5 ppm_{vd}	
PM, PM_{10}, $PM_{2.5}$ and MWC Metals	12 mg/dscm	Fabric Filter
Lead	140 μg/dscm	
CO	100 ppm_{vd} (4-hr); 80 ppm_{vd} (30-day)	Good Combustion Practices and Design
VOCs	7 ppm_{vd}	
MWC Organics (as Dioxins/Furans)	13 ng/dscm	
Mercury	25 μg/dscm or 85% reduction (quarterly test); 15 μg/dscm (12-month)	Activated Carbon Injection (with Fabric Filter)

Table 5-7:
BACT Summary for Ancillary Equipment

Equipment	Pollutant(s)	Proposed Control Technology
Storage Silos	PM	Fabric Filter
Diesel Fire Pumps	NO_x, PM, SO_2, CO, VOC	Good Combustion Practices & Design and Use of Ultra Low Sulfur Fuel
Emergency Generator	NO_x, PM, SO_2, CO, VOC	Good Combustion Practices & Design and Use of Ultra Low Sulfur Fuel

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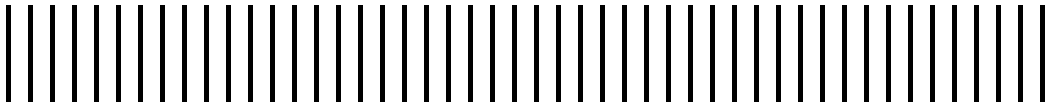
Prevention of Significant Deterioration (PSD)
Permit Application

Solid Waste Authority of Palm Beach County

Appendix A

FDEP Air Permit Application Form

Palm Beach Renewable Energy Facility No. 2



3582056

MALCOLM PIRNIE

Appendix A
FDEP Air Permit Application Form

A completed FDEP Form No. 62-210.900(1), Application for Air Permit – Long Form is provided in this appendix. The application form addresses the emission units associated with the proposed Palm Beach Renewable Energy Facility No. 2 as required for the issuance of an air construction permit for a proposed project subject to PSD review.

Department of
Environmental Protection

Division of Air Resource Management

APPLICATION FOR AIR PERMIT - LONG FORM

I. APPLICATION INFORMATION

Air Construction Permit – Use this form to apply for an air construction permit:

- For any required purpose at a facility operating under a federally enforceable state air operation permit (FESOP) or Title V air operation permit;
- For a proposed project subject to prevention of significant deterioration (PSD) review, nonattainment new source review, or maximum achievable control technology (MACT);
- To assume a restriction on the potential emissions of one or more pollutants to escape a requirement such as PSD review, nonattainment new source review, MACT, or Title V; or
- To establish, revise, or renew a plantwide applicability limit (PAL).

Air Operation Permit – Use this form to apply for:

- An initial federally enforceable state air operation permit (FESOP); or
- An initial, revised, or renewal Title V air operation permit.

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: **Solid Waste Authority of Palm Beach County**	
2. Site Name: **Palm Beach Renewable Energy Facility No. 2 (PBREF2)**	
3. Facility Identification Number:	
4. Facility Location... Street Address or Other Locator: **7501 North Jog Road** City: **West Palm Beach** County: **Palm Beach** Zip Code: **33412**	
5. Relocatable Facility? ☐ Yes ☑ No	6. Existing Title V Permitted Facility? ☐ Yes ☑ No

Application Contact

1. Application Contact Name: **Leah Richter, P.E.**
2. Application Contact Mailing Address... Organization/Firm: **Malcolm Pirnie, Inc.** Street Address: **8201 Peters Road, Suite 3400** City: **Plantation** State: **Florida** Zip Code: **33324**
3. Application Contact Telephone Numbers... Telephone: **(954) 525 - 2499** ext. Fax: **(954) 761 - 7939**
4. Application Contact E-mail Address: **lrichter@pirnie.com**

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	3. PSD Number (if applicable):
2. Project Number(s):	4. Siting Number (if applicable):

APPLICATION INFORMATION

Purpose of Application

This application for air permit is being submitted to obtain: (Check one)

Air Construction Permit

☑ Air construction permit.

☐ Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL).

☐ Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL), and separate air construction permit to authorize construction or modification of one or more emissions units covered by the PAL.

Air Operation Permit

☐ Initial Title V air operation permit.

☐ Title V air operation permit revision.

☐ Title V air operation permit renewal.

☐ Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is required.

☐ Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is not required.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit (Concurrent Processing)

☐ Air construction permit and Title V permit revision, incorporating the proposed project.

☐ Air construction permit and Title V permit renewal, incorporating the proposed project.

Note: By checking one of the above two boxes, you, the applicant, are requesting concurrent processing pursuant to Rule 62-213.405, F.A.C. In such case, you must also check the following box:

☐ I hereby request that the department waive the processing time requirements of the air construction permit to accommodate the processing time frames of the Title V air operation permit.

Application Comment

This is an application for an air construction permit for the Solid Waste Authority of Palm Beach County's proposed Palm Beach Renewable Energy Facility No. 2 (PBREF2). The proposed PBREF2 will feature mass-burn municipal waste combustor (MWC) units that will have a combined municipal solid waste (MSW) nominal processing capacity of 3,000 tons per day. Steam generated from the combustion of the MSW will be directed to a steam turbine generator set for the production of electricity. The proposed PBREF2 will be located at the Authority's existing Palm Beach Renewable Energy Park (PBREP) in West Palm Beach, Florida.

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Processing Fee
1	Municipal Waste Combustor #1	AC1A	*** see note below***
2	Municipal Waste Combustor #2	AC1A	
3	Municipal Waste Combustor #3	AC1A	
4a, 4b, 4c	Lime Storage Silos (3 units)	AC1F	
5	Carbon Storage Silo	AC1F	
6a, 6b	Diesel Fire Pumps (2 units)	AC1F	
7	Emergency Generator	AC1F	

Application Processing Fee

Check one: ☐ Attached - Amount: $_____ ☑ Not Applicable

**** In accordance with F.A.C. 62-4.050(4)(w), the air permit processing fee schedule does not apply to applications subject to certification under the Florida Electrical Power Plant Siting Act.***

APPLICATION INFORMATION

Owner/Authorized Representative Statement

Complete if applying for an air construction permit or an initial FESOP.

1. Owner/Authorized Representative Name :
   Mark Hammond, Executive Director
2. Owner/Authorized Representative Mailing Address...
   Organization/Firm: **Solid Waste Authority of Palm Beach County**
   Street Address: **7501 North Jog Road**
   City: **West Palm Beach** State: **Florida** Zip Code: **33412**
3. Owner/Authorized Representative Telephone Numbers...
   Telephone: **(561) 640-4000** ext. Fax: **(561) 640-3400**
4. Owner/Authorized Representative E-mail Address: **mhammond@swa.org**
5. Owner/Authorized Representative Statement:

   I, the undersigned, am the owner or authorized representative of the corporation, partnership, or other legal entity submitting this air permit application. To the best of my knowledge, the statements made in this application are true, accurate and complete, and any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department.

   Signature

   5/6/10
   Date

APPLICATION INFORMATION

Application Responsible Official Certification

Complete if applying for an initial, revised, or renewal Title V air operation permit or concurrent processing of an air construction permit and revised or renewal Title V air operation permit. If there are multiple responsible officials, the "application responsible official" need not be the "primary responsible official."

1. Application Responsible Official Name: **Mark Hammond, Executive Director**

2. Application Responsible Official Qualification (Check one or more of the following options, as applicable):

- ☐ For a corporation, the president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit under Chapter 62-213, F.A.C.
- ☐ For a partnership or sole proprietorship, a general partner or the proprietor, respectively.
- ☑ For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official.
- ☐ The designated representative at an Acid Rain source, CAIR source, or Hg Budget source.

3. Application Responsible Official Mailing Address...
Organization/Firm: **Solid Waste Authority of Palm Beach County**
Street Address: **7501 North Jog Road**
City: **West Palm Beach** State: **Florida** Zip Code: **33412**

4. Application Responsible Official Telephone Numbers...
Telephone: **(561) 640-4000** ext. Fax: **(561) 640-3400**

5. Application Responsible Official E-mail Address: **mhammond@swa.org**

6. Application Responsible Official Certification:

I, the undersigned, am a responsible official of the Title V source addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other applicable requirements identified in this application to which the Title V source is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit. Finally, I certify that the facility and each emissions unit are in compliance with all applicable requirements to which they are subject, except as identified in compliance plan(s) submitted with this application.

Signature

5/6/10
Date

APPLICATION INFORMATION

Professional Engineer Certification

1. Professional Engineer Name: **Amit Chattopadhyay**
   Registration Number: **52823**
2. Professional Engineer Mailing Address...
   Organization/Firm: **Malcolm Pirnie, Inc.**
   Street Address: **17-17 Route 208 North, 2nd Floor**
   City: **Fair Lawn** State: **NJ** Zip Code: **07410**
3. Professional Engineer Telephone Numbers...
   Telephone: **(201) 398 - 4311** ext. Fax: **(201) 797 - 4399**
4. Professional Engineer E-mail Address: **achattopadhyay@pirnie.com**
5. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

(3) If the purpose of this application is to obtain a Title V air operation permit (check here ☐, if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.

(4) If the purpose of this application is to obtain an air construction permit (check here ☑, if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here ☐, if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here ☐, if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

Signature (seal)

Date: 5/7/2010

AMIT CHATTOPADHYAY — LICENSED — No. 52823 — STATE OF FLORIDA — PROFESSIONAL ENGINEER

* Attach any exception to certification statement.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates... Zone **17** East (km) **585.3** North (km) **2961.7**		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) **26° 46' 33"** Longitude (DD/MM/SS) **80° 08' 31"**	
3. Governmental Facility Code: **3**	4. Facility Status Code: **C**	5. Facility Major Group SIC Code: **49**	6. Facility SIC(s): **4953**
7. Facility Comment :			

Facility Contact

1. Facility Contact Name: **Mark Hammond, Executive Director**
2. Facility Contact Mailing Address... Organization/Firm: **Solid Waste Authority of Palm Beach County** Street Address: **7501 North Jog Road** City: **West Palm Beach** State: **Florida** Zip Code: **33412**
3. Facility Contact Telephone Numbers: Telephone: **(561) 640-4000** ext. Fax: **(561) 640-3400**
4. Facility Contact E-mail Address: **mhammond@swa.org**

Facility Primary Responsible Official

Complete if an "application responsible official" is identified in Section I that is not the facility "primary responsible official."

1. Facility Primary Responsible Official Name:
2. Facility Primary Responsible Official Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
3. Facility Primary Responsible Official Telephone Numbers... Telephone: ( ) - ext. Fax: ( ) -
4. Facility Primary Responsible Official E-mail Address:

FACILITY INFORMATION

Facility Regulatory Classifications

Check all that would apply *following* completion of all projects and implementation of all other changes proposed in this application for air permit. Refer to instructions to distinguish between a "major source" and a "synthetic minor source."

1. ☐ Small Business Stationary Source	☐ Unknown
2. ☐ Synthetic Non-Title V Source	
3. ☑ Title V Source	
4. ☑ Major Source of Air Pollutants, Other than Hazardous Air Pollutants (HAPs)	
5. ☐ Synthetic Minor Source of Air Pollutants, Other than HAPs	
6. ☑ Major Source of Hazardous Air Pollutants (HAPs)	
7. ☐ Synthetic Minor Source of HAPs	
8. ☑ One or More Emissions Units Subject to NSPS (40 CFR Part 60)	
9. ☐ One or More Emissions Units Subject to Emission Guidelines (40 CFR Part 60)	
10. ☑ One or More Emissions Units Subject to NESHAP (40 CFR Part 61 or Part 63)	
11. ☐ Title V Source Solely by EPA Designation (40 CFR 70.3(a)(5))	
12. Facility Regulatory Classifications Comment:	

Item 10. Note:
Only the diesel fire pumps and emergency generator to be installed at proposed facility are expected to be subject to a NESHAP (Part 63) regulation. These emergency units will be subject to the NESHAP provisions under 40 CFR 63, Subpart ZZZZ for Reciprocating Internal Combustion Engines (RICE MACT rule).

FACILITY INFORMATION

List of Pollutants Emitted by Facility

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?
NOX	A - Major pollutant	
CO	A - Major pollutant	
SO2	A - Major pollutant	
H106	A - Major pollutant	
VOC	B - Facility regulated pollutant, not major or synthetic minor	
PM	B - Facility regulated pollutant, not major or synthetic minor	
PM10	B - Facility regulated pollutant, not major or synthetic minor	
PM2.5	B - Facility regulated pollutant, not major or synthetic minor	
PB	B - Facility regulated pollutant, not major or synthetic minor	
FL, H107	A - Major pollutant	
SAM	B - Facility regulated pollutant, not major or synthetic minor	
D/F	B - Facility regulated pollutant, not major or synthetic minor	
H114	B - Facility regulated pollutant, not major or synthetic minor	
H027	B - Facility regulated pollutant, not major or synthetic minor	
NH3	B - Facility regulated pollutant, not major or synthetic minor	

B. EMISSIONS CAPS

Facility-Wide or Multi-Unit Emissions Caps

1. Pollutant Subject to Emissions Cap	2. Facility-Wide Cap [Y or N]? (all units)	3. Emissions Unit ID's Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap

Not Applicable

7. Facility-Wide or Multi-Unit Emissions Cap Comment:

C. FACILITY ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Facility Plot Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **Figures 2-1, 2-2** ☐ Previously Submitted, Date:_____

2. Process Flow Diagram(s): (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **Figure 2-3** ☐ Previously Submitted, Date:_____

3. Precautions to Prevent Emissions of Unconfined Particulate Matter: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **Section 4.5.4** ☐ Previously Submitted, Date:_____

Additional Requirements for Air Construction Permit Applications

1. Area Map Showing Facility Location:
   ☑ Attached, Document ID: **Figure 2-1** ☐ Not Applicable (existing permitted facility)

2. Description of Proposed Construction, Modification, or Plantwide Applicability Limit (PAL):
   ☑ Attached, Document ID: **Section 2**

3. Rule Applicability Analysis:
   ☑ Attached, Document ID: **Section 4**

4. List of Exempt Emissions Units: **Diesel storage tank, aqueous ammonia (19%) or urea storage tank, and ash handling system (based on 62-210.300(3)(b)1., F.A.C.)**
   ☐ Attached, Document ID:_____ ☐ Not Applicable (no exempt units at facility)

5. Fugitive Emissions Identification:
   ☐ Attached, Document ID:_____ ☑ Not Applicable

6. Air Quality Analysis (Rule 62-212.400(7), F.A.C.):
   ☑ Attached, Document ID: **See Air Quality Modeling Report** ☐ Not Applicable

7. Source Impact Analysis (Rule 62-212.400(5), F.A.C.):
   ☑ Attached, Document ID: **See Air Quality Modeling Report** ☐ Not Applicable

8. Air Quality Impact since 1977 (Rule 62-212.400(4)(e), F.A.C.):
   ☑ Attached, Document ID: **See Air Quality Modeling Report** ☐ Not Applicable

9. Additional Impact Analyses (Rules 62-212.400(8) and 62-212.500(4)(e), F.A.C.):
   ☑ Attached, Document ID: **See Air Quality Modeling Report** ☐ Not Applicable

10. Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.):
    ☐ Attached, Document ID:_____ ☑ Not Applicable

C. FACILITY ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for FESOP Applications

1. List of Exempt Emissions Units:
   ☐ Attached, Document ID:_____ ☑ Not Applicable (no exempt units at facility)

Additional Requirements for Title V Air Operation Permit Applications

1. List of Insignificant Activities: (Required for initial/renewal applications only)
   ☐ Attached, Document ID:_____ ☐ Not Applicable (revision application)

2. Identification of Applicable Requirements: (Required for initial/renewal applications, and for revision applications if this information would be changed as a result of the revision being sought)
   ☐ Attached, Document ID:_____
   ☐ Not Applicable (revision application with no change in applicable requirements)

3. Compliance Report and Plan: (Required for all initial/revision/renewal applications)
   ☐ Attached, Document ID:
   Note: A compliance plan must be submitted for each emissions unit that is not in compliance with all applicable requirements at the time of application and/or at any time during application processing. The department must be notified of any changes in compliance status during application processing.

Not Applicable

4. List of Equipment/Activities Regulated under Title VI: (If applicable, required for initial/renewal applications only)
   ☐ Attached, Document ID:_____
   ☐ Equipment/Activities Onsite but Not Required to be Individually Listed
   ☐ Not Applicable

5. Verification of Risk Management Plan Submission to EPA: (If applicable, required for initial/renewal applications only)
   ☐ Attached, Document ID:_____ ☐ Not Applicable

6. Requested Changes to Current Title V Air Operation Permit:
   ☐ Attached, Document ID:_____ ☐ Not Applicable

C. FACILITY ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Facilities Subject to Acid Rain, CAIR, or Hg Budget Program

1. Acid Rain Program Forms:

   Acid Rain Part Application (DEP Form No. 62-210.900(1)(a)):
   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____
   ☑ Not Applicable (not an Acid Rain source)

   Phase II NO_X Averaging Plan (DEP Form No. 62-210.900(1)(a)1.):
   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____
   ☑ Not Applicable

   New Unit Exemption (DEP Form No. 62-210.900(1)(a)2.):
   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____
   ☑ Not Applicable

2. CAIR Part (DEP Form No. 62-210.900(1)(b)):
   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____
   ☑ Not Applicable (not a CAIR source)

3. Hg Budget Part (DEP Form No. 62-210.900(1)(c)):
   ☐ Attached, Document ID:_____ ☐ Previously Submitted, Date:_____
   ☑ Not Applicable (not a Hg Budget unit)

Additional Requirements Comment

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for an initial, revised or renewal Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for an air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application – Where this application is used to apply for both an air construction permit and a revised or renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes, and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit addressed in this application that is subject to air construction permitting and for each such emissions unit that is a regulated or unregulated unit for purposes of Title V permitting. (An emissions unit may be exempt from air construction permitting but still be classified as an unregulated unit for Title V purposes.) Emissions units classified as insignificant for Title V purposes are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

EMISSIONS UNIT INFORMATION
Section [1] of [5]

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

   ☑ The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

   ☐ The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

   ☐ This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

   ☑ This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

   ☐ This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:

Municipal Waste Combustor (MWC) Unit Nos. 1, 2, and 3
Three identical units each rated to process 1000 tons/day of municipal solid waste (MSW).

3. Emissions Unit Identification Number: **1, 2, 3 (see comment below)**

4. Emissions Unit Status Code: **C**	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: **49**

8. Federal Program Applicability: (Check all that apply)

   ☐ Acid Rain Unit

   ☐ CAIR Unit

   ☐ Hg Budget Unit

9. Package Unit:
   Manufacturer: Model Number:

10. Generator Nameplate Rating: **nominal 90-100 MW (combined for MWC Units #1, #2, #3)**

11. Emissions Unit Comment:
The emissions unit information in this section applies to each of three identical MWCs (Unit Identification Nos. 1, 2, and 3) and the information is provided on a per unit basis for each of the three MWCs.

Emissions Unit Control Equipment/Method: Control 1 of 4

1. Control Equipment/Method Description: **Selective Non-Catalytic Reduction for NOx**
2. Control Device or Method Code: **107**

Emissions Unit Control Equipment/Method: Control 2 of 4

1. Control Equipment/Method Description: **Gas Scrubber – Spray Dryer Absorber**
2. Control Device or Method Code: **013**

Emissions Unit Control Equipment/Method: Control 3 of 4

1. Control Equipment/Method Description: **Fabric Filter (High Temperature, T > 250 °F)**
2. Control Device or Method Code: **016**

Emissions Unit Control Equipment/Method: Control 4 of 4

1. Control Equipment/Method Description: **Activated Carbon Injection System (Carbon Adsorption)**
2. Control Device or Method Code: **207**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate:	**1000 tpd of MSW with HHV = 5000 Btu/lb**
2. Maximum Production Rate:	
3. Maximum Heat Input Rate:	**416.7 MMBtu/hr at 100% of the maximum continuous rating (MCR) and 458.3 MMBtu/hr at 110% of the MCR (see comments below)**
4. Maximum Incineration Rate:	**83,333 pounds/hr (at 100% MCR); 91,667 pounds/hr (at 110% MCR) and 1000 tons/day**
5. Requested Maximum Operating Schedule:	
24 hours/day	**7** days/week
52 weeks/year	**8760** hours/year

6. Operating Capacity/Schedule Comment:

The maximum heat input rate indicated above at 416.7 MMBtu/hr reflects the maximum continuous rating (MCR) of the combustion system corresponding to a municipal solid waste (MSW) throughput of 1000 tpd and a MSW higher heating value (HHV) of 5,000 Btu/lb.

The combustion system will have a short-term, peak heat input of 110% MCR.
For peak operations (short-term basis) at 110% MCR, the maximum heat input rate is approximately 458.3 MMBtu/hr.

C. EMISSION POINT (STACK/VENT) INFORMATION

(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **See Figure 2-2 and Air Quality Modeling Report**	2. Emission Point Type Code: **2 (see comment below)**

3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:

Not applicable

4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:

Not applicable

5. Discharge Type Code: **V**	6. Stack Height: **310 feet**	7. Exit Diameter: **8.1 feet**
8. Exit Temperature: **285 °F**	9. Actual Volumetric Flow Rate: **184,310 acfm**	10. Water Vapor: **19.6 %**

11. Maximum Dry Standard Flow Rate: **94,936 dscfm (at 7% oxygen)**	12. Nonstack Emission Point Height: feet
13. Emission Point UTM Coordinates... Zone: **17** East (km): **585.30** North (km): **2961.74**	14. Emission Point Latitude/Longitude… Latitude (DD/MM/SS) Longitude (DD/MM/SS)

15. Emission Point Comment:

Each of the three MWC units will have a separate exhaust flue. The exhaust flues will be co-located and contained in a common outer stack.

The flow rate data provided in items 9. and 11. reflect the design condition. Actual flow rates are expected to vary over a range of operating conditions.

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 2

1. Segment Description (Process/Fuel Type): **Municipal Solid Waste (MSW) will be combusted and steam will be produced to power an electrical generator (emissions related to tons of MSW burned).**		
2. Source Classification Code (SCC): **50100105**	3. SCC Units: **Tons Burned**	
4. Maximum Hourly Rate: **41.67 (at MCR)** **45.83 (at 110% MCR)**	5. Maximum Annual Rate: **365,000**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: **10**
10. Segment Comment:		

Segment Description and Rate: Segment 2 of 2

1. Segment Description (Process/Fuel Type): **Natural gas will be used on a limited basis as an auxiliary fuel during periods of unit start-up and shutdown and to maintain combustion temperature during combustion of low BTU waste.**		
2. Source Classification Code (SCC): **50190006**	3. SCC Units: **Million Cubic Feet Burned**	
4. Maximum Hourly Rate: **0.16**	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: **1020**
10. Segment Comment:		

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
NOX	**107**		**EL**
CO			**EL**
SO2	**013**	**016**	**EL**
H106	**013**	**016**	**EL**
VOC	**0**	**207**	**EL**
PM	**016**		**EL**
PM10	**016**		**EL**
PM2.5	**016**		**EL**
PB	**016**		**EL**
FL, H107	**013**	**016**	**EL**
SAM	**013**	**016**	**EL**
D/F	**0**	**207**	**EL**
H114	**207**	**016**	**EL**
H027	**016**		**EL**
NH3			**EL**

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **NOX**	2. Total Percent Efficiency of Control: **65-70%**
3. Potential Emissions: **74.76** lb/hour **253.02** tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **100 ppm$_{vd}$ at 7% oxygen (24-hour daily avg.) and 85 ppm$_{vd}$ at 7% oxygen (12-month rolling avg.)** Reference: **BACT**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **See Appendix B for detailed emission calculations**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **100 ppm_{vd} at 7% oxygen (24-hour) and 85 ppm_{vd} at 7% oxygen (12-month)**	4. Equivalent Allowable Emissions: **74.76** lb/hour **253.02** tons/year
5. Method of Compliance: **CEMS**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emission limits shown above are proposed as BACT and are more stringent than the NOx emission limit required by 40 CFR 60, Subpart Eb.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **CO**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **45.50** lb/hour **144.95** tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **100 ppm$_{vd}$ at 7% oxygen (4-hour block avg.) and 80 ppm$_{vd}$ at 7% oxygen (30-day rolling avg.)** Reference: **40 CFR 60, Subpart Eb and BACT**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **See Appendix B for detailed emission calculations**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **100 ppm_{vd} at 7% oxygen (4-hour)**	4. Equivalent Allowable Emissions: **45.50** lb/hour tons/year
5. Method of Compliance: **CEMS**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emission limit shown above is required by 40 CFR 60, Subpart Eb.**	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **80 ppm_{vd} at 7% oxygen (30-day)**	4. Equivalent Allowable Emissions: lb/hour **144.95** tons/year
5. Method of Compliance: **CEMS**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emission limit shown above is proposed as BACT as a 30-day rolling average and used to establish allowable annual emissions (tons/year).**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **SO2**	2. Total Percent Efficiency of Control: **80%**
3. Potential Emissions: **25.00** lb/hour **99.55** tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **24 ppm_{vd} at 7% oxygen (24-hour daily geometric avg.)** Reference: **BACT**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **See Appendix B for detailed emission calculations**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **24 ppm_{vd} at 7% oxygen (24-hour daily geometric avg.)**	4. Equivalent Allowable Emissions: **25.00** lb/hour **99.55** tons/year
5. Method of Compliance: **CEMS**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emission limit shown above is proposed as BACT and is more stringent than the emission limit required by 40 CFR 60, Subpart Eb.**	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **80% emission reduction**	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance: **CEMS**	
6. Allowable Emissions Comment (Description of Operating Method): **The above emission reduction level is prescribed by 40 CFR 60, Subpart Eb.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **H106 (HCl)**	2. Total Percent Efficiency of Control: **95%**
3. Potential Emissions: **11.86** lb/hour **47.24** tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **20 ppm_{vd} at 7% oxygen** Reference: **BACT**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **See Appendix B for detailed emission calculations**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **20 ppm_{vd} at 7% oxygen**	4. Equivalent Allowable Emissions: **11.86** lb/hour **47.24** tons/year
5. Method of Compliance: **USEPA Method 26 or 26A**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emission limit shown above is proposed as BACT and is more stringent than the emission limit required by 40 CFR 60, Subpart Eb.**	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **95% emission reduction**	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance: **USEPA Method 26 or 26A**	
6. Allowable Emissions Comment (Description of Operating Method): **The above emission reduction level is prescribed by 40 CFR 60, Subpart Eb.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **VOC**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **5.01** lb/hour **19.93** tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **7 ppm$_{vd}$ at 7% oxygen** Reference: **BACT**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **See Appendix B for detailed emission calculations**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **7 ppm_{vd} at 7% oxygen**	4. Equivalent Allowable Emissions: **5.01** lb/hour **19.93** tons/year
5. Method of Compliance: **USEPA Method 18 or 25A (initial performance test only to demonstrate compliance)**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emission limit shown above is proposed as BACT.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **PM, PM10, PM2.5**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **4.69** lb/hour **18.69** tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **12 mg/dscm at 7% oxygen** Reference: **BACT**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **See Appendix B for detailed emission calculations**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **12 mg/dscm at 7% oxygen**	4. Equivalent Allowable Emissions: **4.69** lb/hour **18.69** tons/year
5. Method of Compliance: **USEPA Method 5**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emission limit shown above is proposed as BACT and is more stringent than the emission limit specified for PM by 40 CFR 60, Subpart Eb.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **PB**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **0.055** lb/hour **0.22** tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **140 µg/dscm at 7% oxygen** Reference: **40 CFR 60, Subpart Eb, BACT**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **See Appendix B for detailed emission calculations**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **140 µg/dscm at 7% oxygen**	4. Equivalent Allowable Emissions: **0.055** lb/hour **0.22** tons/year
5. Method of Compliance: **USEPA Method 29**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emission limit shown above is the emission limit specified by 40 CFR 60, Subpart Eb.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **FL, H107 (HF)**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **1.14** lb/hour **4.53** tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **3.5 ppm$_{vd}$ at 7% oxygen** Reference: **BACT**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **See Appendix B for detailed emission calculations**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **3.5 ppm_{vd} at 7% oxygen**	4. Equivalent Allowable Emissions: **1.14** lb/hour **4.53** tons/year
5. Method of Compliance: **USEPA Method 13A or 13B (initial performance test only to demonstrate compliance)**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emission limit shown above is proposed as BACT.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **SAM**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **7.97** lb/hour **31.74** tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **5 ppm_{vd} at 7% oxygen** Reference: **BACT**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **See Appendix B for detailed emission calculations**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **5 ppm_{vd} at 7% oxygen**	4. Equivalent Allowable Emissions: **7.97** lb/hour **31.74** tons/year
5. Method of Compliance: **USEPA Method 8 (initial performance test only to demonstrate compliance)**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emission limit shown above is proposed as BACT.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **D/F (Dioxin/Furan)**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **5.09E-06** lb/hour **2.03E-05** tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **13 ng/dscm at 7% oxygen** Reference: **40 CFR 60, Subpart Eb, BACT**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **See Appendix B for detailed emission calculations**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **13 ng/dscm at 7% oxygen**	4. Equivalent Allowable Emissions: **5.09E-06** lb/hour **2.03E-05** tons/year
5. Method of Compliance: **USEPA Method 23**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emission limit shown above is the emission limit specified by 40 CFR 60, Subpart Eb.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **H114 (Hg)**	2. Total Percent Efficiency of Control: **85%**
3. Potential Emissions: **9.78E-03** lb/hour **0.0234** tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **25 µg/dscm at 7% oxygen (quarterly test average)** **15 µg/dscm at 7% oxygen (12-month rolling average)** Reference:	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **See Appendix B for detailed emission calculations**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **25 µg/dscm at 7% oxygen (quarterly test)** **15 µg/dscm at 7% oxygen (12-month avg.)**	4. Equivalent Allowable Emissions: **9.78E-03** lb/hour **0.0234** tons/year
5. Method of Compliance: **USEPA Method 29**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable short-term and annual emission limits proposed as indicated above are more stringent than the emission limit required by 40 CFR 60, Subpart Eb.**	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **85% emission reduction**	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance: **USEPA Method 29**	
6. Allowable Emissions Comment (Description of Operating Method): **The above emission reduction level is prescribed by 40 CFR 60, Subpart Eb.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **H027 (Cd)**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **3.91E-03** lb/hour **0.0156** tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **10 µg/dscm at 7% oxygen** Reference: **40 CFR 60, Subpart Eb, BACT**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **See Appendix B for detailed emission calculations**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **10 µg/dscm at 7% oxygen**	4. Equivalent Allowable Emissions: **3.91E-03** lb/hour **0.0156** tons/year
5. Method of Compliance: **USEPA Method 29**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emission limit shown above is the emission limit specified by 40 CFR 60, Subpart Eb.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **NH3**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **4.14** lb/hour **16.50** tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **15 ppm$_{vd}$ at 7% oxygen** Reference: **anticipated maximum ammonia slip level for SNCR system**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **See Appendix B for detailed emission calculations**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **15 ppm_{vd} at 7% oxygen**	4. Equivalent Allowable Emissions: **4.14** lb/hour **16.50** tons/year
5. Method of Compliance: **USEPA Conditional Test Method CTM027 (initial performance test only)**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emission limit shown above is the anticipated maximum ammonia slip level for the SNCR control system.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

Complete Subsection G if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

Visible Emissions Limitation: Visible Emissions Limitation 1 of 1

1. Visible Emissions Subtype: **VE10**	2. Basis for Allowable Opacity: ☑ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: **10** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **USEPA Method 9 (performance testing) and COMS**	
5. Visible Emissions Comment: **The 10% opacity (6-minute average) standard is prescribed by 40 CFR 60, Subpart Eb.**	

Visible Emissions Limitation: Visible Emissions Limitation __ of ____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

H. CONTINUOUS MONITOR INFORMATION

Complete Subsection H if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor 1 of 7

1. Parameter Code: **EM**	2. Pollutant(s): **NOX**
3. CMS Requirement: ☑ Rule ☐ Other	
4. Monitor Information... **To Be Determined (items 4. – 6.)** Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
1. Continuous Monitor Comment: **A continuous emissions monitoring system (CEMS) for NOx is required by 40 CFR 60.58b(h).**	

Continuous Monitoring System: Continuous Monitor 2 of 7

1. Parameter Code: **EM**	2. Pollutant(s): **SO2**
3. CMS Requirement: ☑ Rule ☐ Other	
4. Monitor Information... **To Be Determined (items 4. – 6.)** Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment: **A continuous emissions monitoring system (CEMS) for SO2 is required by 40 CFR 60.58b(e).**	

H. CONTINUOUS MONITOR INFORMATION (CONTINUED)

Continuous Monitoring System: Continuous Monitor 3 of 7

1. Parameter Code: **EM**	2. Pollutant(s): **CO**
3. CMS Requirement:	☑ Rule ☐ Other
4. Monitor Information... To Be Determined (items 4. – 6.) Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment: **A continuous emissions monitoring system (CEMS) for CO is required by 40 CFR 60.58b(i).**	

Continuous Monitoring System: Continuous Monitor 4 of 7

1. Parameter Code: **VE**	2. Pollutant(s):
3. CMS Requirement:	☑ Rule ☐ Other
4. Monitor Information... **To Be Determined (items 4. – 6.)** Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment: **A continuous opacity monitoring system (COMS) is required by 40 CFR 60.58b(c).**	

H. CONTINUOUS MONITOR INFORMATION (CONTINUED)

Continuous Monitoring System: Continuous Monitor 5 of 7

1. Parameter Code: **O2**	2. Pollutant(s):
3. CMS Requirement: ☑ Rule ☐ Other	
4. Monitor Information... **To Be Determined (items 4. – 6.)** Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment: **A continuous emissions monitoring system (CEMS) for measuring the oxygen (or carbon dioxide) content of the flue gas at each location where CO, SO2, and NOx are monitored is required by 40 CFR 60.58b(b).**	

Continuous Monitoring System: Continuous Monitor 6 of 7

1. Parameter Code: **Steam Flow**	2. Pollutant(s):
3. CMS Requirement: ☑ Rule ☐ Other	
4. Monitor Information... **To Be Determined (items 4. – 6.)** Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment: **A steam flow meter is required by 40 CFR 60.58b(i) to continuously measure and record the steam flow (calculated as a 4-hour block average).**	

H. CONTINUOUS MONITOR INFORMATION (CONTINUED)

Continuous Monitoring System: Continuous Monitor 7 of 7

1. Parameter Code: **TEMP**	2. Pollutant(s):
3. CMS Requirement:	☑ Rule ☐ Other
4. Monitor Information... **To Be Determined (items 4. – 6.)** Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment: **A continuous monitoring system for measuring and recording the temperature (calculated as a 4-hour block average) of the flue gas stream at the inlet to the fabric filter (particulate matter control device) is required by 40 CFR 60.58b(i).**	

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____

2. Fuel Analysis or Specification: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____

3. Detailed Description of Control Equipment: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____

4. Procedures for Startup and Shutdown: (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____
   ☑ Not Applicable **(construction application)**

5. Operation and Maintenance Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____
   ☐ Not Applicable

6. Compliance Demonstration Reports/Records:
   ☐ Attached, Document ID: _____
   Test Date(s)/Pollutant(s) Tested: _____
   _____
   ☐ Previously Submitted, Date: _____
   Test Date(s)/Pollutant(s) Tested: _____
   _____
   ☐ To be Submitted, Date (if known):_____
   Test Date(s)/Pollutant(s) Tested: _____
   _____
   ☑ Not Applicable
   Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.

7. Other Information Required by Rule or Statute:
   ☑ Attached, Document ID: **see comment** ☐ Not Applicable

I. EMISSIONS UNIT ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(10) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)): ☑ Attached, Document ID: **see comment** ☐ Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rules 62-212.400(4)(d) and 62-212.500(4)(f), F.A.C.): ☑ Attached, Document ID: **see comment** ☐ Not Applicable
3. Description of Stack Sampling Facilities: (Required for proposed new stack sampling facilities only) ☑ Attached, Document ID: **see comment** ☐ Not Applicable

Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements: ☐ Attached, Document ID: _____
2. Compliance Assurance Monitoring: ☐ Attached, Document ID: _____ ☐ Not Applicable
3. Alternative Methods of Operation: ☐ Attached, Document ID: _____ ☐ Not Applicable
4. Alternative Modes of Operation (Emissions Trading): ☐ Attached, Document ID: _____ ☐ Not Applicable

Not Applicable

Additional Requirements Comment

Additional information indicated above is provided in the PSD permit application as follows:

Process Flow Diagram (see Section 2);
Fuel Analysis/Specification - municipal solid waste with a design higher heating value (HHV) of 5,000 Btu/lb; natural gas will be used as a supplemental fuel primarily during periods of startup/shutdown;
Detailed Control Equipment Description (see Sections 2 & 5 – note that detailed design level information on control equipment is not available);
Operation & Maintenance Plan and Description of Stack Sampling Facilities are not available and are to be provided at a later date;
Other Information Required by Rule or Statute (see Section 4 discussion of applicable regulatory requirements);
Control Technology Review & Analysis (see Section 5); and
Good Engineering Practice Stack Height Analysis (see Air Quality Modeling Report).

EMISSIONS UNIT INFORMATION
Section [2] of [5]

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

   ☑ The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

   ☐ The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

   ☐ This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

   ☑ This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

   ☐ This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
Three identical lime storage silos (Units #4a, 4b, 4c). These silos will be used to provide storage of lime for use in the spray dryer absorber control device to reduce acid gas emissions in the flue gas streams from the municipal waste combustors.

3. Emissions Unit Identification Number: **4a, 4b, 4c (see comment below)**

4. Emissions Unit Status Code: **C**	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: **49**

8. Federal Program Applicability: (Check all that apply)

   ☐ Acid Rain Unit

   ☐ CAIR Unit

   ☐ Hg Budget Unit

9. Package Unit:
   Manufacturer: Model Number:

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:
The emissions unit information in this section applies to each of three identical lime storage silos (Unit Identification Nos. 4a, 4b, and 4c) and the information is provided on a per unit basis for each of the three lime storage silos.

Emissions Unit Control Equipment/Method: Control 1 of 1

1. Control Equipment/Method Description: **Fabric Filter (Low Temperature, T < 180 °F)**
2. Control Device or Method Code: **018**

Emissions Unit Control Equipment/Method: Control __ of __

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control __ of __

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control __ of __

1. Control Equipment/Method Description:
2. Control Device or Method Code:

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate:	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate:	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule:	
24 hours/day	**7** days/week
52 weeks/year	**8760** hours/year
6. Operating Capacity/Schedule Comment:	

Information for the above items is not applicable to storage silos since they are not direct process/production equipment.

C. EMISSION POINT (STACK/VENT) INFORMATION

(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **See Figure 2-2**	2. Emission Point Type Code: **1 (see comment below)**	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: **Not applicable**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: **Not applicable**		
5. Discharge Type Code: **(see comment)**	6. Stack Height: **(see comment)** feet	7. Exit Diameter: **(see comment)** feet
8. Exit Temperature: **Ambient**	9. Actual Volumetric Flow Rate: **760** acfm	10. Water Vapor: %
11. Maximum Dry Standard Flow Rate:	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates... Zone: **17** East (km): **585.27** North (km): **2961.74**	14. Emission Point Latitude/Longitude… Latitude (DD/MM/SS) Longitude (DD/MM/SS)	
15. Emission Point Comment: **Each of the three lime storage silos will have a separate exhaust. Stack exhaust parameters (discharge type, height, and exit diameter) are not available pending final design information.** **The flow rate provided above in item 9. is the estimated flow rate expected during filling of a single lime silo.**		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Lime Storage Silo**		
3. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: **Information for the above items is not applicable to storage silos since they are not direct process/production units or fuel burning equipment.**		

Segment Description and Rate: Segment __ of __

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM	**018**		**NS**
PM10	**018**		**NS**
PM2.5	**018**		**NS**

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **PM, PM10, PM2.5**	2. Total Percent Efficiency of Control: **> 99%**
3. Potential Emissions: **0.078** lb/hour **0.032** tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.01 grains/dscf** Reference: **fabric filter design requirement**	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **See Appendix B for detailed emission calculations**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.01 grains/dscf**	4. Equivalent Allowable Emissions: **0.078** lb/hour **0.032** tons/year
5. Method of Compliance: **Waiver from PM compliance testing is proposed in accordance with F.A.C. 62-297.620(4), which allows FDEP to specify an alternative standard of 5% opacity and waive PM compliance test for emission units with potential emissions less than 100 tons per year and equipped with a baghouse.**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emissions shown above are proposed to satisfy BACT requirements.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

Complete Subsection G if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

Visible Emissions Limitation: Visible Emissions Limitation 1 of 1

1. Visible Emissions Subtype: **VE05**	2. Basis for Allowable Opacity: ☑ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: **5** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **USEPA Method 9**	
5. Visible Emissions Comment: **Waiver from PM compliance testing is proposed in accordance with F.A.C. 62-297.620(4), which allows FDEP to specify an alternative standard of 5% opacity and waive PM compliance test for emission units with potential emissions less than 100 tons per year and equipped with a baghouse.**	

Visible Emissions Limitation: Visible Emissions Limitation __ of ____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

H. CONTINUOUS MONITOR INFORMATION

Complete Subsection H if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor ___of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Not Applicable

Continuous Monitoring System: Continuous Monitor ___of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____

2. Fuel Analysis or Specification: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: **not applicable** ☐ Previously Submitted, Date _____

3. Detailed Description of Control Equipment: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____

4. Procedures for Startup and Shutdown: (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____
   ☑ Not Applicable (construction application)

5. Operation and Maintenance Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____
   ☐ Not Applicable

6. Compliance Demonstration Reports/Records:
   ☐ Attached, Document ID: _____
   Test Date(s)/Pollutant(s) Tested: _____
   _____
   ☐ Previously Submitted, Date: _____
   Test Date(s)/Pollutant(s) Tested: _____
   _____
   ☐ To be Submitted, Date (if known):_____
   Test Date(s)/Pollutant(s) Tested: _____
   _____
   ☑ Not Applicable
   Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.

7. Other Information Required by Rule or Statute:
   ☐ Attached, Document ID: **see comment** ☑ Not Applicable

I. EMISSIONS UNIT ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(10) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)):
   ☑ Attached, Document ID: **see comment** ☐ Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rules 62-212.400(4)(d) and 62-212.500(4)(f), F.A.C.):
   ☐ Attached, Document ID: _____ ☑ Not Applicable
3. Description of Stack Sampling Facilities: (Required for proposed new stack sampling facilities only)
   ☐ Attached, Document ID: _____ ☑ Not Applicable

Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements:
   ☐ Attached, Document ID: _____
2. Compliance Assurance Monitoring:
   ☐ Attached, Document ID: _____ ☐ Not Applicable
3. Alternative Methods of Operation:
   ☐ Attached, Document ID: _____ ☐ Not Applicable
4. Alternative Modes of Operation (Emissions Trading):
   ☐ Attached, Document ID: _____ ☐ Not Applicable

Not Applicable

Additional Requirements Comment

Additional information indicated above is provided in the PSD permit application as follows:

Process Flow Diagram (see Section 2);
Detailed Control Equipment Description (see Sections 2 & 5 – note that detailed design level information on control equipment is not available);
Operation & Maintenance Plan is not available and is to be provided at a later date; and
Control Technology Review & Analysis (see Section 5).

EMISSIONS UNIT INFORMATION
Section [3] of [5]

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

☑ The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

☐ The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

☑ This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

☐ This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

☐ This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
A single carbon storage silo (Unit #5). The silo will be used to provide storage of carbon which will be injected into the flue gas streams from the municipal waste combustors for control of mercury emissions.

3. Emissions Unit Identification Number: **5**

4. Emissions Unit Status Code: **C**	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: **49**

8. Federal Program Applicability: (Check all that apply)

☐ Acid Rain Unit

☐ CAIR Unit

☐ Hg Budget Unit

9. Package Unit:
Manufacturer: Model Number:

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

Emissions Unit Control Equipment/Method: Control 1 of 1

1. Control Equipment/Method Description: **Fabric Filter (Low Temperature, T < 180 °F)**
2. Control Device or Method Code: **018**

Emissions Unit Control Equipment/Method: Control __ of __

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control __ of __

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control __ of __

1. Control Equipment/Method Description:
2. Control Device or Method Code:

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate:
2. Maximum Production Rate:
3. Maximum Heat Input Rate:
4. Maximum Incineration Rate: pounds/hr tons/day
5. Requested Maximum Operating Schedule: **24** hours/day **7** days/week **52** weeks/year **8760** hours/year
6. Operating Capacity/Schedule Comment: **Information for the above items is not applicable to the storage silo since it is not direct process/production equipment.**

C. EMISSION POINT (STACK/VENT) INFORMATION

(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **See Figure 2-2**	2. Emission Point Type Code: **1**	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: **Not applicable**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: **Not applicable**		
5. Discharge Type Code: **(see comment)**	6. Stack Height: **(see comment)** feet	7. Exit Diameter: **(see comment)** feet
8. Exit Temperature: **Ambient**	9. Actual Volumetric Flow Rate: **910** acfm	10. Water Vapor: %
11. Maximum Dry Standard Flow Rate:	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates... Zone: **17** East (km): **585.33** North (km): **2961.74**	14. Emission Point Latitude/Longitude… Latitude (DD/MM/SS) Longitude (DD/MM/SS)	
15. Emission Point Comment: **Stack exhaust parameters (discharge type, height, and exit diameter) are not available pending final design information.** **The flow rate provided above in item 9. is the estimated flow rate expected during filling of the carbon silo.**		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Carbon Storage Silo**		
4. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: **Information for the above items is not applicable to storage silos since they are not direct process/production units or fuel burning equipment.**		

Segment Description and Rate: Segment __ of __

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM	**018**		**NS**
PM10	**018**		**NS**
PM2.5	**018**		**NS**

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **PM, PM10, PM2.5**	2. Total Percent Efficiency of Control: **> 99%**
3. Potential Emissions: **0.093** lb/hour **0.004** tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.01 grains/dscf** Reference: **Fabric filter design requirement**	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **See Appendix B for detailed emission calculations**	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.01 grains/dscf**	4. Equivalent Allowable Emissions: **0.093** lb/hour **0.004** tons/year
5. Method of Compliance: **Waiver from PM compliance testing is proposed in accordance with F.A.C. 62-297.620(4), which allows FDEP to specify an alternative standard of 5% opacity and waive PM compliance test for emission units with potential emissions less than 100 tons per year and equipped with a baghouse.**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emissions shown above are proposed to satisfy BACT requirements.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

Complete Subsection G if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

Visible Emissions Limitation: Visible Emissions Limitation 1 of 1

1. Visible Emissions Subtype: **VE05**	2. Basis for Allowable Opacity: ☑ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: **5** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **USEPA Method 9**	
5. Visible Emissions Comment: **Waiver from PM compliance testing is proposed in accordance with F.A.C. 62-297.620(4), which allows FDEP to specify an alternative standard of 5% opacity and waive PM compliance test for emission units with potential emissions less than 100 tons per year and equipped with a baghouse.**	

Visible Emissions Limitation: Visible Emissions Limitation __ of ____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

H. CONTINUOUS MONITOR INFORMATION

Complete Subsection H if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor ___of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Not Applicable

Continuous Monitoring System: Continuous Monitor ___of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____

2. Fuel Analysis or Specification: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: **not applicable** ☐ Previously Submitted, Date _____

3. Detailed Description of Control Equipment: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____

4. Procedures for Startup and Shutdown: (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____
   ☑ Not Applicable (construction application)

5. Operation and Maintenance Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____
   ☐ Not Applicable

6. Compliance Demonstration Reports/Records:
   ☐ Attached, Document ID: _____
   Test Date(s)/Pollutant(s) Tested: _____
   _____
   ☐ Previously Submitted, Date: _____
   Test Date(s)/Pollutant(s) Tested: _____
   _____
   ☐ To be Submitted, Date (if known):_____
   Test Date(s)/Pollutant(s) Tested: _____
   _____
   ☑ Not Applicable
   Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.

7. Other Information Required by Rule or Statute:
   ☐ Attached, Document ID: **see comment** ☑ Not Applicable

I. EMISSIONS UNIT ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(10) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)): ☑ Attached, Document ID: **see comment** ☐ Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rules 62-212.400(4)(d) and 62-212.500(4)(f), F.A.C.): ☐ Attached, Document ID: _____ ☑ Not Applicable
3. Description of Stack Sampling Facilities: (Required for proposed new stack sampling facilities only) ☐ Attached, Document ID: _____ ☑ Not Applicable

Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements: ☐ Attached, Document ID: _____
2. Compliance Assurance Monitoring: ☐ Attached, Document ID: _____ ☐ Not Applicable
3. Alternative Methods of Operation: ☐ Attached, Document ID: _____ ☐ Not Applicable
4. Alternative Modes of Operation (Emissions Trading): ☐ Attached, Document ID: _____ ☐ Not Applicable

Not Applicable

Additional Requirements Comment

Additional information indicated above is provided in the PSD permit application as follows:

Process Flow Diagram (see Section 2);
Detailed Control Equipment Description (see Sections 2 & 5 – note that detailed design level information on control equipment is not available);
Operation & Maintenance Plan is not available and is to be provided at a later date; and Control Technology Review & Analysis (see Section 5).

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

☑ The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

☐ The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

☐ This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

☑ This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

☐ This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
Two identical diesel fire pumps (Units #6a, 6b). These standby units will be used to provide power to pump water for fire suppression purposes in emergency situations.

3. Emissions Unit Identification Number: **6a, 6b**

4. Emissions Unit Status Code: **C**	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: **49**

8. Federal Program Applicability: (Check all that apply)

☐ Acid Rain Unit

☐ CAIR Unit

☐ Hg Budget Unit

9. Package Unit:
Manufacturer: Model Number:

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:
The emissions unit information in this section applies to each of two identical diesel fire pumps (Unit Identification Nos. 6a and 6b) and the information is provided on a per unit basis for each of the two diesel fire pumps.

EMISSIONS UNIT INFORMATION
Section [4] of [5]

Emissions Unit Control Equipment/Method: Control 1 of 1

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control _ of _

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Not Applicable

Emissions Unit Control Equipment/Method: Control _ of _

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control _ of _

1. Control Equipment/Method Description:
2. Control Device or Method Code:

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate:
2. Maximum Production Rate:
3. Maximum Heat Input Rate: **1.8 MMBtu/hr**
4. Maximum Incineration Rate: pounds/hr tons/day
5. Requested Maximum Operating Schedule: hours/day day/week weeks/year **100** hours/year **Additional operating time may be required in emergency situations. See comment below.**
6. Operating Capacity/Schedule Comment: **The requested maximum operating schedule reflects periodic maintenance and readiness testing of each diesel fire pump engine. Additional operating time may be required for operation during emergency situations.**

C. EMISSION POINT (STACK/VENT) INFORMATION

(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **See Figure 2-2 (located at Fire Pump House)**	2. Emission Point Type Code: **1 (see comment below)**

3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:

Not applicable

4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:

Not applicable

5. Discharge Type Code: **V**	6. Stack Height: **25** feet	7. Exit Diameter: **0.33** feet
8. Exit Temperature: **540 °C**	9. Actual Volumetric Flow Rate: **1344** acfm	10. Water Vapor: %

11. Maximum Dry Standard Flow Rate:	12. Nonstack Emission Point Height: feet
13. Emission Point UTM Coordinates... Zone: **17** East (km): **585.44** North (km): **2961.73**	14. Emission Point Latitude/Longitude… Latitude (DD/MM/SS) Longitude (DD/MM/SS)

15. Emission Point Comment:

Each of the two diesel fire pump units will have a separate exhaust. The exhaust temperature and flow rate provided above in items 8. and 9. is based on preliminary information from Cummins, Inc.

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Fire Pump Engine - diesel fuel (ultra low sulfur, 15 ppm_w sulfur content)**		
5. Source Classification Code (SCC): **20200102**	3. SCC Units: **Thousand Gallons Burned**	
4. Maximum Hourly Rate: **0.013 (see comment)**	5. Maximum Annual Rate: **1.3 (see comment)**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **0.0015**	8. Maximum % Ash:	9. Million Btu per SCC Unit: **138**
10. Segment Comment: **The maximum hourly rate data provided above in item 4. is based on preliminary information from Cummins, Inc (12.9 gal/hr of diesel at 250 HP). The maximum annual rate assumes 100 hours per year of operation of each standby fire pump engine for maintenance and readiness testing. If emergency situations occur for extended periods, the maximum annual rate may increase.**		

Segment Description and Rate: Segment __ of __

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
NOX			**EL**
CO			**EL**
SO2			**EL**
PM			**EL**
VOC			**EL**

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **NOX**	2. Total Percent Efficiency of Control: %
3. Potential Emissions: **1.40** lb/hour **0.070** tons/year	4. Synthetically Limited? ☑ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **2.544 grams/HP-hr** Reference: **Cummins, Inc.**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

See Appendix B for detailed emission calculations

11. Potential, Fugitive, and Actual Emissions Comment:

Potential emissions shown in item 3. reflect operation of the fire pump engine for purposes of maintenance and readiness testing. Additional annual emissions may result if emergency situations occur requiring water for fire suppression purposes for extended periods.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **2.544 grams/HP-hr**	4. Equivalent Allowable Emissions: **1.40** lb/hour **0.070** tons/year
5. Method of Compliance: **Purchasing fire pump engines that are certified by the manufacturer to meet the applicable emission standards and maintaining and operating the engines in accordance with manufacturer instructions.**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emissions shown above will meet NSPS (40 CFR 60, Subpart IIII for compression ignition internal combustion engines) and BACT requirements.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **CO**	2. Total Percent Efficiency of Control: %
3. Potential Emissions: **0.66** lb/hour **0.033** tons/year	4. Synthetically Limited? ☑ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **1.193 grams/HP-hr** Reference: **Cummins, Inc.**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

See Appendix B for detailed emission calculations

11. Potential, Fugitive, and Actual Emissions Comment:

Potential emissions shown in item 3. reflect operation of the fire pump engine for purposes of maintenance and readiness testing. Additional annual emissions may result if emergency situations occur requiring water for fire suppression purposes for extended periods.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **1.193 grams/HP-hr**	4. Equivalent Allowable Emissions: **0.66** lb/hour **0.033** tons/year
5. Method of Compliance: **Purchasing fire pump engines that are certified by the manufacturer to meet the applicable emission standards and maintaining and operating the engines in accordance with manufacturer instructions.**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emissions shown above will meet NSPS (40 CFR 60, Subpart IIII for compression ignition internal combustion engines) and BACT requirements.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **SO2**	2. Total Percent Efficiency of Control: %
3. Potential Emissions: **2.75E-03** lb/hour **1.37E-04** tons/year	4. Synthetically Limited? ☑ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **15 ppm_w sulfur content (ultra low sulfur diesel fuel)** Reference: **Cummins, Inc. and NSPS requirement**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

See Appendix B for detailed emission calculations

11. Potential, Fugitive, and Actual Emissions Comment:

Potential emissions shown in item 3. reflect operation of the fire pump engine for purposes of maintenance and readiness testing. Additional annual emissions may result if emergency situations occur requiring water for fire suppression purposes for extended periods.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **15 ppm_w sulfur content of fuel**	4. Equivalent Allowable Emissions: **2.75E-03** lb/hour **1.37E-04** tons/year
5. Method of Compliance: **Use of diesel fuel with maximum sulfur content specified by applicable NSPS requirements and maintaining and operating the units in accordance with manufacturer instructions.**	
6. Allowable Emissions Comment (Description of Operating Method): **Allowable emissions reflect the use of ultra low sulfur fuel as required by NSPS (40 CFR 60, Subpart IIII for compression ignition internal combustion engines) and will meet BACT requirements.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **PM**	2. Total Percent Efficiency of Control: %
3. Potential Emissions: **0.061** lb/hour **3.06E-03** tons/year	4. Synthetically Limited? ☑ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.111 grams/HP-hr** Reference: **Cummins, Inc.**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

See Appendix B for detailed emission calculations

11. Potential, Fugitive, and Actual Emissions Comment:

Potential emissions shown in item 3. reflect operation of the fire pump engine for purposes of maintenance and readiness testing. Additional annual emissions may result if emergency situations occur requiring water for fire suppression purposes for extended periods.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.111 grams/HP-hr**	4. Equivalent Allowable Emissions: **0.061** lb/hour **3.06E-03** tons/year
5. Method of Compliance: **Purchasing fire pump engines that are certified by the manufacturer to meet the applicable emission standards and maintaining and operating the engines in accordance with manufacturer instructions.**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emissions shown above will meet NSPS (40 CFR 60, Subpart IIII for compression ignition internal combustion engines) and BACT requirements.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **VOC**	2. Total Percent Efficiency of Control: %
3. Potential Emissions: **0.034** lb/hour **1.71E-03** tons/year	4. Synthetically Limited? ☑ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.062 grams/HP-hr** Reference: **Cummins, Inc.**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

See Appendix B for detailed emission calculations

11. Potential, Fugitive, and Actual Emissions Comment:

Potential emissions shown in item 3. reflect operation of the fire pump engine for purposes of maintenance and readiness testing. Additional annual emissions may result if emergency situations occur requiring water for fire suppression purposes for extended periods.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.062 grams/HP-hr**	4. Equivalent Allowable Emissions: **0.034** lb/hour **1.71E-03** tons/year
5. Method of Compliance: **Purchasing fire pump engines that are certified by the manufacturer to meet the applicable emission standards and maintaining and operating the engines in accordance with manufacturer instructions.**	
6. Allowable Emissions Comment (Description of Operating Method): **The allowable emissions shown above will meet NSPS (40 CFR 60, Subpart IIII for compression ignition internal combustion engines) and BACT requirements.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

Complete Subsection G if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

Visible Emissions Limitation: Visible Emissions Limitation __ of ____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

Not Applicable

Visible Emissions Limitation: Visible Emissions Limitation __ of ____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

H. CONTINUOUS MONITOR INFORMATION

Complete Subsection H if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor ___of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Not Applicable

Continuous Monitoring System: Continuous Monitor ___of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____

2. Fuel Analysis or Specification: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____

3. Detailed Description of Control Equipment: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: **not applicable** ☐ Previously Submitted, Date _____

4. Procedures for Startup and Shutdown: (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____
   ☑ Not Applicable (construction application)

5. Operation and Maintenance Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____
   ☐ Not Applicable

6. Compliance Demonstration Reports/Records:
   ☐ Attached, Document ID: _____
   Test Date(s)/Pollutant(s) Tested: _____
   _____
   ☐ Previously Submitted, Date: _____
   Test Date(s)/Pollutant(s) Tested: _____
   _____
   ☐ To be Submitted, Date (if known):_____
   Test Date(s)/Pollutant(s) Tested: _____
   _____
   ☑ Not Applicable
   Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.

7. Other Information Required by Rule or Statute:
   ☑ Attached, Document ID: **see comment** ☐ Not Applicable

I. EMISSIONS UNIT ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(10) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)): ☑ Attached, Document ID: **see comment** ☐ Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rules 62-212.400(4)(d) and 62-212.500(4)(f), F.A.C.): ☐ Attached, Document ID: _____ ☑ Not Applicable
3. Description of Stack Sampling Facilities: (Required for proposed new stack sampling facilities only) ☐ Attached, Document ID: _____ ☑ Not Applicable

Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements: ☐ Attached, Document ID: _____
2. Compliance Assurance Monitoring: ☐ Attached, Document ID: _____ ☐ Not Applicable
3. Alternative Methods of Operation: ☐ Attached, Document ID: _____ ☐ Not Applicable
4. Alternative Modes of Operation (Emissions Trading): ☐ Attached, Document ID: _____ ☐ Not Applicable

Not Applicable

Additional Requirements Comment

Additional information indicated above is provided in the PSD permit application as follows:

Process Flow Diagram - not applicable since the diesel fire pumps are standby units for fire suppression purposes in emergencies (not part of process operations);
Fuel Analysis – ultra low sulfur diesel (15 ppm_w sulfur content) will be used as required by the applicable NSPS Subpart IIII;
Operation & Maintenance Plan is not available and is to be provided at a later date;
Other Information Required by Rule or Statute (see Section 4); and
Control Technology Review & Analysis (see Section 5).

EMISSIONS UNIT INFORMATION
Section [5] of [5]

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

☑ The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

☐ The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

☑ This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

☐ This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

☐ This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
Emergency generator (Unit #7). This emergency unit will be used to provide limited power to the facility during periods of electrical power loss.

3. Emissions Unit Identification Number: **7**

4. Emissions Unit Status Code: **C**	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: **49**

8. Federal Program Applicability: (Check all that apply)

☐ Acid Rain Unit

☐ CAIR Unit

☐ Hg Budget Unit

9. Package Unit:
Manufacturer: Model Number:

10. Generator Nameplate Rating: **250 kW (nominal)**

Emissions Unit Comment:

EMISSIONS UNIT INFORMATION
Section [5 of [5]

Emissions Unit Control Equipment/Method: Control _ of _

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control _ of _

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control _ of _

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control _ of _

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Not Applicable

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate:
2. Maximum Production Rate:
3. Maximum Heat Input Rate: **2.65 MMBtu/hr**
4. Maximum Incineration Rate: pounds/hr tons/day
5. Requested Maximum Operating Schedule: hours/day day/week weeks/year **100** hours/year **Additional operating time may be required in emergency situations. See comment below.**
6. Operating Capacity/Schedule Comment: **The requested maximum operating schedule reflects use for maintenance purposes and readiness testing of the emergency generator. Additional operating time may be required for operations during emergency situations (power outages).**

C. EMISSION POINT (STACK/VENT) INFORMATION

(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **See Figure 2-2 (to be located in or near Switch Gear Room)**	2. Emission Point Type Code: **1**	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: **Not applicable**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: **Not applicable**		
5. Discharge Type Code: **V**	6. Stack Height: **26** feet	7. Exit Diameter: **0.83** feet
8. Exit Temperature: **1061 °F**	9. Actual Volumetric Flow Rate: **2085** acfm	10. Water Vapor: %
11. Maximum Dry Standard Flow Rate:	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates... Zone: **17** East (km): **585.22** North (km): **2961.74**	14. Emission Point Latitude/Longitude… Latitude (DD/MM/SS) Longitude (DD/MM/SS)	
15. Emission Point Comment: **The exhaust temperature and flow rate provided above in items 8. and 9. is based on preliminary information from Cummins, Inc.**		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Emergency generator – diesel fuel (ultra low sulfur, 15 ppm_w sulfur content)**		
8. Source Classification Code (SCC): **20200102**	3. SCC Units: **Thousand Gallons Burned**	
4. Maximum Hourly Rate: **0.019 (see comment)**	5. Maximum Annual Rate: **1.9 (see comment)**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **0.0015**	8. Maximum % Ash:	9. Million Btu per SCC Unit: **138**
10. Segment Comment: **The maximum hourly rate data provided above in item 4. is based on preliminary information from Cummins, Inc (19.2 gal/hr of diesel at full load condition). The maximum annual rate assumes 100 hours per year of operation for maintenance and readiness testing. If emergency situations occur for extended periods, the annual rate may increase.**		

Segment Description and Rate: Segment __ of __

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
NOX			**EL**
CO			**EL**
SO2			**EL**
PM			**EL**
VOC			**EL**

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **NOX**	2. Total Percent Efficiency of Control: %
3. Potential Emissions: **2.92** lb/hour **0.15** tons/year	4. Synthetically Limited? ☑ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **3.55 grams/HP-hr** Reference: **Cummins, Inc. (for worst-case load condition)**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

See Appendix B for detailed emission calculations

11. Potential, Fugitive, and Actual Emissions Comment:

Potential emissions shown in item 3. reflect operation of the emergency generator for purposes of maintenance and readiness testing. Additional annual emissions may result if emergency situations occur requiring use of the generator for extended periods.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **3.55 grams/HP-hr**	4. Equivalent Allowable Emissions: **2.92** lb/hour **0.15** tons/year
5. Method of Compliance: **Purchasing a generator that is certified by the manufacturer to meet the applicable emission standards and maintaining and operating the unit in accordance with manufacturer instructions.**	
6. Allowable Emissions Comment (Description of Operating Method): **Emissions will be certified by manufacturer to meet NSPS (40 CFR 60, Subpart IIII for compression ignition internal combustion engines) and will meet BACT requirements.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **CO**	2. Total Percent Efficiency of Control: %
3. Potential Emissions: **1.77** lb/hour **0.088** tons/year	4. Synthetically Limited? ☑ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **4.29 grams/HP-hr** Reference: **Cummins, Inc. (for worst-case load condition)**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

See Appendix B for detailed emission calculations

11. Potential, Fugitive, and Actual Emissions Comment:

Potential emissions shown in item 3. reflect operation of the emergency generator for purposes of maintenance and readiness testing. Additional annual emissions may result if emergency situations occur requiring use of the generator for extended periods.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **4.29 grams/HP-hr**	4. Equivalent Allowable Emissions: **1.77** lb/hour **0.088** tons/year
5. Method of Compliance: **Purchasing a generator that is certified by the manufacturer to meet the applicable emission standards and maintaining and operating the unit in accordance with manufacturer instructions.**	
6. Allowable Emissions Comment (Description of Operating Method): **Emissions will be certified by manufacturer to meet NSPS (40 CFR 60, Subpart IIII for compression ignition internal combustion engines) and will meet BACT requirements.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **SO2**	2. Total Percent Efficiency of Control: %
3. Potential Emissions: **4.09E-03** lb/hour **2.04E-04** tons/year	4. Synthetically Limited? ☑ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **15 ppm_w sulfur content (ultra low sulfur diesel fuel)** Reference: **Cummins, Inc. and NSPS requirement**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

See Appendix B for detailed emission calculations

11. Potential, Fugitive, and Actual Emissions Comment:

Potential emissions shown in item 3. reflect operation of the emergency generator for purposes of maintenance and readiness testing. Additional annual emissions may result if emergency situations occur requiring use of the generator for extended periods.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **15 ppm_w sulfur content of fuel**	4. Equivalent Allowable Emissions: **4.09E-03** lb/hour **2.04E-04** tons/year
5. Method of Compliance: **Use of diesel fuel with maximum sulfur content specified by applicable NSPS requirements and maintaining and operating the unit in accordance with manufacturer instructions.**	
6. Allowable Emissions Comment (Description of Operating Method): **Allowable emissions reflect the use of ultra low sulfur fuel as required by NSPS (40 CFR 60, Subpart IIII for compression ignition internal combustion engines) and will meet BACT requirements.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **PM**	2. Total Percent Efficiency of Control: %
3. Potential Emissions: **0.066** lb/hour **3.28E-03** tons/year	4. Synthetically Limited? ☑ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.32 grams/HP-hr** Reference: **Cummins, Inc. (for worst-case load condition)**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

See Appendix B for detailed emission calculations

11. Potential, Fugitive, and Actual Emissions Comment:

Potential emissions shown in item 3. reflect operation of the emergency generator for purposes of maintenance and readiness testing. Additional annual emissions may result if emergency situations occur requiring use of the generator for extended periods.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.32 grams/HP-hr**	4. Equivalent Allowable Emissions: **0.066** lb/hour **3.28E-03** tons/year
5. Method of Compliance: **Purchasing a generator that is certified by the manufacturer to meet the applicable emission standards and maintaining and operating the unit in accordance with manufacturer instructions.**	
6. Allowable Emissions Comment (Description of Operating Method): **Emissions will be certified by manufacturer to meet NSPS (40 CFR 60, Subpart IIII for compression ignition internal combustion engines) and will meet BACT requirements.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS

(Optional for unregulated emissions units.)

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: **VOC**	2. Total Percent Efficiency of Control: %
3. Potential Emissions: **0.12** lb/hour **5.77E-03** tons/year	4. Synthetically Limited? ☑ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.28 grams/HP-hr** Reference: **Cummins, Inc. (for worst-case load condition)**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

See Appendix B for detailed emission calculations

11. Potential, Fugitive, and Actual Emissions Comment:

Potential emissions shown in item 3. reflect operation of the emergency generator for purposes of maintenance and readiness testing. Additional annual emissions may result if emergency situations occur requiring use of the generator for extended periods.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.28 grams/HP-hr**	4. Equivalent Allowable Emissions: **0.12** lb/hour **5.77E-03** tons/year
5. Method of Compliance: **Purchasing a generator that is certified by the manufacturer to meet the applicable emission standards and maintaining and operating the unit in accordance with manufacturer instructions.**	
6. Allowable Emissions Comment (Description of Operating Method): **Emissions will be certified by manufacturer to meet NSPS (40 CFR 60, Subpart IIII for compression ignition internal combustion engines) and will meet BACT requirements.**	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of ___

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

Complete Subsection G if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

Visible Emissions Limitation: Visible Emissions Limitation __ of ____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

Not Applicable

Visible Emissions Limitation: Visible Emissions Limitation __ of ____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

H. CONTINUOUS MONITOR INFORMATION

Complete Subsection H if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor ___of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Not Applicable

Continuous Monitoring System: Continuous Monitor ___of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____

2. Fuel Analysis or Specification: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____

3. Detailed Description of Control Equipment: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: **not applicable** ☐ Previously Submitted, Date _____

4. Procedures for Startup and Shutdown: (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____
   ☑ Not Applicable (construction application)

5. Operation and Maintenance Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☑ Attached, Document ID: **see comment** ☐ Previously Submitted, Date _____
   ☐ Not Applicable

6. Compliance Demonstration Reports/Records:
   ☐ Attached, Document ID: _____
   Test Date(s)/Pollutant(s) Tested: _____
   _____
   ☐ Previously Submitted, Date: _____
   Test Date(s)/Pollutant(s) Tested: _____
   _____
   ☐ To be Submitted, Date (if known):_____
   Test Date(s)/Pollutant(s) Tested: _____
   _____
   ☑ Not Applicable
   Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.

7. Other Information Required by Rule or Statute:
   ☑ Attached, Document ID: **see comment** ☐ Not Applicable

I. EMISSIONS UNIT ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(10) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)): ☑ Attached, Document ID: **see comment** ☐ Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rules 62-212.400(4)(d) and 62-212.500(4)(f), F.A.C.): ☐ Attached, Document ID: _____ ☑ Not Applicable
3. Description of Stack Sampling Facilities: (Required for proposed new stack sampling facilities only) ☐ Attached, Document ID: _____ ☑ Not Applicable

Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements: ☐ Attached, Document ID: _____
2. Compliance Assurance Monitoring: ☐ Attached, Document ID: _____ ☐ Not Applicable
3. Alternative Methods of Operation: ☐ Attached, Document ID: _____ ☐ Not Applicable
4. Alternative Modes of Operation (Emissions Trading): ☐ Attached, Document ID: _____ ☐ Not Applicable

Not Applicable

Additional Requirements Comment

Additional information indicated above is provided in the PSD permit application as follows:

Process Flow Diagram - not applicable since the emergency generator is a standby unit (not part of normal process operations);
Fuel Analysis – ultra low sulfur diesel (15 ppm_w sulfur content) will be used as required by the applicable NSPS Subpart IIII;
Operation & Maintenance Plan is not available and is to be provided at a later date;
Other Information Required by Rule or Statute (see Section 4); and
Control Technology Review & Analysis (see Section 5).

Prevention of Significant Deterioration (PSD)
Permit Application

Solid Waste Authority of Palm Beach County

Appendix B

Emission Calculations

Palm Beach Renewable Energy Facility No. 2

3582056

MALCOLM PIRNIE

Appendix B
Emission Calculations

This appendix provides emission calculations for each emission unit to be installed and operated at the proposed Palm Beach Renewable Energy Facility No. 2. Emission calculations are included for the following equipment:

- Municipal waste combustors (MWCs)
- Lime storage silos
- Carbon storage silo
- Diesel fire pumps
- Emergency generator

TABLE B-1
Summary of Annual Emission Estimates for MWCs and Ancillary Equipment
Palm Beach Renewable Energy Facility No. 2

Pollutant	Maximum Annual Emissions, tons/yr				
	MWCs[1]	Silos[2]	Diesel Fire Pumps[3]	Emergency Generator	Total
Nitrogen Oxides (NO_x)	759.06	---	0.140	0.146	759.4
Carbon Monoxide (CO)	434.86	---	0.066	0.088	435.0
Sulfur Dioxide (SO_2)	298.66	---	2.75E-04	2.04E-04	298.7
Hydrogen Chloride (HCl)	141.72	---	---	---	141.7
Volatile Organic Compounds (VOCs)	59.79	---	3.42E-03	5.77E-03	59.8
Particulate Matter (PM)[4]	56.08	0.036	6.12E-03	3.28E-03	56.1
Particulate Matter (PM_{10})[4]	56.08	0.036	6.12E-03	3.28E-03	56.1
Particulate Matter ($PM_{2.5}$)[4]	56.08	0.036	6.12E-03	3.28E-03	56.1
Lead	0.65	---	---	---	0.65
Hydrogen Fluoride (HF)	13.59	---	---	---	13.6
Sulfuric Acid Mist (H_2SO_4)	95.22	---	---	---	95.2
MWC Organics (Dioxin/Furans)	6.08E-05	---	---	---	6.08E-05
Mercury	0.070	---	---	---	0.070
Cadmium	0.047	---	---	---	0.047
Ammonia Slip	49.50	---	---	---	49.5

[1] Maximum annual emissions are total emissions from three identical MWCs. The MWCs will each have a nominal MSW processing capacity of 1000 tpd.

[2] Maximum annual emissions are total emissions from lime and carbon storage silos.

[3] Maximum annual emissions are total emissions from two identical diesel fire pump units each with a nominal 250 HP power output rating.

[4] Maximum annual emissions of PM, PM_{10} and $PM_{2.5}$ reflect emission levels to be demonstrated by testing for PM in accordance with USEPA Method 5.

TABLE B-2a
Emissions Estimates for Municipal Waste Combustors (MWCs)
Palm Beach Renewable Energy Facility No. 2

Estimated Exhaust Parameters at Design Condition for a MWC with a MSW Processing Capacity of 1000 tpd (65% Average Excess Air and 5,000 Btu/lb HHV for MSW)			
Exhaust Temp, ºF	285	Exhaust Flow, acfm	184,310
Exhaust Moisture, %	19.63	Exhaust Flow, dscfm	104,981
Exhaust Oxygen (dry basis), %	8.33	Corrected Exhaust Flow, dscfm at 7% oxygen	94,936

Pollutant	Maximum Concentration	Units [2]	Maximum Estimated Emissions [1]	
			lbs/hr [3]	tons/yr
Nitrogen Oxides (NO_x), 24-hour basis	100	ppm_{vd}	74.76	
Nitrogen Oxides (NO_x), 12-month rolling basis	85	ppm_{vd}		253.02
Carbon Monoxide (CO), 4-hour basis	100	ppm_{vd}	45.50	
Carbon Monoxide (CO), 30-day rolling basis	80	ppm_{vd}		144.95
Sulfur Dioxide (SO_2), 24-hour basis	24	ppm_{vd}	25.00	99.55
Hydrogen Chloride (HCl)	20	ppm_{vd}	11.86	47.24
VOCs (as propane)	7	ppm_{vd}	5.01	19.93
Particulate Matter (PM) [4]	12	mg/dscm	4.69	18.69
Particulate Matter (PM_{10}) [4]	12	mg/dscm	4.69	18.69
Particulate Matter ($PM_{2.5}$) [4]	12	mg/dscm	4.69	18.69
Lead	140	µg/dscm	0.055	0.22
Fluorides (as HF)	3.5	ppm_{vd}	1.14	4.53
Sulfuric Acid Mist (H_2SO_4)	5	ppm_{vd}	7.97	31.74
MWC Organics (Dioxins/Furans)	13	ng/dscm	5.09E-06	2.03E-05
Mercury, quarterly test basis [5]	25	µg/dscm	9.78E-03	
Mercury, 12-month rolling basis	15	µg/dscm		2.34E-02
Cadmium	10	µg/dscm	3.91E-03	1.56E-02
Ammonia Slip	15	ppm_{vd}	4.14	16.50

[1] Maximum estimated emissions reflects a single MWC unit with a nominal rated MSW processing capacity of 1000 tpd.

[2] Limits shown reflect concentrations corrected to 7% oxygen.

[3] Hourly emissions shown reflect maximum hourly values calculated at 110% of maximum continuous rating (MCR) for the combustor.

[4] Maximum estimated emissions for PM, PM_{10} and $PM_{2.5}$ reflect emissions to be measured as PM by USEPA Method 5 testing. PM_{10} and $PM_{2.5}$ emissions are conservatively assumed to be equivalent to the total PM emission rate.

[5] For mercury, the short-term maximum concentration is based on a three test average for a quarterly performance test event.

TABLE B-2b
Emission Calculations for Municipal Waste Combustors (MWCs)
Palm Beach Renewable Energy Facility No. 2

Data from Table B-2a	
Corrected Exhaust Flow, dscfm at 7% oxygen	94,936
NO_x Emission Limit, ppm_{vd} (at 7% oxygen), 24-hour basis	100
NO_x Emission Limit, ppm_{vd} (at 7% oxygen), 12-month basis	85
CO Emission Limit, ppm_{vd} (at 7% oxygen), 4-hr average basis	100
CO Emission Limit, ppm_{vd} (at 7% oxygen), 30-day rolling basis	80

MWC Emission Calculations

Calculations for NO_x

Estimated Maximum Hourly Emissions

= 94,936 dscfm × 100 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 46 lb/lbmol × 60 min/hr
= 67.96 lbs/hr × 1.1 (increase to 110% of MCR)
= 74.76 lbs/hr

Estimated Maximum Annual Emissions

= 94,936 dscfm × 85 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 46 lb/lbmol × 60 min/hr
= 57.767 lbs/hr × 8760 hr/yr × ton / 2000 lbs
= 253.02 tons/yr

Calculations for CO

Estimated Maximum Hourly Emissions

= 94,936 dscfm × 100 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 28 lb/lbmol × 60 min/hr
= 41.368 lbs/hr × 1.1 (increase to 110% of MCR)
= 45.50 lbs/hr

Estimated Maximum Annual Emissions

= 94,936 dscfm × 80 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 28 lb/lbmol × 60 min/hr
= 33.094 lbs/hr × 8760 hr/yr × ton / 2000 lbs
= 144.95 tons/yr

TABLE B-2b (Continued)
Emission Calculations for Municipal Waste Combustors (MWCs)
Palm Beach Renewable Energy Facility No. 2

Data from Table B-2a	
Corrected Exhaust Flow, dscfm at 7% oxygen	94,936
SO_2 Emission Limit, ppm_{vd} (at 7% oxygen)	24
HCl Emission Limit, ppm_{vd} (at 7% oxygen)	20

MWC Emission Calculations

Calculations for SO_2

Estimated Maximum Hourly Emissions

= 94,936 dscfm × 24 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 64.1 lb/lbmol × 60 min/hr
= 22.729 lbs/hr × 1.1 (increase to 110% of MCR)
= 25.00 lbs/hr

Estimated Maximum Annual Emissions

= 94,936 dscfm × 24 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 64.1 lb/lbmol × 60 min/hr
= 22.729 lbs/hr × 8760 hr/yr × ton / 2000 lbs
= 99.55 tons/yr

Calculations for HCl

Estimated Maximum Hourly Emissions

= 94,936 dscfm × 20 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 36.5 lb/lbmol × 60 min/hr
= 10.785 lbs/hr × 1.1 (increase to 110% of MCR)
= 11.86 lbs/hr

Estimated Maximum Annual Emissions

= 94,936 dscfm × 20 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 36.5 lb/lbmol × 60 min/hr
= 10.785 lbs/hr × 8760 hr/yr × ton / 2000 lbs
= 47.24 tons/yr

TABLE B-2b (Continued)
Emission Calculations for Municipal Waste Combustors (MWCs)
Palm Beach Renewable Energy Facility No. 2

Data from Table B-2a	
Corrected Exhaust Flow, dscfm at 7% oxygen	94,936
VOC Emission Limit, ppm_{vd} (at 7% oxygen as propane)	7
PM, PM_{10}, $PM_{2.5}$ Emission Limit, mg/dscm (at 7% oxygen)	12

MWC Emission Calculations

Calculations for VOC

Estimated Maximum Hourly Emissions

= 94,936 dscfm × 7 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 44 lb/lbmol × 60 min/hr
= 4.550 lbs/hr × 1.1 (increase to 110% of MCR)
= 5.01 lbs/hr

Estimated Maximum Annual Emissions

= 94,936 dscfm × 7 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 44 lb/lbmol × 60 min/hr
= 4.550 lbs/hr × 8760 hr/yr × ton / 2000 lbs
= 19.93 tons/yr

Calculations for PM, PM_{10}, $PM_{2.5}$

Estimated Maximum Hourly Emissions

= 94,936 dscfm × 12 mg/dscm × m^3 / 35.31 ft^3 × 60 mins/hr
× g / 1000 mg × lb / 453.6 g
= 4.268 lbs/hr × 1.1 (increase to 110% of MCR)
= 4.69 lbs/hr

Estimated Maximum Annual Emissions

= 94,936 dscfm × 12 mg/dscm × m^3 / 35.31 ft^3 × 60 mins/hr
× g / 1000 mg × lb / 453.6 g
= 4.268 lbs/hr × 8760 hr/yr × ton / 2000 lbs
= 18.69 tons/yr

TABLE B-2b (Continued)
Emission Calculations for Municipal Waste Combustors (MWCs)
Palm Beach Renewable Energy Facility No. 2

Data from Table B-2a	
Corrected Exhaust Flow, dscfm at 7% oxygen	94,936
Lead Emission Limit, µg/dscm (at 7% oxygen)	140
Fluorides Emission Limit, ppm_{vd} (at 7% oxygen as HF)	3.5

MWC Emission Calculations

Calculations for Lead

Estimated Maximum Hourly Emissions

= 94,936 dscfm × 140 µg/dscm × m^3 / 35.31 ft^3 × 60 mins/hr
× g / 10^6 µg × lb / 453.6 g
= 0.0498 lbs/hr × 1.1 (increase to 110% of MCR)
= 0.055 lbs/hr

Estimated Maximum Annual Emissions

= 94,936 dscfm × 140 µg/dscm × m^3 / 35.31 ft^3 × 60 mins/hr
× g / 10^6 µg × lb / 453.6 g
= 0.0498 lbs/hr × 8760 hr/yr × ton / 2000 lbs
= 0.22 tons/yr

Calculations for Fluorides (as HF)

Estimated Maximum Hourly Emissions

= 94,936 dscfm × 3.5 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 20 lb/lbmol × 60 min/hr
= 1.034 lbs/hr × 1.1 (increase to 110% of MCR)
= 1.14 lbs/hr

Estimated Maximum Annual Emissions

= 94,936 dscfm × 3.5 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 20 lb/lbmol × 60 min/hr
= 1.034 lbs/hr × 8760 hr/yr × ton / 2000 lbs
= 4.53 tons/yr

TABLE B-2b (Continued)
Emission Calculations for Municipal Waste Combustors (MWCs)
Palm Beach Renewable Energy Facility No. 2

Data from Table B-2a	
Corrected Exhaust Flow, dscfm at 7% oxygen	94,936
Sulfuric Acid Mist Emission Limit, ppm_{vd} (at 7% oxygen)	5
MWC Organics Emission Limit, ng/dscm (at 7% oxygen)	13

MWC Emission Calculations

Calculations for Sulfuric Acid Mist (H_2SO_4)

Estimated Maximum Hourly Emissions

= 94,936 dscfm × 5 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 98.1 lb/lbmol × 60 min/hr
= 7.247 lbs/hr × 1.1 (increase to 110% of MCR)
= 7.97 lbs/hr

Estimated Maximum Annual Emissions

= 94,936 dscfm × 5 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 98.1 lb/lbmol × 60 min/hr
= 7.247 lbs/hr × 8760 hr/yr × ton / 2000 lbs
= 31.74 tons/yr

Calculations for MWC Organics (Dioxins/Furans)

Estimated Maximum Hourly Emissions

= 94,936 dscfm × 13 ng/dscm × m^3 / 35.31 ft^3 × 60 mins/hr
× g / 10^9 ng × lb / 453.6 g
= 4.623 × 10^{-6} lbs/hr × 1.1 (increase to 110% of MCR)
= 5.09 × 10^{-6} lbs/hr

Estimated Maximum Annual Emissions

= 71,202 dscfm × 13 ng/dscm × m^3 / 35.31 ft^3 × 60 mins/hr
× g / 10^9 ng × lb / 453.6 g
= 4.623 × 10^{-6} lbs/hr × 8760 hr/yr × ton / 2000 lbs
= 2.03 × 10^{-5} tons/yr

TABLE B-2b (Continued)
Emission Calculations for Municipal Waste Combustors (MWCs)
Palm Beach Renewable Energy Facility No. 2

Data from Table B-2a	
Corrected Exhaust Flow, dscfm at 7% oxygen	94,936
Mercury Emission Limit, µg/dscm (at 7% oxygen), qtr. test basis	25
Mercury Emission Limit, µg/dscm (at 7% oxygen), 12-month basis	15
Cadmium Emission Limit, µg/dscm (at 7% oxygen)	10

MWC Emission Calculations

Calculations for Mercury

Estimated Maximum Hourly Emissions

= 94,936 dscfm × 25 µg/dscm × m^3 / 35.31 ft^3 × 60 mins/hr
× g / 10^6 µg × lb / 453.6 g
= 8.891 × 10^{-3} lbs/hr × 1.1 (increase to 110% of MCR)
= 9.78 × 10^{-3} lbs/hr

Estimated Maximum Annual Emissions

= 94,936 dscfm × 15 µg/dscm × m^3 / 35.31 ft^3 × 60 mins/hr
× g / 10^6 µg × lb / 453.6 g
= 5.335 × 10^{-3} lbs/hr × 8760 hr/yr × ton / 2000 lbs
= 0.0234 tons/yr

Calculations for Cadmium

Estimated Maximum Hourly Emissions

= 94,936 dscfm × 10 µg/dscm × m^3 / 35.31 ft^3 × 60 mins/hr
× g / 10^6 µg × lb / 453.6 g
= 3.556 × 10^{-3} lbs/hr × 1.1 (increase to 110% of MCR)
= 3.91 × 10^{-3} lbs/hr

Estimated Maximum Annual Emissions

= 94,936 dscfm × 10 µg/dscm × m^3 / 35.31 ft^3 × 60 mins/hr
× g / 10^6 µg × lb / 453.6 g
= 3.556 × 10^{-3} lbs/hr × 8760 hr/yr × ton / 2000 lbs
= 0.0156 tons/yr

TABLE B-2b (Continued)
Emission Calculations for Municipal Waste Combustors (MWCs)
Palm Beach Renewable Energy Facility No. 2

Data from Table B-2a	
Corrected Exhaust Flow, dscfm at 7% oxygen	94,936
Ammonia Emission Limit, ppm_{vd} (at 7% oxygen)	15

MWC Emission Calculations

Calculations for Ammonia

Estimated Maximum Hourly Emissions

= 94,936 dscfm × 15 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 17 lb/lbmol × 60 min/hr
= 3.767 lbs/hr × 1.1 (increase to 110% of MCR)
= 4.14 lbs/hr

Estimated Maximum Annual Emissions

= 94,936 dscfm × 15 ppm_{vd} × 10^{-6} / 0.7302 atm-ft^3/ lbmol-R
× 1 / (460 + 68) R × 17 lb/lbmol × 60 min/hr
= 3.767 lbs/hr × 8760 hr/yr × ton / 2000 lbs
= 16.50 tons/yr

TABLE B-3
Estimated Emissions from Lime Storage Silos
Palm Beach Renewable Energy Facility No. 2

Estimated Lime Storage Operating Data	
Filling Frequency	548 fill events/yr
Filling Duration	1.5 hrs/fill event
Air Blower Size	750 cfm
Lime Added	44,000 lb/fill event
Lime Density	45 lb/ft^3
Lime Volume Added	978 ft^3/fill event
PM Emission from Fabric Filter	0.01 gr/dscf
"Safety" Factor	20 %

Emission Calculations

Air Volume through Fabric Filter

= 750 ft^3/min × 60 min/hr × 1.5 hr/event + 978 ft^3/event
= 68,478 ft^3/event

Maximum Estimated Hourly PM Emissions

= 68,478 ft^3/event × 0.01 gr/dscf × 1 lb/7000 gr × 1 event/1.5 hr × 1.20 ("safety" factor)
= 0.078 lb/hr

Maximum Estimated Annual PM Emissions

= 0.078 lb/hr × 1.5 hr/event × 548 event/yr × 1 ton/2000 lb
= 0.032 tons/yr

Note: estimated emissions reflect total emissions for three identical lime silos planned for PBREF2.

TABLE B-4
Estimated Emissions from Carbon Storage Silo
Palm Beach Renewable Energy Facility No. 2

Estimated Carbon Storage Operating Data	
Filling Frequency	34 fill events/yr
Filling Duration	2.5 hrs/fill event
Air Blower Size	900 cfm
Carbon Added	35,000 lb/fill event
Carbon Density	32 lb/ft^3
Carbon Volume Added	1094 ft^3/fill event
PM Emission from Fabric Filter	0.01 gr/dscf
"Safety" Factor	20 %

Emission Calculations

Air Volume through Fabric Filter

= 900 ft^3/min × 60 min/hr × 2.5 hr/event + 1094 ft^3/event
= 136,094 ft^3/event

Maximum Estimated Hourly PM Emissions

= 136,094 ft^3/event × 1 event/2.5 hr × 0.01 gr/dscf × 1 lb/7000 gr × 1.20 ("safety" factor)
= 0.093 lb/hr

Maximum Estimated Annual PM Emissions

= 0.093 lb/hr × 2.5 hr/event × 34 events/yr × 1 ton/2000 lb
= 0.0040 tons/yr

TABLE B-5
Estimated Emissions from Diesel Fire Pumps
Palm Beach Renewable Energy Facility No. 2

Fire Water Pump Engine Specifications (Diesel-Fired)		
a) Power Output Rating (per unit)	250	hp
b) Maximum Annual Operating Hours (for maintenance & readiness testing)	100	hrs (per unit)

Pollutant	Emission Data* (g/hp-hr)	Maximum Estimated Emissions Per Unit	
		(lb/hr)	(tons/yr)
Nitrogen Oxides (NO_x)	2.544	1.40	7.01E-02
Carbon Monoxide (CO)	1.193	0.658	3.29E-02
Sulfur Dioxide (SO_2)	**	2.75E-03	1.37E-04
Particulate Matter (PM)	0.111	6.12E-02	3.06E-03
VOC	0.062	3.42E-02	1.71E-03

* Emissions data obtained from vendor emission data sheet (Cummins Inc., CFP7E-F60 Fire Pump Driver)

** Emissions for SO_2 are based on the use of ultra low sulfur diesel fuel (15 ppm_w sulfur content) and are calculated based on a 12.9 gal/hr fuel consumption rate from vendor data and a 7.1 lb/gal fuel density.

TABLE B-6
Estimated Emissions from Emergency Generator
Palm Beach Renewable Energy Facility No. 2

Emergency Generator Specifications (Diesel-Fired)	
Power Output Rating (nominal)	250 kW
Maximum Annual Operating Hours (for maintenance & readiness testing)	100 hrs

Pollutant	Power Output* (hp)	Emission Data* (g/hp-hr)	Maximum Estimated Emissions	
			(lb/hr)	(tons/yr)
Nitrogen Oxides (NO_x)	373	3.55	2.92	0.146
Carbon Monoxide (CO)	187	4.29	1.77	8.84E-02
Sulfur Dioxide (SO_2)	373	**	4.09E-03	2.04E-04
Particulate Matter (PM)	93	0.32	6.56E-02	3.28E-03
VOC	187	0.28	0.115	5.77E-03

* Emissions and power output data obtained from vendor emission data sheet (Cummins Inc., 250DQDAA 60 Hz Diesel Generator Set). Maximum emissions conservatively reflect short-term, worst-case emissions considering the various operating load conditions provided on the vendor emission data sheet. Average emission rates across the various load conditions will be lower to comply with the following federal emission standards for internal combustion engines (40 CFR 60, Subpart IIII and 40 CFR 89):

NO_x + NMHC: 3.0 g/hp-hr
CO: 2.6 g/hp-hr
PM: 0.15 g/hp-hr

** Emissions for SO_2 are based on the use of ultra low sulfur diesel fuel (15 ppm_w sulfur content) and are calculated based on a 19.2 gal/hr fuel consumption rate from vendor data and a 7.1 lb/gal fuel density.

Prevention of Significant Deterioration (PSD)
Permit Application

Solid Waste Authority of Palm Beach County

Appendix C

Materials Separation Plan

Palm Beach Renewable Energy Facility No. 2

3582056

MALCOLM PIRNIE

Appendix C
Materials Separation Plan

In accordance with the siting requirements of 40 CFR §60.57b, the Solid Waste Authority of Palm Beach County (Authority) has developed a Materials Separation Plan. The draft versions of the Materials Separation Plan and public review related information is provided in this appendix as part of the Authority's PSD permit application submittal. The following documents are provided herein:

- Preliminary and Final Draft Materials Separation Plan
- Response to Comments on Preliminary Draft Materials Separation Plan (note that no comments were received on the Preliminary Draft Materials Separation Plan; therefore, this information is not provided herein).
- Proof of Publication of the Notification of Public Meeting and Transcript of the Public Meeting on the Preliminary Draft Materials Separation Plan (this information is provided in Appendices J and K of the Final Draft Materials Separation Plan).

Solid Waste Authority of Palm Beach County

Materials Separation Plan

Preliminary Draft



June 2009

INDEPENDENT ENVIRONMENTAL ENGINEERS, SCIENTISTS AND CONSULTANTS

MALCOLM PIRNIE

The Preliminary Draft Materials Separation Plan (Plan) was drafted and available for public review for 30 days from June 4th, 2009 through July 8th, 2009. During that time the public did not submit any questions or comments on the Plan. Furthermore, a public meeting was held on July 8th, 2009 to give the public an opportunity to submit comments on the plan. No one from the public was in attendance at the meeting. The Preliminary Draft Materials Separation Plan has hence not been substantively changed. However, since the date of the preliminary draft plan, the Authority has recently combined their residential and commercial materials recovery facility operations and this is so noted within the text of the Final Draft Materials Separation Plan.

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Solid Waste Authority of Palm Beach County

Final Draft Materials Separation Plan



February 2010

INDEPENDENT ENVIRONMENTAL ENGINEERS, SCIENTISTS AND CONSULTANTS

MALCOLM PIRNIE

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B. Standard Solid Waste Interlocal Agreement
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G. Location of Solid Waste Authority Facilities
H. Preliminary Draft Materials Separation Plan – Public Meeting PowerPoint Presentation
I. Preliminary Draft Materials Separation Plan – Public Meeting Agenda
J. Preliminary Draft Materials Separation Plan – Public Notice Advertisement
K. Preliminary Draft Materials Separation Plan – Public Meeting Transcript

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List of Acronyms

Act	Solid Waste Act
Authority	Solid Waste Authority of Palm Beach County
C&D	Construction and Demolition
CESQG	Conditionally Exempt Small Quantity Generator Program
County	Palm Beach County
FDEP	Florida Department of Environmental Protection
HHW	Household Hazardous Waste
ISWMP	Integrated Solid Waste Management Plan
MRF	Material Recovery Facility
MSW	Municipal Solid Waste
NCRRF	North County Resource Recovery Facility (Existing Renewable Energy Facility)
Proposed Facility	Proposed New Renewable Energy Facility #2, a 3,000 tpd mass burn waste-to-energy (WTE) facility
RBRC	Rechargeable Battery Recycling Corporation
System	Municipal Solid Waste System
Tpd	Tons per day
Tpy	Tons per year
WTE	Waste-To-Energy

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1. Introduction

1.1. Purpose

The Solid Waste Authority (Authority) of Palm Beach County (County) intends to develop on the Authority's existing property the Palm Beach Renewable Energy Facility #2, a 3,000 tpd mass burn waste-to-energy (WTE) facility (Proposed Facility). This Materials Separation Plan is prepared by the Authority to satisfy the requirements set forth in 40 CFR 60.57 b, which applies to the development of a WTE facility.

1.2. Background

In 2006, the Authority updated its comprehensive Integrated Solid Waste Management Plan (ISWM Plan) with the principal goals of reducing the amount of waste placed in landfills for disposal and the conservation of landfill space as a result of effective integrated solid waste management operations. Under the ISWM Plan, the Authority manages solid waste through a combination of techniques and programs which recognize that municipal solid waste (MSW) is made up of distinct components that should be managed separately. In this Materials Separation Plan, the Authority explains how it addresses material separation as part of the Authority's overall integrated solid waste management program.

The Authority implements the provisions of the ISWM Plan through an award-winning, integrated, municipal solid waste management system (the System) that combines recycling, composting, converting waste to energy through combustion, and landfilling to effectively manage the County's waste. The System implements the provisions of the ISWM Plan and integrates solid waste transportation, processing, recycling, resource recovery and disposal technologies while protecting the environment and achieving the Authority's 50 percent (50%) recycling waste reduction goal. A more detailed description of the Authority's System is provided in Sections 2 and 3 of this Materials Separation Plan, which highlights the initiatives implemented by the Authority.

The Authority's existing renewable energy facility, the North County Resource Recovery Facility (NCRRF), has been operational since 1989 and has a rated capacity of 624,000 tons-per-year (tpy). However, over the past 10 years, the NCRRF has frequently processed more than 800,000 tpy of waste. In addition, nearly 500,000 tpy of combustible waste is landfilled because the capacity of the NCRRF has been exceeded. Due to the growing need for additional capacity as a result of recent and projected increases in the County's population, the Authority seeks to develop a 3,000 tpd

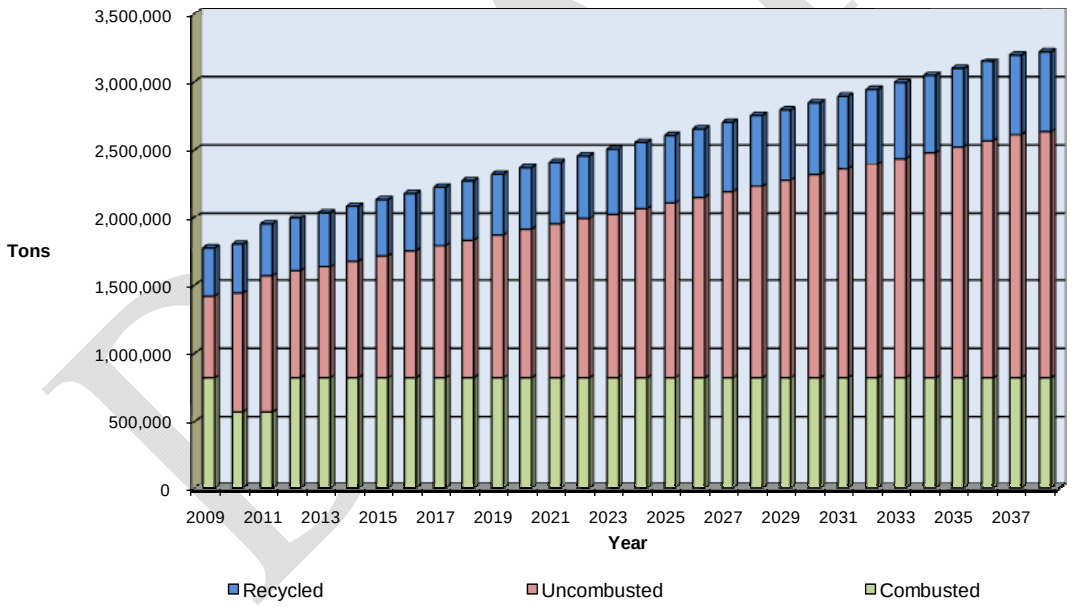
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Proposed Facility to increase the Authority's capacity to process combustible waste and minimize landfilling of MSW.

In 2008, the population of Palm Beach County was approximately 1,294,654. The population is projected to increase to 1,879,400 by 2030. Constructing the 3,000 tpd Proposed Facility will allow the Authority to increase overall waste processing capacity by approximately 985,000 tons per year (tpy) of MSW to address the increased MSW generation associated with the growing population. In addition, the Proposed Facility will extend the life of the Authority's existing and future Class I landfill.

Figure 1-1 (Waste Disposition-Current System Capacity) depicts the Authority's MSW processing capacity if the Authority continues to rely solely on the current combustion capacity of the NCRRF.

Figure 1-1: Waste Disposition -- Current System Capacity

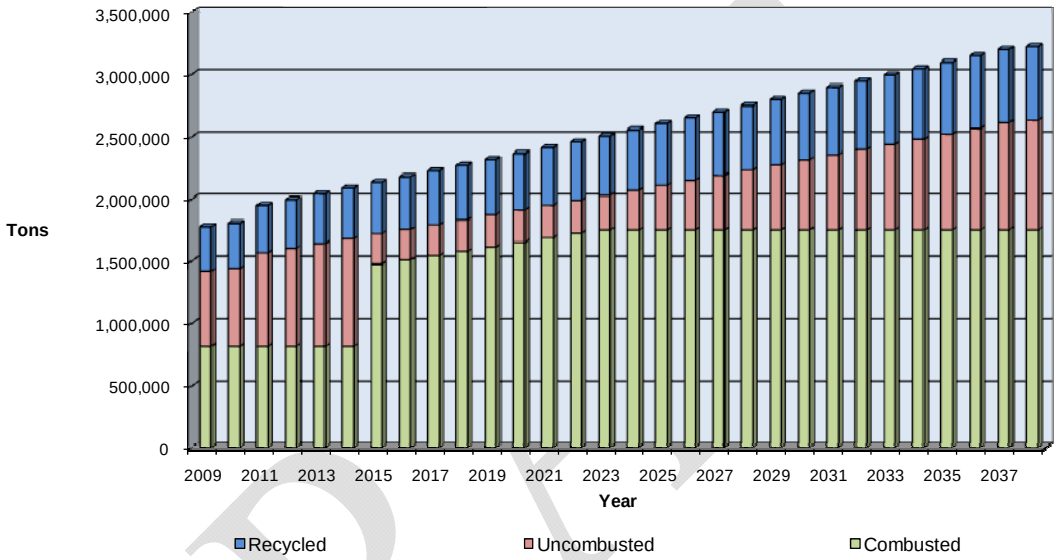


Source: Landfill Depletion Model 2009

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Figure 1-2 (Waste Disposition – Future System Capacity with Proposed Facility Operational in 2015) depicts the Authority's MSW processing capacity if the Proposed Facility becomes operational in 2015.

Figure 1-2: Waste Disposition -- Future System Capacity with Proposed Renewable Energy Facility Operational in 2015



Source: Landfill Depletion Model 2009

Despite the Authority's comprehensive recycling program, the amount of solid waste the Authority delivers to the NCRRF has increased since the NCRRF began operation in 1989. The rated capacity of the NCRRF is 624,000 tpy; however (excluding FY 2005-2006 which was impacted by a fire at the plant), the NCRRF has processed more than 800,000 tons of waste per year every year since FY 1996-1997. In FY 2007-2008, the NCRRF processed 858,511 tons. Current population projections for the County suggest that the amount of processible waste generated in the County will continue to increase.

Ash residue is consistent with the Authority's ash reuse plan and any unprocessible waste is disposed of in accordance with the Authority's landfill plan. Based on the 2009 Landfill Depletion Model, estimated landfill depletion dates for the Class I and Class III landfills in the County are 2026 and 2015, respectively. If the Authority placed Class III waste in the Class I landfill after 2015, the final depletion of the Class I landfill is expected to take place in 2024. In addition, the Authority is currently in the planning and siting process for a Class I landfill to dispose of the ash from the Proposed Facility and portions of the solid waste not handled by the System. The Authority evaluated multiple

options for future solid waste management and determined that the Proposed Facility is an essential component for the Authority's ISWM Plan. The Authority plans to enhance its recycling program, construct the Proposed Facility, and construct a new Class I Landfill as part of its integrated plan for the management of the County's growing waste stream.

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2. Solid Waste Management System Summary

2.1. Description of the Solid Waste Authority

The Authority is the governmental agency responsible for providing an economical and environmentally-sound solid waste management system for Palm Beach County, Florida. The Authority was established as an independent special taxing district under the Palm Beach County Solid Waste Act, Chapter 75-473, Laws of Florida, Special Acts of 1975, as amended and supplemented (Act). The Act was amended in 1991, converting the Authority to a dependent special district, with the County Commissioners of Palm Beach County serving as the governing Board of the Authority. In 2001, the Special Act was "codified", incorporating all past amendment into a new "Special Act", abolishing all past acts such that the Authority is now operating under "Chapter 2001-331 Laws of Florida".

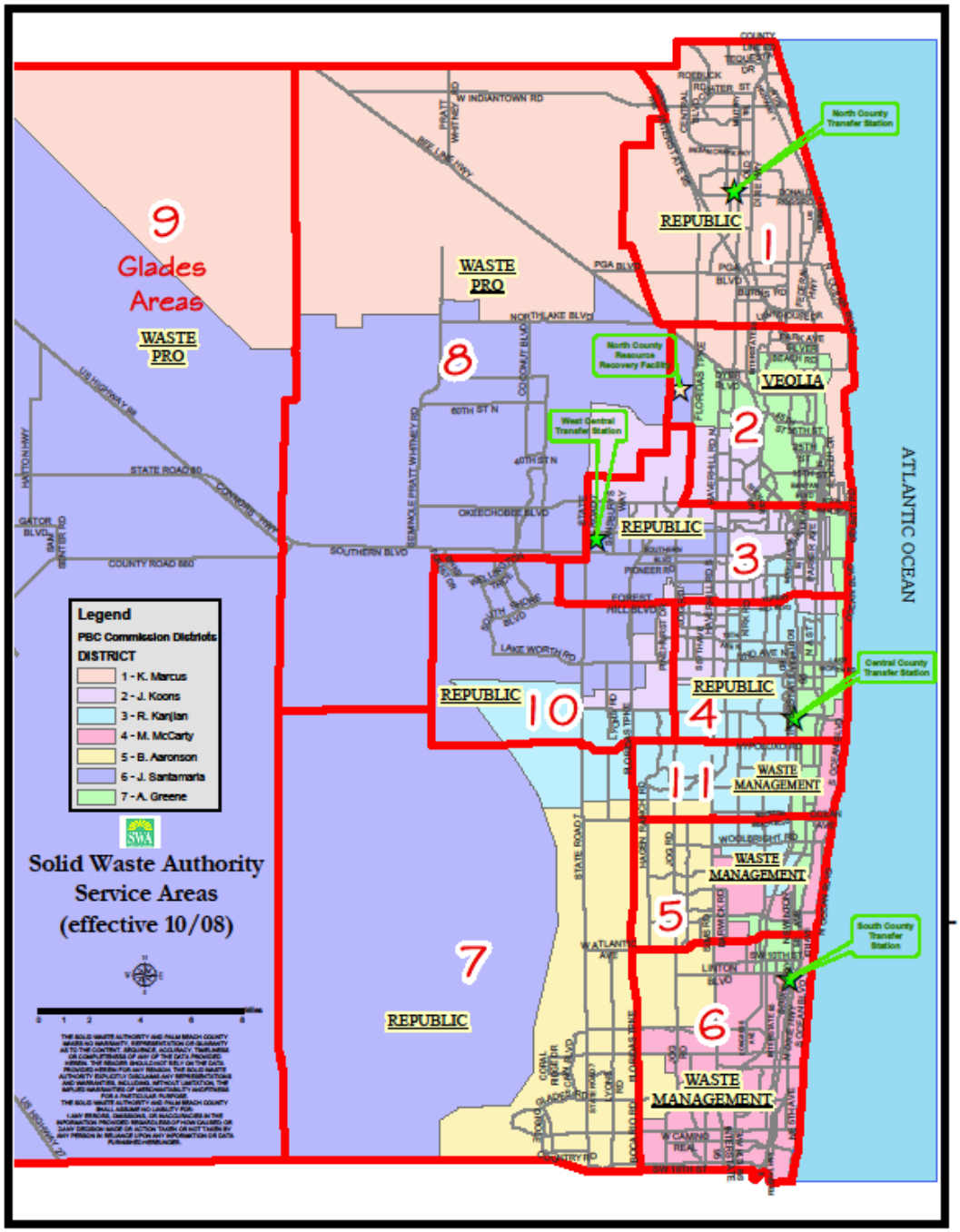
Among other specific purposes and powers, the Act gives the Authority the power to construct and operate solid waste disposal facilities, including resource recovery facilities. The Authority has the responsibility for collection of solid waste in the unincorporated areas of the County, as well as responsibility for recycling and solid waste disposal in unincorporated and certain municipal areas of the County.

2.2. Solid Waste System Service Area

Using its own employees, the Authority provides solid waste disposal and recycling services and programs to the County's 1.4 million residents and businesses. The Authority also provides solid waste and recycling collection services to the residents and businesses in unincorporated Palm Beach County by using private haulers under exclusive franchise agreements. The unincorporated area of the County is divided into eleven service areas, each of which is designated to one of the haulers that have an exclusive right to provide collection services in their respective service areas. Similarly, all of the municipalities within the incorporated area of the County have solid waste collection agreements. The Authority has interlocal agreements with their municipal partners to deliver their residential solid waste, recyclable materials, and commercial solid waste to facilities designated by the Solid Waste Authority. The unincorporated area and the eleven service areas are depicted in Figure 2-1.

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Figure 2-1: Solid Waste and Recycling Collection Service Areas
(Unincorporated Palm Beach County)



2.3. Solid Waste System Agreements

The Authority's success in managing the County's waste stream is due in part to its solid waste system agreements. The Authority has entered into a number of agreements that have enabled the Authority to provide an economical and environmentally-sound System of integrated solid waste management services. These agreements include:

- **Solid Waste Authority/Palm Beach County Agreement** – Responsibility and authority over all County landfill facilities was transferred to the Authority effective October 1, 1983.
- **Board of County Commissioners/Solid Waste Authority Interlocal Agreement** – Responsibility for programs relating to solid waste management was transferred from the Board of County Commissioners to the Authority.
- **Four Franchise Haulers (11 Franchise Service Areas)** – Responsibility for solid waste and recycling collection in the unincorporated area of the County is managed pursuant to exclusive agreements. A list of the current contractors are listed below and in Figure 2-1:
    1. Waste Pro
    2. Republic
    3. Veolia
    4. Waste Management
- **Construction and Demolition Debris (Permitted Roll-Off Haulers)** – Residents and businesses within the unincorporated area of Palm Beach County may contract with permitted roll-off haulers to properly dispose of construction and demolition debris. A list of current permitted haulers is presented below:

Al's Excavating	Republic Services
FSR Transporting and Crane Services, Inc.	Talk Trash, Inc.
Henderson's Sani-Service Systems, Inc.	Tidy Coast Containers
Veolia Environmental Services	WM Inc. of Florida
Rite-Way Recycling	Waste Pro of Florida, Inc.
Southern Waste Systems, LLC.	World Waste Services

The names, addresses, and contact information for these haulers are provided on the Authority's website (www.swa.org) for resident and business access in order to prevent improper disposal of construction debris.

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- **Interlocal Agreements –** Interlocal agreements are executed with municipal partners in Palm Beach County that wish to have the Authority provide a comprehensive environmental solid waste disposal and recycling plan. Currently, the Authority has interlocal agreements with 33 of 38 municipalities as listed below:

Atlantis	Gulf Stream	Lake Park	Palm Beach
Belle Glade	Haverhill	Lantana	Palm Beach Gardens
Boynton Beach	Highland Beach	Loxahatchee Groves	Palm Beach Shores
Briny Breezes	Hypoluxo	Manalapan	Palm Springs
Cloud Lake	Juno Beach	Mangonia Park	Royal Palm Beach
Glen Ridge	Jupiter	North Palm Beach	South Bay
Golf	Jupiter Inlet Colony	Ocean Ridge	South Palm Beach
Greenacres	Lake Clarke Shores	Pahokee	Tequesta
Wellington			

A copy of the standard interlocal agreement is provided in Attachment 2.

2.4. Solid Waste System Components

The Authority has built a system of facilities that combines recycling, composting, converting waste to energy through combustion, and landfilling to manage the MSW and accomplish its material separation goals. The Authority's System includes the following facilities:

- A Commercial Materials Recycling Facility
- A Compost Facility
- A Ferrous Processing Facility
- A Residential Materials Recycling Facility
- A Household Hazardous Waste Facility
- North County Resource Recovery Facility
- The North County Landfill
- Five Transfer Stations for Class I Waste (garbage)
- A Woody Waste Recycling Facility
- C&D debris and yard trash disposal facilities
- A Regional Wastewater Residuals (sludge) Pelletizing Facility

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2.5. Solid Waste and Recyclable Material Quantities

The Authority emphasizes the conservation of resources by diverting materials from solid waste disposal facilities through recycling, reuse, and reduction. As a leader in the recycling industry, the Authority's award winning recycling program has been recognized for excellence by associations such as the Solid Waste Association of North America and Recycle Florida Today. Since the inception of the recycling program, the Authority has recycled more than two million tons of residential and commercial material that otherwise would have been landfilled. In calendar year 2006, the Authority received 2,029,454 tons of solid waste of which 554,085 tons were recycled, as reported by the Florida Department of Environmental Protection (FDEP). It should be noted that the information provided by the FDEP does not include construction and demolition (C&D) recycling quantities. Table 2-2 presents the recycling rates calculated by FDEP, as well as the recycling rates when construction and demolition debris is included, for the years 2003 through 2006.

Table 2-1.
Palm Beach County Recycling Rates

Year	FDEP Recycling Rate	Recycling Rate including C&D	Tons/ capita disposed
2003	33%	51%	1.03
2004	33%	43%	1.13
2005	29%	46%	1.15
2006	27%	43%	1.15
2007	36%	50%	1.02

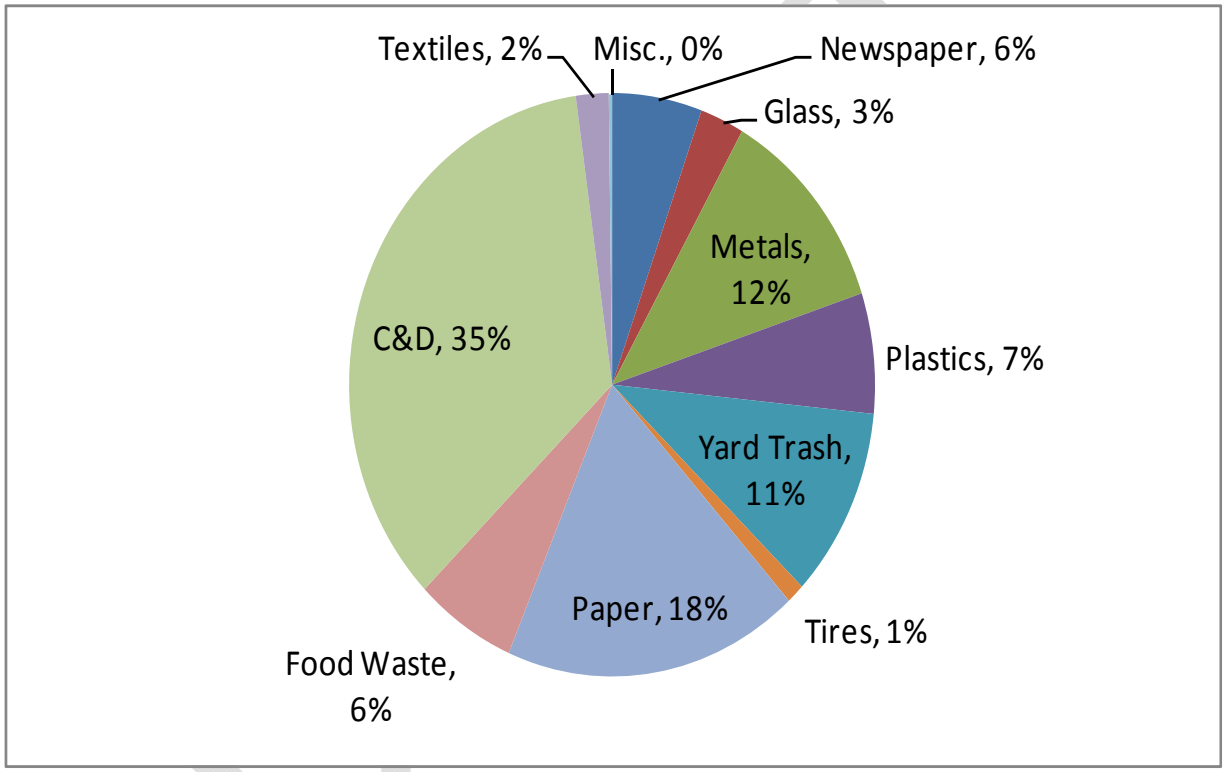
Note: 2008 data is not available as the FDEP is currently compiling this information.

Table 2-1 demonstrates that the Authority usually meets or exceeds the state recycling goal of 30%. The Authority also strives for a 50% waste reduction goal, which includes materials recycled as well as reported C&D materials. The years the Authority did not reach their 50% waste reduction goal is attributed to hurricane and disaster relief efforts for Hurricanes Wilma, Francis and Jeanne between the years 2004 and 2005. During these years, there was an increased amount of garbage due to disaster conditions, and much of the material was disposed of without taking the extra time to separate recyclable materials. Permitted C&D facilities must report the amount of materials they recycle, however, only municipal waste is counted. Ten percent of the total tonnage reported is deducted as "non-MSW-C&D", even though the material could be counted as recycled materials to meet the Authority's 50% goal. This inconsistent reporting of C&D tonnages may have contributed to the lower recycling rate during some years.

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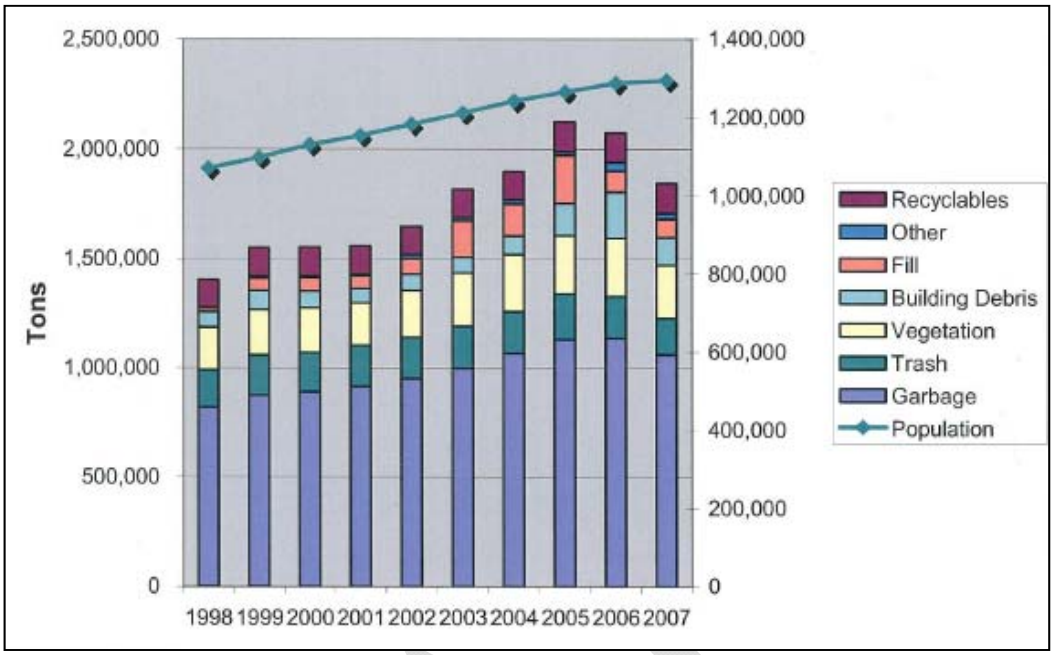
The population of the County has increased 12 percent during the years of 2001-2006. The five-year trend in solid waste generation, collection and disposal in the County has similarly increased by 10 percent. As reported by the FDEP (not including C&D quantities), in 2006 27 percent of the solid waste generated and managed in the County was recycled, 50 percent was landfilled and 23 percent was combusted. Figures 2.3 – 2.4 illustrate the composition, quantities and management of solid waste in the County in 2006.

Figure 2-2: Municipal Solid Waste Composition[1]



[1] Some materials have been combined: Metals include Aluminum Cans, Steel Cans, Ferrous and Non-ferrous metals, and White Goods; Paper includes Corrugated, Office and Other Paper; and Plastics include Plastic bottles and other plastics.

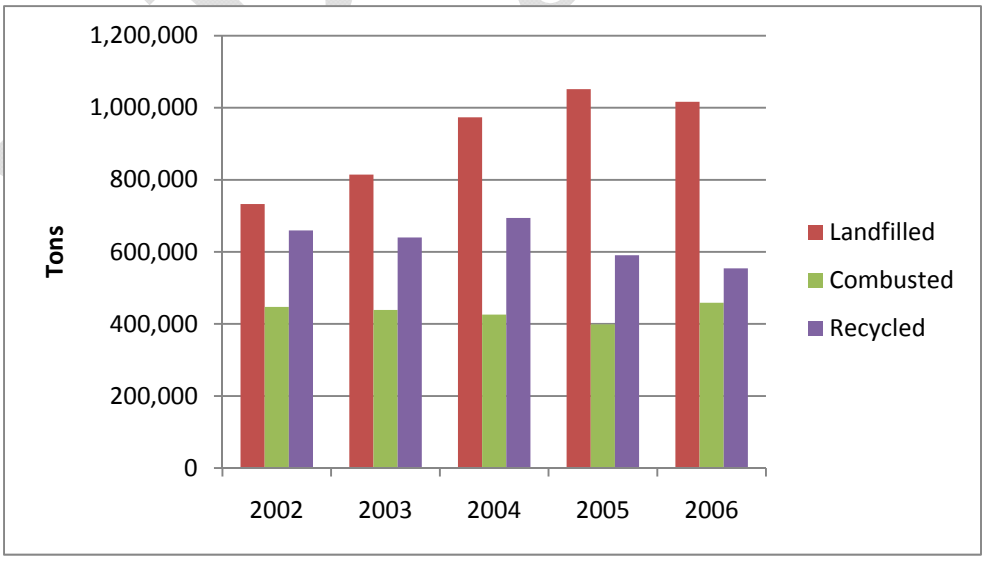
Figure 2-3: Historical Waste Receipts



Source: *Landfill Depletion Model 2008*

The historical recycling quantities of solid waste specifically managed by the Authority are depicted below:

Figure 2-4: Historical Municipal Solid Waste Management Only (not including C&D)*



Source: *FDEP Solid Waste Management Data*

***Note** – Tonnages reported for Combustion only include the net combusted output*

Although the recycling and separation program continues to improve, the System will need to be expanded to handle the additional non-recyclable materials projected to be generated within the service area in the future. A more detailed breakdown of the Authority's waste stream quantities and characteristics set forth in Attachment 3.

2.6. Materials Separation Program

The Authority has implemented a materials separation plan which is an integral part of its System. The materials separation plan includes the following programs:

- Waste Reduction/Resource Recovery
- Landfilling
- Commercial Materials Recycling Program
- Institutional and Industrial Recycling Program
- Residential Materials Recycling Program
- Composting Program
- Ferrous Processing Program
- Construction and Demolition Debris Program
- Woody Waste Recycling Program (Horticultural)
- Household Hazardous Waste Program
- Conditionally Exempt Small Quantity Generator (CESQG) Program
- Disaster Debris Management Program
- White Goods Program
- Waste Tire Program
- Special Waste Programs
    - Mercury Containing Devices Recycling Program
    - Electronics Products Recycling Program
    - Medical Waste Recycling Program
    - Used Motor Oil Recycling Program
    - Greenhouse Gas Reduction Program
    - Source Reduction and Contributions to the Community
    - Renewable Energy

These programs are more fully described in Section 3.

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3. Material Separation Plan

3.1. Goals and Approach

The Authority has identified a number of policies and goals to assist in the effective development of its material separation and recycling System. The following is a summary of the most significant of the Authority's efforts to provide for successful materials separation plan implementation.

- **Integrated Solid Waste Management.**

  Policy – Utilize the principles of Integrated Solid Waste Management to conserve landfill capacity, while recovering energy and material resources from the solid waste stream through a well planned and operated system using source reduction, recycling, composting, combustion and landfilling.

- **Source Reduction.**

  Policy – Develop and manage a countywide source reduction program. This is a comprehensive program to address all areas of source reduction, including decreased consumption by residents of materials that result in additional solid waste, reduced material volume, reduced toxicity or products and/or operating procedures, and reuse. The program is intended to make waste prevention a priority for the County.

- **Recycling.**

  Policy – Implement programs to recover recyclable materials from the solid waste stream within the County. Recycling programs include both materials mandated for recycling by law or regulation, and any other materials which may be effectively recovered and marketed as commodities.

- **Organics Reclamation.**

  Policy – Utilize organics reclamation to manage selected portions of the solid waste stream (e.g., vegetation and wastewater treatment plant sludge), and create products that have value as commodities for agricultural or horticultural uses. Some of the technologies include composting, mulching, and drying.

- **Combustion.**

  Policy – Utilize combustion, with the recovery of energy, to manage those portions of the solid waste stream which cannot be efficiently managed through waste reduction, recycling or organics reclamation.

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- **Landfill.**

  Policy – Utilize landfill disposal for the wastes and residues remaining after applying waste reduction, recycling, organics reclamation and combustion technologies to the waste stream.

- **Special Wastes.**

  Policy – Implement special waste management programs for those wastes identified as special wastes, and also for any wastes accepted by the Authority which require testing, documentation or special handling to assure operational compliance and worker safety.

- **Hazardous Waste Management.**

  Policy – Encourage the proper and responsible management of hazardous wastes within the County. To the maximum extent practicable, the potential for the improper introduction of hazardous wastes into the environmental shall be minimized.

The Authority has implemented a comprehensive integrated solid waste management system with proven success. The subsequent sections summarize the current ISWM Plan and the proposed additions to the ISWM Plan that will be implemented in the near future.

3.2. Authority Material Separation Program

3.2.1. Commercial Materials Recycling Program[2]

Commercial recycling in Palm Beach County is entirely voluntary. In the Authority's 14,000 square foot commercial recycling facility, the Authority operates a 22,000 tpy commercial materials recovery facility that sorts and bales commercial paper and cardboard for sale to paper mills in the southeastern United States. The commercial materials recycling facility gives businesses the opportunity to recycle, either at their place of business or at one of the more than 150 public drop-off locations located throughout the County. These drop-off locations are free and allow businesses to take items such as office paper, magazines, cardboard, newspapers and catalogs. Through the Authority's Commercial Materials Purchasing Agreement program, eligible businesses are paid for their office paper. A copy of this agreement can be found in Attachment 4.

3.2.2. Institutional and Industrial Recycling

Institutional recycling in Palm Beach County is promoted by the Authority's designated education staff. Through the Authority's Education Outreach Program, the Authority is actively involved in educating school-age children about the importance of recycling and reducing waste. The Authority offers the following:

- Classroom presentations (Grades K-12)

[2] Since the preliminary draft of this plan, the Authority has since relocated and combined their residential and commercial MRF facilities.

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- Facility tours (Grades 4-12)
- Educational CD and DVD offerings
- Lesson Plans
- Activity sheets
- Reference materials

A representative sample of the educational materials used is included in Attachment 5.

The Palm Beach County School District appoints a recycling coordinator that coordinates recycling programs in the schools throughout the district. The Authority coordinates with the School District recycling coordinator for educational materials as well as recycling program assistance. The Authority provided desk side recycling bins and 95 gallon containers to schools for separating and recycling recyclable materials. These educational efforts touched more than 630,000 residents, including approximately 26,000 students.

The Authority employs recycling specialists (field representatives) to provide outreach services to residents, businesses, and institutions throughout the County. These field representatives are available to higher education institutions as well as industrial entities within the County to encourage and assist with coordination of recycling efforts. Industrial entities can also participate in the small business waste drop-off (if they qualify), public recycling drop-off locations, and the commercial materials purchasing program.

3.2.3. Residential Materials Recycling Program[3]

The Authority operates a 175,000 tpy Materials Recycling Facility where it receives, sorts, processes, and prepares materials collected through the Authority's residential recycling program. The following materials are accepted at this facility.

Commingled

- Aluminum cans, foil and pie plates
- Clear, brown and green glass
- Plastic Containers #1-5 and 7

Fiber

- Newspapers and all their inserts
- Brown paper bags
- Magazines and catalogs
- Corrugated cardboard

[3] Since the preliminary draft of this plan, the Authority has since relocated and combined their residential and commercial MRF facilities.

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- Telephone books

The 72,000 square foot facility is owned by the Authority and has a processing capacity of 175,000 tpy. It is operated by FCR Florida, Inc. The facility currently handles approximately 100,000 tpy. It processes of 33 tons per hour of paper and 15 tons per hour of commingled containers.

The Authority is currently constructing a new Materials Recovery Facility (MRF) for combined residential and commercial services. The 140,000 square foot facility will be the largest MRF in the State and it is sized to manage the projected growth in the recycling stream. Once the MRF is completed, the Authority will begin accepting junk mail, all paperboard products, and steel cans at the curb as well, further reducing reliance on landfills.

The Authority operates a bin distribution program to promote single-family and multi-family residents recycling. A toll-free phone number is provided to residents to request bins at any time. Since the inception of this program, the Authority has witnessed a 20% increase of self-hauler municipalities. Eight of the Authority's staff members are also dedicated to working in the field to promote recycling for both residents and businesses around the County. Promotional materials used for a variety of audiences to promote recycling are included in Attachment 5 for further reference.

3.2.4. Composting Program

The Authority's Compost Facility accepts mulch produced by the Authority from vegetative debris from curbside collection routes and wastewater residuals from the City of West Palm Beach and others. Vegetative mulch is composted with wastewater residuals to produce compost that is suitable for agricultural and horticultural uses. The composting facility incorporates windrow/in-vessel and static pile technologies and has the capacity to treat 120,000 tpy of material. The composting operation produces a Class AAA compost product that is given to the public free of charge. In 1994 the Compost Facility received the American Society of Mechanical Engineers Award for Resource Recovery.

3.2.5. Ferrous Processing Program

The Ferrous Processing Facility processes ferrous metals (such as tin cans) recovered at the Material Recovery Facility, and the Class III landfill. White goods recovered from the Class III landfill are inspected prior to processing and any freon is removed. The mixed ferrous material from the NCRRF is size reduced by a vertical shredder and passed through an air classification system, which is coupled with magnets to separate the ferrous material from the non-ferrous tramp material. The ferrous material is transported by railcar to manufacturers who melt it down to make new steel products.

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In 2006, more than 180,000 tons of ferrous and non-ferrous metals were collected and separated by the Authority. Approximately 79 percent of those metals were recycled, instead of being buried in the landfill.

3.2.6. Construction and Demolition Debris Program

Construction and demolition debris (C&D) is defined as the solid waste resulting from the construction, renovation, remodeling, repair and demolition of structures. Much of the C&D debris can be recycled if properly sorted. Materials comprising C&D include concrete, asphalt, cardboard, stone, brick, wood, metals, plasterboard and sheetrock.

In 1975, the Authority Board adopted "Rule I", an operating permit for Solid Waste Facilities in Palm Beach County. Due to changes in federal and state programs it was revised in 1991 to be compatible with the State of Florida's Solid Waste Management Act of 1988 and more clearly defines the procedures necessary to secure a permit from the Authority for operating a private construction debris and vegetation material recycling facility. The Authority has and continues to strongly promote and support the private recycling efforts of construction and vegetation debris countywide. The strategically located sites throughout the county provides other important benefits by increasing recycling participation and reducing tremendous travel time resulting in a decrease of emissions and greenhouse gases. A list of approved permitting C&D/vegetation recycling facilities is provided below:

Table 3-1: Permitted C&D and Yard Trash Disposal Facilities

Name	*Location*	*Materials Accepted*
Amerigrow Recycling	Delray Beach, FL	Yard Trash
Atlas-Lox Road South	Parkland, FL	Yard Trash, C&D
Waste Management	Riviera Beach, FL	C&D
Atlas Peat & Soil	Boynton Beach, FL	Yard Trash
B.G. Katz Nurseries	Boca Raton, FL	Yard Trash
County Mulch	Jupiter, FL	Yard Trash
DMS Wood Farms	Boynton Beach, FL	Yard Trash
DS Eakins Construction Corp.	Riviera Beach, FL	Clean concrete, Asphalt
Eastwood Mulch	West Palm Beach, FL	Yard Trash
Palm City Transfer and Recycling	West Palm Beach, FL	Yard Trash, C&D
Palm Beach Wood Products	Loxahatchee, FL	Yard Trash
Southeastern Organics	West Palm Beach, FL	Yard Trash
Sun Recycling LLC	West Palm Beach, FL	Yard Trash, C&D

Source: www.swa.org

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3.2.7. Woody Waste Recycling Program (Horticultural)

Horticultural or yard waste includes vegetative materials resulting from landscaping maintenance or land clearing operations, and includes grass clippings, palm fronds, tree and shrub trimmings, trees and tree stumps. The Authority receives more than 250,000 tons of yard waste per year. Approximately 100,000 tons of yard waste is shredded and used at the compost facility and given to the community free of charge. The remaining yard waste is delivered to the New Hope Power processing site near 20-Mile Bend for processing into boiler fuel for the Okeelanta Cogeneration Plant, south of South Bay.

3.2.8. Household Hazardous Waste Program

Household Hazardous Wastes (HHW) are those wastes that are generated by homeowners and consist of discarded chemical products such as pesticides, paints, stains, solvents, drain cleaners, used motor oil, pool chemicals, antifreeze, auto batteries and household batteries. HHW is not collected curbside, but these materials can be delivered either to the Authority's Household Hazardous Waste Facility or the Authority's Transfer Station(s).

The Authority collected more than 1.7 million pounds of HHW last year. There is no fee for residents and the Authority provides a fee-based system for the disposal of HHW by qualifying small businesses to dispose of HHW. The Authority's network of six drop-off locations, open six days a week, provides one of the highest levels for household hazardous waste collection services in the country. Educational and promotional materials for Household Hazardous Waste provided by the Authority are provided in Attachment 6.

3.2.9. Conditionally Exempt Small Quantity Generator (CESQG) Program

A Conditionally Exempt Small Quantity Generator is defined as any entity, other than a household, that generates less than 220 pounds of hazardous waste or 2.2 pounds of acute hazardous waste per calendar month, and never accumulates more than 2,200 pounds of hazardous waste. The Authority's CESQG program is one of less than a half dozen in the state of Florida.

The advantage of this program is that small quantities from different generators can be combined for disposal and the costs distributed among the contributors. Each business pays for only their share of the combined drum of waste. Hazardous wastes generated by CESQGs may be delivered to the Authority's Hazardous Waste Collection facility in proper containers for disposal.

3.2.10. Disaster Debris Management Program

The Authority is responsible for implementing debris removal and disposal actions upon a major debris generating event (e.g. Hurricanes). The Authority has developed a Debris Management Program in order to efficiently manage disaster debris clean up services.

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Each jurisdiction is responsible for coordinating the permanent removal, storage, recycling and disposal of all disaster debris deposited along or immediately adjacent to public rights-of-way in the jurisdiction.

The Authority has entered into interlocal agreements with municipalities in Palm Beach County to allow for a cooperative effort in the management of disaster debris and securing reimbursement for eligible disaster debris management costs.

3.2.11. White Goods Program

White goods are large discarded appliances, such as stoves and refrigerators. These materials are banned from landfills in Florida. The Authority accepts white goods at the Authority's Class I landfill where the white goods are separated and handled by a scrap metal processor for recycling.

3.2.12. Waste Tire Program

The Authority collects waste tires at its solid waste facilities and tires are sent to Wheelabrator Technologies for disposal. The Authority also works with the local sheriff's department to reduce the occurrences of illegal tire dumping within the County.

3.3. Special Waste Programs

Many special wastes, such as vegetation, appliances, construction debris, tires, etc. have established handling methods and are routinely accepted by the Authority. Other materials such as contaminated soils or asbestos are not as readily identifiable and may require laboratory analysis or special provisions to be accepted. In the end, the final decision must be made in consideration of both regulatory constraints and operational impacts.

The Authority considers the following issues in deciding whether or not to accept any special wastes:

- The regulatory status of the waste and/or related regulatory requirements;
- The type of hazards presented and the potential for worker exposure;
- The operational requirements to safely mange the special waste in accordance with all applicable laws and regulations;
- The desirability of disposing of the material in the Authority's landfill versus encouraging other disposal means; and
- Likelihood of illegal dumping.

Examples of the special solid wastes generated within the County whose disposal and collection methods are unique are presented below:

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3.3.1. Mercury Containing Devices Recycling Program

Fluorescent lamps offer an energy efficient and cost effective alternative to traditional lighting. However fluorescent lamps contain mercury, and therefore should not be incinerated. Because part of the waste generated within the County is incinerated, fluorescent lamps must be delivered to one of the Authority's hazardous waste drop-off locations, or one of the Authority's transfer stations, or the HHW facility, where they will be disposed of properly. Other mercury containing devices such as thermostats, thermometers, electrical switches and liquid mercury are also disposed of at these locations.

Educational materials and promotional recycling materials regarding mercury containing devices are provided free of charge to residents. The Authority has a contact phone number and website for information about the proper disposal of these items. A list of drop-off areas is also provided on the Authority's website and in promotional television commercials.

3.3.2. Electronics Products (E-Waste) Recycling Program

The Authority accepts E-waste from County residents such as computers, monitors, printers, cell phones, radios, and televisions and are collected, processed, and recycled in the United States. Collected items are sorted by the Authority and hauled away by a private contractor. The electronics are then stripped apart and useful components redistributed. While the Authority has recently seen a rise in the number of rechargeable batteries being processed, the Authority has been collecting and recycling rechargeable batteries for more than 15 years.

Household batteries and auto batteries may contain metals and acids and must be disposed of properly. While rechargeable batteries contain metals, rechargeable batteries are beneficial because they reduce overall battery waste. Additionally, when rechargeable batteries reach the end of their useful life, the metals in the batteries can be recycled. All residents with rechargeable batteries for disposal are encouraged to contact the Rechargeable Battery Recycling Corporation (RBRC) which operates a program to collect and recycle batteries.

Educational and promotional materials regarding electronic recycling are provided free of charge to residents. The Authority maintains a contact phone number and website for information about the proper disposal of these items.

3.3.3. Medical Waste

Needles, syringes and other types of biomedical waste are not accepted at any Authority facility. However, the Palm Beach County Health Department has a "Sharps" Depository program for home users. Information and drop-off locations from the Authority are available to all users.

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Educational and promotional materials regarding medical waste are provided free of charge to residents. The Authority maintains a contact phone number and website for information about the proper disposal of these items.

3.3.4. Used Motor Oil

During 2007, the Authority recycled more than 31,095 gallons of used oil from Palm Beach County residents. Residents are encouraged to bring their used motor oil to the Authority's HHW Facility or transfer station free of charge. Educational and promotional materials regarding used motor oil are provided free of charge to residents. The Authority maintains a contact phone number and website for information about the proper disposal of these items.

3.3.5. Greenhouse Gas Reduction

The Authority's existing Renewable Energy Facility (the NCRRF), active landfill gas management systems, landfill gas to energy projects, and recycling programs reduce greenhouse gas emissions believed to contribute to global climate change. At the NCRRF, the Authority reduces greenhouse gas emissions by producing electricity that would otherwise have been generated by a fossil fuel power plant, and by decreasing the volume of waste that would otherwise have gone to the landfill, decomposed and generated methane, which is 21 times more potent than carbon dioxide as a greenhouse gas.

Landfill gas from the North County Landfill is now being used at the recently constructed Regional Pelletizing Facility. This Facility uses the landfill gas in the pellet dryers where wastewater residuals are treated and dried to create Class AA Biosolids. These biosolids can then be land applied to provide nutrients instead of fertilizer. By beneficially using landfill gas instead of energy produced from fossil fuels, this Facility helps to reduce greenhouse gas emissions.

Additionally, the Authority recovers metals, such as iron and aluminum, thereby avoiding the greenhouse gases resulting from the mining and production of metals from virgin materials. The Authority's recycling programs contribute as well. Since the beginning of the program, the Authority has recycled nearly 2 million tons of paper, plastic, aluminum and glass. Because producing new products from recovered materials consumes less energy, recycling reduces greenhouse gas generation. The Authority's transfer stations also reduce greenhouse gas emissions and pollution through enhanced transportation efficiency.

3.3.6. Source Reduction and Contributions to the Community

Source reduction addresses product manufacture, purchasing habits and product use. Options available in implementing source reduction efforts include product reuse, increasing the recycled content of products or packaging, reduction in material volume of

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products or packaging, increasing the useable life of a product, and decreasing the total quantity or toxicity of products used. Last year, the Authority donated more than 10,000 gallons of recycled paint, obtained in part from unused latex paint collected through the Authority's Household Hazardous Waste Program, to non-profit and governmental agencies for use on homes, public buildings and in graffiti abatement programs.

The Authority acknowledges that public information, outreach, and education programs are key components for successful source reduction efforts. The Authority sponsors various programs established for the purpose of providing community awareness and educational programs, as presented below:

- **Litter Abatement "Adopt-A-Spot Program"** – Litter abatement and beautification program that provides community groups tools and supplies to "adopt" and improve the appearance of specific locations in their community.
- **Rebuilding Together of the Palm Beaches** – Volunteer based non-profit organization which offers assistance to the elderly, disabled and low income families with children. Repairs to the interior and exterior of qualifying homes are the basis of work performed through this program.
- **Paint Your Heart Out Palm Beach County** – Volunteer based non-profit organization which paints the exterior of qualifying single family homes with Authority's recycled paint at no cost to the homeowner. More than 80 homes were painted or repaired last year.
- **Neighbor to Neighbor Volunteer Program** – This program is based on neighbors teaching neighbors about recycling and waste prevention in their own community development. This program is open to all Palm Beach County residents who are interested in volunteering in their own community.
- **Green Team Volunteer Program –** Green Team volunteers assist Authority staff with community actions and special events. Volunteers help educate residents about the Authority's waste prevention and recycling programs.
- **Administrative Support Volunteers and Non-Paid Internship Volunteers** – Volunteers assist the Authority with a wide range of duties in several departments, including, recycling, media arts, customer information services, and management information systems.
- **School Recycling and Educational Programs –** Through the Authority's Education Outreach Program, the Authority is actively involved in educating children about the importance of recycling and reducing waste. The Authority offers the following information and materials:
    - Classroom presentations
    - Facility tours
    - Educations CD and DVD offerings

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- Lesson Plans
- Activity Sheets
- Reference Materials

- **Resource Depot –** Funded in part by a $140,000 per year grant, the organization is a reuse center which collects business discards, samples, and scraps that would otherwise be landfilled. These items are donated, free of charge, back to educators, parents, and other non-profit organizations. Additional information on the Resource Depot program can be found at (www.resourcedeopt.net)

3.3.7. Renewable Energy

While the Authority's existing Renewable Energy Facility (the NCRRF) reduces the volume of waste disposed of in the landfill, it also produces clean electricity. Additionally, the Authority uses landfill gas, which consists primarily of methane, as a renewable energy source to produce clean energy as an alternative to fossil fuels.

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4. Public Comments

A public meeting was held on July 8, 2009 concerning the Preliminary Draft Materials Separation Plan. A PowerPoint Presentation, handout materials, meeting agenda, and copies of the plan were made available to the public. No members of the public were in attendance at the meeting and no one from the public submitted any questions or comments regarding the plan.

A copy of the PowerPoint presentation, the meeting agenda, and the public notice of the meeting are all included in Appendices H-J of this Plan. These materials have been prepared to satisfy EPA requirements in 40 CFR 60.57b, the siting requirements under Subpart Eb of the New Source Performance Standards adopted by EPA for large municipal waste combustors.

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APPENDIX A
2009 SWA LANDFILL DEPLETION MODEL

2009 Landfill Depletion Model

Forecast of Waste Generation and Landfill Depletion: 2009 - 2038

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November 2008

2009 LANDFILL DEPLETION MODEL

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2009 LANDFILL DEPLETION MODEL

1.0 INTRODUCTION

1.1 PURPOSE

The principles of integrated solid waste management as put forth in the Environmental Protection Agency's hierarchy of integrated solid waste management are designed to minimize the quantity of waste disposed in landfills. The recycling, composting, and resource recovery programs that make up a part of the SWA's solid waste management system divert materials from landfill disposal and decrease the volume of landfill space required to serve the Palm Beach County population.

Despite the existence of these programs, the SWA recognizes the unique characteristics of landfilling as a waste disposal option, not the least of which is the reality that landfill space, unlike other forms of infrastructure, is a depletable resource. Recycling, composting, and resource recovery are all factors in increasing the life of a given landfill volume, however given existing technology, there will always be a need to landfill some portion of the waste stream. It is reasonable to assume that although the need to provide replacement capacity can be delayed through recycling, composting, and resource recovery programs, it cannot be prevented. The availability of landfill capacity is a driving force behind the solid waste management system decision making process.

Prudent planning requires identifying the time at which the need for replacement capacity becomes critical and taking the required steps to ensure that replacement capacity is available. Although replacement landfill capacity can be secured in several ways, including siting a new landfill and contracting with a private landfill operator, the long lead time in siting, permitting, and constructing a landfill site, often greater than ten years, necessitates effective long range planning in order to ensure the viability of available options. The SWA's primary long range planning tool is the Landfill Depletion Model.

The Landfill Depletion Model is intended to forecast the estimated life of the SWA's landfills in order to facilitate facilities planning decisions and to assess the impact of alternatives and alternative states of nature on landfill life. As a planning tool, the model is useful in identifying the point or points in time at which a decision is required in order to ensure the availability of disposal capacity.

The Landfill Depletion Model considers the dynamic interrelationships between the available processing and disposal options, population projections and population growth rates, per capita generation rates, recycling rates, diversion rates, incineration capacity and reduction effectiveness, landfill compacted densities, and cover material requirements and produces a projected date of landfill depletion. With this date established and the anticipated lead time known, the latest date at which a decision must be made can be determined.

Because of the many factors impacting the rate of landfill depletion and in order to minimize the possibility of falling behind on the critical path, the Landfill Depletion Model is run on an annual basis when the latest population projections become available.

1.2 Model Description

Population projections and per capita waste generation rates are used to forecast annual waste generation for the next 30 years. The annual waste tonnages are adjusted downward to account for recycling, incineration, and waste reduction activities. The net landfill tonnage is converted to cubic yards and the landfill depletion determined using estimated compacted densities. In every period, the cubic yards depleted in the period are deducted from the remaining volume at the end of the prior period to determine the volume remaining. A negative number in the "Landfill Volume Remaining" column indicates that the landfill is at capacity. The main schedules are as follows:

Table 1	Estimated Population and Solid Waste Generation
Table 2	Class 1 Landfill Depletion
Table 2A	Class 1 Landfill Depletion w/ the addition of a Third Boiler at the WTE Plant
Table 3	Class 3 Landfill Depletion
Table 3A	Class 3 Landfill Depletion w/ the addition of a Third Boiler at the WTE Plant
Table 4	North County Landfill Depletion Under Balanced Life Scenario
Table 4A	North County Landfill Depletion Under Balanced Life Scenario- Third Boiler at WTE Plant

1.3 Prior Results

The landfill depletion model was last updated in December 2007 and was based on operating data through FY 2007. The model predicted final depletion would occur in 2021 assuming the Class 1 and Class 3 landfills reach capacity at the same time. The model further indicated that adding a 3000 TPD Mass Burn Plant in the year 2015 would extend the life of the landfill to 2026.

Although the model is a long range planning tool, an evaluation of short term performance versus actual results is an important aspect of the annual review in order to identify any short term changes which may impact long term results. The following table presents projected, actual, and percent variance data for the previous year:

	Projected	Actual	Variance
Total Solid Waste Generation	2,005,912	1,639,812	18.3%
Class 1 Generation	1,389,082	1,196,347	13.9%
Class 3 Generation	616,830	443,465	28.1%
Total Generation Rate (ppd)	8.26	6.95	15.9%
Class 1 Generation Rate	5.72	5.07	11.4%
Class 3 Generation Rate	2.54	1.88	26.0%
Total Landfilled Tonnage	1,119,241	802,716	28.3%
Class 1 Landfilled Tonnage	746,984	534,987	28.4%
Class 3 Landfilled Tonnage	372,257	267,729	28.1%

Note:
(1) Total generation is net of out-of-county recyclables, sludge, and clean and restricted use fill.
(2) Total landfill quantity is net of recovered fill material, metals, and OCC.
(3) Per capita generation rates expressed net of fill and sludge.

Total generation of MSW and recyclables decreased from 1,758,335 tons to 1,639,812 tons, a decline of

118,523 tons, and fell short of the model projection by 366,100 tons (18.3%). With respect to Class 1 material, after a 6.6% decline in FY 2007, garbage deliveries declined an additional 24,325 tons (2.3%) in FY 2008 to 1,036,241 tons, the lowest generation since FY 2002-2003. Factors responsible for the decline are generally believed to be the steep decline in the real estate market and the economic slowdown.

The continuing decline in Class 3 material deliveries is comprised of a 55,296 ton (43.8%) reduction in building debris and a 33,893 ton (13.9%) reduction in vegetation. With regard to building debris, which declined 40.0% in FY 2007, the further decline is directly attributable to decreased construction and renovation activity related to the decline in the real estate market and general economic conditions. The reduction in vegetation was partially due to the diversion of vegetation from the high generating Acreage to private recyclers.

Landfill consumption totaled 802,716 tons and fell short of the projection by 316,525 tons (28.3%). The shortfall was the direct result of the sharp decline in the waste stream coupled with the decision to leave the assumed per capita generation rate unchanged in last year's model amid conflicting signals regarding the trend in waste generation rates. The protracted slump in the real estate market has continued to put downward pressure on waste generation. Because the ***Landfill Depletion Model*** is a long range planning tool short-term variances can be expected.

2.0 LANDFILL DEPLETION MODEL ASSUMPTIONS

2.1 POPULATION

Recent projections indicate that the population of Palm Beach County is anticipated to increase from an estimated 1,294,654 people in 2007 to 1,811,300 people in 2035. Both the population growth and the timing of population growth are critical to properly assessing future waste generation and landfill longevity.

The SWA uses the University of Florida Bureau of Economic and Business Research medium permanent population projections as published in ***Florida Population Studies (Vol. 41, Bulletin No. 150)***. The BEBR population projections are the same projections used by Palm Beach County Planning and Zoning for planning purposes. The average annual growth rate from 2008 through 2035 is approximately 1.24%. The BEBR projections are presented in 5 year intervals. The between interval population estimates are calculated through interpolation using the periodic growth factors. The between interval growth rates are as follows:

Average Annual Growth Rates		Average Annual Growth Rates	
2008-2010	1.55%	2010-2015	1.56%
2015-2020	1.34%	2020-2025	1.21%
2025-2030	1.06%	2030-2035	0.92%

Tourism being one of Palm Beach County's largest economic contributors, there is an annual surge in population between Thanksgiving and Easter. Due to the difficulty in predicting seasonal population, which fluctuates with general economic conditions and the weather, among other factors, the solid waste generation projections are made using only permanent population. As a result of this, the per capita generation rates used in the model may not be comparable to those of other jurisdictions.

The Bureau of Economic and Business Research provides no estimate beyond 2035. The population growth rate beyond 2035 is assumed to be equal to the average annual growth rate for the 2030-2035 period. Given that the projected landfill depletion date is prior to 2035, population growth beyond 2030 has no impact on the projection. The 2008 population estimate represents of decrease of 379 people in

comparison to the previous year. This follows a lackluster 0.5% increase over the one year period ending April 1, 2007 and 1.7%, 1.9%, and 2.5% increases for the years ended April 1, 2006, 2005, and 2004, respectively.

2.2 WASTE GENERATION

Two per capita generation rates are utilized in the model: one for Class 1 material (garbage and special wastes) and one for Class 3 material (trash and building debris). Class 1 material is delivered to the North County Resource Recovery Facility for incineration with material in excess of the plant's capacity landfilled directly in the Class 1 landfill. Class 3 material is delivered to the Class 3 landfill for processing and disposal. In order to calculate the per capita generation rates, SWA incoming waste tonnages for the preceding several years are reviewed in an effort to identify any trends. The data source is SWA scale reports. The per capita generation rates used in the model reflect only the material the SWA receives or reasonably expects to receive.

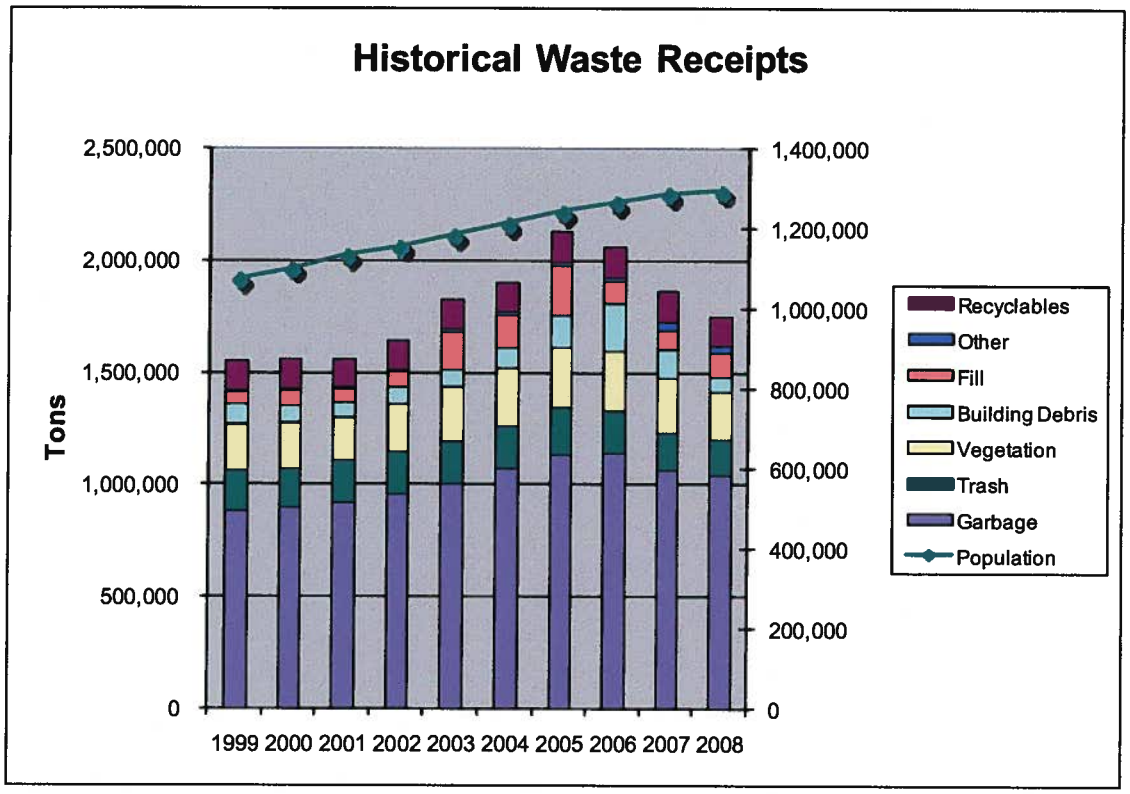
Currently, considerable quantities of primarily heavy construction and demolition debris and clean vegetation are delivered to private recyclers permitted by the SWA. Material that is currently diverted to private recyclers is assumed to continue to be delivered to private recyclers.

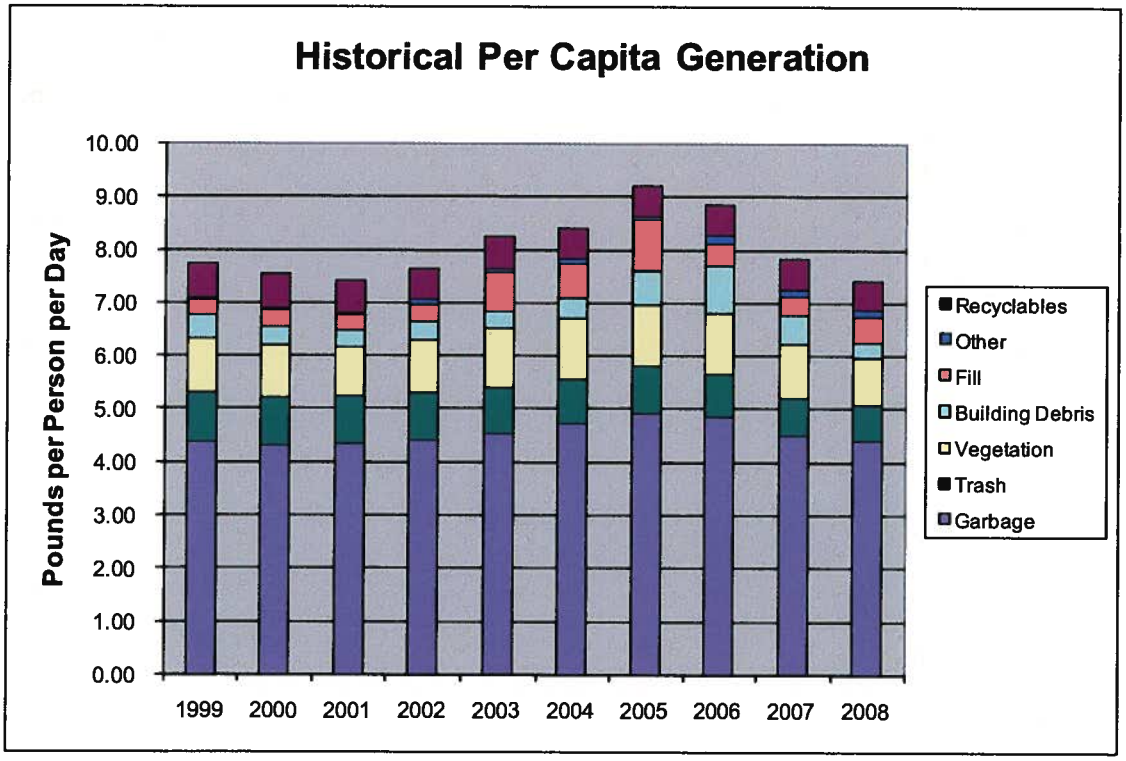
2.2.1 Per Capita Generation Rates - Discussion

The per capita generation rate decreased for the second consecutive year from 8.12 pounds per person per day in FY 2006-2007 to 7.69 in FY 2007-2008, the lowest level since FY 2000-2001. Significant decreases were experienced in Garbage (4.49 to 4.39), Building Debris (.53 to .30) and Vegetation (1.03 to 0.89) due to the reasons previously discussed. Recyclables deliveries decreased from 136,141 tons to 131,964 tons, a decrease of 3.1%, for the reasons discussed in Section 2.5. The per capita generation of recyclables decreased from .58 to .56 pounds per person per day.

The per capita generation rates are calculated by dividing the average daily pounds of waste received by the BEBR estimated permanent projection for April 2008. Fluctuations in the per capita generation rates can result from many factors, including changes in the waste stream, increased or decreased private sector recycling activity, and error in the population estimate.

Because the SWA operates both a Class 1 and a Class 3 landfill, incoming MSW is characterized as either Class 1 or Class 3 material. The Class 1 generation rate, which includes Garbage, Recyclables, Direct Landfill, and other special wastes, decreased from 5.17 to 5.06 pounds per person per day, the lowest level since FY 2000-2001, due to the decline in garbage deliveries. The Class 3 generation rate, which includes Trash, Building Debris, Vegetation, and Tires, decreased from 2.27 to 1.88 pounds per person per day, the lowest level on record, largely due to the sharp decline in Construction Debris deliveries. Combining the Class 1 and Class 3 generation rates presented above the total per capita generation rate decreased from 7.44 to 6.94 pounds per person per day, the lowest level since FY 1996-1997. Note that these rates do not include sludge, which is mostly composted and has no significant impact on landfill life, or restricted use fill, which is recycled as road base material and landfill cover. Current and historical estimated per capita waste generation rates are presented on Pages 5 and 6.


Historical Waste Receipts
Tons
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
1999 2000 2001 2002 2003 2004 2005 2006 2007 2008
Recyclables
Other
Fill
Building Debris
Vegetation
Trash
Garbage
Population


Historical Per Capita Generation
Pounds per Person per Day
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1999 2000 2001 2002 2003 2004 2005 2006 2007 2008
Recyclables
Other
Fill
Building Debris
Vegetation
Trash
Garbage

Solid Waste Authority of Palm Beach County
Historical Per Capita Generation Rates

	Fiscal Year							Base Year
	2007/2008	2006/2007	2005/2006	2004/2005	2003/2004	2002/2003	2001/2002	1985/1986
Population	1,294,654	1,295,033	1,287,987	1,265,900	1,242,270	1,211,448	1,183,197	753,700
Tonnage	1,817,981	1,918,735	2,152,816	2,203,456	1,962,951	1,880,348	1,708,332	1,222,930
Garbage	1,036,241	1,060,566	1,135,093	1,129,444	1,066,741	997,657	950,713	536,775
Trash	161,584	166,146	190,854	210,279	191,626	191,692	189,420	290,327
Vegetative	209,141	243,034	267,440	265,503	260,042	244,823	212,942	30,724
CD	70,853	126,149	210,479	147,008	85,319	72,467	75,836	354,574
Sludge	68,503	75,225	78,785	78,846	64,566	62,952	61,812	119
Clean Fill	109,666	85,175	96,868	220,220	146,155	167,054	70,839	1,733
Tires	1,887	2,013	1,930	2,438	3,694	3,224	1,499	2,690
Miscellaneous	28,142	24,286	36,720	14,103	14,452	11,236	17,416	5,988
Subtotal MSW	1,686,017	1,782,594	2,018,169	2,067,841	1,832,595	1,751,105	1,580,477	1,222,930
Recyclables	131,964	136,141	134,647	135,615	130,356	129,243	127,834	0
Total MSW	1,817,981	1,918,735	2,152,816	2,203,456	1,962,951	1,880,348	1,708,311	1,222,930
Garbage	4.39	4.49	4.83	4.89	4.71	4.51	4.40	3.90
Trash	0.68	0.70	0.81	0.91	0.85	0.87	0.88	2.11
Vegetative	0.89	1.03	1.14	1.15	1.15	1.11	0.99	0.22
CD	0.30	0.53	0.90	0.64	0.38	0.33	0.35	2.58
Sludge	0.29	0.32	0.34	0.34	0.28	0.28	0.29	0.00
Clean Fill	0.46	0.36	0.41	0.95	0.64	0.76	0.33	0.01
Tires	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.02
Miscellaneous	0.12	0.10	0.16	0.06	0.06	0.05	0.08	0.04
Subtotal MSW	7.14	7.54	8.59	8.95	8.08	7.92	7.32	8.89
Recyclables	0.56	0.58	0.57	0.59	0.57	0.58	0.59	0.00
Total MSW	7.69	8.12	9.16	9.54	8.66	8.50	7.91	8.89
Major Categories (pounds per person per day)								
Class 1	**5.06**	**5.17**	**5.56**	**5.54**	**5.34**	**5.15**	**5.08**	**3.95**
Class 3	**1.88**	**2.27**	**2.85**	**2.71**	**2.38**	**2.32**	**2.22**	**4.93**
Sludge	**0.29**	**0.32**	**0.34**	**0.34**	**0.28**	**0.28**	**0.29**	**0.00**
Fill	**0.46**	**0.36**	**0.41**	**0.95**	**0.64**	**0.76**	**0.33**	**0.01**
Garbage and Trash	**6.94**	**7.44**	**8.41**	**8.24**	**7.73**	**7.46**	**7.30**	**8.88**

2.2.2 Assumed Per Capita Generation Rates

In the model, incoming MSW and recyclables are grouped into four major categories, Class 1, Class 3, sludge, and fill of which sludge and fill are not considered in the model because of alternative disposal and use options. Class 1 material consists of the following: Garbage, Recyclables, Direct Landfill, Special Handling, Animals, and other miscellaneous wastes. Class 3 material consists of Trash, Vegetation, Building Debris, Tires, Trailers, and Asbestos. The values for the Class 1 and Class 3 categories for the last sixteen years are as follows:

	Class 1 Material	Class 3 Material	Total	*Vegetation*
1997/1998	4.85	2.24	7.09	*1.01*
1998/1999	5.02	2.41	7.43	*1.04*
1999/2000	4.97	2.24	7.21	*1.00*
2000/2001	4.98	2.14	7.11	*0.92*
2001/2002	5.08	2.22	7.30	*0.99*
2002/2003	5.15	2.32	7.46	*1.11*
2003/2004	5.34	2.38	7.73	*1.15*
2004/2005	5.54	2.71	8.24	*1.15*
2005/2006	5.56	2.85	8.41	*1.14*
2006/2007	5.17	2.27	7.44	*1.03*
2007/2008	5.06	1.88	6.94	*0.89*

The key element that must be considered in establishing the per capita generation rate assumptions is the general trend in the generation rates and the probability that this trend will continue or reverse. As previously discussed, the decrease in the Class 3 generation rate resulted from decreased Building Debris, Trash and Vegetation deliveries. While it is difficult to pinpoint the cause of this decline, undoubtedly this results from the combined effect of the absence of significant storm events, the diversion of heavy tree debris to private recyclers, the slowdown in the real estate market, and the drought. To what degree each of these factors had an impact is difficult to determine.

Outside of vegetation, the average generation rate of Class 3 material for each of the past eight years in chronological order was as follows: 1.22, 1.23, 1.21, 1.23, 1.56, 1.71, 1.24 and .99 pounds per person per day. As the data indicates, the decline in Class 3 material deliveries predicted in last year's model has materialized, and the generation rate has returned to near the pre-storm level. Given the potential for future storm events in this active storm cycle, conservatism dictates that we allow for the probability of future storm events. Last year the forecast generation rate was set at the five-year average over the period ending in FY 2007, or 1.39 pounds per person per day. This period included FY 2005 and FY 2006, both storm years. If recent history is any indication of future events, we can expect several quiet years interrupted by periods of increased hurricane activity, therefore it is more realistic to use an estimate that incorporates both quiet years and storm years. In looking at the data, the per capita generation fell within the 1.21 to 1.24 (average equals 1.23) range for five of the past eight years, and averaged 1.64 over the storm impacted years. Ignoring the most recent year as resulting from a short term economic event and assuming a 20% probability of a storm event in any given year, the weighted average per capita generation rate is estimated at 1.31 pounds per person per day.

Vegetation is the second component of the Class 3 generation rate. In viewing the above data, three distinct periods of vegetation generation emerge. During the period from FY 1998 to FY 2002, the average per capita generation rate was 1.0 pound per person per day, and ranged from a low of .92 to a high of 1.04. For the next four years the per capita generation was higher, averaging 1.14 and ranging from 1.11 to 1.15 pounds per person per day. This period includes the three hurricanes and the pine bore beetle infestation that resulted in the decline and loss of pine trees in our western communities. During the period after FY 2006 the per capita generation of vegetation declined for two consecutive years. This can be attributed to two factors: 1) no significant storm events, and 2) the increased diversion of this material to private processers. With the likelihood of future storm events it is reasonable to assume that the future will resemble the recent past; therefore, the assumed generation rate of vegetation is established at the average of the last 10 years, or 1.04 pounds per person per day. Adding the generation rates for Class 3 material and vegetation, the total Class 3 generation rate is assumed to be 2.35 pounds per person per day.

The Class 1 generation rate decreased from 5.17 pounds per person per day to 5.06 pounds per person per day, which is roughly equivalent to the rate for FY 2002. Data for the first month of FY 2009 indicates a continuation of the downward trend amid continuing economic weakness and the collapse of the housing

bubble. The now apparent continuing downward trend justifies a reduction in the estimated per capita generation rate going forward. It is reasonable to assume that the higher generation rates experienced from 2003-2006 were related to unprecedented real estate activity and that the low generation rates of the past two years were related to an unprecedented collapse in the real estate market. Therefore, this period is not considered in the projection. Fitting an exponential trend line to the per capita generation rates from FY 1992 through FY 2003 ($4.5258e^{.01x}$) and forecasting forward to FY 2009 produces a projected generation rate of 5.42 increasing at a rate of 1.0% per year. These values are used in the model except for FY 2009 and FY 2010, which due to the economic slowdown, are projected at the FY 2008 rate of 5.06 pounds per person per day.

It must be noted that the calculated per capita generation rates are dependent upon the BEBR annual population estimate, and the potential for error increases as the time since the last census increases. The model incorporates a sensitivity analysis to reflect the uncertainty in the assumptions and to accommodate alternative points of view.

The generation rates include only the waste the SWA receives and not materials delivered to permitted recyclers or shipped out of the county. It is assumed that the material not coming to the SWA's system will continue to be diverted from the system. To the extent that this assumption is incorrect, the estimated landfill life will be shorter than that predicted by the model. Because the SWA performs an annual review of waste generation and consumption data as part of the landfill depletion model update, any substantive changes will be detected, their potential impact evaluated, and any planning revisions made long before the disposal capacity of the landfill is significantly impacted.

2.3 Waste Disposal

Class 1 material is assumed to be delivered to the plant unless the plant is at capacity, in which case it is delivered to the Class 1 landfill as raw garbage. Class 3 material is assumed to be delivered to the Class 3 landfill, except as follows. Currently, considerable quantities of Class 3 material are either commingled at the transfer stations and delivered to the Resource Recovery Facility or diverted to the Class 1 landfill for operational reasons. Operational constraints at the transfer stations, particularly in the southern part of the county, will most likely result in the commingling continuing. Additionally, the SWA diverts a large percentage of building debris and C&D processor residue to the Class 1 landfill because of the gypsum content in this material and the potential for odor. The model incorporates the commingling of Class 3 material by including a factor for commingled Class 3 material expressed as a percent of incoming Class 3 material. The rate used in the model is 31%. This rate is comprised of a 3% commingled rate for vegetation and a 57% commingled rate for the balance of the Class 3 material.

2.4 Unforeseen Events

The waste generation rates used in the model do not include an allowance for increased depletion resulting from the landfilling of storm debris from a hurricane or other natural disaster. Through the effective use of temporary debris sites the SWA is able to manage the post-disaster cleanup and dispose of storm debris with limited impact on landfill capacity. The SWA's ability to accomplish this has been demonstrated following Hurricanes Irene, Frances, Jeanne, and Wilma. Additionally, the model assumes that the Resource Recovery Facility will be operating without any catastrophic outages, other than scheduled maintenance and minor outages, that would result in more than 5% downtime over the life of the plant. This assumption was recently tested following a fire in the boiler building in October 2005. Despite the magnitude of the damage, the plant was fully operational within two months.

2.5 Recycling Rates

The total annual generation of Class 1 and Class 3 material is adjusted to account for recycling and waste

reduction activities. On the Class 1 side, during FY 2007-2008 131,964 tons of recyclables were delivered to the SWA's MRF and CMRF, a 3.1% decrease in relation to FY 2006-2007. The per capita generation of recyclables decreased from .58 to .56 pounds per person per day. Dividing the per capita generation rate for recyclables by the per capita generation rate of Class 1 material produces a reduction rate of 11.0%, which is 1.8% lower than last year and the lowest since the early 90's. The decline was the result of Waste Management, Inc. diverting commercial paper and cardboard from the SWA's commercial MRF (CMRF) to their own recycling facility due to the historically high market demand and prices for these materials.

Although the amount of material delivered to the SWA's residential MRF (RMRF) increased by 5.0%, the amount of material delivered to the CMRF fell 31.2%. Had this material come to the SWA, recyclable tonnage would have totaled approximately 142,000 tons, or 11.8% of total Class 1 material, and the per capita generation rate would have been .60, the highest level in 7 years. The market for recyclables is a competitive market. It is the SWA's experience that as commodity prices increase and other players enter the market some material flows away from the Authority, but as prices subsequently fall the material returns. As of this writing, due to the economic slowdown in general and significantly lower demand by China in particular, the prices of recovered materials are falling rapidly. With the expectation that some of this material will return and in anticipation of the introduction of residential mixed paper next year, the assumed Class 1 recycling rate remains at 13% of Class 1 material in the model.

On the Class 3 side the most significant recycling activity involves clean vegetation. During the year the SWA recovered and/or recycled 203,170 tons of vegetation and mulch, amounting to 97.1% of the 209,141 tons of inbound vegetative debris and up from 95.3% the prior year. Additional recovered materials included 1,047 tons of ferrous metal, 65 tons of cardboard, and 1,529 tons of tires delivered to the resource recovery facility or exported. In total, the SWA recovered and/or recycled 205,811 tons or 46.4% of the 443,465 tons of Class 3 material (net of clean fill) delivered in FY 2007-2008. This compares to 32.3% in FY 2004-2005, and 37.5% in FY 2005-2006 and 43.8% in FY 2006-2007. The assumed Class 3 recycling rate is 40%, the average of the previous four years' rates.

2.6 Compacted Densities

Forecasted incoming solid waste tonnage is converted to consumed landfill volume by multiplying by the average compacted density. Although industry standards do exist, in reality landfill compacted densities vary widely based on the type of material landfilled and the operating procedures employed. Because the SWA landfills large quantities of ash and process residue from the RDF Resource Recovery Facility in the Class 1 landfill and diverts nearly all clean vegetation, the accuracy of industry averages cannot be relied upon for SWA system planning purposes.

To avoid uncertainty in estimating the compacted densities the SWA conducts an annual survey to determine the volume of landfill space consumed. The calculated waste volume in place for the prior year is subtracted from that for the present year to determine the volume depleted during the year. Using SWA waste tonnage data, the average landfill compacted density for the year and life-to-date is calculated. These densities are used to arrive at the density assumptions used in the model.

As can be seen on the following page, the average density over the life of the landfill is 1,715 pounds per cubic yard in the Class 1 landfill and 1,360 pounds per cubic yard in the Class 3 landfill. These rates are used in the model. The model calculates the Class 1 volume depleted by applying the above compacted density to plant residues and the estimated density of raw garbage of 1,200 pounds per cubic yard to the estimated quantity of landfilled raw garbage, and summing the two. The Class 3 volume is calculated by dividing the estimated compacted density into the pounds of landfilled solid waste.

Solid Waste Authority of Palm Beach County
Landfill Depletion Model Landfill Density Calculation

Class 1 Annual Landfill Density Estimate

	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008
Direct Haul	58,061	67,297	209,606	80,934	28,263
Transfer	304,661	353,278	336,554	275,107	286,852
Non-Processible	51	0	34,717	20,218	0
Residue	234,499	232,174	215,671	194,620	219,776
Uncombusted RDF	1,179	239	1,924	0	0
Ash	111,032	126,965	114,432	85,654	96
Total Tonnage to Landfill Disposal	709,483	779,953	912,904	656,533	534,987
Cubic Yards Depleted	785,940	959,009	1,219,671	848,202	486,759
Estimated Average Density	1,805	1,627	1,497	1,548	2,198

Class 3 Annual Landfill Density Estimate

	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008
Direct Haul	268,754	400,344	312,284	230,903	231,225
Transfer, Residue and Ash	102,924	91,712	8,677	62,823	146,663
Total Tonnage	371,678	492,056	320,961	293,726	377,888
Transfer Out Tires	179	117	82	227	214
Recovered Fill	146,155	220,220	96,868	85,165	109,666
Recovered Road Material/Concrete	0	0	0	0	0
Recovered Ferrous and White Goods	2,906	2,973	3,529	2,341	1,047
Fuel to Okeelanta or Wheelabrator	0	0	0	0	0
Cardboard	81	92	59	57	65
Net Transfer to Reduction Program	0	0	0	0	0
Vegetation/Mulch	(1,976)	(1,467)	(978)	(1,093)	(833)
Total Recovered Material	147,345	221,935	99,560	86,697	110,159
Total Tonnage to Landfill Disposal	224,333	270,121	221,401	207,029	267,729
Cubic Yards Depleted	368,102	428,853	202,730	388,893	187,130
Estimated Average Density	1,219	1,260	2,184	1,065	2,861

Life to Date Average Landfill Density Estimate

	Class 1		Class 3	
	Annual	*Cumulative*	Annual	*Cumulative*
Tons Disposed Through 11/11/91		*735,890*		*537,637*
Less October 1991		*22,374*		*20,127*
Less 11 Days of November		*8,529*		*5,211*
Tons Disposed Through 9/30/91		*704,987*		*512,299*
Tons Disposed 10/01/01 - 9/30/02	588,932	*5,541,393*	150,318	*2,465,147*
Tons Disposed 10/01/02 - 9/30/03	633,376	*6,174,769*	165,472	*2,630,619*
Tons Disposed 10/01/03 - 9/30/04	709,483	*6,884,252*	224,333	*2,854,952*
Tons Disposed 10/01/04 - 9/30/05	779,953	*7,664,205*	270,121	*3,125,073*
Tons Disposed 10/01/05 - 9/30/06	912,904	*8,577,109*	221,401	*3,346,474*
Tons Disposed 10/01/06 - 9/30/07	656,533	*9,233,642*	207,029	*3,553,503*
Tons Disposed 10/01/07 - 9/30/08	534,987	*9,768,629*	267,729	*3,821,232*
Cubic Yards Depleted at 9/30/02 (1)		6,404,387		3,744,598
Estimated Average Density to 9/30/02		**1,730**		**1,317**
Cubic Yards Depleted at 9/30/03 (1)		7,090,845		4,042,962
Estimated Average Density to 9/30/03		**1,742**		**1,301**
Cubic Yards Depleted at 9/30/04 (1)		7,876,785		4,411,064
Estimated Average Density to 9/30/04		**1,748**		**1,294**
Cubic Yards Depleted at 9/30/05 (1)		8,835,794		4,839,917
Estimated Average Density to 9/30/05		**1,735**		**1,291**
Cubic Yards Depleted at 9/30/06		10,055,465		5,042,647
Estimated Average Density to 9/30/06		**1,706**		**1,327**
Cubic Yards Depleted at 9/30/07		10,903,667		5,431,540
Estimated Average Density to 9/30/07		**1,694**		**1,308**
Cubic Yards Depleted at 9/30/08		11,390,426		5,618,670
Estimated Average Density to 9/30/08		**1,715**		**1,360**

2.7 Cover Material

Because daily cover is included in the annual volume used in the density calculation, it is not addressed in the model. Final cover consuming landfill volume is assumed to be 5% of the total landfill volume. This reflects the fill volume estimates from the closure of the first six cells of the Class 1 landfill. The estimated volume consumed by final cover is accounted for by reducing the available landfill capacity by 5%.

2.8 Available Landfill Volumes

The available landfill volumes have been calculated by the SWA's engineers, Camp Dresser and McKee, using CAD analysis. CDM estimates total landfill volume at 51,884,000 cubic yards prior to settlement, of which 9,698,800 cubic yards are within Class 3 cells. This estimate assumes landfilling to 167 feet NGVD, 7 feet above the permitted height of 160 feet, with settlement to 160 feet. Because the Landfill Depletion Model uses compacted densities that include settlement, the volume above 160 feet NGVD, an estimated 1,760,000 yards, has been deducted for the purpose of the model. Therefore, the total estimated landfill volume is 50,124,427 cubic yards. The landfill consists of 262 acres of Class 1 capacity and 72 acres of Class 3 capacity. With the 1,760,000 cubic yards deducted from the Class 1 and Class 3 landfills on a proportional basis, there is an estimated 40,754,579 cubic yards of Class 1 space and 9,369,848 cubic yards of Class 3 space (Class 3 Cells 1-6 and 8). Through September 30, 2007, 11,390,426 cubic yards of Class 1 volume and 5,618,670 cubic yards of Class 3 volume have been depleted.

2.9 Resource Recovery Facility (NCRRF)

The rated capacity of the NCRRF is 624,000 tons per year, however excluding FY 2005-2006 which was impacted by a fire at the plant, the plant has surpassed 800,000 tons of processible waste per year every year since FY 1996-1997. In FY 2007-2008, the plant processed 858,511 tons. This compares to 850,671 tons in FY 2006-2007, 782,960 tons in FY 2005-2006, and 884,005 tons in FY 2004-2005.

With the exception of the period impacted by the planned retrofit of the facility, the assumed throughput is 817,000 tons, reflecting the following: the SWA's long range planning assumption of 860,000 tons of processible waste per year; the long term successful operating history of the plant; and estimated downtime of 5% based on the rapid recovery time from two recent major unscheduled outages. During the retrofit, which is scheduled from April 2010 to March 2011, throughput is reduced by 60%.

The residuals from the plant include ash, process residue, and unprocessibles. Unprocessibles are estimated at 4.0% of total delivered waste in the present model, which is equal to the average of the past five years (4.1% in FY 2003-2004, 4.3% in FY 2004-2005, 4.4% in FY 2005-2006, 3.7% in FY 2006-2007, and 3.6% in FY 2007-2008). Unprocessibles are currently landfilled in the Class 3 landfill, and the SWA expects this practice to continue.

Process residue and ash totaled 40.8% in FY 2003-2004, 40.6% in FY 2004-2005, 41.8% in FY 2005-2006, 38.0% in FY 2006-2007 and 38.75% in FY 2007-2008. The Operating and Maintenance Agreement with the plant operator requires a minimum 60% reduction over the life of the contract, therefore ash and residue are assumed to total 40% of processible waste. The SWA is currently landfilling ash in the Class 3 landfill and expects to continue to do so. Since historically, based on an average of the past ten years, ash represents approximately 35% of the residuals, it is assumed in the model that 35% of the residuals are landfilled in the Class 3 landfill.

The SWA is pursuing options to expand incinerating capacity. At this time the SWA is evaluating the feasibility of constructing a 3,000 ton per day mass burn waste-to-energy plant adjacent to the existing facility. The model includes a scenario for the addition of this facility in the year 2015. Annual throughput is estimated at 936,000 tons. Residues are estimated at 28% by weight of incoming waste.

3.0 MODEL RESULTS

3.1 SUMMARY OF RESULTS

The summary results of the landfill depletion model for the existing incineration capacity and the proposed expanded incineration capacity are presented below in Table 3.1 and in the following paragraphs. The landfill depletion model results are included in Appendix A of the Report for further inspection.

The estimated landfill depletion dates for the Class 1 and Class 3 landfills are 2026 and 2015, respectively, compared to 2024 and 2013 in the prior model. On a balanced basis, which would require landfilling Class 3 waste in the Class 1 landfill after 2015, final depletion is expected to take place in 2024, which is unchanged from the previous model. The volume allocation associated with the balanced life scenario through depletion is approximately 75% Class 1 and 25% Class 3 material.

A 3,000 ton per day mass burn plant online in 2015 would add approximately seven years to the life of the site on a balanced basis, placing the ultimate depletion in the year 2031. The volume allocation associated with the balanced life scenario and the third boiler is approximately 51% Class 1 and 49% Class 3.

Scenario		Projected Life	Balanced Life
Two Boiler Results	Class 1	2026 (262 AC)	2024
	Class 3	2015 (72 AC)	
Mass Burn Added in 2015	Class 1	2044 (262 AC)	2031
	Class 3	2015 (72 AC)	

3.2 SPECIAL SCENARIO - RESERVE LANDFILL CAPACITY FOR RESOURCE RECOVERY RESIDUES

The SWA's Resource Recovery Facility is anticipated to be operational until at least 2030; therefore, the SWA may wish to reserve capacity for process residue and ash at the current landfill until 2030. Additionally, because Class 3 material cannot be managed at the SWA's transfer stations, the SWA may wish to provide capacity for this material at the current landfill as well. The model was used to evaluate the impact of this strategy. In order to provide capacity for process residue, ash and Class 3 waste through 2030, the SWA would have to divert all unprocessed Class 1 waste to an alternative site starting in 2021.

Assuming that a Mass Burn Plant is operational in 2015, the model indicates that the facility would not reach capacity until 2023, and the landfill would provide capacity for incinerator ash and residue and Class 3 waste beyond 2030 without diverting any waste to an alternative site.

3.3 SENSITIVITY ANALYSIS - THREE STATES OF NATURE

The above results are based upon a set of assumptions that represents a reasonable best guess. As with any model, these assumptions are based upon current circumstances and information. Some assumptions will inevitably vary; therefore, the actual results will deviate from the projections. In order to ascertain the potential magnitude of these deviations, the model has been run using "Most Likely", "Optimistic", and "Pessimistic" assumption sets, which are defined as follows.

Assumptions	Optimistic	Pessimistic
Generation Rates	5% Lower	5% Higher
Recycling Rates	20% Higher	5% Lower
Compacted Densities	10% Higher	10% Lower

The range for the Class 1 generation rate is somewhat conservative because the calculated annual generation rate has been less than the optimistic assumption fourteen of the last sixteen years and has never exceeded the pessimistic assumption even in the years impacted by hurricanes. Similarly for Class 3 material, the calculated annual generation rate has been less than or equal to the optimistic assumption thirteen of the last sixteen years and has exceeded the pessimistic assumption only twice and those were hurricane impacted years.

The 20% increase in the Class 1 recycling rate under the "optimistic" assumption set assumes the introduction of new programs to collect additional materials, such as mixed paper and junk mail. The 5% lower assumption under the "pessimistic" assumption set assumes no new programs and a slight erosion in participation.

The Class 1 and Class 3 life-to-date compacted densities have been within the assumed ranges for more than ten years.

The results of the sensitivity analysis are presented below. The analysis indicates that based on the current configuration, on a balanced basis the landfill is reasonably expected to be fully depleted at a time ranging from 2022 to 2027. Assuming the addition of the mass burn plant in 2015 and using the current landfill configuration, the landfill is reasonably expected to be depleted during the time period ranging from 2028 to 2035.

Scenario Summary			
	Most Likely	Optimistic	Pessimistic
Assumptions:			
Class 1 Generation Rate	5.42	5.15	5.69
Class 3 Generation Rate	2.35	2.23	2.47
Class 1 Recycling Rate	13%	16%	12%
Class 3 Recycling Rate	35%	35%	35%
Garbage Density	1,200	1,320	1,080
Trash Density	1,360	1,496	1,224
Plant Residuals Density	1,715	1,887	1,544
Results:			
Class 1	2026	2030	2024
Class 3	2015	2016	2014
Balanced Life	**2024**	**2027**	**2022**
Class 1 w/ Mass Burn	2044	2054	2038
Class 3 w/ Mass Burn	2015	2016	2014
Balanced Life w/ Mass Burn	**2031**	**2035**	**2028**

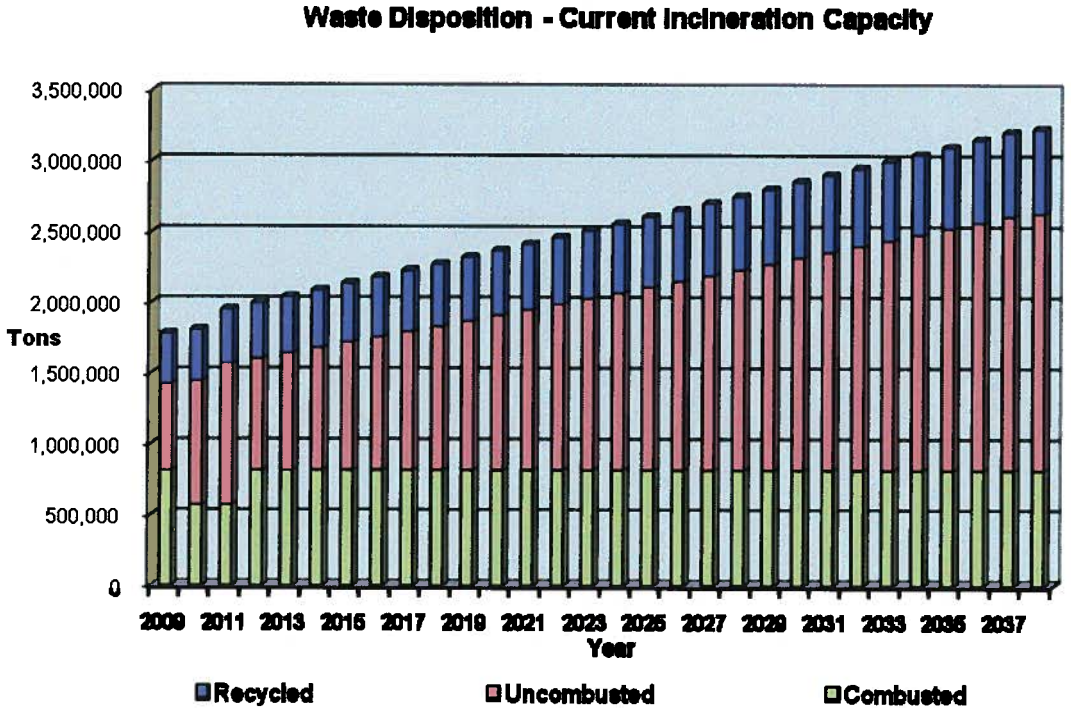
This exercise was undertaken to demonstrate how the estimate can vary given the realization of extreme values of the key assumptions. On a balanced life basis, the earliest predicted depletion date is 2022, which is six years beyond the life of the bonds issued to finance the existing SWA facilities. In recognition of the lead times involved, the SWA is currently in the process of designing and permitting the replacement landfill.

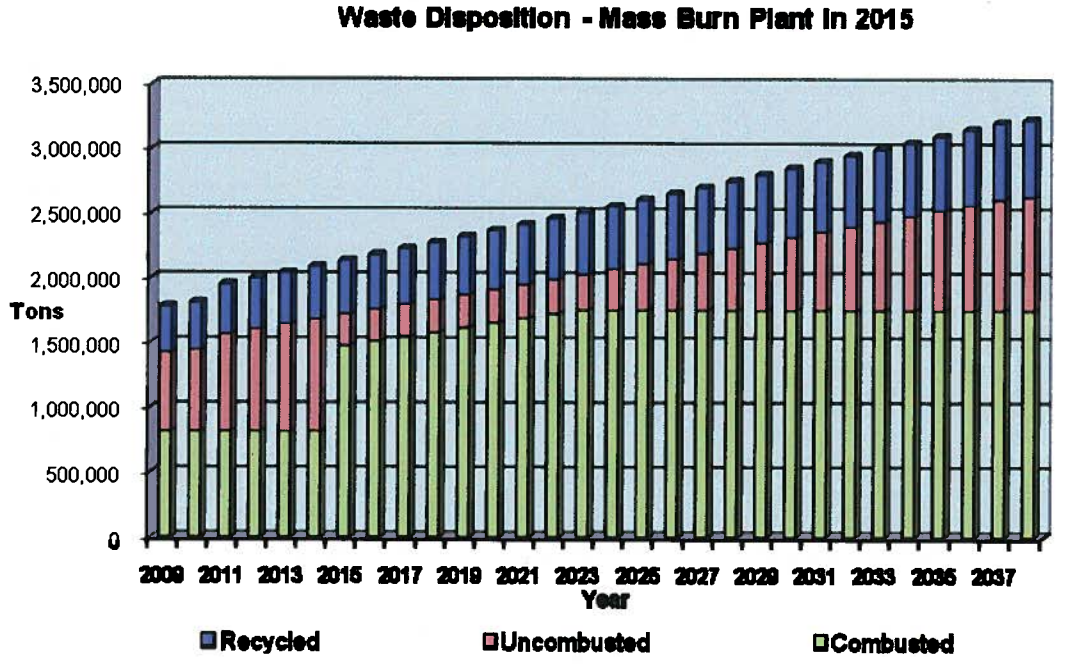
4.0 SUMMARY AND CONCLUSIONS

The landfill depletion model is designed to forecast the estimated life of the SWA's North County landfills in order to facilitate facilities planning decisions and assess the impact of alternatives and alternative states of nature on landfill life. Given current information and expectations of future events, the ***2009 Landfill Depletion Model*** predicts the estimated life of the North County landfill as follows:

Depletion Results	
Acreage	334
Available Capacity	50,124,427
Remaining Capacity	33,115,331
Depletion Year w/ Current Incineration Capacity	2024 (16 years)
Depletion year w/ Mass Burn Plant Online in 2015	2031 (23 years)

The above estimates are based on a reasonable Most Likely set of assumptions. As with any forecast, the result is subject to uncertainty. Should actual performance deviate from the assumptions adopted herein, results will vary. As this analysis is performed annually, any events that could potentially impact the life of the landfill will be identified long before depletion and afford the SWA the opportunity to plan accordingly.


Waste Disposition - Current Incineration Capacity
3,500,000
3,000,000
2,500,000
2,000,000
Tons
1,500,000
1,000,000
500,000
0
2009 2011 2013 2015 2017 2019 2021 2023 2025 2027 2029 2031 2033 2035 2037
Year
Recycled
Uncombusted
Combusted


Waste Disposition - Mass Burn Plant in 2015
3,500,000
3,000,000
2,500,000
2,000,000
Tons
1,500,000
1,000,000
500,000
0
2009 2011 2013 2015 2017 2019 2021 2023 2025 2027 2029 2031 2033 2035 2037
Year
Recycled
Uncombusted
Combusted

APPENDIX A

LANDFILL DEPLETION MODEL OUTPUT

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Solid Waste Authority of Palm Beach County
Landfill Depletion Model

Landfill Volume Assumptions

Total Estimated Volume (Net of 5% Final Cover)		**47,618,206**
Class 1 (Net of 5% Final Cover)		38,716,850
Class 3 (Net of 5% Final Cover)		8,901,356
Volume Depleted to Date		**17,009,096**
Class 1		11,390,426
Class 3		5,618,670
Additional Volume from Future Expansion Options		
Option 1		
Option2		
Option 3		
Option 4		
Total Identified Options		0
Class 1 Allocation	0.00%	0
Class 3 Allocation	0.00%	0
Estimated Acreage		**334.00**
Class 1		262.00
Class 3		72.00
Volume Remaining		**30,609,110**
Class 1		27,326,424
Class 3		3,282,686

Waste Generation and Recovery Assumptions

	Class 1	Class 3
Per Capita Generation Rate	5.42	2.35
Recycling Rate	13%	35%
Cover Material as a Percent of Landfill Volume	5%	5%
Raw Waste Density in Pounds per Cubic Yard	1,200	1,360
Plant Residue Density in Pounds per Cubic Yard	1,715	1,715
Per Capita Generation Growth Rate	1.00%	0.00%

Landfill Depletion Model Results

Estimated Depletion	
Class 1	**2026**
Class 3	**2015**
Balanced Life	**2024**
Class 1 w/ Mass Burn in the Year 2015	**2044**
Class 3 w/ Mass Burn in the Year 2015	**2015**
Balanced Life w/ Mass Burn in the Year 2015	**2031**

Solid Waste Authority of Palm Beach County
Landfill Depletion Model
Table 1: Estimated Population and Solid Waste Generation

	Palm Beach County Permanent Population (1)	Daily Per Capita Class 3 Generation lbs	Annual Per Capita Class 3 Generation lbs	Annual Estimated Class 3 Generation tons	Daily Per Capita Class 1 Generation lbs	Annual Per Capita Class 1 Generation lbs	Annual Estimated Class 1 Generation tons	Daily Per Capita MSW Generation lbs	Annual Per Capita MSW Generation lbs	Annual Estimated MSW Generation tons
2009	1,314,918	2.35	858	563,936	5.06	1,847	1,214,261	7.41	2,705	1,778,197
2010	1,335,500	2.35	858	572,763	5.06	1,847	1,233,267	7.41	2,705	1,806,030
2011	1,356,527	2.35	858	581,781	5.53	2,018	1,368,779	7.88	2,876	1,950,560
2012	1,377,886	2.35	858	590,941	5.58	2,038	1,404,234	7.93	2,896	1,995,175
2013	1,399,580	2.35	858	600,245	5.64	2,059	1,440,607	7.99	2,916	2,040,852
2014	1,421,617	2.35	858	609,696	5.70	2,079	1,477,922	8.05	2,937	2,087,618
2015	1,444,000	2.35	858	619,296	5.75	2,100	1,516,204	8.10	2,958	2,135,499
2016	1,463,430	2.35	858	627,629	5.81	2,121	1,551,971	8.16	2,979	2,179,600
2017	1,483,121	2.35	858	636,074	5.87	2,142	1,588,583	8.22	3,000	2,224,657
2018	1,503,078	2.35	858	644,633	5.93	2,164	1,626,058	8.28	3,021	2,270,690
2019	1,523,303	2.35	858	653,307	5.99	2,185	1,664,417	8.34	3,043	2,317,724
2020	1,543,800	2.35	858	662,097	6.05	2,207	1,703,681	8.40	3,065	2,365,778
2021	1,562,578	2.35	858	670,150	6.11	2,229	1,741,647	8.46	3,087	2,411,798
2022	1,581,584	2.35	858	678,302	6.17	2,251	1,780,460	8.52	3,109	2,458,761
2023	1,600,821	2.35	858	686,552	6.23	2,274	1,820,137	8.58	3,132	2,506,689
2024	1,620,292	2.35	858	694,903	6.29	2,297	1,860,699	8.64	3,154	2,555,601
2025	1,640,000	2.35	858	703,355	6.36	2,320	1,902,164	8.71	3,177	2,605,519
2026	1,657,522	2.35	858	710,870	6.42	2,343	1,941,711	8.77	3,201	2,652,581
2027	1,675,230	2.35	858	718,464	6.48	2,366	1,982,081	8.83	3,224	2,700,546
2028	1,693,128	2.35	858	726,140	6.55	2,390	2,023,290	8.90	3,248	2,749,430
2029	1,711,218	2.35	858	733,898	6.61	2,414	2,065,356	8.96	3,272	2,799,254
2030	1,729,500	2.35	858	741,739	6.68	2,438	2,108,296	9.03	3,296	2,850,035
2031	1,745,559	2.35	858	748,627	6.75	2,462	2,149,151	9.10	3,320	2,897,778
2032	1,761,767	2.35	858	755,578	6.81	2,487	2,190,798	9.16	3,345	2,946,375
2033	1,778,126	2.35	858	762,594	6.88	2,512	2,233,251	9.23	3,370	2,995,845
2034	1,794,636	2.35	858	769,675	6.95	2,537	2,276,528	9.30	3,395	3,046,202
2035	1,811,300	2.35	858	776,821	7.02	2,562	2,320,643	9.37	3,420	3,097,464
2036	1,828,041	2.35	858	784,001	7.09	2,588	2,365,512	9.44	3,446	3,149,513
2037	1,844,937	2.35	858	791,247	7.16	2,614	2,411,249	9.51	3,472	3,202,496
2038	1,844,937	2.35	858	791,247	7.23	2,640	2,435,362	9.58	3,498	3,226,609
Annual Growth Rate	1.17%	0.00%	0.00%	1.17%	1.00%	1.25%	2.43%	0.90%	0.90%	2.08%

Sources and Notes:
(1) Bureau of Economic and Business Research, University of Florida, Florida Population Studies; As summarized in Table 1A.
(2) Per capita generation rates include commercial generation and thus are not related to the generation rates used in the Assessment Billing Program.
(3) The waste quantities include only waste received at SWA facilities.

Solid Waste Authority of Palm Beach County
Landfill Depletion Model
Table 1A: Population Projection

Year Ended September	Estimated Permanent Population
1999	1,042,196
2000	1,131,184
2001	1,154,464
2002	1,183,197
2003	1,211,448
2004	1,242,270
2005	1,265,900
2006	1,287,987
2007	1,295,033
2008	1,294,654
2009	1,314,918
2010	1,335,500
2011	1,356,527
2012	1,377,886
2013	1,399,580
2014	1,421,617
2015	1,444,000
2016	1,463,430
2017	1,483,121
2018	1,503,078
2019	1,523,303
2020	1,543,800
2021	1,562,578
2022	1,581,584
2023	1,600,821
2024	1,620,292
2025	1,640,000
2026	1,657,522
2027	1,675,230
2028	1,693,128
2029	1,711,218
2030	1,729,500
2031	1,745,559
2032	1,761,767
2033	1,778,126
2034	1,794,636
2035	1,811,300
2036	1,828,041
2037	1,844,937

University of Florida BEBR Medium Permanent Population Estimate	
2005	1,265,900
2008	1,294,654
2010	1,335,500
2015	1,444,000
2020	1,543,800
2025	1,640,000
2030	1,729,500
2035	1,811,300
2005-2008	0.75%
2008-2010	1.55%
2010-2015	1.56%
2015-2020	1.34%
2020-2025	1.21%
2025-2030	1.06%
2030-2035	0.92%
2035-2008-2035	0.92% 1.24%

(1) Population estimates from Bureau of Economic and Business Research, Florida Population Studies, Bulletin No. 150, February 2008.
(2) Population estimates calculated as follows:

r=ln(p2015/P2010)/5	P2011= P2010x(e^(nr))
r=ln(1.0812)/5	P2011=1,335,500x(e^(1*.0156))
r=.0156	P2011=1,335,500x1.0157
	P2011 = 1,356,527

Solid Waste Authority of Palm Beach County
Landfill Depletion Model
Table 2: Estimated Class 1 Landfill Depletion - Current Two Boiler System

	Class 1 Waste Generation *Tons*	Class 1 Waste Net of Recycled *Tons*	Class 3 Diverted to Class 1 *Tons*	NCRRF Unprocessible Waste *Tons*	Uncombusted Waste Landfilled *Tons*	Process Residue, Ash, and RDF Landfilled *Tons*	Class 1 Waste Landfilled *Tons*	Class 1 Volume Consumed *CY*	Class 1 Volume Remaining *CY*
Total Estimated Volume to +160 NGVD									**38,716,850**
Volume Depleted Through Fiscal Year 2007/2008									**11,390,426**
Remaining volume based on 262.00 Acres of Class 1 Landfill									**27,326,424**
2009	1,214,261	**1,056,407**	174,820	0	380,186	212,420	**592,606**	**881,363**	**26,445,061**
2010	1,233,267	**1,072,943**	177,556	0	654,770	148,694	**803,464**	**1,264,687**	**25,180,374**
2011	1,368,779	**1,190,838**	180,352	0	775,461	148,694	**924,155**	**1,465,839**	**23,714,535**
2012	1,404,234	**1,221,684**	183,192	0	553,834	212,420	**766,254**	**1,170,776**	**22,543,759**
2013	1,440,607	**1,253,328**	186,076	0	588,362	212,420	**800,782**	**1,228,324**	**21,315,435**
2014	1,477,922	**1,285,792**	189,006	0	623,756	212,420	**836,176**	**1,287,314**	**20,028,121**
2015	1,516,204	**1,319,097**	191,982	0	660,037	212,420	**872,457**	**1,347,782**	**18,680,338**
2016	1,551,971	**1,350,215**	194,565	0	693,738	212,420	**906,158**	**1,403,951**	**17,276,388**
2017	1,588,583	**1,382,067**	197,183	0	728,208	212,420	**940,628**	**1,461,401**	**15,814,987**
2018	1,626,058	**1,414,670**	199,836	0	763,465	212,420	**975,885**	**1,520,162**	**14,294,825**
2019	1,664,417	**1,448,043**	202,525	0	799,526	212,420	**1,011,946**	**1,580,264**	**12,714,562**
2020	1,703,681	**1,482,203**	205,250	0	836,411	212,420	**1,048,831**	**1,641,738**	**11,072,823**
2021	1,741,647	**1,515,233**	207,747	0	871,938	212,420	**1,084,358**	**1,700,951**	**9,371,873**
2022	1,780,460	**1,549,000**	210,274	0	908,232	212,420	**1,120,652**	**1,761,440**	**7,610,433**
2023	1,820,137	**1,583,519**	212,831	0	945,309	212,420	**1,157,729**	**1,823,235**	**5,787,198**
2024	1,860,699	**1,618,808**	215,420	0	983,186	212,420	**1,195,606**	**1,886,363**	**3,900,835**
2025	1,902,164	**1,654,883**	218,040	0	1,021,881	212,420	**1,234,301**	**1,950,855**	**1,949,979**
2026	1,941,711	**1,689,289**	220,370	0	1,058,617	212,420	**1,271,037**	**2,012,082**	**(62,102)**
2027	1,982,081	**1,724,411**	222,724	0	1,096,093	212,420	**1,308,513**	**2,074,542**	**(2,136,644)**
2028	2,023,290	**1,760,262**	225,104	0	1,134,324	212,420	**1,346,744**	**2,138,260**	**(4,274,904)**
2029	2,065,356	**1,796,859**	227,509	0	1,173,326	212,420	**1,385,746**	**2,203,264**	**(6,478,168)**
2030	2,108,296	**1,834,217**	229,939	0	1,213,115	212,420	**1,425,535**	**2,269,578**	**(8,747,747)**
2031	2,149,151	**1,869,761**	232,074	0	1,250,794	212,420	**1,463,214**	**2,332,377**	**(11,080,123)**
2032	2,190,798	**1,905,994**	234,229	0	1,289,181	212,420	**1,501,601**	**2,396,356**	**(13,476,479)**
2033	2,233,251	**1,942,929**	236,404	0	1,328,291	212,420	**1,540,711**	**2,461,538**	**(15,938,017)**
2034	2,276,528	**1,980,579**	238,599	0	1,368,136	212,420	**1,580,556**	**2,527,948**	**(18,465,965)**
2035	2,320,643	**2,018,959**	240,815	0	1,408,732	212,420	**1,621,152**	**2,595,607**	**(21,061,572)**
2036	2,365,512	**2,057,995**	243,040	0	1,449,994	212,420	**1,662,414**	**2,664,377**	**(23,725,949)**
2037	2,411,249	**2,097,787**	245,287	0	1,492,032	212,420	**1,704,452**	**2,734,439**	**(26,460,388)**
2038	2,435,362	**2,118,765**	245,287	0	1,513,009	212,420	**1,725,429**	**2,769,403**	**(29,229,791)**

Assumptions:

Average Annual Class 1 Growth Rate	**2.43%**
Recycling Rate (Net of Ferrous)	**13.00%**
Recycling Growth Rate	**0.00%**
Cover Material	**5.00%**
Raw Garbage Density in Lbs per Cubic Yard	**1,200**
Process Residue Density in Lbs per Cubic Yard	**1,715**
Daily Average Plant Throughput, Design	**2,000**
Plant Capacity (Processible Tons)	**817,000**
Process Residue, Ash, and RDF to Landfill	**40.00%**
Percent of Residue, Ash, and RDF to Class 1	**65.0%**
Unprocessibles to Landfill (Percent of Delivered)	**4.00%**
Percent of Unprocessibles to Class 1	**0.00%**

Estimated Depletion

Class 1	**2026**
Balanced Life	**2024**

Solid Waste Authority of Palm Beach County

Landfill Depletion Model

Table 2A: Estimated Class 1 Landfill Depletion - Proposed Mass Burn Plant in 2015

	Class 1 Waste Generation *Tons*	Class 1 Waste less Recycling *Tons*	Class 3 Diverted to Class 1 *Tons*	NCRRF Unprocessible Waste *Tons*	Uncombusted Waste Landfilled *Tons*	Process Residue, Ash, and RDF Landfilled *Tons*	Class 1 Waste Landfilled *Tons*	Class 1 Volume Consumed *CY*	Class 1 Volume Remaining *CY*
Total Estimated Volume to +160 NGVD									**38,716,850**
Volume Depleted Through Fiscal Year 2007/2008									**11,390,426**
Remaining volume based on 262.00 Acres of Class 1 Landfill									**27,326,424**
2009	1,214,261	**1,056,407**	174,820	0	380,186	212,420	**592,606**	**881,363**	**26,445,061**
2010	1,233,267	**1,072,943**	177,556	0	409,670	148,694	**558,364**	**856,187**	**25,588,874**
2011	1,368,779	**1,190,838**	180,352	0	530,361	148,694	**679,055**	**1,057,339**	**24,531,535**
2012	1,404,234	**1,221,684**	183,192	0	553,834	212,420	**766,254**	**1,170,776**	**23,360,759**
2013	1,440,607	**1,253,328**	186,076	0	588,362	212,420	**800,782**	**1,228,324**	**22,132,435**
2014	1,477,922	**1,285,792**	189,006	0	623,756	212,420	**836,176**	**1,287,314**	**20,845,121**
2015	1,516,204	**1,319,097**	191,982	0	0	212,420	**212,420**	**247,720**	**20,597,400**
2016	1,551,971	**1,350,215**	194,565	0	0	212,420	**212,420**	**247,720**	**20,349,680**
2017	1,588,583	**1,382,067**	197,183	0	0	212,420	**212,420**	**247,720**	**20,101,960**
2018	1,626,058	**1,414,670**	199,836	0	0	212,420	**212,420**	**247,720**	**19,854,240**
2019	1,664,417	**1,448,043**	202,525	0	0	212,420	**212,420**	**247,720**	**19,606,520**
2020	1,703,681	**1,482,203**	205,250	0	0	212,420	**212,420**	**247,720**	**19,358,800**
2021	1,741,647	**1,515,233**	207,747	0	0	212,420	**212,420**	**247,720**	**19,111,080**
2022	1,780,460	**1,549,000**	210,274	0	0	212,420	**212,420**	**247,720**	**18,863,360**
2023	1,820,137	**1,583,519**	212,831	0	9,309	212,420	**221,729**	**263,235**	**18,600,125**
2024	1,860,699	**1,618,808**	215,420	0	47,186	212,420	**259,606**	**326,363**	**18,273,761**
2025	1,902,164	**1,654,883**	218,040	0	85,881	212,420	**298,301**	**390,855**	**17,882,906**
2026	1,941,711	**1,689,289**	220,370	0	122,617	212,420	**335,037**	**452,082**	**17,430,824**
2027	1,982,081	**1,724,411**	222,724	0	160,093	212,420	**372,513**	**514,542**	**16,916,283**
2028	2,023,290	**1,760,262**	225,104	0	198,324	212,420	**410,744**	**578,260**	**16,338,022**
2029	2,065,356	**1,796,859**	227,509	0	237,326	212,420	**449,746**	**643,264**	**15,694,759**
2030	2,108,296	**1,834,217**	229,939	0	277,115	212,420	**489,535**	**709,578**	**14,985,180**
2031	2,149,151	**1,869,761**	232,074	0	314,794	212,420	**527,214**	**772,377**	**14,212,804**
2032	2,190,798	**1,905,994**	234,229	0	353,181	212,420	**565,601**	**836,356**	**13,376,448**
2033	2,233,251	**1,942,929**	236,404	0	392,291	212,420	**604,711**	**901,538**	**12,474,909**
2034	2,276,528	**1,980,579**	238,599	0	432,136	212,420	**644,556**	**967,948**	**11,506,962**
2035	2,320,643	**2,018,959**	240,815	0	472,732	212,420	**685,152**	**1,035,607**	**10,471,355**
2036	2,365,512	**2,057,995**	243,040	0	513,994	212,420	**726,414**	**1,104,377**	**9,366,978**
2037	2,411,249	**2,097,787**	245,287	0	556,032	212,420	**768,452**	**1,174,439**	**8,192,539**
2038	2,435,362	**2,118,765**	245,287	0	577,009	212,420	**789,429**	**1,209,403**	**6,983,136**

Assumptions:

Average Annual Class 1 Growth Rate	**2.43%**
Recycling Rate (Net of Ferrous)	**13.00%**
Recycling Growth Rate	**0.00%**
Cover Material	**5.00%**
Raw Garbage Density in Lbs per Cubic Yard	**1,200**
Process Residue Density in Lbs per Cubic Yard	**1,715**
RDF Plant Capacity (Processible Tons)	**817,000**
Plant Capacity w/ Mass Burn Plant	**1,753,000**
Mass Burn Residuals	**28.00%**
Mass Burn Unprocessibles	**0.00%**
Add Mass Burn Plant in Year	**2015**

Estimated Depletion

Class 1	**2044**
Balanced Life	**2031**

Solid Waste Authority of Palm Beach County

Landfill Depletion Model

Table 3: Estimated Class 3 Landfill Depletion - Current Two Boiler System

	Class 3 Waste Generation *Tons*	Class 3 Waste Recycled *Tons*	Class 3 Waste Net *Tons*	NCRRF Unprocessible Waste *Tons*	NCRRF Ash, Residue and RDF *Tons*	Class 3 Diverted to Class 1 *Tons*	Class 3 Waste Landfilled *Tons*	Class 3 Volume Consumed *CY*	Class 3 Volume Remaining *CY*
Total Estimated Volume to +160 NGVD									**8,901,356**
Volume Depleted Through Fiscal Year 2007/2008									**5,618,670**
Remaining Volume based on 72.00 Acres of Class 3 Landfill									**3,282,686**
2009	563,936	197,377	**366,558**	34,042	114,380	(174,820)	**340,160**	**500,235**	**2,782,451**
2010	572,763	200,467	**372,296**	23,829	80,066	(177,556)	**298,634**	**439,168**	**2,343,282**
2011	581,781	203,623	**378,157**	23,829	80,066	(180,352)	**301,701**	**443,677**	**1,899,605**
2012	590,941	206,829	**384,111**	34,042	114,380	(183,192)	**349,342**	**513,738**	**1,385,867**
2013	600,245	210,086	**390,159**	34,042	114,380	(186,076)	**352,505**	**518,390**	**867,478**
2014	609,696	213,394	**396,302**	34,042	114,380	(189,006)	**355,718**	**523,115**	**344,363**
2015	619,296	216,753	**402,542**	34,042	114,380	(191,982)	**358,982**	**527,915**	**(183,552)**
2016	627,629	219,670	**407,959**	34,042	114,380	(194,565)	**361,815**	**532,081**	**(715,634)**
2017	636,074	222,626	**413,448**	34,042	114,380	(197,183)	**364,687**	**536,304**	**(1,251,938)**
2018	644,633	225,621	**419,011**	34,042	114,380	(199,836)	**367,597**	**540,583**	**(1,792,521)**
2019	653,307	228,657	**424,649**	34,042	114,380	(202,525)	**370,546**	**544,920**	**(2,337,442)**
2020	662,097	231,734	**430,363**	34,042	114,380	(205,250)	**373,535**	**549,316**	**(2,886,757)**
2021	670,150	234,553	**435,598**	34,042	114,380	(207,747)	**376,273**	**553,342**	**(3,440,100)**
2022	678,302	237,406	**440,896**	34,042	114,380	(210,274)	**379,044**	**557,418**	**(3,997,518)**
2023	686,552	240,293	**446,259**	34,042	114,380	(212,831)	**381,849**	**561,543**	**(4,559,061)**
2024	694,903	243,216	**451,687**	34,042	114,380	(215,420)	**384,689**	**565,719**	**(5,124,779)**
2025	703,355	246,174	**457,181**	34,042	114,380	(218,040)	**387,562**	**569,945**	**(5,694,724)**
2026	710,870	248,804	**462,065**	34,042	114,380	(220,370)	**390,117**	**573,702**	**(6,268,426)**
2027	718,464	251,463	**467,002**	34,042	114,380	(222,724)	**392,700**	**577,499**	**(6,845,925)**
2028	726,140	254,149	**471,991**	34,042	114,380	(225,104)	**395,309**	**581,337**	**(7,427,263)**
2029	733,898	256,864	**477,034**	34,042	114,380	(227,509)	**397,947**	**585,216**	**(8,012,479)**
2030	741,739	259,609	**482,131**	34,042	114,380	(229,939)	**400,613**	**589,137**	**(8,601,616)**
2031	748,627	262,019	**486,607**	34,042	114,380	(232,074)	**402,955**	**592,580**	**(9,194,196)**
2032	755,578	264,452	**491,126**	34,042	114,380	(234,229)	**405,318**	**596,056**	**(9,790,252)**
2033	762,594	266,908	**495,686**	34,042	114,380	(236,404)	**407,704**	**599,564**	**(10,389,816)**
2034	769,675	269,386	**500,288**	34,042	114,380	(238,599)	**410,111**	**603,104**	**(10,992,921)**
2035	776,821	271,887	**504,934**	34,042	114,380	(240,815)	**412,541**	**606,678**	**(11,599,599)**
2036	784,001	274,400	**509,601**	34,042	114,380	(243,040)	**414,982**	**610,268**	**(12,209,866)**
2037	791,247	276,937	**514,311**	34,042	114,380	(245,287)	**417,446**	**613,891**	**(12,823,757)**
2038	791,247	276,937	**514,311**	34,042	114,380	(245,287)	**417,446**	**613,891**	**(13,437,648)**

Assumptions:

Average Annual Class 3 Growth Rate	**1.17%**
Recycling/Reduction Rate	**35.00%**
Recycling Growth Rate	**0.00%**
Cover Material	**5.00%**
Trash Density In Lbs per Cy	**1,360**
Percent of NCRRRF Unprocessibles to Class 3	**100.00%**
Percent of Class 3 Material Diverted to Class 1	**31.00%**

Estimated Depletion

Class 3	**2015**
Balanced Life	**2024**

Solid Waste Authority of Palm Beach County

Landfill Depletion Model

Table 3A: Estimated Class 3 Landfill Depletion - Proposed Mass Burn Plant in 2015

	Class 3 Waste Generation *Tons*	Class 3 Waste Recycled *Tons*	Class 3 Waste Net *Tons*	NCRRF Unprocessible Waste *Tons*	NCRRF Ash, Residue and RDF *Tons*	Class 3 Diverted to Class 1 *Tons*	Class 3 Waste Landfilled *Tons*	Class 3 Volume Consumed *CY*	Class 3 Volume Remaining *CY*
Total Estimated Volume to +160 NGVD									**8,901,356**
Volume Depleted Through Fiscal Year 2007/2008									**5,618,670**
Remaining Volume based on 72.00 Acres of Class 3 Landfill									**3,282,686**
2009	563,936	197,377	**366,558**	34,042	114,380	(174,820)	**340,160**	**500,235**	**2,782,451**
2010	572,763	200,467	**372,296**	23,829	80,066	(177,556)	**298,634**	**439,168**	**2,343,282**
2011	581,781	203,623	**378,157**	23,829	80,066	(180,352)	**301,701**	**443,677**	**1,899,605**
2012	590,941	206,829	**384,111**	34,042	114,380	(183,192)	**349,342**	**513,738**	**1,385,867**
2013	600,245	210,086	**390,159**	34,042	114,380	(186,076)	**352,505**	**518,390**	**867,478**
2014	609,696	213,394	**396,302**	34,042	114,380	(189,006)	**355,718**	**523,115**	**344,363**
2015	619,296	216,753	**402,542**	34,042	299,190	(191,982)	**543,793**	**799,695**	**(455,332)**
2016	627,629	219,670	**407,959**	34,042	308,627	(194,565)	**556,062**	**817,738**	**(1,273,071)**
2017	636,074	222,626	**413,448**	34,042	318,278	(197,183)	**568,585**	**836,154**	**(2,109,225)**
2018	644,633	225,621	**419,011**	34,042	328,150	(199,836)	**581,367**	**854,951**	**(2,964,177)**
2019	653,307	228,657	**424,649**	34,042	338,247	(202,525)	**594,413**	**874,137**	**(3,838,314)**
2020	662,097	231,734	**430,363**	34,042	348,575	(205,250)	**607,730**	**893,720**	**(4,732,034)**
2021	670,150	234,553	**435,598**	34,042	358,523	(207,747)	**620,416**	**912,376**	**(5,644,410)**
2022	678,302	237,406	**440,896**	34,042	368,685	(210,274)	**633,349**	**931,396**	**(6,575,806)**
2023	686,552	240,293	**446,259**	34,042	376,460	(212,831)	**643,929**	**946,955**	**(7,522,760)**
2024	694,903	243,216	**451,687**	34,042	376,460	(215,420)	**646,769**	**951,130**	**(8,473,891)**
2025	703,355	246,174	**457,181**	34,042	376,460	(218,040)	**649,642**	**955,356**	**(9,429,247)**
2026	710,870	248,804	**462,065**	34,042	376,460	(220,370)	**652,197**	**959,114**	**(10,388,361)**
2027	718,464	251,463	**467,002**	34,042	376,460	(222,724)	**654,780**	**962,911**	**(11,351,272)**
2028	726,140	254,149	**471,991**	34,042	376,460	(225,104)	**657,389**	**966,749**	**(12,318,021)**
2029	733,898	256,864	**477,034**	34,042	376,460	(227,509)	**660,027**	**970,628**	**(13,288,649)**
2030	741,739	259,609	**482,131**	34,042	376,460	(229,939)	**662,693**	**974,549**	**(14,263,198)**
2031	748,627	262,019	**486,607**	34,042	376,460	(232,074)	**665,035**	**977,992**	**(15,241,190)**
2032	755,578	264,452	**491,126**	34,042	376,460	(234,229)	**667,398**	**981,468**	**(16,222,658)**
2033	762,594	266,908	**495,686**	34,042	376,460	(236,404)	**669,784**	**984,976**	**(17,207,634)**
2034	769,675	269,386	**500,288**	34,042	376,460	(238,599)	**672,191**	**988,516**	**(18,196,150)**
2035	776,821	271,887	**504,934**	34,042	376,460	(240,815)	**674,621**	**992,090**	**(19,188,239)**
2036	784,001	274,400	**509,601**	34,042	376,460	(243,040)	**677,062**	**995,679**	**(20,183,919)**
2037	791,247	276,937	**514,311**	34,042	376,460	(245,287)	**679,526**	**999,303**	**(21,183,221)**
2038	791,247	276,937	**514,311**	34,042	376,460	(245,287)	**679,526**	**999,303**	**(22,182,524)**

Assumptions:

Average Annual Class 3 Growth Rate	**1.17%**
Recycling/Reduction Rate	**35.00%**
Recycling Growth Rate	**0.00%**
Cover Material	**5.00%**
Trash Density in Lbs per Cy	**1,360**
Percent of NCRRRF Unprocessibles to Class 3	**100.00%**
Percent of Class 3 Material Diverted to Class 1	**31.00%**

Estimated Depletion

Class 3	**2015**
Balanced Life	**2031**

Solid Waste Authority

Landfill Depletion Model

Table 4: Estimated Landfill Depletion Assuming Balanced Life - Current Two Boiler System

	Class 1 Landfill Volume Depleted	Class 3 Landfill Volume Depleted	Total Landfill Volume Depleted	Cumulative Class 1 Volume Depleted	Cumulative Class 3 Volume Depleted	Cumulative Class 1 Percentage Volume	Cumulative Class 3 Percentage Volume	Landfill Volume Remaining
Total Estimated Volume to +160 NGVD								**47,618,206**
Volume Depleted Through Fiscal Year 2007/2008								**17,009,096**
Remaining Volume								**30,609,110**
2009	881,363	500,235	1,381,598	12,271,789	6,118,905	66.73%	33.27%	**29,227,512**
2010	1,264,687	439,168	1,703,856	13,536,476	6,558,073	67.36%	32.64%	**27,523,656**
2011	1,465,839	443,677	1,909,516	15,002,315	7,001,751	68.18%	31.82%	**25,614,140**
2012	1,170,776	513,738	1,684,514	16,173,091	7,515,488	68.27%	31.73%	**23,929,626**
2013	1,228,324	518,390	1,746,714	17,401,416	8,033,878	68.41%	31.59%	**22,182,912**
2014	1,287,314	523,115	1,810,429	18,688,730	8,556,993	68.59%	31.41%	**20,372,483**
2015	1,347,782	527,915	1,875,697	20,036,512	9,084,908	68.80%	31.20%	**18,496,786**
2016	1,403,951	532,081	1,936,032	21,440,462	9,616,989	69.03%	30.97%	**16,560,754**
2017	1,461,401	536,304	1,997,705	22,901,863	10,153,293	69.28%	30.72%	**14,563,049**
2018	1,520,162	540,583	2,060,745	24,422,025	10,693,877	69.55%	30.45%	**12,502,304**
2019	1,580,264	544,920	2,125,184	26,002,288	11,238,797	69.82%	30.18%	**10,377,120**
2020	1,641,738	549,316	2,191,054	27,644,027	11,788,113	70.11%	29.89%	**8,186,066**
2021	1,700,951	553,342	2,254,293	29,344,977	12,341,455	70.39%	29.61%	**5,931,773**
2022	1,761,440	557,418	2,318,858	31,106,417	12,898,873	70.69%	29.31%	**3,612,915**
2023	1,823,235	561,543	2,384,778	32,929,652	13,460,416	70.98%	29.02%	**1,228,137**
2024	1,886,363	565,719	2,452,082	34,816,016	14,026,135	71.28%	28.72%	**(1,223,945)**
2025	1,950,855	569,945	2,520,800	36,766,871	14,596,080	71.58%	28.42%	**(3,744,745)**
2026	2,012,082	573,702	2,585,784	38,778,953	15,169,782	71.88%	28.12%	**(6,330,528)**
2027	2,074,542	577,499	2,652,041	40,853,494	15,747,281	72.18%	27.82%	**(8,982,569)**
2028	2,138,260	581,337	2,719,598	42,991,754	16,328,618	72.47%	27.53%	**(11,702,167)**
2029	2,203,264	585,216	2,788,480	45,195,018	16,913,835	72.77%	27.23%	**(14,490,647)**
2030	2,269,578	589,137	2,858,715	47,464,597	17,502,972	73.06%	26.94%	**(17,349,363)**
2031	2,332,377	592,580	2,924,957	49,796,973	18,095,552	73.35%	26.65%	**(20,274,320)**
2032	2,396,356	596,056	2,992,412	52,193,329	18,691,608	73.63%	26.37%	**(23,266,731)**
2033	2,461,538	599,564	3,061,102	54,654,867	19,291,172	73.91%	26.09%	**(26,327,834)**
2034	2,527,948	603,104	3,131,052	57,182,815	19,894,277	74.19%	25.81%	**(29,458,886)**
2035	2,595,607	606,678	3,202,285	59,778,422	20,500,954	74.46%	25.54%	**(32,661,170)**
2036	2,664,377	610,268	3,274,645	62,442,799	21,111,222	74.73%	25.27%	**(35,935,815)**
2037	2,734,439	613,891	3,348,330	65,177,238	21,725,113	75.00%	25.00%	**(39,284,145)**
2038	2,769,403	613,891	3,383,293	67,946,641	22,339,003	75.26%	24.74%	**(42,667,439)**

Assumptions: **See Table 1, Table 2, and Table 3.**

Solid Waste Authority of Palm Beach County

Landfill Depletion Model

Table 4A: Estimated Landfill Depletion Assuming Balanced Life - Proposed Mass Burn Plant in 2015

	Class 1 Landfill Volume Depleted	Class 3 Landfill Volume Depleted	Total Landfill Volume Depleted	Cumulative Class 1 Volume Depleted	Cumulative Class 3 Volume Depleted	Cumulative Class 1 Percentage Volume	Cumulative Class 3 Percentage Volume	Landfill Volume Remaining
Total Estimated Volume to +160 NGVD								**47,618,206**
Volume Depleted Through Fiscal Year 2007/2008								**17,009,096**
Remaining Volume								**30,609,110**
2009	881,363	500,235	1,381,598	12,271,789	6,118,905	66.73%	33.27%	**29,227,512**
2010	856,187	439,168	1,295,356	13,127,976	6,558,073	66.69%	33.31%	**27,932,156**
2011	1,057,339	443,677	1,501,016	14,185,315	7,001,751	66.95%	33.05%	**26,431,140**
2012	1,170,776	513,738	1,684,514	15,356,091	7,515,488	67.14%	32.86%	**24,746,626**
2013	1,228,324	518,390	1,746,714	16,584,416	8,033,878	67.37%	32.63%	**22,999,912**
2014	1,287,314	523,115	1,810,429	17,871,730	8,556,993	67.62%	32.38%	**21,189,483**
2015	247,720	799,695	1,047,415	18,119,450	9,356,688	65.95%	34.05%	**20,142,068**
2016	247,720	817,738	1,065,459	18,367,170	10,174,426	64.35%	35.65%	**19,076,610**
2017	247,720	836,154	1,083,875	18,614,890	11,010,581	62.83%	37.17%	**17,992,735**
2018	247,720	854,951	1,102,671	18,862,610	11,865,532	61.39%	38.61%	**16,890,064**
2019	247,720	874,137	1,121,857	19,110,330	12,739,669	60.00%	40.00%	**15,768,206**
2020	247,720	893,720	1,141,440	19,358,050	13,633,390	58.68%	41.32%	**14,626,766**
2021	247,720	912,376	1,160,096	19,605,770	14,545,765	57.41%	42.59%	**13,466,670**
2022	247,720	931,396	1,179,116	19,853,490	15,477,161	56.19%	43.81%	**12,287,554**
2023	263,235	946,955	1,210,190	20,116,725	16,424,116	55.05%	44.95%	**11,077,364**
2024	326,363	951,130	1,277,494	20,443,089	17,375,246	54.06%	45.94%	**9,799,871**
2025	390,855	955,356	1,346,212	20,833,944	18,330,603	53.20%	46.80%	**8,453,659**
2026	452,082	959,114	1,411,195	21,286,026	19,289,716	52.46%	47.54%	**7,042,464**
2027	514,542	962,911	1,477,453	21,800,567	20,252,628	51.84%	48.16%	**5,565,011**
2028	578,260	966,749	1,545,010	22,378,828	21,219,377	51.33%	48.67%	**4,020,001**
2029	643,264	970,628	1,613,892	23,022,092	22,190,005	50.92%	49.08%	**2,406,109**
2030	709,578	974,549	1,684,127	23,731,670	23,164,553	50.60%	49.40%	**721,982**
2031	772,377	977,992	1,750,369	24,504,047	24,142,546	50.37%	49.63%	**(1,028,387)**
2032	836,356	981,468	1,817,824	25,340,402	25,124,014	50.21%	49.79%	**(2,846,210)**
2033	901,538	984,976	1,886,514	26,241,941	26,108,989	50.13%	49.87%	**(4,732,724)**
2034	967,948	988,516	1,956,464	27,209,888	27,097,506	50.10%	49.90%	**(6,689,188)**
2035	1,035,607	992,090	2,027,696	28,245,495	28,089,595	50.14%	49.86%	**(8,716,884)**
2036	1,104,377	995,679	2,100,056	29,349,872	29,085,275	50.23%	49.77%	**(10,816,941)**
2037	1,174,439	999,303	2,173,742	30,524,311	30,084,577	50.36%	49.64%	**(12,990,683)**
2038	1,209,403	999,303	2,208,705	31,733,714	31,083,880	50.52%	49.48%	**(15,199,388)**

Assumptions: **See Table 1, Table 2, and Table 3.**

APPENDIX B

HISTORICAL INCOMING WASTE TONNAGE

Solid Waste Authority of Palm Beach County
Historical Solid Waste Tonnages
Adjusted for Revised Solid Waste Densities

85/86	Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furn.	Garbage	LC	Pesticide	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
	OCT	0.00	0.00	32.65	23,716.52	0.00	273.71	23.91	0.00	118.75	0.00	42,504.37	0.00	1.74	329.35	3.75	0.00	22,933.28	3,407.00	93,345.03
	NOV	0.00	0.00	12.24	23,075.80	0.00	473.52	0.00	0.00	141.25	0.00	41,433.41	0.00	12.88	43.04	0.00	0.00	24,610.05	2,415.65	92,217.84
	DEC	0.00	0.00	58.18	27,322.69	0.00	181.56	17.25	0.00	37.50	0.00	45,837.13	0.00	0.18	1,124.52	0.00	0.00	23,147.46	2,041.56	99,768.03
	JAN	0.00	0.00	25.28	26,489.35	0.00	143.27	36.89	0.00	228.75	0.00	46,896.31	0.00	15.15	273.62	4.52	0.00	30,082.72	1,862.85	106,058.71
	FEB	0.00	0.00	25.61	22,411.99	0.00	111.69	4.37	0.00	43.75	0.00	43,533.76	603.38	0.84	209.93	4.25	0.00	21,172.99	2,015.95	90,138.51
	MAR	0.00	0.00	14.89	19,738.94	0.00	108.36	3.22	0.00	83.64	0.00	49,707.50	3,421.84	47.39	360.65	4.30	0.00	20,162.28	2,022.01	95,655.02
	APR	0.00	0.00	25.56	22,019.13	0.00	124.56	4.42	0.00	90.00	0.00	45,560.25	10,059.82	0.66	333.27	0.45	0.00	23,828.78	2,510.97	104,557.87
	MAY	0.00	0.00	57.31	17,657.65	0.00	65.71	0.00	0.00	18.75	0.00	44,131.03	18,623.31	32.85	77.54	3.55	0.00	24,649.83	2,815.36	108,132.89
	JUN	0.00	0.00	21.24	21,010.29	0.00	182.23	4.89	0.00	360.00	0.00	44,881.97	17,375.65	2.36	3,727.63	1.00	0.00	25,140.90	3,172.81	115,880.96
	JUL	0.00	0.00	9.71	18,951.68	0.00	212.54	10.09	0.00	438.75	0.00	45,445.73	11,316.05	2.15	74.82	1.00	0.00	27,363.67	3,076.43	106,902.61
	AUG	0.00	0.00	23.17	19,665.82	0.00	373.49	8.93	0.00	195.00	0.00	42,704.94	12,186.03	16.05	63.36	7.70	0.00	23,020.79	2,809.52	101,074.80
	SEP	0.00	0.00	40.82	25,350.12	0.00	439.80	4.68	0.00	36.92	0.00	44,138.87	13,578.23	19.09	606.22	3.67	0.00	22,406.48	2,573.91	109,198.80
	Total	**0.00**	**0.00**	**346.66**	**267,409.95**	**0.00**	**2,690.44**	**118.65**	**0.00**	**1,773.06**	**0.00**	**536,775.27**	**87,164.31**	**151.34**	**7,223.95**	**34.19**	**0.00**	**288,519.24**	**30,724.02**	**1,222,931.09**
	Average	**0.00**	**0.00**	**28.89**	**22,284.16**	**0.00**	**224.20**	**9.89**	**0.00**	**147.78**	**0.00**	**44,731.27**	**7,263.69**	**12.61**	**602.00**	**2.85**	**0.00**	**24,043.27**	**2,560.34**	**101,910.92**
	Percent	**0.00%**	**0.00%**	**0.03%**	**21.87%**	**0.00%**	**0.22%**	**0.01%**	**0.00%**	**0.14%**	**0.00%**	**43.89%**	**7.13%**	**0.01%**	**0.59%**	**0.00%**	**0.00%**	**23.59%**	**2.51%**	**100.00%**

86/87	Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furniture	Garbage	LC	Pesticide	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
	OCT	0.00	0.00	28.36	33,776.62	0.00	393.77	0.00	0.00	48.75	0.00	45,630.98	18,590.42	4.58	290.22	2.30	0.00	18,833.42	2,699.80	118,299.22
	NOV	0.00	0.00	35.32	28,495.31	0.00	261.49	8.77	0.00	27.50	0.00	45,504.00	13,112.31	2.66	281.09	1.05	0.00	16,581.92	2,186.44	106,497.86
	DEC	0.00	0.00	62.87	31,451.67	0.00	413.85	44.54	0.00	57.32	0.00	55,055.42	11,845.30	1.27	269.71	8.33	0.00	16,425.12	2,097.92	117,733.31
	JAN	0.00	0.00	60.87	30,277.69	0.00	411.70	10.72	0.00	150.62	0.00	51,699.26	8,856.43	0.38	660.98	5.59	0.00	16,772.10	2,270.95	111,177.09
	FEB	0.00	0.00	100.20	29,516.31	0.00	1,078.77	7.71	0.00	85.25	0.00	47,977.67	9,284.64	1.68	117.89	2.50	0.00	18,070.80	2,079.60	108,323.02
	MAR	0.00	0.00	35.48	17,241.63	0.00	363.16	10.84	0.00	998.88	0.00	55,711.68	8,426.25	3.75	44.54	0.95	0.00	17,750.43	2,587.70	103,175.27
	APR	0.00	0.00	42.75	20,831.52	0.00	352.68	11.94	0.00	904.41	0.00	50,328.29	4,609.04	2.18	77.00	0.00	0.00	17,033.33	2,875.57	97,068.72
	MAY	0.00	0.00	77.52	23,435.69	0.00	305.82	0.00	0.00	322.29	0.00	48,960.85	4,957.82	12.12	3.63	3.90	0.00	16,032.65	2,521.97	96,634.27
	JUN	0.00	0.00	23.43	25,624.36	0.00	318.31	6.30	0.00	281.98	0.00	48,957.20	4,176.42	0.14	14.95	0.00	0.00	17,931.40	3,207.66	100,542.15
	JUL	0.00	0.00	33.14	24,345.24	0.00	300.39	0.00	0.00	208.12	0.00	49,564.90	3,889.55	10.04	39.45	1.25	0.00	17,884.48	3,288.51	99,565.06
	AUG	0.00	0.00	47.99	23,557.19	0.00	368.11	7.77	0.00	253.39	0.00	45,242.56	4,685.84	0.47	99.52	3.70	0.00	16,262.77	2,835.51	93,364.81
	SEP	0.00	0.00	96.14	22,685.71	0.00	434.22	3.51	0.00	288.68	0.00	48,129.41	4,062.24	8.01	286.98	0.00	0.00	18,587.31	2,980.59	97,762.80
	Total	**0.00**	**0.00**	**643.85**	**311,438.92**	**0.00**	**5,002.27**	**112.10**	**0.00**	**3,627.19**	**0.00**	**592,762.22**	**94,496.26**	**47.28**	**2,185.96**	**29.57**	**0.00**	**208,165.74**	**31,632.22**	**1,250,143.56**
	Average	**0.00**	**0.00**	**53.65**	**25,953.24**	**0.00**	**416.86**	**9.34**	**0.00**	**302.27**	**0.00**	**49,396.85**	**7,874.69**	**3.94**	**182.16**	**2.46**	**0.00**	**17,347.14**	**2,636.02**	**104,178.63**
	Percent	**0.00%**	**0.00%**	**0.05%**	**24.91%**	**0.00%**	**0.40%**	**0.01%**	**0.00%**	**0.29%**	**0.00%**	**47.42%**	**7.56%**	**0.00%**	**0.17%**	**0.00%**	**0.00%**	**16.65%**	**2.53%**	**100.00%**

SWA scale system output converts volume transactions to tonnage using assumed waste densities. Currently available information allows the retrieval of tonnage information on volume transactions. For 92/93 and on "actuals" are used. For prior years, assumed weights have been replaced with more accurate estimates based on reasoneble and reliable density estimates. Animals not included due to inconsistent recording. Animal tonnage is insignificant.

87/88

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furniture	Garbage	LC	Pesticide	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	0.00	0.00	210.76	23,142.60	0.00	203.09	7.83	0.00	307.68	0.00	50,145.73	3,761.04	0.55	216.55	0.00	0.00	18,797.22	3,223.35	100,018.39
NOV	0.00	0.00	211.58	21,954.85	0.00	75.88	3.82	0.00	899.80	0.00	50,279.05	3,069.62	0.24	182.25	0.00	0.00	17,028.29	2,546.12	96,231.30
DEC	0.00	0.00	215.23	22,949.80	0.00	93.09	9.50	0.00	318.23	0.00	53,532.36	2,812.24	3.67	1,052.80	1.62	0.00	16,727.68	1,960.80	99,677.01
JAN	0.00	0.00	45.98	20,303.32	0.00	182.03	35.04	0.00	224.83	0.00	52,228.10	4,137.48	0.74	83.03	1.12	0.00	17,945.73	1,270.15	96,437.34
FEB	0.00	0.00	71.86	19,236.14	0.00	205.13	14.48	0.00	929.91	0.00	53,829.24	3,425.54	0.80	940.59	0.00	0.00	17,840.77	1,274.36	97,768.82
MAR	0.00	0.00	124.40	24,563.60	0.00	138.00	8.63	0.00	940.87	0.00	58,845.36	3,345.92	0.55	19.45	7.24	0.00	18,832.27	1,554.55	108,380.83
APR	0.00	0.00	116.41	21,334.22	0.00	84.34	5.74	0.00	1,460.20	0.00	52,492.48	3,685.82	0.00	22.53	0.00	0.00	18,192.37	1,501.67	98,895.78
MAY	0.00	0.00	110.49	21,145.85	0.00	136.40	83.25	0.00	786.55	0.00	53,790.68	5,028.27	0.23	22.65	1.00	0.00	19,491.15	1,530.05	102,106.57
JUN	0.00	0.00	186.33	28,428.47	0.00	259.92	200.85	0.00	394.63	0.00	54,840.00	3,378.51	23.07	0.00	2.85	0.00	20,494.74	1,850.50	108,059.47
JUL	0.00	0.00	153.27	25,460.82	0.00	125.89	263.15	0.00	677.80	0.00	51,892.97	2,277.22	2.35	207.87	1.40	0.00	19,431.31	1,728.82	102,222.88
AUG	0.00	0.00	140.45	30,459.67	0.00	168.71	55.92	0.00	122.71	0.00	56,676.19	3,671.20	0.00	320.77	3.92	0.00	20,605.62	2,373.05	114,598.21
SEP	0.00	0.00	158.48	27,851.54	0.00	195.96	4.21	0.00	165.84	0.00	50,675.04	4,385.25	0.81	66.96	2.42	0.00	19,089.34	2,219.36	104,815.21
Total	**0.00**	**0.00**	**1,745.24**	**284,830.84**	**0.00**	**1,848.44**	**672.22**	**0.00**	**7,228.65**	**0.00**	**639,227.20**	**42,978.11**	**33.01**	**3,115.45**	**21.37**	**0.00**	**224,476.49**	**23,032.78**	**1,229,209.80**
Average	**0.00**	**0.00**	**145.44**	**23,735.90**	**0.00**	**154.04**	**56.02**	**0.00**	**602.39**	**0.00**	**53,268.93**	**3,581.51**	**2.75**	**259.62**	**1.78**	**0.00**	**18,706.37**	**1,919.40**	**102,434.15**
Percent	**0.00%**	**0.00%**	**0.14%**	**23.17%**	**0.00%**	**0.15%**	**0.05%**	**0.00%**	**0.59%**	**0.00%**	**52.00%**	**3.50%**	**0.00%**	**0.25%**	**0.00%**	**0.00%**	**18.26%**	**1.87%**	**100.00%**

88/89

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furniture	Garbage	LC	Pesticide	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	0.00	0.00	87.89	26,181.30	0.00	148.86	3.98	0.00	160.12	0.00	52,270.66	3,934.36	3.99	81.09	7.27	0.00	19,745.70	2,979.17	105,604.20
NOV	0.00	0.00	115.50	20,594.23	0.00	85.51	3.21	0.00	134.98	0.00	55,707.52	4,168.18	2.84	8.56	3.65	0.00	20,423.35	2,816.71	104,042.22
DEC	0.00	0.00	22.82	19,791.84	0.00	59.12	36.39	0.00	78.28	0.00	57,471.58	4,655.35	1.51	54.53	2.25	0.00	20,760.60	3,043.60	105,977.87
JAN	0.00	0.00	36.53	18,400.88	0.00	221.87	4.54	0.00	196.23	0.00	60,790.77	4,118.88	2.24	73.82	2.75	0.00	21,503.73	2,531.37	107,883.60
FEB	0.00	0.00	10.38	18,629.32	0.00	155.11	0.00	0.00	401.14	0.00	54,998.22	8,719.66	2.12	1.90	0.00	0.00	21,886.88	2,437.62	103,242.34
MAR	0.00	0.00	18.99	18,882.59	0.00	150.81	0.00	0.00	389.27	0.00	63,944.25	7,583.63	20.20	28.09	2.80	0.00	26,236.49	2,993.14	120,050.28
APR	0.00	0.00	21.40	19,338.76	0.00	120.56	20.54	0.00	579.52	0.00	57,997.92	4,788.47	5.33	7.79	2.12	0.00	23,904.27	3,076.20	109,862.89
MAY	0.00	0.00	27.21	17,833.23	0.00	57.52	4.79	0.00	959.36	0.00	62,303.68	5,934.25	6.65	0.16	0.00	0.00	27,354.77	3,292.18	117,573.97
JUN	0.00	0.00	7.74	18,338.71	0.00	59.44	232.87	0.00	1,156.07	0.00	58,867.27	6,022.51	0.94	14.68	0.00	0.00	26,286.47	3,557.21	114,545.90
JUL	0.00	0.00	0.00	19,422.48	0.00	104.99	421.12	0.00	870.20	0.00	56,349.08	3,449.17	0.94	3,600.13	0.00	0.00	24,201.07	3,230.77	111,649.95
AUG	0.00	0.00	44.01	22,220.82	0.00	128.50	391.36	0.00	802.56	0.00	58,738.55	3,791.56	1.18	8.85	3.65	0.00	27,373.20	3,348.82	116,852.85
SEP	0.00	0.00	54.96	17,290.95	0.00	123.76	123.09	0.00	816.26	0.00	53,969.32	2,401.99	0.28	21.99	1.20	0.00	27,657.25	3,247.14	105,708.20
Total	**0.00**	**0.00**	**447.23**	**234,524.89**	**0.00**	**1,396.05**	**1,241.89**	**0.00**	**6,543.99**	**0.00**	**693,409.02**	**57,567.99**	**48.22**	**3,899.59**	**25.69**	**0.00**	**287,335.77**	**36,553.91**	**1,322,994.25**
Average	**0.00**	**0.00**	**37.27**	**19,543.74**	**0.00**	**116.34**	**103.49**	**0.00**	**545.33**	**0.00**	**57,784.09**	**4,797.33**	**4.02**	**324.97**	**2.14**	**0.00**	**23,944.65**	**3,046.16**	**110,249.52**
Percent	**0.00%**	**0.00%**	**0.03%**	**17.73%**	**0.00%**	**0.11%**	**0.09%**	**0.00%**	**0.49%**	**0.00%**	**52.41%**	**4.35%**	**0.00%**	**0.29%**	**0.00%**	**0.00%**	**21.72%**	**2.76%**	**100.00%**

89/90

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furniture	Garbage	LC	Pesticide	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	0.00	0.00	34.55	15,313.72	0.00	66.78	9.28	0.00	478.68	0.00	56,519.68	2,248.03	0.71	2.55	2.00	0.00	24,348.26	2,919.45	101,943.88
NOV	0.00	0.00	6.85	14,758.80	0.00	188.91	9.31	0.00	498.72	0.00	57,318.34	1,997.30	0.01	0.00	0.00	0.00	22,957.82	2,555.62	100,291.88
DEC	0.00	0.00	13.63	13,037.13	0.00	190.40	2.82	0.00	455.70	0.00	56,619.71	1,835.76	0.80	23.66	0.00	0.00	20,140.62	807.94	93,127.97
JAN	0.00	0.00	63.78	11,003.99	0.00	334.94	5.72	0.00	544.58	0.00	66,560.11	1,929.79	0.00	5.82	3.14	0.00	28,276.96	2,858.09	111,386.91
FEB	0.00	0.00	107.26	11,903.85	0.00	132.15	5.32	0.00	332.27	0.00	45,456.98	2,487.67	1.82	364.42	1.50	0.00	23,693.25	2,408.02	86,874.51
MAR	0.00	0.00	121.91	14,178.32	0.00	117.73	13.22	0.00	223.16	0.00	61,876.38	2,280.23	1.15	96.84	5.87	0.00	24,046.59	2,418.85	105,380.24
APR	0.00	0.00	70.06	8,975.38	0.00	143.65	92.00	0.00	283.16	0.00	59,283.07	1,999.96	1.57	28.23	1.25	0.00	21,566.82	2,035.72	94,480.87
MAY	0.00	175.80	95.69	9,695.40	0.00	164.30	1.01	0.00	329.18	0.00	59,631.02	1,758.35	0.06	3.38	6.81	0.00	23,251.28	1,920.19	97,052.27
JUN	0.00	728.91	53.07	9,083.53	0.00	92.51	6.20	0.00	750.67	0.00	56,762.99	2,060.84	0.17	52.03	8.21	0.00	23,143.72	1,720.30	94,463.15
JUL	0.00	219.05	37.98	9,191.74	0.00	237.13	3.03	0.00	406.45	0.00	56,961.91	2,328.84	0.00	9.94	0.00	0.00	24,150.09	1,915.79	95,481.94
AUG	0.00	0.00	77.17	8,960.82	0.00	339.17	8.47	0.00	356.32	0.00	57,663.01	1,715.79	0.13	14.82	7.28	0.00	26,692.09	1,814.19	97,649.26
SEP	0.00	14.29	81.25	7,838.11	0.00	151.48	51.45	0.00	348.85	0.00	51,194.57	1,042.39	0.00	118.67	5.12	0.00	20,909.52	1,605.17	83,340.87
Total	**0.00**	**1,138.05**	**743.20**	**133,940.77**	**0.00**	**2,179.15**	**207.63**	**0.00**	**5,007.94**	**0.00**	**685,847.77**	**23,664.95**	**6.42**	**720.36**	**40.98**	**0.00**	**283,177.01**	**24,779.33**	**1,161,453.56**
Average	**0.00**	**94.84**	**61.93**	**11,161.73**	**0.00**	**161.60**	**17.30**	**0.00**	**417.33**	**0.00**	**57,153.98**	**1,972.08**	**0.54**	**60.03**	**3.42**	**0.00**	**23,598.08**	**2,064.94**	**96,787.80**
Percent	**0.00%**	**0.10%**	**0.06%**	**11.53%**	**0.00%**	**0.19%**	**0.02%**	**0.00%**	**0.43%**	**0.00%**	**59.05%**	**2.04%**	**0.00%**	**0.06%**	**0.00%**	**0.00%**	**24.38%**	**2.13%**	**100.00%**

90/91	Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furniture	Garbage	LC	Pesticide	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
	OCT	0.00	81.97	47.00	15,023.85	0.00	155.57	2,944.28	2.79	2,282.29	23.19	60,219.29	2,638.54	0.62	97.73	0.00	0.00	16,930.47	2,367.97	102,815.55
	NOV	0.00	152.42	112.59	12,342.72	0.00	123.36	2,921.79	333.82	914.45	20.37	56,903.50	1,195.99	0.54	0.96	1.30	0.00	13,911.55	1,876.25	90,811.81
	DEC	0.00	551.38	88.92	8,354.20	0.00	106.59	3,487.84	18.00	615.22	34.28	58,938.83	1,833.42	1.44	22.60	4.11	0.00	12,264.98	1,548.83	87,870.64
	JAN	0.00	162.13	31.28	9,378.26	0.00	197.17	3,676.14	405.14	619.44	28.88	65,854.11	1,284.45	2.29	27.50	7.10	0.00	14,351.88	1,743.10	97,768.87
	FEB	0.00	110.51	50.75	10,874.66	0.00	173.16	3,591.33	501.01	650.82	19.83	57,626.91	1,519.55	0.89	43.23	0.00	0.00	12,742.73	1,741.77	89,646.95
	MAR	0.00	99.10	120.83	11,729.20	0.00	170.90	19.29	523.50	730.80	18.10	61,303.55	2,064.84	0.51	15.54	2.40	0.00	14,078.65	2,060.76	92,937.77
	APR	0.00	38.37	24.84	10,741.84	0.00	173.18	6,368.85	264.17	480.14	24.89	63,033.24	2,393.04	0.22	6.48	0.00	0.00	14,569.79	2,130.92	100,249.97
	MAY	0.00	18.62	10.70	10,753.04	0.00	513.74	4,164.88	217.91	760.23	25.62	59,583.95	2,370.90	0.25	7.88	0.00	0.00	14,371.58	2,330.96	95,130.05
	JUN	0.00	49.02	55.42	10,355.46	0.00	975.99	3,713.10	85.43	760.24	24.41	52,543.94	748.90	0.07	19.30	0.00	0.00	13,240.29	2,428.46	85,000.03
	JUL	0.00	17.41	75.77	10,986.06	0.00	275.30	2,332.08	858.40	344.48	17.92	57,463.19	1,312.80	107.00	6.70	0.00	0.00	15,384.84	2,501.05	91,683.00
	AUG	0.00	6.31	160.56	9,797.51	0.00	1,365.18	2,732.13	894.21	483.80	8.14	53,990.34	2,419.23	0.13	7.33	0.00	1,612.39	13,291.99	2,652.12	89,421.16
	SEP	0.00	12.34	69.50	9,912.47	0.00	236.89	3,607.27	269.53	551.36	14.34	52,055.03	8,429.70	0.70	20.06	0.00	2,294.24	12,662.70	2,907.03	93,043.16
	Total	**0.00**	**1,299.58**	**848.16**	**130,249.25**	**0.00**	**4,467.03**	**39,558.98**	**4,373.91**	**9,193.07**	**259.77**	**699,515.88**	**28,211.18**	**114.66**	**275.11**	**14.91**	**3,906.63**	**167,801.44**	**26,289.22**	**1,116,378.76**
	Average	**0.00**	**108.30**	**70.68**	**10,854.10**	**0.00**	**372.25**	**3,296.58**	**364.49**	**766.09**	**21.65**	**58,292.99**	**2,350.93**	**9.56**	**22.93**	**1.24**	**325.55**	**13,983.45**	**2,190.77**	**93,031.56**
	Percent	**0.00%**	**0.12%**	**0.08%**	**11.67%**	**0.00%**	**0.40%**	**3.54%**	**0.39%**	**0.82%**	**0.02%**	**62.66%**	**2.53%**	**0.01%**	**0.02%**	**0.00%**	**0.35%**	**15.03%**	**2.35%**	**100.00%**

91/92	Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furniture	Garbage	LC	Pesticide	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
	OCT	0.00	97.97	60.44	14,291.72	0.00	368.07	5,653.25	126.68	633.89	11.74	59,194.73	5,611.94	0.33	13.20	8.08	3,360.38	17,724.19	3,038.68	110,195.28
	NOV	0.00	50.14	31.27	11,422.81	0.00	203.73	5,882.20	348.30	402.53	5.14	55,735.10	3,220.66	0.46	4.19	0.00	585.82	15,615.25	2,392.27	95,899.67
	DEC	0.00	125.20	207.95	10,238.59	0.00	305.73	4,621.20	93.86	302.03	4.28	61,957.35	1,891.35	0.49	777.78	0.00	39.12	14,068.06	2,606.02	97,239.00
	JAN	0.00	74.80	247.83	10,700.41	0.00	203.96	6,149.55	700.52	556.79	9.76	61,899.91	3,126.39	1.33	42.50	0.00	49.29	15,507.89	2,327.81	101,598.74
	FEB	0.00	47.65	50.30	9,091.28	0.00	261.68	5,901.09	907.57	819.70	8.08	57,714.58	4,371.96	0.57	16.10	6.92	116.04	14,135.61	1,964.27	95,413.40
	MAR	0.00	99.03	88.50	8,953.63	0.00	329.54	5,885.62	787.74	517.66	5.45	62,950.66	1,691.59	1.07	15.87	0.00	140.69	14,994.37	2,391.42	98,852.84
	APR	0.00	172.15	61.54	9,295.16	0.00	342.67	5,403.70	663.97	481.84	3.65	59,248.00	1,754.76	2.12	12.23	0.00	843.81	14,924.16	2,368.89	95,578.65
	MAY	0.00	800.29	77.87	8,078.46	0.00	333.78	6,094.16	565.52	598.91	4.21	53,686.53	1,533.65	0.48	8.81	0.00	827.11	14,408.37	2,337.96	89,356.09
	JUN	0.00	25.81	86.78	8,445.59	0.00	534.43	3,918.78	877.36	1,154.30	5.59	58,559.67	1,040.53	5.71	21.28	0.00	1,177.30	16,482.16	2,717.63	95,052.91
	JUL	0.00	127.42	105.47	10,180.89	0.00	426.52	3,572.38	638.21	616.49	4.36	53,841.19	1,533.45	0.00	29.84	4.94	1,120.77	17,079.69	2,597.87	91,879.49
	AUG	0.00	25.72	30.74	9,716.42	0.00	438.89	3,357.42	631.90	682.15	15.04	53,688.20	1,336.98	0.17	17.20	0.00	983.06	14,844.67	3,157.92	88,926.48
	SEP	0.00	148.34	43.33	9,364.14	0.00	506.17	4,205.66	562.92	783.66	4.54	54,287.71	1,312.58	1.45	40.36	5.49	613.00	16,212.91	3,962.62	92,054.87
	Total	**0.00**	**1,794.52**	**1,092.02**	**119,778.89**	**0.00**	**4,255.15**	**60,645.01**	**6,904.55**	**7,549.95**	**81.84**	**692,763.63**	**28,425.82**	**14.18**	**999.36**	**25.43**	**9,856.39**	**185,997.33**	**31,863.36**	**1,152,047.42**
	Average	**0.00**	**149.54**	**91.00**	**9,981.57**	**0.00**	**354.60**	**5,053.75**	**575.38**	**629.16**	**6.62**	**57,730.30**	**2,368.82**	**1.18**	**83.28**	**2.12**	**821.37**	**15,499.78**	**2,655.28**	**96,003.95**
	Percent	**0.00%**	**0.16%**	**0.09%**	**10.40%**	**0.00%**	**0.37%**	**5.26%**	**0.60%**	**0.66%**	**0.01%**	**60.13%**	**2.47%**	**0.00%**	**0.09%**	**0.00%**	**0.86%**	**16.14%**	**2.77%**	**100.00%**

92/93	Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furniture	Garbage	LC	Pesticide	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
	OCT	0.00	77.35	14.38	10,903.42	0.00	355.68	3,533.10	321.79	376.56	3.01	52,221.19	901.68	0.12	4.19	8.19	220.34	13,869.03	5,002.03	87,812.04
	NOV	0.00	360.79	27.92	8,825.62	0.00	394.90	2,549.39	428.23	302.53	1.50	55,468.68	561.06	0.45	21.22	0.00	2,157.91	11,487.47	3,756.22	86,343.89
	DEC	0.00	331.07	27.28	9,499.07	0.00	552.32	5,181.17	310.89	444.92	14.05	58,058.88	2,300.00	1.21	19.42	0.00	5,062.81	13,145.16	3,909.95	98,858.20
	JAN	0.00	173.61	40.13	9,114.27	0.00	434.67	6,400.60	188.23	341.62	8.81	60,202.58	1,050.70	0.71	41.92	3.63	4,579.96	12,551.50	4,215.28	99,346.22
	FEB	0.00	14.40	23.15	9,584.71	0.00	478.89	5,723.80	152.05	617.92	2.32	54,269.58	735.62	0.70	0.54	53.51	3,976.35	12,382.16	4,007.23	92,022.93
	MAR	0.00	75.68	110.47	8,841.61	0.00	530.04	6,273.66	121.48	491.57	7.54	66,710.54	2,392.36	0.98	336.72	0.00	7,070.72	16,866.14	8,198.21	118,027.70
	APR	0.00	34.12	76.43	9,944.01	0.00	383.12	5,193.91	79.52	56.98	9.32	60,680.25	2,131.30	1.27	63.35	11.05	5,985.82	16,724.81	6,605.81	107,981.07
	MAY	0.00	227.65	42.26	9,593.94	0.00	486.49	4,664.85	78.87	0.00	3.83	54,408.59	1,060.04	0.35	34.43	0.00	4,944.42	14,048.62	5,107.11	94,701.45
	JUN	0.00	564.37	5.13	9,488.19	0.00	709.25	2,881.08	123.27	0.00	5.47	56,938.35	478.75	0.00	0.88	2.47	4,029.72	17,305.44	5,757.86	98,270.21
	JUL	0.00	0.00	22.51	8,472.31	0.00	495.69	2,499.41	83.05	0.00	11.07	53,867.84	546.89	0.00	8.05	0.00	3,854.97	15,397.63	4,623.59	89,881.01
	AUG	0.00	0.00	14.73	9,564.47	0.00	480.30	2,210.00	73.47	0.00	6.02	55,685.09	1,060.26	0.00	10.20	2.14	3,433.70	16,182.33	6,013.31	94,736.02
	SEP	0.00	0.00	19.50	9,200.25	0.00	1,969.37	1,842.74	125.07	0.00	8.33	54,527.79	1,013.15	0.00	100.88	14.12	4,910.03	15,750.49	6,438.13	95,719.85
	Total	**0.00**	**1,859.04**	**423.89**	**113,031.87**	**0.00**	**7,270.72**	**48,733.71**	**2,083.90**	**2,632.10**	**81.27**	**683,039.36**	**14,231.79**	**5.79**	**639.78**	**95.11**	**50,226.75**	**175,710.78**	**63,634.73**	**1,163,700.59**
	Average	**0.00**	**154.92**	**35.32**	**9,419.32**	**0.00**	**605.89**	**4,061.14**	**173.66**	**219.34**	**6.77**	**56,919.95**	**1,185.98**	**0.48**	**53.32**	**7.93**	**4,185.56**	**14,642.57**	**5,302.89**	**96,975.05**
	Percent	**0.00%**	**0.16%**	**0.04%**	**9.71%**	**0.00%**	**0.62%**	**4.19%**	**0.18%**	**0.23%**	**0.01%**	**58.70%**	**1.22%**	**0.00%**	**0.05%**	**0.01%**	**4.32%**	**15.10%**	**5.47%**	**100.00%**

93/94

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furniture	Garbage	LC	Pesticide	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	0.00	0.00	15.93	10,898.23	0.00	348.29	2,527.73	326.60	0.00	7.53	57,951.42	921.08	0.00	0.00	0.00	36.45	13,920.76	5,952.24	92,904.28
NOV	0.00	0.00	9.15	9,295.81	0.00	236.24	2,049.64	259.28	0.00	4.24	62,388.65	947.14	1.04	26.25	4.38	126.35	13,600.95	5,891.84	94,640.96
DEC	0.00	0.00	7.92	8,534.30	0.00	318.83	3,862.78	214.95	0.00	12.35	63,047.82	535.88	0.00	5.46	2.63	36.00	13,519.71	5,135.75	95,232.18
JAN	0.00	0.00	0.35	8,278.81	0.00	236.84	3,665.13	96.45	2.50	7.75	65,347.52	1,754.17	0.00	1.90	0.00	105.57	14,138.58	5,471.88	97,105.25
FEB	0.00	0.00	2.00	8,307.13	0.00	253.80	3,296.75	141.71	4.59	5.88	62,027.92	1,343.54	0.00	5.35	0.00	48.83	12,715.75	5,618.47	91,771.72
MAR	0.00	0.00	2.80	9,042.00	0.00	284.63	4,961.57	270.71	0.00	7.69	67,724.24	1,384.55	0.00	18.64	12.20	104.71	17,727.67	7,680.00	109,221.61
APR	0.00	0.00	0.00	6,296.71	0.00	423.56	3,881.46	288.96	461.88	7.78	62,891.49	1,738.27	0.00	0.11	0.00	51.21	16,596.09	7,319.86	99,957.16
MAY	0.00	0.00	0.00	8,696.98	0.00	377.93	4,172.70	190.47	3,080.32	3.12	60,920.42	742.46	0.00	2.22	0.00	87.42	17,328.07	8,872.39	102,454.50
JUN	0.00	0.00	2.02	5,636.53	0.00	221.16	3,419.74	138.00	3,685.28	6.58	81,485.20	1,400.25	0.00	2.89	5.77	48.30	16,592.79	11,183.68	103,827.99
JUL	0.00	0.00	0.21	5,197.67	0.00	208.80	3,820.97	132.24	6,816.33	1.12	53,447.76	1,223.95	0.00	5.37	0.00	64.41	14,684.40	9,794.67	95,197.90
AUG	0.00	0.00	10.50	5,050.35	0.00	494.78	4,393.45	150.32	6,129.79	8.60	60,436.48	2,871.95	0.00	0.88	0.00	33.21	15,023.95	12,306.78	106,909.04
SEP	0.00	0.00	1.82	4,376.04	0.00	200.89	4,016.09	153.86	6,411.05	7.45	56,355.67	900.89	0.09	0.89	0.92	37.79	15,147.24	11,711.81	99,322.30
Total	**0.00**	**0.00**	**52.70**	**83,808.56**	**0.00**	**3,601.35**	**44,068.01**	**2,363.55**	**28,391.54**	**78.07**	**734,024.59**	**15,764.13**	**1.13**	**69.76**	**25.90**	**760.25**	**180,996.18**	**96,539.17**	**1,188,544.89**
Average	**0.00**	**0.00**	**4.39**	**6,984.05**	**0.00**	**300.11**	**3,672.33**	**196.96**	**2,199.30**	**6.51**	**61,168.72**	**1,313.68**	**0.09**	**5.81**	**2.16**	**63.35**	**15,083.02**	**8,044.93**	**99,045.41**
Percent	**0.00%**	**0.00%**	**0.00%**	**7.05%**	**0.00%**	**0.30%**	**3.71%**	**0.20%**	**2.22%**	**0.01%**	**61.78%**	**1.33%**	**0.00%**	**0.01%**	**0.00%**	**0.06%**	**15.23%**	**8.12%**	**100.00%**

94/95

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furniture	Garbage	LC	Pesticide	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	0.00	0.00	0.00	5,613.06	0.00	202.61	4,839.19	214.12	9,027.82	10.12	57,408.68	1,606.89	0.00	8.08	0.00	19.50	13,852.18	12,080.84	104,682.89
NOV	0.00	0.00	1.97	4,484.08	0.00	164.84	4,102.55	204.08	6,342.22	5.18	63,172.81	1,175.89	0.00	12.21	13.24	29.86	14,143.77	13,141.75	106,994.05
DEC	0.00	0.00	0.00	5,763.37	0.00	191.33	5,677.96	206.60	833.47	13.07	67,147.84	816.11	0.00	3.14	0.00	11.59	14,621.54	12,004.79	107,292.81
JAN	0.00	0.00	0.00	7,831.11	0.00	225.85	6,158.41	238.23	1,807.99	2.74	64,057.30	1,579.91	0.00	0.00	0.00	10.81	13,116.35	11,430.78	106,061.46
FEB	0.00	0.00	4.65	5,355.27	0.00	463.72	5,417.67	181.67	1,416.42	2.85	57,401.18	2,525.08	0.00	7.80	0.00	48.08	10,891.54	10,027.76	93,741.69
MAR	0.00	0.00	4.10	7,823.84	0.00	800.66	6,077.03	235.31	2,509.41	1.49	64,831.59	7,332.05	0.00	0.00	13.25	23.37	13,259.57	12,993.26	115,904.93
APR	0.00	0.00	10.51	6,420.77	0.00	323.54	4,883.70	220.77	2,379.72	4.27	57,667.76	2,796.72	0.00	0.00	0.00	23.90	12,583.10	11,631.56	98,946.32
MAY	0.00	0.00	1.13	7,308.66	0.00	148.32	5,265.93	237.67	3,901.20	2.11	81,356.02	3,000.30	0.00	8.36	0.00	12.43	13,444.69	12,968.37	107,653.39
JUN	0.00	0.00	1.93	5,473.81	0.00	191.70	4,361.86	179.77	3,357.07	3.09	59,899.47	1,774.45	0.00	1.69	0.00	18.11	13,712.41	13,554.72	102,530.08
JUL	0.00	0.00	0.73	5,678.56	0.00	122.51	4,879.20	156.66	2,282.42	0.20	56,095.61	1,686.89	0.00	21.63	0.00	22.30	13,850.54	11,846.61	96,441.86
AUG	0.00	0.00	0.43	6,887.81	0.00	166.29	4,063.45	334.92	2,270.35	2.15	60,087.61	2,989.14	0.19	38.80	1.66	23.92	12,726.66	11,365.38	100,958.76
SEP	0.00	0.00	2.20	8,365.02	0.00	149.53	4,019.48	503.70	1,171.57	5.50	55,633.63	2,684.50	0.09	0.00	0.00	288.87	11,947.97	12,312.68	97,084.72
Total	**0.00**	**0.00**	**27.65**	**76,803.36**	**0.00**	**3,150.90**	**59,346.41**	**2,913.70**	**37,099.66**	**52.77**	**724,759.30**	**29,969.73**	**0.28**	**101.71**	**28.15**	**530.54**	**158,152.32**	**145,356.48**	**1,238,292.96**
Average	**0.00**	**0.00**	**2.30**	**6,400.28**	**0.00**	**262.58**	**4,945.53**	**242.81**	**3,091.64**	**4.40**	**60,396.61**	**2,497.48**	**0.02**	**8.48**	**2.35**	**44.21**	**13,179.36**	**12,113.04**	**103,191.08**
Percent	**0.00%**	**0.00%**	**0.00%**	**6.20%**	**0.00%**	**0.25%**	**4.79%**	**0.24%**	**3.00%**	**0.00%**	**58.53%**	**2.42%**	**0.00%**	**0.01%**	**0.00%**	**0.04%**	**12.77%**	**11.74%**	**100.00%**

95/96

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furn.	Garbage	LC	Pesticide	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	0.00	0.00	5.49	8,306.43	0.00	150.58	3,529.75	839.43	1,103.24	0.30	62,568.40	713.09	0.00	2.48	0.00	109.85	14,031.60	10,258.85	101,419.49
NOV	0.00	0.00	0.47	7,577.50	0.00	165.44	3,848.98	151.54	1,170.79	5.80	59,920.30	1,236.95	0.00	0.51	0.00	30.75	11,877.89	9,065.06	95,051.76
DEC	0.00	0.00	0.09	6,486.63	0.00	146.73	4,637.98	196.79	1,110.82	4.64	60,711.75	1,630.56	0.00	6.21	0.00	23.32	11,756.81	6,828.16	93,540.71
JAN	0.00	0.00	0.00	8,199.45	0.00	164.29	5,781.94	355.70	1,086.16	4.97	67,707.15	30.16	0.00	0.00	0.00	49.41	14,589.86	6,771.91	104,741.00
FEB	0.00	0.00	0.19	8,921.47	0.00	315.23	6,827.95	216.42	1,240.79	2.55	60,711.76	0.00	0.00	1.75	0.00	6.85	12,744.83	6,960.11	97,949.92
MAR	0.00	0.00	0.00	9,752.63	0.00	145.62	6,749.53	212.68	1,724.66	5.14	64,177.95	0.00	0.00	1.92	0.00	7.23	12,201.36	7,431.40	102,410.12
APR	0.00	0.00	0.00	11,704.69	0.00	273.41	6,566.69	285.33	1,489.64	2.62	64,690.18	0.00	0.00	8.28	0.00	21.58	13,827.35	7,829.74	106,899.47
MAY	0.00	0.00	0.37	9,956.33	0.00	196.96	5,977.02	253.66	1,165.88	2.70	64,875.94	0.00	0.00	0.00	3.41	15.31	14,642.38	11,365.54	108,455.50
JUN	0.00	0.00	0.22	9,174.17	0.00	65.15	4,261.28	142.95	1,704.25	4.08	58,741.40	0.00	0.00	1.77	0.00	62.75	12,867.57	11,064.11	98,089.70
JUL	0.00	0.00	0.00	9,420.41	0.00	63.50	3,893.83	166.17	4,162.69	4.62	61,493.70	0.00	0.00	1.11	4.59	9.05	14,742.65	10,223.82	103,986.34
AUG	0.00	0.00	0.03	9,588.82	0.00	152.44	4,174.49	162.07	3,233.39	6.98	59,474.35	0.00	0.00	0.00	0.00	1.16	13,345.50	10,894.01	101,031.24
SEP	0.00	0.00	2.35	9,021.73	0.00	83.17	3,486.62	324.83	2,771.44	2.51	57,535.10	0.00	0.00	0.00	0.00	5.58	13,330.75	11,579.33	98,143.21
Total	**0.00**	**0.00**	**9.21**	**108,108.46**	**0.00**	**1,922.52**	**59,536.06**	**3,107.37**	**21,963.95**	**46.91**	**742,807.98**	**3,610.76**	**0.00**	**24.01**	**8.00**	**342.84**	**159,958.35**	**110,072.06**	**1,211,516.48**
Average	**0.00**	**0.00**	**0.77**	**9,009.04**	**0.00**	**160.21**	**4,961.34**	**258.95**	**1,830.33**	**3.91**	**61,900.67**	**300.90**	**0.00**	**2.00**	**0.67**	**28.57**	**13,329.86**	**9,172.67**	**100,959.67**
Percent	**0.00%**	**0.00%**	**0.00%**	**8.92%**	**0.00%**	**0.16%**	**4.91%**	**0.26%**	**1.81%**	**0.00%**	**61.31%**	**0.30%**	**0.00%**	**0.00%**	**0.00%**	**0.03%**	**13.20%**	**9.09%**	**100.00%**

96/97

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furn.	Garbage	LC	Pesticide	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	24.08	0.00	0.00	4,899.37	2,604.72	74.95	5,092.65	299.32	3,420.44	9.87	63,684.82	0.00	0.00	0.30	0.00	25.27	12,500.11	12,159.05	104,794.95
NOV	25.16	0.00	0.00	3,735.92	3,700.11	64.80	4,816.39	251.30	2,871.07	9.65	60,493.45	0.00	0.00	0.00	1.23	74.90	9,107.87	10,911.88	96,063.73
DEC	32.73	0.00	0.00	3,539.05	3,364.94	121.22	6,343.78	253.38	2,370.37	8.20	68,224.89	0.00	0.00	0.00	0.00	4.25	9,110.56	8,784.40	102,155.57
JAN	30.40	0.00	0.00	4,926.70	2,674.21	105.04	7,023.80	359.02	1,726.88	5.61	69,890.70	0.00	0.00	0.00	0.00	0.00	11,397.53	9,101.15	107,241.04
FEB	38.48	0.00	0.18	5,586.94	2,458.25	137.71	5,184.91	143.22	1,943.51	4.82	64,004.73	0.00	0.00	0.91	0.00	18.64	10,277.50	8,723.38	98,523.18
MAR	25.11	0.00	0.05	3,689.92	2,483.20	66.34	5,759.53	187.09	853.66	5.71	69,172.09	0.00	0.00	0.00	0.00	15.21	10,792.54	10,725.87	103,776.32
APR	29.80	0.00	0.54	3,868.09	2,559.37	154.13	4,690.37	237.72	1,172.69	4.97	67,967.76	0.00	0.00	0.00	0.00	23.60	11,789.09	10,722.18	103,220.31
MAY	24.29	0.00	1.29	3,551.83	3,433.44	62.48	4,838.42	154.68	1,295.94	4.71	66,075.02	0.00	0.00	0.00	1.95	32.44	11,359.21	11,390.90	102,226.60
JUN	24.27	0.00	0.00	4,186.48	3,215.69	109.49	3,227.39	185.34	1,808.05	5.57	65,657.00	0.00	0.00	0.00	11.11	45.31	12,539.44	14,122.95	105,118.09
JUL	27.17	0.00	6.29	4,738.95	3,393.17	106.50	3,323.82	143.17	779.05	7.73	62,495.40	0.00	0.00	1.97	3.38	268.59	16,303.78	15,178.51	106,777.48
AUG	24.29	0.00	0.00	5,565.27	3,561.30	174.93	3,555.21	155.23	1,135.23	6.11	61,959.68	0.00	0.00	0.00	0.00	343.32	18,084.09	14,138.28	108,702.92
SEP	22.07	0.00	0.00	4,599.54	2,210.41	97.91	4,044.28	119.86	174.06	4.63	63,488.23	0.00	0.00	0.00	0.00	337.57	12,813.16	15,228.09	103,137.81
Total	**327.85**	**0.00**	**8.35**	**52,868.06**	**35,658.81**	**1,275.50**	**57,900.55**	**2,489.33**	**19,550.95**	**75.58**	**783,111.57**	**0.00**	**0.00**	**3.16**	**17.67**	**1,189.10**	**146,074.88**	**141,186.62**	**1,241,738.00**
Average	**27.32**	**0.00**	**0.70**	**4,405.67**	**2,971.57**	**106.29**	**4,825.05**	**207.44**	**1,629.25**	**6.30**	**65,259.30**	**0.00**	**0.00**	**0.27**	**1.47**	**99.09**	**12,172.91**	**11,765.55**	**103,274.95**
Percent	**0.03%**	**0.00%**	**0.00%**	**4.27%**	**2.88%**	**0.10%**	**4.67%**	**0.20%**	**1.58%**	**0.01%**	**63.19%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.10%**	**11.79%**	**11.39%**	**100.00%**

97/98

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furn.	Garbage	LC	Pest/Paint	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	30.03	0.00	3.58	5,117.25	886.18	118.58	4,658.74	125.88	1.16	6.11	63,954.20	0.00	0.00	0.00	4.26	1,371.62	14,388.30	16,310.09	106,975.94
NOV	29.31	0.00	0.13	3,383.36	1,101.40	106.00	4,756.44	153.59	1,512.54	6.97	61,556.38	0.00	0.00	0.00	5.99	2,867.70	15,056.04	14,171.71	104,707.56
DEC	29.28	0.00	0.01	3,556.46	3,205.38	210.00	5,623.69	166.24	2,436.99	4.43	76,370.40	0.00	0.00	0.00	0.00	933.89	26,734.87	12,500.23	131,771.87
JAN	30.08	0.00	0.00	3,846.19	1,777.57	162.35	5,356.55	238.28	1,080.95	9.48	73,860.62	0.00	0.00	1.33	2.91	1,782.50	18,028.13	13,811.48	119,988.42
FEB	36.99	0.00	0.00	4,012.11	1,358.45	188.23	4,859.63	473.34	549.54	4.75	68,785.89	0.00	0.00	0.00	0.00	404.81	13,510.78	15,576.43	109,760.95
MAR	36.57	0.00	0.54	4,359.51	1,040.02	148.89	5,910.31	290.97	758.58	8.37	74,819.39	0.00	20.75	0.00	0.00	430.69	13,989.24	15,518.77	117,330.60
APR	23.67	0.00	0.52	4,552.77	1,130.97	244.69	5,662.41	221.24	985.41	6.69	69,318.43	0.00	14.35	12.05	0.00	249.50	15,335.40	15,897.53	113,455.63
MAY	28.53	0.00	0.00	5,992.04	1,139.68	131.46	4,937.82	123.83	1,681.89	7.87	65,843.07	0.00	14.34	8.73	0.00	646.33	15,492.87	15,707.82	111,756.08
JUN	24.76	0.00	0.00	5,364.35	1,013.57	139.84	4,872.86	172.25	3,369.46	4.13	67,419.02	0.00	7.95	0.97	2.42	542.72	13,737.85	16,116.31	112,788.46
JUL	23.03	0.00	0.18	5,437.23	785.44	133.26	4,153.95	132.06	2,666.90	8.44	87,195.38	0.00	14.52	0.00	0.00	323.20	14,867.14	16,981.46	112,722.19
AUG	30.00	0.00	0.13	4,747.50	671.25	198.66	3,731.75	245.17	1,373.54	8.10	64,250.48	0.00	12.65	0.00	0.00	434.41	14,174.91	16,781.69	106,660.24
SEP	26.91	0.00	0.00	4,666.82	935.08	132.80	3,807.38	156.46	1,984.73	8.18	67,366.88	0.00	14.19	0.00	0.00	408.72	14,759.49	17,146.63	111,414.27
Total	**349.18**	**0.00**	**5.09**	**55,035.59**	**15,044.97**	**1,914.74**	**58,331.53**	**2,499.31**	**18,401.69**	**83.52**	**820,740.14**	**0.00**	**98.75**	**23.08**	**15.58**	**10,396.09**	**190,075.02**	**186,317.95**	**1,359,332.21**
Average	**29.10**	**0.00**	**0.42**	**4,586.30**	**1,253.75**	**159.56**	**4,860.96**	**208.26**	**1,533.47**	**6.96**	**68,395.01**	**0.00**	**8.23**	**1.92**	**1.30**	**866.34**	**15,839.59**	**15,526.50**	**113,277.68**
Percent	**0.03%**	**0.00%**	**0.00%**	**4.05%**	**1.11%**	**0.14%**	**4.29%**	**0.18%**	**1.35%**	**0.01%**	**60.38%**	**0.00%**	**0.01%**	**0.00%**	**0.00%**	**0.76%**	**13.98%**	**13.71%**	**100.00%**

98/99

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furn.	Garbage	LC	Pest/Paint	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	28.82	0.00	0.00	7,130.23	1,501.06	343.84	4,015.31	170.98	2,080.61	8.46	67,524.06	0.00	13.70	0.00	2.12	558.47	15,608.93	17,343.25	116,329.84
NOV	25.19	0.00	0.00	7,455.80	1,149.37	469.40	4,048.61	290.72	3,932.44	11.00	70,550.44	0.00	12.15	0.00	0.00	390.38	13,409.91	15,480.43	117,225.84
DEC	31.23	0.00	0.00	6,969.96	719.47	586.15	4,701.64	224.02	3,518.02	13.37	76,769.96	0.00	10.29	0.00	0.00	410.43	13,822.50	13,027.89	120,804.93
JAN	27.84	0.00	0.00	5,406.54	859.03	557.00	4,909.81	224.10	4,895.99	8.08	74,846.18	0.00	13.89	0.00	0.00	498.56	14,330.34	12,688.85	119,266.01
FEB	30.47	0.00	0.03	6,061.65	886.32	514.29	4,752.49	235.69	6,381.01	4.31	68,363.65	0.00	11.92	0.00	0.00	551.07	13,335.25	13,503.58	114,631.73
MAR	33.42	0.00	0.82	8,064.36	617.71	551.65	5,617.34	187.52	5,558.88	14.16	78,501.86	0.00	20.93	9.30	3.36	515.21	15,231.18	16,251.54	131,179.24
APR	26.91	0.00	0.00	7,552.92	394.53	609.04	5,487.50	220.16	4,714.67	4.97	73,092.18	0.00	15.50	0.97	0.00	594.48	16,048.17	16,508.31	125,270.31
MAY	22.73	0.00	1.31	6,475.69	312.83	504.42	5,536.91	151.28	3,495.96	9.88	70,640.14	0.00	17.29	12.57	0.00	507.36	15,473.88	17,378.65	120,540.90
JUN	23.94	0.00	0.00	6,216.75	422.97	496.66	4,234.26	239.25	6,203.57	12.90	76,717.83	0.00	20.26	4.14	2.33	588.58	17,126.35	19,451.23	131,761.02
JUL	28.32	0.00	0.32	5,671.07	263.73	304.57	3,918.79	270.37	6,655.37	12.22	70,472.43	0.00	18.79	0.00	0.00	734.69	16,356.54	18,864.34	123,567.55
AUG	22.47	0.00	0.00	6,642.06	351.04	284.76	3,709.11	158.15	6,056.03	17.40	73,471.41	0.00	19.18	0.00	14.54	732.43	15,637.78	19,997.93	127,114.29
SEP	22.92	0.00	0.00	5,673.29	211.39	184.92	3,434.34	197.73	4,820.80	12.40	73,683.91	0.00	13.90	13.91	5.68	681.67	16,322.87	20,778.33	126,058.06
Total	**324.26**	**0.00**	**2.48**	**79,320.32**	**7,689.45**	**5,406.70**	**54,364.11**	**2,569.97**	**58,313.35**	**129.15**	**874,634.05**	**0.00**	**185.80**	**40.89**	**28.03**	**6,763.33**	**182,703.70**	**201,274.13**	**1,473,749.72**
Average	**27.02**	**0.00**	**0.21**	**6,610.03**	**640.79**	**450.56**	**4,530.34**	**214.16**	**4,859.45**	**10.76**	**72,886.17**	**0.00**	**15.48**	**3.41**	**2.34**	**563.61**	**15,225.31**	**16,772.84**	**122,812.48**
Percent	**0.02%**	**0.00%**	**0.00%**	**5.38%**	**0.52%**	**0.37%**	**3.69%**	**0.17%**	**3.96%**	**0.01%**	**59.35%**	**0.00%**	**0.01%**	**0.00%**	**0.00%**	**0.46%**	**12.40%**	**13.66%**	**100.00%**

99/00

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furn.	Garbage	LC	Pest/Paint	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	29.93	0.00	0.00	5,904.09	186.71	147.62	3,316.23	380.88	3,800.94	12.32	75,429.94	0.00	11.39	23.38	0.00	1,030.96	14,666.95	21,885.64	126,826.98
NOV	22.22	0.00	1.08	5,918.34	143.10	176.30	4,686.77	342.37	4,676.42	13.17	74,895.94	0.00	16.42	0.00	0.00	934.72	14,372.82	21,188.47	127,388.14
DEC	36.39	0.00	0.00	5,698.34	142.50	265.52	4,775.48	328.46	4,328.21	14.47	76,583.23	0.00	20.69	18.51	3.99	642.11	14,117.24	14,518.76	121,494.08
JAN	28.13	0.00	0.47	5,730.83	254.78	159.52	4,892.84	368.16	8,255.79	8.48	75,317.43	0.00	15.37	13.40	10.26	572.11	13,904.23	13,061.84	122,593.64
FEB	28.44	0.00	0.03	5,520.51	395.23	186.74	4,042.63	500.03	4,768.14	16.02	72,963.01	0.00	16.31	23.11	0.00	718.37	13,222.10	13,865.71	116,266.38
MAR	24.78	0.00	0.00	5,975.37	417.98	220.97	4,654.17	343.40	5,183.96	12.18	79,324.98	0.00	23.11	16.57	0.00	583.42	15,373.44	14,910.71	127,065.02
APR	24.21	0.00	1.49	6,369.07	680.56	174.98	3,856.13	320.53	4,551.38	13.29	72,516.07	0.00	18.09	0.00	3.16	477.10	14,384.94	14,100.39	117,491.39
MAY	25.05	0.00	0.00	5,918.17	666.43	181.38	5,099.54	305.16	8,679.88	12.67	75,451.41	0.00	19.60	11.73	2.32	692.61	15,263.85	15,577.80	125,907.60
JUN	18.82	0.00	0.50	5,521.64	633.82	145.03	4,314.36	253.55	5,659.13	17.62	71,775.00	0.00	18.25	0.00	1.35	681.82	15,272.03	15,696.86	120,009.78
JUL	25.15	0.00	0.00	5,483.15	289.30	129.49	4,425.77	284.95	5,101.21	21.16	70,910.34	0.00	16.92	9.95	5.77	708.99	15,803.54	15,388.36	118,604.05
AUG	25.49	0.00	0.00	6,444.41	438.96	231.76	4,798.54	268.68	5,162.53	17.48	74,834.09	0.00	19.58	12.56	16.23	2,543.40	17,746.71	18,723.82	131,284.24
SEP	26.23	0.00	0.00	5,386.38	503.06	96.84	4,314.51	306.84	5,514.93	24.03	70,273.57	0.00	22.43	0.00	3.49	897.56	14,532.30	16,263.53	118,165.70
Total	**314.84**	**0.00**	**3.57**	**69,870.30**	**4,752.43**	**2,116.15**	**53,176.95**	**4,003.01**	**63,682.52**	**182.87**	**890,275.01**	**0.00**	**218.36**	**129.21**	**46.57**	**10,483.17**	**178,660.15**	**195,181.89**	**1,473,097.00**
Average	**26.24**	**0.00**	**0.30**	**5,822.53**	**396.04**	**176.35**	**4,431.41**	**333.58**	**5,306.88**	**15.24**	**74,189.58**	**0.00**	**18.20**	**10.77**	**3.88**	**873.60**	**14,888.35**	**16,265.16**	**122,758.08**
Percent	**0.02%**	**0.00%**	**0.00%**	**4.74%**	**0.32%**	**0.14%**	**3.61%**	**0.27%**	**4.32%**	**0.01%**	**60.44%**	**0.00%**	**0.01%**	**0.01%**	**0.00%**	**0.71%**	**12.13%**	**13.25%**	**100.00%**

00/01

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furn.	Garbage	LC	Pest/Paint	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	35.41	0.00	0.78	5,381.70	538.81	135.38	4,099.36	274.50	3,888.63	23.44	78,361.31	0.00	40.87	22.68	3.15	728.93	16,527.90	16,388.72	124,427.57
NOV	25.40	0.00	0.00	5,278.28	88.00	112.47	3,360.84	276.81	5,678.68	25.91	76,844.28	0.00	27.74	0.08	4.37	678.46	14,214.76	13,881.03	120,493.11
DEC	26.57	0.00	0.00	4,786.04	47.19	251.83	5,379.57	193.25	8,076.91	37.81	77,103.01	0.00	10.96	0.00	0.00	350.24	13,929.38	10,861.61	121,054.37
JAN	30.55	0.00	0.00	4,333.81	71.21	152.08	6,014.81	466.71	4,614.96	38.32	79,731.75	0.00	16.93	10.90	5.89	502.07	14,741.07	12,215.72	122,944.58
FEB	30.21	0.00	0.00	4,443.20	44.91	178.38	5,512.18	327.95	4,888.15	41.73	70,793.69	0.00	24.90	0.00	2.81	574.84	13,447.32	12,815.95	113,126.20
MAR	27.72	0.00	0.00	5,002.41	46.07	210.24	5,513.66	383.54	4,741.50	36.21	81,001.95	0.00	11.99	0.00	0.00	602.72	15,841.51	15,540.83	126,960.35
APR	31.32	0.00	1.13	4,690.49	55.56	89.37	5,323.18	326.04	3,856.28	33.72	74,681.73	0.00	12.73	0.00	11.44	574.03	15,830.68	14,469.89	119,987.59
MAY	38.32	0.00	0.21	5,970.43	76.12	112.86	5,301.67	372.14	4,474.77	12.37	77,468.21	0.00	250.78	0.26	6.38	676.77	16,927.00	17,072.76	128,760.85
JUN	24.03	0.00	0.87	6,018.64	77.29	127.91	3,727.38	499.64	4,339.29	9.59	74,775.70	0.00	18.58	0.00	2.67	770.59	17,175.61	17,514.89	125,062.88
JUL	27.16	0.00	9.64	6,080.58	119.31	150.68	3,884.75	425.79	5,204.60	14.70	78,090.39	0.00	22.49	0.00	6.15	1,635.36	16,887.58	17,414.84	129,974.02
AUG	26.85	0.00	0.00	7,141.26	96.20	193.19	4,195.53	348.38	4,318.29	12.91	77,542.10	0.00	19.52	0.00	4.40	1,458.59	16,938.83	18,410.64	130,704.69
SEP	33.22	0.00	0.00	5,607.28	109.10	69.29	4,075.55	277.57	4,726.00	12.99	70,348.37	0.00	12.75	0.00	0.00	934.04	15,018.43	17,160.18	118,382.77
Total	**354.76**	**0.00**	**12.63**	**64,714.12**	**1,369.77**	**1,783.46**	**56,388.48**	**4,170.32**	**58,804.06**	**297.70**	**914,740.49**	**0.00**	**470.24**	**33.92**	**47.06**	**9,484.64**	**187,480.07**	**183,747.08**	**1,483,898.78**
Average	**29.56**	**0.00**	**1.05**	**5,392.84**	**114.15**	**148.62**	**4,699.04**	**347.53**	**4,900.34**	**24.81**	**76,228.37**	**0.00**	**39.19**	**2.83**	**3.92**	**790.39**	**15,623.34**	**15,312.26**	**123,658.23**
Percent	**0.02%**	**0.00%**	**0.00%**	**4.36%**	**0.09%**	**0.12%**	**3.80%**	**0.28%**	**3.96%**	**0.02%**	**61.64%**	**0.00%**	**0.03%**	**0.00%**	**0.00%**	**0.64%**	**12.63%**	**12.38%**	**100.00%**

01/02

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furn.	Garbage	LC	Pest/Paint	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	39.38	0.00	3.16	7,538.43	121.88	119.80	4,368.43	149.62	4,887.16	14.52	80,051.97	0.00	17.84	0.00	0.00	1,266.16	17,830.55	19,391.01	135,797.89
NOV	27.16	0.00	0.00	6,712.73	28.03	79.09	4,899.44	89.69	5,619.19	14.98	77,287.88	0.00	21.13	0.00	6.98	860.12	14,954.28	15,161.21	125,761.91
DEC	33.94	0.00	0.00	5,969.71	71.04	120.14	5,534.03	193.51	5,253.46	17.90	79,533.80	0.00	25.30	0.00	0.70	604.62	14,342.68	12,332.41	124,033.24
JAN	29.99	0.00	0.00	5,925.52	3.81	158.99	5,247.15	265.38	6,294.81	14.19	82,873.32	0.00	29.77	11.09	4.60	730.06	15,336.88	14,734.75	131,660.11
FEB	28.44	0.00	0.00	5,972.42	29.51	100.84	5,142.97	133.72	4,514.17	11.06	77,101.58	0.00	20.91	0.00	3.10	482.26	14,481.86	15,070.55	123,073.39
MAR	43.84	0.00	0.00	5,586.53	31.82	140.53	6,362.86	99.38	5,054.31	17.59	76,330.01	0.00	19.56	11.29	0.00	606.31	14,536.74	13,562.98	122,403.75
APR	28.25	0.00	0.00	8,365.51	106.41	204.93	6,289.43	92.74	3,197.34	13.41	82,324.53	0.00	24.95	0.00	0.00	528.30	16,461.67	15,629.01	131,286.48
MAY	36.52	0.00	0.00	7,525.60	71.01	94.16	5,587.88	3,232.51	12,496.83	15.33	61,580.75	0.00	22.95	0.00	5.05	1,060.18	16,891.76	18,804.57	147,405.08
JUN	31.68	0.00	0.00	6,227.50	66.93	66.42	5,741.94	3,593.71	3,404.02	11.88	77,740.57	0.00	23.68	0.00	3.21	1,717.47	15,493.66	17,933.31	132,055.96
JUL	38.92	0.00	4.62	5,876.28	133.85	56.93	5,078.12	4,179.39	3,979.48	9.27	82,982.94	0.00	24.66	0.00	12.21	1,630.43	17,231.18	19,140.43	140,378.69
AUG	35.03	0.00	0.00	6,298.73	111.59	94.24	3,479.61	1,368.28	4,735.51	15.31	78,707.20	0.00	27.38	0.00	0.00	2,258.45	16,478.85	20,280.77	133,690.95
SEP	38.53	0.00	0.77	4,869.94	191.27	154.96	4,102.27	3,098.28	11,402.90	13.38	74,171.20	0.00	24.02	0.00	0.68	1,874.88	14,613.66	17,285.02	131,839.92
Total	**409.66**	**0.00**	**8.55**	**74,868.90**	**966.95**	**1,391.03**	**61,812.11**	**16,496.21**	**70,839.16**	**168.78**	**950,685.75**	**0.00**	**282.15**	**22.38**	**36.71**	**13,599.24**	**188,653.77**	**199,326.02**	**1,579,567.37**
Average	**34.14**	**0.00**	**0.71**	**6,239.08**	**80.58**	**115.92**	**5,151.01**	**1,374.66**	**5,903.26**	**14.07**	**79,223.81**	**0.00**	**23.51**	**1.87**	**3.06**	**1,133.27**	**15,721.15**	**16,610.50**	**131,630.61**
Percent	**0.03%**	**0.00%**	**0.00%**	**4.74%**	**0.06%**	**0.09%**	**3.91%**	**1.04%**	**4.48%**	**0.01%**	**60.19%**	**0.00%**	**0.02%**	**0.00%**	**0.00%**	**0.86%**	**11.94%**	**12.62%**	**100.00%**

02/03

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furn./App	Garbage	LC	Pest/Paint	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	41.83	0.00	0.00	6,004.05	261.27	341.44	5,005.58	752.25	22,889.02	17.84	79,959.99	0.00	20.03	6.76	2.84	1,463.43	15,219.54	16,544.26	148,530.13
NOV	33.83	0.00	0.00	5,456.46	185.24	392.66	4,846.04	149.83	4,005.34	25.69	78,743.07	0.00	22.30	0.00	8.50	791.07	14,211.79	16,290.02	125,161.84
DEC	39.06	0.00	0.00	4,202.38	280.94	286.43	5,555.02	164.16	8,220.82	34.64	87,215.24	0.00	23.22	8.79	11.65	1,602.60	14,311.08	13,782.12	135,738.15
JAN	34.73	0.00	1.58	5,785.14	222.08	419.77	5,702.42	206.75	8,831.75	15.89	84,947.05	0.00	35.60	0.14	7.71	1,431.45	14,778.96	14,614.32	137,035.34
FEB	31.06	0.00	0.00	5,483.43	142.04	403.10	4,786.56	186.51	7,014.66	19.52	78,843.50	0.00	18.43	0.00	0.00	1,020.31	13,676.44	15,300.88	126,926.44
MAR	33.67	0.00	0.00	6,136.99	330.64	282.84	6,603.84	136.54	8,093.68	23.85	88,486.37	0.00	23.02	0.00	7.11	1,322.04	16,440.24	20,269.31	148,190.14
APR	34.12	0.00	0.00	5,888.21	191.16	193.43	6,378.57	335.35	18,668.77	21.97	86,406.08	0.00	24.42	0.00	13.76	1,687.69	17,363.24	19,631.90	156,838.67
MAY	32.50	0.00	0.00	6,147.44	169.04	195.49	5,550.30	542.42	30,150.47	26.23	86,192.02	0.00	30.10	0.00	11.90	938.95	17,926.73	20,061.39	167,974.98
JUN	31.72	0.00	2.03	6,483.08	227.18	186.48	4,307.54	699.67	9,332.07	20.54	82,088.83	0.00	21.49	0.00	3.44	2,123.37	17,453.86	21,424.08	144,405.38
JUL	31.73	0.00	4.66	6,097.76	175.09	193.26	4,731.34	1,391.74	15,885.55	18.75	81,808.35	0.00	31.85	10.33	5.80	2,724.60	17,130.77	22,131.72	152,373.30
AUG	38.15	0.00	1.06	6,292.26	208.57	131.13	4,938.11	2,460.00	10,986.20	22.37	80,948.25	0.00	44.10	0.00	2.54	3,035.19	15,934.22	22,646.19	147,688.34
SEP	38.91	0.00	0.00	5,965.53	130.40	105.91	4,546.56	3,428.72	22,975.58	19.90	81,934.74	0.00	30.35	0.05	4.88	1,292.56	16,593.83	22,680.32	159,748.22
Total	**421.31**	**0.00**	**9.33**	**69,942.73**	**2,523.65**	**3,131.94**	**62,951.88**	**10,453.94**	**167,053.89**	**267.19**	**997,573.49**	**0.00**	**324.91**	**26.07**	**80.13**	**19,433.26**	**191,040.70**	**225,376.51**	**1,750,610.93**
Average	**35.11**	**0.00**	**0.78**	**5,828.56**	**210.30**	**261.00**	**5,245.99**	**871.16**	**13,921.16**	**22.27**	**83,131.12**	**0.00**	**27.08**	**2.17**	**6.68**	**1,619.44**	**15,920.06**	**18,781.38**	**145,884.24**
Percent	**0.02%**	**0.00%**	**0.00%**	**4.00%**	**0.14%**	**0.18%**	**3.60%**	**0.60%**	**9.54%**	**0.02%**	**56.98%**	**0.00%**	**0.02%**	**0.00%**	**0.00%**	**1.11%**	**10.91%**	**12.87%**	**100.00%**

03/04

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furn./App	Garbage	LC	Pest/Paint	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	39.01	0.00	0.00	6,622.89	60.46	172.64	4,966.58	1,054.16	27,266.08	25.10	83,280.46	0.00	21.70	0.00	0.00	950.97	15,244.31	21,501.01	161,205.37
NOV	29.85	0.00	0.00	5,830.30	1.40	152.24	4,595.21	1,116.85	11,078.83	22.52	80,342.64	0.00	23.25	0.00	14.63	828.81	13,558.66	18,161.62	135,756.81
DEC	35.16	0.00	0.39	5,627.50	2.06	1,548.45	5,786.22	1,800.70	8,250.81	23.42	93,006.37	0.00	30.95	0.00	7.41	639.99	14,114.57	17,018.84	147,892.84
JAN	41.85	0.00	1.14	6,208.64	0.00	112.21	5,665.62	828.45	8,364.68	22.30	87,947.47	0.00	34.02	0.85	2.87	752.55	13,969.12	16,825.97	140,577.74
FEB	37.76	0.00	0.00	6,242.82	19.90	584.40	5,067.48	1,400.81	6,720.63	20.05	82,824.86	0.00	20.70	0.00	5.68	508.22	13,692.18	15,756.28	132,901.77
MAR	39.71	0.00	2.75	5,500.25	0.00	259.21	6,740.49	1,537.29	9,978.99	50.36	93,969.16	0.00	46.11	0.00	0.74	767.87	16,045.76	20,630.48	155,569.17
APR	36.50	0.00	0.16	5,702.52	0.00	161.18	7,365.53	1,353.43	7,253.87	15.49	88,504.46	0.00	28.15	0.00	2.34	1,025.76	17,615.31	21,409.11	150,473.81
MAY	29.90	0.00	2.15	5,761.06	0.00	101.33	5,275.58	135.13	8,684.55	16.91	85,063.42	0.00	21.45	0.00	14.94	694.96	17,421.34	22,872.15	146,094.87
JUN	44.54	0.00	0.00	17,687.61	0.00	126.94	5,137.44	679.63	16,514.17	21.34	86,558.12	0.00	30.55	0.00	1.07	788.17	18,322.96	24,473.37	170,385.91
JUL	33.21	0.00	0.00	6,489.77	0.00	212.42	4,783.93	1,130.05	20,717.07	25.32	85,310.33	0.00	32.60	0.00	11.92	820.77	18,926.38	23,347.59	161,841.36
AUG	39.11	0.00	0.00	6,570.04	0.00	142.02	4,557.97	2,061.44	13,836.83	22.14	88,738.61	0.00	37.05	0.00	16.44	149.60	18,636.74	26,008.31	160,816.30
SEP	30.93	0.00	0.00	6,972.31	18.94	118.64	4,623.93	759.84	7,488.84	20.34	111,183.74	0.00	22.37	0.00	2.99	1,639.68	13,492.61	22,470.24	168,845.40
Total	**437.53**	**0.00**	**6.59**	**85,215.71**	**102.76**	**3,691.68**	**64,565.98**	**13,657.78**	**146,155.35**	**285.29**	**1,066,729.64**	**0.00**	**348.90**	**0.85**	**81.03**	**9,567.35**	**191,039.94**	**250,474.97**	**1,832,361.35**
Average	**36.46**	**0.00**	**0.55**	**7,101.31**	**8.56**	**307.64**	**5,380.50**	**1,138.15**	**12,179.61**	**23.77**	**88,894.14**	**0.00**	**29.08**	**0.07**	**6.75**	**797.28**	**15,920.00**	**20,872.91**	**152,696.78**
Percent	**0.02%**	**0.00%**	**0.00%**	**4.65%**	**0.01%**	**0.20%**	**3.52%**	**0.75%**	**7.98%**	**0.02%**	**58.22%**	**0.00%**	**0.02%**	**0.00%**	**0.00%**	**0.52%**	**10.43%**	**13.67%**	**100.00%**

Significant impact from Hurricanes Frances and Jeanne

04/05

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct	Fill	Furn./App	Garbage	LC	Pest/Paint	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	45.11	0.00	0.00	12,590.13	0.00	118.83	5,024.78	219.48	19,906.74	20.29	96,423.44	0.00	23.18	0.00	7.49	528.27	14,551.56	22,079.64	171,538.94
NOV	41.82	0.00	0.00	12,304.79	0.00	111.32	6,442.78	128.46	21,194.71	23.02	94,856.70	0.00	27.83	0.00	20.44	1,615.77	15,188.93	21,827.72	173,784.29
DEC	31.44	0.00	0.00	12,500.47	0.00	343.09	6,707.04	681.82	25,375.23	27.02	97,800.29	0.00	39.46	0.00	0.00	259.27	22,197.92	21,320.00	187,283.05
JAN	39.57	0.00	1.87	12,275.42	3.58	238.04	6,425.29	1,695.23	17,205.22	32.22	96,296.96	0.00	27.52	0.00	8.07	671.27	18,517.96	19,580.85	173,019.07
FEB	32.89	0.00	0.00	13,802.74	0.73	311.27	6,839.97	1,534.59	18,552.60	31.46	88,239.89	0.00	19.67	0.00	0.00	651.60	16,202.42	16,720.86	162,940.69
MAR	38.87	0.00	0.00	14,014.56	0.00	385.43	8,729.67	739.67	23,859.19	23.94	104,044.42	0.00	43.49	0.00	5.35	478.83	17,880.00	18,783.71	189,027.13
APR	34.04	0.00	1.79	12,454.07	3.85	160.04	7,942.95	122.83	23,533.08	16.73	94,732.89	0.00	43.95	0.00	0.00	779.48	17,850.71	19,436.76	177,113.15
MAY	31.78	0.00	0.11	13,041.44	0.00	133.48	6,940.42	2,517.17	27,104.22	22.61	95,318.14	0.00	34.20	0.00	0.00	937.81	17,359.92	20,311.25	183,752.55
JUN	25.99	0.00	0.00	11,335.57	0.00	138.97	8,533.94	2,265.49	16,773.65	25.26	97,939.56	0.00	52.55	2.90	3.01	306.89	19,055.56	23,721.09	178,180.43
JUL	24.91	0.00	0.00	10,423.19	0.00	143.56	5,815.06	625.61	8,864.30	15.57	86,879.16	0.00	32.60	0.00	0.79	848.87	17,389.49	21,978.09	152,841.20
AUG	27.90	0.00	0.37	11,751.47	0.00	170.78	5,946.68	959.13	9,274.26	15.28	91,187.85	0.00	32.53	0.00	0.70	597.53	16,762.63	24,898.99	161,626.10
SEP	28.26	0.00	0.00	10,513.70	0.00	182.81	5,897.16	1,788.86	8,577.27	23.84	85,721.65	0.00	29.78	0.00	14.23	657.53	18,496.55	26,511.29	156,242.93
Total	**402.58**	**0.00**	**4.14**	**147,007.55**	**8.16**	**2,437.62**	**78,845.74**	**13,278.34**	**220,220.45**	**277.24**	**1,129,440.95**	**0.00**	**406.76**	**2.90**	**60.08**	**8,333.12**	**209,453.65**	**257,170.25**	**2,067,349.53**
Average	**33.55**	**0.00**	**0.35**	**12,250.63**	**0.68**	**203.14**	**6,570.48**	**1,106.53**	**18,351.70**	**23.10**	**94,120.08**	**0.00**	**33.90**	**0.24**	**5.01**	**694.43**	**17,454.47**	**21,430.85**	**172,279.13**
Percent	**0.02%**	**0.00%**	**0.00%**	**7.11%**	**0.00%**	**0.12%**	**3.81%**	**0.64%**	**10.65%**	**0.01%**	**54.63%**	**0.00%**	**0.02%**	**0.00%**	**0.00%**	**0.40%**	**10.13%**	**12.44%**	**100.00%**

05/06

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct LF	Fill	Furn./App	Garbage	LC	Pest/Paint	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	29.38	0.00	0.00	8,564.65	0.00	141.87	5,506.80	1,587.61	6,936.04	16.28	94,920.99	0.00	28.20	0.00	3.43	334.98	13,032.22	20,714.80	151,817.25
NOV	28.88	0.00	0.00	10,779.11	0.00	100.75	8,683.19	564.40	9,525.82	21.32	104,308.85	0.00	38.28	0.00	22.92	231.30	9,746.30	14,242.81	158,293.93
DEC	24.73	0.00	0.68	17,634.21	0.00	177.21	8,019.86	779.89	7,953.01	17.12	99,328.87	0.00	21.56	0.00	20.79	297.82	16,907.98	18,230.50	169,414.23
JAN	39.20	0.00	0.00	19,901.82	0.00	101.78	7,306.13	809.31	7,056.46	17.16	97,985.66	0.00	29.70	0.00	6.72	527.03	18,829.53	20,700.44	173,310.94
FEB	25.14	0.00	0.00	17,265.02	4.27	232.65	7,084.26	781.90	6,078.26	14.17	89,136.99	0.00	29.64	2.85	2.00	559.12	16,553.46	18,907.76	156,677.49
MAR	28.90	0.00	1.04	24,392.95	0.00	194.14	7,525.37	2,755.45	6,045.93	24.79	100,787.74	0.00	39.61	0.00	20.07	1,120.08	18,192.43	20,581.00	181,709.50
APR	30.56	0.00	1.78	21,252.74	0.00	117.36	6,625.37	1,227.12	5,930.15	11.01	91,605.35	0.00	22.25	0.00	4.78	923.86	15,943.98	20,028.01	163,724.32
MAY	21.89	0.00	9.23	21,170.62	0.00	126.04	7,825.41	3,792.54	5,447.98	15.31	99,285.87	0.00	27.72	0.00	4.77	0.00	17,969.15	24,653.92	180,350.45
JUN	39.99	0.00	0.81	22,113.32	10.26	135.09	5,829.10	3,253.57	11,313.89	14.59	91,979.75	0.00	31.49	0.00	31.84	69.38	17,563.81	25,599.41	177,986.30
JUL	26.97	0.00	0.00	16,901.31	0.00	209.72	6,928.42	2,338.04	9,023.40	13.54	88,171.24	0.00	22.16	0.00	6.74	1,851.34	16,072.37	25,254.75	166,620.00
AUG	30.79	0.00	0.18	15,975.04	0.00	283.30	5,145.11	9,412.87	8,571.77	14.83	89,208.74	0.00	22.02	0.00	0.00	106.44	14,906.15	26,886.03	170,543.07
SEP	29.64	0.00	0.00	14,513.36	0.00	130.38	4,306.02	8,727.41	12,985.39	21.82	88,334.18	0.00	17.73	0.41	4.40	1,548.54	14,692.59	24,265.74	169,577.81
Total	**356.07**	**0.00**	**13.72**	**210,464.15**	**14.53**	**1,930.29**	**78,785.04**	**36,030.11**	**96,868.10**	**201.74**	**1,135,054.23**	**0.00**	**330.38**	**3.26**	**128.46**	**7,369.89**	**190,409.97**	**280,065.17**	**2,018,025.09**
Average	**29.67**	**0.00**	**1.14**	**17,538.68**	**1.21**	**160.86**	**6,565.42**	**3,002.51**	**8,072.34**	**16.81**	**94,587.85**	**0.00**	**27.53**	**0.27**	**10.71**	**614.16**	**15,867.50**	**21,672.10**	**168,168.76**
Percent	**0.02%**	**0.00%**	**0.00%**	**10.18%**	**0.00%**	**0.09%**	**3.81%**	**1.74%**	**4.69%**	**0.01%**	**54.90%**	**0.00%**	**0.02%**	**0.00%**	**0.01%**	**0.36%**	**9.21%**	**12.58%**	**97.61%**

Significant impact from Hurricane Wilma

06/07

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct LF	Fill	Furn./App	Garbage	LC	Pest/Paint	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	32.02	0.00	0.00	13,716.95	0.00	165.41	4,470.08	4,329.25	16,313.67	14.28	85,256.05	0.00	25.37	0.00	3.51	1,754.63	13,994.84	22,452.47	162,528.53
NOV	23.62	0.00	6.83	12,571.49	0.00	153.06	5,315.03	1,903.18	9,949.04	11.58	87,776.62	0.00	29.13	0.00	24.15	5.93	13,473.26	18,647.75	149,890.67
DEC	28.90	0.00	0.58	11,312.72	2.13	136.82	6,757.72	2,270.10	6,833.49	16.19	90,459.72	0.00	22.71	0.00	5.89	2,588.87	13,160.32	14,238.13	147,834.29
JAN	37.34	0.00	0.00	12,883.50	0.00	159.26	8,567.71	2,683.74	8,504.60	9.69	96,194.13	0.00	35.71	11.12	5.67	434.28	14,992.02	17,295.19	159,813.96
FEB	33.42	0.00	0.00	9,653.58	22.50	176.65	7,065.32	2,424.25	3,591.89	15.98	83,792.63	0.00	34.01	0.00	5.14	644.05	12,375.32	15,097.99	134,932.73
MAR	40.62	0.00	0.32	10,401.32	0.00	157.18	7,514.71	2,594.25	5,734.94	25.55	92,311.83	0.00	30.78	3.08	10.02	1,235.60	13,439.14	17,156.85	150,855.99
APR	29.83	0.00	0.00	11,122.67	0.00	172.63	7,434.71	189.94	3,556.23	14.42	87,373.33	0.00	21.33	0.50	0.00	671.21	13,607.79	18,796.28	142,990.87
MAY	32.85	0.00	0.65	11,017.18	0.00	147.27	6,209.49	1,031.56	7,756.01	11.18	91,203.96	0.00	32.61	1.53	0.00	885.24	14,277.53	23,514.49	156,121.53
JUN	32.55	0.00	0.00	9,906.71	0.00	131.51	5,524.89	2,408.85	4,678.77	13.49	88,774.59	0.00	34.26	2.36	0.33	659.70	14,245.44	23,078.52	149,489.77
JUL	26.67	0.00	0.82	8,080.89	0.00	117.07	5,217.15	2,999.16	7,763.44	12.02	89,772.71	0.00	30.21	0.00	3.94	916.41	14,483.58	22,824.26	152,248.33
AUG	39.72	0.00	0.20	8,929.02	0.00	313.74	5,830.01	265.71	5,919.84	10.11	87,899.70	0.00	44.22	0.00	15.34	1,470.76	15,013.33	21,901.23	147,452.93
SEP	24.64	0.00	0.00	6,527.67	0.00	181.93	5,518.26	429.55	6,574.88	9.35	79,747.39	0.00	17.81	0.79	3.64	0.00	12,802.96	16,763.78	128,602.65
Total	**382.18**	**0.00**	**9.40**	**126,123.68**	**24.83**	**2,012.53**	**75,225.08**	**23,529.34**	**85,174.80**	**163.84**	**1,060,562.66**	**0.00**	**358.15**	**19.38**	**77.63**	**11,266.68**	**165,885.53**	**231,766.74**	**1,782,562.25**
Average	**31.85**	**0.00**	**0.78**	**10,510.31**	**2.05**	**167.71**	**8,288.76**	**1,960.78**	**7,097.90**	**13.65**	**88,380.22**	**0.00**	**29.85**	**1.62**	**6.47**	**938.89**	**13,822.13**	**19,313.90**	**148,546.85**
Percent	**0.02%**	**0.00%**	**0.00%**	**6.10%**	**0.00%**	**0.10%**	**3.64%**	**1.14%**	**4.12%**	**0.01%**	**51.30%**	**0.00%**	**0.02%**	**0.00%**	**0.00%**	**0.54%**	**8.02%**	**11.21%**	**86.22%**

07/08

Month	Animals	Reef	Asbestos	C/D	Residue	Tires	Sludge	Direct LF	Fill	Furn./App	Garbage	LC	Pest/Paint	Special	Trailers	Mulch	Trash/Other	Vegetation	Total
OCT	27.37	0.00	0.00	6,717.09	0.00	160.97	5,342.07	648.07	10,524.34	26.77	93,741.53	0.00	34.44	1.50	0.00	738.95	15,795.42	17,873.19	151,431.71
NOV	34.49	0.00	0.00	5,780.74	0.42	121.79	4,098.44	435.26	11,205.55	4.44	87,802.94	0.00	35.28	0.00	0.25	374.99	13,241.97	15,037.94	138,174.50
DEC	31.87	0.00	0.00	5,442.68	6.25	142.75	5,524.63	1,418.21	9,905.89	11.59	88,459.28	0.00	31.83	0.00	2.82	1,187.18	12,167.55	11,332.08	135,664.61
JAN	31.88	0.00	0.00	6,518.81	24.39	219.12	6,072.90	1,301.82	9,470.28	17.41	93,120.41	0.00	38.15	0.00	0.00	414.60	13,394.70	13,723.17	144,347.64
FEB	31.81	0.00	0.00	5,551.99	4.48	234.71	4,630.24	2,342.30	6,971.53	7.53	87,517.75	0.00	37.61	0.11	0.44	700.81	12,259.01	12,668.89	132,959.01
MAR	35.38	0.00	0.00	5,951.02	19.60	149.14	7,066.68	2,065.65	8,572.13	13.07	91,211.82	0.00	32.28	0.00	0.84	1,050.03	13,164.90	14,317.98	143,850.32
APR	34.61	0.00	0.58	7,092.57	0.00	161.25	6,872.05	1,866.67	9,674.29	10.94	88,978.15	0.00	50.96	0.00	2.43	808.84	14,593.37	16,525.73	146,672.44
MAY	28.31	0.00	0.54	5,402.15	20.28	114.13	5,521.51	2,518.49	9,349.89	10.56	84,267.69	0.00	36.41	0.00	0.00	0.00	13,142.06	19,112.27	139,522.29
JUN	25.92	0.00	0.00	6,293.40	0.00	113.36	6,089.02	3,872.54	8,936.23	7.34	80,835.58	0.00	38.14	0.00	0.00	901.52	12,613.35	19,573.06	139,099.46
JUL	36.01	0.00	0.00	6,418.03	0.00	148.90	5,553.47	7,015.98	8,458.57	7.77	82,731.93	0.00	53.94	0.04	3.42	1,405.80	14,152.42	20,861.30	146,847.58
AUG	26.76	0.00	0.00	5,021.19	0.00	173.52	5,016.09	2,900.39	8,760.30	8.30	78,336.60	0.00	31.34	0.00	7.09	0.00	13,481.42	20,007.28	133,768.28
SEP	32.15	0.00	0.34	4,649.58	0.00	147.32	6,715.91	1,122.41	7,837.23	3.86	79,237.26	0.00	36.19	0.00	0.00	542.54	13,464.72	20,083.25	133,872.76
Total	**378.56**	**0.00**	**1.46**	**70,839.25**	**75.42**	**1,886.96**	**68,503.01**	**27,305.79**	**109,666.23**	**127.58**	**1,038,240.94**	**0.00**	**456.57**	**1.65**	**17.09**	**8,125.06**	**161,470.89**	**200,916.14**	**1,688,010.60**
Average	**31.38**	**0.00**	**0.12**	**5,903.27**	**6.29**	**157.25**	**5,708.58**	**2,275.48**	**9,138.85**	**10.63**	**86,353.41**	**0.00**	**38.05**	**0.14**	**1.42**	**677.09**	**13,455.91**	**16,743.01**	**140,500.88**
Percent	**0.02%**	**0.00%**	**0.00%**	**3.43%**	**0.00%**	**0.09%**	**3.31%**	**1.32%**	**5.30%**	**0.01%**	**50.12%**	**0.00%**	**0.02%**	**0.00%**	**0.00%**	**0.39%**	**7.81%**	**9.72%**	**81.55%**

APPENDIX B
STANDARD SOLID WASTE INTERLOCAL AGREEMENT

INTERLOCAL AGREEMENT FOR THE DELIVERY OF MUNICIPAL SOLID WASTE TO DESIGNATED FACILITIES AND FOR A MUNICIPAL RECYCLING PROGRAM

THIS AGREEMENT, made and entered into this ____day of _____, 2008 by and between the **SOLID WASTE AUTHORITY OF PALM BEACH COUNTY,** a dependent special district created pursuant to Chapter 2001-331, Laws of Florida, as amended, hereinafter called "Authority", and the **CITY OF** _____, a municipal corporation, chartered and organized in accordance with the laws of the State of Florida, hereinafter called "CITY".

WITNESSETH:

WHEREAS, the Authority has been empowered by law to carry out the powers, obligations and requirements in Palm Beach County, Florida, prescribed to a "county" pursuant to the provisions of Chapter 403, Part IV, *Florida Statutes*; and

WHEREAS, Chapter 403, Part IV, *Florida Statutes* encourages counties to enter into Interlocal Agreements with municipalities to establish recycling programs and carry out recycling activities; and

WHEREAS, the CITY desires to work in cooperation with the Authority to continue a municipal recycling program toward achievement and maintenance of the State recycling goal and the requirements of Chapter 403, Part IV, *Florida Statutes*; and

WHEREAS, in addition, the CITY provides for the collection of solid waste from the residents and businesses and residential recyclables within its boundaries and recognizes the need for safe and sanitary processing and disposal of solid waste and residential recyclable materials; and

WHEREAS, the CITY wishes to participate in a coordinated County-wide program for the management of hazardous waste and control of solid waste processing and disposal and residential recycling participation in cooperation with federal, state, and local agencies responsible for the prevention, control, or abatement of air, water, and land pollution; and

WHEREAS, the CITY together with Palm Beach County recognizes the need to plan and develop an adequate solid waste and residential recycling system for the benefit of all the residents of Palm Beach County.

NOW, THEREFORE, in consideration of the mutual covenants and promises hereinafter contained to be kept and performed by the parties hereto, and for the mutual benefit of the CITY, its constituents and the Authority, it is agreed as follows:

1. The purpose of this Agreement is to set forth the terms and conditions for the delivery of municipal solid waste to designated facilities and for the operation of a recycling program between the Authority and the CITY in this combined agreement which upon execution by both parties shall automatically rescind the "Interlocal Agreement for Municipal

Recycling and Grant Management" set to expire on September 30, 2008 and the "Interlocal Agreement for Delivery of Municipal Solid Waste to a Designated Facility" expiring on September 30, 2010 previously entered into by the parties and shall become effective upon filing with the Clerk of the Courts in accordance with Chapter 163, *Florida Statutes*.

2. The CITY agrees that all solid waste and residential recyclables collected by or on behalf of the CITY shall be disposed of at an Authority operated facility or Authority permitted facility ("designated facilities"), in accordance with this Agreement.

3. The CITY agrees to cooperate with the Authority to provide all necessary and required information to the Authority in a timely manner so that it can be determined if the CITY's solid waste and residential recyclables are being delivered to a designated facility.

4. The Authority agrees to maintain its disposal facilities to ensure adequate capacity for the CITY's waste and residential recyclables to operate within all applicable local, state and federal environmental guidelines.

5. Compliance with Zoning Ordinances

Any transfer and/or disposal of solid waste and recyclable materials shall be undertaken in a location suitable and adequate for such activity and shall comply with all local zoning ordinances and any other applicable local and state statutes, ordinances and regulations.

6. Waste Disposal Requirements

All solid waste and residential recyclables collected by or on behalf of the CITY shall be disposed of at an Authority operated or permitted facility in accordance with the criteria established for acceptance of loads deemed suitable for processing at the designated facilities.

7. Collection of Source-Separated Recyclable Material

A. Residential

Individual residents/homeowners shall be encouraged by the CITY to separate their solid waste into recyclables and non-recyclables. Each residential unit or combination of units will receive the appropriate type and number of reusable containers, in accordance with the countywide recycling program, into which Recyclable Materials will be deposited.

Commingled Recyclable Materials shall mean: aluminum cans, foil and pans; aseptic containers; gable-topped containers; glass bottles and jars (green, brown and clear); and plastic containers # 1 - #7 (except Styrofoam). Commingled

recyclables will be deposited into one of the appropriately designated reusable containers.

Fiber Recyclable Materials shall mean: newspapers (including inserts); magazines and catalogs; phone books; corrugated cardboard; and kraft bags. Fiber Recyclable Materials shall be placed loose in the other appropriately designated reusable container.

Corrugated cardboard shall be cut to an acceptable size and flattened, and for curbside residents, shall be set beside or in the same reusable container as the Fiber Recyclable Material. Residents receiving containerized service may receive a separate container to be used for the collection of Corrugated cardboard.

The Authority retains the right to modify the manner in which materials are set out for collection with proper notice to the CITY. Notice for a substantial change in collection method shall be no less than one year.

B. Commercial

Individual businesses shall be encouraged by the CITY to separate their solid waste into two categories: recyclable and non-recyclable. Businesses contracting for services will arrange with their service provider to receive one or more containers into which recyclable material may be deposited. Acceptable materials for commercial recycling shall include: Commingled Recyclable Materials, Corrugated Cardboard, Sorted White Ledger, Mixed Paper and Sorted Office Paper and any other materials agreed to in writing by the CITY and the Authority.

Commercial recyclable materials shall be sorted by the business by type and placed in separate containers. Corrugated Cardboard, Sorted White Ledger, Mixed Paper and Sorted Office Paper as more specifically defined as follows shall be prepared for collection in accordance with the collection standards below:

(1) Sorted White Ledger - white ledger or computer printout paper. Dry and free of contaminants.

(2) Sorted Office Paper - office paper including letterhead, computer paper, legal paper, loose-leaf paper, copy and typing paper.

(3) Corrugated Cardboard – containers having liners of either test liner, jute, or kraft.

(4) Mixed Paper – a mixture of various types and grades of paper including but not limited to: all office paper, colored paper, corrugated cardboard, envelopes (excluding envelopes with cellophane windows), junk mail, kraft bags, magazines, and catalogs. Mixed Paper does not include tissue or towel type paper.

8. Commercial Recycling Revenue Share

As a further incentive for the CITY to actively pursue commercial recycling, the Authority and the CITY may enter into a separate agreement to provide for payment to the CITY for all acceptable loads of agreed upon commercial Recyclable Materials. Types of commercial Recyclable Materials eligible for payment shall be determined by the Authority.

9. Transportation and Equipment

The CITY shall be responsible for having collected Recyclable Materials transported to a designated facility, including, but not limited to, the Authority's Residential Materials Recycling Facility (RMRF), the Authority's Commercial Materials Recycling Facility (CMRF), one of five transfer stations, a Private Commercial Materials Recycling Facility (PCMRF) or any other sites designated by the Authority for recycling. The Authority or its contractor shall receive, process, dispose of and/or recover all Recyclable Materials delivered by or on behalf of the CITY, at no charge to the CITY, except for unacceptable loads as described below. Collection equipment must be of a type to provide for rear, side or front unloading and may be compartmentalized or in separate vehicles.

10. Improperly Prepared Recyclable Materials

When a collector's crew encounters improperly prepared materials or non-recyclable items, they must follow this procedure:

A. The collector shall pickup all Recyclable Materials except for those contaminated by non-recyclable material or those which cannot be safely retrieved from the reusable containers. Improperly sorted materials or contaminated materials will be left in the reusable containers or temporarily removed and returned to the reusable containers. The collector shall leave an Authority and/or CITY approved form on the material or in the container. The form will notify the resident or business that material has not been properly sorted, and will provide information on how to contact the CITY or Authority recycling coordinator for further information. Upon request of the CITY, the Authority will provide rejection procedure training for the route drivers. The Authority and the CITY will consult and evaluate the extent of the need for such training, which shall be provided by the Authority.

As a means of strengthening the CITY's ability to have its collector fulfill the CITY's recycling needs, the CITY agrees to notify and consult with the Authority when preparing the CITY's future request for collection franchise bids.

B. It shall be the responsibility of the CITY or its collector to contact residents or businesses that repeatedly place improperly sorted materials in their designated container and inform and encourage them to properly sort materials. If the

problem persists, the CITY shall notify the Authority, who shall then assist the CITY in resolving the problem.

11. Recycling Containers

The Authority shall provide yellow and blue eighteen (18) and ninety-six (96) gallon recycling containers. The yellow and blue colors reflect a consistent educational advertising effort through TV commercials, newsprint, radio, mailer, or other source. It is the CITY's responsibility to make sure it or its collection contractor has equipment compatible to provide proper collection of these recycling containers without damage. The CITY or its collection contractor shall be responsible for replacement of any recycling container(s) damaged during service at no additional cost to the Authority.

12. Compliance with Zoning Ordinances

Any transfer and/or storage of the Recyclable Materials shall be undertaken in a location suitable and adequate for such activity and shall comply with all local zoning ordinances and any other applicable local and state statutes, ordinances and regulations.

The CITY further agrees to use its best efforts to amend or modify its appropriate zoning, building, or land development code to require new multi-family or commercial developments to provide adequate space for recycling containers.

13. Unacceptable Materials

Criteria have been established for acceptance of loads deemed suitable for processing at designated facilities. If the load contains in excess of 12% non-recyclable materials by volume, the receiving facility will reject the load. The CITY or its contractor will be charged the actual disposal cost and a $250.00 processing fee for any rejected load due to contamination or equipment mechanical failure. The Authority will notify the CITY immediately of a contaminated load. If the problem of unacceptable loads persists, (more than two times in a month) the Authority may elect to monitor the route for proper sorting and tagging procedures, and/or make recommendations to the CITY.

14. Promotion and Education Responsibilities

The Authority will provide recycling bins/containers and assist in promoting and educating residents within the CITY in an effort to work together and increase recyclable tonnages.

15. Delivery of Collected Material

The CITY agrees that it shall require that all Recyclable Materials separated from the normal waste stream that are collected by or on behalf of the CITY shall be delivered to designated facilities. The Authority may, from time to time, undesignate a facility. The CITY will take such action as is necessary and available to ensure against and prevent

scavenging and unauthorized removal of such recyclables within the jurisdiction of the CITY.

16. Term

This Agreement shall begin on the date herein above and continue through September 30, 2013, and may be renewed for a period of five (5) years upon mutual agreement. Notwithstanding termination, any rights or duties imposed by law shall remain in effect.

This Agreement may be modified only by the written consent of both parties; or terminated by either party upon one hundred twenty days (120) days written notice to the other. The effective date of termination will be the last day of the fiscal year in which the notice was given.

17 Change in Law

In the event any change in law abrogates or modifies any provisions or applications of this Agreement, the parties hereto agree to enter into good faith negotiations and use their best efforts to reach a mutually acceptable modification of this Agreement.

18. Notices.

All formal notices affecting the provisions of this Agreement shall be delivered in person or be sent by registered or certified mail to the individual designated below, until such time as either party furnishes the other party written instructions to contact another individual.

For the Authority:	For the CITY:
Solid Waste Authority of Palm Beach County 7501 North Jog Road West Palm Beach, Florida 33412 Attention: Executive Director	

19. If any clause, section, or provision of this Agreement shall be declared to be unconstitutional, invalid or unenforceable for any cause or reason, or is abrogated or negated by a change in law, the same shall be eliminated from this Agreement, and the remaining portion of this Agreement shall be in full force and effect and be valid as if such invalid portions thereof had not been incorporated herein.

IN WITNESS WHEREOF, the parties hereto have entered into this Agreement effective as of the day and year first above written:

As to the Authority:

WITNESSES:

SOLID WASTE AUTHORITY OF
PALM BEACH COUNTY

_____

_____
Mark Hammond, Executive Director

ATTEST:

SOLID WASTE AUTHORITY OF
PALM BEACH COUNTY

_____

_____
Sandra J. Vassalotti, Clerk to the Authority

As to the CITY:

ATTEST:

_____

_____

(Affix Municipal Seal)

APPROVED AS TO FORM
AND LEGAL SUFFICIENCY

_____
Legal Counsel
Solid Waste Authority of Palm Beach County

Date: _____

APPROVED AS TO FORM
AND LEGAL SUFFICIENCY

_____

Date: _____

APPENDIX C
FDEP CALENDAR YEAR 2006 WASTE STREAM CHARACTERISTICS AND QUANTITIES

Table 1

MUNICIPAL SOLID WASTE
COLLECTION AND RECYCLING
(January 1, 2006 - December 31, 2006)

OPEN DATA FILE before pushing button, do not alter any formats, do not enter information in shaded areas.

COUNTY: Palm Beach | 2006 POPULATION(a): 1,287,987

(1) Materials Type	(2) Collected Tons	(3) Percent Total Tons(b)	(4) Pounds per Capita per Day(c)	(5) DEP Certified #s	(6) Non-Certified Recycling #s	(7) Recycled Tons Total (d)	(8) Percent Recycled(e)
(Minimum 4 of 8)							
a. Newspaper (f)	111,620	6	0.47	63,139	0	63,139	57
b. Glass (f)	54,795	3	0.23	4,452	0	4,452	8
c. Aluminum cans (f)	12,177	1	0.05	2,976	0	2,976	24
d. Plastic bottles (f)	28,412	1	0.12	3,094	0	3,094	11
e. Steel cans (f)	16,236	1	0.07	15,580	0	15,580	96
f. Corrugated paper (f)	198,886	10	0.85	57,400	0	57,400	29
g. Office paper (f)	36,530	2	0.16	1,449	0	1,449	4
h. Yard trash (f,g)	215,122	11	0.92		43,190	43,190	20
a. Other plastics	107,561	5	0.46	2,622	0	2,622	2
b. Ferrous metals(h)	144,091	7	0.61	114,372	0	114,372	79
c. White goods(h)	24,354	1	0.10		21,785	21,785	89
d. Non-ferrous metals	40,589	2	0.17	32,080	0	32,080	79
e. Other paper	131,915	7	0.56	26,920	0	26,920	20
f. Textiles	40,589	2	0.17	0	0	0	0
a. C&D debris (k)	714,368	35	3.04	23,382	0	23,382	3
b. Food	125,826	6	0.54		0	0	0
c. Miscellaneous	4,059	0	0.02		0	0	0
d. Tires	22,324	1	0.09		0	0	0
e. Process fuel(g,i)	NA	NA	NA		141,644	141,644	100
4. County Totals	2,029,454	100.00	8.63	347,466	206,619	554,085	27

Must Equal Figure Reported in 5.e.: 2,029,454 ***No rates>100%***

5. MSW Management (tons)

a. Recycled (Line 4, Column 7)	554,085
b. Landfilled (Including Landfilled Combustor Ash)	1,016,794
c. Gross Combusted (WTE Input)	867,845
i) Landfilled Combustor Ash (j)	334,722
ii) Combustor Material Recycled (k)	74,548
iii) Net Combusted (Output) = 5c - 5c(i) - 5c(ii)	458,575
d. Gross MSW = 5a+5b+5c	2,438,724
e. Net MSW = 5a+5b+5c(iii)	2,029,454

(Must Equal Line 4, Column 2 of the Table and Line 4, Column 2 of TABLE 3.)

6. Adjusted Recycling Rate Calculations

a. Total tons of special wastes recycled.	184,834
(Process Fuel & Yard Waste only)	
b. Special waste recycling percent	9.1
(Divide line 6a by line 4, column 2 and multiply times 100.)	
c. Line 4, column 8 minus line 6b.	18
Adjusted Recycling Rate (6d or 6e the value not equal to 0)	
d. If line 6b is equal to or greater than 15%, enter here line 6c plus 15%.	0%
e. If line 6b is less than 15%, enter here line 4, column 8.	27%

	Landfilled		Combusted		Recycled (Unadj.)	
	Tons	%	Tons	%	Tons	%
Gross MSW Management	1,016,794	42%	867,845	36%	554,085	23%
Net MSW Management	1,016,794	50%	458,575	23%	554,085	27%

(a) Official April 1, 2006 Governor's Office population estimates.
(b) Percent Total Tons = column 2 (material type tons) divided by line 4, column 2 (total county tons collected) times 100.
(c) Pounds/Capita/Day = column 2 (material type tons) times 2,000 pound/ton divided by the 2006 county population divided by 365 days.
(d) Column 5 (Recovered Material Certified Numbers) + column 6 (Non-Certified Numbers) = column 7 (Total Recycled Tons)
(e) Percent Recycled = column 7 (Total recycled tons) divided by column 2 (material type tons) times 100. No recycling rates can be greater than 100%.
(f) The Legislature established a goal of 50 percent for at least four out of these eight materials for recycling.
(g) The total of Process Fuel and Yard Trash can count towards no more than one half of the 30 percent recycling goal for each county.
(h) To establish ferrous tonnage, subtract known white goods tonnage from Certified ferrous tonnage (White Goods + Ferrous Metals = Certified Ferrous.) If white goods tonnage is not known, use 16% of the Certified Ferrous tonnage for this figure.
(i) Process fuel (yard, wood and paper waste used in process boilers) should not be included in line 4, column 2 (total county tons collected), as they are accounted for in other material categories. They should be counted in line 4. column 7 (total county tons recycled).
(j) Tonnage of incinerator byproducts (i.e. ash and filtered material) disposed in landfill.
(k) Tonnage of materials recovered at the incinerator that is recycled (i.e ash and ferrous metals.)
(l) Tonnage most likely does not include Land Clearing Debris (LCD).

TABLE 2

WASTE REDUCTION

GOALS WORKSHEET

(January 1, 2006 - December 31, 2006)

OPEN DATA FILE before pushing button, do not alter any formats, do not enter information into shaded areas.

COUNTY	Palm Beach

1. BASE YEAR #1: July 1, 1988 - June 30, 1989

a. Total MSW disposed (landfilled plus combusted)	1,168,389 Tons
b. Population (Official April 1, 1988 figure)	831,146 People
c. MSW/Capita: 1a/1b =	1.41 Tons/Capita

2. BASE YEAR #2: July 1, 1989 - June 30, 1990

a. Total MSW disposed (landfilled plus combusted)	1,107,585 Tons
b. Population (Official April 1, 1989 figure)	865,507 People
c. MSW/Capita: 2a/2b =	1.28 Tons/Capita

3. BASE YEAR #3: July 1, 1990 - June 30, 1991

a. Total MSW disposed (landfilled plus combusted)	945,856 Tons
b. Population (Official April 1, 1990 figure)	893,305 People
c. MSW/Capita: 3a/3b =	1.06 Tons/Capita

4. BASE YEAR #4: July 1, 1991 - June 30, 1992

a. Total MSW disposed (landfilled plus combusted)	975,964 Tons
b. Population (Official April 1, 1991 figure)	883,044 People
c. MSW/Capita: 4a/4b =	1.11 Tons/Capita

5. BASE YEAR #5: July 1, 1992 - June 30, 1993

a. Total MSW disposed (landfilled plus combusted)	976,026 Tons
b. Population (Official April 1, 1992 figure)	896,970 People
c. MSW/Capita: 5a/5b =	1.09 Tons/Capita

6. BASE YEAR #6: July 1, 1993 - June 30, 1994

a. Total MSW disposed (landfilled plus combusted)	990,116 Tons
b. Population (Official April 1, 1993 figure)	918,223 People
c. MSW/Capita: 6a/6b =	1.08 Tons/Capita

7. CURRENT YEAR: January 1, 2006 - December 31, 2006

a. Total MSW disposed (Table 1, line 5b plus 5c(iii))	1,475,369 Tons
b. Population (Official April 1, 2006 figure)	1,287,987 People
c. MSW/Capita: 7a/7b =	1.15 Tons/Capita

8. WASTE REDUCTION PROGRESS ***(a)***

a. Base Year #1 to Current Year:	[(1c - 7c) / 1c] x 100 =	19%
b. Base Year #2 to Current Year:	[(2c - 7c) / 2c] x 100 =	11%
c. Base Year #3 to Current Year:	[(3c - 7c) / 3c] x 100 =	-8%
d. Base Year #4 to Current Year:	[(4c - 7c) / 4c] x 100 =	-3%
e. Base Year #5 to Current Year:	[(5c - 7c) / 5c] x 100 =	-5%
f. Base Year #6 to Current Year:	[(6c - 7c) / 6c] x 100 =	-6%

(a) A negative number indicates that there has been an increase in the MSW disposal rate per capita.

TABLE 3

CURRENT MUNICIPAL SOLID WASTE
COLLECTION AND RECYCLING BY GENERATOR TYPE
(January 1, 2006 - December 31, 2006

OPEN DATA FILE before pushing button, do not alter any formats, do not enter information in shaded areas.

SECTION A

COUNTY: Palm Beach

2006 POPULATION(a): 1,287,987

	(1)	(2)	(3)	(4)	(5)	(6)
Generator Type	Collected and Recycled Jan. 1, 2006 - Dec. 31, 2006					
	Collected Tons(b)	Percent Total Tons(c)	Pounds per Capita per Day(d)	Recycled Tons	Percent Recycled(e)	
1. Residential Single Family	642,043	32	2.73	175,292	27	
2. Residential Multi-Family	345,484	17	1.47	94,325	27	
3. Commercial	1,041,927	51	4.43	284,468	27	
4. County Totals	2,029,454	100	8.63	554,085	27	
Must Equal Figure Reported in Table1:	2,029,454		8.63	554,085	27	

NOTE: Line 4, Columns 2,4,5,6 (Generator Type County Totals) Must Equal TABLE 1, Line 4, Columns 2,4,7,8 (County Totals).

County Average Solid Waste Disposal Fees (dollars per ton) (f)

Class I	WTE Facility	Yard Trash	White Goods	C&D	Passenger Tires	Asbestos	Out of County	Petroleum Contaminated Soils
$28.00	$28.00	$25.00	$10.00	$40.00	$175.00	$150.00	$66.00	$150.00

(a) Official April 1, 2006 Governor's Office population estimates.

(b) Collected Tons = Tons Recycled + Tons Landfilled + Tons Combusted (Net).

(c) Percent Total Tons = column 2 (generator type tons) divided by column 2, line 4 (total county tons collected) times 100.

(d) Pounds/Capita/Day = column 2 (generator type tons) times 2,000 pound/ton divided by the appropriate county population divided by 365 days.

(e) Percent Recycled = column 5 (recycled tons) divided by column 2 (generator type tons) times 100.

(f) If any numbers are expressed in units other than dollars per ton, indicate those units beneath the number. If using a range, specify an average value.

TABLE 4

PARTICIPATION IN RECYCLING

(Average for the Calendar Year, 2006 (a)

OPEN DATA FILE before pushing button, do not alter any formats, do not enter information in shaded areas.

COUNTY: Palm Beach

2006 POPULATION(b): 1,287,987

Generator Type	Total Units in County	Residents per Unit (c)
Residential Single Family	399,306	4
Residential Multi-Family	228,860	2
Commercial	56,900	NA

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Recycling Services	County Units with Service Available	Percent of Total Units in County with Service Available(d)	County Units Participating in Available Service	Percent of County Units Participating in Available Service(e)	Percent of Total Units in County Participating(f)	Population Participating in Available Service(g)	Percent of County Population Participating in Available Service(h)
Residential Single Family							
a. Curbside collection	399,306	100	319,445	80	80	1,277,780	99
b. Drop off stations	399,306	100	99,827	25	25	399,308	31
c. Mobile drop off	0	0	0	0	0	0	0
d. Buy back centers	0	0	0	0	0	0	0
Residential Multi-Family							
a. Curbside collection	228,860	100	160,202	70	70	320,404	25
b. Drop off stations	228,860	100	34,329	15	15	68,658	5
c. Mobile drop off	0	0	0	0	0	0	0
d. Buy back centers	0	0	0	0	0	0	0
Commercial							
a. Scheduled collection	56,900	100	14,225	25	25	NA	NA
b. On call collection	56,900	100	0	0	0	NA	NA

(a) In the application narrative, include a summary of calculations/methodology used to determine average figures

(b) Official April 1, 2006 Governor's Office population estimate.

(c) The Residents per Unit figures for Residential Single Family and Residential Multi Family can be acquired from the county planning department as reported in the County's comprehensive plan.

(d) Percent of Total Units in County with Service Available = column 2 (County Units with Service Available) divided by Total Units in County times 100.

(e) Percent of County Units Participating in Available Service = column 4 (County Units Participating in Available Service) divided by column 2 (County Units with Available Service) times 100.

(f) Percent of Total Units in County Participating = column 4 (County Units Participating in Available Service) divided by Total Units in County times 100.

(g) Population Participating in Available Service = column 4 (County Units Participating in Available Service) times Residents per Unit.

(h) Percent of County Population Participating in Available Service = column 7 (Population Participating in Available Service) divided by the2000 official population times 100.

APPENDIX D
COMMERCIAL MATERIAL PURCHASE AGREEMENT

SOLID WASTE AUTHORITY OF PALM BEACH COUNTY
7501 NORTH JOG ROAD
WEST PALM BEACH, FL 33412
PHONE: (561) 640-4000 FAX: (561) 640-3400

COMMERCIAL MATERIAL PURCHASE AGREEMENT APPLICATION

Seller's Business Name: _____

Address: _____

City: _____ State: ____ Zip:_____

Telephone Number: _____ Fax Number: _____

Type of Business: Individual: ( ) Corporation: ( )Partnership: ( ) Other ( )

AGREEMENT: **It is expressly understood that by signing this document, Seller agrees to the terms and conditions set forth on the face and reverse side of this document.**

- All vehicles used for delivery must have a Solid Waste Authority decal issued upon first weigh-in.
- All vehicles must notify the Weighmasters upon weigh-in that they are a Commercial Materials vendor and provide the Solid Waste Authority account number.
- Upon tipping material, the Seller must receive signed acceptance of material by Solid Waste Authority staff. Failure to receive acceptance will result in non-payment for materials delivered, and possibly a charge for the materials.
- After tipping and receiving approval, vehicles must weigh out. Failure to do so will result in non-payment for materials.
- Should materials delivered be deemed contaminated and not acceptable, and the Seller chooses to leave material with the Solid Waste Authority, a fee will be assessed for disposal of the material. The Seller must pay cash or have an existing Solid Waste Authority charge account to pay for the disposed material.

SELLER:

Authorized Signature:_____ (Corporate Seal)

Print Name: _____

Title: _____

Date: _____

AUTHORITY:

Authorized Signature: _____ Title_____ Date: _____

COMMERCIAL MATERIAL
PURCHASE AGREEMENT

THIS AGREEMENT made and entered into on the date so stated on the front side of this document by and between the **SOLID WASTE AUTHORITY OF PALM BEACH COUNTY,** (Authority) a dependent special district created pursuant to Chapter 75-473, Laws of Florida, as amended, with offices located at 7501 North Jog Road, West Palm Beach, Florida 33412 and the Seller so stated on the front of this document.

WHEREAS, Seller desires to sell to Authority certain quantities of commercially generated recyclable material (as hereinafter defined) on the terms and conditions set forth herein, and

WHEREAS, Authority desires to purchase from Seller certain quantities of commercially generated recyclable material (as hereinafter defined) on the terms and conditions set forth herein; and

NOW THEREFORE, in consideration of the mutual promises and agreements contained herein, the parties hereto, intending to be legally bound, hereby agree as follows:

1. DEFINITIONS

a) **CONTAMINATION** shall mean garbage, Hazardous Waste as herein defined, food contamination, or any other material other than Old Corrugated Containers or Sorted White Ledger, as herein defined.

b) **FACILITIES** shall initially mean the Commercial Materials Recycling Facility, owned and designated by the Authority to receive commercial recyclables located at 6554 North Jog Road, West Palm Beach, Florida, 33412. The Authority may at any time, designate other Authority owned facilities upon written notice to the Seller.

c) **GARBAGE** shall mean all putrescible waste which generally includes but is not limited to kitchen and table food waste, animal, vegetative, food or any organic waste that is attendant with or results from the storage, preparation, cooking or handling of food materials whether attributed to residential or commercial activities.

d) **HAZARDOUS WASTE** shall mean solid waste as defined by the State of Florida Department of Environmental Regulation as a hazardous waste in the State of Florida Administrative Code, or by any future legislative action or by federal, state or local law.

e) **OLD CORRUGATED CONTAINERS (OCC)** shall mean loads of commercially generated corrugated containers having liners of either test liner, jute or kraft. Loads shall consist of at least ninety-five percent (95%) OCC and no more than five percent (5%) by volume of Sorted White Ledger as herein defined, other paper typically generated by an office, or Contamination. However, no more than two-fifths (2/5) of the five percent (5%) by volume may be Contamination.

f) **PROCESSING COSTS** shall mean all Authority costs associated with the preparation of commercially generated recyclable material for market. Costs shall include capital costs, operating costs, administrative costs and residue disposal costs. Processing Costs shall be $23.60 per ton and may be adjusted at any time for any significant cost component changes or any budgetary changes.

g) **SORTED WHITE LEDGER (SWL)** shall mean loads of commercially generated paper typically produced by offices, containing primarily white groundwood free ledger, bond, writing, and all other papers which have a similar fiber and filler content. Loads shall consist of at least ninety-five percent (95%) SWL and no more than five percent (5%) by volume of OCC, other paper typically generated by an office, or Contamination. However, no more than two-fifths (2/5) of the five percent (5%) by volume may be Contamination.

2. TERM

The initial term of this Agreement shall be for one (1) year from the effective date of the Agreement. At the conclusion of the initial term, this Agreement will be automatically renewed for one (1) additional year unless either party notifies the other of termination. Seller must notify the Authority of intent to terminate at least ninety (90) days prior to expiration of the initial term.

3. SALE OF MATERIAL

Seller agrees to sell to Authority and Authority agrees to purchase from Seller, subject to the terms and conditions set forth herein, all Old Corrugated Containers (OCC) and all Sorted White Ledger (SWL) generated by Seller during the term of this Agreement.

4. PURCHASE PRICE

The price paid per ton by Authority to Seller shall be calculated separately for each commodity as follows: total monthly revenue received by the Authority for the commodity less Processing Costs then divided by the total monthly tons received then further multiplied by eighty percent (80%) [((Rev-cost)/tons)x.80].

5. CONTAMINATION

Each load of material shall be inspected at time of delivery by authorized personnel of Authority to determine type of material and percentage of Contamination, if any. If a load contains less than ninety –five percent (95%) of material other than OCC or SWL, the Seller shall have the option to a) if the contamination is other commercial fiber, Seller may leave the load with the Authority and receive no payment for the load; b) if the contamination is other than commercial fiber, Seller may leave the load with the Authority, receive no payment for the load and be charged the current appropriate disposal fee; or c) remove the load from the Facilities and dispose of the load through other means.

If more than four (4) loads delivered to Authority by Seller in any thirty (30) day period are considered by Authority to be contaminated, Seller will be notified by mail and given thirty (30) days to clean up the material at the source. Failure to clean up loads will result in termination of agreement.

If Seller delivers to Authority any load containing Hazardous Waste, Seller will immediately be notified and given the option to clean up the material. If Seller delivers to Authority more than two times during any twelve (12) month period, any load containing Hazardous Waste, Authority may terminate this Agreement.

6. TERMS OF PAYMENT

Authority agrees to pay for Seller's preceding month's OCC or SWL within forty-five (45) days. If Seller delivers less than two (2) tons total of OCC and SWL combined, Authority reserves the right to withhold payment to Buyer until such time as the total tons delivered by Buyer exceeds two (2) tons. All deliveries shall be weighed at time of delivery to Authority's Facilities in accordance with industry standards. All weights as stated on Authority's weigh tickets issued at time of delivery shall be final.

7. FAILURE TO DELIVER

If Seller fails to deliver any OCC or SWL to Authority's Facilities for three (3) consecutive months, Authority shall notify Seller by mail of intent to immediately terminate Agreement. Seller may reactivate Agreement upon payment to Authority of a one hundred-fifty dollar ($150.00) reactivation fee.

8. INDEMNIFICATION

Having considered the risks and potential liabilities that may exist during the performance of the services and in consideration of the promises included herein, the Authority and the Seller agree to allocate such liabilities as follows:

Seller agrees to protect, defend, indemnify, and hold harmless the Authority, its employees and representatives, from any and all claims and liabilities including all attorney's fees and court costs, including appeals, for which the Authority, its employees and representatives, can or may be held liable as a result of injury (including death) to persons or damage to property occurring by reason of any acts or omissions of the Seller, its employees, or agents, arising out of or connected with this Agreement. The Seller shall not be required to indemnify the Authority or its agents, employees, or representatives, when an occurrence results solely form the wrongful acts or omissions of the Authority, or its agents, employees or representatives.

Upon completion of all obligations and duties provided for in this Agreement, or in the event of termination of this Agreement for any reason, the terms and conditions of this Article shall survive.

SUBSTITUTE W-9

1. What is the name under which you file your Federal Income Taxes with the Internal Revenue Service?

PLEASE PRINT OR TYPE

NAME_____
ADDRESS_____
CITY_____ST_____ZIP_____
TELEPHONE NUMBER_____

2. What is your business type - Check One

_____Corporation _____Partnership
_____Government _____Proprietorship
_____Charitable Organization _____Private Individual

3. What is the Taxpayer Identification number used to report your income to the IRS?

Federal Employer I.D. Number _____-_____
Social Security Number_____-_____-_____

(**NOTE**: Individuals, sole proprietorships and partnerships should list the applicable Social Security Number. Others should list the applicable Federal Employer I.D. Number.)

4. Please indicate the transaction types for which payments are made to you:

_____Service Only
_____Service & Material
_____Rents
_____Material Only
_____Other

(describe)_____

5. CERTIFICATION: UNDER PENALTIES OF PERJURY, I CERTIFY THAT THE NUMBER SHOWN ON THIS FORM IS MY CORRECT TAXPAYER I.D. NUMBER AND THAT THE ABOVE REFERENCED ENTITY OR PERSON IS NOT SUBJECT TO BACKUP WITHHOLDING.

Signature_____Date_____

Title_____

RETURN TO: SOLID WASTE AUTHORITY OF PALM BEACH COUNTY
7501 NORTH JOG ROAD
WEST PALM BEACH, FL 33412
ATTN: MICHELLE NAPIER
Phone: (561) 640-4000 Ext. 4530 - Fax: (561)-683-4067

APPENDIX E
EDUCATIONAL RECYCLING LITERATURE



I'm Groovin' News and I'm here to give you the scoop on recycling.

DID YOU KNOW?

Each year the United States produces 150 million tons of solid waste. One-third of that (50 million tons) is paper.

Many green growing plants remove carbon dioxide and other pollutants from the air to create fresh air that we breathe.

In 1989, more than 2 billion seedlings were planted in the United States. In 1991, 6 new trees were planted for every U.S. Citizen.

WORD UNSCRAMBLE

IESTFERROTAON
Replanting plants and trees on over-cut land _____

NFISAROERT
A hot, steamy jungle which is home to half of the Earth's plant and animal species

LILDALFN
Where your solid waste goes if it is not reycled _____

COGOYEL
Scientific study of plants and animals in the places where they live _____

PRESWANEP
Item that is easily recycled _____

NVIMREONNTE
The air, water and land around us _____

RISEOON
The wearing away of the Earth's surface by wind or water. It can be accelerated by the removal of trees and plant life _____

Things You Can Do

- If your school has a school paper, suggest that it be printed on recycled paper.
- Write a story for your paper on the environment.
- Write on both side of your paper.
- Wrap gifts in the colorful newspaper comics.
- Precycle - buy gifts without excessive packaging.
- Have a newspaper drive. See whose class can recycle the most paper.

WORD FIND

Find the environmental words listed. They run backwards, forwards and diagonally, so look closely!

ECOLOGY	NEWSPAPER
EARTH	RESOURCE
ENVIRONMENT	GROOVIN NEWS
OZONE	CARBON DIOXIDE
RECYCLING	PRECYCLE
ENERGY	TRASH
LANDFILL	SOLID WASTE

A N P E D I X O I D N O B R A C
M R L C N H X D W X H D V A E O
Q P B M W O T H C K J S L E N E
Y G O L O C E R G T H R A U E T
E G U V J E Y F A N I E I R B S
C W R T O K E A R E A P Y C T A
R S X E E P F S Z M K A J E W W
U Y Q I N R Q G T N L P S L T D
O X R D H E N O Z O Z S M C D I
S G N I L C Y C E R V W E Y P L
E K Y G Z A A U Z I S E R C Q O
R B B J C G R O O V I N N E W S
C C A E L L I F D N A L F R O X
I Z D H F L B M Y E G T V P U N

SWA
SOLID WASTE AUTHORITY



hi

boys and girls, I'm Radical Glass. I'm a ketchup bottle now, but I was a soda bottle before. I've been recycled many times and I'm glad! Thanks to people who recycle, I'm not just sitting in a landfill taking up valuable space. Instead, I'm saving resources and energy. This activity sheet will help you understand how you can help our environment! Let's start...

RADICAL GLASS

Recycle the letters in my name to make new words. Whoever recycles the most wins!

Example: *CALL*

Circle the glass items that can be recycled.

GLASS JARS

DRINKING GLASSES

DISHES

WINDOW GLASS

LIGHT BULBS

CERAMIC PLATES

SODA BOTTLES

MAYONNAISE JAR



Things You Can Do

Fill a glass jar from home with water. Then place a sweet potato with toothpicks (4-5) around the middle into the water. Roots will grow into the water and leaves will sprout from the top. In a few weeks, you can plant the potatoes in soil and grow more potatoes.



Did YOU Know?

Americans drink more than 10 million bottles and cans of soft drinks every 20 minutes. These can all be recycled.

By recycling one glass container, enough energy is saved to run a 100 watt lightbulb for 4 hours.

Turn this sheet over and create your own glass recycling character.
Don't forget to name it!

WORD FIND

Find the environmental word listed. They run backwards,forwards and diagonally, so look closely!

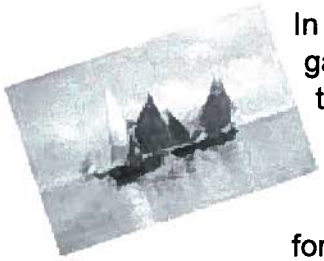
ALUMINUM
EARTH
ENERGY
ENVIRONMENT
IGLOO
GLASS
LANDFILL
LITTER
MILKJUG
NEWSPAPER
RECYCLE
RESOURCES
SCHOOL
SODA CAN
SUNNY SAM
TRASH CAN

E	N	E	W	S	P	A	P	E	R	L
N	A	V	Y	U	B	C	G	G	A	I
V	A	L	A	N	D	F	I	L	L	T
I	T	R	B	N	T	D	V	A	U	T
R	R	E	C	Y	C	L	E	S	M	E
O	R	S	L	S	C	J	I	S	I	R
N	S	O	D	A	C	A	N	W	N	F
M	K	U	D	M	I	L	K	J	U	G
E	A	R	T	H	M	E	O	D	M	E
N	S	C	H	O	O	L	G	I	I	N
T	P	E	N	E	R	G	Y	F	Y	E
S	O	S	T	R	A	S	H	C	A	N

Name:_____ Date:_____

"History of Garbage"

People who lived during Prehistoric times usually lived together in small groups and would travel across the land very often. Their garbage was thrown directly on the land. Since they did not stay in one place for a long time, the garbage was not a problem.



In early civilizations, there was no garbage collection. The people left garbage on the floor of their home. Sometimes it was even thrown in the roadway or in rivers. The Egyptians threw their garbage in the Nile River! Can you imagine what the river looked like?



About 500 B.C., the Greek people built the first dump-style area for garbage. The Greeks established a law that required garbage to be thrown away at least one mile away from the city walls. They also established a law that made it illegal to throw garbage on the streets.

During the Middle Ages, civilizations became more populated. Most people threw garbage into the streets. Pigs walked freely down the street eating the garbage. There weren't any garbage trucks that came and picked up the garbage. It was not very healthy to leave rotting food and other garbage in the streets. Insects, rats and other animals would go into the streets to eat the food. In fact, the rats spread a disease known as the Bubonic plague that killed thousands and thousands of people.



In the late 1700's, Benjamin Franklin started the first garbage collection service and street-cleaning service. Also during this time people began digging holes and burying their garbage in their own backyard rather than throw it into the street. As a result, there was less garbage on the streets and health conditions improved.



In England during the 1800's garbage was burned. During the early 1900's in the United States, garbage was placed in a dump or placed in the ocean, rivers or it was burned.

During the middle of the 1900's, garbage was placed in sanitary landfills which are more environmentally-friendly.

In Palm Beach County, your garbage is burned and used to make electricity. Then the ashes that remain from the burning process are placed in the landfill.

- Source: American Forest & Paper Association



Steel Can Recycling Information

Steel cans and other steel items are recycled in Palm Beach County when residents place them in the garbage or the recycling bins. When steel cans are thrown in the garbage, they are removed at the Solid Waste Authority (SWA) of Palm Beach County's Waste-to-Energy facility *(this is the facility where garbage is shredded, burned and used as a fuel source)* by a large magnet. After the steel is separated, it is placed in a machine which cleans and crushes it into nuggets. Afterwards, the nuggets are shipped from the SWA to steel mills where the actual recycling takes place.

When steel cans are placed in a recycling bin, they are separated from the other recyclables by a magnet and then baled. The bales are shipped to mills that melt the steel so that it can be used to make recycled steel products such as steel cans, construction beams, parts of cars and parts of trucks.

Interesting Steel Recycling Facts

- Every ton of steel recycled saves 2,500 pounds of iron ore, 1,000 pounds of coal, and 40 pounds of limestone.*
- In 1994, the automobile recycling industry recycled enough steel from old cars to produce almost 13 million new cars.*
- Americans discard enough iron and steel products to supply all of the automakers in America continually with the necessary amount of steel to build cars.**

Source: *Steel Recycling Institute, **Recycler's Handbook
For more information, access the Steel Recycling Institute at http://www.recycle-steel.org

Aluminum Can Recycling Information

The aluminum can was invented in 1968. Aluminum cans are made from bauxite ore which is a non-renewable resource mined from the ground. This mining process creates pollution and consumes energy. Therefore, recycling aluminum cans reduces pollution, conserves engery and saves landfill space.

Aluminum cans placed in recycling bins are collected and brought to the Solid Waste Authority (SWA) of Palm Beach County's Materials Recycling Facility (MRF) where they are separated from other recyclables and then baled. The aluminum bales are loaded onto semi-trailer trucks and transported from the MRF to aluminum manufacturing plants where they are melted into a liquid form. Afterwards, the aluminum is cooled and then poured into a flat mold which gives it a long, rectangular shape. A flat sheet of aluminum is formed after the aluminum solidifies in the mold. The sheets of aluminum are sold to companies that make them into recycled products, such as aluminum cans. It takes approximately 60 days for an aluminum can to be recycled and appear back on store shelves.

Interesting Aluminum Can Recycling Facts

- Since 1972, approximately 13 million tons of aluminum have been recycled. That's enough aluminum cans to place side by side and stretch from the earth to the moon 190 times.*
- It takes approximately 32 aluminum cans to make 1 pound of aluminum.*
- The first aluminum can was made in 1968.**
- Aluminum was worth more than gold when it was discovered.**
- Americans throw away enough aluminum every 3 months to rebuild the entire commercial air fleet in America.**

Source: *Aluminum Can Manufacturers Institute, ** Recyclers Handbook
For Reynolds Aluminum Corp - http://www.rmc.com

Paper Recycling Information

Newspapers and other paper products collected from residents are brought to the Solid Waste Authority (SWA) of Palm Beach County's Materials Recycling Facility where they are separated according to grade *(quality of paper)*. All the newspaper is placed in a separate pile, all the cardboard is placed in a separate pile, all the magazines are placed in a separate pile and all the mixed paper is placed together in a pile. Once the paper is sorted, it is baled or loaded loosely onto trucks that transport it to paper manufacturing mills. At the mills, the paper is loaded onto conveyor lines which move it to a pulper which is a machine filled with water that has steel blades on the bottom. When the pulper is turned on, it tears the soaked paper apart and the ink is dissolved with chemicals. (*Sometimes chemicals are also added to whiten the fiber.*) At this point, the paper is referred to as "slurry" because it is mainly water mixed with paper fiber. The slurry is sprayed through two fabric belts which squeeze out some of the water. Then the slurry is carried by a conveyor to steel rollers which squeeze more water out of the fiber. Afterwards, a conveyor carries the slurry to numerous heated rollers which dry it. Following this, the slurry is pressed between steel rollers which smoothes it into dry, flat paper. Finally, the paper goes to a machine which cuts it into the specified size and then winds it onto cardboard tubes. The paper is then loaded onto trucks and transported to companies that purchase the recycled paper.

Low-grade paper can be recycled into egg cartons or fiberboard. High-grade paper can be recycled into envelopes, writing paper and office paper. Other grades are recycled into toilet tissue and paper towels. Regardless of the quality of paper, there is a limit to the number of times paper can be recycled because each time it is recycled the fiber gets thinner and thinner.

Interesting Paper Recycling Facts

- It takes 17 trees to make 1 ton of paper.**
- A stack of newspaper 3 1/2 feet high will save one Southern Pine tree.*
- Americans purchase 62 million newspapers everyday and discard 44 million of them.***
- Phone books are made with the lowest possible quality paper; however, they can still be recycled and made into ceiling tiles, textbook covers and insulation.***

Source: *World Wildlife Federation, **American Forest and Paper Association, ***Recyclers Handbook
For more information access the Mead Corporation at http://www.mead.com or the American Forest and Paper Association at http//afandpa.org

Glass Recycling Information

Glass bottles and jars placed in recycling bins are collected from Palm Beach County residents and brought to the Solid Waste Authority (SWA) of Palm Beach County's Materials Recycling Facility where workers sort them according to their color: green, clear or brown. After the glass is sorted, it is placed in trucks which transport it to glass manufacturing companies. These companies mechanically remove the product labels, metal lids and then crush the glass. The crushed glass, also called cullet, is mixed with sand, soda ash and limestone and heated at a temperature of 2,800 degrees Fahrenheit. After the cullet is heated sufficiently, it will liquify into molten glass. The molten glass is poured into glass container molds to form recycled glass bottles, jars and other products.

Recycling glass saves natural gas and electricity because the cullet melts easier than sand; therefore, the furnace does not have to be set at as high a temperature.
(Windows, drinking glasses, dishes, light bulbs, pyrex and mirrors are made from glass that has different ingredients than what is used in glass bottles and jars. Therefore, these items are not accepted for recycling in Palm Beach County.)

Interesting Facts About Glass Recycling

- Approximately 41 billion glass containers are produced in the United States (U.S.) each year.*
- Glass-making has been recorded as early as 5,000 B.C.*
- Every glass container made today has a percentage of recycled glass in its contents.*
- We save the following each time we recycle a ton of glass: 1,330 pounds of sand, 433 pounds of soda ash and 433 pounds of limestone.**

Source: *Glass Packaging Institute, ** Recyclers Handboo

Plastic Recycling Information

Plastic containers that are placed in recycling bins are collected and brought to the Solid Waste Authority (SWA) of Palm Beach County's Materials Recycling Facility. The containers are sorted according to the number on the container (*the number on plastic containers indicates the particular type of plastic that was used to construct the container).* Afterwards, the plastic is baled and loaded onto semi-trailer trucks. The plastic is transported from the MRF to a plastic manufacturing mill where it is cleaned, washed and either cut into flakes by a grinder or pellitized. Then the flakes or pellets are melted and stretched to form plastic fiber.
Recycled plastic can be used to make a variety of products including t-shirts, carpets, recycled plastic containers, hoses, plastic lumber, street signs, pens, recycling bins, fiberfill for sleeping bags, notebooks and many more products.

Interesting Facts About Plastic Recycling

- The first PET (plastic # 1) bottle was recycled in 1977.*
- Five PET bottles will provide enough fiber to make an extra-large t-shirt
- It takes five two-liter PET bottles to make one square foot of carpet.*
- It takes 35 two-liter PET bottles to make enough fiberfill for a ski jacket.*
- It takes 1,050 milk jugs to make a 6 foot plastic park bench.**
- Every hour Americans consume 2 ½ million plastic bottles. **
- SWA's recycling bins are made from post-consumer recycled plastic.

Source: * NAPCOR
**Recyclers' Handbook
For more information, please visit the American Plastics Council website at www.plasticsresource.com

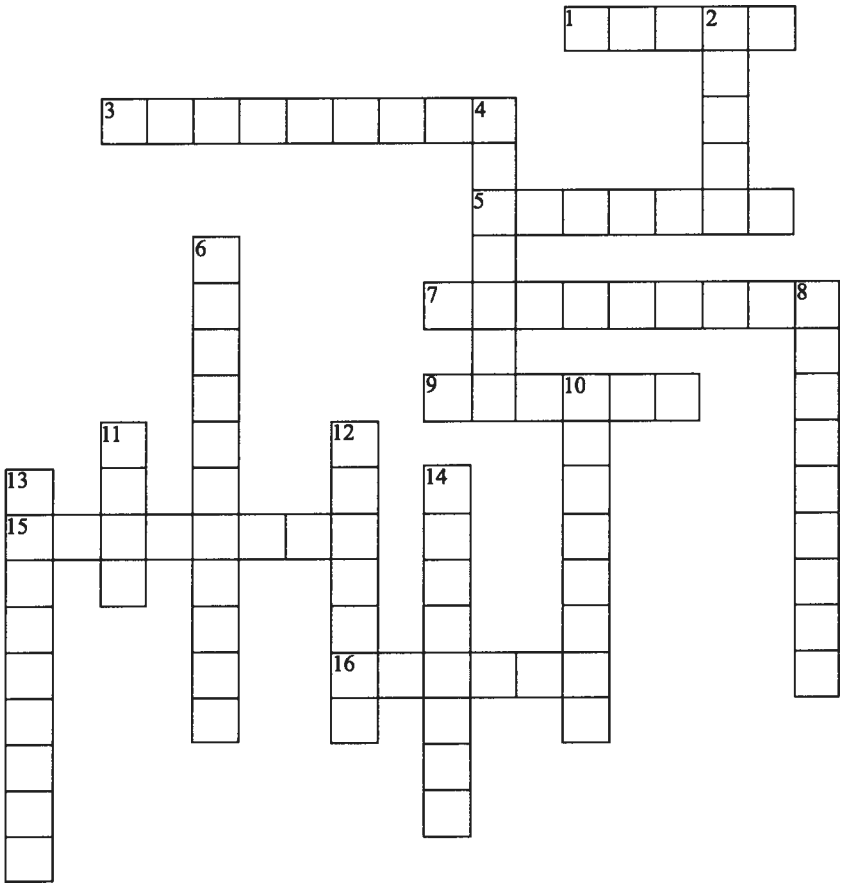
Plastic Recycling

Code	Original Plastic	New Products
1 (PET) Polyethylene Terephthalate	**Soft-drink bottles, peanut butter jars, salad dressing bottles, frozen-food trays**	Surfboards, film, paint brushes, skis, carpets, soft-drink bottles
2 (HDPE) High Density Polyethylene	**Detergent bottles, milk and water jugs**, toys, grocery bags*	Flowerpots, trash cans, trash bags, stadium seats, toys, detergent bottles, plastic lumber
3 (V) Polyvinyl Chloride	**Shampoo bottles**, clear food wrap	Floor mats, pipes, hoses, mud flaps on trucks
4 (LDPE) Low Density Polyethylene	Bread bags, frozen-food bags	Grocery and other types of bags, lawn furniture
5 (PP) Polypropylene	**Ketchup bottles, yogurt cups, other food containers**	Food trays, car battery parts, brooms, video cassette storage cases
6 (PS) (styrofoam) Polystyrene	Plastic spoons, foam cups and trays*	Trash cans, egg cartons, hangers, flower pots, building insulation, rulers
7 Other Plastics	Packages with many layers of materials	Plastic lumber, limited number of recycled products such as pens and street signs

Bolded items ARE acceptable in Palm Beach County's residential recycling program.

** These items should be dropped off at grocery stores to be recycled.*

Recycle Right!



Across

1. 3 colors, green, blue, and clear
3. The way to reduce the amount of garbage we produce
5. Reduce, Reuse,...
7. Common Household Hazard Waste
9. Bin that newspaper goes in
15. What pie plates, tin foil, and cans are made out of
16. Place where you can recycle computer paper

Down

2. Item gathered with a magnet at the Waste to Energy Plant
4. 2500 tons are processed a day at the Waste to Energy Plant
6. Energy made from burning garbage
8. Plastic that we do not accept at SWA
10. Where the ashes and trash are buried
11. Color bin where aluminum cans are placed
12. Natural fertilizer
13. Goes into yellow bin and must be corrugated
14. Water that runs through the landfill that is harmful to the environment

Recycling Matters



ALUMINUM
ASHES
BLUE
BURN
CARDBOARD
COMPOST
ELECTRICITY
ENERGY
GARBAGE
GLASS
HAZARDOUS
LANDFILL
LEACHATE
MAGAZINES
NEWSPAPER
PLASTIC
RECYCLING
REDUE
REUSE
STEEL
STYROFOAM
WASTE
YELLOW

APPENDIX F
HOUSEHOLD HAZARDOUS WASTE PROMOTIONAL LITERATURE

Holiday Collection Schedule

Your waste hauler works on all holidays but two. **There is no collection service on Thanksgiving Day or Christmas Day and there is no make-up day.** If your collection day falls on one of these two holidays, your service will resume on **your next scheduled collection day.**

Horario De Colección para Días Festivos

Su transportador trabaja todos los días de fiesta con execpción a **los siguientes días festivos, Día de Acción de Gracias y Día de Navidad** en los cuales su transportador **no proveerá servicio de colección.** Si su día de servicio cae en uno de estos días festivos, su servicio reasumirá en **el próximo día designado para colección para su área.**

SWA
SOLID WASTE AUTHORITY





SWA
SOLID WASTE AUTHORITY

Curbside Collection Guidelines for UNINCORPORATED Palm Beach County Residents





Service is between the hours of 6:00 am and 5:00 pm. Please have all garbage, bulk, recycling and yard waste curbside by 6:00 am on your scheduled collection day.

Customer Information Services
(561) 697-2700 or 1-866-792-4636 toll-free
www.swa.org

Garbage Service

(2 times per week)
Please have your garbage curbside before 6:00 a.m. on your scheduled collection day only.



Your garbage is collected manually and you must follow the **50/50** rule. Garbage must be containerized in standard **32-50 gallon** cans or sealed plastic bags. Containers and contents can weigh no more than **50 pounds**. Any container exceeding the **50 gallon** capacity limit **will not** be serviced.

All garbage must be placed in front of your home and within 6 feet of the edge of the traveled portion of the roadway.

Garbage must not be stacked over water or gas meters, under low hanging branches or utility wires or within 4 feet of mail boxes or fire hydrants.

DO NOT MIX GARBAGE WITH YARD WASTE (VEGETATION)

Your waste hauler is not required to collect any debris that does not meet the above guidelines. If your debris does not meet guidelines and is not collected you may do one of the following:

1) *Correct the debris to meet required collection guidelines. Once corrected it will be picked up on **your next scheduled service day** or:*

2) *Transport the material directly to SWA's landfill located at 6600 North Jog Road in West Palm Beach (west of the Turnpike, between 45th Street and the Beeline Highway). IF YOU ELECT TO TRANSPORT THE MATERIAL TO THE LANDFILL PLEASE BE AWARE YOU WILL BE CHARGED FOR THE DISPOSAL COST AND CASH IS REQUIRED!*

Llame al departamento de Servicios de Información al Consumidor del SWA para:

- Servicio de colección residencial de basura, vegetación, reciclaje para las áreas no-incorporada:
  - Problemas de Servicio incluyendo falta de recojido
  - Pautas del servicio de la colección
  - Dias de Servicio de colección
  - Ordenar Recipientes de Reciclar
  - Horario De Colección para Días Festivos
- Información y Preguntas Sobre:
  - Gravamen y facturación de basura sólida
  - Desperdicios Caseros Peligrosos Al Medio Ambiente
  - Localizaciones y horas de operación de facilidades de disposición
  - Localizaciones para desalojar Reciclaje
- Programas de servicio a la comunidad y oportunidades para ser voluntario:
  (561) 697-2700 or 1-866-792-4636 toll free
- Visitas con guias y presentaciones:
  (561) 640-4000
- Reportar disposición Iligal:
  (561) 697-2700 or 1-866-792-4636 toll free
- Para información adicional visite nuestra página web:
  www.swa.org

Call the Solid Waste Authority Customer Information Services Department for:

- **Unincorporated** residential garbage, yard waste, or recycling collection services:
  - service problems including missed pickups
  - collection service guidelines
  - collection service days
  - order a recycling bin
  - holiday schedule
- Questions and Information About:
  - solid waste assessment and billing
  - household hazardous waste
  - disposal facility locations and hours of operation
  - recycling drop-off locations
- Community Service & Volunteer Programs:
  (561) 697-2700 or 1 (866) 792-4636 toll free
- Tours/Presentations:
  (561) 640-4000
- Report Illegal Dumping:
  (561) 697-2700 or 1-866-792-4636 toll free
- For Additional Public Information Visit Our Website:
  www.swa.org

Servicio de Basura

(2 veces por semana)

Por favor, coloque su basura a la orilla de la acera antes de las 6:00 a.m. en el día designado para servicio en su área.



Su basura se recoge manualmente y usted debe seguir la regla del 50/50. Toda basura debe ser colocada en un recipiente de 32 a 50 gallones de capacidad o dentro de bolsas plásticas selladas. Si usa recipientes de basura ó bolsas plásticas no deben exceder más de cincuenta libras cada una, una vez llenas y deben ser cerradas ó atadas. No se recogerá ni se le dará servicio a ningún recipiente o bolsa plástica que exceda el límite de capacidad de 50 galones.

Toda basura residencial deberá ser colocada a no menos de seis pies de su acera ó pavimento público al lado de la carretera.

La basura no se debe colocar sobre los metros de agua o de gas, debajo de ramas o de alambres de utilidad. La basura se debe mantener a 4 píes de distancia de los buzones de correo o de las bocas de incendio.

NO MEZCLE LA BASURA CON LA BASURA DE SU PATIO (VEGETACIÓN)

No se le requiere a su transportador recoger ningún tipo de escombros o desechos que no cumplan con los requerimientos antedichos de colección. Si su transportador no le recoge los escombros o desechos debido a que no cumplan con los criterios establecidos de colección, puede hacer lo siguiente:

1) Corrija los escombros o desechos de acuerdo a los requerimientos de colección. Una vez que sea corregido, se le recogerá el material dentro del próximo día programado para servicio en su área o,
2) Transporte el material directamente al vertedero del SWA localizado en el 6600 North Jog Road en West Palm Beach (al oeste del Turnpike, entre la calle 45 y el Beeline Highway). ¡SI USTED ELIGE TRANSPORTAR EL MATERIAL AL VERTEDERO, POR FAVOR ENTIENDA QUE LE COBRARAN POR LA DISPOSICIÓN Y SOLO PODRÁ PAGAR CON DINERO EN EFECTIVO!

Trash/Bulk Items

(2 times per week)

Please have your trash/bulk items curbside before 6:00 a.m. on either scheduled collection day only.



Bulk Items

Discarded furniture and appliances as well as other household items including toilets, bathtubs, water softeners, and similar household goods that will not fit into a standard garbage can is collected twice per week and may be placed curbside with the regular household garbage.

For safety reasons:

Please remove or seal doors on refrigerators, freezers, washers and dryers before placing outside for collection so that children can not crawl inside and become trapped.

All mirrors, glass doors, glass table tops, pane glass windows, etc. must be broken up and containerized in solid containers (no plastic bags). Container and contents must weigh less than **50 pounds**.

Up to 2 tires, **off the rim,** are collected curbside per year. Place them at the curb with your regular household garbage on either garbage collection day.

Construction Debris

Debris from **minor home repairs** such as replacing a rotted piece of trim or a broken tile. Construction debris is limited to 2 cubic yards per collection day (equal to a standard size refrigerator) and must follow the **50/50 rule**. Debris must be containerized in standard **32-50 gallon** cans or sealed plastic bags. Containers and contents can weigh no more than **50 pounds**. Carpeting must be cut to 4 foot lengths, rolled up and weigh less than **50 pounds**.

With the exception of carpeting, any construction debris from minor home repairs that is placed upon the ground and not containerized will not be collected.

Your waste hauler is not required to collect any debris that does not meet the above guidelines. If your debris does not meet guidelines and is not collected you may do one of the following:

1) *Correct the debris to meet required collection guidelines. Once corrected it will be picked up on **your next scheduled service day** or:*
2) Contact your current waste hauler for their contracted special service fee.
3) Contact any other private hauler listed in the Yellow Pages under "Rubbish Removal" for their collection rate.
4) *Transport the material directly to SWA's landfill located at 6600 North Jog Road in West Palm Beach (west of the Turnpike, between 45th Street and the Beeline Highway). IF YOU ELECT TO TRANSPORT THE MATERIAL TO THE LANDFILL PLEASE BE AWARE YOU WILL BE CHARGED FOR THE DISPOSAL COST AND CASH IS REQUIRED!*

Los siguientes artículos no son recogidos en la orilla de su acera

- **Desechos de construcción, remodelación ó destrucción (C&D)** de una estructura incluyendo pero no limitado a tejas o ripias (material para techos), verjas, cobertizos, bloques de concreto, ladrillos, asfalto, etc.
- **Desechos de Piezas de mecánica** no serán recogidos en la orilla de su acera incluyendo pero no limitado a piezas de carros, botes, embarcaciones marinas o embarcaciones de agua, carritos de golf, motocicletas, equipos de cortar grama, motores de combustión, etc.
- **Limpieza de escombros de vegetación,** troncos de árboles, tierra suelta, raíces con tierra, árboles enteros, etc. no será recogida en la orilla de su acera.

Los residentes pueden hacer lo siguiente para disponer de sus Desechos de construcción, remodelación, destrucción ó limpieza de escombros de vegetación no-aceptable:

1) Comuniquese con su transportador de basura para su tarifa contractual de servicios especiales.
2) Comuniquese con cualquier otro transportador privado localizado dentro de las Páginas Amarillas bajo "Retiro de Desperdicios" para su tarifa de colección.
3) Alquile un depósito de basura de cualquier transportador de transbordo autorizado listado en la página web del SWA (www.swa.org).
4) Transporte el material directamente al vertedero del SWA localizado en el 6600 North Jog Road en West Palm Beach (al oeste del Turnpike, entre la calle 45 y el Beeline Highway). ¡SI USTED ELIGE TRANSPORTAR EL MATERIAL AL VERTEDERO, POR FAVOR ENTIENDA QUE LE COBRARÁN POR LA DISPOSICIÓN Y SOLO PODRÁ PAGAR CON DINERO EN EFECTIVO!

Never Collected Curbside

- **Major construction, demolition and remodeling debris** are never collected curbside. Debris includes but is not limited to roofing shingles, fencing, sheds, concrete blocks, bricks, asphalt, etc.

- **Automotive debris of any kind** is never collected curbside. Debris includes but is not limited to car parts, boat parts,, water craft, golf carts, motorcycles, lawn equipment, etc. as well as combustion engines.

- **Land Clearing** is never collected curbside and includes but is not limited to stumps, dirt, rootballs, whole trees, etc.

Residents may do one of the following for non-acceptable construction and demolition, automotive and land clearing debris:

1) Contact your current waste hauler for their contracted special service fee.

2) Contact any other private hauler listed in the Yellow Pages under "Rubbish Removal" for their collection rate.

3) Rent a roll-off dumpster from any permitted roll-off hauler listed on SWA's web site (www.swa.org).

4) Transport the material directly to SWA's landfill located at 6600 North Jog Road in West Palm Beach (west of the Turnpike, between 45th Street and the Beeline Highway). *IF YOU ELECT TO TRANSPORT THE MATERIAL TO THE LANDFILL PLEASE BE AWARE YOU WILL BE CHARGED FOR THE DISPOSAL COST AND CASH IS REQUIRED!*

Basura Voluminosa

(2 veces por semana)

Por favor, coloque su basura a la orilla de la acera antes de las 6:00 a.m. en el dia designado para servicio en su área.



Artículos Voluminosa
Desechos voluminosos del hogar como muebles, tocadores, electrodomésticos, retretes (inodoros), bañeras, unidades de suavizar el agua u otros artículos de hogar que no quepan dentro de su recipiente de basura, serán recogidos dos veces por semana y pueden ser colocádos al lado de su basura regular. Toda basura voluminosa deberá ser colocada a no menos de seis pies de su acera ó pavimento público al lado de la carretera.

5 Por razones de seguridad:
Le pedimos que por favor, **remueva o selle** las puertas de las neveras, lavadoras y secadoras antes de colócarlas a la orilla de su acera para que los niños no puedan encerarse o atraparse dentro de ellas.

Todo tipo de espejos, puertas, mesas o ventanas con vidrio, etc. Este material se debe romper en pedazos y colocar dentro de un envase sólido (no se permite poner vidrio en bolsas plásticas). El envase y su contenido deben pesar menos de 50 libras.

Anualmente se recogerán dos (2) llantas, **sin aros**, a la orilla de su acera. Colóquelas en la acera en el día designado de recogido para basura. Se les pide a los residentes con más de dos (2) llantas para desechar hacer lo siguiente:

Desechos de Construción
Desechos de **reparaciones menores de hogar** tales como reemplazos de madera descompuesta o de azulejos rotos. Los desechos de construcción se limitan a 2 yardas cúbicas por día de colección (equivalente a un refrigerador de tamaño normal) y se debe seguir la **regla del 50/50**. Los desechos deben ser colocados dentro de un recipiente de basura de **32-50 galones** de tamaño o bolsas plásticas selladas. Los envases y el contenido no pueden pesar más de **50 libras** cada uno. Artículos como alfombras deben ser cortadas en pedazos que no midan más de 4 pies de largo, deben ser enrolladas y no deben pesar más de **50 libras**.

Con la excepción de alfombras, ningún remanente de construcción de reparaciones menores de hogar deben ser colocadas sueltas sobre la tierra en la orilla de su acera. Para ser recogido estos artículos tienen que ser colocados dentro de un recipiente.

No se le requiere a su transportador recoger ningún tipo de escombros o desechos que no cumplan con los requerimientos antedichos de colección. Si su transportador no le recoge los escombros o desechos debido a que no cumplan con los criterios establecidos de colección, puede hacer lo siguiente:

1) 12 Corrija los escombros o desechos de acuerdo a los requerimientos de colección. Una vez que sea corregido, se le recogerá el material dentro **del próximo día programado** para servicio en su área o,
2) 13 Comuniquese con su transportador de basura para su tarifa contractual de servicios especiales.
3) 14 Comuniquese con cualquier otro transportador privado localizado dentro de las Páginas Amarillas bajo "Retiro de Desperdicios" para su tarifa de colección.
4) 15 Transporte el material directamente al vertedero del SWA localizado en el 6600 North Jog Road en West Palm Beach (al oeste del Turnpike, entre la calle 45 y el Beeline Highway). ¡SI USTED ELIGE TRANSPORTAR EL MATERIAL AL VERTEDERO, POR FAVOR ENTIENDA QUE LE COBRARÁN POR LA DISPOSICIÓN Y SOLO PODRÁ PAGAR CON DINERO EN EFECTIVO!

Yard Waste (Vegetation)

(1 time per week)

Please have your yard waste curbside before 6:00 a.m. on your scheduled collection day only.



Yard waste includes debris from **routine residential yard maintenance** only. It **does not** include debris generated from **land clearing or tree removal.** All vegetation must be kept separate from other debris and be dirt and sand free.

Yard waste is collected manually by a different truck than the garbage and is **limited to 6 cy per week** (the equivalent of 3 standard refrigerators). All yard waste, with the exception of tree branches and palm fronds, must be containerized in standard **32-50 gallon** cans or sealed plastic bags. Containers and contents can not weigh more than **50 pounds**. Branches must be 6 feet or less in length and **50 pounds** or less in weight.

DO NOT MIX YARD WASTE (VEGETATION) WITH GARBAGE OR ANY OTHER DEBRIS

Your waste hauler is not required to collect any debris that does not meet the above guidelines. If your debris does not meet guidelines and is not collected you may do one of the following:

1) *Correct the debris to meet required collection guidelines. Once corrected it will be picked up on your next scheduled service day or:*
2) *Contact your current waste hauler for their contracted special service fee.*
3) *Contact any other private hauler listed in the Yellow Pages under "Rubbish Removal" for their collection rate.*
4) *Transport the material directly to SWA's landfill located at 6600 North Jog Road in West Palm Beach (west of the Turnpike, between 45th Street and the Beeline Highway). IF YOU ELECT TO TRANSPORT THE MATERIAL TO THE LANDFILL PLEASE BE AWARE YOU WILL BE CHARGED FOR THE DISPOSAL COST AND CASH IS REQUIRED!*

Desperdicios Caseros Peligrosos Al Medio Ambiente



Desperdicios caseros peligrosos al medio ambiente no pueden ser recogidos a la orilla de su acera por ejemplo artículos como aceite usado de motor de autos, baterías recargables, baterías de autos, tanques de gas propano, bombillas florecientes, pintura acéite y pesticides.

Los Residentes pueden disponer de los desperdicios caseros peligrosos al medio ambiente en las facilidades designadas del SWA ó en los centros de recaudación atraves del condado gratuitamente y no se require cita. Para la localización más cercana a usted, llame al 1-866-792-4636.

ELECTRÓNICOS

Reciclaje - El SWA tiene un programa de reciclaje para equipos electrónicos por ejemplo: computadoras, monitores, televisiones, VCR's, estereofónicos, impresoras, máquinas de fax, etc. Se le exhorta a los residentes del condado de Palm Beach a traer gratuitamente, todos sus equipos electrónicos a cualquier de nuestras estaciones de transferencia para desechos o a la facilidad principal del SWA de desperdicios caseros peligrosos al medio ambiente. Para la localización más cercana a usted y horas de operación, visite nuestra página web al www.swa.org o llame al 1-866-792-4636.

Disposición - Si usted no puede traer su artículo de electrónica a una de nuestras localizaciones, lo puede colocar al lado de su basura regular a la orilla de su acera ó pavimento público al lado de la carretera. Electrónicos pequeños deben ser colocados dentro de su recipiente de basura. Electrónicos grandes deben ser colocados al lado de su recipiente de basura.

DISPOSICIÓN DE PINTURA

Reciclando - Los residentes del condado de Palm Beach pueden traer gratuitamente pintura (látex o de acéite) a cualquier facilidad de colección designada del SWA para desperdicios caseros peligrosos al medio ambiente. La pintura será nuevamente reciclada y se reutilizará en programas para servicios de la comunidad del SWA en proyectos para restaurar las comunidades y para beneficiar esos en necesidad a través del condado de Palm Beach. Para la localización más cercana a usted y horas de operación, visite nuestra página web al www.swa.org o llame al 1-866-792-4636.

Disposición - Pintura a base de acéite nunca se recoge a la orilla de su acera. Pintura látex (a base de agua) debe estar totalmente seca antes de que se pueda disponer. (Para secar la pintura a base de látex, destape la lata y agregele arena o polvo de acerrin). Cuando esté totalmente seca, ponga la lata destapada con su basura regular.

Household Hazardous Waste



Household hazardous wastes are never collected curbside. A few examples are used motor oil, rechargeable or auto batteries, propane tanks, fluorescent light bulbs, oil based paint and pesticides.

Household hazardous waste may be dropped at any SWA designated Household Hazardous Waste collection site at **no charge** to Palm Beach County residents. There is no appointment necessary. For a location nearest you and hours of operation, visit www.swa.org or call 1-866-792-4636.

ELECTRONICS

Recycling - The SWA has an Electronic Recycling Program and residents are encouraged to bring all electronics such as: computers, monitors, televisions, VCR's, stereos, printers, fax machines, etc. to any one of our transfer stations or SWA's main household hazardous waste facility at no charge to residents of Palm Beach County. For a location nearest you and hours of operation, visit www.swa.org or call 1-866-792-4636.

Disposal - If you are unable to bring your electronic item to one of our drop-off locations it may be placed curbside with your regular household garbage on either scheduled collection day. Electronics small enough to fit should be placed inside a standard garbage can. All others should be placed next to the can.

PAINT DISPOSAL

Recycling - Residents of Palm Beach County can bring unused, unwanted paint (latex or oil based) to any SWA designated household hazardous waste collection site at no charge. Newly recycled paint is then used in SWA's community service programs on projects to restore communities and benefit those in need throughout Palm Beach County. For a location nearest you and hours of operation, visit www.swa.org or call 1-866-792-4636.

Disposal - Oil-based paint is never collected curbside. Latex paint (water-based) **must be dried completely** before it is disposed. (To dry latex paint, remove the lid and add sand, kitty litter or saw dust). When completely dried, leave uncovered and place into your regular garbage.

Vegetación

(Una vez por semana)

Por favor, coloque su vegetación a la orilla de la acera antes de las 6:00 a.m. en el día designado para servicio en su área.



Vegetación incluye solamente desechos de **mantenimiento rutinario residencial. No incluye** los desechos de limpieza de escombros de vegetación de solares ó el levantamiento de árboles. Mantenga su vegetación separada de otros artículos y libre de tierra y/o arena suelta.

La vegetación es recogida manualmente y no es recogido por su camión regular de basura. **Se limita a 6 yardas cúbicas por semana** (equivalente a un refrigerador de tamaño normal). Toda vegetación con excepción de las ramas de árbol y frondas de palmas, deben ser colocadas dentro de un recipiente de basura de **32 a 50 galones** de capacidad ó deben ser colocadas dentro de una bolsa de basura plástica sellada. Cada recipiente ó bolsa llena de vegetación no debe de pesar más de **50 lbs.**

NO MEZCLE LA VEGETACIÓN CON LA BASURA O NINGUNA OTRO DESPERDICIO

No se le requiere a su transportador recoger ningún tipo de escombros o desechos que no cumplan con los requerimientos antedichos de colección. Si su transportador no le recoge los escombros o desechos debido a que no cumplan con los criterios establecidos de colección, puede hacer lo siguiente:

1) Corrija los escombros o desechos de acuerdo a los requerimientos de colección. Una vez que sea corregido, se le recogerá el material dentro del próximo día programado para servicio en su área o,
2) Comuniquese con su transportador de basura para su tarifa contractual de servicios especiales.
3) Comuniquese con cualquier otro transportador privado localizado dentro de las Páginas Amarillas bajo "Retiro de Desperdicios" para su tarifa de colección.
4) Transporte el material directamente al vertedero del SWA localizado en el 6600 North Jog Road en West Palm Beach (al oeste del Tumpike, entre la calle 45 y el Beeline Highway). ¡SI USTED ELIGE TRANSPORTAR EL MATERIAL AL VERTEDERO, POR FAVOR ENTIENDA QUE LE COBRARÁN POR LA DISPOSICIÓN Y SOLO PODRÁ PAGAR CON DINERO EN EFECTIVO!

Recycling Service

(1 time per week)
Please have your recycling curbside before 6:00 a.m.
on your scheduled collection day only.



Yellow Bin

- Newspaper
- Brown Paper Grocery Bags
- Magazines
- Catalogs
- **Corrugated Cardboard**
  (flatten and cut to 3' x 3' maximum)

Blue Bin

- Drink Boxes
- Milk and Juice Containers
- Aluminum Cans
- Aluminum Foil and Pie Plates
- Glass Bottles and Jars (all colors, no lids or caps)
- Plastic Containers 1 thru 7

Please

- **No** 12-Pack Beverage Boxes
- **No** Tissue Boxes
- **No** Cereal Boxes
- **No** Plastic Bags
- **No** Mail

Please

- **No** Light Bulbs, Mirrors or Plate Glass
- **No** Plastic Wrap or Bags
- **No** Steel or Tin Cans
- **No** Styrofoam

For any questions or concerns with the collection of your recycling contact SWA at 697-2700 or 1 (866) 792-4636 toll free
To order new or replacement recycling bins contact SWA at 1 (866) NEW-BINS

Reciclaje

(1 vez por semana)
Por favor, coloque su reciclaje a la orilla de la acera antes de las 6:00 a.m.
en el día designado para servicio en su área.



Recipiente Amarillo

- Periódico
- Bolsas de Papel Marrón
- Revistas
- Catálogos
- **Cartón Corrugado**
  (Cartón corrugado es el cartón que tiene las paredes acaneladas.)Corte el cartón corrugado (3' x 3') y aplástelo y colóquelo al lado de su recipiente de reciclar amarillo.

Recipiente Azul

- Cajitas de Jugo
- Recipientes de Leche y de Jugo
- Latas de Aluminio
- Platos y Papel de Aluminio
- Botellas y Jarros de Vidrio (de todos colores, no incluya las tapas)
- Recipiente Plástico con números del 1 al 7

No se acepta dentro de su recipiente de reciclar amarillo

- Cajas de Bebidas de Envoltura de 12 (12-pack)
- Cajas de Pañuelos Desechables
- Cajas de Cereal
- Bolsas Plásticas
- Correspondencia

No se acepta dentro de su recipiente de reciclar azul

- Bombillas, Espejos ó Platos de Vidrio
- Bolsas ó Envolturas Plásticas
- Acero ó Estaño
- Estyrofoam

Para mas información o preguntas sobre su servicio de colección de reciclaje por favor, llame al SWA libre de cargos al 1-866-792-4636.
Si necesita un recipiente de reciclar o un reemplazo llame libre de cargos al 1-866-639-2467.

APPENDIX G
LOCATION OF SOLID WASTE AUTHORITY FACILITIES


urban design kilday STUDIOS
MALCOLM PIRNIE
Gables at Northlake
Northlake Blvd.
NORTH
Steeplechase
Ironhorse Country Club
Bee Line Hwy
Grassy Waters Preserve
ADMINISTRATION BUILDING
Dyer Park
NCRRF Scale House
CLASS III LANDFILL
Florida's Turnpike
NORTH COUNTY RESOURCE RECOVERY FACILITY (N.C.R.R.F.)
Landfill Scale House
FERROUS PROCESSING FACILITY
Jog Road
MATERIALS RECYCLING FACILITY (existing)
PBC Owned (Winding Waters)
HOUSEHOLD HAZARDOUS WASTE FACILITY (HHW)
Haverhill Road
COMPOST FACILITY
CLASS I LANDFILL
Cypress Run
Caribbean Village
Rookery
Gramercy Park
45th Street
BIOSOLIDS PELLETIZATION FACILITY (under construction)
MATERIALS RECYCLING FACILITY (MRF) (under construction)

APPENDIX H
PUBLIC MEETING POWERPOINT PRESENTATION

Preliminary Draft Materials Separation Plan

SWA SOLID WASTE AUTHORITY

Public Meeting
July 8, 2009
SWA Auditorium
7pm

MALCOLM PIRNIE

Solutions for Life™

Agenda

A.	Introduction
B.	Proposed New Waste-To-Energy Facility
C.	Size of the Service Area served by the Solid Waste Authority
D.	Amount of Solid Waste in the Solid Waste Authority's Service Area
E.	Types and Estimated Amounts of Materials Proposed for Separation
F.	The Methods Proposed for Materials Separation
G.	Amount of Residual Waste
H.	Alternate Disposal Methods for Handling Residual Waste
I.	Locations to Review Comments and Final Plan
J.	Comments and Questions

A. Introduction - Purpose

The Authority Intends to Develop the Palm Beach Renewable Energy Facility No. 2.

- The Authority has Prepared a Preliminary Draft Materials Separation Plan (Plan) to satisfy the Requirements of *40 CFR 60.57 (b) which Apply to the Development of a Waste-to-Energy Facility.*
- *The Preliminary Draft Materials Separation Plan addresses Material Separation as part of the Authority's overall solid waste management programs.*
- *This Public Meeting is to provide the public information and address public comments regarding the Authority's Plan.*



Solid Waste Authority Overview

- Dependent Special District with County Commission oversight.
- Manage 1.9 million tons of waste annually throughout Palm Beach County.
- Employ about 400 staff members to manage the integrated solid waste system throughout the incorporated and unincorporated County.
- Authority services are paid for annually by a non-ad valorem assessment on the tax bill of every property owner in Palm Beach County.

NOTICE OF PROPOSED PROPERTY TAXES AND PROPOSED OR ADOPTED NON-AD VALOREM ASSESSMENTS

2008 PROPOSED A' /ALOREM TAXES

The taxing authorities which levy property taxes against your property will soon hold **PUBLIC HEARINGS** to adopt budgets and tax rates for the next year.

The purpose of these **PUBLIC HEARINGS** is to receive opinions from the general public and to answer questions on the proposed tax change and budget **PRIOR TO TAKING FINAL ACTION.**

Each taxing authority may **AMEND OR ALTER** its proposal at the hearing.

DO NOT PAY
*THIS IS * NOT * A BILL*

2008 PROPOSED AND/OR ADOPTED NON-AD VALOREM ASSESSMENTS

LEVYING AUTHORITY	TELEPHONE NUMBER	RATE	ASSESSED AMOUNT
SOLID WASTE AUTHORITY	(561)697-2700	156.00	156.00

What Does the Solid Waste Authority Do?



Collection

Trash/ Garbage



Resource Recovery

Recyclables



Recycling



Renewable Electricity Sales Revenue (offsets some Operational Costs)



Recyclables Sales Revenue (offsets some Operational Costs)



Ash & Residue to Landfill

The Solid Waste Authority of Palm Beach County is the governmental agency responsible for providing an economical and environmentally conscious integrated solid waste management system for Palm Beach County, FL.

Visit www.swa.org to learn more!

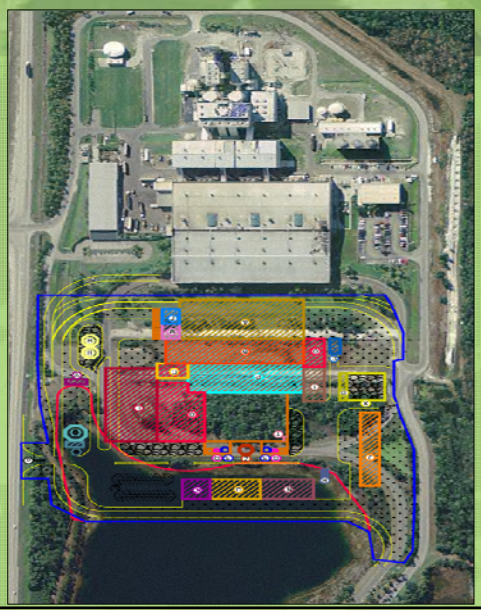
A. Introduction - Background

The Authority Implements the Provisions of the County's Integrated Solid Waste Management Plan through an award-winning Integrated Solid Waste Management System

- **Goals of the Integrated Solid Waste Management Plan**
  - *Reducing the amount of waste placed in landfills for disposal.*
  - *Managing Solid Waste through programs that handle different types of waste separately.*
  - *Incorporate methods, approaches, and mechanisms to promote environmental protection.*
- **Integrated Solid Waste Management System**
  - *Combines recycling, reduction, composting, converting waste to energy and landfilling.*
  - *Integrates cost effective solid waste transportation techniques.*
  - *Utilizes effective hazardous waste disposal techniques.*
  - *Incorporates solid waste processing and recycling methods to reduce the amount of waste placed in landfills.*
  - *Implements procedures that provide alternative sources of energy.*

B. Proposed New Waste-To-Energy Facility

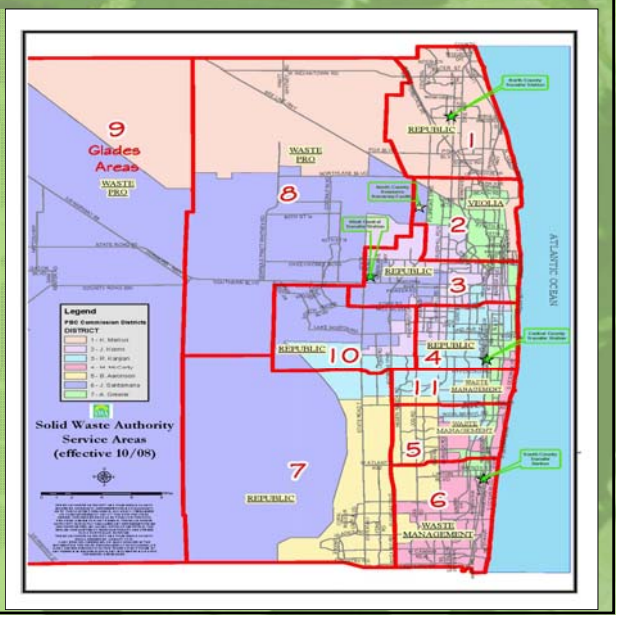
- 3,000 ton per day Proposed Facility
  - The existing North County Resource Recovery Facility (NCRRF) has a rated capacity of 624,000 tons per year (tpy) and currently operates at over 800,000 tpy.
  - 500,000 tpy of waste is landfilled due to over capacity.
  - Proposed Facility will increase the overall capacity by approximately 985,000 tpy.



C. Size of the Service Area

The Solid Waste Authority's Service Area includes all of Palm Beach County.

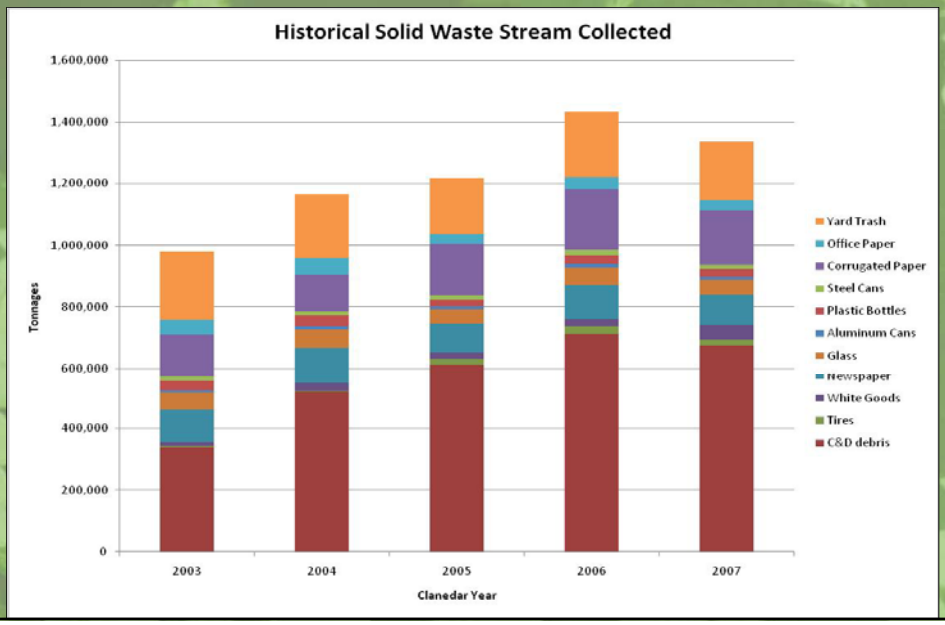
- The Authority provides ***solid waste disposal services*** to the County's 1.3 million residents and businesses.
- The Authority provides ***solid waste and recycling collection and disposal services*** to the residents and businesses in the ***unincorporated*** areas of the County.
- The unincorporated area is divided into eleven service areas, each designated to a specific solid waste contractor.



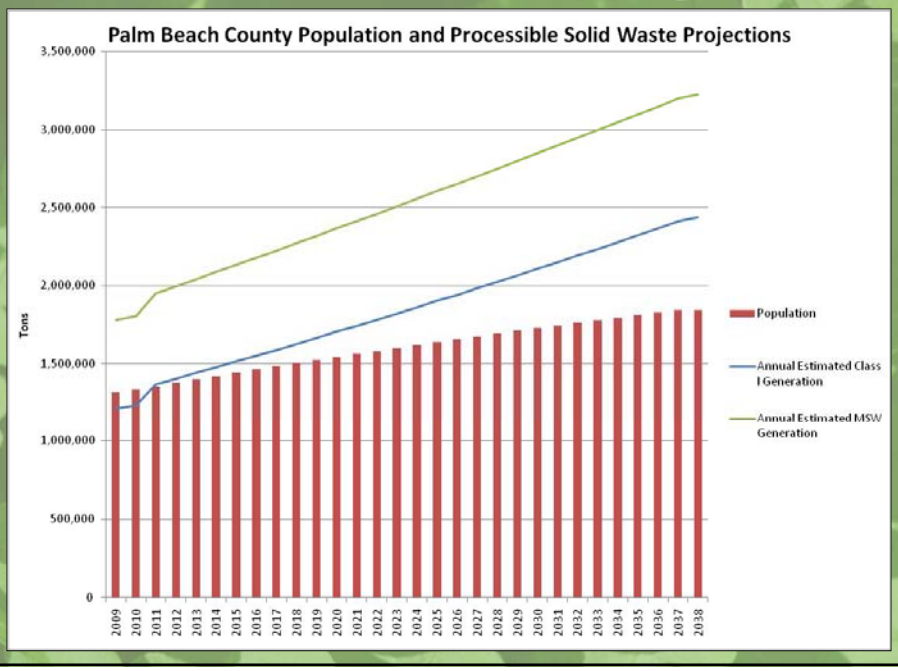
D. Amount of Solid Waste In the Authority's Service Area



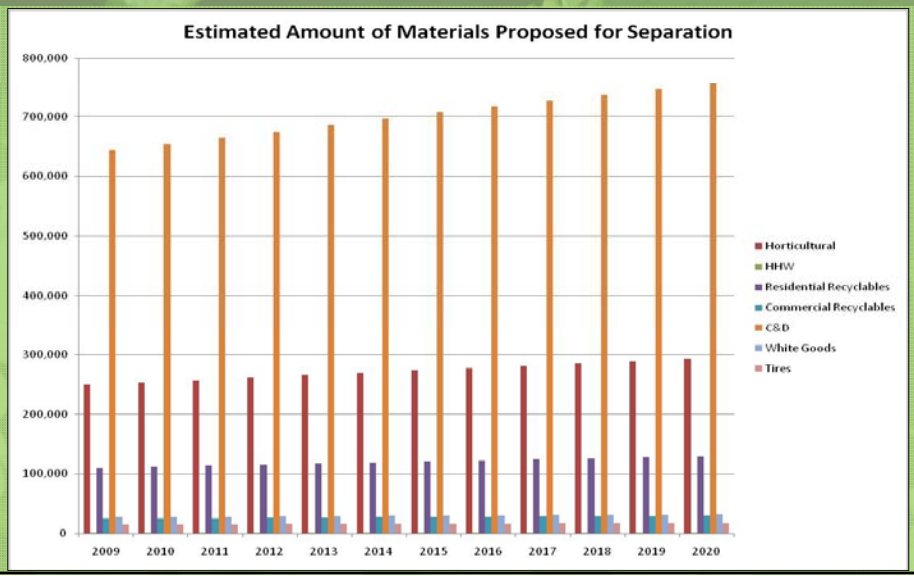
D. Amount of Solid Waste In the Authority's Service Area



As the population of Palm Beach County continues to grow, the amount of solid waste to be managed also increases.



E. Types and Estimated Materials Proposed for Separation



F. The Methods Proposed for Materials Separation

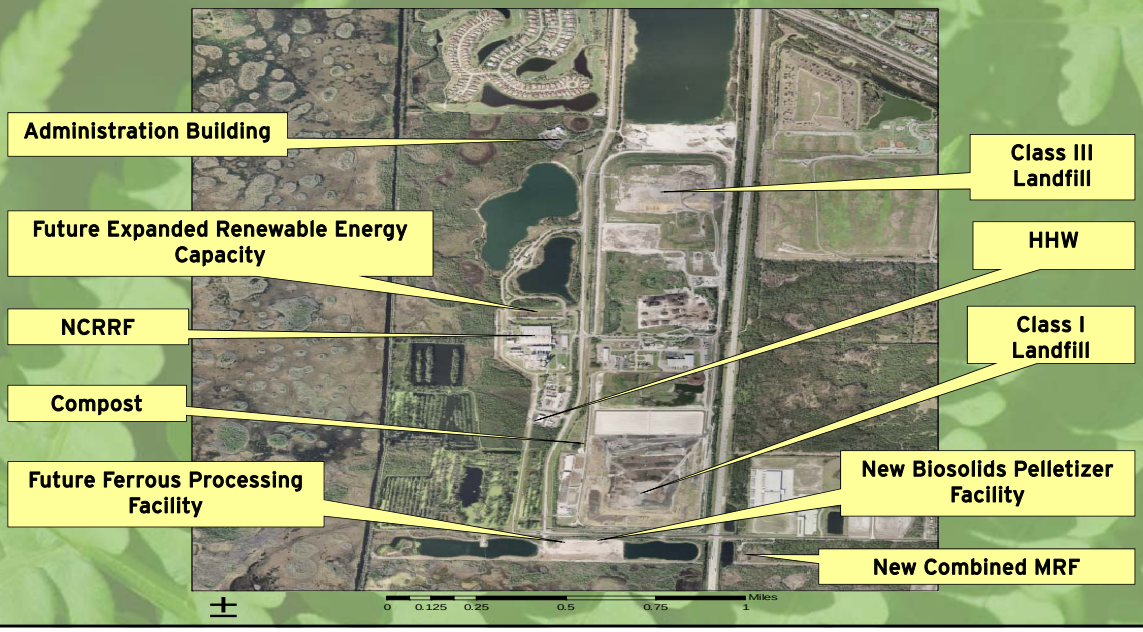
Material Separation System Programs

- Waste Reduction/Resource Recovery
- Landfilling
- Commercial / Institutional
- Residential
- Composting
- Ferrous Processing
- Construction & Demolition Debris
- Woody Waste Recycling Program
- Household Hazardous Waste
- Conditionally Exempt Small Quantity Generator
- Disaster Debris Management
- White Goods
- Waste Tires

Special Waste Programs

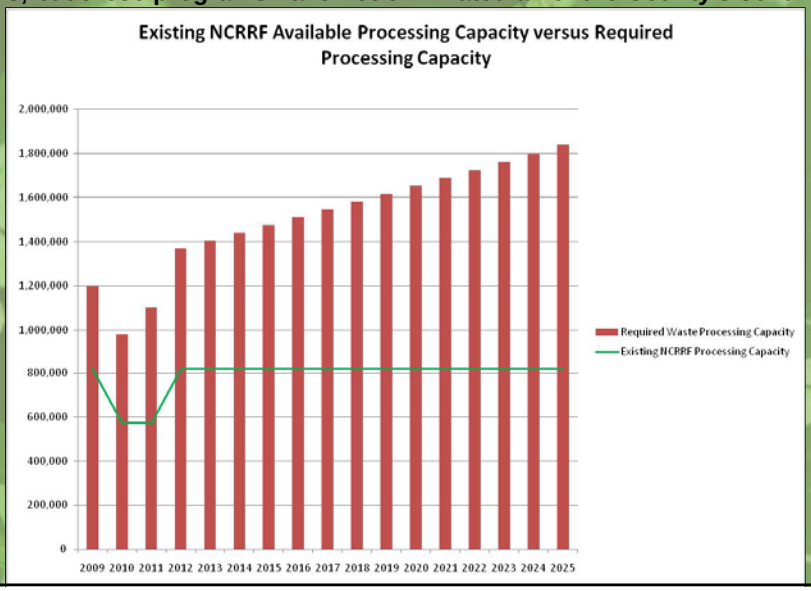
- Mercury Containing Devices
- Electronics Products (E-Waste)
- Medical Waste
- Used Motor Oil
- Greenhouse Reduction
- Source Reductions and Contributions to the Community

Palm Beach Renewable Energy Park

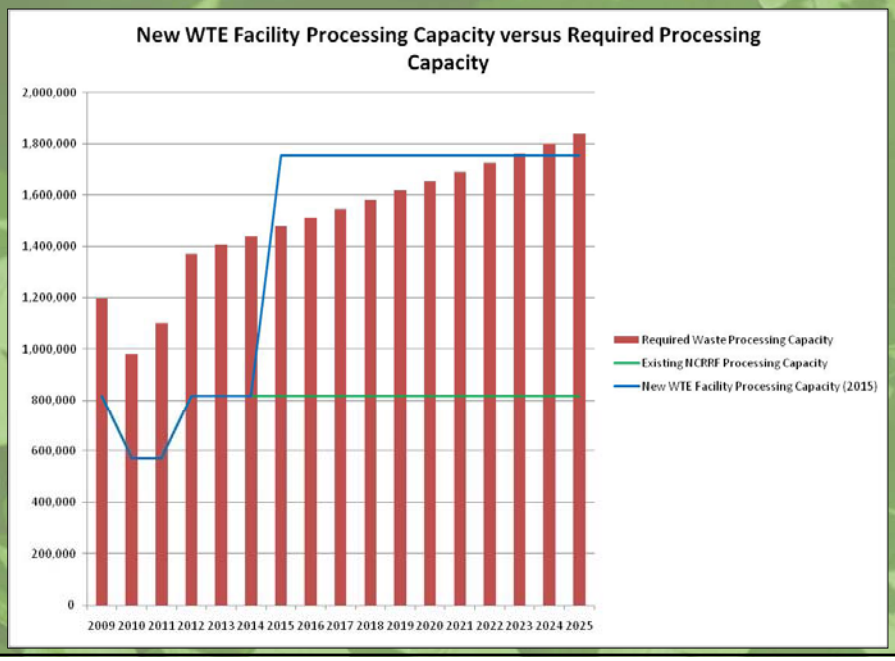


G. Amount of Residual Waste

The Authority is using its best efforts to promote recycling and materials separation programs, but these programs have not eliminated all of the County's solid waste.



G. Amount of Residual Waste



H. Alternate Disposal Methods for Handling Residual Waste

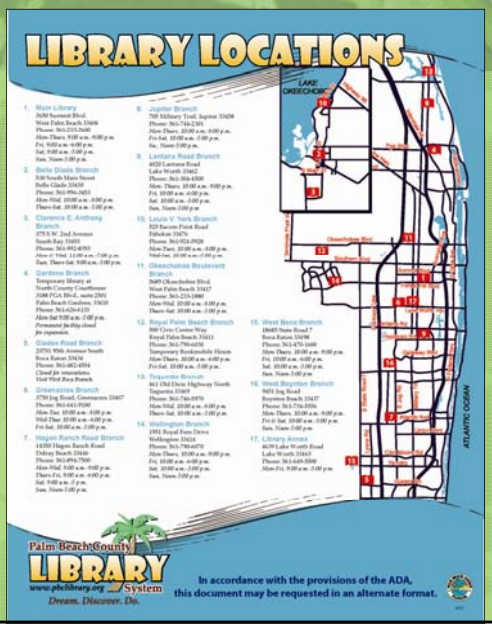
- ***Landfilling*** – The Authority can place the material in a landfill.
- ***WTE*** – The Authority can use a Waste-To-Energy Facility to recovery energy and reduce the volume of material needing disposal. There are no other solid waste disposal options that have a long-term record of successful operations in the United States.

The Proposed Facility is an essential component for the Authority's integrated solid waste management system.

I. Locations to Review Comments and Final Draft Plan

Next Steps

- Comments at this public meeting will be available to review within 45 days of the date of this public meeting at all Public Libraries.
- Final Draft of the Materials Separation Plan will be revised and available for review at all Public Libraries.
- Date of Final Draft availability will be published in a future public advertisement in The Post.




Thank You & Questions

APPENDIX I
PUBLIC MEETING AGENDA

Solid Waste Authority of Palm Beach County

Preliminary Draft Materials Separation Plan

Public Meeting Agenda

Solid Waste Authority Auditorium

7501 North Jog Road

West Palm Beach, Florida 33412

July 8, 2009

7:00 p.m. E.S.T.

MEETING AGENDA

A. Introduction

B. Proposed Renewable Energy Facility

C. Size of the Service Area served by the Solid Waste Authority

D. Amount of Solid Waste in the Solid Waste Authority's Service Area

E. Types and Estimated Amounts of Materials Proposed for Separation

F. The Methods Proposed for Materials Separation

G. Amount of Residual Waste for Disposal

H. Alternate Disposal Methods for Handling Residual Waste

I. Locations to Review Summary of Public Comments and to review Final Draft Materials Separation Plan

J. Public comments and questions

A. Introduction

Purpose: The Solid Waste Authority of Palm Beach County (the "Authority") intends to develop on the Authority's existing property the Palm Beach Renewable Energy Facility #2 (the "Facility"). The Authority has prepared a Preliminary Draft Materials Separation Plan to satisfy the requirements set forth in 40 CFR 60.57 (b), which apply to the development of a Waste-to-Energy facility. The Preliminary Draft Materials Separation Plan has been available to the public for review for 34 days. The purpose of this public hearing is to provide the public with information regarding the Authority's future solid waste management plans and to address any comments from the public regarding the Preliminary Draft Materials Separation Plan.

Background: The Authority implements the provisions of the County's Integrated Solid Waste Management Plan (ISWM Plan). In 2006, the Authority updated the ISWM Plan with the principle goals of reducing the amount of waste placed in landfills for disposal and the conservation of landfill space as a result of effective integrated solid waste management operations. Under the ISWM Plan, the Authority manages solid waste through a combination of techniques and programs which recognize that municipal solid waste (MSW) is made up of distinct components that should be managed separately. The Preliminary Draft Materials Separation Plan addresses material separation as part of the Authority's overall integrated solid waste management program.

The Authority implements the provisions of the ISWM Plan through an award-winning, integrated, municipal solid waste management system (the "System") that combines waste reduction, recycling, composting, converting waste to energy through combustion, and landfilling to effectively manage the County's waste. The Authority achieves its 50 percent (50%) recycling waste reduction goal through various mechanisms, approaches, and methods that promote environmental protection. As such:

- The System integrates cost effective solid waste transportation techniques that minimize environmentally harmful emissions;
- The System utilizes effective hazardous waste disposal through the use of modern facilities and advanced technological operations;
- The System incorporates solid waste processing, composting, and recycling methods in order to reduce the amount of waste placed in landfills for disposal; and
- The System implements resource recovery procedures that provide alternative sources of energy and effectively conserve landfill space.

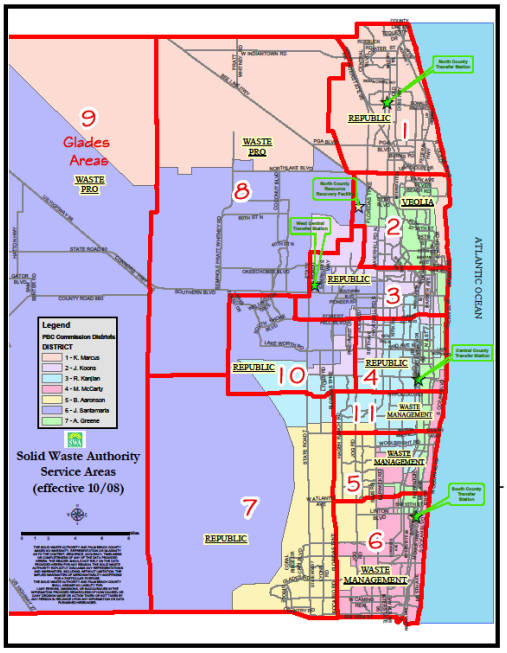
B. Proposed Renewable Energy Facility

The Authority's existing renewable energy facility, the North County Resource Recovery Facility (NCRRF), has been operational since 1989 and has a rated capacity of 624,000 tons-per-year (tpy). However, over the past 10 years, the NCRRF has frequently processed more than 800,000 tpy of waste. In addition, nearly 500,000 tpy of combustible waste is landfilled because the capacity of the NCRRF has been exceeded. Due to the growing need for additional capacity as a result of recent and projected increases in the County's population, the Authority seeks to develop a 3,000 tpd mass burn waste-to-energy facility (Proposed Facility) to increase the Authority's capacity to process combustible waste and minimize the landfilling of MSW. Constructing the 3,000 tpd Proposed Facility will allow the Authority to increase its overall waste processing capacity by approximately 985,000 tpy.

C. Size of the Service Area served by the Solid Waste Authority

The Authority's service area includes all of Palm Beach County. Using its own employees, the Authority provides solid waste disposal and recycling services and programs to the County's 1.3 million residents and businesses. The Authority also provides solid waste and recycling collection services to the residents and businesses in the unincorporated areas of Palm Beach County by using private haulers under exclusive franchise agreements. The unincorporated area of the County is divided into eleven service areas, each of which is designated to one of the haulers that have an exclusive right to provide collection services in their respective service areas. Similarly, all of the municipalities within the incorporated area of the County have solid waste collection agreements. The Authority has interlocal agreements with their municipal partners to deliver their residential solid waste, recyclable materials, and commercial solid waste to facilities designated by the Authority. The unincorporated area and the eleven service areas are depicted in Figure 1.

Figure 1: Solid Waste and Recycling Collection Service Areas
(Unincorporated Palm Beach County)



D. Amount of Solid Waste in the Solid Waste Authority's Service Area

The Authority emphasizes the conservation of resources by diverting materials from solid waste disposal facilities through recycling, reuse, and reduction. Since the inception of the recycling program, the Authority has recycled more than two million tons of residential and commercial material that otherwise would have been landfilled. In calendar year 2006, the Authority received 2,029,454 tons of solid waste of which 554,085 tons were recycled, as reported by the Florida Department of Environmental Protection (FDEP). The historical quantities of solid waste specifically managed by the Authority are depicted in Table 1.

Table 1: Historical Solid Waste Stream Collected and Managed (tons)[1]

Calendar Year	2003	2004	2005	2006	2007
Collected Amounts					
C&D debris	339,550	517,670	612,284	714,368	674,731
Tires	3,453	3,836	18,347	22,324	20,572
White Goods	12,493	25,781	22,792	24,354	47,313
Newspaper	105,494	120,033	93,775	111,620	98,741
Glass	54,441	61,065	44,849	54,795	47,313
Aluminum Cans	8,200	9,115	10,193	12,177	10,286
Plastic Bottles	31,639	35,165	22,424	28,412	24,685
Steel Cans	14,360	13,085	14,270	16,236	14,400
Corrugated Paper	141,356	121,002	165,126	198,886	174,854
Office Paper	47,046	52,846	30,579	36,530	32,914
Yard Trash	223,332	205,024	184,436	215,122	191,311
Management					
Combusted[2]	438,905	425,800	398,729	458,575	498,194
Landfilled[3]	814,476	973,598	1,051,750	1,016,794	818,311
Recycled[4]	630,314	694,254	590,595	554,085	740,612

Source: FDEP Solid Waste Management Data

[1] This list only represents a select number of materials collected and separated by the Authority.
[2] Represents the net combusted (output), which does not include combustor material recycled or landfilled combustor ash.
[3] Includes landfilled combustor ash.
[4] Does not include recycled C&D Quantities.

The projected quantities of waste handled in the future along with future population projections are depicted in Table 2.

Table 2: Palm Beach County Population and Processible Solid Waste Projections (in tons)

Year	Population	Annual Estimated Class I Waste Generation[1]	Annual Total Estimated MSW Generation (tons)[2]
2009	1,314,918	1,214,261	1,778,197
2010	1,335,500	1,233,267	1,806,030
2011	1,356,527	1,368,779	1,950,560
2012	1,377,886	1,404,234	1,995,175
2013	1,399,580	1,440,607	2,040,852
2014	1,421,617	1,477,922	2,087,618
2015	1,444,000	1,516,204	2,135,499
2016	1,463,430	1,551,971	2,179,600
2017	1,483,121	1,588,583	2,224,657
2018	1,503,078	1,626,058	2,270,690
2019	1,523,303	1,664,417	2,317,724
2020	1,543,800	1,703,681	2,365,778
2021	1,562,578	1,741,647	2,411,798
2022	1,581,584	1,780,460	2,458,761
2023	1,600,821	1,820,137	2,506,689
2024	1,620,292	1,860,699	2,555,601
2025	1,640,000	1,902,164	2,605,519
2026	1,657,522	1,941,711	2,652,581
2027	1,675,230	1,982,081	2,700,546
2028	1,693,128	2,023,290	2,749,430
2029	1,711,218	2,065,356	2,799,254
2030	1,729,500	2,108,296	2,850,035
2031	1,745,559	2,149,151	2,897,778
2032	1,761,767	2,190,798	2,946,375
2033	1,778,126	2,233,251	2,995,845
2034	1,794,636	2,276,528	3,046,202
2035	1,811,300	2,320,643	3,097,464
2036	1,828,041	2,365,512	3,149,513
2037	1,844,937	2,411,249	3,202,496
2038	1,844,937	2,435,362	3,226,609

Source: The Solid Waste Authority of Palm Beach County's 2009 Landfill Depletion Model, dated November 2008

[1] Includes only Class I waste that has the potential to be combusted.
[2] Includes both Class III and Class I waste. Class III material is not typically combustible.

E. Types and Estimated Amounts of Materials Proposed for Separation

The types and estimated amounts of materials proposed for separation by the Solid Waste Authority are depicted in Table 3.

Table 3: Estimated Amount of Materials Proposed for Separation

Year	Horticultural[1]	HHW[2]	Residential Recyclables[3]	Commercial Recyclables[3]	C&D[4]	White Goods[5]	Tires[6]
2009	249,572	1,176	110,273	25,065	644,310	27,211	15,028
2010	253,478	1,195	111,999	25,457	654,395	27,637	15,263
2011	257,469	1,213	113,762	25,858	664,698	28,072	15,503
2012	261,523	1,232	115,553	26,265	675,164	28,514	15,747
2013	265,640	1,252	117,373	26,679	685,794	28,963	15,995
2014	269,823	1,272	119,221	27,099	696,592	29,419	16,247
2015	274,071	1,292	121,098	27,526	707,560	29,882	16,503
2016	277,759	1,309	122,727	27,896	717,081	30,284	16,725
2017	281,496	1,327	124,379	28,271	726,730	30,691	16,950
2018	285,284	1,344	126,052	28,652	736,508	31,104	17,178
2019	289,123	1,363	127,748	29,037	746,418	31,523	17,409
2020	293,013	1,381	129,467	29,428	756,462	31,947	17,643

[1] Horticultural projections were calculated using the per capita average from recent years from the Authority's Landfill Depletion Model and multiplied by population projection as presented in Table 2.
[2] Includes certain special wastes such as; mercury containing devices, electronics, medical wastes, and used motor oil. Projections based on a five year per capita average.
[3] Used the most recent full year data from http://www.swa.org/pdf/fy09_incoming_residential_recycling.pdf and http://www.swa.org/pdf/fy09_incoming_commercial_recycling.pdf. The average per capita generation rate was multiplied by the population projections in Table 2.
[4] C&D projections were calculated using the per capita average from recent years from the Authority's Landfill Depletion Model and multiplied by population projections presented in Table 2.
[5] White Goods projections were calculated using the per capita average from recent years and multiplied by population projections presented in Table 2.
[6] Tire projections were calculated using the per capita average from recent years from the Authority's Landfill Depletion Model and multiplied by population projections presented in Table 2.

F. The Methods Proposed for Materials Separation

The Authority has implemented a comprehensive integrated materials separation system that includes the following programs:

- Commercial Materials Recycling Program
- Institutional and Industrial Recycling Program
- Residential Materials Recycling Program
- Composting Program
- Ferrous Metal Processing Program
- Construction and Demolition Debris Program
- Woody Waste Recycling Program (Horticultural)
- Household Hazardous Waste Program
- Conditionally Exempt Small Quantity Generator (CESQG) Program
- Disaster Debris Management Program
- White Goods Program
- Waste Tire Program

The Authority has implemented various Special Waste Programs that handle materials such as contaminated soils and asbestos. Some of these products are handled at the Household Hazardous Waste Facility while others are processed and disposed of separately. The following is a list of programs designed to handle special waste products:

- Mercury Containing Devices Recycling Program
- Electronic Products (E-Waste) Recycling Program
- Medical Waste “Sharps” Depository Program
- Used Motor Oil (HHW) Program
- Greenhouse Gas Reduction Program
- Source Reduction and Contributions to the Community

G. Amount of Residual Waste for Disposal

Despite the Authority's comprehensive recycling program, the amount of solid waste the County delivers to the Facility has increased each year since the Facility began operation, primarily due to population growth.

Table 4: Existing NCRRF Available Processing Capacity versus Required Processing Capacity

Year	Available Waste Processing Capacity	Combusted[1]	Combustible Waste Landfilled[2]	Required Waste Processing Capacity[3]	Waste Processing Capacity Shortfall
	A	B	C	D =B + C	E = A - D
2009	817,000	817,000	380,186	1,197,186	(380,186)
2010[4]	571,900	571,900	409,670	981,570	(409,670)
2011	571,900	571,900	530,361	1,102,261	(530,361)
2012	817,000	817,000	553,834	1,370,834	(553,834)
2013	817,000	817,000	588,362	1,405,362	(588,362)
2014	817,000	817,000	623,756	1,440,756	(623,756)
2015[5]	1,753,000	1,477,037	0	1,477,037	275,963
2016	1,753,000	1,510,738	0	1,510,738	242,262
2017	1,753,000	1,545,208	0	1,545,208	207,792
2018	1,753,000	1,580,465	0	1,580,465	172,535
2019	1,753,000	1,616,526	0	1,616,526	136,474
2020	1,753,000	1,653,411	0	1,653,411	99,589
2021	1,753,000	1,688,938	0	1,688,938	64,062
2022	1,753,000	1,725,232	0	1,725,232	27,768
2023	1,753,000	1,753,000	9,308	1,762,309	(9,309)
2024	1,753,000	1,753,000	47,186	1,800,186	(47,186)
2025	1,753,000	1,753,000	85,881	1,838,881	(85,881)

Source: The Solid Waste Authority of Palm Beach County's 2009 Landfill Depletion Model, dated November 2008

[1] Represents the gross amount of waste combusted (input).
[2] Does not include landfilled combustor ash and only includes Class 1 waste that can potentially be combusted.
[3] This value represents the combusted material in addition to the landfilled material that could be combusted (Class I).
[4] Reduced waste processing capacity at the NCRRF in 2010 and 2011 due to the planned refurbishment of the NCRRF.
[5] The Proposed Facility is anticipated to come online and begin accepting waste in 2015.

H. Alternate Disposal Methods for Handling Residual Waste

The Authority is using its best efforts to promote recycling and material separation programs, but these programs have not eliminated all of the County's solid waste. With regard to the waste that is not recycled, the Authority has two basic options: (1) the Authority can place the material in a landfill or (2) the Authority can use a waste-to-energy facility to recover energy and reduce the volume of material needing disposal. There are no other solid waste disposal options that have a long-term record of successful operations in the United States.

The estimated depletion dates for the Class I and Class III landfills in the County are 2026 and 2015, respectively. The Authority is also in the planning and siting process to develop a new Class I landfill to dispose of the ash from the NCRRF and the Proposed Facility and portions of the solid waste not handled by the current System.

The Authority evaluated multiple options for future solid was management and determined that the Proposed Facility is an essential component for the Authority's integrated solid waste management system. The Authority plans to enhance its recycling program (e.g., currently constructing a new 450 tpd combined residential and commercial Materials Recycling Facility), construct the Proposed Facility, and construct a new Class I Landfill as part of its integrated plan for the management of the County's growing waste stream.

I. Locations to Review Public Comments and to Review the Final Draft Materials Separation Plan

The comments discussed during this public meeting as well as written comments received prior to the meeting will be available to review within 45 days of the date of this public meeting at the locations in Table 5. The Final Draft Materials Separation Plan will be revised to incorporate comments discussed at the meeting. The date the final draft will be available for the public to review will be published in a future public advertisement in The Post.

Table 5: Locations and hours of operation for Palm Beach County Public Libraries

Public Library Name and Location	Hours of Operation	Public Library Name and Location	Hours of Operation
Main Library (West Palm Beach) 3650 Summit Boulevard West Palm Beach, FL 33406	M-TH 9AM to 9PM FRI 9:00 AM to 6:00 PM SAT 9AM to 5PM SUN 12PM to 5PM	**Loula V. York Branch** 525 Bacom Point Road Pahokee, FL 33476	M-T 10AM to 8PM W-SAT 10AM to 5PM
Belle Glade Branch 530 S. Main Street Belle Glade, FL 33430	M-W 10 AM to 8PM TH-SAT 10AM to 5PM	**Lantana Road Branch (Lake Worth)** 4020 Lantana Road Lake Worth, FL 33462	M-TH 10AM to 9PM FRI 10AM to 6PM SAT 10 AM to 5PM SUN 12PM to 5PM
Hagen Ranch Road Branch 14350 Hagen Ranch Road Delray Beach, FL 33446	M-W 9AM to 9PM TH-FRI 9AM to 6PM SAT 9AM to 5PM SUN 12PM to 5PM	**West Boca Branch** 18585 State Road 7 Boca Raton, FL 33498	M-TH 10AM to 9PM FRI 10AM to 6PM SAT 10 AM to 5PM SUN 12PM to 5PM
Jupiter Branch 705 Military Trail Jupiter, FL 33458	M-TH 10AM to 9PM F-SAT 10AM to 5PM SUN 12PM to 5PM	**Tequesta Branch** 461 Old Dixie Highway North Tequesta, FL 33469	M-W 10AM to 8PM TH-FRI 10 AM to 5 PM SAT 10 AM to 5PM
Wellington Branch 1951 Royal Fern Drive Wellington, FL 33414	M-TH 10AM to 9PM FRI 10AM to 6PM SAT 10AM to 5PM SUN 12PM to 5PM	**Library Annex** 4639 Lake Worth Road Lake Worth, FL 33463	M-FRI, 9AM to 5PM
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J. Public Questions and Comment

APPENDIX J
PUBLIC NOTICE ADVERTISEMENT

THE PALM BEACH POST

Published Daily and Sunday
West Palm Beach, Palm Beach County, Florida

PROOF OF PUBLICATION

STATE OF FLORIDA
COUNTY OF PALM BEACH

Before the undersigned authority personally appeared **Rose Novotny**, who on oath says that she is **Real Estate Manager** of The Palm Beach Post, a daily and Sunday newspaper, published at West Palm Beach in Palm Beach County, Florida; that the attached copy of advertising for a **Notice** in the matter of **Public Meeting** was published in said newspaper in the issues of **June 4, 5, 6, & 7, 2009.** Affiant further says that the said The Post is a newspaper published at West Palm Beach, in said Palm Beach County, Florida, and that the said newspaper has heretofore been continuously published in said Palm Beach County, Florida, daily and Sunday and has been entered as second class mail matter at the post office in West Palm Beach, in said Palm Beach County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that she/he has neither paid nor promised any person, firm or corporation any discount rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper. Also published in Martin and St. Lucie Counties.

Sworn to and subscribed before 8th day of June, A.D. 2009
Who is personally known to me.

NOTARY PUBLIC-STATE OF FLORIDA
Karen M. McLinton
Commission # DD832672
Expires: NOV. 15, 2012
BONDED THRU ATLANTIC BONDING CO., INC.

RECEIVED JUN 10 2009

NO. 4437391R

PRELIMINARY DRAFT MATERIALS SEPARATION PLAN NOTIFICATION OF PUBLIC MEETING

The Solid Waste Authority of Palm Beach County (Authority) prides itself in its award winning integrated municipal solid waste management system. This system combines recycling, composting, waste-to-energy facilities, and landfilling to handle the municipal solid waste produced throughout Palm Beach County. Through this system, the Authority has been able to divert solid waste from the landfill and processes it in an environmentally friendly manner. However, the Authority has determined that it does not have enough processing capacity in its existing facilities to handle the future municipal solid waste generated within the County. The Authority is currently making provisions to build a new waste-to-energy facility on the Authority's existing property (Palm Beach Renewable Energy Facility No. 2). This new facility will complement the Authority's existing waste-to-energy facility and provide the Authority with the capacity it requires to process the County's municipal solid waste well into the future. In accordance with 40 CFR 60.57b, Siting Requirements, the Authority is required to prepare a Materials Separation Plan, which outlines and explains all separation and recycling techniques the Authority uses in its integrated municipal solid waste management system.

Notice is hereby given by the Authority, that a Public Meeting will be held to present and review the Authority's Preliminary Draft Materials Separation Plan in accordance with 40 CFR 60.57b, Siting Requirements, which applies to the development of a waste-to-energy facility. The Authority will receive written and oral comments from the public regarding the Preliminary Draft Materials Separation Plan at this Public Meeting. In addition, written comments may also be mailed or hand delivered (during normal business hours) to the Authority, located at the Solid Waste Authority Administration Building, 7501 North Jog Road, West Palm Beach, FL 33412.

Public Comment Period: Public comments regarding the Solid Waste Authority Preliminary Draft Materials Separation Plan will be received beginning June 4, 2009 and continuing through July 8, 2009. Comments may be received at the public meeting or by mail at the address listed above.

Location of Public Meeting: Solid Waste Authority Auditorium, 7501 North Jog Road, West Palm Beach, FL 33412.

Date and Time of Public Meeting: July 8, 2009, 7:00 PM.

Locations where the Preliminary Draft Materials Separation Plan may be reviewed and normal business hours: The Preliminary Draft Materials Separation Plan will be available for review beginning June 4, 2009 at all Palm Beach County public libraries. Location and hours of operations are listed below.

Responses to public comments on the Preliminary Draft Materials Separation Plan: Public comments will be reviewed and incorporated into the Final Draft Material Separation Plan after the Public Meeting and will be made available for inspection at the locations listed below.

Location where the Final Draft Materials Separation Plan may be reviewed and normal business hours: The Final Draft Materials Separation Plan will be made available for inspection at the locations listed below after the preliminary draft has been revised.

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PUB: June 4 – 7, 2009

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This E-Sheet(R) is provided as conclusive evidence that the ad appeared in the newspaper on the date and page indicated. You may not create derivative works or in any way exploit or re-purpose any content.
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Client Name: PB CNTY SOLID WASTE AUTHORITY
Advertiser:
Section/Page/Zone: Sports/C002/TC Zone/Full Run
Description: PUBLIC MEETING

2 Minutes

From staff and wire reports

Who's in the news ...

Danica singed for drug-cheat remark

Indycar racer Danica Patrick may want to make sure she's channeling her inner Phyllis Diller the next time she goes for a laugh. She insists she was joking when she said using performance-enhancing drugs would only be cheating if she got caught — but the U.S. Anti-Doping Agency isn't laughing.

CEO Travis Tygart said her comments, printed in this week's *Sports Illustrated*, were "totally irresponsible."

"In one interview, she undercut what millions of parents try their best to teach their kids every day in this country, that winners never cheat and cheaters never win," Tygart said.

In an interview with Dan Patrick published in *Sports Illustrated*, Danica Patrick was asked, if she could take a performance-enhancing drug and not get caught, would she do it if it allowed her to win the Indianapolis 500.

"Well, then it's not cheating, is it? If nobody finds out?" she said.

Dan Patrick: "So you would do it?"

Danica Patrick: "Yeah, it would be like finding a gray area. In motorsports, we work in the gray areas a lot. You're trying to find where the holes are in the rule book."



DARREN HAUCK/The Associated Press

Danica Patrick insists she meant her remarks about performance-enhancing drugs as a joke.

Danica Patrick later said her answers were a joke and she apologized if they came across differently.

"With all the baseball stuff, I've followed it and this is a real problem," she told *USA Today*. "It's a shame kids think they have to do this to get ahead."

Dungy, Harrison on NBC's NFL team

NBC has hired Tony Dungy, recently retired as coach of the Indianapolis Colts, and Rodney Harrison, the former Pro Bowl safety for the New England Patriots and San Diego Chargers, as analysts for its show that previews the network's Sunday night NFL game.



Dungy

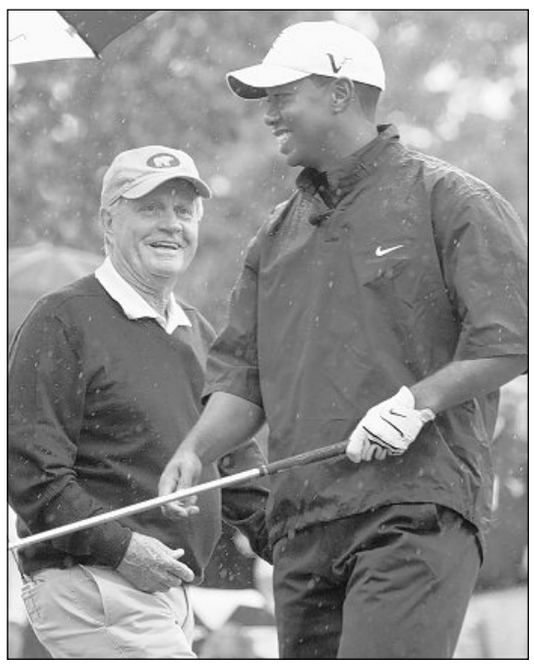


Harrison

That Harrison promised to be "brutally honest" about friends and former teammates comes as little surprise. Dungy's understated reputation might make it harder to imagine him ripping coaches and players.

Dungy proved willing to be frank on a conference call Wednesday, questioning new Bears quarterback Jay Cutler's maturity and opining that Chicago acquired him specifically to beat the rival Green Bay Packers.

"You think that because he's such a nice guy, but he can do it subtly," Colts center Jeff Saturday said. "He'll make his point with guys he thinks are underperforming."



JAY LAPRETE/The Associated Press

Worth standing in the rain

DUBLIN, OHIO – Jack Nicklaus and Tiger Woods were all smiles while playing together in the rain for the Memorial Skins Game, a prelude to the PGA Tour's Memorial Tournament, which starts today. Woods won the event on Nicklaus' home course of Muirfield Village, holing in a chip from 25 yards in the rough on the 18th hole. "Didn't surprise me," Nicklaus said. "Didn't surprise him."

Congressman to NBA: Let 18-year-olds play

Maybe Twain was right about Congress after all. Even with a war abroad, an economy in tatters and health-care reform looming, one U.S. representative has found time to badger the NBA to allow basketball players 18 years old and fresh out of high school to join its ranks.

U.S. Rep. Steve Cohen, D-Tenn., wants the next contract between the league and its players union to scrap the rules that players must be at least 19 years old and a year out of high school to join an NBA team.

Cohen — whose district includes the University of Memphis, home to college basketball's most recent admissions scandal — called the rule an unfair restriction on the ability of athletes to follow their chosen career.

He threatened to do anything in his power — hearings, even — if the two sides don't explain their antipathy to 18-year-olds.

If anything, the league prefers a higher age limit. Commissioner David Stern said last month he wouldn't mind if the new agreement pushed the minimum age to 20.

What's on ...

Television

GOLF		
10 a.m.	Celtic Manor Wales Open	Golf
1 p.m.	Melwood Prince George's County Open	Golf
3 p.m.	Memorial Tournament	Golf
LACROSSE		
9:30 p.m.	Nationals at Bayhawks (taped)	ESPN2
MLB		
4 p.m.	Royals at Rays	Sun*
7 p.m.	Brewers at Marlins	FSN
NBA FINALS		
9 p.m.	Game 1: Magic at Lakers	ABC
NHL — STANLEY CUP FINALS		
8 p.m.	Game 4: Red Wings at Penguins	Versus
SOCCER		
7:30 p.m.	Red Bull New York at D.C. United	ESPN2
TENNIS		
5 a.m.	French Open	Tennis
8 a.m.	French Open	ESPN2

* — Not shown on Comcast

Radio

MLB		
1 p.m.	Rangers at Yankees	640-AM
7 p.m.	Brewers at Marlins	760-AM, 790-AM, 1450-AM

Area events

FLORIDA STATE LEAGUE		
7:05 p.m.	Yankees at Hammerheads	(800) 745-3000
MLB		
7 p.m.	Brewers at Marlins	(877) 627-5467
DOG RACING		
1 p.m.	Palm Beach Kennel Club	(561) 683-2222
HORSE RACING		
12:40 p.m.	Calder Race Course	(800) 333-3227
JAI ALAI		
Noon	Miami Jai-Alai	(305) 633-6400
7 p.m.	Dania Jai-Alai	(954) 927-2841

On the blogs

at PalmBeachPost.com/dolphins

With seven total TDs and 90 catches in two seasons, wide receiver Ted Ginn Jr. hasn't been a bust. But he needs to be more if the Dolphins' offense is going to become more explosive and productive.

— Edgar Thompson

Online poll at PalmBeachPost.com/sports

Today's question: Who will win the NBA Finals?

A. Orlando Magic

B. Los Angeles Lakers

Yesterday's results: Would new ownership help return the Panthers to the playoffs?

I don't think so, 64 percent; I think so, 36 percent

This week's schedule

	SUNDAY MAY 31	MONDAY JUNE 1	TUESDAY JUNE 2	WEDNESDAY JUNE 3	THURSDAY JUNE 4	FRIDAY JUNE 5	SATURDAY JUNE 6
Florida Marlins *PalmBeachPost.com/marlins* Land Shark Stadium Tickets: (561) 966-3309	NYM 3 FLA 2	FLA 7 MIL 4	FLA 10 MIL 3	MIL at FLA, late	vs. MIL 7:10 p.m. FSN	vs. SF 7:10 p.m. FSN	vs. SF 6:10 p.m. No TV



Win
A Generator!
Courtesy of
BrandsMart U.S.A.
OF COURSE... YOUR FAVORITE BRANDS AT LOW, LOW PRICES

One-Stop shopping for Hurricane Season
Our online directory makes it easy:

- 24/7 access to local vendors, including company details, photos and informative videos
- Find shutters, generators, storage and more
- Link to checklists of what to do before, during and after the storm

4412738

Go to stormexpo2009.com

NO. 4437391R
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PUB: June 4 – 7, 2009

CYANMAGENTAYELLOWBLACK 5 Color/Final

Even broken foot couldn't trip student's desire to go to school

▶ PERFECT *from 1B*

As a student at SeaWind Elementary, Schoemer was honored for perfect attendance. With the recognition came a challenge from the principal not to miss a day for the rest of his academic career.

"I took the challenge," he said simply.

Perfect attendance, though, is not so simple. School often takes a back seat to family vacations and religious holidays. Illness and injury can interfere. For a high school student nearing graduation, school can seem less important.

Schoemer, who also attended Murray Middle School, got sick only in the summer. He came close to missing school when he broke his foot, but the injury occurred on a Saturday. He was out of the hospital Sunday and back in school Monday. His mother asked if he wanted to stay home and rest.

"I said, 'No, I gotta keep going to school,' " he said.

Schoemer plans to attend Indian River State College before transferring to Florida Gulf Coast University, where he hopes to study marine or environmental science.

As to whether his streak will survive the late nights and temptations of college life, Schoemer isn't sure.

"I'll try to, but I'm not promising anything," he said with a laugh.

cara_fitzpatrick@pbpost.com

Take note

- Students most likely to miss school are those from homes where a language other than English was spoken, if the student was learning English or if the student had a disability.
- Asian/Pacific Islander students were least likely to miss school, and American Indian students were most likely to miss school.
- Factors leading to absenteeism include family health or financial concerns, a poor school climate, drug and alcohol use, and transportation problems.

Sources: National Center for Education Statistics, *The New York Times*

Mother left toddler with sister; police, DCF officials on scene

▶ SHAWN *from 1B*

to Bethesda Memorial Hospital.

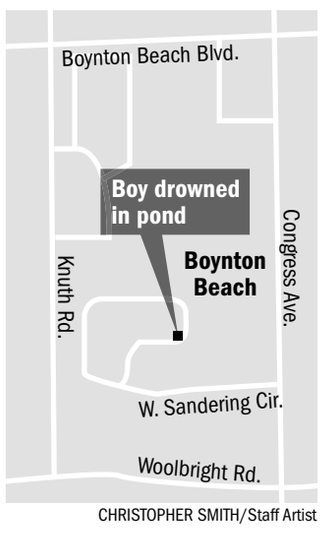
Despite Turco's efforts, Shawn died at the hospital.

It's unclear exactly how old Shawn was. Police said he was 18 months, but a relative said he was 2½ years old.

Contacted Thursday evening, his aunt, Marantha Termilus, could only say, "We are doing terrible. Horrible."

The child's mother, Marie Termilus, was working in Delray Beach and had left her son with her sister, 32-year-old Rose Durand, along with four other children she was watching, Marantha Termilus said.

Marantha Termilus said Marie usually has another baby-sitter for her son.



CHRISTOPHER SMITH/Staff Artist

It is unclear whether Durand was on the playground with the children or in the apartment. After learning about Shawn's death, Durand complained of feeling ill and was taken to a nearby hospital. Police had not talked to her as of Thursday evening, Slater said.

Marantha Termilus said her sister moved to Boynton Beach from Haiti about six years ago.

Police and officials from the state's Department of Children and Families are investigating how the child got into the pond.

"We're talking to anybody and everybody who was there," Slater said.

Officials from the company that manages the complex, on Congress Avenue south of Boynton Beach Boulevard, forced reporters to leave the complex and then attempted to have them removed from a nearby public sidewalk. A few residents also threatened reporters who were filming and interviewing residents.

christina_denardo@pbpost.com

Our History, Your Story

The official centennial book, Palm Beach County at 100: Our History, Our Home, publishes soon.

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Murray R. Gordon M.D. in front of the Biltmore, Palm Beach, 1945

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REAL ESTATE WEEKEND
FRIDAYS
New Homes
The Palm Beach Post

NO. 4437932R

City of Belle Glade

NOTICE OF PUBLIC HEARING

A Public Hearing will be held Monday, June 15, 2009 at 7:00 p.m. in the Belle Glade City Hall Commission Chambers located at 110 Dr. Martin Luther King, Jr. Blvd., West Belle Glade, Palm Beach County, FL

The Belle Glade City Commission is holding this hearing in accordance with section 180.301, Fla. Stat., to receive public comments in order to determine whether the transfer of the City of Belle Glade's water and wastewater utility system to the Glades Utility Authority is in the public interest.

PLEASE TAKE NOTICE AND BE ADVISED that if a person desires to appeal any decision made by the City of Belle Glade City Commission with respect to any matter considered at subject hearing, (s) he will need a record of the proceeding and, for such purpose, will need to ensure that a verbatim record of the proceeding is made, which record includes the testimony and evidence upon which the appeal is to be based (§ 286.0105, Fla. Stat.)

In accordance with Americans with Disabilities Act of 1990, persons needing special accommodations to participate in this proceeding should contact the City Clerk at 561-996-0100 no later than 48 hours prior to the proceeding. If hearing impaired, telephone the Florida Relay Service Numbers, 800-955-8771 (TDD) or 800-955-8770 (Voice), for assistance. (Reference: Florida Statutes 286.26)

Publish: June 5, 2009, The Palm Beach Post

NO. 4437391R

PRELIMINARY DRAFT MATERIALS SEPARATION PLAN NOTIFICATION OF PUBLIC MEETING

The Solid Waste Authority of Palm Beach County (Authority) prides itself in its award winning integrated municipal solid waste management system. This system combines recycling, composting, waste-to-energy facilities, and landfilling to handle the municipal solid waste produced throughout Palm Beach County. Through this system, the Authority has been able to divert solid waste from the landfill and processes it in an environmentally friendly manner. However, the Authority has determined that it does not have enough processing capacity in its existing facilities to handle the future municipal solid waste generated within the County. The Authority is currently making provisions to build a new waste-to-energy facility on the Authority's existing property (Palm Beach Renewable Energy Facility No. 2). This new facility will complement the Authority's existing waste-to-energy facility and provide the Authority with the capacity it requires to process the County's municipal solid waste well into the future. In accordance with 40 CFR 60.57b, Siting Requirements, the Authority is required to prepare a Materials Separation Plan, which outlines and explains all separation and recycling techniques the Authority uses in its integrated municipal solid waste management system.

Notice is hereby given by the Authority, that a Public Meeting will be held to present and review the Authority's Preliminary Draft Materials Separation Plan in accordance with 40 CFR 60.57b, Siting Requirements, which applies to the development of a waste-to-energy facility. The Authority will receive written and oral comments from the public regarding the Preliminary Draft Materials Separation Plan at this Public Meeting. In addition, written comments may also be mailed or hand delivered (during normal business hours) to the Authority, located at the Solid Waste Authority Administration Building, 7501 North Jog Road, West Palm Beach, FL 33412.

Public Comment Period: Public comments regarding the Solid Waste Authority Preliminary Draft Materials Separation Plan will be received beginning June 4, 2009 and continuing through July 8, 2009. Comments may be received at the public meeting or by mail at the address listed above.

Location of Public Meeting: Solid Waste Authority Auditorium, 7501 North Jog Road, West Palm Beach, FL 33412.

Date and Time of Public Meeting: July 8, 2009, 7:00 PM.

Locations where the Preliminary Draft Materials Separation Plan may be reviewed and normal business hours: The Preliminary Draft Materials Separation Plan will be available for review beginning June 4, 2009 at all Palm Beach County public libraries. Location and hours of operations are listed below.

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Belle Glade Branch 530 S. Main Street Belle Glade, FL 33430	M-W 10 AM to 8PM TH-SAT 10AM to 5PM	**North County Regional** 11303 Campus Drive Palm Beach Gardens, FL 33410	M-TH 10AM to 9PM FRI 10AM to 6PM SAT 10AM to 5PM SUN 12PM to 5PM
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Okeechobee Blvd. Branch 5689 Okeechobee Blvd. West Palm Beach, FL 33417	M-W 10AM to 8PM TH-SAT 10AM to 5PM		

PUB: June 4 – 7, 2009

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Publication Date: 06/05/2009

CYANMAGENTAYELLOWBLACK 13 Color/Final

NEWSMAKERS

Today's highlights

Colbert 'going commando' to broadcast from Iraq: Stephen Colbert will broadcast four shows next week from Baghdad, where he says he'll be "Bob Hoping" it for the troops. Colbert arrived at the former Al Faw Palace at Camp Victory on Friday. For weeks, he's promoted the trip on Comedy Central's *The Colbert Report*, but because the military urged caution, he has trumpeted only a vague trip to "the Persian Gulf." The series of shows, each to be taped in front of about 450 troops, has been dubbed *Operation Iraqi Stephen: Going Commando*. It will be the first time anyone has broadcast from Iraq for a USO tour. Colbert has often infused his humor into real events, but he is an ardent supporter of the troops.



Colbert

Boyle feels 'more like herself,' leaves clinic: The brother of talent show contestant Susan Boyle says the singer has left a mental health care facility and is doing better. Gerry Boyle told GMTV Friday that his sister had been released from the London clinic. She was admitted Sunday, after coming in second place in the *Britain's Got Talent* television show. Gerry Boyle said his sister suffered from an anxiety attack but now seems "a lot more like herself." In eight weeks, Boyle went from the quiet life of a church volunteer in a small town in Scotland to global fame.

— Palm Beach Post wire services

Quote of the day



Photo courtesy of Lance Armstrong

'Wassup, world? My name is Max Armstrong and I just arrived. My Mommy is healthy and so am I!'

— LANCE ARMSTRONG, posting on Twitter to announce the birth of his son Max. The boy weighed 7 pounds, 5 ounces and was 20 inches long. Max is the first child of Armstrong, 37, and his girlfriend, Anna Hansen. The cycling champ also has three children with his ex-wife, Kristin.



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BELMONT STAKES COMMENTARY

Belmont plays spoiler again

Borel and company's dreams are buried by the tough race track.

By SALLY JENKINS
The Washington Post

NEW YORK — Belmont Park is a huge, vacant lot of a racecourse and it just doesn't pay to make predictions about what will happen over its empty mile-and-a-half length, when you can't even see who's leading on the far side of the track. Big dreams get buried in the sand and the distance, and so do favorites. Calvin Borel was so jabberingly cocksure that Mine That Bird was the best horse in the field that he guaranteed a victory, only to get the dirt kicked on it in the last sixteenth of a mile by a veteran who knew better, Kent Desormeaux.

You couldn't very well expect Mine That Bird's people to know what Belmont does to favorites, how it dulls hope and instead nurtures fresh mystery horses ridden by loss-hardened jockeys, or how it kills a good story line, because they had never been in such a position before. They'd come out of nowhere. Borel, that habitual rail hugger and ebullient chatterbox, had no way of judging when to move in the deep loam of a Belmont Stakes because he'd never been in one. "It's a very, very different track," said Desormeaux, whose Summer Bird nabbed the victory ahead of Dunkirk and Mine That Bird. "They don't call it 'The Big Sandy' for nothing."

It was hard to imagine another animal with the skipping heart or late speed of Mine That Bird, the little gelding who was a 50-to-1 shot winner of the Kentucky Derby and the second-place finisher in the Preakness. And it was hard to imagine a jockey with more odds-defying audacity than Borel, the Louisiana grade-school dropout, who entered on such a hot streak. "If you don't come with confidence to a race like this you might as well not come," Borel said afterward. Borel was so nervy he defected from Mine That Bird for Rachel Alexandra in the Preakness, and then came back to his mount when the big filly declined to enter the Belmont. He could hardly conceive of losing; in the month of May he'd won 33 of 125 races and finished in the money 70 times. No jockey had ever won a Triple Crown on different horses, but Borel didn't see why it couldn't be done.

"I can't blame him for it, he was starting to feel like Superman, invincible," Desormeaux guessed.

After a workout last week Borel swore that Mine That Bird loved the Belmont track, describing him as almost bouncing off the dirt. He was so convinced that he announced, "We're going to win it, no questions asked." It was an imprudent thing to say, given Belmont's long history of frustrating Triple Crown seekers, and especially foolish given the fact Borel had never ridden in a Belmont before. But could you really blame him?

Instead of studying the track, Borel enjoyed his newfound celebrity in Manhattan, which he had earned with a lifetime of hardscrabble work on the backstretches of Louisiana. He rang the opening bell at the New York Stock Exchange, and appeared on *Late Show With David Letterman* and *Good Morning America*. Asked if he regretted guaranteeing a victory, he shook his head. The colt was well-trained, ready and had the breeding. If Mine That Bird didn't win, it would only be the jockey's fault, he suggested. "I have no excuses."

But perhaps neither Borel nor trainer Bennie "Chip" Woolley — that New Mexico roadie with an amiable twang and a busted leg who won the Kentucky Derby on his first try — realized how the five-week Triple Crown campaign can wear on a horse's stamina and disposition. Or just how grueling the run around that distended oval would be. Earlier in the week when Woolley had seen Belmont for the first time, he stared, daunted, at the yawning expanse. "It's a very large place," he said. "It's a little different when you walk up there, look at the oval and you can't see the whole thing. It's big." After watching his horse lope part way around the track, Woolley thought, "My God, he ain't gonna make it all the way around there."

After the race, the team behind Mine That Bird exhibited all the qualities that had made them so refreshing and so worth following throughout the Triple Crown season. They were unassuming, gracious sportsmen, and appreciative of the experience of a lifetime. Woolley refused to second-guess his jockey — "That's a judgment call out there and I'll pat him on the back when I see him." As for Borel, he had "No regrets at all," he said. "We just got outrun. Don't take nothing away from the horse."

Belmont Stakes Chart

11th Race at Belmont Park, Saturday, 1 Mile. Purse: $1,000,000-Added 3 Year Olds., The Belmont Stakes 141st Running.
Stake Value Of Race: $1,000,000. Value To Winner: $600,000, Second $200,000, Third $100,000, Fourth $60,000, Fifth $30,000.

HORSE	WGT	PP			1M	1	STR	FIN	JOCKEY	TO $1
Summer Bird	126	4	5-1	6-1	9-2	4-1	4-5	1-2	Desormeaux	11.90
Dunkirk	126	2	1-1	1-1	1-1	3-2	2-1	2-nk	Velazquez	4.60
Mine That Bird	126	7	10	10	8-	1-	1-	3-3	Borel	1.25
Charitable Man	126	6	4-	4-1	3-1	2-1	3-1	4-3	Garcia	4.60
Luv Gov	126	5	9-3	9-1	10	7-	6-2	5-4	Mena	22.40
Flying Private	126	8	6-	5-	6-	5-1	5-	6-2	Leparoux	17.30
Brave Victory	126	10	8-1	8-2	5-1	9-	8-2	7-1	Maragh	27.50
Mr. Hot Stuff	126	3	3-1	3-	4-1	6-	7-1	8-7	Prado	22.60
Chocolate Candy	126	1	7-1	7-	7-	8-2	9-14	9-29	Gomez	9.50
Miner's Escape	126	9	2-1	2-1	2-	10	10	10	Lezcano	22.00
Time			23.410	47.130	1:12.430	1:37.860	2:01.660	2:27.540		

PAYOUTS

4 (4) Summer Bird	25.80	9.30	4.70
2 (2) Dunkirk		5.40	3.60
7 (7) Mine That Bird			2.60

Daily Double: 5/4 $152.50
Daily Double BROOKLYN-BELMONT: 3/4 $337.50
Exacta 4/2 $121.00
Superfecta 4/2/7/6 $852.00
Trifecta 4/2/7 $295.00
Pick 3: 2/5/4 (3 correct) $2,577.00
Pick 4: 4/2/5/4 (4 correct) $17,085.00
Pick 6: 6/7/4/2/5/4 (5 correct) $2,482.00
Pick 6: 6/7/4/2/5/4 (6 correct) $969,345.00
Trainer: Tim Ice
Winner: CH C, 3, by Birdstone-Hong Kong Squall
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Grove setting tone at practices

▶ DOLPHINS *from 1C*

just eats on you. (Jake) once told us, you only have a short time to do this and the whole time the goal is to win."

But when the phone rang one night in early March, Jake Grove finally shared some good news — Bill Parcells and the Miami Dolphins had signed Grove to a five-year deal.

Since then, Chuck Grove hears something in his son's voice he'd almost forgotten.

"To me, Jake's as excited as he was when he got drafted," his father said. "He's rejuvenated."

Jake Grove feels a difference every day. In a word: stability.

Grove had four different head coaches the past four seasons in Oakland. But he expects just the opposite in Miami, which finished 11-5 in 2008 under rookie head coach Tony Sparano.

"I expect them to be here in five years," Grove said. "I'm hoping I won't have a new coach every year; won't have to learn a new system every year.

"I've done that. It's tough."

Grove, 29, isn't getting ahead of himself, either.

The Dolphins seem to be headed in the right direction, but their playoff appearance in January also was their first since 2001.

"They did some good things," Grove said. "But that was last year. That doesn't mean anything now."

Grove himself feels poised for big things, too. Yet, five NFL seasons have taught him patience and humility.

In 2004, Grove was the first center drafted, with the No. 45 pick, and started eight games as a rookie. But he battled injuries for three seasons and spent half of 2007 on injured reserve.

In January 2008, Grove underwent knee surgery and spent the next two months on crutches. He wasn't able to run again until last June.

"It's a tough recovery," the 6-foot-4, 300-pound Grove said. "But once I was got going again, I really took off in a hurry and felt so much better. It's never going to be perfect. Nobody ever is."

When coaches determined 2008 starting center Samson Satele largely was responsible for the Dolphins' inconsistency running the ball out of their base offense, Grove became Miami's main target in free agency.

Grove, who signed a $29 million deal, with $14.5 million guaranteed, has come in and set the tone for an offensive line with no other starter older than 27.

Satele, who also was listed at 300 pounds, started every game since he was a second-round pick in 2007.

But last season his reliance on quickness, not power, was exposed against big-time nose tackles like New England's Vince Wilfork, Baltimore's Haloti Ngata and Kris Jenkins of the New York Jets. (Miami was 2-4 against those teams.) Grove might be roughly the same size as Satele, but Grove approaches the game differently.

"I like his aggressiveness," running back Ricky Williams said. "He jumps those nose guards. It's nice because that's where everything starts."

Grove's mean streak has caused quite a stir at Dolphins practice, even though the team will be in shorts until training camp opens in late July.

"I'm excited to see him out in pads because he seems like a really mean player," second-year left tackle Jake Long said.

Hokies longtime head coach Frank Beamer expects Grove's new teammates to see what he did.

"Every play is going to be full speed, tough to the end, nasty to the end," Beamer said. "He's not a big talker. But he's a hard-working, tough player.

"Jake's one of my favorite people. I like what he's all about."

Growing up on a farm, Grove baled hay in 95-degree heat, dug fence posts and worked with cattle, developing qualities he later would use on the football field.

"It didn't matter if it was raining, it didn't matter if it was snowing, you had to get out and go," he said. "It didn't matter if you stayed up late the night before, you had to get up and work.

"I think just little things like that have really translated well into playing football."

But Grove is more than a big, strong farm boy looking to knock someone down.

"Jake brings a physicality to the game and he's a very smart football player," quarterback Chad Pennington said. "Any time you have that combination you have a really good center."

A happy one, too.

Chuck Grove hears that every time his son calls.

"Having a fresh start, and having it with someone like Bill Parcells, makes us all feel good," he said.

edgar_thompson@pbpost.com

NO. 4436350R

NOTICE OF COMPREHENSIVE DEVELOPMENT PLAN TEXT AND MAP CHANGE

The Town of Palm Beach Shores proposes to adopt the following Ordinance:

ORDINANCE NO. O-1-09

AN ORDINANCE OF THE TOWN COMMISSION OF THE TOWN OF PALM BEACH SHORES, FLORIDA, AMENDING ITS COMPREHENSIVE DEVELOPMENT PLAN TO ADOPT EVALUATION AND APPRAISAL ("EAR") BASED AMENDMENTS PURSUANT TO SECTION 163.3191, *FLORIDA STATUTES*, WHICH PROVIDES FOR A COMPREHENSIVE UPDATE TO ALL ELEMENTS, AND WHICH INCLUDE THE TOWN'S WATER SUPPLY FACILITIES WORK PLAN IN ACCORDANCE WITH SECTION 163.3177, *FLORIDA STATUTES*; INCLUDING REVISED TEXT AND MAPS NECESSARY TO UPDATE THE DATA AND ANALYSIS OF THE COMPREHENSIVE PLAN; PROVIDING THAT THE TEXT AND MAPS, AS AMENDED OR REVISED, SHALL BE ADOPTED AS ADDENDA TO THE EXISTING TEXT AND MAPS IN ALL AMENDED ELEMENTS; PROVIDING FOR TRANSMITTAL TO THE STATE LAND PLANNING AGENCY; PROVIDING A CONFLICTS CLAUSE AND A SEVERABILITY CLAUSE; PROVIDING AN EFFECTIVE DATE; AND FOR OTHER PURPOSES.

A Transmittal Public Hearing and First Reading of the Ordinance referenced above amending the Comprehensive Development Plan by adopting text and map amendments will be held by the Town Commission on June 15, 2009 at 7:00 p.m. or as soon thereafter as this item can be heard and continuing from time to time and place to place in the Town Commission Chambers located at 247 Edwards Lane, Palm Beach Shores, Florida.

A copy of the Comprehensive Development Plan amendments and the Ordinance proposed for the Transmittal Public Hearing and First Reading are available for inspection and copying in the office of the Town Clerk during normal business hours of 8:30 a.m. to 4:30 p.m., Monday through Friday. All interested persons are encouraged to come to the public hearing and be heard.

If a person decides to appeal any decision made by the Town Commission with respect to any matter considered at this meeting or hearing, he or she will need to insure that a verbatim record of the proceedings is made, which record should include the testimony and evidence from which the appeal is to be based. The Town of Palm Beach Shores does not provide such a record.

PUBLISH: June 7, 2009

NO. 4437391R

PRELIMINARY DRAFT MATERIALS SEPARATION PLAN NOTIFICATION OF PUBLIC MEETING

The Solid Waste Authority of Palm Beach County (Authority) prides itself in its award winning integrated municipal solid waste management system. This system combines recycling, composting, waste-to-energy facilities, and landfilling to handle the municipal solid waste produced throughout Palm Beach County. Through this system, the Authority has been able to divert solid waste from the landfill and processes it in an environmentally friendly manner. However, the Authority has determined that it does not have enough processing capacity in its existing facilities to handle the future municipal solid waste generated within the County. The Authority is currently making provisions to build a new waste-to-energy facility on the Authority's existing property (Palm Beach Renewable Energy Facility No. 2). This new facility will complement the Authority's existing waste-to-energy facility and provide the Authority with the capacity it requires to process the County's municipal solid waste well into the future. In accordance with 40 CFR 60.57b, Siting Requirements, the Authority is required to prepare a Materials Separation Plan, which outlines and explains all separation and recycling techniques the Authority uses in its integrated municipal solid waste management system.

Notice is hereby given by the Authority, that a Public Meeting will be held to present and review the Authority's Preliminary Draft Materials Separation Plan in accordance with 40 CFR 60.57b, Siting Requirements, which applies to the development of a waste-to-energy facility. The Authority will receive written and oral comments from the public regarding the Preliminary Draft Materials Separation Plan at this Public Meeting. In addition, written comments may also be mailed or hand delivered (during normal business hours) to the Authority, located at the Solid Waste Authority Administration Building, 7501 North Jog Road, West Palm Beach, FL 33412.

Public Comment Period: Public comments regarding the Solid Waste Authority Preliminary Draft Materials Separation Plan will be received beginning June 4, 2009 and continuing through July 8, 2009. Comments may be received at the public meeting or by mail at the address listed above.

Location of Public Meeting: Solid Waste Authority Auditorium, 7501 North Jog Road, West Palm Beach, FL 33412.

Date and Time of Public Meeting: July 8, 2009, 7:00 PM.

Locations where the Preliminary Draft Materials Separation Plan may be reviewed and normal business hours: The Preliminary Draft Materials Separation Plan will be available for review beginning June 4, 2009 at all Palm Beach County public libraries. Location and hours of operations are listed below.

Responses to public comments on the Preliminary Draft Materials Separation Plan: Public comments will be reviewed and incorporated into the Final Draft Material Separation Plan after the Public Meeting and will be made available for inspection at the locations listed below.

Location where the Final Draft Materials Separation Plan may be reviewed and normal business hours: The Final Draft Materials Separation Plan will be made available for inspection at the locations listed below after the preliminary draft has been revised.

AGENDA FOR THE PUBLIC MEETING

A. Introduction
B. Service Area of the Solid Waste Authority for Solid Waste and Recycling Collection
C. Waste Generation and the Preliminary Draft Materials Separation Plan
D. Type and estimated amounts of proposed materials separation
E. Quantities of residual waste and alternate disposal methods
F. Public comments and questions

Location and hours of operation for Palm Beach County Public Libraries

Public Library Name and Location	Hours of Operation	Public Library Name and Location	Hours of Operation
Main Library (West Palm Beach) 3650 Summit Boulevard West Palm Beach, FL 33406	M-TH 9AM to 9PM FRI 9AM to 6PM SAT 9AM to 5PM SUN 12PM to 5PM	**Loula V. York Branch** 525 Bacom Point Road Pahokee, FL 33476	M-T, 10AM to 8PM W-SAT, 10AM to 5PM
Belle Glade Branch 530 S. Main Street Belle Glade, FL 33430	M-W 10 AM to 8PM TH-SAT 10AM to 5PM	**North County Regional** 11303 Campus Drive Palm Beach Gardens, FL 33410	M-TH 10AM to 9PM FRI 10AM to 6PM SAT 10AM to 5PM SUN 12PM to 5PM
Hagen Ranch Road Branch 14350 Hagen Ranch Road Delray Beach, FL 33446	M-W 9AM to 9PM TH-FRI 9AM to 6PM SAT 9AM to 5PM SUN 12PM to 5PM	**Royal Palm Beach Branch** 500 Civic Center Way Royal Palm Beach, FL 33411	M 10AM to 5PM T-TH 10AM to 8PM FRI-SAT 10AM to 5PM
Jupiter Branch 705 Military Trail Jupiter, FL 33458	M-TH 10AM to 9PM F-SAT 10AM to 5PM SUN 12PM to 5PM	**Southwest County Regional** 20701 95th Ave. South Boca Raton, FL 33434	M-TH 10AM to 9PM FRI 10AM to 6PM SAT 10AM to 5PM SUN 12PM to 5PM
Wellington Branch 1951 Royal Fern Drive Wellington, FL 33414	M-TH 10AM to 9PM FRI 10AM to 6PM SAT 10AM to 5PM SUN 12PM to 5PM	**Tequesta Branch** 461 Old Dixie Highway North Tequesta, FL 33469	M-W 10AM to 8PM TH-SAT 10AM to 5PM
West Boynton Branch 9451 Jog Road Boynton Beach, FL 33437	M-TH 10AM to 9PM FRI - SAT 10AM to 5 PM SUN 12PM to 5PM	**Library Annex** 4639 Lake Worth Road Lake Worth, FL 33463	M-FRI, 9AM to 5PM
Greenacres Branch 3750 Jog Road Greenacres, FL 33467	M-W 10AM to 8PM TH-SAT 10AM to 5 PM SUN 12 PM to 5 PM	**Clarence E. Anthony Branch** 375 SW 2nd Ave., South Bay, FL 33493	M&W 11AM to 7PM T,TH,F & SAT, 9AM to 5 PM
Okeechobee Blvd. Branch 5689 Okeechobee Blvd. West Palm Beach, FL 33417	M-W 10AM to 8PM TH-SAT 10AM to 5PM		

PUB: June 4 – 7, 2009

APPENDIX K
PUBLIC MEETING TRANSCRIPT

MINUTES

PUBLIC MEETING
MATERIALS SEPARATION PLAN
SOLID WASTE AUTHORITY AUDITORIUM
JULY 8, 2009 - 7:00 PM

STAFF:	Mark Hammond, Executive Director
	Bob Worobel, Director of Plant Operations & Facility Maint.
	Mark Eyeington, Chief Operating Officer
	Ray Schauer, Director of Engineering & Public Works
	John Archambo, Director of Customer Relations
	Brian Fuente, Facility Maintenance Supervisor
OTHERS:	David Dee, Young van Assenderp, P.A.
	Leah Richter, Malcolm Pirnie
	Tom Henderson, Malcolm Pirnie
	Ryann Davis, Malcolm Pirnie
	Sam Rosania, Malcolm Pirnie

PURPOSE OF MEETING: **To provide the public an opportunity to ask questions concerning the Authority's Preliminary Draft Materials Separation Plan.**

David Dee introduced himself as an attorney and stated that he had been hired by Malcolm Pirnie to assist the Solid Waste Authority of Palm Beach County (Authority) in obtaining approval for the Authority's new resource recovery facility (i.e., Renewable Energy Facility No. 2). Mr. Dee, Malcolm Pirnie, and the Authority's staff are ready to conduct a public hearing concerning the Preliminary Draft Materials Separation Plan (Plan) that had been prepared by Authority. A power point presentation had been prepared that addresses a variety of issues about the Plan. Handout materials, a meeting agenda, and copies of the Plan also are available for the public.

By 7:18 PM., no one from the public had appeared to ask questions about the Plan. Mr. Dee stated that notice of this meeting was published approximately 34 days ago in the Palm Beach Post newspaper, and notice was published on four* separate occasions. Nonetheless, there were no members of the public in attendance.

The Authority will send copies of the power point presentation, the meeting agenda, the notice of meeting, and the Plan to the U.S. Environmental Protection Agency (EPA). All of these materials have been prepared to satisfy the EPA requirements in 40 CFR 60.57b, the siting requirements under Subart Eb of the New Source Performance Standards adopted by EPA for large municipal waste combustors.

Meeting adjourned at approximately 7:20 PM.

Transcribed by: Kathleen A. Levas
Engineering Administration

*Correction: The advertisement was actually published on four separate occasions although three separate occasions was referenced at the meeting.

Prevention of Significant Deterioration (PSD)
Permit Application

Solid Waste Authority of Palm Beach County

Appendix D

Air Pollution Control Equipment Cost Estimates

Palm Beach Renewable Energy Facility No. 2

3582056

MALCOLM PIRNIE

Appendix D
Air Pollution Control Equipment Cost Estimates

Included in this appendix is supporting information relative to the economic impact evaluations presented in Section 5.3.5 of the NO_x BACT analysis for the municipal waste combustors (MWCs). Detailed air pollution control equipment cost estimates with itemized breakdowns of the capital and operating cost components are provided for SCR and SNCR control systems in Table D-1 and Table D-2, respectively. Both the SCR and SNCR cost estimates are for a single MWC rated to process 1,000 tons per day of MSW. The cost estimates were prepared following the general cost estimating approach described in the latest version of the USEPA Air Pollution Control Cost Manual (USEPA, 2002).

Also included in this appendix, is a technical document for a SCR control system obtained from Rambøll Denmark A/S (Ramboll), a European engineering firm which has extensive experience with SCR control systems at WTE plants located throughout Europe. Since vendor representatives based in the United States did not provide requested SCR cost information, Ramboll was contacted to obtain SCR cost data and supporting technical information for the BACT analysis. As noted in Section 5.3.5 and Table D-1, the Ramboll technical document was largely relied upon for generating the capital and operating cost estimates for a SCR system.

TABLE D-1
SELECTIVE CATALYTIC REDUCTION (SCR) CAPITAL COST COMPONENTS
FOR A SINGLE 1000 TPD MUNICIPAL WASTE COMBUSTOR
PALM BEACH RENEWABLE ENERGY FACILITY NO. 2

DIRECT COSTS:	**FACTOR**	**NOTES (1)**	**COST ($)**
1) Purchased Equipment Costs			
a) Basic Equipment			
1) Basic Equipment and Auxiliaries from SCR Supplier		**(2)**	8,000,000
2) Additional Ductwork (220 ft at $1800/ft)		**(3)**	396,000
3) Increased ID Fan Size		**(3)**	8,700
Subtotal of Basic Equipment	A		8,404,700
b) Instruments and Controls	0.1 A		840,470
c) Sales Tax	Exempt		---
d) Freight	0.05A		420,235
Total Purchased Equipment Cost = B	B		9,665,405
2) Direct Installation Costs			
a) Foundations and Supports	0.16 B		1,546,465
b) Handling and Erection	0.40 B		3,866,162
c) Electrical		**(4)**	500,000
d) Piping	0.02 B		193,308
e) Insulation	0.01 B		96,654
f) Painting	0.01 B		96,654
3) Costs for Expansion of APC Building for SCR Components		**(3)**	432,000
Total Direct Installation Cost			6,731,243
TOTAL DIRECT COST			**16,396,648**
INDIRECT COSTS:			
4) Engineering	0.10 B		966,541
5) Construction and Field Expenses	0.05 B		483,270
6) Contractor Fees	0.10 B		966,541
7) Start-up	0.02 B		193,308
8) Performance Test	0.01 B		96,654
9) Contingency	0.15 B		1,449,811
TOTAL INDIRECT COST			**4,156,124**
TOTAL CAPITAL COST			20,552,772

TABLE D-1 (Continued)
SELECTIVE CATALYTIC REDUCTION (SCR) OPERATING COST COMPONENTS
FOR A SINGLE 1000 TPD MUNICIPAL WASTE COMBUSTOR
PALM BEACH RENEWABLE ENERGY FACILITY NO. 2

DIRECT ANNUAL OPERATING COSTS:	**FACTOR**	**NOTES (1)**	**COST ($)**
Operating Labor (3 shifts/day)	1 hour per shift ($50/hr)		54,750
Supervisory Labor	15% of Operating Labor		8,213
Maintenance Labor (3 shifts/day)	1 hour per shift ($50/hr)		54,750
Maintenance Materials	100% of Maintenance Labor		54,750
Catalyst Replacement	[FWF][Catalyst Cost, $]	**(5)**	145,000
Reagent Cost (ammonia/urea)	$1.40/gallon urea solution	**(6)**	253,903
Power (Electricity) Consumption	$0.063/kWh	**(7)**	158,679
Lost Power Generation/Steam for FG Heating	$0.063/kWh	**(8)**	324,230
Total Direct Annual Operating Cost			1,054,274
INDIRECT ANNUAL OPERATING COSTS:			
Overhead	60% of Labor and Materials		103,478
Administration and Insurance	4% of Total Capital Cost		822,111
Capital Recovery	[CRF][Total Capital Cost]	**(9)**	1,940,182
Total Indirect Annual Operating Cost			2,865,770
TOTAL ANNUALIZED COST (per unit)			**3,920,044**
Uncontrolled NOx Emissions (250 ppmv)			744.2
Tons Per Year of NOx Removed (50 ppmv NOx in outlet)			595.3
COST EFFECTIVENESS ($/ton NOx Removed)			**6,585**

NOTES:

(1) Source: EPA Air Pollution Control Cost Manual (Sixth Edition) , EPA/452/B-02-001, January 2002, U.S. EPA Office of Air Quality Planning and Standards (OAQPS) except as noted.

(2) Purchased equipment cost represents estimate provided by Ramboll including transfer cost to United States.

(3) Malcolm Pirnie engineering estimate.

(4) Estimate provided by Ramboll.

(5) Catalyst cost based on FWF (Future Worth Factor) of 0.174 for a 5-year catalyst life and 7% interest rate; catalyst cost of $20,000/m3 and catalyst requirement of 1 m3 per ton/hr of MSW capacity as provided by Ramboll.

(6) SCR reagent cost is based on 0.39 kg NH3/kg NOx removed and 1.05 overdosing factor from Ramboll. Cost assumes use of 50% urea solution at 9.5 lbs/gallon and 28.3% ammonia by weight. Delivered cost of $1.40/gallon of urea.

(7) Power (electricity) demand calculated per hour as follows (from OAQPS Cost Manual):

[(1.17E-4)(acfm)(delta P)/eff] Where: acfm = exhaust actual cubic feet per minute (184,310 acfm)
delta P = pressure drop across system (20 mbar; 8 inches of water from Ramboll)
eff = combined fan and motor efficiency (60%)

(8) Lost power generation for steam required to raise flue gas temperature to SCR operating temperature estimated assuming a 20 °C increase in temperature is needed as indicated by Ramboll.

(9) CRF (Capital Recovery Factor) = 0.0944 and is based on 20 year equipment life and 7 % interest rate as specified for NOx controls in Section 4.2 of OAQPS Cost Manual.

TABLE D-2

SELECTIVE NON-CATALYTIC REDUCTION (SNCR) CAPITAL COST COMPONENTS

FOR A SINGLE 1000 TPD MUNICIPAL WASTE COMBUSTOR

PALM BEACH RENEWABLE ENERGY FACILITY NO. 2

DIRECT COSTS:	**FACTOR**	**NOTES (1)**	**COST ($)**
1) Purchased Equipment Costs			
a) Basic Equipment			
1) Basic Equipment		**(2)**	623,000
2) Auxiliaries & Ductwork	Included Above		---
Subtotal of Basic Equipment	A		623,000
b) Instruments and Controls	0.1 A		62,300
c) Sales Tax	Exempt		---
d) Freight	Included Above		---
Total Purchased Equipment Cost (PEC)	B		685,300
2) Direct Installation Costs			
a) Foundations and Supports	0.10 B		68,530
b) Handling and Erection	0.20 B		137,060
c) Electrical	0.10 B		68,530
d) Piping		**(3)**	33,333
e) Insulation	0.01 B		6,853
f) Painting	0.01 B		6,853
Total Direct Installation Cost			321,159
TOTAL DIRECT COST			**1,006,459**
INDIRECT COSTS:			
3) Engineering	0.10 B		68,530
4) Construction and Field Expenses	0.05 B		34,265
5) Contractor Fees	0.10 B		68,530
6) Start-up	0.02 B		13,706
7) Performance Test	0.01 B		6,853
8) Contingency	0.15 B		102,795
TOTAL INDIRECT COST			**294,679**
TOTAL CAPITAL COST			1,301,138

TABLE D-2 (Continued)
SELECTIVE NON-CATALYTIC REDUCTION (SNCR) OPERATING COST COMPONENTS
FOR A SINGLE 1000 TPD MUNICIPAL WASTE COMBUSTOR
PALM BEACH RENEWABLE ENERGY FACILITY NO. 2

DIRECT ANNUAL OPERATING COSTS:	**FACTOR**	**NOTES (1)**	**COST ($)**
Operating Labor (3 shifts/day)	1 hour per shift ($50/hr)		54,750
Supervisory Labor	15% of Operating Labor		8,213
Maintenance Labor (3 shifts/day)	1 hour per shift ($50/hr)		54,750
Maintenance Materials	100% of Maintenance Labor		54,750
Reagent Cost (Urea)	$1.40/gallon urea solution	**(4)**	236,261
Power (Electricity) Consumption	$0.063/kWh	**(5)**	24,835
Total Direct Annual Operating Cost			433,558
INDIRECT ANNUAL OPERATING COSTS:			
Overhead	60% of Labor and Materials		103,478
Administration and Insurance	4% of Total Capital Cost		52,046
Capital Recovery	[CRF][Total Capital Cost]	**(6)**	122,827
Total Indirect Annual Operating Cost			278,350
TOTAL ANNUALIZED COST (per unit)			**711,908**
Uncontrolled NOx Emissions (250 ppmv)			744.2
Tons Per Year of NOx Removed (85 ppmv NOx in outlet)			491.2
COST EFFECTIVENESS ($/ton NOx Removed)			**1,449**

NOTES:

(1) Source: EPA Air Pollution Control Cost Manual (Sixth Edition) , EPA/452/B-02-001, January 2002, U.S. EPA Office of Air Quality Planning and Standards (OAQPS) except as noted.

(2) Purchased equipment cost & auxiliaries represents estimated price based on SNCR system cost information available from a recent MWC emissions control project. Cost was scaled based on MWC unit size.

(3) Malcolm Pirnie engineering estimate.

(4) SNCR reagent cost for urea solution based on 1.25 dosing factor. Cost assumes use of urea solution with density of 9.5 lbs/gallon and 50% urea by weight. Delivered cost of $1.40/gallon of urea.

(5) Power (electricity) demand calculated based on 45 kW x 8760 hours/yr for SNCR system requirements (compressor, pumps and heater). Estimated cost based on a per MWC basis for shared system components.

(6) CRF (Capital Recovery Factor) = 0.0944 and is based on 20 year equipment life and 7 percent interest rate as indicated for NOx Controls in Section 4.2 of OAQPS Cost Manual.

SCR - Key Capital Cost, Operation Cost Data and Technical Information

Memo to support NOx control BACT Analysis by Malcolm Pirnie

December 2009

RAMBOLL

SCR - Key Capital Cost, Operation Cost Data and Technical Information

Memo to support NOx control BACT Analysis by Malcolm Pirnie

December 2009

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Checked by BKC/JH
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1. Introduction

The aim of this report is to provide the required cost and technical information regarding SCR for Step 1 of the NOx BACT analysis.

The report includes estimate of:

- Technical description of SCR
  - dimensions/ weight
  - auxiliary installation
  - operation temperature and lifetime of catalyst
  - pressure drop in system
- Key cost information for SCR
  - capital cost
  - operating cost

The new waste-to-energy (WtE) in Florida will have a nominal waste treatment capacity of 3,000 tons per day. It is foreseen that 3 or 4 lines will be required depending on the supplier of the grate. The total SCR installation will therefore consist of either 1) three units at 1,000 tons per day or 2) four units at 750 tons per day.

Assessment of SNCR is not within the scope of the report.

2. Assumptions

The assumption in Table 1 are given by MALCOLM PIRNIE, Inc, whereas the economical assumptions in Table 2 are estimated by Rambøll and provided here for guidance only.

Table 1: Technical assumption given

Parameter	Unit	Option 1 (3 units)	Option 2 (4 units)
Flue gas			
Exhaust flow	lb/h	565,885	424,414
Exhaust temp	°F	285	285
Exhaust flow	A ft^3/min	184.310	138,232
Oxygen content	% O^2, dry	8,33%	8,33%
Moisture content	lb/h	71,835	53,876
SCR			
SCR operating temp	°F	480	480
NOx (inlet)	ppm v (7% O_2, dry) peak	280	280
NOx (inlet)	ppm v (7% O_2, dry) average	250	250
NOx (outlet)	ppm v (7% O_2, dry)	50	50

Table 2: Economical assumptions

Parameter	Unit	Value
Value of drum steam (=lost electricity production)	USD/kWh	0,021
Value of produced electricty	USD/kWh	0,07
Cost of ammonia	USD/kg 100% NH_3	1,5

The flue gas values in Table 1 have to be recalculated into volume (m^3) as the inlet and outlet values for NOx are given as ppm by volume. The calculated flue gas volumes are stated in Table 3.

Table 3: Flue gas flow by volume

Flue gas flow		
Flue gas flow, m3 per hour, wet, actual O_2	m^3, wet, act O_2	313.000
Flue gas flow, Rm3 per hour, wet, act O_2	Rm^3/h, wet, act O_2	221.000
Flue gas flow, Rm3 per hour, dry, 7% O_2	Rm^3/h, dry, 7% O_2	175.000

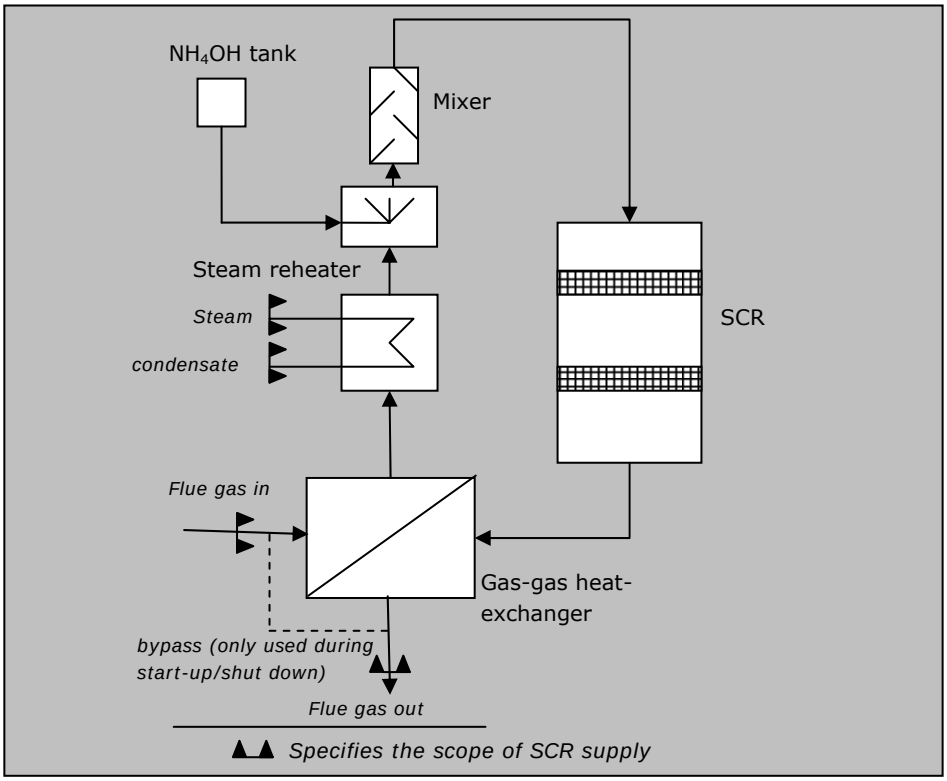
2.1 Scope of SCR Supply

The complete SCR installation consists of:

- gas-gas heat exchanger
- steam reheater
- ammonia injection
- static mixer of the flue gas
- SCR catalyst of housing
- auxiliary installations (e.g. ammonia storage)
- structural support
- CMS (control monitoring system)
- electrical installations

Foundation and building is not within the scope of supply.

Figure 1: Concept diagram of SCR installation



3. Technical Information

3.1 Dimensions

The dimensions in Table 4 give a general idea of the size of the main SCR components. Dimensions of especially the gas-gas heat exchanger and steam reheater can to a relatively high degree be adjusted with regard to height, length and width.

Table 4: Dimension of SCR components

Parameter	Unit	Option 1 (per 1 of 3 units)	Option 2 (per 1 of 4 units)
Gas-gas heat exchanger			
Height x Length x Width	m x m x m	8 x 8 x 8	8 x 7 x 7
Weight (in operation)	ton	200	150
Steam reheater			
Height x Length x Width	m x m x m	2,5 x 7,5 x 2,5	2,5 x 7,5 x 2
Weight (in operation)	ton	50	40
SCR			
Height x Length x Width	m x m x m	14 x 5 x 6	13 x 4,5 x 5,5
Weight (in operation)	ton	80	65

3.2 Footprint of SCR

The footprint per unit of the SCR installation (including gas-gas exchanger, steam reheater, SCR catalyst unit as well as required free space) in option 1 is estimated to be around 12 meters times 26 meters. The height of the SCR tower will be around 27 meters.

For option 2 the foot print of the SCR installation per unit will be decreased with 0-2 meters in all directions (depending on whether the Supplier increases volume by increased width, length or height or a combination) compared to option 1.

3.3 Catalyst

The ceramic catalyst typical consists of TiO_2 (titanium dioxide) as support material as well as V_2O_5 (vanadium penta-oxide) and WO_3 (tungsten trioxide) as active substance.

The following reactions take place on the surface (there is however some uncertainty of the exact relation between NO_2 and NH_3 in reaction (2)):

$$4\ NO + 4NH_3 + O_2 \rightarrow 4\ N_2 + 6\ H_2O \quad (1)$$

$$2\ NO_2 + 4\ NH_3 + O_2 \rightarrow 3\ N_2 + 6\ H_2O \quad (2)$$

In flue gas from waste incineration more than 90% of the NOx will consists of nitric oxide (NO). Reaction 1 will therefore be the dominating. The ammonia use per in kg NH_3 per kg NOx removed will be 0,39 kg NH_3/kg NOx , assuming 95% of NOx presents as NO.

The reaction efficiency will typical be around 95% or higher. The remaining NH_3 will mainly leave non-reacted as NH_3 in slip.

Two to three layers of catalysts are expected with a height of 1,2-1,5 meter. The total volume of catalyst is expected to be around 1 m^3 catalyst per 'installed ton per hour of incineration capacity' in case of an emission requirement of 50 ppm NOx, dry, 7% O_2.

It is possible to remove dioxin with the SCR units. Normally an extra third layer will be installed with a slightly different catalyst targeting dioxins.

3.4 SCR Efficiency

An outlet level of 50 ppm NOx, dry, 7% O_2 is used in the calculations in this memo.

Experience from Ramboll projects have shown that a guarantee value of 50 ppm NOx, dry, 7% O_2 can be easily obtained.

3.5 NH_3 Slip

Suppliers are typically willing to guarantee a maximum ammonia slip of 5 mg NH_3/Nm^3 at 11%O_2, which corresponds to around 10 ppm NH_3, dry, 7% O_2.

3.6 Temperatures in SCR Installation

The proposed SCR operating temperature of 480 °F (249 °C) will prevent deposits of ammonia salts on the surface of the SCR catalyst. It will therefore be possible to operate continuously without regeneration of the catalyst.

The reheating can be done by either saturated drum steam (900 psig) or main steam (830 psig, 805 °F/ 429°C).

Low temperature SCR have been used with mixed results in Europe and the general trend is to go back to a SCR operating of 480 °F ± °40 F to void the need a regeneration.

The net energy input from the reheating by external source is more less independent of the SCR operating temperature as the main part of the heat is covered a gas-gas exchanger, where the incoming gas to the SCR is heating by the outgoing gas from the SCR.

Experience shows that the net energy input is around 36 °F ±9 °F (20 °C±5 °C), as it is dependent in the efficiency of the gas-gas heat exchanger. The efficiency of the gas-gas heat exchanger will in the end be a trade-off between 1) the marginal in-

vestment cost of a more efficiency gas-gas heat exchanger and 2) the reduced cost of a lower steam usage.

3.6.1 Temperature in SCR System

The change in temperature with in the SCR installation is shown in Table 5. The indicated temperatures are based on a 20 °C raise of temperature in the steam reheater. The limited impacts from evaporation of water in the ammonia solution and heat loss to surroundings are excluded.

Table 5: Temperature in SCR system

Parameter	Unit	Value
Upstream 'gas gas heat exchanger'	°F	285
Upstream 'steam reheater'	°F	444
SCR operating temperature	°F	480
Downstream ' gas gas heat exchanger'	°F	321

3.6.2 SCR Lifetime

It is possible be get a guaranteed catalyst lifetime of up to 40,000 operation hours or 5.5 years operation after the first touch of the flue gas on the catalyst.

The precondition of above mentioned 40,000 operation hours is a very efficient removal of SO_2 and dust before the inlet to the SCR.

The lifetime is defined as the length of period in which the following three conditions are fulfilled;

- fulfilments of emission requirements for NOx
- NH_3 consumption is within the guarantee value (typically corresponding to around 5% overdosing of stoichiometric use)
- NH_3 slip is not exceeding the guarantee value.

Based on European experience a catalyst lifetime up to 10 years may be possible.

3.6.3 Cleaning System for SCR

There will be no need for regeneration of SCR catalyst at an operating temperature of 480 °F.

Online sootblowing can be used to clean SCR, but it is the experience that sootblowing is not necessary, if the dust content is very low in the inlet of SCR. This will normally be fulfilled by using a bag house filter for the dust removal.

3.6.4 Pressure Drop

It is estimated that the total pressure drop over the gas-gas exchanger, steam reheater and SCR unit will be around 2.000 Pascal (equivalent to 20 mbar).

3.6.5 Additional Electricity Consumption

The SCR unit will have a minimum of direct usage of electricity. The installation of SCR instead of SNCR will however increase the pressure drop in the facility and thereby the amount of work for the ID-fan.

Secondly there will be an additional electrical usage, if the ID-fan is placed after the SCR, due to a larger volume of flue gas, as the temperature will be increased with 36 °F over the SCR. This additional electrical usage can be voided by installing the ID-fan before the SCR, but the main disadvantage will be a small overpressure in the SCR and the ducts before the stack. An advantage of installing the ID-fan upstream the SCR is that a more compressed gas will, at least in principle, give a relatively better contact between the gas and catalyst. Alternatively two ID-fans can be installed in the flue treatment system.

The potential extra usage due to increased temperature will not be included in the calculations.

4. Cost Information

4.1 Estimated Installation Cost

The estimated costs in Table 6 are based on recent contract negotiated by Ramboll and cost estimates on projects in Europe and North America.

The cost of Client project management and taxes are excluded. The price level is for 2009.

Table 6: Estimated cost of SCR

	SCR 1 unit (750 t per day)	SCR 1 unit (1000 t per day)
Capital Cost (mill USD)		
- De-NOx unit[1]	6,0	7,0
- Transfer cost to US	1,0	1,0
- CMS/ electricity	0,5	0,5
- Installation[2]	-	-
- Unforeseen	0,5	0,5

4.2 Estimated Annual Cost

The SCR unit will have following main costs:

- steam for gas reheater
- ammonia usage
- additional electricity use due to increase pressure drop of SCR
- catalyst material exchange
- maintenance labour

The estimated annual cost will be calculated per ton waste, as the consumption of energy and ammonia is independent of whether the treatment facility is designed as 3 or 4 units.

[1] Includes share of common ammonia storage and handling system

[2] MALCOLM PIRNIE may estimate installation cost based on local condition.

4.2.1 Steam for Gas Reheater

It is assumed that the flue gas will require an additional 20 °C (36 °F) temperature raise after the gas-gas heat exchanger in order to reach to required SCR operating temperature of 480 °F, please refer to chapter 3.6 for further discussion.

Table 7: Steam usage per ton waste

Parameter	Unit	Value
Assumptions		
Required reheating (ΔT)	°C	20
Heat capacity	MJ/kg/°C	0,0011
Density flue gas	kg/Rm^3	1,38
Steam use per ton	kWh/ton	40

4.2.2 Ammonia Usage

The assumption of ammonia usage is discussed in 3.3.

Table 8: Ammonia usage per ton waste

Parameter	Unit	Value
Inlet NO_x level (at 7% O_2)	ppm, dry, 7% O_2	250
Outlet NO_x level (at 7% O_2)	ppm, dry, 7% O_2	50
Conversion from ppm to mg/Rm^3, dry, 7% O_2		1,913
Inlet NO_x level	mg NO_2/Rm^3, dry, 7%O_2	478
Outlet NO_x level	mg NO_2/Rm^3, dry, 7%O_2	96
Amount of NOx to be removed	kg NOx/ton	1,61
Theoretical use of ammonia per kg NO removed	kg 100% NH_3/kg NO_2 removed	0,39
Overdosing factor	-	1,05
100% NH_3 use per ton	kg 100% NH_3 per ton	0,66

4.2.3 Additional Electricity Usage

The assumption of additional electricity usage is discussed in 3.6.4 and 3.6.5.

Table 9: Additional electricity consumption for SCR per ton

Parameter	Unit	Value
Pressure drop over SCR installation	pascal	2.000
Actual flue gas flow	m^3 per second, wet, act O_2	2
Efficiency of ID-fan's motor (assumed)	%	75%
Electricity required	kWh/ton	6

4.2.4 **Cost of Catalyst Material**

Refer to 3.6.2 for the operating lifetime considerations included this analysis.

The unit cost of catalyst is roughly estimated to 20,000 USD/m^3 (2009 cost)

4.2.5 **Cost of Labour**

The additional maintenance labour required with SCR will be similar to that required for SNCR, as everything is automatic and maintenance free of SNCR.

5. Delivery Schedule

The installation of SCR will not be a critical factor, as the grate/boiler will be decisive factor due to longer design phase and period for delivery.

6. General references of SCR in Europe

6.1 Sweden and Norway

In Sweden and Norway a NOx tax has been introduced enforcing the WtE facilities operating with very low emission levels even though the regulation demands 200 mg/Nm^3.

We have chosen some of the new WtE plants:

Location	Size (t/h)	Supplier	Year	De-NOx	Recirculation	Emission (mg NOx/Nm^3 at 11% O_2, dry)
Malmö, Sweden	25	Martin	2003	SCR	no	<25
Halmstad, Sweden	15	Fisia Babcock	2003	SCR	no	25-50
Uppsala, Sweden	22	Von Roll	2004	SCR	yes	25-50
Oslo*, Norway	20	Von Roll	2010	SCR	no	<15

*Oslo (Norway): design guarantee

6.2 Europe in general

We have chosen various WtE facilities in Europe to indicate the emission level when there are no taxes to drive the emissions as low as possible.

Location	Size (t/h)	Supplier	Year	De-NOx	Recirculation	Emission (mg/Nm^3)
Düsseldorf, Germany	6x12,5	Fisia Babcock	1x1980 2x1989 2x1991 1x1995	SCR	no	100-150
Kiel, Germany	2x8,75	Fisia Babcock	2x1996	SCR	yes	70-80
Vienna, Austria	2x16,6	Martin	(2x1971) 2x1989	SCR	no	˜70
Rotterdam, Netherland	4x13,5	Martin	(4x1962) 4x	SCR	no	˜70

Prevention of Significant Deterioration (PSD)
Permit Application

Solid Waste Authority of Palm Beach County

Appendix E

RACT/BACT/LAER Clearinghouse Summaries

Palm Beach Renewable Energy Facility No. 2

3582056

MALCOLM PIRNIE

Appendix E
RACT/BACT/LAER Clearinghouse Summaries

This appendix provides information obtained from USEPA's RACT/BACT/LAER Clearinghouse (RBLC). The RBLC is a centralized permit database containing case-by-case permit determinations and identifying air pollution control technologies that have been required for reducing emissions from proposed and modified stationary sources of air pollutant emissions throughout the United States. Information contained in the RBLC has been provided by state and local permitting agencies. The RBLC was created by UESPA to promote information sharing and to assist permit applicants and permitting authorities with determining appropriate control technology requirements for New Source Review (NSR) permits.

For the proposed project, RBLC summary tables have been prepared for each of the following emission units addressed in this permit application:

- Municipal Waste Combustors (MWCs)
- Storage Silos
- Diesel Fire Pumps (< 500 HP)
- Emergency Generator (diesel-fired, < 1,000 kW)

The RBLC summaries provided in the appendix reflect information contained in the database as of February 10, 2010. For the MWCs, diesel fire pumps and the emergency generator, the RBLC summary provides data covering the most recent 10-year period. For the storage silos, the summary tables are based on the most recent 20-30 entries due to the large number of permit determinations included in the database for these emission units.

TABLE E-1
RACT/BACT/LAER Clearinghouse Summary for Municipal Waste Combustors

Facility	Description	State/ RBLC Code	Permit Date	Emission Limits								Controls	Basis
				NO_x	PM	CO	SO_2	VOC	HCl	Dioxins & Furans	Mercury		
Olmsted County Waste-to-Energy	One new MWC unit rated at 200 tons/day	MN-0073	08/2007	150 ppm						13.0 ng/dscm		SNCR, flue gas recirculation,and activacted carbon injection	BACT (PSD)
Hillsborough Resource Recovery Facility	One new MWC unit rated at 600 tons/day	FL-0284	11/2006	90 ppm (annual) 100 ppm (24-hr)	12 mg/dscm (PM_{10})	80 ppm(30-day) 100 ppm (4-hr)	26 ppm		25 ppm	13.0 ng/dscm	0.028 mg/dscm	SNCR, flue gas recirculation, spray dryer absorber, activacted carbon injection, and fabric filters	BACT (PSD)
Harrisonburg Resource Recovery Facility	Modify two model Barlow project IFB-05-02. Each unit rated at 100 tons/day (34,675 tpy)	VA-0297	11/2005	250 ppm	24 mg/dscm	100 ppm	30 ppm		25 ppm	13.0 ng/dscm	0.080 mg/dscm	Flue gas recirculation, dry flue gas scrubbing (with lime), fabric filer, and carbon injection system	Not Specified
Lee County Waste-to-Energy Facility	One new mass burn MWC unit rated at 291.5 MMBtu/hr (660 tons/day)	FL-0258	10/2003	110 ppm (annual) 150 ppm (24-hr)	20.6 mg/dscm	80 ppm (annual) 100 ppm (4-hr)	26 ppm		25 ppm	13.0 ng/dscm	0.028 mg/dscm	SNCR, dry scrubbers, baghouse, and carbon injection system	BACT (PSD)
Wheelabrator/Gloucester County RRF	Permit modifications for two water wall MWC units rated at 620 tons/day	NJ-0060	06/2003	350 ppm (annual) 205 ppm (1-hr)		100 ppm						SNCR	BACT (PSD)
Harrisonburg Resource Recovery Facility	Modify two MWC units each rated at 100 tons/day (36,500 tpy)	VA-0277	03/2003	160 ppm	24 mg/dscm	100 ppm	30 ppm		25 ppm	13.0 ng/dscm	0.080 mg/dscm	Flue gas recirculation, dry flue gas scrubbing (with lime), fabric filer, and carbon injection system	Not Specified
Harrisonburg Resource Recovery Facility	Modify two MWC units each rated at 100 tons/day	VA-0271	03/2003	10.25 lb/hr	1.68 lb/hr	8.03 lb/hr	5.5 lb/hr	0.42 lb/hr	2.58 lb/hr	13.0 ng/dscm	0.080 mg/dscm	Flue gas recirculation, dry flue gas scrubbing (with lime), fabric filer, and carbon injection system	Not Specified
Camden Resource Recovery Facility	Four mass burn water wall MWC units. Rated at 350 tons/day	NJ-0037	03/2002	5.08 lb/ton 338.0 lb/hr (all units)	0.31 lb/ton 23.5 lb/hr	4.13 lb/ton 249.0 lb/hr (all units)	2.36 lb/ton 138.0 lb/hr (all units)	0.20 lb/ton 27.0 lb/hr	1.21 lb/ton 70.5 lb/hr	0 lb/ton 0 lb/hr	0.005 lb/ton 0.31 lb/hr	ESP and semi-dry scrubber system	BACT
Riley Energy Systems Resource Recovery Facility	Two mass burn water wall MWC units each rated at 250 tons/day (50 MMBtu/hr)	CT-0144	11/2001	180 ppm 0.285 lb/MMBtu 30.9 lb/hr	0.0110 gr/dscf 0.021 lb/MMBtu 2.25 lb/hr	100 ppm	71.0 ppm 0.156 lb/MMBtu 16.95 lb/hr	18.0 ppm 0.010 lb/MMBtu 1.10 lb/hr	20.0 ppm 30452 ug/dscm 6.0 lb/hr	30.0 ng/dscm 1.3E-8 gr/dscf 2.5E-6 lb/hr	837 ug/dscm 3.7E-4 gr/dscf 0.1650 lb/hr	SNCR, fabric filter and carbon injection system	BACT
Dade County Resource Recovery Facility	Modify four MCW units with combined rating of 3000 tons/day	FL-0164	07/2000	250 ppm 614.9 ton/yr	0.011 gr/dscf 29.0 ton/yr	200 ppm 0.20 lb/MMBtu 267.7 ton/yr	29.0 ppm 214.2 ton/yr	25 ppm 19.1 ton/yr	25.0 ppm 0.10 lb/MMBtu 134.2 ton/yr	30.0 ng/dscm 3.8E-5 ton/yr	0.070 mg/dscm 0.08 ton/yr	SNCR, fabric filter, dry scrubbers and carbon injection system	Not Specified
Cominco Red Dog Mine	Permit modifications for facility including waste incinerator at 625.0 lb/hr	AK-0033	12/1999		0.0860 gr/dscf							No controls specified	BACT (PSD)
Wheelabrator South Broward Resource Recovery Facility	Permit modifications for MWC unit rated at 323.6 MMBtu/hr	FL-0169	09/1999	205 ppm 106.5 lb/hr 466.4 ton/yr	0.024 lb/MMBtu 7.35 lb/hr 32.24 ton/yr	100 ppm 31.8 lb/hr 139.1 ton/yr	29.0 ppm 32.8 lb/hr 143.5 ton/yr		29.0 ppm 11.7 lb/hr 51.3 ton/yr	1.3E-8 gr/dscf 8.2E-6 lb/hr 3.6E-5 ton/yr	3.06 E-5 gr/dscf 0.019 lb/hr 0.08 ton/yr	SNCR, spray dryer absorber and fabric filter controls. Source separation specified for mercury control.	Not Specified
Wheelabrator North Broward Resource Recovery Facility	Permit modifications for 3 MWC units rated at 302.5 MMBtu/hr	FL-0170	09/1999	205 ppm 114.0 lb/hr	0.024 lb/MMBtu 0.012 gr/dscf 27.0 mg/dscm	100 ppm 33.9 lb/hr	29.0 ppm 35.1 lb/hr		29.0 ppm 12.6 lb/hr	1.31E-8 gr/dscf 30 ng/dscm 3.8E-5 ton/yr	3.06E-5 gr/dscf 70 ug/dscm 0.09 ton/yr	SNCR, spray dryer absorber and fabric filter controls. Source separation specified for mercury control.	Not Specified

TABLE E-2
RACT/BACT/LAER Clearinghouse Summary for Storage Silos for PM Emissions

Facility	Description	State/RBLC Code	Permit Date	Pollutant	Emission Limits	Control Description	Basis
Lake Charles Cogeneration, LLC	Sand/Bottom Ash Silos and Day Bins	LA-0231	6/2009	PM	0.12 lb/hr 0.005 gr/dscf	Fabric Filters	BACT-PSD
Tate & Lyle Ingredients Americas, Inc.	Lime Silo	IA-0095	9/2008	PM, PM_{10}	0.005 gr/dscf	Dust Collector	BACT-PSD
Big Cajun I Power Plant	Limestone Silo and Crusher	LA-0223	1/2008	PM	0.02 lb/hr 0.02 tons/year	Fabric Filter	BACT-PSD
	Lime Silos			PM	0.22 lb/hr 0.01 tons/yr	Fabric Filter	
Little Gypsy Generating Plant	Activated Lime and Carbon Silos	LA-0221	11/2007	PM	Not indicated	Fabric Filter	BACT-PSD
Homeland Energy Solutions	Coal Storage Silos	IA-0089	08/2007	PM	0.005 gr/dscf	Baghouse	BACT-PSD
ADM Corn Processing	Dry Germ Silo	IA-0088	6/2007	PM_{10}, PM	0.004 gr/dscf each	Baghouse	BACT-PSD
	Limestone Silo						
Hillsborough County Resource Recovery Facility	Lime and Carbon Storage Silo	FL-0284	11/2006	PM	5% Opacity	Fabric Filter	BACT-PSD
CLM Superior	Lime Silos	WI-0233	8/2006	PM	0.56 lb/hr	Baghouse	BACT-PSD
Certainteed Insulation	Storage Silos	TX-0505	4/2006	PM	0.14 lb/hr 0.61 ton/yr	Not Indicated	BACT-PSD
NRG Coal Handling Plant	Limestone Silos	TX-0507	4/2006	PM_{10}	0.61 lb/hr, 2.67 ton/yr	Not Indicated	BACT-PSD
Stora Enso - Biron Mill	Coal Silo	WI-0234	3/2006	PM_{10}, PM	0.1 lb/hr	Baghouse	BACT-PSD
Rodemacher Brownfield Unit 3	Limestone Rock Silo	LA-0202	2/2006	PM_{10}	0.21 lb/hr, 0.12 ton/yr	Baghouse	BACT-PSD
Arkansas Lime Company	Lime Storage Silo and Load out	AR-0082	8/2005	PM_{10}	0.015 gr/dscf	Dust Collector	BACT-PSD
Plaquemine PVC Plant	Delivery and H/C Cleaning Silos	LA-0204	7/2005	PM_{10}	0.01 gr/dscf	Cyclone and Baghouse	BACT-PSD
Auburn Nugget	Silos	IN-0119	5/2005	PM	0.01 gr/dscf	Bin Filters	BACT-PSD
TS Power Plant	Lime and Carbon Silos	NV-0036	5/2005	PM_{10}	0.02 gr/dscf each silo	Bin Vents	BACT-PSD
OPPD- Nebraska City Station	Activated Carbon Silo	NE-0031	3/2005	PM	0.01 gr/dscf	Not Indicated	BACT-PSD
Monticello Mill	Raw Petroleum Coke Silo	MS-0077	3/2005	PM_{10}	0.17 lb/hr 0.75 ton/yr	Baghouse	BACT-PSD
	Pulverized Petroleum Coke Silo			PM_{10}	0.14 lb/hr 0.61 ton/yr	Baghouse	
Nucor Steel	Raw Material Storage Silos	NC-0113	11/2004	PM	0.01 gr/dscf	Bin Vent Filters	BACT-PSD
Nucor Steel	Raw Material Storage Silos	NC-0112	11/2004	PM	0.01 gr/dscf	Bin Vent Filters	BACT-PSD
WPS-Weston Plant	Lime Storage Silo	WI-0228	10/2004	PM_{10}	0.01 gr/dscf 0.1 lb/hr	Baghouse	BACT-PSD
Inland Paperboard and Packaging Orange Mill	Lime Storage Silos (2)	TX-0485	10/2004	PM_{10}	Silo 1 -- 3.4 lb/hr, 2.0 ton/yr Silo 2 -- 0.01 lb/hr, 0.1 ton/yr	Best Management Practices Not Indicated	LAER
MS Chem. Nitrogen, LLC	Lime Storage Silo	MS-0070	9/2004	PM	No limits - negligible emissions	Baghouse	BACT-PSD
SteelCorr, Inc	Material Storage Silo	AR-0077	07/2004	PM	0.01 gr/dscf	Fabric Filters	BACT-PSD
Charter Steel	Carbon and Lime Silos	OH-276	6/2004	PM	0.45 tpy each 0.1 lb/hr each 0.01 gr/dscf each	Bin Vent Filters	BACT-PSD
MidAmerican Energy Company	Lime Silo	IA-0067	6/2003	PM	0.01 gr/dscf	Bin Vent Filters	BACT-PSD
	Silos				0.005 g/decf	Baghouse	
	Two Lime Silos				0.005 g/decf	Bin Vent Filters	
	Activated Carbon Silo				0.005 g/decf	Baghouse	

TABLE E-3
RACT/BACT/LAER Clearinghouse Summary for Diesel Fire Pumps (< 500 HP) for NO_x, VOC, CO, SO_2, and TSP/PM_{10} Emission Control

Facility	Description	State/ RBLC Code	Permit Date	Emission Limits					Control Description	Basis
				NO_x	SO_2	TSP/PM_{10}	VOC	CO		
Chouteau Power Plant	One 267 hp Diesel Fire Pump	OK-0129	01/23/2009	4.9 lb/hr 7.8 g/hp-hr	0.11 lb/hr	0.24 lb/hr 0.4 g/hp-hr	0.66 lb/hr	2.6 g/hp-hr	Good Combustion Practices, Low Sulfur Fuel	BACT-PSD
Ohio River Clean Fuels, LLC	Two 300 hp Diesel Fire Pumps	OH-0317	11/20/2008	4.89 lb/hr 1.23 tpy	--	0.27 lb/hr 0.07 tpy	0.26 lb/hr 0.07 tpy	1.72 lb/hr 0.43 tpy	Good Combustion Practices, Good Engine Design, Ignition Timing Retard, Turbocharger, Low-Temperature Aftercooler	BACT-PSD
CPV St Charles	One 300 hp Diesel Fire Pump	MD-0040	11/12/2008	3.0 g/hp-h (NOx and NMOC combined)	--	0.15 g/hp-h	3.0 g/hp-h (NOx and NMOC combined)	2.6 g/hp-h	Ultra-low Sulfur Fuel (15 ppm)	
Arsenal Hill Power Plant	One Diesel 310 hp Fire Pump	LA-0224	3/20/2008	9.61 lb/hr	0.64 lb/hr	0.68 lb/hr	0.77 lb/hr	2.07 lb/hr	Low Sulfur Fuel, Limited Operating Hours, and Proper Engine Maintenance	BACT-PSD
Dry Fork Station	One Diesel 360 hp Fire Pump	WY-0064	10/15/2007	4.8 g/hp-h	--	0.15 g/hp-h	--	2.6 g/hp-h	Tier II Certified Engine, 500 hours of Operation	MACT
Minnesota Steel Industries, LLC	One diesel Fire Pump <500hp	MN-0070	09/07/2007	--	--	--	--	--	Limited Operatin Hours, 0.05% Low Sulfur Fuel	
Blythe Energy Project II	One 303 hp Diesel Fire Pump	CA-1144	4/25/2007	7.5 lb/hr	--	0.10 lb/hr	--	0.70 lb/hr	Low Sulfur Fuel	BACT-PSD
Progress Bsrtow Power Plant	One Diesel 300 hp Fire Pump	FL-0285	1/26/2007	7.8 g/hp-h	--	--	--	2.6 g/hp-h	None Specified	BACT-PSD
ADM Polymers	Four 460 hp Diesel Fire Pumps	IA-0084	11/30/2006	--	--	--	3.0 g/bhp-h 1.65 tpy	2.6 g/bhp-h 0.78 tpy	Good Combustion Practices	BACT-PSD, MACT
South Harper Peaking Facility	One 0.47 MMBtu/hr Fire Pump	MO-0067	12/29/2004	--	--	--	--	--	Ignition Timing Retard	BACT-PSD
WPS - Weston Plant	One Diesel 450 hp Fire Pump	WI-0228	10/19/2004	14.26 lb/hr	0.94 lb/hr	1.01 lb/hr	1.14 lb/hr	3.07 lb/hr	Limited Hours of Operation, Ultra-low Sulfur Fuel (0.003% sulfur), Good Combustion Practices	BACT-PSD
Duke Energy Washington County LLC	One Diesel 400 hp Fire Pump	OH-0254	8/14/2003	12.8 lb/hr 3.2 tpy	0.84 lb/hr 0.21 tpy	0.88 lb/hr 0.21 tpy	--	2.7 lb/hr 0.69 tpy	Low Sulfur Fuel, Limited Hours of Operation, and Combustion Control	BACT-PSD
Los Angeles County Probation/FAC Planning/ISD	One 240 bhp Diesel Fire Pump	CA-1073	8/14/2003	4.2 g/hp-h	--	0.14 g/bhp-h	--	0.44 g/bhp-h	Low Sulfur Fuel, 5.5 Degrees fuel injection timing retard, After-cooler by raw water, 200 hours of operation	BACT-PSD
MidAmerican Energy Company	One 500 hp Diesel Fire Pump	IA-0067	6/17/2003	4.41 lb/MMBtu 4.2 tpy	0.052 lb/MMBtu 0.05 tpy	0.31 lb/MMBtu	0.35 lb/MMBtu	0.95 lb/MMBtu 0.9 tpy	Good Combustions Practices, Low Sulfur Fule	BACT-PSD
Wallula Power Plant	One Diesel Fire Pump	WA-0291	1/3/2003	--	--	3.7 lb/hr 13.9 tpy	--	--	Low Sulfur Fuel, and Limited Hours of Operation	NA
Hawkeye Generating, LLC	One Diesel Fire Pump	IA-0060	7/23/2002	3.8 lb/hr	--	0.22 lb/hr	0.54 lb/hr	4.7 lb/hr	Good Combustion Practices, Timing Retard	BACT-PSD
El Paso Merchant Energy Co.	One 250 hp Diesel Fire Pump	MS-0055	6/24/2002	--	--	--	--	--	None	BACT
Ultramar	One Diesel 300 hp Fire Pump	CA-1075	5/14/2002	5.89 g/bhp-h	--	0.25 g/bhp-h	0.73 g/bhp-h	3.55 g/bhp-h	Air/Fuel Controller, Limited Hours of Operation	BACT-PSD
Greater Des Moines Energy Center	One 235 bhp Diesel Fire Pump	IA-0058	4/10/2002	2.55 lb/hr 0.64 tpy	--	0.56 lb/hr 0.14 tpy	--	2.21 lb/hr 0.55 tpy	Retarded Ignition Timing	BACT-PSD
Cliffs Energy Project	One Diesel 200 hp Fire Pump	WA-0306	9/11/2001	--	--	--	--	--	Low Sulfur Fuel, Limited Hours of Operation	BACT
Longview Energy Development	One 368 hp Diesel Fire Pump	WA-0288	9/4/2001	--	--	--	--	--	Good Combustion, Clean Fuel, Limited Operating Hours	BACT
Choctaw Gas Generation, LLC	One 1.3 MMBtu/hr Diesel Fire Pump	MS-0058	12/13/2001	--	--	--	--	--	Limited Operating Hours, Good Combustion Practices	Other Case-by-Case
Palestine Energy Facility	One Diesel Fire Pump	TX-0260	12/13/2000	9.45 lb/hr 0.47 tpy	0.70 lb/hr 0.04 tpy	0.67 lb/hr 0.03 tpy	0.77 lb/hr 0.04 tpy	2.04 lb/hr 0.10 tpy	None	BACT-PSD
Duke Enrgy Audrain Generating Station	One 140 kW Diesel Fire Pump	MO-0058	5/9/2000	42 ppm @15% O_2 9.3 g/bhp-h	--	--	--	42 ppm @15% O_2 2.5 g/bhp-h	Good Combustion Practices, Water Spray Injection for NOx	BACT-PSD

TABLE E-4

RACT/BACT/LAER Clearinghouse Summary for Diesel-Fired Emergency Generators (< 1000 kW) for NO_x, VOC, CO, SO_2, and TSP/PM_{10} Emission Control

Facility	Description	State/ RBLC Code	Permit Date	Emission Limits					Control Description	Basis
				NO_x	SO_2	TSP/PM_{10}	VOC	CO		
Drake Cement LLC	One 210 kW Diesel Emergency Generator	AZ-0051	4/12/2006	4.0 g/kW-hr 3-hr avg	---	0.20 g/kW-hr 3-hr avg.	---	3.5 g/kW-hr 3-hr avg	None	BACT-PSD
Dalitalia LLC - Muskogee Porcelain Floor Tile Plant	One Diesel Emergency Generator	OK-0110	10/21/2005	---	---	0.0022 lb/hp-hr	0.0025 lb/hp-hr	0.0067 lb/hp-hr	Good combustion practices. Limited operating hours.	BACT
Dalitalia LLC - Muskogee Porcelain Floor Tile Plant	One Diesel Emergency Generator	OK-0111	10/14/2005	---	---	0.0022 lb/hp-hr	0.0025 lb/hp-hr	0.0067 lb/hp-hr	Good combustion practices. Limited operating hours.	BACT
Duke Energy Hanging Rock Energy Facility	Two 500 kW Diesel Emergency Generator	OH-0252	12/28/2004	10.2 lb/hr each 2.55 tpy each	0.27 lb/hr each 0.067 tpy each	0.59 lb/hr each 0.148 tpy each	1.1 lb/hr each 0.369 tpy each	12.6 lb/hr each 31.4 tpy each	Limited operating hours. Use of low sulfur fuel	BACT-PSD
Wallula Generation, LLC Wallula Power Plant	One Diesel Emergency Generator	WA-0291	1/3/2003	568.0 ppm_{dv} @ 15% O_2 3-hr avg 31.6 lb.hr 3-hr avg	---	---	---	---	Limited operating hours.	Other
Free State Electric, LLC Kelson Ridge	One 700 kW Diesel Emergency Generator	MD-0033	9/27/2001	---	---	---	---	---	Good combustion practices. Limited operating hours.	LAER/ BACT
Kiowa Power Partners LLC Kiamichi Energy Facility	One 0.84 MMBtu Diesel Emergency Generator	OK-0074	5/1/2001	42.0 lb/MMBtu	2.0 grain/100scf	1.24 lb/MMBtu	0.09 lb/MMBtu	0.085 lb/MMBtu	Good combustion practice and design.	BACT-PSD
The AES Aurora - AES Wolf Hollow LP	One 310 kW Diesel Emergency Generator	TX-0326	7/20/2000	17.14 lb/hr 0.70 tpy	0.0022 lb/hr 0.0001 tpy	0.16 lb/hr 0.0070 tpy	0.20 lb/hr 0.008 tpy	1.12 lb/hr 0.05 tpy	None	Other
Shell Chemical Company - Geismar Plant	One 415 hp Diesel Generator Heater	LA-0146	5/10/2000	0.67 lb/hr 0.67 tpy	---	1.01 lb/hr 0.05 tpy	---	3.32 lb/hr 0.14 tpy	Good combustion practice and design. Use of clean burning fuel.	BACT-PSD
Tesoro Alaska Company - Kenai Refinery	One 1.0 MMBtu/hr Emergency Electric Generator	AK-0037	3/21/2000	3.1 lb/ MMBtu	500 ppm 3-hr avg.	0.3627 lb/MMBtu	---	0.81 lb/MMBtu, 3-hr avg.	Limited operating hours.	BACT-PSD

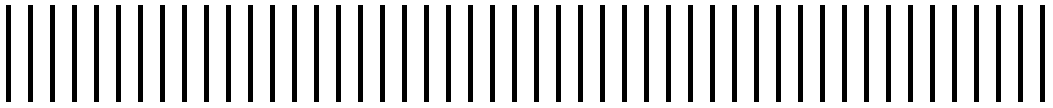
Prevention of Significant Deterioration (PSD)
Permit Application

Solid Waste Authority of Palm Beach County

Appendix F

Air Quality Modeling Report

Palm Beach Renewable Energy Facility No. 2



3582056

MALCOLM PIRNIE

Solid Waste Authority of Palm Beach County

7501 North Jog Road • West Palm Beach, FL 33412

Air Quality Modeling Report

Submitted as *Appendix F of the PSD Permit Application*

Palm Beach Renewable Energy Facility No. 2

April 2010

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3582056

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Attachments

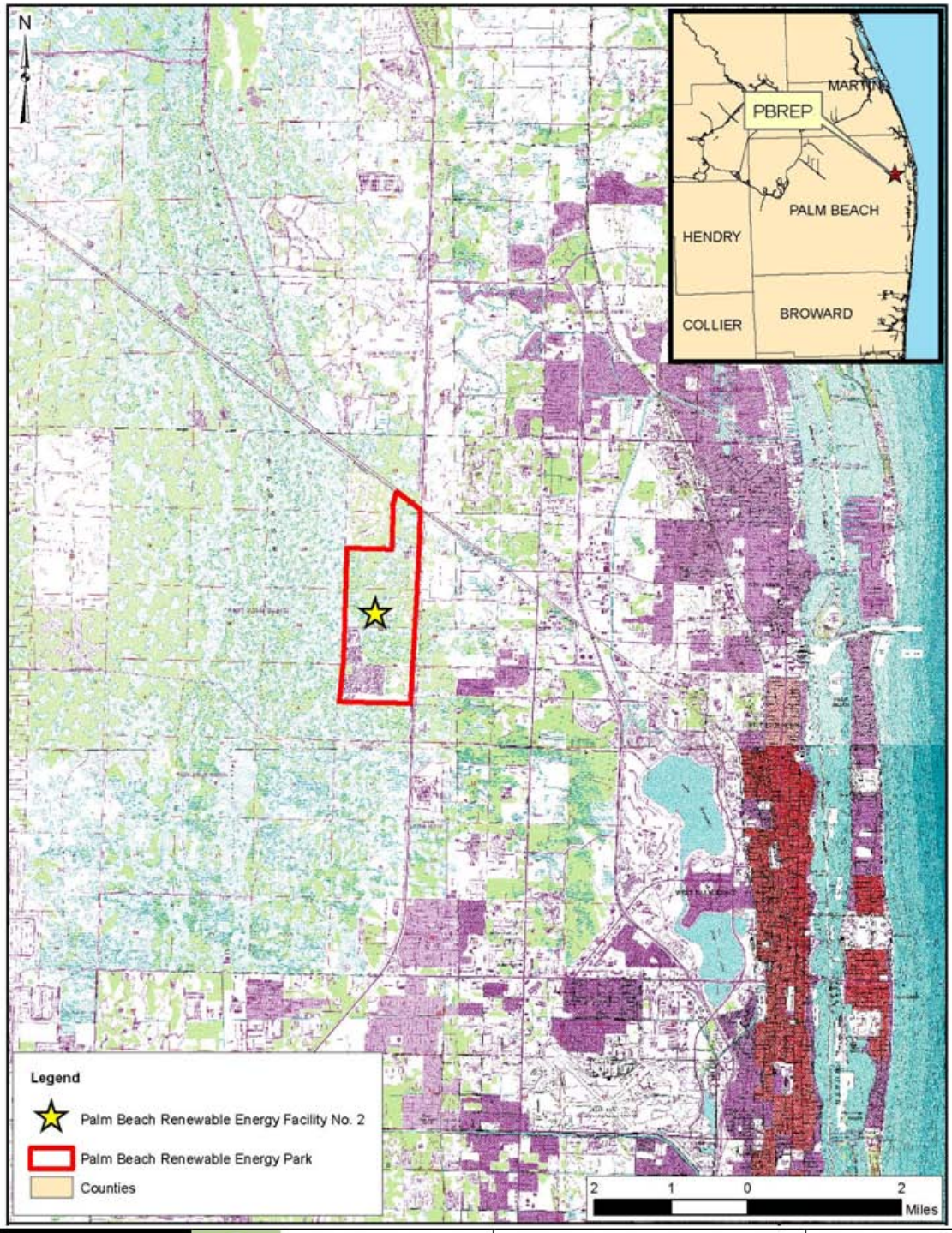
A. Class I Air Dispersion Modeling Report

1. Introduction

The Solid Waste Authority of Palm Beach County (the Authority) is planning to expand its solid waste processing capacity by constructing a mass burn waste-to-energy facility in West Palm Beach, Florida (see Figure 1-1), adjacent to its existing renewable energy facility. The new facility, the Palm Beach Renewable Energy Facility No. 2 (PBREF2), will have a total facility throughput of 3,000 tons per day (tpd) of municipal solid waste (MSW). State-of-the-art emissions control systems will be included in the PBREF2 to minimize air pollutant emissions. In addition, continuous emissions monitoring equipment will be used to ensure on-going compliance with state and federal air regulations.

The Authority's 1,320 acre campus (Palm Beach Renewable Energy Park, PBREP) includes the existing renewable energy facility (the North County Resource Recovery Facility (NCRRF)), a refuse-derived fuel (RDF) facility which has two identical MWC units, with a nominal design capacity of 2,000 tpd of MSW (approximately 1,800 tpd of RDF). The construction of the PBREF2 will complement services that are being provided by the existing facilities at the PBREP, and will also serve to enhance the Authority's 2006 *Integrated Solid Waste Management Plan* (ISWM Plan) to develop a system of programs and facilities to effectively and economically manage solid waste through source reduction, recycling, composting, combustion, and landfilling. The ISWM Plan also calls for the expanded combustion capacity in order to extend the life of the existing landfill beyond its currently anticipated lifespan. The existing renewable energy facility is major source, and based upon its estimated emissions, the proposed project will be a major modification.

As part of the regulatory permitting process for the project, air dispersion modeling was performed to demonstrate that the air quality impacts of the proposed project will comply with all applicable standards and criteria, including National Ambient Air Quality Standards (NAAQS), Prevention of Significant Deterioration (PSD) increments (40 CFR Part 51.166), and Florida Ambient Air Quality Standards (FAAQS). This air quality modeling report describes the analyses that were performed to demonstrate that the proposed facility will meet all applicable air quality standards and criteria.



MALCOLM PIRNIE | SWA Solid Waste Authority of Palm Beach County | Topographical Map of Palm Beach Renewable Energy Facility No. 2 | MALCOLM PIRNIE, INC. | FIGURE 1-1

The report is organized into the following sections:

- **Section 2 – Background and Project Description** briefly describes the proposed project.
- **Section 3 – Applicable Regulations** discusses the air quality standards and criteria used for the modeling.
- **Section 4 – Existing Conditions** discusses the general climate and meteorological conditions in the vicinity of the project site, along with the attainment status and background air quality representative of the area.
- **Section 5 – Air Quality Analysis Methodology** discusses the methodology and parameters used for the modeling analysis, including:
    - selection of the appropriate dispersion model,
    - discussion of the required model input data, and
    - procedures used to select applicable model options.
- **Section 6 – Class II Modeling Results** presents the results of the analyses conducted as part of the modeling effort.
- **Section 7 – Additional Impacts Analysis** presents the results of the growth analysis, and soils and vegetation analysis performed for the proposed project
- **Section 8 – Class I Area Analysis** discusses the results of a Class I analysis performed for Everglades National Park and Biscayne National Park as part of the PSD process. The full Class I analysis is described in Attachment A of this report.
- **Section 9 – References** lists the published regulatory material to be used as guidance in the performance of the modeling analysis.

2. Background and Project Description

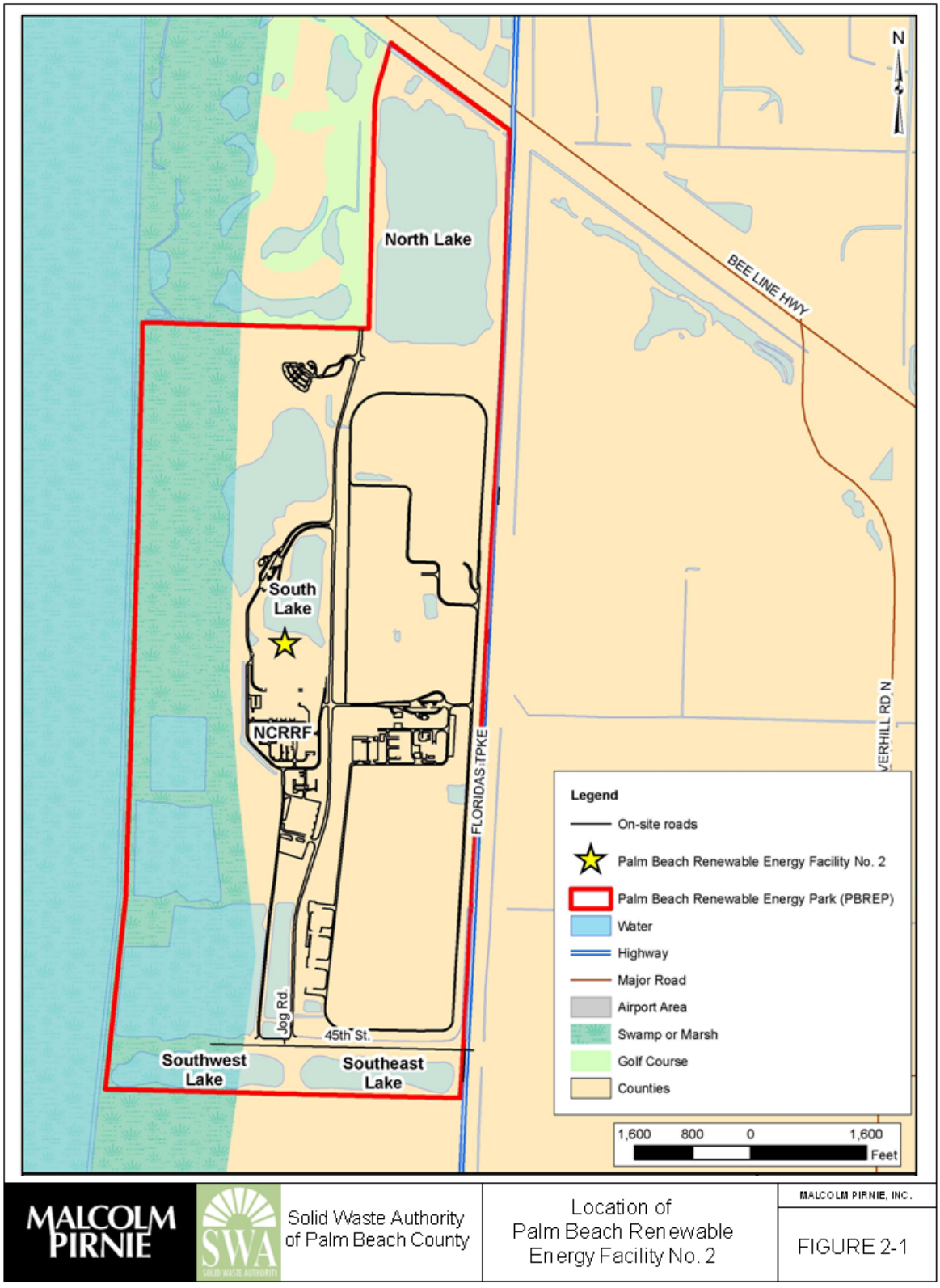
2.1. Background

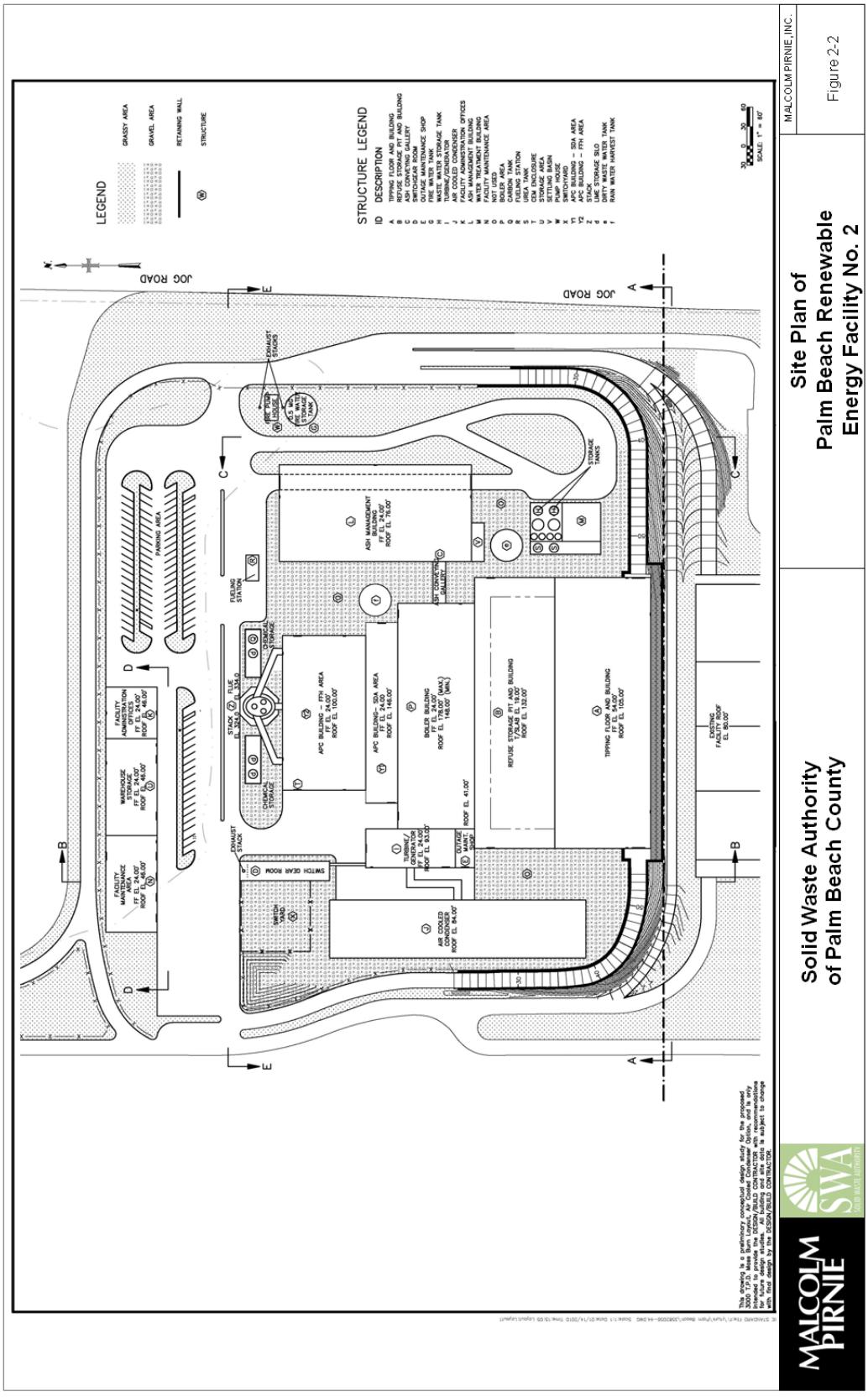
The PBREF2 will be located near 6501 Jog Road, West Palm Beach, within the Palm Beach Renewable Energy Park. Access to the project site is along Jog Road via 45th Street (State Road 705), which is a two-lane road at the southern border of the existing renewable energy facility site, or via Bee Line Highway (State Road 710) from the north (see Figure 2-1). The project site is buffered by developed and undeveloped land owned by the Authority to the north, south, east, and west. The new facility is adjacent to the northern border of the existing renewable energy facility, NCRRF. A site plan of the PBREF2 is shown in Figure 2-2. The PBREP and its existing facilities are subject to conditions of certification that were issued in accordance with the Florida Electrical Power Plant Siting Act (PPSA) (Sections 403.501 to .518, Florida Statutes). The construction and operation of the new facility also will be reviewed pursuant to the PPSA because, among other things, the new facility will increase the steam electrical generating capacity of the Authority's campus.

2.2. Project Description

2.2.1. Municipal Waste Combustors

The proposed facility will have three identical 1,000 tpd MWC units, with a total facility throughput of 3,000 tpd. Each of the three identical MWC units will exhaust through a single flue, and the three identical flues will be enclosed in an outer concrete stack. Nitrogen oxides (NO_x) emissions will be controlled with a selective non-catalytic reduction (SNCR) system. Emissions of acid gases, including sulfur dioxide (SO_2) and hydrogen chloride (HCl), will be controlled with a spray dryer absorber (SDA) with lime injection in combination with a fabric filter (FF) baghouse. Metals and other particulate matter (PM) emissions will also be controlled by the FF baghouse. Good combustion practices will be utilized to minimize products of incomplete combustion, such as carbon monoxide (CO), volatile organic compounds (VOCs), and trace organics. The MWC units will use an activated carbon injection (ACI) system for control of mercury emissions. These state-of-the-art air pollution control systems have consistently proven to be effective in controlling the various pollutants present in MWC flue gases.


N
North Lake
BEE LINE HWY
South Lake
NCRRF
FLORIDAS TPKE
VERHILL RD N
Jog Rd.
45th St.
Southwest Lake
Southeast Lake
Legend
On-site roads
Palm Beach Renewable Energy Facility No. 2
Palm Beach Renewable Energy Park (PBREP)
Water
Highway
Major Road
Airport Area
Swamp or Marsh
Golf Course
Counties
1,600 800 0 1,600
Feet
MALCOLM PIRNIE
SWA
Solid Waste Authority of Palm Beach County
Location of Palm Beach Renewable Energy Facility No. 2
MALCOLM PIRNIE, INC.
FIGURE 2-1


LEGEND
GRASSY AREA
GRAVEL AREA
RETAINING WALL
STRUCTURE
STRUCTURE LEGEND
ID DESCRIPTION
JOG ROAD
PARKING AREA
FUELING STATION
CHEMICAL STORAGE
SWITCH GEAR ROOM
TURBINE/GENERATOR
OUTAGE MAINT. ROOM
TANKAGE
EXISTING FACILITY ROOF
SCALE: 1" = 80'
Solid Waste Authority of Palm Beach County
Site Plan of Palm Beach Renewable Energy Facility No. 2
MALCOLM PIRNIE, INC.
Figure 2-2

2.2.2. Ancillary Equipment

In addition to the MWC units and associated air pollution control systems, supporting (ancillary) equipment will be installed as part of the project. This ancillary equipment includes lime and carbon storage silos, ash handling equipment, emergency fire water pumps and an emergency generator. This equipment is further described in the sections below.

2.2.2.1. Lime and Carbon Silos

Lime will be used as the reagent in the SDA systems for control of acid gas emissions and carbon will be used in the ACI systems to reduce mercury emissions from the MWCs. To provide storage of the lime and carbon at the PBREF2, three lime silos and one carbon silo will be installed. Both lime and carbon will be delivered to the facility via truck shipment. Particulate matter emissions from the silos will be controlled by fabric filters.

2.2.2.2. Cooling System

An air-cooled condenser will be installed at the PBREF2 to provide dry cooling of exhaust steam from the turbines. Dry cooling in an air-cooled condenser provides significant environmental benefits compared with wet cooling tower systems including elimination of issues typically associated with makeup water supply and blowdown disposal. Additionally, particulate matter emissions attributed to drift from a wet cooling tower are avoided in an air-cooled condenser.

2.2.2.3. Fire Water Pumps

As part of the project, two fire water pumps will be installed at the facility. These fire pumps will be standby units and will serve to provide power to pump water for fire suppression purposes in the event of an emergency situation. The fire water pumps are each expected to be powered by a nominal 250 horsepower (HP) diesel-fired engine.

2.2.2.4. Emergency Generator

To provide limited back-up power to the facility in the event of an emergency or electrical power failure, a diesel-fired emergency generator will be installed as part of the project. This generator will be operated to provide safe shutdown of the facility and to provide power to the control room and administration building under emergency situations. The generator is expected to have a nominal 250 kW power output rating.

2.2.2.5. Ash Management Building

Ash handling equipment will be installed at the PBREF2 to manage the ash generated from the combustion process and the fly ash collected by the air pollution control equipment. The collected ash will be transferred to the ash management building via an enclosed conveyor. The ash management building will house ash processing equipment including ferrous and non-ferrous recovery systems. Since the ash will be wetted to a

moisture content level in the approximate range of 20 to 25 percent, fugitive dust emissions from the ash handling equipment are expected to be negligible. To further minimize particulate emissions from the ash handling equipment, exhaust air from the ash management building will be routed to a fabric filter control device prior to discharge to the atmosphere.

3. Applicable Regulations

The proposed project will be subject to a number of federal and state air quality standards, regulations, and air quality criteria, including the following.

- National Ambient Air Quality Standards (NAAQS) established by the U.S. Environmental Protection Agency (USEPA) for criteria pollutants.
- New Source Review (NSR) permitting requirements for major sources (sources having emissions of a regulated pollutant equal to or greater than 100 tons per year) under the federal Prevention of Significant Deterioration (PSD) regulations. The PSD regulations under 40 CFR §52.21 and Florida Administrative Code (F.A.C.) 62-212.400 are applicable on a pollutant-specific basis to new major sources and to major modifications at existing sources located in areas which are in attainment with one or more of the NAAQS.
- State of Florida air quality requirements under F.A.C. Chapter 62.

3.1. Ambient Air Quality Standards

The Clean Air Act Amendments (CAAA) requires the USEPA to set NAAQS for wide-spread pollutants from numerous and diverse sources considered harmful to public health and the environment. There are currently NAAQS designated for six pollutants: sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), ozone (O_3), and particulate matter (PM_{10} and $PM_{2.5}$). The CAAA also established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings. Florida has incorporated the NAAQS by reference into state regulations (F.A.C. Section 62-204.800) and in addition, has established state ambient air quality standards (FAAQS, F.A.C. Section 62-204.240). Table 3-1 lists the current Florida state and national AAQS.

The USEPA recently revised particulate matter ambient air quality standards, rescinding the annual PM_{10} NAAQS, and lowering the 24-hour $PM_{2.5}$ NAAQS; however, most states, including Florida, have not yet promulgated regulations for the control of $PM_{2.5}$ emissions. Therefore, following USEPA guidance, the air quality analysis will use PM_{10} as a surrogate for $PM_{2.5}$.

Table 3-1:
Florida State and National Ambient Air Quality Standards

Pollutant	Averaging Time	FAAQS	NAAQS	
			Primary	Secondary
Carbon Monoxide (CO)	8-hour[1]	9 ppm	9 ppm	---
	1-hour[1]	35 ppm	35 ppm	---
Nitrogen Dioxide (NO_2)	Annual	100 µg/m^3 (0.5 ppm)	100 µg/m^3 (0.053 ppm)	Same as primary
	1-hour[2]	---	189 µg/m^3 (0.100 ppm)	---
Sulfur Dioxide (SO_2)	Annual	60 µg/m^3	0.03 ppm (80 µg/m^3)	Same as primary
	24-hour[1]	260 µg/m^3	0.14 ppm (365 µg/m^3)	Same as primary
	3-hour[1]	1300 µg/m^3	---	0.5 ppm (1300 µg/m^3)
PM_{10}	Annual[3]	50 µg/m^3	---	---
	24-hour[4]	150 µg/m^3	150 µg/m^3	Same as primary
$PM_{2.5}$	Annual [5]	---	15 µg/m^3	Same as primary
	24-hour[6]	---	35 µg/m^3	Same as primary
Lead (Pb)	3-month rolling[7]	---	0.15 µg/m^3	Same as primary
	Quarterly	1.5 µg/m^3	1.5 µg/m^3	Same as primary
Ozone	8-hour[8] (2008)	---	0.075 ppm	Same as primary
	8-hour[9] (1997)	---	0.08 ppm	Same as primary
	1-hour[10]	0.12 ppm	0.12 ppm	Same as primary

Sources: F.A.C. Section 62-204.240 and 40 CFR Part 50.

1. Not to be exceeded more than once per calendar year.
2. Effective April 12, 2010. The standard is based on the 3-year average of the 98th-percentile of the annual distribution of daily maximum 1-hour concentrations.
3. Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the USEPA revoked the annual PM_{10} standard in 2006 (effective December 17, 2006).
4. The 24-hour PM_{10} standard is not to be exceeded more than once per year on average over 3 years.
5. To attain the annual $PM_{2.5}$ standard, the 3-year average of the weighted annual mean concentrations must be less than or equal to the standard.
6. The Federal 24-hour $PM_{2.5}$ standard was changed from 65µg/m^3 to 35 µg/m^3 on December 17, 2006. The 24-hour $PM_{2.5}$ standard is met when the 3-year average of the 98th percentile is less than or equal to the standard.
7. Final rule signed October 15, 2008.
8. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008)
9. The standard is attained when the 3-year average of the fourth-highest daily maximum is less than or equal to the standard.
10. The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1. As of June 15, 2005, the USEPA revoked the 1-hour ozone standard in all areas except the fourteen 8-hour ozone non-attainment Early Action Compact (EAC) areas.

3.2. New Source Review Requirements

The existing renewable energy facility, NCRRF, is a major source of air emissions, and federal NSR requirements under the CAA will apply for the proposed project. NSR refers to the pre-construction review process for new and modified major sources for the purpose of protecting air quality, and includes Prevention of Significant Deterioration (PSD) and Nonattainment NSR (NNSR) regulations. Under the NSR program, NNSR and PSD review are required for major sources of air pollutant emissions on a pollutant-specific basis.

A primary objective of the NSR program is to create a permitting framework that supports compliance with the NAAQS. The USEPA tracks compliance with the NAAQS for each criteria pollutant by designating each area of the country as either "attainment" if the area meets the NAAQS or "nonattainment" if the area does not meet the NAAQS. Thus, a separate determination of attainment status is made for each criteria pollutant. Consequently, a given area may have attainment status for some pollutants and nonattainment status for others.

The proposed PBREF2 will be located in Palm Beach County, which is part of the Southeast Florida Intrastate Air Quality Control Region (40 CFR 81.49). The proposed site of the PBREF2 is located in an area that is in attainment of the NAAQS for all criteria pollutants, and classified as attainment/maintenance for ozone by FDEP (F.A.C. 62-204.340); therefore, PSD regulations will apply to the project.

3.2.1. PSD Review Requirements

Under PSD, review is required for each regulated pollutant with a net emissions increase (for modified sources) or potential emissions (for new sources) equal to or exceeding the applicable significant emission rate (SER) thresholds. The SERs are defined in the federal PSD regulations under 40 CFR §52.21(b)(23)(i). SER thresholds have been established for both criteria and non-criteria pollutants. Emissions estimates for the PBREF2 are shown in Table 3-2 and are compared to the PSD significant emission rates. These emission estimates are based on the anticipated allowable concentration of each pollutant in the exhaust gas. The estimated volume of exhaust gas was calculated based upon the conceptual design of the new MWC units.

Table 3-2:
PBREF2 Emission Rate Estimates

Pollutant	Significant Emission Rate Threshold (tons/yr)	Net Emissions Increase [1] (tons/yr)	Subject to PSD Permitting?
Nitrogen Oxides (NO_x)	40	759.4	Yes
Carbon Monoxide (CO)	100	435.0	Yes
Sulfur Dioxide (SO_2)	40	298.7	Yes
Particulate Matter (PM)	25	56.1	Yes
Particulate Matter (PM_{10})	15	56.1	Yes
Particulate Matter ($PM_{2.5}$)[2]	10	56.1	Yes
Volatile Organic Compounds (VOCs)	40	59.8	Yes
Lead (Pb)	0.6	0.65	Yes
Fluorides	3	13.6	Yes
Sulfuric Acid Mist (SAM)	7	95.2	Yes
Hydrogen Sulfide (H_2S)	10	Negligible[3]	No
Total Reduced Sulfur	10	Negligible[3]	No
Reduced Sulfur Compounds	10	Negligible[3]	No
MWC Organics (as Dioxins/Furans)	3.5E-06	6.1E-05	Yes
MWC Metals (as PM)	15	56.1	Yes
MWC Acid Gases (as SO_2 & HCl)	40	440.4	Yes

Source: 40 CFR 52.21(b)(23).

(1) The net emissions increase values shown are the estimated potential emissions associated with the proposed PBREF2. **No increases in emissions are expected from existing operations at the PBREP.**

(2) In attainment areas in a SIP-approved PSD state, PM_{10} is allowed to be used as a surrogate to meet PSD requirements for $PM_{2.5}$ prior to the state amending its SIP to incorporate the $PM_{2.5}$ requirements.

(3) Emissions of hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds from the MWC units are expected to be negligible due to oxidizing conditions in the combustors.

Therefore, the proposed project is classified as a major modification of an existing major source. Under federal PSD regulations, it must be demonstrated through an evaluation of ambient impacts that the proposed facility would not cause or contribute to a violation of ambient air quality standards, including the NAAQS and FAAQS, or applicable PSD increments for those pollutants emitted in significant amounts.

3.2.1.1. PSD Increments

In order to maintain air quality in areas that meet the NAAQS, the CAAA also established maximum allowable increases over baseline concentrations, called PSD increments. The PSD increments were established for three land use classifications:

Class I, Class II, and Class III. Class I areas are areas of special national or regional value, such as national parks, and are afforded the greatest degree of air quality protection. Palm Beach County area is designated as a Class II area (normal, well-managed growth allowed) for increment consumption. No area of the country has been designated as Class III. The Class I and Class II PSD increments are shown below in Table 3-3.

Table 3-3:
Class I and Class II PSD Increments

Pollutant	Averaging Time	Class I PSD Increments ($\mu g/m^3$)	Class II PSD Increments ($\mu g/m^3$)
Nitrogen Dioxide (NO_2)	Annual	2.5	25
Sulfur Dioxide (SO_2)	Annual 24-hour 3-hour	2 5 25	20 91 512
Particulate Matter (PM_{10})	Annual 24-hour	5 10	17 30

Source: 40 CFR 52.21

Notes:

1. Long-term (annual) increments are not to be exceeded.
2. Short-term (3-hour and 24-hour) increments are not to be exceeded more than once per year.

3.2.1.2. Significant Impact Levels

Following USEPA guidance, the first step of this PSD air quality evaluation is a preliminary analysis to determine if the PSD-applicable emissions from the proposed facility will result in a significant impact. Maximum predicted short-term and annual average impacts are compared to pollutant-specific Significant Impact Levels, or SILs, depending on the area classification. If the maximum predicted impacts are below the SILs, then the pollutant emissions from a major source or major modification are considered to be insignificant, will not to cause or contribute to an exceedance of an ambient air quality standard or increment, and thus, a cumulative, multisource analysis is not required. The Class I and Class II area SILs are shown below in Table 3-4. Note that the Class I SILs, proposed in 1996, have not yet been promulgated.

Table 3-4:
Class I and Class II Significant Impact Levels

Pollutant	Averaging Time	Proposed Class I Significant Impact Levels ($\mu g/m^3$)	Class II Significant Impact Levels ($\mu g/m^3$)
Nitrogen Dioxide (NO_2)	Annual	0.1	1.0
Sulfur Dioxide (SO_2)	Annual 24-hour 3-hour	0.1 0.2 1.0	1.0 5.0 25.0
Particulate Matter (PM_{10})	Annual 24-hour	0.2 0.3	1.0 5.0

Source: Federal Register, Vol. 61, July 23, 1996

3.2.1.3. Class I Areas

PSD regulations provide special protection to Class I areas, areas of special national or regional value from a natural, scenic, recreational, or historic perspective. Sources or modifications subject to PSD review may not adversely impact a Class I area. This protection is provided by the stringent limits defined by the Class I increments and by controlling pollutant levels to prevent adverse affects on the special attributes of a Class I area (or air quality related values, AQRVs), such as flora and fauna, or visibility.

3.3. Ambient Reference Concentrations

The Florida Air Toxics Working Group, composed of Florida Department of Environmental Protection (FDEP) and county air toxics staff developed a working list of Ambient Reference Concentrations (ARCs) for a number of hazardous air pollutants (HAPs) listed in Title III of the CAAA of 1990 and other air toxics that might be of concern (FDEP, 1995). These ARCs were designed to serve as guidance levels below which there would be no significant risk to human health. Although FDEP eventually determined that the ARCs were not rules, do not implement any statutory authority, nor are they to be used in the evaluation of air permits (FDEP, 2000), they are, nonetheless, useful for evaluating the magnitude of non-criteria pollutant impacts. Thus, impacts due to the emissions of air toxics from the PBREF2 were compared to relevant ARCs.

3.4. Florida Power Plant Siting Act

The PBREP and its existing facilities are subject to conditions of certification that were issued in accordance with the Florida Electrical Power Plant Siting Act (PPSA, Sections 403.501 to 403.518, Florida Statutes). The construction and operation of the new facility will also be reviewed pursuant to the PPSA because, among other things, the new facility will increase the steam electrical generating capacity of the Authority's campus.

4. Existing Conditions

4.1. Climatology

The proposed facility is to be located in Palm Beach County, on the lower east coast of Florida. Palm Beach County, along with the rest of southern Florida has a tropical climate. Based upon a 30-year database from the National Climatic Data Center (NCDC), the annual average temperature is 75.3°F. Record extreme temperatures ranged from 24°F minimum to 101°F maximum. The annual average relative humidity is 71.5 percent. Annual average precipitation is 61.4 inches, most of it occurring during the summer and wet period from May through October. Hurricane season is officially from June 1st through November 30th.

Between May and October, the weather is hot, humid, and wet with average temperatures ranging between 78.1°F and 82.8°F. This season is characterized by occasional afternoon thunderstorms and sea breezes that result in cooler temperatures in the afternoons. The weather from November through April tends to be warm and generally dry with a range of average temperatures from 66.2°F to 73.8 °F. On occasion, short-term cold fronts can result in temperatures in the 40s and 50s.

4.2. Background Air Quality

Background air quality is established by ambient air monitoring stations maintained by FDEP and local agencies with stations located throughout the state to monitor ambient levels of criteria pollutants (CO, NO_2, SO_2, lead, ozone, and particulates, PM_{10} and $PM_{2.5}$). Published FDEP monitoring data from 2006 through 2008 reported at ambient monitoring stations in the vicinity of the project site were used to determine representative background air quality data; these data, and are presented in Table 4-1. These monitoring stations may include influences from nearby industrial sources and therefore may not be classified strictly as background monitors. The data indicate that all NAAQS are currently being met in the region surrounding the proposed project.

Table 4-1:
Background Air Quality

Pollutant	Averaging Time	Monitoring Location	Monitored Concentration (µg/m^3)		
			2006	2007	2008
NO_2	Annual[1]	West Palm Beach (Belvedere Road)	18	15	--
	1-hour		98	105	68
SO_2	Annual[1]	Riviera Beach	3	3	4
	24-hour[2]		5	3	10
	3-hour[2]		5	10	10
CO	8-hour[2]	West Palm Beach (Belvedere Road)	2,061	1,489	1,145
	1-hour[2]		3,206	2,405	1,718
PM_{10}	Annual[1]	Belle Glade	20.1	16.4	18.9
	24-hour[2]		42	37	49
$PM_{2.5}$	Annual[1]	Royal Palm	--	7.29	6.05
	24-hour[3]		18.2	20.9	14.1
Pb	Quarterly[4]	Pinellas Park	0.01	0.01	0.01
	3-month[5]				
O_3 (ppm)	8-hour[6]	Royal Palm Beach	0.071	0.066	0.066
	1-hour[2]		0.093	0.078	0.074

Source: USEPA AirData - Monitor Values Report - Criteria Air Pollutants.

Notes:

1. Annual concentrations are based upon maximum calendar year monitored concentrations.
2. Short-term concentrations for NO_2, SO_2 and CO are based upon highest, second-highest monitored concentrations.
3. $PM_{2.5}$ 24-hour concentration is the 98th percentile value.
4. Pb quarterly concentration is based on the maximum quarterly arithmetic mean concentration.
5. Pb 3-month averaging time was signed into effect October 15, 2008.
6. Ozone 8-hour concentration is based on the highest fourth-highest monitored concentration.

-- insufficient data to produce a valid average.

5. Air Quality Analysis Methodology

5.1. Objectives

Air dispersion modeling was performed to demonstrate that the air quality impacts for the PBREF2 will comply with all applicable standards and criteria, including National Ambient Air Quality Standards (NAAQS), Florida Ambient Air Quality Standards (FAAQS), and Prevention of Significant Deterioration (PSD) increments (40 CFR Part 51.166). The modeling analysis for the PBREF2 determined potential ambient air quality impacts for applicable pollutants that have the potential to be emitted in significant amounts, as shown in Table 3-2. Based upon the emission estimates from the PBREF2, modeling was required for CO, NO_2, SO_2, lead, and particulate matter (PM_{10} and $PM_{2.5}$).

The dispersion modeling was performed following the procedures described in the *Air Quality Modeling Protocol* (Malcolm Pirnie, 2009) which was reviewed and approved by FDEP and USEPA Region 4. The modeling followed guidance provided in the *Guideline on Air Quality Models* (USEPA, 2008a), the *New Source Review Workshop Manual* (USEPA, 1990), and guidance provided by FDEP.

5.2. Model Selection

The analysis for the PBREF2 was performed using AERMOD (American Meteorological Society/Environmental Protection Agency Regulatory Model, USEPA, 2004a), the model recommended for regulatory assessments by FDEP and USEPA. The AERMOD system has multi-layer meteorology (important for taller stacks), includes handling of convective (unstable) conditions, terrain depiction, and refined characterization of surface conditions. The analysis used the latest version of AERMOD (currently version 09292), and followed the latest USEPA guidance for using AERMOD (USEPA, 2009a).

The AERMOD modeling system includes the following options:

- USEPA regulatory default option, including the use of stack-tip downwash, calm wind/missing data processing;
- Concentration estimates from 1-hour to annual average;
- Point, area, and volume sources. Line sources may also be modeled as a string of volume sources or as elongated area sources;
- Building downwash algorithms to account for the effects of aerodynamic downwash due to nearby buildings on point source emissions;

- Source emission rates can be treated as constant throughout the modeling period, or varied by month, season, hour-of-day, or other optional periods;
- Ability to include multiple receptor grids and grid types in a single run;
- Ability to model in both simple terrain and complex terrain (terrain above stack release height); and
- In elevated terrain, a hill height scale along with the receptor elevation is input to the model.

The terrain data used by AERMOD was processed using the AERMAP pre-processing program (USEPA, 2004b, 2009b). AERMAP processes commercially available Digital Elevation Model (DEM) data and creates a file suitable for use by AERMOD. The AERMAP file contains elevation and hill height scaling factors for each receptor in the air dispersion study. The latest version of AERMAP (currently version 09040) was used for the analysis.

The meteorological data used by AERMOD was developed using the meteorological data preprocessor AERMET (USEPA, 2004c). AERMET incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts. AERMET processes commercially available or custom meteorological data to create two files: a surface data file and an upper air data file used by AERMOD. When applying the AERMET meteorological processor (currently version 06341) to process meteorological data for the AERMOD model, appropriate values for three surface characteristics, surface roughness length, albedo, and Bowen ratio, must be determined. USEPA recently developed the AERSURFACE tool (USEPA, 2008b) to aid users in obtaining realistic and reproducible surface characteristic values, including albedo, Bowen ratio, and surface roughness length, for input to AERMET. AERSURFACE uses publicly available national land cover datasets and look-up tables of surface characteristics that vary by land cover type and season.

A commercial version of the AERMOD model, *BREEZE AERMOD* (*BREEZE* Software, Trinity Consultants, Inc.), was used for the analysis. This commercial version of the AERMOD program combines the regulatory executable files of the AERMOD system with Windows-based pre- and post-processing programs to allow easier data input entry and advanced data processing and graphing capabilities.

5.3. Model Input

The AERMOD model requires four types of input:

- Source parameters (type, dimensions, location, flow, and emission rates);
- Meteorological data (surface and profile data files);

- Receptor location (ground level and/or flagpole), fence line, simple, intermediate, and complex terrain grid receptors; and
- Model control options (land use/land cover, building wake information, regulatory control options, averaging time, etc.)

5.3.1. Source Parameters

The primary sources of emissions at the new facility are the MWC units. The MWC emissions will be exhausted from a tall stack which contains three identical flues (one for each of the three identical MWC units). The three identical flues will be adjacent to each other within an outer concrete shell; and were modeled as a single merged stack with an equivalent diameter following regulatory guidance. The source parameters for the new MWC unit are shown in Table 5-1. The new MWC units can operate at various operating conditions; the range of operating flow rates is indicated in Table 5-1 along with the design condition. Emissions from the other project-related ancillary equipment (i.e., the lime and carbon silo baghouse vents, the baghouse vent for the ash handling facility, the emergency fire water pumps, and the emergency generator) were considered negligible and were not included in the analysis as discussed in the modeling protocol reviewed and approved by FDEP.

Table 5-1:
MWC Source Parameters

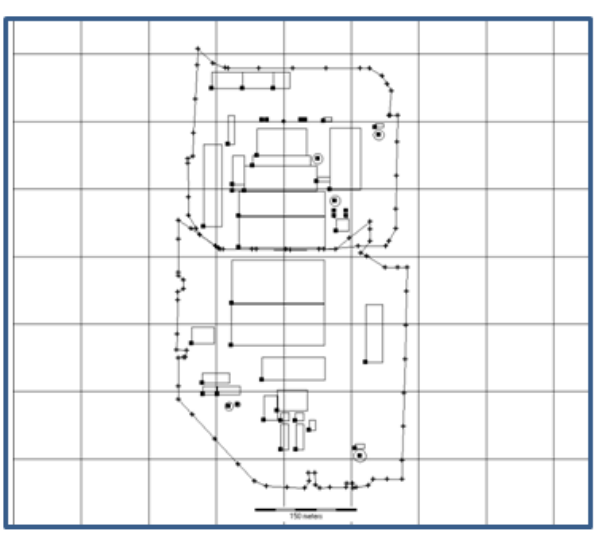
Source	Base Elevation (meters)	Stack Height (meters)	Stack Diameter (meters)	Exhaust Flow Rate (m^3/sec)	Exhaust Velocity (m/s)	Exhaust Temp (°K)
New MWC Unit	7.32	94.49	4.26	185.37 (min) 260.95 (design) 301.78 (max)	12.99 (min) 18.29 (design) 21.15 (max)	413.7

Notes:

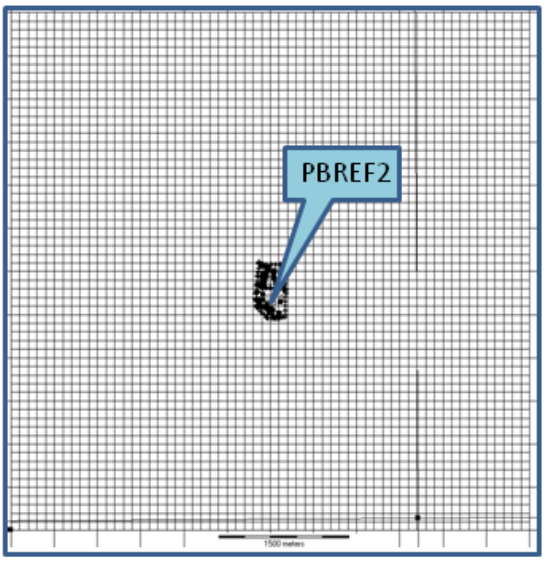
1. Stack height is the height above base elevation.
2. Stack diameter is an effective stack diameter for a single merged stack.
3. Exhaust flow rate is the combined flow rate for all MWCs at 3,000 tons/day (for three 1,000 ton/day MWC units).

5.3.2. Receptor Location and Elevation

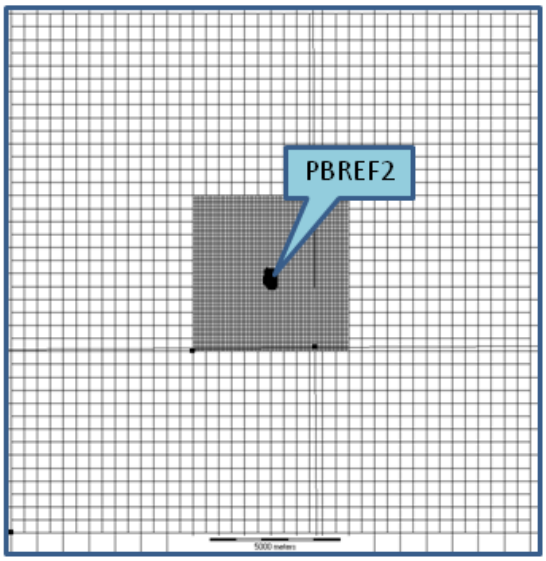
Receptors were placed on a Cartesian grid network. A tiered grid network was used in order to ensure that the maximum impact was captured. A fine 100 meter (m)-spaced grid was placed out to 3 kilometers (km). A coarser grid with 500-m spacing was placed from 3-km to 10-km, followed by a coarser 1,000-m spaced grid from 10-km out to 30-km. Receptors were also placed around the PBREF2 fence line at a spacing of 50 meters. Because the public will have limited access within the fence lines of both the existing RDF and the proposed facility (for example, at drop-off areas and at visitor centers), grid receptors within the fence line were also included in the model. Figure 5-1 depicts the model setup of the receptor grid network and the boundary receptors utilized for the modeling analysis.



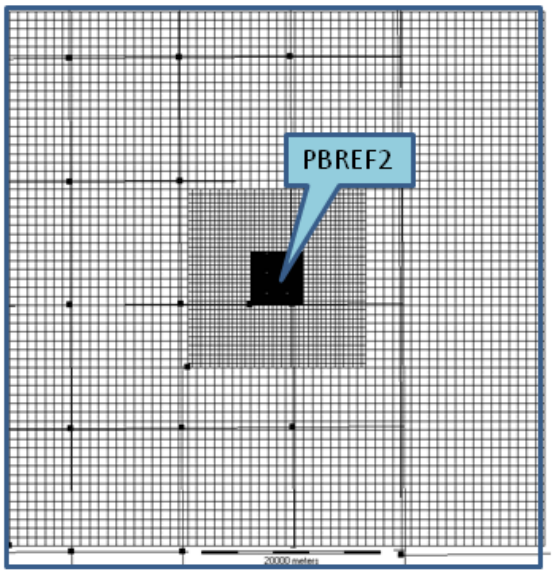
50–meter spaced Fenceline Receptors



100–meter spaced Grid



500–meter spaced Grid



1000–meter spaced Grid

MALCOLM PIRNIE / SWA	Solid Waste Authority of Palm Beach County	Receptor Locations	MALCOLM PIRNIE, INC. FIGURE 5-1

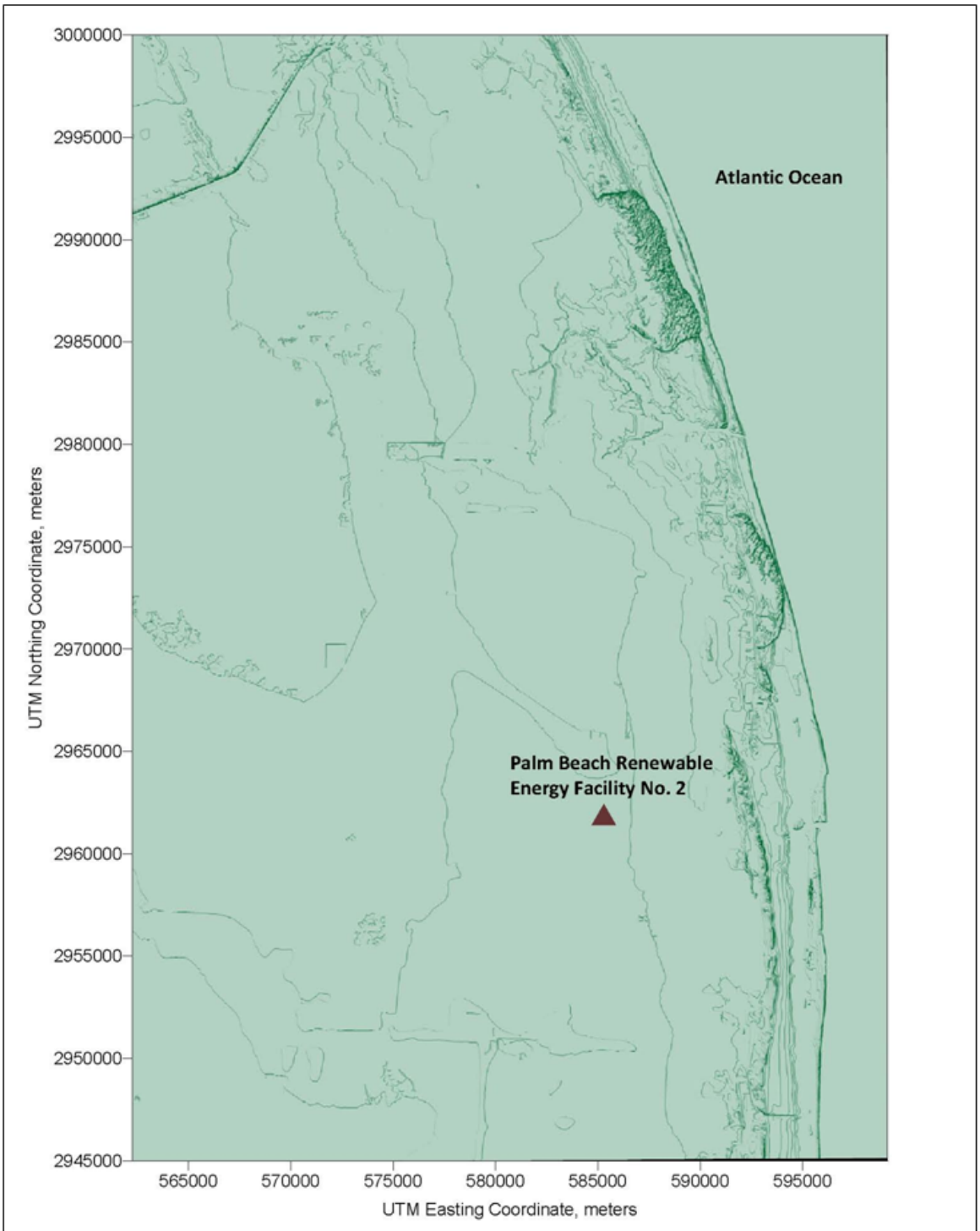
Terrain in the vicinity of the project site is relatively flat. Figure 5-2 shows the topography in the vicinity of the project. Terrain elevations at each receptor location in the vicinity of the PBREF2 were evaluated based on electronic terrain data from FDEP Land Boundary Information System (LABINS). The terrain files are in NAD27 datum Zone 17, and all have 10-meter resolution with the exception of three terrain quads, which were at 30-meter resolution. Grid receptors that fell over water (in the Atlantic Ocean) to the east were placed at sea level elevation. All receptors were placed at ground level. The terrain data used by AERMOD were processed using the AERMAP pre-processing program.

5.3.3. Meteorological Data

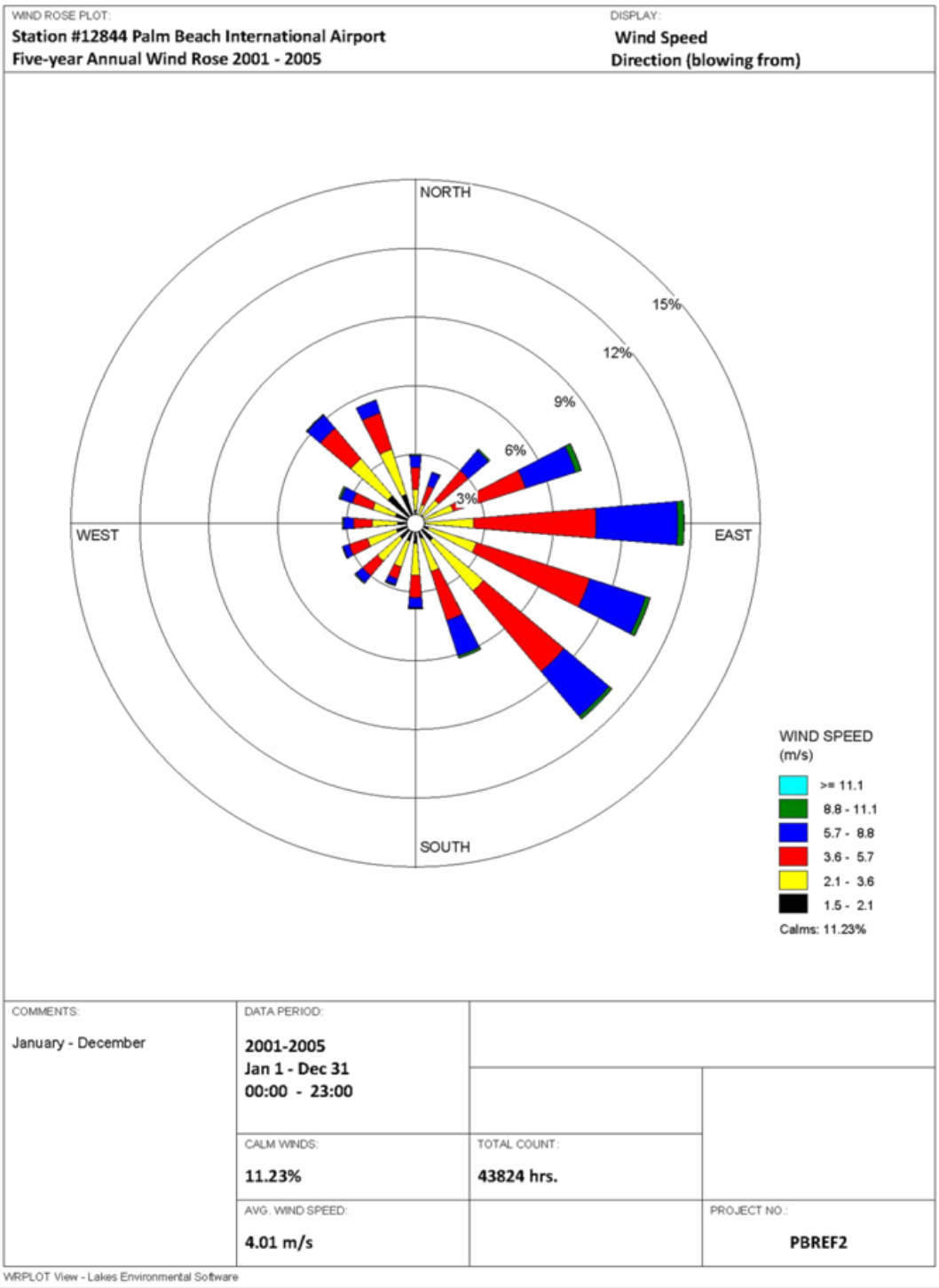
The AERMOD analysis was run with five years of AERMOD- ready meteorological data provided by the FDEP. The 2001 through 2005 hourly surface data were measured at Palm Beach International Airport (PBIA) and the upper air data were measured at Florida International University (FIU) in Miami. The nearest National Weather Service (NWS) station at PBIA is approximately 6.7 miles southeast of the site. The five-year average wind rose (wind blowing from) based on these hourly data is presented in Figure 5-3. The data were processed using AERSURFACE (USEPA, 2008b) following the latest regulatory guidance (USEPA, 2009a).

According to Section 8.3 of 40 CFR Part 51, Appendix W, "the meteorological data used as input to a dispersion model should be selected on the basis of spatial and climatological (temporal) representativeness as well as the ability of the individual parameters selected to characterize the transport and dispersion conditions in the area of concern. The representativeness of the data is dependent on: (1) the proximity of the meteorological monitoring site to the area under consideration; (2) the complexity of the terrain; (3) the exposure of the meteorological monitoring site; and (4) the period of time during which data are collected. The spatial representativeness of the data can be adversely affected by large distances between the source and receptors of interest and the complex topographic characteristics of the area. Temporal representativeness is a function of the year-to-year variations in weather conditions." In addition, the facility's location and surrounding land use should be relatively similar to the measurement site.

The five-year average wind rose (see Figure 5-3) based on the AERMOD-ready meteorological data provided by FDEP shows that the prevailing wind direction is from the east off of the Atlantic Ocean. The NWS Automated Surface Observing Station (ASOS) at PBIA is located approximately 10.8 kilometers (6.7 miles) south of the project site. It is the closest primary weather observation site to the project site. As is also true for most of the peninsula portion of the State of Florida, the terrain is mostly flat and there are no significant terrain features that will affect the wind flow between the site and the NWS station. The base elevation of each site is similar. The NWS station elevation is 5.8 meters whereas the base elevation of the proposed stack is 7.3 meters.



MALCOLM PIRNIE / SWA	Solid Waste Authority of Palm Beach County	Topography	MALCOLM PIRNIE, INC. FIGURE 5-2



MALCOLM PIRNIE | SWA Solid Waste Authority of Palm Beach County | Five-year Annual Wind Rose 2001 – 2005 | MALCOLM PIRNIE, INC. | FIGURE 5-3

Both locations are less than seven miles from the coast of the Atlantic Ocean and therefore both locations would experience the same coastal influences. In addition, due to the short distance between the sites, the same range of wind speed and wind direction would be present during a typical day. The upper air station located at Miami is appropriate for the sounding data for the southern half of the Florida peninsula.

The FDEP-provided meteorological data were processed applying the surrounding land-use parameters for the twelve (12) default AERMET sectors around the ASOS site. The surface characteristic parameters of albedo, Bowen ratio, and surface roughness were extracted using the USEPA's AERSURFACE program. Surface roughness is a measure of the underlying roughness of surface cover; albedo is the ratio of incoming to reflected solar radiation; and the Bowen ratio is the ratio of sensible and latent heat fluxes. These sector-averaged values were included in the AERMET data file provided by FDEP.

A comparison of the average values of the surface characteristics at the PBIA and the PBREF2 site was conducted using AERSURFACE and the most recent USEPA guidance. AERSURFACE determined the surface characteristic values from the USGS National Land Cover Data 1992 archives (NLCD92) and the look-up tables for representative values categorized by land cover and seasons that are provided in the AERSURFACE User's Guide (USEPA, 2008b). Per current regulatory guidance (Section 2.3 of the AERSURFACE User's Manual), a 1-kilometer distance was used to determine the surface roughness length for each sector. The average surface characteristic values within 1 kilometer of each site are presented below in Table 5-2.

Table 5-2:
Comparison of Surface Characteristics

Parameter	PBIA	PBREF2	Parameter Range
Albedo	0.17	0.15	0.1 – 1
Bowen Ratio	0.82	0.28	0.1 – 1.5
Surface Roughness	0.104	0.219	0.005 – 1.3

Source: AERSURFACE User's Guide (USEPA, 2008)

The surface characteristics for both sites are relatively similar even considering that the area within 1 kilometer of the PBIA ASOS station is completely comprised of just the land use associated with the airport itself. The ASOS station is located in the center portion of the western half of the airport complex, free of any structures that may influence the wind flow.

Differences in the surface characteristics of albedo and Bowen ratio between the meteorological station and a project site have been shown to have relatively minor effects on the overall predicted impacts. The surface roughness at the facility is slightly higher than that of the NWS station. However, since a tall stack height of 310 feet is being

proposed for the facility, the difference in surface roughness is unlikely to have an effect on the predicted concentrations. Therefore, the meteorological conditions from the PBIA surface station and the FIU Miami upper air station are considered representative of the facility site and appropriate for use in the air quality analysis.

5.3.4. Model Control Options

The analysis included the use of selected model control options that allow the model to be made more site and project specific. These model options include land use classification, incorporation of building wake information, averaging time, and regulatory control options.

5.3.4.1. GEP Stack Height/Downwash Analysis

A GEP stack height analysis was performed in accordance with USEPA's *Guideline for Determination of Good Engineering Practice Stack Height* (USEPA, 1985). Per guidelines in this document, GEP stack height is the higher of 65 meters, or a height, H_G, determined from the dimensions of all building tiers within the region of influence using the following equation:

$$H_G = H + 1.5L$$

where:

H = height of the structure within 5L of the stack, and

L = lesser dimension of the height or projected width of the structure.

For a squat structure where the height is less than the projected width, the following equation is used:

$$H_G = 2.5H$$

USEPA's *Building Profile Input Program* with the PRIME algorithm (BPIPPRM) (USEPA, 2004d) was used to determine the potential effects of on-site and nearby structures on the dispersion from the source, and GEP stack height. The program requires the input of the horizontal, lateral, and vertical extent of each building, as well as the source-specific parameters of facility stacks. The program includes an algorithm for calculating downwash values for input into the PRIME algorithm contained in AERMOD.

The building and source parameter data were used to calculate the predominant building dimensions associated with the MWC exhaust stack at wind directions of every 10 degrees. This output was used by the model in determining downwash effects on the dispersion of plumes. Based on the GEP stack height analysis, the stack height for the

proposed project (310 feet above grade) is below GEP stack height (385 feet above grade); therefore, building wake effects were included in the analysis. Detailed building dimensions used in the GEP analysis are presented in Table 5-3.

Table 5-3:
BPIP Buildings and Heights

Building Name	Building Height	
	(ft)	(m)
Tipping Floor and Building	51.0	15.5
Refuse Storage Pit Building	108.0	32.9
Boiler Building	154.0	46.9
Air Pollution Control Building – FFH Area	76.0	23.2
Air Pollution Control Building – SDA Area	122.0	37.2
Ash Management Building	52.0	15.9
Ash Conveyor Building	20.0	6.1
Turbine-Generator Building	69.0	21.0
Air Cooled Condenser	60.0	18.3
Switch Gear Room	16.0	4.9
Water Treatment Building	20.0	6.1
Facility Maintenance Building	22.0	6.7
Outage Maintenance Shop	17.0	5.2
Facility Administration Building	22.0	6.7
Fire Pump House	15.0	4.6
Fueling Station	10.0	3.0
Storage Area	22.0	6.7
Lime Storage Tank 1	70.0	21.3
Lime Storage Tank 2	70.0	21.3
Lime Storage Tank 3	70.0	21.3
Carbon Storage Tank	60.0	18.3
Urea Storage Tank 1	25.0	7.6
Urea Storage Tank 2	25.0	7.6
Fire Water Storage Tank	35.0	10.7
Wastewater Storage Tank 1	35.0	10.7
Wastewater Storage Tank 2	35.0	10.7
Dirty Waste Water Tank	35.0	10.7
Rain Water Harvest Tank	25.0	7.6

5.3.4.2. Land Use Classification

The land use classification procedure recommended by USEPA as outlined in Section 7.2.3 of the *Guideline on Air Quality Models* (USEPA, 2008a) was used to identify

whether rural or urban dispersion coefficients were applicable for this modeling analysis. The procedure involves classifying the land use within a 3-km radius circle centered on the PBREF2 site using Auer's land use typing scheme (Auer, 1978). If more than fifty percent of the area within this 3-km radius circle consists of Auer's industrial, commercial or compact residential land types, then urban dispersion coefficients are used in the modeling; otherwise, rural dispersion coefficients would be used. Figure 5-4 shows the land uses within 3-km of the project and a breakdown of the classifications. Based upon the analysis, rural dispersion coefficients were used for the analysis.

5.3.4.3. Chemical Transformation

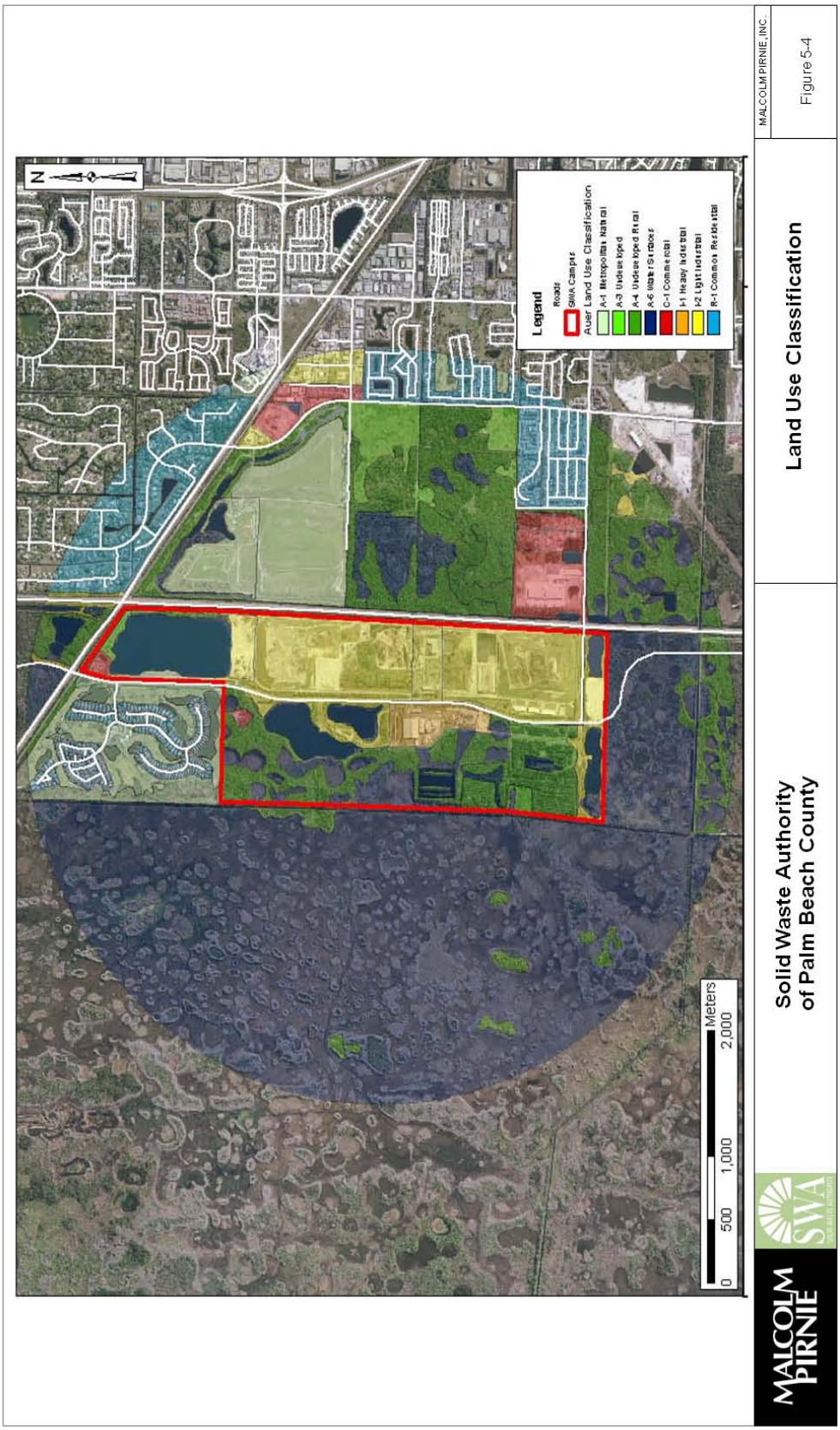
Following USEPA guidance (40 CFR 51 Appendix W, Section 5.2.4), the initial screen to determine nitrogen dioxide (NO_2) impacts from emissions of nitrogen oxides (NO_x) assumed total conversion of NO to NO_2, i.e., all NO_x is in the form of NO_2.

5.3.4.4. Averaging Times

The AERMOD output included 1-hour, 3-hour, 8-hour, and 24-hour averages (short-term) and long-term (annual) averages as appropriate. For comparison with the Class II significant impact levels (SILs), and *de minimis* monitoring concentrations, maximum short-term and annual averages were used for comparison to the criteria. For NAAQS and PSD Class II increments, maximum annual averages were used for comparison to annual criteria, and the highest second-highest (H2H) short-term averages (i.e., less than one year) were used for comparison to the short-term criteria. For comparison to the short-term PM_{10} NAAQS, the highest sixth highest (H6H) concentration over five (5) years was used. For comparison to the short-term $PM_{2.5}$ NAAQS and to remain conservative, the maximum predicted 24-hour concentration from the five (5) years of meteorological data was used. The maximum 24-hour concentration was used as a conservative comparison to the 3-month rolling average and quarterly lead standard. For comparison to the annual average PM_{10} and $PM_{2.5}$ NAAQS, the maximum annual average concentration over the five (5)-year meteorological database was used. For comparison to the 1-hour NO_2 standard, the eighth highest daily 1-hour maximum NO_2 impact averaged over the five years of meteorological data was used for comparison to the standard. The eight-highest daily 1-hour NO2 value was determined from the predicted impacts determined from the MAXTABLE option in AERMOD.

5.3.4.5. Regulatory Defaults

Following USEPA guidance and the modeling protocol, the modeling used the AERMOD regulatory default option. This option includes buoyancy-induced dispersion, final plume rise, the effects of stack-tip downwash, and calm wind processing.


Land Use Classification
Solid Waste Authority
of Palm Beach County
MALCOLM PIRNIE, INC.
Figure 5-4
Legend
Roads
SWA Campus
Auer Land Use Classification
A-1 Metropolitan Natural
A-3 Undeveloped
A-4 Undeveloped Rural
A-6 Water Features
C-1 Commercial
I-1 Heavy Industrial
I-2 Light Industrial
R-1 Common Residential
N
0
500
1,000
2,000
Meters

6. Class II Modeling Results

Air quality impact analyses required by the PSD regulations are addressed in this section. Air dispersion modeling was performed to assess impacts of the proposed PBREF2. Approved modeling methodologies presented in the *Air Quality Modeling Protocol* (Malcolm Pirnie, 2009) and discussed in Section 5 of this report were implemented to assess the potential air quality impacts due to the emissions from the PBREF2.

6.1. Worst Case Load Analysis

Since the proposed MWC unit can operate at varying loads, a worst-case load analysis was performed using AERMOD to determine the load that would result in the highest impact for each averaging time. The worst case load analysis examined six (6) load operating scenarios to determine the worst-case operating condition. Exhaust parameters used for the analysis reflected operations at each of the loads, as presented in Table 6-1.

Table 6-1:
Stack Parameters for Worst Case Load Analysis

Operating Condition	Stack Height		Stack Diameter		Exhaust Flowrate	Exhaust Velocity		Exhaust Temperature	
	(ft)	(m)	(ft)	(m)	(acfm)	(ft/min)	(m/s)	(°F)	(°K)
Scenario 1a	310.0	94.5	14.0	4.26	509,193	3,315.0	16.84	285.0	413.7
Scenario 1b	310.0	94.5	14.0	4.26	552,930	3,600.4	18.29	285.0	413.7
Scenario 2	310.0	94.5	14.0	4.26	516,168	3,360.2	17.07	285.0	413.7
Scenario 3a	310.0	94.5	14.0	4.26	608,223	3,960.6	20.12	285.0	413.7
Scenario 3b	310.0	94.5	14.0	4.26	639,435	4,163.4	21.15	285.0	413.7
Scenario 4	310.0	94.5	14.0	4.26	392,769	2,557.1	12.99	285.0	413.7

Notes:

1. Stack height is the height above base elevation.
2. Stack diameter is an effective stack diameter for a single merged stack based on the diameter of a stack with an area equivalent to the sum of the areas of the three identical flues
3. Exhaust flow rate is the combined flow rate for all MWCs at 3,000 tons/day (for three 1,000 ton/day MWC units).
4. The design operating load is Scenario 1b.

AERMOD modeling was performed for each source configuration shown in Table 6-1. A unitized emission rate of 1 gram per second (g/s) was used to produce normalized concentrations ($\mu g/m^3$ per g/s). These normalized concentrations were then multiplied by the emission rates for each pollutant shown on Table 6-2 to determine the maximum predicted impact.

Table 6-2:
Emission Rates for Worst Case Load Analysis

Operating Condition	NO_x (g/sec)	SO_2 (g/sec)	PM (g/sec)	CO (g/sec)
Scenario 1a	21.84	8.59	1.61	15.64
Scenario 1b	21.84	8.59	1.61	15.64
Scenario 2	20.05	7.89	1.48	14.36
Scenario 3a	24.02	9.45	1.77	17.20
Scenario 3b	24.11	9.49	1.78	17.27
Scenario 4	15.26	6.00	1.13	10.92

Notes:

1. Emission rates are the combined emission rates for all MWCs at 3,000 tons/day (for three 1,000 ton/day MWC units).
2. Emission rates for SO_2, PM, and CO reflect maximum short-term emission rates. The emission rate for NO_x is based on a concentration of 85 ppmv and reflects an annual average stack exhaust concentration. The emission rate for SO_2 is based on a concentration of 24 ppmv.
3. PM_{10} and $PM_{2.5}$ emissions are conservatively assumed to be equivalent to the total PM emission rate.

It was determined that over the five years of meteorological data, the highest impacts due to the emissions from the proposed MWC unit occurred under Scenario 1a, as indicated in Table 6-3. Therefore, both Scenario 1a and the design load (Scenario 1b) were evaluated in the preliminary analysis.

Table 6-3:
Maximum Predicted Impacts for Worst-Case Load Analysis

Operating Condition	Maximum Impact from 5-year Period (2001–2005) ($\mu g/m^3$)							
	NO_2	SO_2			PM		CO	
	Annual	Annual	24-hour	3-hour	Annual	24-hour	8-hour	1-hour
Scenario 1a	**0.876**	**0.345**	**3.61**	**7.21**	**0.065**	**0.676**	**12.04**	**14.81**
Scenario 1b	0.822	0.323	3.31	6.85	0.061	0.621	11.41	14.00
Scenario 2	0.795	0.313	3.27	6.55	0.059	0.613	10.96	13.48
Scenario 3a	0.850	0.336	3.30	7.10	0.063	0.616	11.78	14.48
Scenario 3b	0.826	0.325	3.12	6.87	0.061	0.586	11.42	14.04
Scenario 4	0.754	0.297	3.20	6.08	0.056	0.602	9.68	12.53

Notes:

1. Impacts predicted for a single merged flue representing three 1,000 tpd units.
2. Impacts in bolded lettering represent overall maximum impact for a given pollutant and averaging time.
3. Design load is Scenario 1b.

6.2. Preliminary Analysis

Following USEPA guidance (USEPA, 1990), a preliminary analysis was conducted to determine if the PBREF2 emissions result in a significant impact on ambient air quality. For each of the criteria pollutants subject to PSD review (NO_x, SO_2, CO, and PM as PM_{10} and $PM_{2.5}$), the PBREF2 emissions were modeled using AERMOD. The maximum pollutant-specific impact for each applicable averaging period from the five years of meteorological data was used to compare to the respective SIL. Both the worst case load and the design load were modeled. The results of the preliminary analysis are presented in Table 6-4. All pollutants modeled had impacts that were well below their respective SILs under both load conditions. Since the maximum impacts under both design and worst-case loads are below significance for all pollutants and averaging times. Therefore, the emissions from the proposed PBREF2 are considered not to cause or contribute to an exceedance of an ambient air quality standard or PSD increment, and a full, cumulative, multisource analysis is not required.

Table 6-4:
Preliminary Impact Analysis

Pollutant	Averaging Time	Maximum Modeled Impact ($\mu g/m^3$)		Significant Impact Level ($\mu g/m^3$)	Less than SIL? (Yes/No)
		Worst Case Load (Scenario 1a)	Design Load (Scenario 1b)		
NO_2	Annual	0.876	0.822	1	Yes
SO_2	Annual	0.345	0.323	1	Yes
	24-hour	3.61	3.31	5	Yes
	3-hour	7.21	6.85	25	Yes
PM_{10}	Annual	0.065	0.061	1	Yes
	24-hour	0.68	0.62	5	Yes
CO	8-hour	12.04	11.41	500	Yes
	1-hour	14.81	14.00	2,000	Yes

Since the worst case load scenario provided the highest impacts, subsequent analyses were performed using the worst case load (Scenario 1A) parameters.

6.3. *De Minimis* (Significant) Monitoring Analysis

PSD regulations require up to one year of continuous ambient air monitoring prior to construction of any new PSD source. However, the regulations allow an exemption from this requirement for those sources whose air quality impacts fall below certain "*de minimis*" levels and where representative ambient monitoring data is available. AERMOD was used to identify if potential emissions from the PBREF2 exceed the *de minimis* monitoring concentrations. As shown in Table 6-5, the maximum modeled

impacts due to the PBREF2 are less than the *de minimis* monitoring levels, and air quality data collected by FDEP at locations in the vicinity of the project site and surrounding areas are available to define the background air quality. Therefore, a waiver for pre-construction ambient monitoring will be requested from FDEP for the project.

Table 6-5:
***De Minimis* Monitoring Analysis**

Pollutant	Averaging Time	Maximum Modeled Impact ($\mu g/m^3$)	*De Minimis* Monitoring Concentration ($\mu g/m^3$)	Less than *De Minimis*? (Yes/No)
NO_2	Annual	0.88	14	Yes
SO_2	24-hour	3.6	13	Yes
PM_{10}	24-hour	0.68	10	Yes
CO	8-hour	12.0	575	Yes
Ozone (O_3)	8-hour	[2]	[2]	[2]
Lead	3-month	0.009	0.1	Yes
Fluorides	24-hour	0.06	0.25	Yes

Notes:

1. Maximum impacts for all averaging times were used for comparison to the *de minimis* monitoring concentrations.
2. No specific air quality concentration for ozone is prescribed. Exemptions are granted when a source's volatile organic compound (VOC) or nitrogen oxide emissions are less than 100 tons per year or representative background data exists.

6.4. Ambient Air Quality Standards Analysis

Although a full, cumulative impact analysis is not required for the proposed PBREF2 since facility impacts were demonstrated to be below significance, modeled impacts were compared to both the National and Florida ambient air quality standards for informational purposes. These comparisons are shown on Table 6-6 and Table 6-7, respectively. The impacts from the proposed PBREF2 were added to the monitored ambient background concentration for each pollutant and averaging time. The short-term and annual impacts from the proposed PBREF2 combined with ambient background levels were well below both the NAAQS and FAAQS.

Table 6-6:
Comparison to the NAAQS

Pollutant	Averaging Time	NAAQS ($\mu g/m^3$)	Modeled Impact ($\mu g/m^3$)	% of NAAQS	Background Concentration ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Below NAAQS? (Yes/No)
NO_2	Annual	100	0.88	0.9%	18	18.9	Yes
	1-hour	189	21.0	11.1%	105	126.0	Yes
SO_2	Annual	80	0.34	0.4%	4	4.3	Yes
	24-hour	365	3.1	0.9%	10	13.1	Yes
	3-hour	1,300	6.8	0.5%	10	16.8	Yes
PM_{10}	24-hour	150	0.45	0.3%	49	49.5	Yes
$PM_{2.5}$	Annual	15	0.06	0.4%	7.29	7.4	Yes
	24-hour	35	0.68	1.9%	20.9	21.3	Yes
CO	8-hour	10,000	9.2	0.1%	2,061	2,070	Yes
	1-hour	40,000	14.4	0.04%	3,206	3,220	Yes
Lead	3-month rolling	0.15	0.009	6.0%	0.01	0.019	Yes
	Quarterly	1.5	0.009	0.6%	0.01	0.019	Yes

Sources: F.A.C. Section 62-204.240 and 40 CFR Part 50.

Notes:

1. Annual standards are not to be exceeded. Short-term standards for SO_2 and CO are not to be exceeded more than once per year.
2. For comparison to the 1-hour NO_2 standard, the 8th highest daily 1-hour maximum NO_2 impact averaged over the five years is used.
3. The 24-hour PM_{10} modeled impacts are based on the highest sixth-highest concentration over five years.
4. The 24-hour $PM_{2.5}$ modeled impacts are based on the maximum 24-hour concentration from the five years.
5. For lead, the maximum 24-hour modeled impact was used to conservatively determine compliance with the quarterly and the 3-month rolling average standards.

Table 6-7:
Comparison to the FAAQS

Pollutant	Averaging Time	FAAQS ($\mu g/m^3$)	Modeled Impact ($\mu g/m^3$)	% of FAAQS	Background Concentration ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Below FAAQS? (Yes/No)
NO_2	Annual	100	0.88	0.9%	18	18.9	Yes
SO_2	Annual	60	0.34	0.6%	4	4.3	Yes
	24-hour	260	3.1	1.2%	10	13.1	Yes
	3-hour	1,300	6.8	0.5%	10	16.8	Yes
PM_{10}	Annual	50	0.06	0.1%	25.9	26.0	Yes
	24-hour	150	0.45	0.3%	49	49.5	Yes
CO	8-hour	10,000	9.2	0.1%	2,061	2,070	Yes
	1-hour	40,000	14.4	0.04%	3,206	3,220	Yes
Lead	3-month rolling	---	---	---	---	---	---
	Quarterly	1.5	0.009	0.6%	0.01	0.019	Yes

Source: F.A.C. Section 62-204.240

Notes:

1. Annual standards are not to be exceeded. Short-term averaging time standards not to be exceeded more than once per calendar year.
2. The 24-hour PM_{10} modeled impacts are based on the highest sixth-highest concentration over five years.
3. For lead, the maximum 24-hour modeled impact was used to conservatively determine compliance with the quarterly standard.

6.5. PSD Class II Increment Analysis

In order to maintain air quality in areas that meet the NAAQS, the CAAA established maximum allowable increases over baseline concentrations, called PSD increments. PSD increments are promulgated for NO_2, SO_2, and PM_{10}. Although the preliminary analysis demonstrated that impacts due to the PBREF2 emissions would be insignificant, these impacts are compared to the PSD Class II increments in Table 6-8 for informational purposes. The pollutant impacts from the proposed PBREF2 are all well below the Class II PSD increments.

Table 6-8:
Comparison to the PSD Class II Increments

Pollutant	Averaging Time	Modeled Impact ($\mu g/m^3$)	PSD Class II Increment ($\mu g/m^3$)	% of PSD Class II Increment
NO_2	Annual	0.88	25	3.5%
SO_2	Annual	0.34	20	1.7%
	24-hour	3.1	91	3.4%
	3-hour	6.8	512	1.3%
PM_{10}	Annual	0.06	17	0.4%
	24-hour	0.59	30	2.0%

Notes:

1. Long-term (annual) increments are not to be exceeded.
2. Short-term (3-hour and 24-hour) increments are not to be exceeded more than once per year.

6.6. Ambient Reference Concentrations Analysis

A modeling analysis was conducted to determine the maximum predicted concentrations due to the emissions of non-criteria pollutants from the proposed PBREF2 in comparison to the ARCs. The non-criteria emission rates utilized in the modeling analysis are presented in Table 6-9.

Table 6-9:
Emission Rates for Ambient Reference Concentration Analysis

Pollutant	Total Emission Rate for 3 MWC Units (g/s)
Arsenic and compounds	1.58E-03
Beryllium and compounds	2.34E-05
Cadmium and compounds	1.48E-03
Lead and compounds	2.07E-02
Mercury and compounds	3.70E-03
Hydrogen chloride	4.48
Sulfuric Acid Mist (H_2SO_4)	3.01
Hydrogen Fluoride (as Fluorides)	0.430
Dioxins and Furans (as 2,3,7,8 TCDD equivalents)	1.96E-09
Ammonia (NH_3)	1.57

Non-criteria pollutant impacts were compared to the ARCs as shown in Table 6-10. Maximum impacts from the proposed PBREF2 for all pollutants are below their respective ARCs.

Table 6-10:
Comparison to the Ambient Reference Concentrations (ARCs)

Pollutant	Averaging Time	Modeled Impact ($\mu g/m^3$)	Ambient Reference Concentration ($\mu g/m^3$)	% of ARC
Arsenic and compounds	Annual	6.32E-05	0.00023	27.5%
	24-hour	6.62E-04	0.02	3.3%
	8-hour	1.21E-03	0.1	1.2%
Beryllium and compounds	Annual	9.38E-07	0.00042	0.2%
	24-hour	9.82E-06	0.005	0.2%
	8-hour	1.80E-05	0.02	0.1%
Cadmium and compounds	Annual	5.93E-05	0.00056	10.6%
	24-hour	6.21E-04	0.005	12.4%
	8-hour	1.14E-03	0.02	5.7%
Lead and compounds	Annual	8.30E-04	0.09	0.9%
	24-hour	8.69E-03	0.1	8.7%
	8-hour	1.59E-02	0.5	3.2%
Mercury and compounds	Annual	1.48E-04	0.3	0.05%
	24-hour	1.55E-03	0.1	1.6%
	8-hour	2.85E-03	0.5	0.6%
Hydrogen Chloride	Annual	1.80E-01	7	2.6%
	24-hour	1.88E+00	17	11.1%
	8-hour	3.45E+00	70	4.9%
Sulfuric Acid Mist (H_2SO_4)	24-hour	1.27E+00	2.4	52.7%
	8-hour	2.32E+00	10	23.2%
Hydrogen Fluoride (as Fluorides)	24-hour	1.81E-01	6.2	2.9%
	8-hour	3.31E-01	26	1.3%
Dioxins and Furans (as 2,3,7,8 TCDD equivalents)	Annual	7.86E-11	2.20E-08	0.4%
Ammonia (NH3)	Annual	6.28E-02	100	0.1%
	24-hour	6.58E-01	41	1.6%
	8-hour	1.21E+00	170	0.7%

Source: FDEP, June 1995, Ambient Reference Concentrations: Updated Air Toxic Working List with References, Version 4.

6.7. Start-up and Shut-down Emissions Evaluation

Start-up and shut-down emissions were qualitatively assessed to determine if emissions that are generated outside of normal operations could potentially result in an adverse air quality impact. Scheduled start-up and shut-down events for the MWC are relatively short in duration and are well planned events. During these periods, the air pollution control equipment remains operational, and pollutant emissions will remain within permitted limits. Therefore, operations during scheduled start-up and shut-down are not

anticipated to be significantly different from those evaluated in this Class II modeling analysis.

7. Additional Impacts Analysis

As described in the draft USEPA New Source Review Workshop Manual (USEPA, 1990), certain additional analyses are required as part of a PSD review. The additional impact analyses which were required as part of the analysis for the PBREF2 facility include:

- Growth impact analysis,
- Ambient air quality impact analysis, and
- Impacts on soil and vegetation.

The depth of these analyses is dependent on the quantity of emissions and the sensitivity of local soils and vegetation. Each of these analyses is discussed in the sections below. A visibility impairment analysis was performed as part of the Class I analysis discussed in Section 8.

7.1. Growth Impact Analysis

The purpose of the growth impact analysis is to provide a projection of the associated growth and emissions that are likely to occur in the area as a direct result of the construction and operation of the proposed project and to assess air quality impacts that would result from that growth. This growth can be measured by the increase in residents in the area, the additional use and need for commercial and industrial facilities to assist the additional population with everyday services, and other growth, such as construction-related activities and motor vehicle emissions.

7.1.1. Residential Growth

Palm Beach County's population (including Palm Beach County cities and the unincorporated areas of the County), according to the 2000 US Census Bureau, was approximately 1,131,191 permanent residents with an estimated additional seasonal population of 123,725 residents. There are approximately 474,175 occupied households. Based on data from the US Census Bureau, the average population density for the county is 635 people per square mile.

Palm Beach County's population grew 31 percent between 1990 and 2000. The state population grew nearly 19 percent from 2000 to 2008. The municipality of West Palm Beach is the largest among the County's 37 municipalities, both in population and area. West Palm Beach has a population of 82,103 permanent residents with an estimated additional seasonal population of 4,652 residents. Based on data from the US Census

Bureau, the average population density for the municipality of West Palm Beach is 1,564 people per square mile.

According to the University of Florida's Bureau of Economic and Business Research, the population as of 2008 for towns and cities at least partially within 5 miles of the proposed PBREF2 was 212,960. Since the proposed facility will divert existing MSW from the landfill, residential growth as a direct result of the proposed PBREF2 is expected to be negligible.

7.1.2. Industrial and Commercial Growth

Between 1998 and 2008, there was an approximate 21 percent increase in the labor force, from more than 519,000 persons in 1998 to over 628,000 by 2008. Of the 20 major employers in the County, at least six lie within 5 miles of the proposed PBREF2, but not closer than 4 miles to the proposed PBREF2. The projected employment in Palm Beach County from 2008 to 2016 is anticipated to increase by 16 percent. A number of industrial parks exist within 5 miles of the proposed PBREF2 which is indicative of potential and planned industrial growth near the project site. The expected commercial and industrial growth due to the new facility will be negligible. The majority of the operations associated with the PBREF2 are relatively self-contained. Therefore, no significant air quality impacts due to associated industrial/commercial growth are expected.

7.1.3. Other Growth

Major roads in the area include Florida's Turnpike, the Bee Line Highway (approximately two miles to the north), and North Military Trail (approximately two miles to the east). The proposed PBREF2 is located in the Authority's PBREP, in an area west of Jog Road. Jog Road can be accessed via State Road 710 (Bee Line Highway) or 45th Street.

The proposed truck traffic that will deliver waste to the proposed PBREF2 currently delivers waste to the PBREP's Class I landfill located east of the NCRRF. The trips generated by the PBREF2 will not increase the number of waste delivery vehicles nor will it alter the origin of vehicles. It will alter the destination, based upon delivering waste to the proposed PBREF2 instead of the Class I landfill. The PBREF2 will operate 7 days a week, 24 hours a day but only accept waste deliveries to the tipping floor Monday-Saturday, 7:00 am to 7:00 pm. Since the Class I Landfill operates during the same timeframe as the PBREF2, no new truck traffic is anticipated as a result of the operation of PBREF2.

Once PBREF2 is operational, the only anticipated additional vehicle traffic will be for the average daily number of personal vehicle trips for the employees who will operate the PBREF2, and the occasional delivery of materials to the PBREF2. The PBREF2 will

have a rotational schedule utilizing one main shift of about 25 employees during tipping floor operational hours or when waste is delivered to the facility and a reduced staff of about five (5) to ten (10) employees during non-tipping floor operational hours. During a 24-hour period, the staff that operates the PBREF2 will add an approximate maximum of 80 personal vehicle trips per day (Monday-Saturday) and approximately 30 personal vehicle trips per day during holidays and Sundays. This small number of personal vehicle trips will not have a significant impact on air quality in the area of the site.

Construction of PBREF2 is anticipated to begin in 2012 with a completion date 2015. Impacts associated with construction of the PBREF2 will be minor. The overall traffic impacts related to the construction and operation of the PBREF2 are negligible. In addition, the construction period is a temporary and transient activity and is not expected to result in a significant impact.

7.2. Ambient Air Quality Impact Analysis

The purpose of this aspect of the additional impacts analysis is to predict the air quality in the vicinity of the project during construction and after commencing operation. This analysis follows the growth analysis by combining the associated growth with the emissions from the planned project. Since the associated growth from the planned project is negligible, the ambient air quality impact from additional growth will also be negligible. Any air quality impacts in the area would be the result of emission increases from the proposed project. However, it has been demonstrated that the proposed project will not result in a significant air quality impact. The results of the ambient air quality analysis can be found in Section 6.

7.3. Impacts on Soil and Vegetation

PSD regulations require an analysis of air quality impacts on sensitive vegetation types, with significant commercial or recreational value, and sensitive types of soil. Within Palm Beach County, the soils surface layer typically consists of very loose to medium dense, relatively clean to slightly silty, and occasionally silty fine to medium sands. The subsurface (depths less than about 125 feet) material consists predominantly of sand, shell, sandstone, and limestone while the materials within several thousand feet of the land surface are sedimentary rocks. Figure 7-1 illustrates the different soil classifications that are found within a 3-kilometer radius around PBREF2.

Twelve major land use and vegetation types have been identified on the site, as depicted in Figure 7-2(which includes land use). The USEPA secondary NAAQS were used to evaluate whether soils and vegetation will experience any adverse effects from air pollution. The secondary NAAQS were developed to prevent unacceptable effects on the public welfare, including unacceptable damage to crops and vegetation. Table 7-1 presents a comparison of the proposed project's impacts to the secondary NAAQS. As

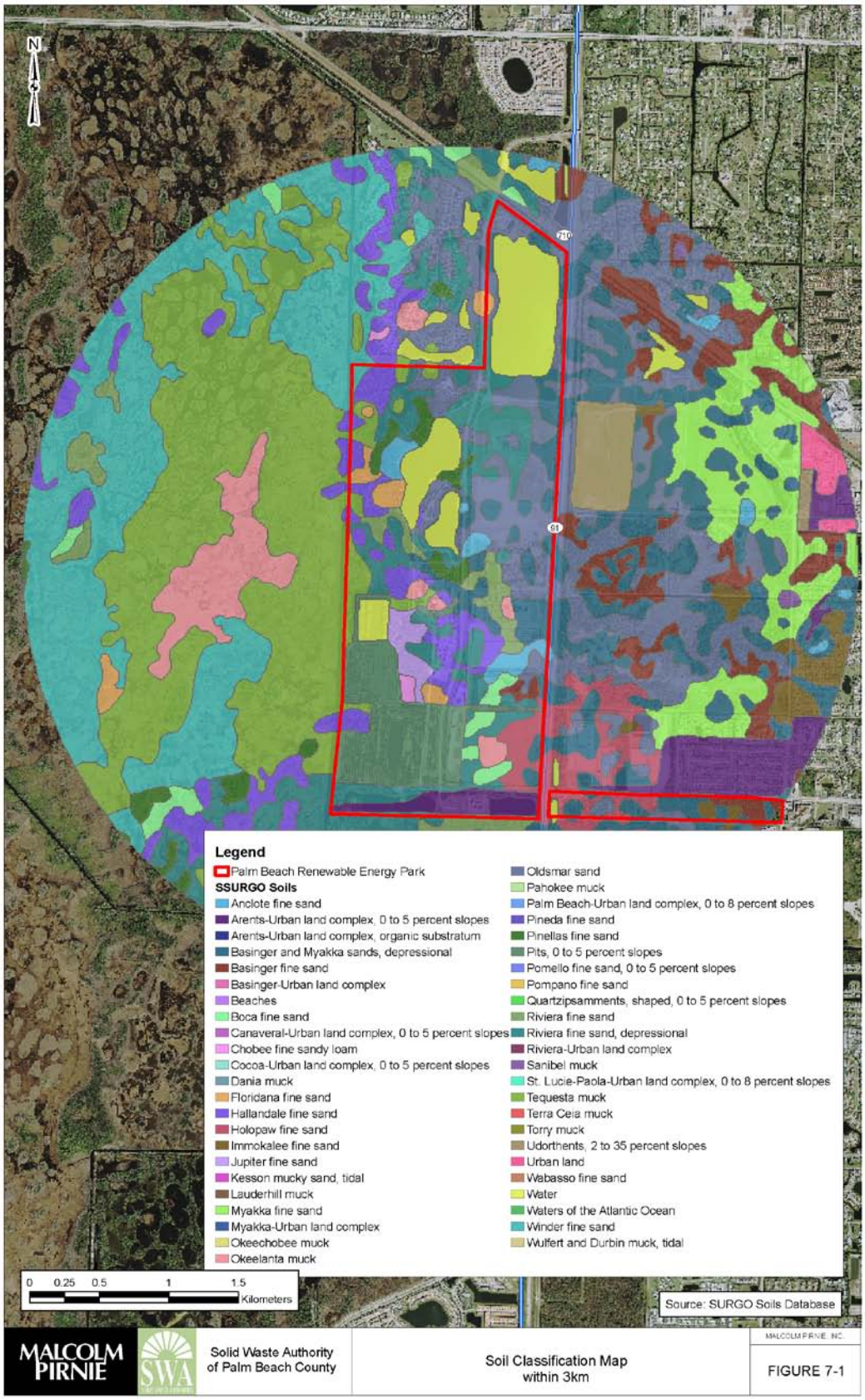
shown, the highest predicted impacts (including the existing background concentration) are all well below the secondary NAAQS for all pollutants and averaging times. Therefore, the proposed PBREF2 will not have an adverse impact on soil and vegetation.

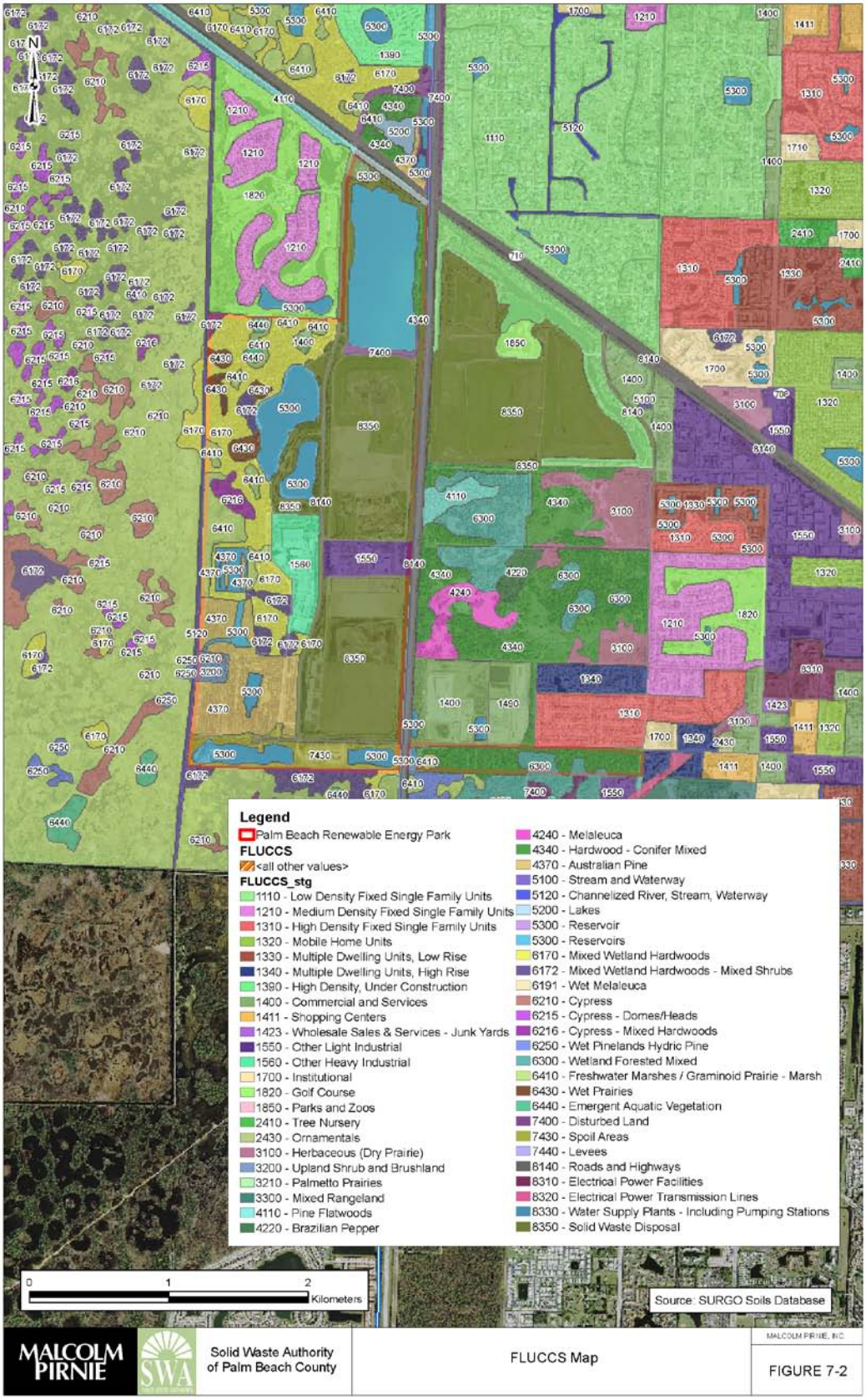
Table 7-1:
Soils and Vegetation Impact Analysis

Pollutant	Averaging Time	NAAQS Secondary Standard µg/m^3	Modeled Impact[1] µg/m^3	% of Secondary NAAQS	Background Concentration µg/m^3	Total Impact µg/m^3
NO_2	Annual	100	0.88	0.9%	18	18.9
SO_2	Annual	80	0.34	0.4%	4	4.3
	24-hour	365	3.1	0.8%	10	13.1
	3-hour	1,300	6.8	0.5%	10	16.8
PM_{10}	24-hour[3]	150	0.45	0.3%	49	49.5
$PM_{2.5}$	Annual	15	0.06	0.4%	7.3	7.4
	24-hour[4]	35	0.68	1.9%	20.9	21.6
Pb	3-month rolling	0.15	0.009	6.0%	0.01	0.019
	Quarterly	1.5	0.009	0.6%	0.01	0.019

Notes:

1. Based on the modeled impact for the PBREF2.
2. Maximum 24-hour modeled concentrations were used to conservatively determine compliance with the lead standard.
3. The 24-hour PM_{10} modeled impacts are based on the highest sixth-highest concentration over five years to compare with the secondary standard.
4. Maximum 24-hour modeled $PM_{2.5}$ concentration was used to conservatively determine compliance with the secondary standard.


N
710
91
Legend
Palm Beach Renewable Energy Park
SSURGO Soils
Anclote fine sand
Arents-Urban land complex, 0 to 5 percent slopes
Arents-Urban land complex, organic substratum
Basinger and Myakka sands, depressional
Basinger fine sand
Basinger-Urban land complex
Beaches
Boca fine sand
Canaveral-Urban land complex, 0 to 5 percent slopes
Chobee fine sandy loam
Cocoa-Urban land complex, 0 to 5 percent slopes
Dania muck
Floridana fine sand
Hallandale fine sand
Holopaw fine sand
Immokalee fine sand
Jupiter fine sand
Kesson mucky sand, tidal
Lauderhill muck
Myakka fine sand
Myakka-Urban land complex
Okeechobee muck
Okeelanta muck
Oldsmar sand
Pahokee muck
Palm Beach-Urban land complex, 0 to 8 percent slopes
Pineda fine sand
Pinellas fine sand
Pits, 0 to 5 percent slopes
Pomello fine sand, 0 to 5 percent slopes
Pompano fine sand
Quartzipsamments, shaped, 0 to 5 percent slopes
Riviera fine sand
Riviera fine sand, depressional
Riviera-Urban land complex
Sanibel muck
St. Lucie-Paola-Urban land complex, 0 to 8 percent slopes
Tequesta muck
Terra Ceia muck
Torry muck
Udorthents, 2 to 35 percent slopes
Urban land
Wabasso fine sand
Water
Waters of the Atlantic Ocean
Winder fine sand
Wulfert and Durbin muck, tidal
0 0.25 0.5 1 1.5
Kilometers
Source: SURGO Soils Database
MALCOLM PIRNIE
Solid Waste Authority of Palm Beach County
Soil Classification Map within 3km
MALCOLM PIRNIE, INC.
FIGURE 7-1


Legend
Palm Beach Renewable Energy Park
FLUCCS
<all other values>
FLUCCS_stg
1110 - Low Density Fixed Single Family Units
1210 - Medium Density Fixed Single Family Units
1310 - High Density Fixed Single Family Units
1320 - Mobile Home Units
1330 - Multiple Dwelling Units, Low Rise
1340 - Multiple Dwelling Units, High Rise
1390 - High Density, Under Construction
1400 - Commercial and Services
1411 - Shopping Centers
1423 - Wholesale Sales & Services - Junk Yards
1550 - Other Light Industrial
1560 - Other Heavy Industrial
1700 - Institutional
1820 - Golf Course
1850 - Parks and Zoos
2410 - Tree Nursery
2430 - Ornamentals
3100 - Herbaceous (Dry Prairie)
3200 - Upland Shrub and Brushland
3210 - Palmetto Prairies
3300 - Mixed Rangeland
4110 - Pine Flatwoods
4220 - Brazilian Pepper
4240 - Melaleuca
4340 - Hardwood - Conifer Mixed
4370 - Australian Pine
5100 - Stream and Waterway
5120 - Channelized River, Stream, Waterway
5200 - Lakes
5300 - Reservoir
5300 - Reservoirs
6170 - Mixed Wetland Hardwoods
6172 - Mixed Wetland Hardwoods - Mixed Shrubs
6191 - Wet Melaleuca
6210 - Cypress
6215 - Cypress - Domes/Heads
6216 - Cypress - Mixed Hardwoods
6250 - Wet Pinelands Hydric Pine
6300 - Wetland Forested Mixed
6410 - Freshwater Marshes / Graminoid Prairie - Marsh
6430 - Wet Prairies
6440 - Emergent Aquatic Vegetation
7400 - Disturbed Land
7430 - Spoil Areas
7440 - Levees
8140 - Roads and Highways
8310 - Electrical Power Facilities
8320 - Electrical Power Transmission Lines
8330 - Water Supply Plants - Including Pumping Stations
8350 - Solid Waste Disposal
N
0
1
2
Kilometers
Source: SURGO Soils Database
MALCOLM PIRNIE
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Solid Waste Authority of Palm Beach County
FLUCCS Map
MALCOLM PIRNIE, INC.
FIGURE 7-2

8. Class I Area Analysis

The Clean Air Act (CAA) designated international parks, national wilderness areas, national memorial parks greater than 5,000 acres, and national parks in excess of 6,000 acres as mandatory Class I areas. Currently, there are 156 federally-mandated Class I areas. Each Class I area is administered by a Federal Land Manager (FLM), agents of the National Park Service (NPS), the United States Department of Agriculture (USDA) Forest Service (FS), or the United States Fish and Wildlife Service (FWS).

8.1. Class I Areas

It has historically been the policy of the USEPA to provide notice to the FLM of any Class I area located within 100 kilometers (km) of a proposed major source or major modification. Major facilities or modifications proposing to locate within 100-km of a PSD Class I area may be required to perform a modeling analysis in terms of air quality impacts (e.g., proposed Class I significant impact levels (SILs) and PSD increments) and air quality related values (AQRVs). However, in recognition of potential effects due to long-range pollutant transport, this distance has been informally expanded to several hundred kilometers in recent years.

The nearest Class I areas to the project site are Everglades National Park, Chassahowitzka National Wildlife Refuge, and St. Marks National Wildlife Refuge. Recent draft guidance by the Federal Land Managers' Air Quality Related Values Work Group (FLAG) provided a screening tool based on project emissions and distance to Class I areas to identify potential Class I areas of interest. Using this screening approach, Everglades National Park (Everglades NP) was identified, and the National Park Service (NPS), the FLM for Everglades, was notified. At the request of NPS, a Class I analysis was performed for Everglades NP. In addition, the NPS requested that a similar type of analysis be performed for Biscayne National Park, a Class II area park along the Atlantic Coast approximately 120 kilometers south of the project site. The Class I area analysis followed the modeling methodology discussed in the modeling protocol (Malcolm Pirnie, 2010), and incorporated comments provided by the FLM in their approval notification. A summary of the results of this analysis are presented in the following sections. For a more detailed discussion on the Class I modeling methodologies and results, please refer to Attachment A, "Class I Air Dispersion Modeling Report", of this report.

8.2. Class I Analysis Methodology

The Class I analysis followed written guidance provided in the *Interagency Work Group on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for*

Modeling Long Range Transport Impacts (USEPA, 1998), as well as the *Federal Land Managers' Air Quality Related Values Workgroup Phase I Report* (FLAG, 2000), *Federal Land Managers' Air Quality Related Values Workgroup Phase I Report Revised* (FLAG, 2008 Draft), *Appendix W: Guideline on Air Quality Models* (USEPA, 2006a), a memorandum from USEPA Office of Air Quality Standards and Planning (USEPA, 2006b), and additional guidance provided by the NPS.

The Class I analysis was performed using the CALPUFF modeling system (CALPUFF 5.8 and CALPOST 6.221), with three years of pre-processed meteorological data (2001 through 2003) from the VISTAS program which was provided by NPS for this analysis. For comparison to the SILs, the maximum predicted impacts from the three years of meteorological data (2001-2003) were used. For comparison to the PSD increments, the highest second-high values were reported for the short-term averaging periods (3-hour and 24-hour), while the maximum annual concentration was compared to the respective annual average increment.

For the AQRV analysis, the total deposition (wet and dry fluxes) of sulfur dioxide (SO_2) and sulfate (SO_4) was used to determine the project S loading for comparison to the air quality related sulfur threshold value. Likewise, the total deposition (wet and dry fluxes) of nitrogen oxides (NO_x – dry deposition only), nitrate (NO_3), and nitric acid (HNO_3) was used to determine the project N loading for comparison to the air quality-related nitrogen threshold value.

As requested by the FLM, both Method 2 and Method 8 were used to assess the potential impact of the project emissions on visibility at each park. The predicted 24-hour change-in-extinction values applying both CALPOST methods were compared to the 0.5 deciview threshold.

8.3. Class I Modeling Results

Predicted impacts at Everglades National Park were compared to the proposed Class I SILs and the Class I PSD increments. Predicted impacts at Biscayne National Park were compared to the Class II SILs and Class II PSD increments. In addition, the lead (Pb) impacts at both parks were compared to the NAAQS, and the potential for visibility impairment and deposition impacts at both parks were compared to the Class I area AQRVs.

8.3.1. Everglades National Park

Table 8-1 and Table 8-2 present the modeled impacts for PBREF2 compared to the proposed Class I SILs and Class I increments, respectively. The maximum predicted impacts for all pollutants and averaging times are generally well below the proposed significant impact levels denoting that the facility emissions will not cause or contribute to an exceedance of an ambient air quality standard or Class I PSD increment at

Everglades NP, and therefore, a full, cumulative modeling analysis is not required. Likewise, the modeled facility impacts are also well below the Class I PSD increments.

To determine the potential lead (Pb) impact, the maximum 24-hour impact at each receptor was used to calculate the individual receptor's monthly impact. for all three years of modeled meteorological data (2001 – 2003). Since the CALPUFF modeling system does not currently have the ability to calculate rolling averages, the rolling 3-month average lead (Pb) impact was determined by post-processing the 24-hour Pb impacts over the three years of meteorological data in a spreadsheet to calculate a rolling 3-month average. The maximum predicted 3-month rolling average at the Everglades NP was determined to be 1.78E-05 $\mu g/m^3$, approximately four orders of magnitude lower than the quarterly standard of 0.15 $\mu g/m^3$.

Table 8-1:
Maximum Impacts ($\mu g/m^3$) Compared to Proposed Class I SILs - Everglades NP

Pollutant	Averaging Time	Proposed Class I SIL ($\mu g/m^3$)	Maximum Modeled Concentration ($\mu g/m^3$)	% of Proposed Class I SIL
NO_2	Annual	0.1	0.0079	7.9%
SO_2	Annual	0.1	0.0031	3.1%
	24-hour	0.2	0.091	45.5%
	3-hour	1.0	0.246	24.6%
PM_{10}	Annual	0.2	0.0007	0.35%
	24-hour	0.3	0.018	6.0%

Table 8-2:
PSD Class I Increment Analysis - Everglades NP

Pollutant	Averaging Time	Class I Increment ($\mu g/m^3$)	Modeled Concentration ($\mu g/m^3$)	% of Increment Consumed
NO_2	Annual	2.5	0.0079	0.3%
SO_2	Annual	2	0.0031	0.2%
	24-hour	5	0.066	1.3%
	3-hour	25	0.191	0.8%
PM_{10}	Annual	5	0.0007	0.01%
	24-hour	10	0.013	0.1%

As requested by the FLM, both Method 2 and Method 8 (Mode 5) were used to assess the potential impact on visibility at the Everglades NP. These methods refer to an option setting (MVISBK) for background light extinction in CALPOST (version 6.221), a

CALPUFF postprocessor. A detailed discussion of the two methodologies is provided in Attachment A. Using Method 2, the most conservative method for determining visibility impairment, the maximum visibility impact from the three years of meteorological data exceeded the thresholds on a single day at a single receptor location. On this day, the maximum change in extinction was 6.26% (compared to the 5% threshold) and the change in deciview (Δdv) was 0.608, compared to the 0.5 deciview threshold set by the FLMs. The visibility impacts using the more recent Method 8 (Mode 5) approach recommended by the FLMs resulted in significantly lower visibility impacts and no exceedances. Using Method 8/Mode 5, the 24-hour change in extinction values were 2.77% and 0.273Δdv, respectively. Total sulfur and nitrate deposition at Everglades NP were both an order of magnitude below the thresholds of 0.01 kg/ha/yr.

8.3.2. Biscayne National Park

Table 8-3 and Table 8-4 present the modeled impacts for PBREF2 at Biscayne NP compared to the Class II SILs and Class II increments, respectively. The maximum predicted impacts for all pollutants and averaging times are generally well below the proposed significant impact levels denoting that the facility emissions will not cause or contribute to a violations of an ambient air quality standard or PSD increment at Biscayne NP and a cumulative impacts analysis is not required. Likewise, the modeled facility impacts are also well below the Class II increments.

The 3-month rolling average for lead at Biscayne NP was determined using the same post-processing methodology used for Everglades NP. The maximum predicted 3-month rolling average Pb impact of 2.04E-05 $\mu g/m^3$ at Biscayne NP was approximately four orders of magnitude lower than the quarterly standard of 0.15 $\mu g/m^3$.

Table 8-3:
Maximum Impacts ($\mu g/m^3$) Compared to Class II SILs - Biscayne NP

Pollutant	Averaging Time	PSD Class II SIL ($\mu g/m^3$)	Maximum Modeled Concentration ($\mu g/m^3$)	% of Class II SIL
NO_2	Annual	1	0.0047	0.5%
SO_2	Annual	1	0.0024	0.2%
	24-hour	5	0.070	1.4%
	3-hour	25	0.183	0.7%
PM_{10}	Annual	1	0.0005	0.05%
	24-hour	5	0.015	0.3%

Table 8-4:
Class II PSD Increment Analysis - Biscayne NP

Pollutant	Averaging Time	Class II Increment ($\mu g/m^3$)	Modeled Concentration ($\mu g/m^3$)	% of Increment Consumed
NO_2	Annual	25	0.0047	0.02%
SO_2	Annual	20	0.0024	0.01%
	24-hour	91	0.055	0.06%
	3-hour	512	0.146	0.03%
PM_{10}	Annual	17	0.0005	0.003%
	24-hour	30	0.015	0.05%

In the case of the AQRVs at Biscayne NP, using the most conservative method (Method 2), the maximum visibility impact exceeded the thresholds only on a single day at a single receptor location using the three years of meteorological data. On this day, the maximum change in extinction was 5.32% (compared to the 5% threshold) and the change in deciview was 0.518 Δdv, compared to the 0.5 deciview threshold set by the FLMs. The visibility impacts using the more recent Method 8 (Mode 5) approach recommended by the FLMs resulted in significantly lower visibility impacts and no exceedances of the thresholds. Using Method 8/Mode 5, the 24-hour change in extinction values were 2.27% and 0.224 Δdv, respectively. Total sulfur and nitrate deposition at Biscayne NP were both an order of magnitude below the thresholds of 0.01 kg/ha/yr.

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Solid Waste Authority of Palm Beach County

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Class I Air Dispersion Modeling Report

Submitted as Attachment A of the Air Quality Modeling Report

Palm Beach Renewable Energy Facility No. 2

April 2010

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1. Introduction

The Solid Waste Authority of Palm Beach County (the Authority) is planning to expand its waste processing capacity by constructing a mass burn waste-to-energy facility in West Palm Beach, Florida (see Figure 1-1), adjacent to its existing renewable energy facility. The new facility, the Palm Beach Renewable Energy Facility No. 2 (PBREF2), will have a total facility throughput of 3,000 tons per day (tpd) of municipal solid waste (MSW). State-of-the-art emissions control systems will be included in the PBREF2 to minimize air pollutant emissions. In addition, continuous emissions monitoring equipment will be used to ensure on-going compliance with state and federal air regulations.

The Authority's 1,320 acre campus (Palm Beach Renewable Energy Park, PBREP) includes the existing renewable energy facility (the North County Resource Recovery Facility (NCRRF)), a refuse-derived fuel (RDF) facility which has two identical MWC units, with a total nominal design capacity of 2,000 tpd of MSW (approximately 1,800 tpd of RDF). The construction of the PBREF2 will complement services that are being provided by the existing facilities at the PBREP, and will also serve to enhance the Authority's 2006 Integrated Solid Waste Management Plan (ISWM Plan) to develop a system of programs and facilities to effectively and economically manage solid waste through source reduction, recycling, composting, combustion, and landfilling. The ISWM Plan also calls for the expanded combustion capacity in order to extend the life of the existing landfill beyond its currently anticipated lifespan. The existing renewable energy facility is a major source of air emissions. It is anticipated that emissions from the proposed PBREF2 would be considered a major modification under the federal New Source Review (NSR) Program. The Palm Beach Renewable Energy Park (PBREP) and its existing facilities are subject to conditions of certification that were issued in accordance with the Florida Electrical Power Plant Siting Act (PPSA) (Sections 403.501 to 403.518, Florida Statutes). The construction and operation of the new PBREF2 also will be reviewed pursuant to the PPSA because, among other things, the new PBREF2 will increase the steam electrical generating capacity of the Authority's campus.

As part of the regulatory permitting process for the project, air dispersion modeling for PBREF2 was performed to demonstrate that the air quality impacts of the proposed facility will comply with all applicable standards and criteria, including National Ambient Air Quality Standards (NAAQS), Florida Ambient Air Quality Standards (FAAQS), and Prevention of Significant Deterioration (PSD) increments (40 CFR Part 51.166). Under the PSD program, an assessment of the potential impacts of a proposed major source or major modification, such as PBREF2, on nearby federal Class I area(s) may also be required. Upon notification of the proposed project, the National Park Service (NPS) requested a Class I analyses for Everglades National Park (Everglades NP). In addition, although not a federally designated Class I area, the NPS requested

similar analyses for the Class II area, Biscayne National Park (Biscayne NP). A Class I modeling protocol (Malcolm Pirnie, 2010) that addressed the modeling methodology to be used to evaluate the impacts from the proposed PBREF2 on these national parks was submitted to the NPS for their review and approval. This report describes the modeling that was performed to demonstrate compliance with the PSD significant impact levels (SILs), established increments, and Air Quality-Related Values (AQRVs) following the methodology presented in the protocol and subsequent NPS comments.

The report is organized into the following sections:

- **Section 2 –Project Description and Background** briefly describes the proposed project and the general climate and meteorological conditions in the vicinity of the project site.

- **Section 3 – Class I Applicability** discusses the Class I areas of interest along with pollutants of potential concern for the proposed project.

- **Section 4 – Existing Air Quality** discusses the air quality standards in support of the requested NAAQS modeling analysis for lead.

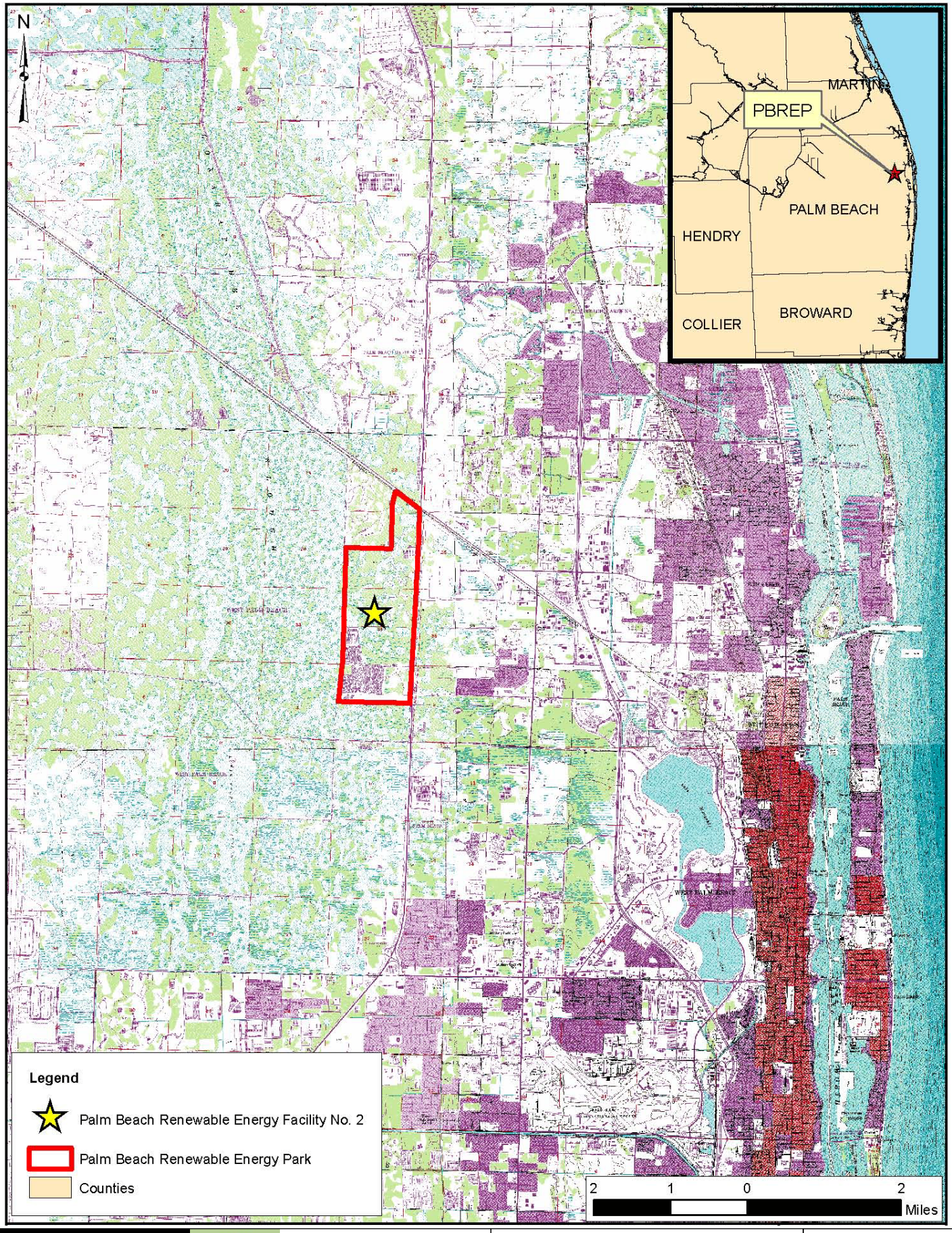
- **Section 5 – Modeling Methodology** discusses the methodology used for the modeling analysis, including:

    - selection of the appropriate dispersion model,
    - discussion of the required model data input,
    - procedures used to select applicable model options, and
    - analyses conducted as part of the modeling effort.

- **Section 6 – Results** presents the results of the analyses conducted as part of the modeling effort.

- **Section 7 – Conclusions**

- **Section 8 – References** lists the published regulatory material to be used as guidance in the performance of the modeling analysis.



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Solid Waste Authority of Palm Beach County

Location Map of Palm Beach Renewable Energy Facility No. 2

MALCOLM PIRNIE, INC.

April 2010

FIGURE 1-1

2. Project Description and Background

2.1. Project Location

Palm Beach Renewable Energy Facility No. 2 (PBREF2) will be located off of Jog Road, West Palm Beach, within the Palm Beach Renewable Energy Park. Access to the project site is along Jog Road via 45th Street (State Road 705), a two-lane road at the southern border of the existing renewable energy facility site, or via Bee Line Highway (State Road 710) from the north (see Figure 2-1). The project site is buffered by developed and undeveloped land owned by the Authority to the north, south, east, and west. The new facility will be adjacent to the northern border of the existing renewable energy facility.

2.2. Description of Project

The proposed facility will have three identical 1,000 tpd MWC units, with a total facility throughput of 3,000 tpd. Each of the three identical MWC units will exhaust through a single flue, and the three identical flues will be enclosed in an outer concrete stack. Nitrogen oxides (NO_X) emissions will be controlled with a selective non-catalytic reduction (SNCR) system. Emissions of acid gases, including sulfur dioxide (SO_2) and hydrogen chloride (HCl), will be controlled with a spray dryer absorber (SDA) with lime injection in combination with a fabric filter (FF) baghouse. Metals and other particulate matter (PM) emissions will also be controlled by the FF baghouse. Good combustion practices will be utilized to minimize products of incomplete combustion, such as carbon monoxide (CO), volatile organic compounds (VOCs), and trace organics. The MWC units will use an activated carbon injection (ACI) system for control of mercury emissions. These state-of-the-art air pollution control systems have consistently proven to be effective in controlling the various pollutants present in MWC flue gases.

In addition to the MWC units and associated air pollution control systems, supporting (ancillary) equipment will be installed as part of the project. This ancillary equipment includes lime and carbon storage silos, and ash handling equipment. Two fire water pumps (diesel-fired) will be installed at the facility. To provide limited back-up power to the facility in the event of an emergency or electrical power failure, a diesel-fired emergency generator will also be installed as part of the project. The proposed site plan is presented in Figure 2-2.

2.3. Climatology and Topography

The proposed facility is to be located in Palm Beach County on the lower east coast of Florida. Palm Beach County is located on a flat coastal sand ridge with elevations between sea level and less than 50 feet above sea level. Figure 2-3 shows the topography in the vicinity of the PBREF2. Palm Beach County, along with the rest of southern

Florida has a tropical climate. The nearest National Weather Service (NWS) station is located at Palm Beach International Airport (PBIA), less than 7 miles south/southeast of the project site.

The annual average temperature is 75.3°F. Record extreme temperatures ranged from 24°F minimum to 101°F maximum. Between May and October, the weather is hot, humid, and wet with average temperatures ranging between 78.1°F and 82.8°F. This season is characterized by occasional afternoon thunderstorms and sea breezes that result in cooler temperatures in the afternoons. The weather from November through April tends to be warm and generally dry with a range of average temperatures from 66.2°F to 73.1°F. On occasion, short-term cold fronts can result in temperatures in the 40s and 50s.

Showers and thunderstorms associated with sea-breezes account for a significant portion of the annual precipitation in South Florida. Annual average precipitation is 61.4 inches; however, it has varied from 27 inches to almost 107 inches. Most of the precipitation occurs during the summer and wet period from May through October. The dry season is associated with the winter months. Hurricane season is officially from June 1st through November 30th. The annual average relative humidity is 71.5%, with humidity in the mornings generally in the 80% range (when temperatures are coolest), and in the 60% range in the afternoons (when temperatures are highest).

The occurrence of a daytime sea-breeze and a nighttime land-breeze is a quite frequent phenomenon in South Florida throughout the calendar year. A sea-breeze typically develops during the daytime heating of the day when the boundary over the land surface heats up quicker than the boundary layer over the nearby water body. The Atlantic Ocean, the Gulf of Mexico, and Lake Okeechobee are the main large water bodies affecting the Palm Beach County area. Conceptually, as the sun heats up the land area, a pressure gradient is formed between the land area and the water body. This pressure gradient causes the movement of the low level air to travel from the sea to the land in the form of a sea-breeze with a return flow aloft to close out the sea-breeze circulation.

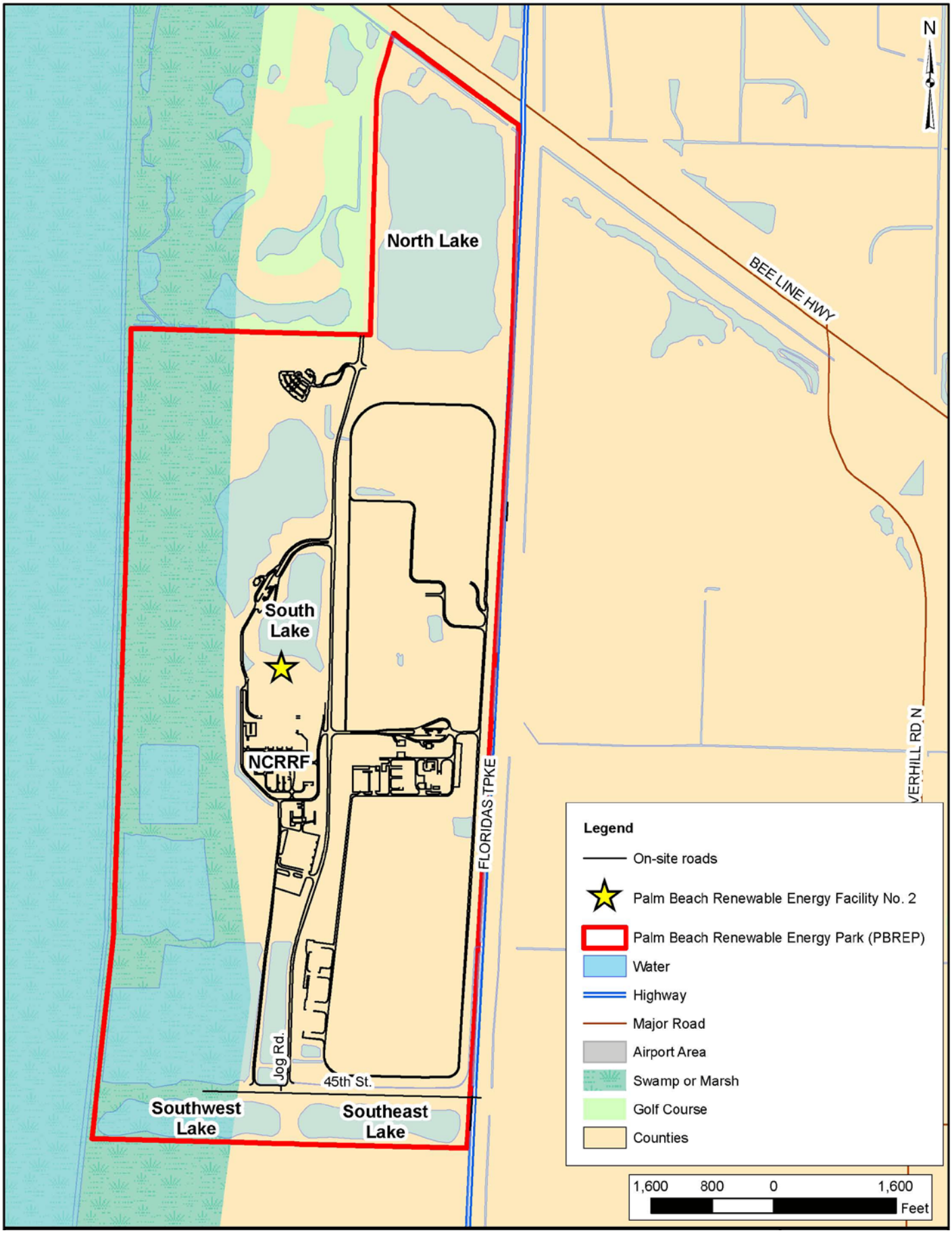
The sea-breeze is enhanced over the summer months due to the presence of more instability over the land and the temperature gradient between the land and the water bodies. The sea-breeze usually starts out as a gentle breeze in the early morning period when the solar radiation from the sun starts to heat the land surface. As the land surface heats up, the air parcel rises and returns to the area over the water body. As the air ascends over the land surface during the sea-breeze circulation, cloud development often occurs. Clouds are usually absent over the water body where the returning air descends in the boundary layer to complete the circulation cycle. The sea-breeze is at its greatest in the afternoon when the heating over the land is at its daily maximum.

Due to the shape of the coastline in the Palm Beach County area, the sea-breeze from the Atlantic Ocean blows from the east to the west. In addition, a lake-breeze from the northwest due to Lake Okeechobee may also affect this region as would a strong sea-breeze from the Gulf of Mexico side of Florida Peninsula. Under the sea-breeze/land

breeze circulation patterns, rain showers may occur and can be enhanced in areas under the influence of merging these sea-breeze fronts. The presence and strength of the daily sea-breeze is dependent on all of the other environmental factors affecting the land area on that particular day. As a sea-breeze front passes a particular location, the location will experience an increase in wind speed and humidity as well as a decrease in ambient temperature since the moist air parcel is moving in from over the water body and is now situated over the land area.

During the night the land mass cools off quicker than the nearby water bodies. This event has the opposite effect than what occurs during the day. If the land cools off below that of the adjacent water body (ocean, lake, etc.), the pressure of the air parcel over the water body will be lower than that of the air parcel over the land area. If the surface wind pattern is not strong enough to oppose it, the land-breeze in which the wind blows from the land towards the ocean will occur. If this land-breeze is strong enough and moisture as well as instability are present, showers may develop over the water body. Previous land-breeze studies in central Florida have found that the average onset of a land-breeze is around 4 to 5 hours after sunset in the summertime months and 6½ to 8 hours in the autumn and winter months.

The five-year average annual wind rose (see Figure 2-4) and the seasonal wind roses for the Palm Beach area are shown in Figure 2-5. These wind roses were developed from the five-year meteorological dataset (2001-2005) provided by FDEP for the Class II air quality analysis. The years used for the Class I analysis (2001-2003) were contained within this period. These seasonal wind roses show that winds blow predominantly from the east through most of the year; however, there is a shift to a more northwesterly direction in the winter months. The average wind speed is approximately 4 meters per second (m/s), or 9 miles per hours (mph). The prevailing wind direction over the course of the year is from the east. High wind speeds are relatively rare, except during exceptional weather events such as hurricanes and tropical storms.



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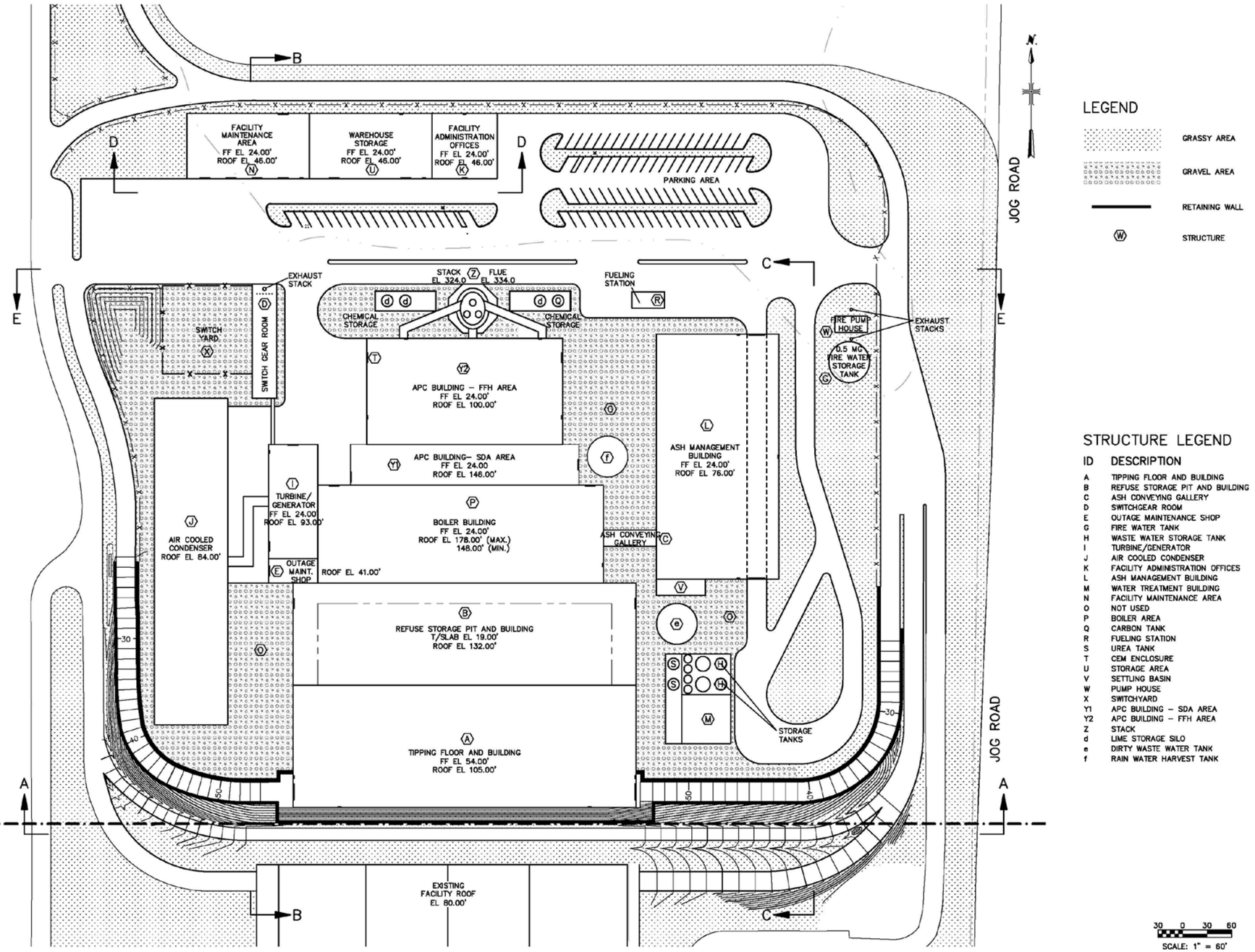
Solid Waste Authority of Palm Beach County

Location of Palm Beach Renewable Energy Facility No. 2

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April 2010

FIGURE 2-1



This drawing is a preliminary conceptual design study for the proposed 3000 T.P.D. Mass Burn Layout, Air Cooled Condenser Option, and is only intended to provide the DESIGN/BUILD CONTRACTOR with recommendations for future design studies. All building and site data is subject to change with final design by the DESIGN/BUILD CONTRACTOR.

E STANDARD File:F:\Work\Palm Beach\3000600-44.DWG Scale:1:1 Date:01/14/2010 Time:15:05 Layout:Layout1

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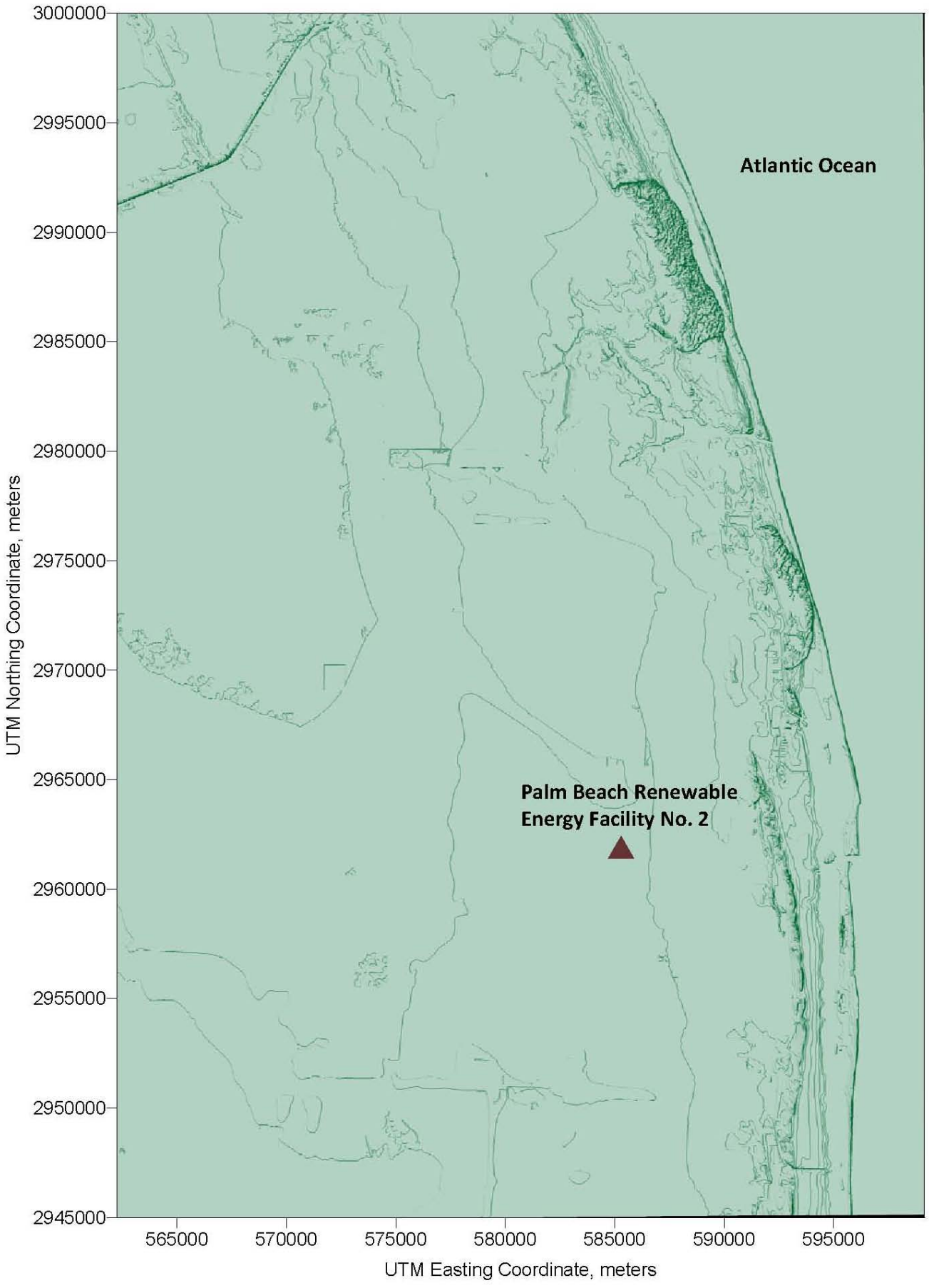
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Site Plan of Palm Beach Renewable Energy Facility No. 2

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Figure 2-2



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Topography

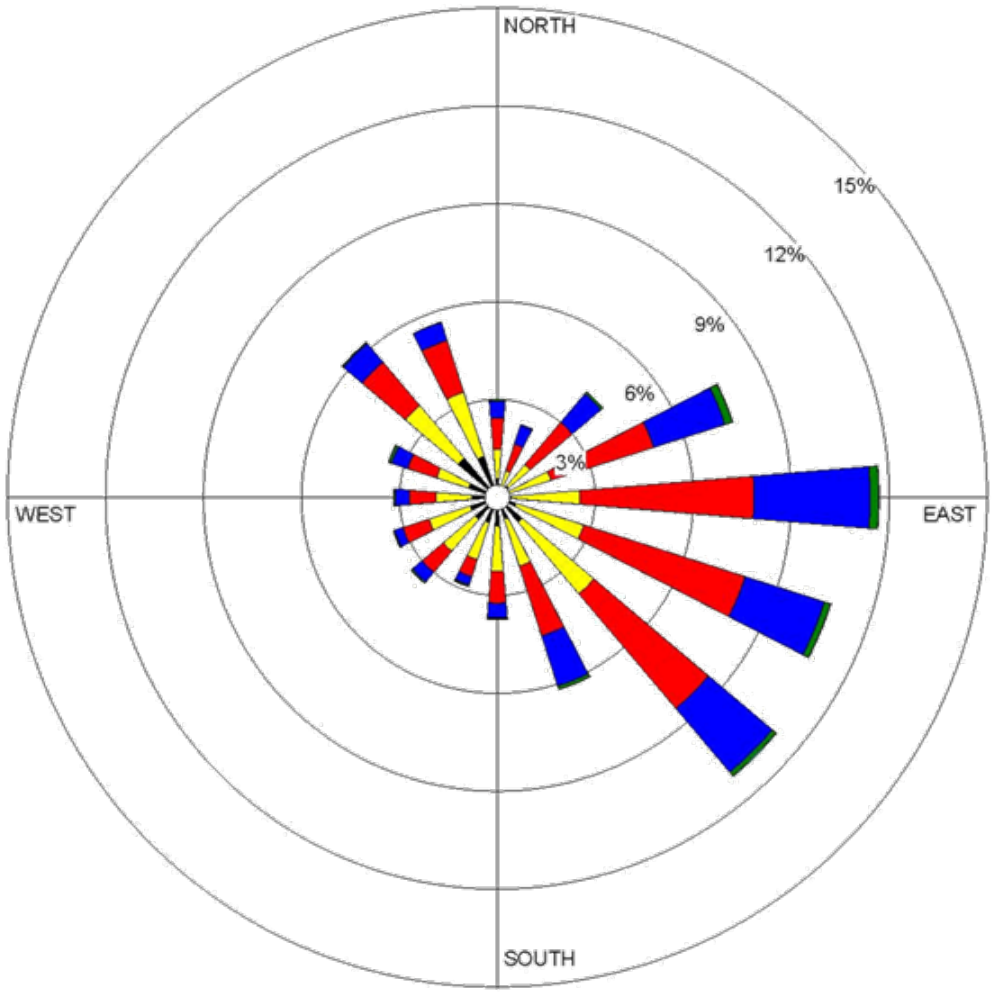
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FIGURE 2-3

WIND ROSE PLOT:
Station #12844 Palm Beach International Airport
Five-year Annual Wind Rose 2001 - 2005

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS: January - December	DATA PERIOD: **2001-2005** **Jan 1 - Dec 31** **00:00 - 23:00**		
	CALM WINDS: **11.23%**	TOTAL COUNT: **43824 hrs.**	
	AVG. WIND SPEED: **4.01 m/s**		PROJECT NO.: **PBREF2**

WRPLOT View - Lakes Environmental Software

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SWA SOLID WASTE AUTHORITY

Solid Waste Authority of Palm Beach County

Five-year Annual Wind Rose 2001 – 2005

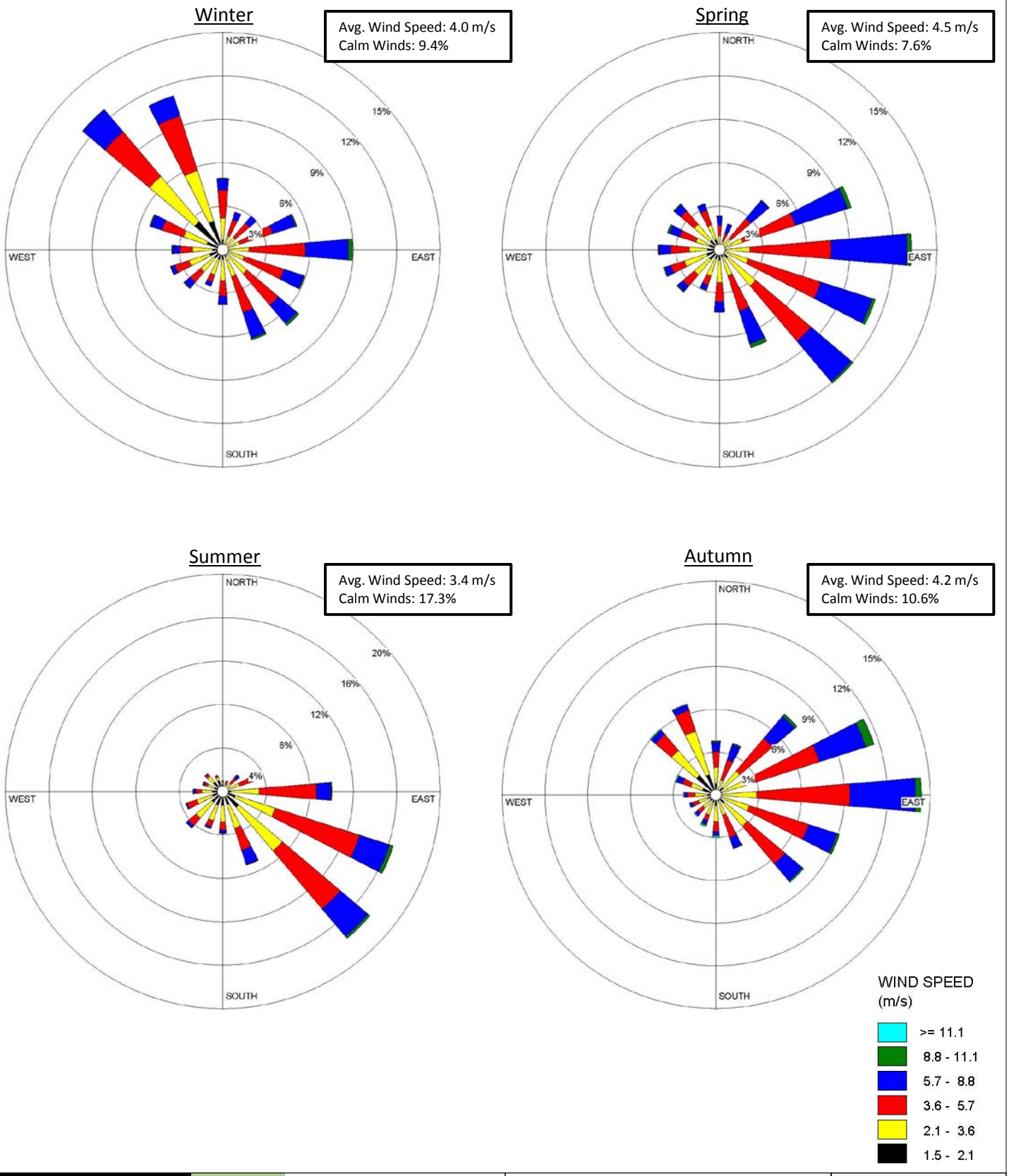
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FIGURE 2-4

WIND ROSE PLOT:
Station #12844 Palm Beach International Airport

DISPLAY:
Wind Speed Direction (blowing from)



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Five-year Seasonal Wind Rose 2001 – 2005

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FIGURE 2-5

3. Class I Applicability

PSD regulations provide special protection to Class I areas, areas of special national or regional value from a natural, scenic, recreational, or historic perspective. Such areas are afforded the greatest degree of air quality protection. The Clean Air Act (CAA) designated international parks, national wilderness areas, national memorial parks greater than 5,000 acres, and national parks in excess of 6,000 acres as mandatory Class I areas. Currently, there are 156 federally-mandated Class I areas. Each Class I area is administered by a Federal Land Manager (FLM), agents of the National Park Service (NPS), the United States Forest Service (FS), or the United States Fish and Wildlife Service (FWS).

It has historically been the policy of the United States Environmental Protection Agency (USEPA) to provide notice to the FLM of any Class I area located within 100 kilometers (km) of a proposed major source or major modification. Major facilities or modifications proposing to locate within 100 km of a PSD Class I area may be required to perform a modeling analysis in terms of air quality impacts (e.g., Class I significant impact levels (SILs) and PSD increments) and air quality related values (AQRVs). However, in recognition of potential effects due to long-range pollutant transport, this distance has been informally expanded to several hundred kilometers in recent years.

The Everglades NP, Chassahowitzka National Wildlife Refuge, and St. Marks National Wildlife Refuge are the nearest Class I areas from the proposed PBREF2 (see Figure 3-1). Table 3-1 presents the distance of the Class I areas from the proposed PBREF2. The FLM for Everglades National Park (NP) is the NPS. The FLM for the Chassahowitzka National Wildlife Refuge and the St. Marks National Wildlife Refuge is the FWS.

Table 3-1:
Nearest Class I Areas to Proposed Project

Class I Area	Federal Land Manager	Distance to PBREF2 (km)
Everglades National Park	National Park Service	118
Chassahowitzka National Wildlife Refuge	US Fish & Wildlife Service	320
St. Marks National Wildlife Refuge	US Fish & Wildlife Service	525

The Federal Land Managers' Air Quality Related Values Workgroup (FLAG) recently drafted a revision to their Phase I Report (FLAG, 2008). While still in draft form, this document includes initial screening criteria for sources greater than 50 km from a Class I area. Namely, for a source greater than 50 km from a Class I area:

if **Q /d < 10**,

where:

Q is the *combined* annual emissions (in tons per year (tpy), based on 24-hour maximum allowable emissions) of sulfur dioxide (SO_2), oxides of nitrogen (NO_X), particulate matter less than 10 microns (PM_{10}), and sulfuric acid mist (H_2SO_4), and

d is the nearest distance to a Class I area in kilometers (km),

then the impacts would be considered negligible, and no AQRV analysis (including visibility) would be required for that Class I area.

Table 3-2 provides the estimated annual emissions from the proposed PBREF2. Based on the annual emissions estimates using the maximum 24-hour allowable emissions[1] shown in Table 3-2, the Q/d estimate for Everglades NP, exceeds 10. Therefore, the emissions and Q/d information was provided to the NPS for their determination on the need for a Class I analysis.

Table 3-2:
Estimated PBREF2 Emissions

Pollutant	PSD Significant Emission Rate Threshold (tons/year)	Potential Annual Emissions (tons/year)	Potential Max. 24-hr-Based Annual Emissions (tons/year)	Subject to PSD Permitting?
Nitrogen Oxides (NO_X)	40	759.06	982.3	Yes – PSD
Sulfur Dioxide (SO_2)	40	298.66	328.5	Yes – PSD
Particulate Matter ($PM_{10}/PM_{2.5}$)	15	56.08	61.7	Yes – PSD
Sulfuric Acid Mist (H_2SO_4) as SO_4	7	95.22	104.7	Yes – PSD
Lead (Pb)	0.6	0.65	0.65	Yes - PSD

Upon notification of the proposed project, the NPS requested the following Class I analyses for Everglades National Park:

- Comparison of maximum impacts at Everglades NP to the proposed Class I SILs;
- Comparison of impacts at Everglades NP to the Class I PSD increments; and
- AQRV analyses for visibility and total sulfate and nitrate deposition.

[1] Assumes maximum allowable 24-hr emission rates of 982.3 TPY of NO_X, 328.5 TPY of SO_2, 61.7 TPY of PM_{10} , and 104.7 TPY of H_2SO_4 , where Q/d = 1477.2 ÷ 118 = 12.5 for Everglades National Park. The values of Q/d for the two remaining Class I areas are below 10.

In addition, although not a federally designated Class I area, the NPS requested analyses for the Class II area Biscayne National Park (NP). The analyses requested for Biscayne NP include:

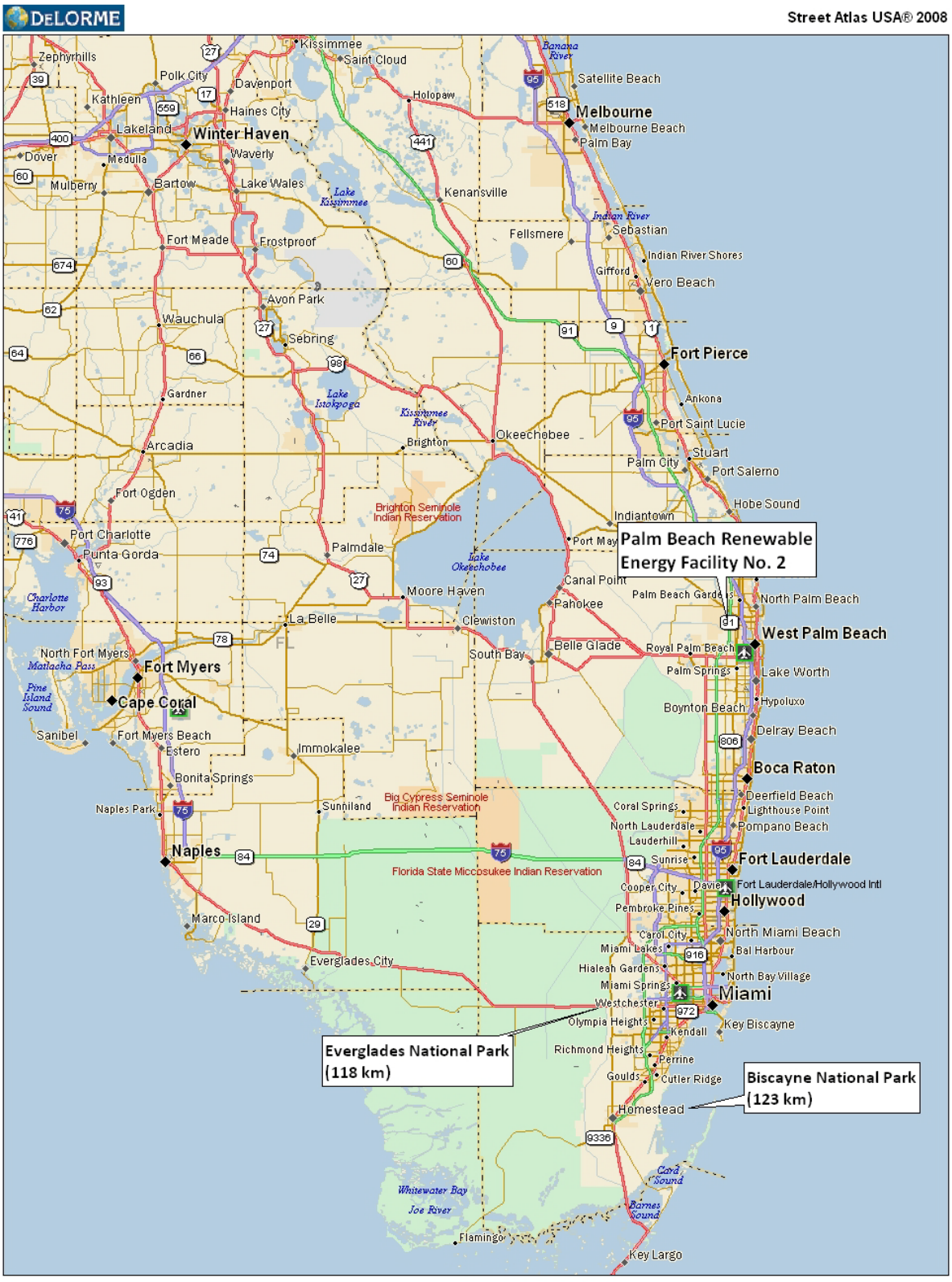
- Comparison of maximum impacts at Biscayne NP to the Class II SILs;
- Comparison of impacts at Biscayne NP to the Class II increments; and
- AQRV analyses for visibility and total sulfates and nitrates.

The NPS also requested that the lead (Pb) impacts (modeled as particulate and reported in units of concentration) at both parks be compared to the NAAQS for lead. Figure 3-2 shows the location of both the Everglades NP and Biscayne NP in relation to the project site.

The following sections in this modeling report present the methodology and modeling results for the analyses for Everglades NP and Biscayne NP.



MALCOLM PIRNIE / SWA SOLID WASTE AUTHORITY — Solid Waste Authority of Palm Beach County	Class I Areas	MALCOLM PIRNIE, INC. April 2010 FIGURE 3-1



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National Parks of Interest

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April 2010

FIGURE 3-2

4. Existing Air Quality

The PBREF2 will be located in Palm Beach County, which is part of the Southeast Florida Intrastate Air Quality Control Region (40 CFR 81.49). The proposed site of the PBREF2 and the two national park areas contained in this modeling report are located in areas that are in attainment of the NAAQS for all criteria pollutants, and classified as attainment/maintenance for ozone by FDEP. Background air quality is established by ambient air monitoring stations maintained by FDEP and local agencies with stations located throughout the state to monitor ambient levels of criteria pollutants. As is typically performed with Class I air quality analyses, the PSD increments, and not the NAAQS, are used as the comparison threshold for which proposed facilities evaluate potential impacts on air quality. Background air quality data is not needed for these types of analyses. However, since a NAAQS analysis for lead has been requested by the NPS, background air quality data from the nearest representative lead monitor from 2006 through 2008 is presented in Table 4-1.

Table 4-1:
Background Air Quality for Lead

Pollutant	Averaging Period	Monitoring Location	Monitored Concentration ($\mu g/m^3$)		
			2006	2007	2008
Pb	Quarterly	Pinellas Park	0.01	0.01	0.01

Source: USEPA AirData - Monitor Values Report - Criteria Air Pollutants.

These background lead data from routinely monitored air quality data were added to the predicted impacts modeled in the Everglades NP and the Biscayne NP to demonstrate compliance with the ambient air quality standard for lead.

5. Methodology

The Class I analysis will follow written guidance provided in the *Interagency Work Group on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* (USEPA, 1998), as well as the *Federal Land Managers' Air Quality Related Values Workgroup Phase I Report* (FLAG, 2000), *Federal Land Managers' Air Quality Related Values Workgroup Phase I Report* Revised (FLAG, 2008 Draft), *Appendix W: Guideline on Air Quality Models* (USEPA, 2006a), a memorandum from USEPA Office of Air Quality Standards and Planning (USEPA, 2006b), and additional guidance provided by the NPS. The methodology also followed the approach described in the *Class I Air Dispersion Modeling Protocol* (Malcolm Pirnie, 2010) which was reviewed and approved by the NPS. This analysis examined the potential impacts due to emissions of the proposed PBREF2 on the following items.

- Class I PSD significant impact levels (proposed[2]) and PSD increments for Everglades NP;
- Class II PSD significant impact levels and PSD increments for Biscayne NP;
- NAAQS analysis for lead (Pb);
- NAAQS analysis for NO_2, SO_2 and PM_{10} at Biscayne NP; and
- Air Quality-Related Values (AQRVs) at both national parks, including
    - visibility impairment; and
    - terrestrial and aquatic resources (through sulfate and nitrate deposition).

5.1. CALPUFF Modeling System Overview

The Class I analyses was performed using the CALPUFF modeling system. The CALPUFF modeling system is a multi-layer, multi-species, non-steady state Lagrangian puff model that simulates the effects of time- and space-varying meteorological conditions on pollutant transport, transformation, and removal. The main components of the CALPUFF modeling system are CALMET (Scire, J.S., F.R. Robe, M.E. Fernau, and R.J. Yamartino, 2000a), CALPUFF (Scire, J.S., D.G. Strimaitis, and R.J. Yamartino, 2000b), and CALPOST.

The CALMET component of the CALPUFF modeling system is a complex model that uses detailed geophysical and meteorological data to create three-dimensional wind fields. Geophysical data include terrain elevation, land use, and surface characteristics.

[2] Federal Register, Vol. 61: 38250; July 23, 1996

Meteorological data contain surface and upper air data, and precipitation information. The most recent USEPA-approved version of CALMET (version 5.8, level 070623) was used by the FLM to process the land use, terrain information, and meteorological data.

CALPUFF is capable of creating sophisticated wind fields generated by terrain and by three-dimensional wind profiles in order to predict pollutant concentrations, pollutant deposition, and visibility impairment downwind of the source. The current USEPA-approved version of CALPUFF (version 5.8, level 070623) was run for the following pollutants:

- Sulfur dioxide (SO_2),
- Sulfate (SO_4),
- Oxides of nitrogen (NO_X),
- Nitrate (NO_3),
- Nitric acid (HNO_3),
- Particulates (PM_{10}); and
- Lead (Pb).

The POSTUTIL program was used to transform the particle size species to any new species such as elemental carbon (EC), fine filterable particulate matter (SOIL), secondary organic aerosols (SOA), and coarse particulate matter (PMC) to develop the concentration files accessed by the CALPOST input files. The CALPOST post-processing program (version 6.211, level 080724) was used to process the output data used to determine the concentrations of PM_{10}, SO_2, and NO_2, total sulfur (S) and nitrogen (N) loading, and the 24-hour extinction coefficients from the source and the existing background at the Class I area. In addition, CALPOST was used to determine the predicted Pb concentrations (as particulate) from the proposed facility within the requested NP areas and to compare these results with the current NAAQS.

5.1.1. CALMET Inputs

The CALMET data set used for the analysis was originally developed through the Visibility Improvement State and Tribal Association of the Southeast (VISTAS) Best Available Retrofit Technology (BART) study for the Everglades NP. The CALMET inputs for Sub Domain 2 developed during the VISTAS study and reprocessed for PSD applications were used for the CALPUFF analysis. The VISTAS CALMET datasets (preprocessed output) were recommended and provided by John Notar of NPS for use in this analysis. Figure 5-1 indicates the locations of the surface, upper air, and overwater meteorological stations located within the CALMET grid. It is our understanding that the VISTAS Sub Domain 2 CALMET inputs were reprocessed by the NPS using the current USEPA-approved CALMET version 5.8 and regulatory-accepted model options. The

CALMET dataset covers the 2001, 2002, and 2003 model years, satisfying the 3-year data requirement for Class I Area analyses.

An overview of the CALMET data grid inputs is presented in Table 5-1. The CALMET modeling domain shown in Figure 5-1 was developed by the NPS using the model options provided in Table 5-2.

Table 5-1:
VISTAS Sub-Domain 2 CALMET Inputs Overview

Parameter	Description
Modeling Period	3 Years (Jan 1, 2001 – December 31, 2003)
Meteorological Inputs	MM5 used as initial guess field; hourly surface observations, precipitation observations, overwater buoy data, and twice-daily upper air sounding data.
Grid Resolution	4 kilometers (in Lambert Conformal coordinate system)
PBREF2 Grid Extent	263 grid cells E-W, 206 grid cells N-S direction
LCC Origin	40.0 N, 97.0 W (NWS-84), Standard Parallels: 33.0 N, 45.0 W
Vertical Layers	10 levels (0, 20, 40, 80, 160, 320, 640, 1200, 2000, 3000, 4000 meters)

Table 5-2:
CALMET Model Options

Variable	Description	USEPA 2006[3]	Proposed PBREF2
GEO.DAT	Name of Geophysical data file	GEO.DAT	geo-domain2-4km-comb-g.dat
SURF.DAT	Name of Surface data file	SURF.DAT	surf2001dom2.dat
PRECIP.DAT	Name of Precipitation data file	PRECIP.DAT	precip2001dom2.dat
NUSTA	Number of upper air data sites	User Defined	10
UPn.DAT	Names of NUSTA upper air data files	UPn.DAT	station-2001.dat
IBYR	Beginning year	User Defines	2001
IBMO	Beginning month	User Defines	1
IBDY	Beginning day	User Defines	1
IBHR	Beginning hour	User Defines	1
IBTZ	Base time zone	User Defines	5
IRLG	Number of hours to simulate	User Defines	8760
IRTYPE	Output file type to create (1 for CALPUFF)	1	1
LCALGRD	Are w-components and temperature needed?	T	T
NX	Number of east-west grid cells	**User Defined**	263
NY	Number of north-south grid cells	**User Defined**	206
DGRIDKM	Grid spacing, km	**User Defined**	4
XORIGKM	Southwest grid cell X coordinate	User Defines	721.995
YORIGKM	Southwest grid cell Y coordinate	User Defines	-1598
XLATO	Southwest grid cell latitude	User Defines	--
YLONO	Southwest grid cell longitude	User Defines	--
IUTMZN	UTM Zone	User Defines	-999
LLCONF	When using Lambert Conformal map coord. rotate winds from true north to map north?	F	T
XLAT1	Latitude of 1st standard parallel	30	33
XLAT2	Latitude of 2nd standard parallel	60	45
RLONO	Longitude used if LLCONF = T	90	97
RLATO	Latitude used if LLCONF = T	40	40
NZ	Number of vertical layers	User Defined	10
ZFACE	Vertical cell face heights (NZ+1 values)	User Defined	0,20,40,80,160,320,640,1200,2000,3000,4000

Variable	Description	USEPA 2006	Proposed PBREF2
LSAVE	Save met. data fields in an unformatted file?	T	T
IFORMO	Format of unformatted file (1 for CALPUFF)	1	1
NSSTA	Number of stations in SURF.DAT file	User Defined	109
NPSTA	Number of stations in PRECIP.DAT	User Defined	96
ICLOUD	Is cloud data to be input as gridded fields? (0 = No)	0	0
IFORMS	Format of surface data (2 = formatted)	2	2
IFORMP	Format of precipitation data (2 = formatted)	2	2
IFORMC	Format of cloud data (2 = formatted)	2	2
IWFCOD	Generate winds by diagnostic wind module? (1 = Yes)	1	1
IFRADJ	Adjust winds using Froude number effects? (1 = Yes)	1	1
IKINE	Adjust winds using kinematic effects? (1 = Yes)	0	0
IOBR	Use O'Brien procedure for vertical winds? (0 = No)	0	0
ISLOPE	Compute slope flows? (1 = Yes)	1	1
IEXTRP	Extrapolate surface winds to upper layers? (-4 = use similarity theory and ignore layer 1 of upper air_station_data)	-4	-4
ICALM	Extrapolate surface calms to upper layers? (0 = No)	0	0
BIAS	Surface/upper-air weighting factors (NZ values)	NZ*0	NZ*0
IPROG	Using prognostic or MM-FDDA data? (0 = No)	0	14
LVARY	Use varying radius to develop surface winds?	F	F
RMAX1	Max surface over-land extrapolation radius (km)	**User Defined**	40
RMAX2	Max aloft over-land extrapolation radius (km)	**User Defined**	40
RMAX3	Maximum over-water extrapolation radius (km)	**User Defined**	100
RMIN	Minimum extrapolation radius (km)	0.1	0.1
RMIN2	Distance (km) around an upper air site where vertical extrapolation is excluded (Set to -1 if IEXTRP = ±4)	4	-1
TERRAD	Radius of influence of terrain features (km)	**User Defined**	15
R1	Relative weight at surface of Step 1 field and obs	**User Defined**	5

Variable	Description	USEPA 2006	Proposed PBREF2
R2	Relative weight aloft of Step 1 field and obs.	**User Defined**	5
DIVLIM	Maximum acceptable divergence	5.E-6	5.E-6
NITER	Max number of passes in divergence minimization	50	50
NSMTH	Number of passes in smoothing (NZ values)	2, 4*(NZ~1)	2, 4*(NZ~1)
NINTR2	Max number of stations for interpolations (NA values)	**99**	99
CRITFN	Critical Froude number	1	1
ALPHA	Empirical factor triggering kinematic effects	0.1	0.1
IDIOPT1	Compute temperatures from observations (0 = True)	0	0
ISURFT	Surface station to use for surface temperature (between 1 and NSSTA)	**User Defined**	50
IDIOPT2	Compute domain-average lapse rates? (0 = True)	0	0
IUPT	Station for lapse rates (between 1 and NUSTA)	**User Defined**	5
ZUPT	Depth of domain-average lapse rate (m)	200	200
IDIOPT3	Compute internally initial guess winds? (0 = True)	0	0
IUPWND	Upper air station for domain winds (-1 = 1/r**2 interpolation of all stations)	-1	-1
ZUPWND	Bottom and top of layer for 1st guess winds (m)	1, 1000	1,1000
IDIOPT4	Read surface winds from SURF.DAT? (0 = True)	0	0
IDIOPT5	Read aloft winds from UPn.DAT? (0 = True)	0	0
CONSTB	Neutral mixing height B constant	1.41	1.41
CONSTE	Convective mixing height E constant	0.15	0.15
CONSTN	Stable mixing height N constant	2400	2400
CONSTW	Over-water mixing height W constant	0.16	0.16
FCORIOL	Absolute value of Coriolis parameter	1.E-4	1.E-4
IAVEZI	Spatial averaging of mixing heights? (1 = True)	1	1
MNMDAV	Max averaging radius (number of grid cells)	1	1
HAFANG	Half-angle for looking upwind (degrees)	30	30
ILEVZI	Layer to use in upwind averaging (between 1 and NZ)	1	1
DPTMIN	Minimum capping potential temperature lapse rate	0.001	0.001
DZZI	Depth for computing capping lapse rate (m)	200	200

Variable	Description	USEPA 2006	Proposed PBREF2
ZIMIN	Minimum over-land mixing height (m)	50	50
ZIMAX	Maximum over-land mixing height (m)	3000	3000
ZIMINW	Minimum over-water mixing height (m)	50	50
ZIMAXW	Maximum over-water mixing height (m)	3000	3000
IRAD	Form of temperature interpolation (1 = 1/r)	1	1
TRADKM	Radius of temperature interpolation (km)	500	500
NUMTS	Max number of stations in temperature interpolations	5	5
IAVET	Conduct spatial averaging of temperature? (1 = True)	1	1
TGDEFB	Default over-water mixed layer lapse rate (K/m)	-0.0098	-0.0098
TGDEFA	Default over-water capping lapse rate (K/m)	-0.0045	-0.0045
JWAT1	Beginning land use type defining water	999	55
JWAT2	Ending land use type defining water	999	55
NFLAGP	Method for precipitation interpolation (2 = 1/r**2)	2	2
SIGMAP	Precip radius for interpolations (km)	100	100
CUTP	Minimum cut off precip rate (mm/hr)	0.01	0.01
SSn	NSSTA input records for surface stations	User Defined	109
USn	NUSTA input records for upper-air stations	User Defined	10
PSn	NPSTA input records for precipitation stations	User Defined	96

Notes:

1. Options for proposed PBREF2 are equivalent to the VISTAS CALMET Model options; year 2001 used as an example.
2. Bolded text indicate variables that will need tailoring for a given application (IWAQM, 1998).
3. OAQPS Memorandum to EPA Region 4 (Atkinson & Fox, 2006b).

The CALMET output contained the hourly gridded meteorological data which was then used as an input into the CALPUFF model.

5.1.2. CALPUFF Input

The CALPUFF model input requires source-specific emission rates for each pollutant (i.e. NO_X, SO_X, PM_{10}, SO_4), source parameters (height, diameter, exit gas temperature, and exit gas velocity, area source length and width dimensions), receptor locations and elevations, and meteorological and geophysical data. The meteorological and geophysical data used in this analysis are from the CALMET output discussed above.

CALPUFF uses background ozone concentrations to simulate the photochemical conversion of SO_2 to SO_4 and NO_X to NO_3. Hourly ozone data from ozone monitoring stations in the region were used as an input. Available hourly ozone data from 2001,

2002, and 2003 provided through the VISTAS dataset were extracted through the preprocessor SUBDOMN (version 1.2) associated with the CALPUFF (version 5.8, level 070623) modeling system and used in this analysis. The extraction from this dataset included all ozone station data within Sub Domain 2 for each respective model year. The ozone monitoring data that were extracted for Sub Domain 2 and used in the CALPUFF analysis have been provided with the modeling files. The default value of 80 ppb was used if hourly ozone data were not available for a particular period.

Background ammonia data are used in the conversion of sulfur oxides to particulate sulfates and nitrous oxides to particulate nitrates. Since there are no ammonia monitoring stations located in either the Everglades NP or Biscayne NP, a background concentration of 0.5 ppb as recommended by NPS and the *IWAQM Phase 2 Report* guidance was used in the modeling analysis. The 0.5 ppb concentration is consistent with background NH_3 values that have been used for the recent Class I analyses in the area of the proposed project. Hygroscopic and Rayleigh scattering used in the analyses are those values recommended by both the *FLAG Phase I Report (2000)* and draft *Phase I Report Revised (2008)*.

CALPUFF utilizes all FLAG-recommended model settings and model control options including:

- Gaussian near-field distribution;
- Transitional plume rise;
- Stack tip downwash;
- PG dispersion coefficients for rural areas and McElroy-Pooler coefficients for urban areas;
- Partial plume path adjustment for terrain; and
- Wet deposition, dry deposition, and chemical transformation using the MESOPUFF II scheme.

CALPUFF combines CALMET gridded data with source data to determine hourly concentrations and deposition values at each receptor. The computation grid in CALPUFF was the same as developed in CALMET (Figure 5-1). The model options used in the CALPUFF analysis, along with the respective USEPA-recommended options, are identified in Table 5-3. These model options match those presented in the modeling protocol submitted to the FLM.

Table 5-3:
CALPUFF Model Options

Variable	Description	USEPA 2006	Proposed PBREF2
METDAT	CALMET input data filename(s) (12 files)	CALMET. DAT	CMETjan1.dat
PUFLST	Filename for general output from CALPUFF	CALPUFF.LST	PB*EV01*.lst
CONDAT	Filename for output concentration data	CONC.DAT	PBE*V01*.con
DFDAT	Filename for output dry deposition fluxes	DFLX.DAT	PB*EV01*.dfx
WFDAT	Filename for output wet deposition fluxes	WFLX.DAT	PB*EV01*.wfx
VISDAT	Filename for output relative humidity (for visibility)	VISB.DAT	PBEV*01*RH.dat
METRUN	Do we run all periods (1) or a subset (0)?	0	0
IBYR	Beginning year	User Defined	2001,2002, 2003
IBMO	Beginning month	User Defined	1
IBDY	Beginning day	User Defined	1
IBHR	Beginning hour	User Defined	1
IRLG	Length of run (hours)	User Defined	8760
NSPEC	Number of species modeled (for MESOPUFF II chemistry)	5	11
NSE	Number of species emitted	3	9
MRESTART	Restart options (0 = no restart), allows splitting runs into smaller segments	**0**	0
METFM	Format of input meteorology (1 = CALMET)	1	1
AVET	Averaging time lateral dispersion parameters (minutes)	60	60
MGAUSS	Near-field vertical distribution (1 = Gaussian)	1	1
MCTADJ	Terrain adjustments to plume path (3 = Plume path)	**3**	3
MCTSG	Do we have subgrid hills? (0 = No), allows CTDM-like treatment for subgrid scale hills	**0**	0
MSLUG	Near-field puff treatment (0 = No slugs)	0	0
MTRANS	Model transitional plume rise? (1 = Yes)	1	1
MTIP	Treat stack tip downwash? (1 = Yes)	1	1
MSHEAR	Treat vertical wind shear? (0 = No)	0	0
MSPLIT	Allow puffs to split? (0 = No)	**0**	0
MCHEM	MESOPUFF-II Chemistry? (1 = Yes)	1	1
MWET	Model wet deposition? (1 = Yes)	1	1
MDRY	Model dry deposition? (1 = Yes)	1	1
MDISP	Method for dispersion coefficients (3 = PG & MP)	3	3
MTURBVW	Turbulence characterization? (Only if MDISP 1 or 5)	3	3

Variable	Description	USEPA 2006	Proposed PBREF2
MDISP2	Backup coefficients (Only if MDISP = 1 or 5)	3	3
MROUGH	Adjust PG for surface roughness? (0 = No)	0	0
MPARTL	Model partial plume penetration? (0 = No)	1	1
MTINV	Elevated inversion strength (0=compute from data)	0	0
MPDF	Use PDF for convective dispersion? (0 = No)	0	0
MSGTIBL	Use TIBL module? (0 = No) allows treatment of subgrid scale coastal areas	0	0
MREG	Regulatory default checks? (1 = Yes)	1	1
CSPECn	Names of species modeled (for MESOPUFF II, must be S02, S04, NOX, HNO3, N03)	**User Defined**	$S0_2$, $S0_4$, NO_X, HNO_3, $N0_3$,
Species Names	Manner species will be modeled	**User Defined**	$S0_2$, $S0_4$, NO_X, HNO_3, $N0_3$, PM800,PM425, PM187,PM112, PM081, PM056
Specie Groups	Grouping of species, if any.	**User Defined**	See POSTUTIL Input files
NX	Number of east-west grids of input meteorology	User Defined	263
NY	Number of north-south grids of input meteor.	User Defined	206
NZ	Number of vertical layers of input meteorology	User Defined	10
DGRIDKM	Meteorology grid spacing (km)	User Defined	4
ZFACE	Vertical cell face heights of input meteorology	User Defined	0,20,40,80, 160,320,640, 1200,2000, 3000, 4000
XORIGKM	Southwest corner (east-west) of input meteorology	User Defined	721.995
YORIGIM	Southwest corner (north-south) of input meteorology	User Defined	-1598.0
IUTMZN	UTM zone	User Defined	NA
XLAT	Latitude of center of meteorology domain	User Defined	NA
XLONG	Longitude of center of meteorology domain	User Defined	NA
XTBZ	Base time zone of input meteorology	User Defined	5
IBCOMP	Southwest X-index of computational domain	**User Defined**	1
JBCOMP	Southwest Y-index of computational domain	**User Defined**	1
IECOMP	Northeast X-index of computational domain	**User Defined**	263
JECOMP	Northeast Y-index of computational domain	**User Defined**	206
LSAMP	Use gridded receptors? (T = Yes)	F	F
IBSAMP	Southwest X-index of receptor grid	User Defined	NA
JBSAMP	Southwest Y-index of receptor grid	User Defined	NA
IESAMP	Northeast X-index of receptor grid	User Defined	NA

Variable	Description	USEPA 2006	Proposed PBREF2
JESAMP	Northeast Y-index of receptor grid	User Defined	NA
MESHDN	Gridded receptor spacing = DGRIDKM / MESHDN	1	NA
ICON	Output concentrations? (1 = Yes)	1	1
IDRY	Output dry deposition flux? (1 = Yes)	1	1
IWET	Output west deposition flux? (1 = Yes)	1	1
IVIS	Output RH for visibility calculations (1 = Yes)	1	1
LCOMPRS	Use compression option in output? (T = Yes)	T	T
ICPRT	Print concentrations? (0 = No)	0	0
IDPRT	Print dry deposition fluxes (0 = No)	0	0
IWPRT	Print wet deposition fluxes (0 = No)	0	0
ICFRQ	Concentration print interval (1 = hourly)	1	1
IDFRQ	Dry deposition flux print interval (1 = hourly)	1	1
IWFRQ	West deposition flux print interval (1 = hourly)	1	1
IPRTU	Print output units (1 = g/m**3; g/m**2/s)	1	3
IMESG	Status messages to screen? (1 = Yes)	1	1
Output Species	Where to output various species	**User Defined**	Default
LDEBUG	Turn on debug tracking? (F = No)	F	F
Dry Gas Dep	Chemical parameters of gaseous deposition species	**User Defined**	Default
Dry Part. Dep	Chemical parameters of particulate deposition species	**User Defined**	Default
RCUTR	Reference cuticle resistance (s/cm)	30.	30
RGR	Reference ground resistance (s/cm)	10.	10
REACTR	Reference reactivity	8	8
NINT	Number of particle-size intervals	9	9
IVEG	Vegetative state (1 = active and unstressed)	1	1
Wet Dep	Wet deposition parameters	**User Defined**	Default
MOZ	Ozone background? (1 = read from ozone.dat)	1	1
BCKO3	Ozone default (ppb) (Use only for missing data)	**80**	12 * 80
BCKNH3	Ammonia background (ppb)	**10**	12 * 0.5
RNITE1	Nighttime S02 loss rate (%/hr)	0.2	.2
RNITE2	Nighttime NOx loss rate (%/hr)	2	2
RNITE3	Nighttime HNO3 loss rate (%/hr)	2	2
SYTDEP	Horizontal size (m) to switch to time dependence	550.	550
MHFTSZ	Use Heifter for vertical dispersion? (0 = No)	0	0
JSUP	PG Stability class above mixed layer	5	5
CONK1	Stable dispersion constant (Eq 2.7-3)	0.01	0.01
CONK2	Neutral dispersion constant (Eq 2.7-4)	0.1	0.1

Variable	Description	USEPA 2006	Proposed PBREF2
TBD	Transition for downwash algorithms (0.5 = ISC)	0.5	0.5
IURB1	Beginning urban land use type	10	10
IURB2	Ending urban land use type	19	19
XMXLEN	Maximum slug length in units of DGRIDKM	1	1
XSAMLEN	Maximum puff travel distance per sampling step (units of DGRIDKM)	1	1
MXNEW	Maximum number of puffs per hour	99	99
MXSAM	Maximum sampling steps per hour	99	99
SL2PF	Maximum Sy/puff length	10	10
PLXO	Wind speed power-law exponents	0.07, 0.07, 0.10, .015, 0.35, 0.55	0.07, 0.07, 0.10, .015, 0.35, 0.55
WSCAT	Upper bounds 1st 5 wind speed classes (m/s)	1.54,3.09,5.14, 8.23.10.8	1.54,3.09,5.14, 8.23.10.8
PGGO	Potential temp. gradients PG E and F (deg/km)	0.020, 0.035	0.020, 0.035
SYMIN	Minimum lateral dispersion of new puff (m)	1.0	1.0
SZMIN	Minimum vertical dispersion of new puff (m)	1.0	1.0
SVMIN	Array of minimum lateral turbulence (m/s)	6 * 0.50	6 * 0.50
SWMIN	Array of minimum vertical turbulence (m/s)	0.20, 0.12, 0.08, 0.06, 0.03, 0.016	0.20, 0.12, 0.08, 0.06, 0.03, 0.016
CDIV	Divergence criterion for dw/dz (1/s)	0.0	0.0
WSCALM	Minimum non-calm wind speed (m/s)	0.5	0.5
XMAXZI	Maximum mixing height (m)	3000	3000
XMINZI	Minimum mixing height (m)	50	50
PPC	Plume path coefficients (only if MCTADJ = 3)	0.5,0.5,0.5,0.5, 0.35,0.35	0.5,0.5,0.5,0.5, 0.35,0.35
NSPLIT	Number of puffs when puffs split	3	3
IRESPLIT	Hours when puff are eligible to split	**User Defined**	NA
ZISPLIT	Previous hour's mixing height (minimum), (m)	100	100
ROLDMAX	Previous Max mixing height/current mixing height ratio, must be less then this value to allow puff split	0.25	0.25
EPSSLUG	Convergence criterion for slug sampling integration	1.0E-04	1.0E-04
EPSAREA	Convergence criterion for area source integration	1.0E-06	1.0E-06
NPT1	Number of point sources	User Defined	1
IPTU	Units of emission rates (1 = g/s)	1	3
NSPT1	Number of point source - species combinations	0	0
NPT2	Number of point sources with fully variable emission rates	0	0

Variable	Description	USEPA 2006	Proposed PBREF2
Point Sources	Point sources characteristics	User Defined	MWC Flues
Area Sources	Area sources characteristics	User Defined	NA
Line Sources	Buoyant lines source characteristics	User Defined	NA
Volume Sources	Volume sources characteristics	User Defined	NA
NREC	Number of user defined receptors	User Defined	901 (Everglades NP) 114 (Biscayne NP)
Receptor Data	Location and elevation (MSL) of receptors	User Defined	Table A1-1 & Table A1-2

Notes:

1. Bolded text indicates variables that will need to be tailored for a given application (IWAQM, 1998).

5.1.3. Receptor Locations

Receptor data for the Everglades NP were obtained from the NPS website[3]. Receptor data for Biscayne NP were derived from a map of the park boundaries and the available 30-meter DEM files using the AERMAP program. Both NP receptor grids were then converted into the Lambert Conformal coordinate system using the coordinate conversion program COORDS (http://www.src.com). A grid spacing of 2.5 kilometers was used to develop the Biscayne NP receptor grid. This receptor spacing is consistent to the spacing that the NPS uses for the Everglades NP. Attachments A1-1 and A1-2 provide the discrete receptor locations used in the modeling analysis for each NP. Figures 5-2 and 5-3 show the locations of these receptors for each national park.

5.1.4. Source Parameter Data

The CALPUFF analysis evaluated potential impacts due to the MWC emissions from the proposed facility on the Everglades NP and Biscayne NP. Other potential ancillary equipment at the proposed PBREF2 have significantly lower emission rates and have low stack heights, thus impacts from these ancillary sources are expected to be negligible at the distant Everglades NP Class I area and Biscayne NP. Therefore, the ancillary equipment sources were not included in this long-range modeling analysis.

Due to the identical exhaust characteristics and closeness of the three individual flues, a merged flue was used in the modeling analysis. This is consistent with the Class II modeling analysis. The MWC source data includes the following parameters:

- Location in UTM coordinates (converted to LLC);

[3] NPS weblink: http://www2.nature.nps.gov/air/maps/receptors

- Base elevation above mean sea level;
- Release height(s) above base elevation;
- Exhaust temperature;
- Exhaust velocity; and
- Merged stack internal diameter (i.e., effective diameter of merged flues)

The stack information for the merged flue under maximum design load is provided in Table 5-4.

Table 5-4:
Stack Parameters for Merged Flue

X	Y	Z	Stack Height	Effective Diameter	Exit Temperature	Exit Velocity
(km as LCC)		(m)	(m)	(m)	(K)	(m/s)
1691.447	-1341.955	7.32	94.49	4.26	413.7	20.12

Due to the distance of the proposed facility to the Everglades NP and Biscayne NP (approximated at 120 kilometers for both parks), building downwash characteristics associated with the proposed source were not incorporated in the CALPUFF modeling. At this distance, it is believed that building downwash will have little or no effect on the impacts from the proposed facility (per John Notar, NPS, e-mail correspondence).

Maximum estimated short-term emission rates for SO_2, H_2SO_4 (as SO_4), NO_X, and PM_{10} for the MWC emissions from the proposed facility which were based on the *maximum design load* are presented in Table 5-5. The estimated short-term emission rates were conservatively used for the annual averaging period for the SILs and increment analysis.

Table 5-5:
Estimated Short-term and Annual Emission Rates

Averaging Period	SO_2 (lb/hr)	H_2SO_4 [1] (lb/hr)	NO_X (lb/hr)	PM/PM_{10} (lb/hr)
Short-term	75.0	23.9	224.3	14.1
Annual	68.2	21.73	173.3	12.8

1. Potential H_2SO_4 emissions are modeled as SO_4.
2. Potential emission rates are the sum of all the flues (3 flues).

As requested by the FLM, the estimated H_2SO_4 emissions were modeled as SO_4 in CALPUFF analysis. The H_2SO_4 emissions represent the potential condensable emissions to be used in the visibility analysis.

The particle size distribution was based on data from the Wurzburg Waste-to Energy (WTE) Facility data as presented in Table 5-6. The Wurzburg particle size distribution data have been used for WTE facilities with similar controls in numerous permitting projects throughout the United States. The mass fraction estimates were adjusted to account for only the PM10 and smaller portion of the size distribution table. Within CALPUFF, the different particle size distributions of the estimated particulate matter were modeled using a unit emission rate of 1 lb/hr for each particle size category (e.g. PM800, PM425, PM187, PM112, PM081, and PM056). The particle size categories represent the approximate mean particle diameter size range within each category bin. These particle size bins were in the CALPUFF input files. The particle size bins are consistent with the NPS-recommended method previously used in the VISTAS study, as well as other recent Class I analyses. During the development of the CALPUFF inputs for this analysis, the NPS recommended that the CALPUFF input files found on the VISTAS website be used as examples for this analysis. Therefore, these VISTAS-developed inputs files were used as example modeling input files. The POSTUTIL program was then used to transform the particle size species contained in the CALPUFF generated concentration file to the revised concentration file that will be read by the CALPOST input files.

The PM_{10} emissions have been broken down within the SOIL and PMC species for this analysis. The PM800 and PM425 particle size categories were used to represent the PMC portion of the emissions. The particle size distribution range of 10.8 to 17.4 microns was factored out of the adjusted mass fraction values. The adjusted mass fraction values were used in the POSTUTIL files to estimate the emission rate for each size category.

Table 5-6:
Particle Size Distribution

Lower Range (um)	Upper Range (um)	Mean Particle Diameter (um)	Fraction of Total Mass	Adjusted Mass Fraction [1]	CALPUFF PM Size Distribution
0	<0.6	0.38	0.53	0.58	PM056
0.6	1	0.82	0.04	0.04	PM081
1	1.6	1.32	0.03	0.03	PM112
1.6	3.2	2.46	0.10	0.11	PM187
3.2	5	4.11	0.08	0.09	PM425
5	7.3	6.11	0.08	0.15	PM800
7.3	10.8	8.96	0.06		
10.8	17.4	13.98	0.08	---	

Source: From Hahn and Sussman, 1986. *Dioxin '86* poster presentation.

1. The adjusted mass fraction value only accounts for the particle size distribution data measured as PM_{10} or less (upper range of 10.8 microns)

The actual PM speciation breakdown for the visibility impairment analysis is presented in the POSTUTIL input files provided on the modeling CD-ROM.

Finally, the emission rate for NO_X was conservatively based on a 100% conversion of NO_X to NO_2 for the modeling analysis.

5.2. Analysis

The refined Class I analysis followed the methodology presented in the approved Class I Modeling Protocol (February 2010). The methodology was based on written guidance provided in the *IWAQM Phase 2 Summary Report* (USEPA, 1998), as well as the *FLAG Phase I Report* (FLAG, 2000), *Revision to the Guideline on Air Quality Models: Adoption of a Preferred Long Range Transport Model and Other Revisions: Final Rule* (Federal Register, 2003), USEPA memorandum from Atkinson and Fox (USEPA, 2006b), *FLAG Phase I Report* Revised (FLAG, 2008 Draft) and additional guidance provided by the NPS. The CALMET/CALPUFF analysis used the specified three years of MM5 and NWS meteorological data developed through the VISTAS process, reprocessed by the FLMs for PSD applications as described in Section 4.1.1, and provided by the NPS for this analysis. The same modeling domain was used for all three years of data (Figure 5-1).

5.2.1. Significant Impact Analysis

Under PSD, significant impact levels (SILs) are used to determine if a proposed source has the potential for causing or contributing to an exceedance of an ambient air quality standard or a PSD increment. In the proposed NSR rule (Federal Register, Vol. 61: 38250; July 23, 1996), USEPA proposed new Class I SILs. Table 5-7 shows the proposed Class I SILs for Everglades NP along with the Class II SILs for Biscayne NP. Although the Class I SILs have not yet been promulgated, they have generally been applied by the FLMs for Class I analyses. The maximum concentrations of NO_2, SO_2, and PM_{10} from the Class I area receptors at Everglades NP were compared to these Class I SILs while the maximum concentrations of NO_2, SO_2, and PM_{10} at Biscayne NP were compared to the Class II SILs. Following regulatory guidance, if the impacts from the proposed PBREF2 are below the SILs, then emissions from the facility are assumed to be insignificant at Everglades NP and Biscayne NP, and no further air quality impact analysis (multisource analysis) is needed.

Table 5-7:
Significant Impact Levels

Pollutant	Averaging Time	Proposed Class I Significant Impact Levels ($\mu g/m^3$)	Class II Significant Impact Levels ($\mu g/m^3$)
Sulfur Dioxide (SO_2)	Annual 24-hour 3-hour	0.1 0.2 1.0	1.0 5.0 25.0
Particulate Matter (PM_{10})	Annual 24-hour	0.2 0.3	1.0 5.0
Nitrogen Dioxide (NO_2)	Annual	0.1	1.0

Source: Federal Register, Vol. 61: 38250; July 23, 1996

However, if the modeled concentration is greater than or equal to the SIL, then a full impact (i.e., cumulative, multisource) analysis may be required to demonstrate compliance with the NAAQS and PSD increments.

The NPS requested that the impacts due to emissions from the proposed PBREF2 be compared to the applicable PSD increments at Everglades NP (Class I increments) and at Biscayne NP (Class II increments). These PSD increments are shown in Table 5-8.

Table 5-8:
PSD Increments

Pollutant	Averaging Time	Class I Increments ($\mu g/m^3$)	Class II Increments ($\mu g/m^3$)
Sulfur Dioxide (SO_2)	Annual 24-hour 3-hour	2 5 25	20 91 512
Particulate Matter (PM_{10})	Annual 24-hour	5 10	17 30
Nitrogen Dioxide (NO_2)	Annual	2.5	25

Source: 40 CFR 52.21
Notes: Long-term (annual) increments are not to be exceeded. Short-term (3-hour and 24-hour) increments are not to be exceeded more than once a year.

5.2.2. Sulfate and Nitrate Loadings

Deposition impacts of sulfur (as sulfate ion) and nitrogen (as nitrate and ammonium ions) were determined at the Everglades NP and Biscayne NP receptors. The calculated deposition fluxes (in kg/ha/year) were compared to the deposition analysis thresholds (DATs) for sulfur and nitrogen, as recommended in *Guidance on Nitrogen and Sulfur Deposition Analysis Thresholds* (FLAG, 2002) and currently posted on the NPS Website. Initially, annual average deposition rates were determined based on the short-term emissions from the proposed facility according to methods specified in *IWAQM Phase II Report, FLAG Phase I Report* and *FLAG Phase I Report Revised*. If necessary, annual

emissions rates are to be used to determine the annual average deposition rates. Annual average deposition rates of NO_X, nitric acid (NO_3), and particulate nitrate (as HNO_3) were calculated by CALPUFF, then converted to nitrogen and summed. Furthermore, the contribution to nitrogen deposition from the nitrogen in ammonium sulfate was included in the total nitrogen deposition. Likewise, annual average deposition rates of SO_2 and SO_4 were converted to sulfur and summed. The POSTUTIL program was used to sum the wet and dry deposition fluxes prior to the CALPOST post-processing and comparison to the deposition threshold values. The eastern DATs of 0.01 kg/hectare per year for nitrogen and 0.01 kg/hectare per year for sulfur were used for the Everglades NP and Biscayne NP as requested by the NPS. The modeling results for analysis of potential sulfur and nitrogen loadings are presented in Section 6.

5.2.3. Visibility Impairment

The NPS has requested visibility analyses for both the Everglades NP Class I area and the Biscayne NP Class II area. In this analysis, the atmospheric light extinction due to emissions from the proposed facility's MWC stack (merged flues) was determined relative to natural conditions at the Everglades NP and Biscayne NP. The unit of visibility is a *deciview* (dv) and this analysis determined the perceived 24-hour change in visibility (Delta deciview). Existing conditions are defined based upon measurements of haze-producing species at each NP area of concern.

The FLM has requested that the visibility impairment analysis be conducted using both Method 2 (FLAG, 2000) and Method 8 (FLAG, 2008) using CALPOST Version 6.221. Method 2 and Method 8 are settings for background light extinction in the CALPOST postprocessor (MVISBK). The initial visibility analysis was performed using Method 2 (MVISBK=2) and using hourly f(RH) values as outlined in the USEPA regional haze guidance document (USEPA, 2003). The maximum relative humidity, RHMAX, for hygroscopic particle growth was capped at 95%. The default Raleigh scattering value of 10 Mm^{-1} was used in the initial Method 2 analysis. The default particle scattering and absorption coefficient relationship to the mass of the species as shown in Table 5-9 was used. Monthly background concentrations of 0.9 ug/m^3 (Ammonium Sulfate) and 8.5 ug/m^3 (SOIL) were used to compute background extinction coefficients. The maximum predicted 24-hour concentrations from the proposed facility emissions was converted to a light extinction value and then compared to a change in light extinction over the background associated with clean natural visibility conditions at Everglades NP and Biscayne NP. Since Biscayne NP does not have any specific background values provided in FLAG, the same values that were for the Everglades NP analysis was used for Biscayne NP. The results for the Method 2 visibility impairment analysis are presented in Section 6.

Table 5-9:
Method 2 - Relationship between Particle Scattering and Mass of Species1

Species	Dry Extinction Efficiency (m2/g)	Relationship
Ammonium Sulfate	3	3 [$(NH_4)_2SO_4$] f(RH)
Ammonium Nitrate	3	3 [NH_4NO_3] f(RH)
Organic Carbon	4	4 [OC]
Elemental Carbon	10	10 [EC]
Soil	1	1 [Soil]
Coarse Matter	0.6	0.6 [Coarse matter]

1. Based on FLAG 2000.

As requested by the NPS, a second analysis for visibility impairment was performed using the refined procedure (Method 8, Mode 5) using monthly f(RH) values as outlined in the FLAG 2008 document. Method 8 uses the new IMPROVE (2006)[4] equation and thus divides the ammonium sulfate, ammonium nitrate and the organic carbon compounds into both small and large categories. A site-specific Raleigh scattering value of 11 Mm^{-1} for the Everglades NP taken from Table V.1-2 of the FLAG 2008 document was used in this analysis. This value is based on the annual average natural conditions for visibility. Monthly relative humidity factors for hygroscopic species (small/large/sea salt) for the Everglades NP (taken from Table V.1-3, V.1-4, and V.1-5 of the FLAG 2008) and monthly background concentrations (taken from Table V.1-2 of the FLAG 2008) was used for computing background extinction coefficients. Again, since no site-specific values for Biscayne NP are available from FLAG 2008, and since Biscayne NP is located in south Florida, the Raleigh scattering value for Everglades NP, as well as the values necessary to calculate natural conditions, was also used for the Biscayne Bay NP analysis. The default particle scattering and absorption coefficient relationship to the mass of the species in the New IMPROVE equation as shown in Table 5-10 was used. Additional terms for sea salt and absorption of NO_2 have been added to this equation. The maximum predicted 24-hour concentrations from the proposed facility emissions was converted to a light extinction value and then compared to a change in light extinction over the background associated with clean natural visibility conditions at Everglades NP and Biscayne NP. The results for the Method 8 (Mode 5) visibility impairment analysis are presented in Section 6.

[4] (Hand and Malm, 2006); http://vista.cira.colostate.edu/improve/Publications/GrayLit/016_IMPROVEeqReview/IMPROVEeqReview.htm

Table 5-10:
New IMPROVE Equation (Method 8) - Default Particle Scattering and Absorption Coefficients [1]

Species	Dry Extinction Efficiency (m2/g)	Relationship
Small Sulfates	2.2	$2.2f_S(RH)$[small sulfates]
Large Sulfates	4.8	$4.8f_S(RH)$[large sulfates]
Small Nitrates	2.4	$2.4f_L(RH)$[small nitrates]
Large Nitrates	5.1	$5.1f_L(RH)$[large nitrates]
Small Organics	2.8	2.8[small organics]
Large Organics	6.1	6.1[large organics]
Elemental Carbon	10	10 [EC]
Soil	1	1 [fine soil]
Sea Salt	1.7	$1.7f_{SS}(RH)$[sea salt]
Coarse Matter	0.6	0.6 [Coarse matter]
Rayleigh Scattering	Site specific (11 Mm^{-1})	Rayleigh
BG Nitrogen Dioxide	0.33	$0.33[NO_2(ppb)]$

1. Based on FLAG 2008.

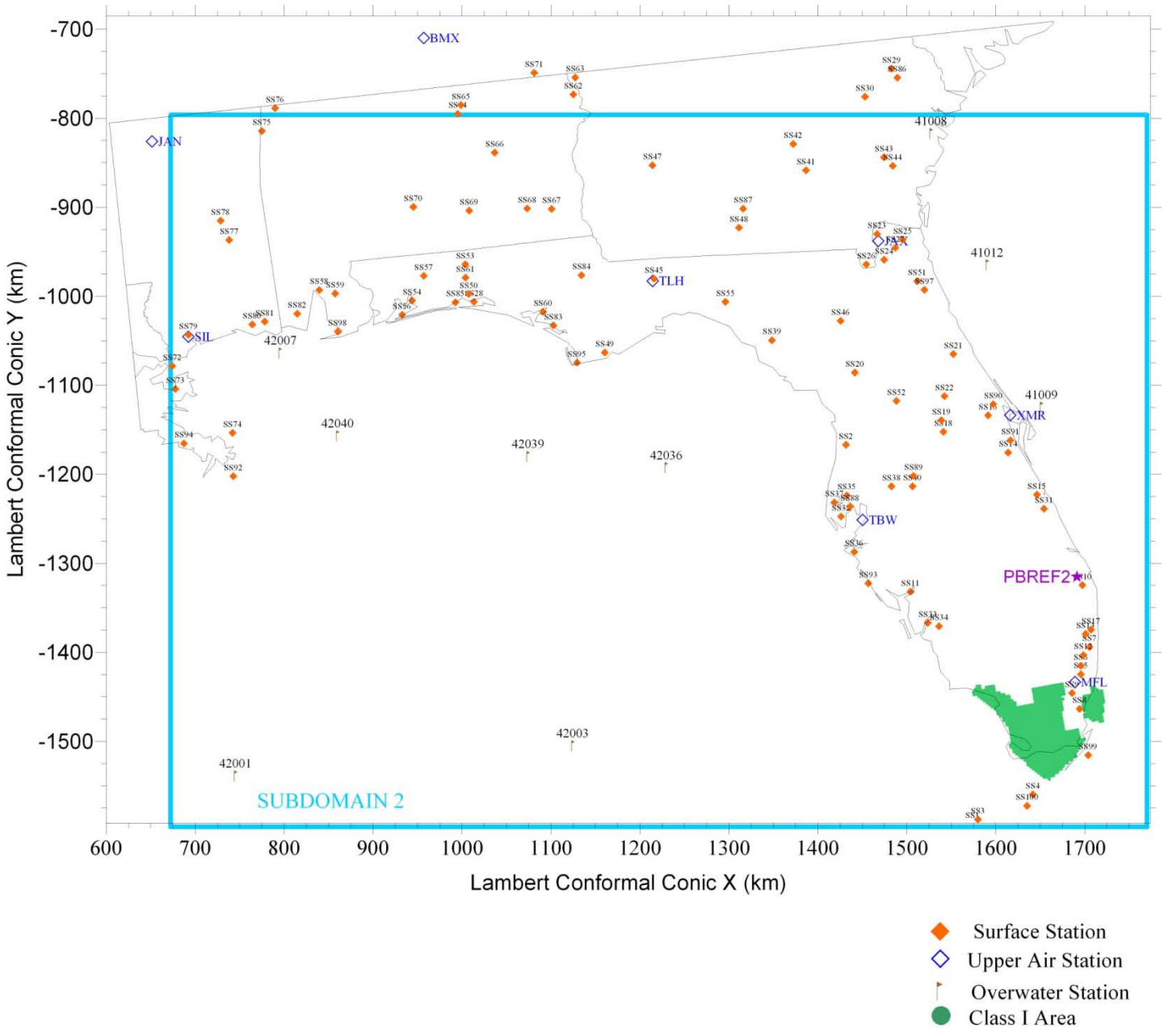
Based upon recent information and guidance provided by the FLMs, if emissions from the proposed facility result in a visibility impact of less than 5%, the FLM should be notified and provided the analysis showing that no adverse impacts to visibility are anticipated due to the proposed emissions. If the daily maximum change in light extinction is between 5% and 10%, the frequency, magnitude, and duration of the visibility impacts will be used to formulate a significance determination. It is our understanding that the FLM considers the magnitude, frequency, duration, location, geographic extent, timing of predicted impact, as well as other factors from the impact analyses, in determining whether an adverse impact is expected from the proposed project's emissions.

5.2.4. Lead Impact Analysis

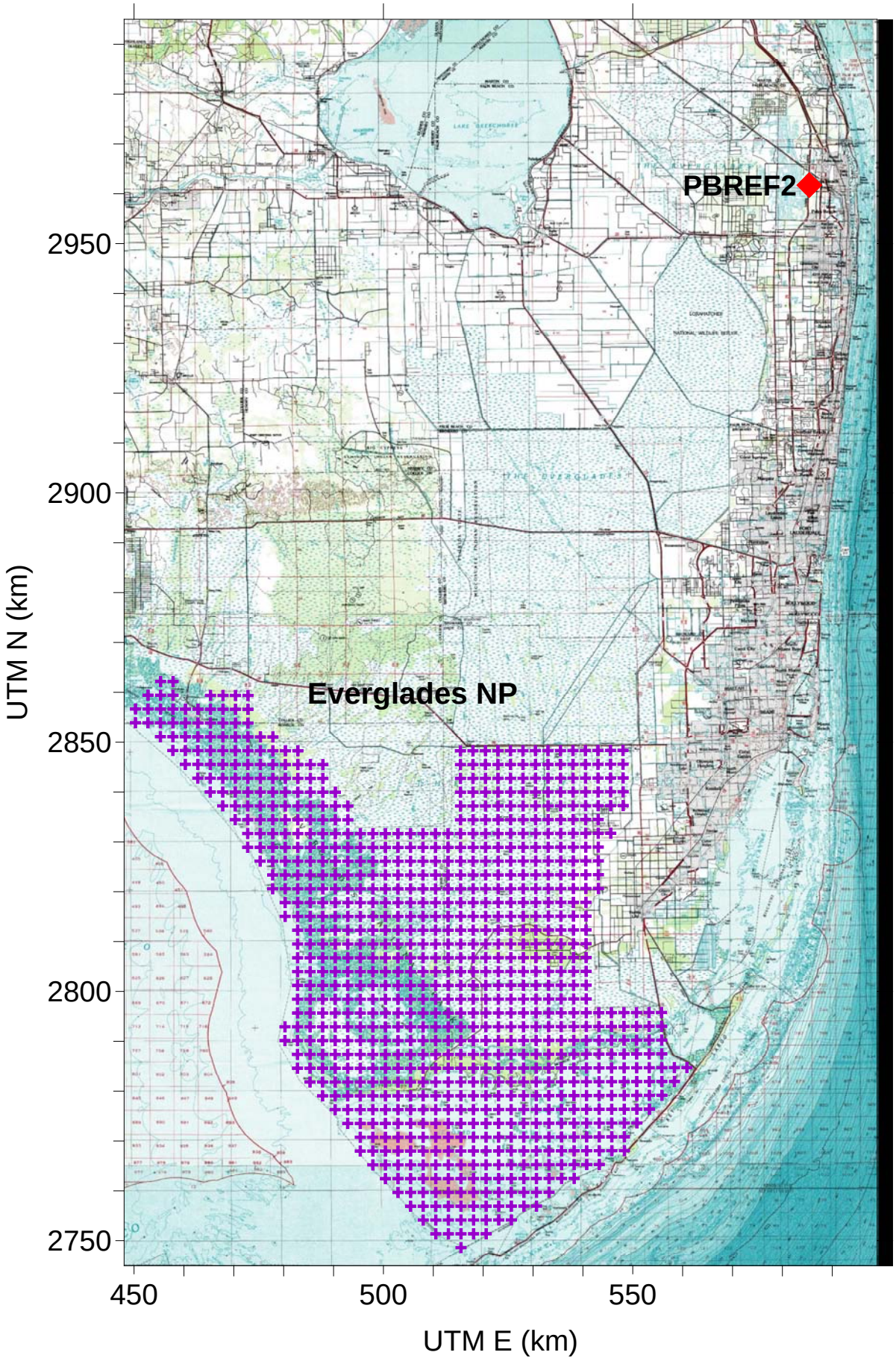
The national ambient air quality standard for lead was revised and lowered in 2008. The current standard is 0.15 $\mu g/m^3$ measured as total suspended particles (TSP) on a rolling 3-month average. The former quarterly standard set at 1.5 ug/m^3 is also still referenced for air quality.

NPS requested that lead (Pb) be modeled as a particulate in CALPUFF, and the predicted impacts be compared to the NAAQS. Therefore, PM_{10} was used as the species in CALPUFF to represent lead emissions in the analysis. The CALPUFF modeling system

does not currently have the ability to calculate a 3-month running average for comparison to the lead NAAQS. In order to estimate this average, the modeling analysis used a post-processing spreadsheet methodology using the 24-hour average lead impacts at each receptor location within the Everglades and Biscayne National Parks to calculate the rolling 3-month average concentration and compare with this standard. The predicted 24-hour concentrations were extracted from the CALPOST output file (i.e. BB03PB3M.lst) and processed using EXCEL to determine the rolling 3-month average from the calculated monthly averages. A lead emission rate of 0.165 lb/hr, which represents the total estimated emissions from all three MWCs, was used in this analysis. The modeling results for the lead analysis are discussed and presented in Section 6.



MALCOLM PIRNIE / SWA SOLID WASTE AUTHORITY	Solid Waste Authority of Palm Beach County	**PBREF2 Modeling Domain**	MALCOLM PIRNIE, INC. April 2010 FIGURE 5-1



MALCOLM PIRNIE

SWA SOLID WASTE AUTHORITY

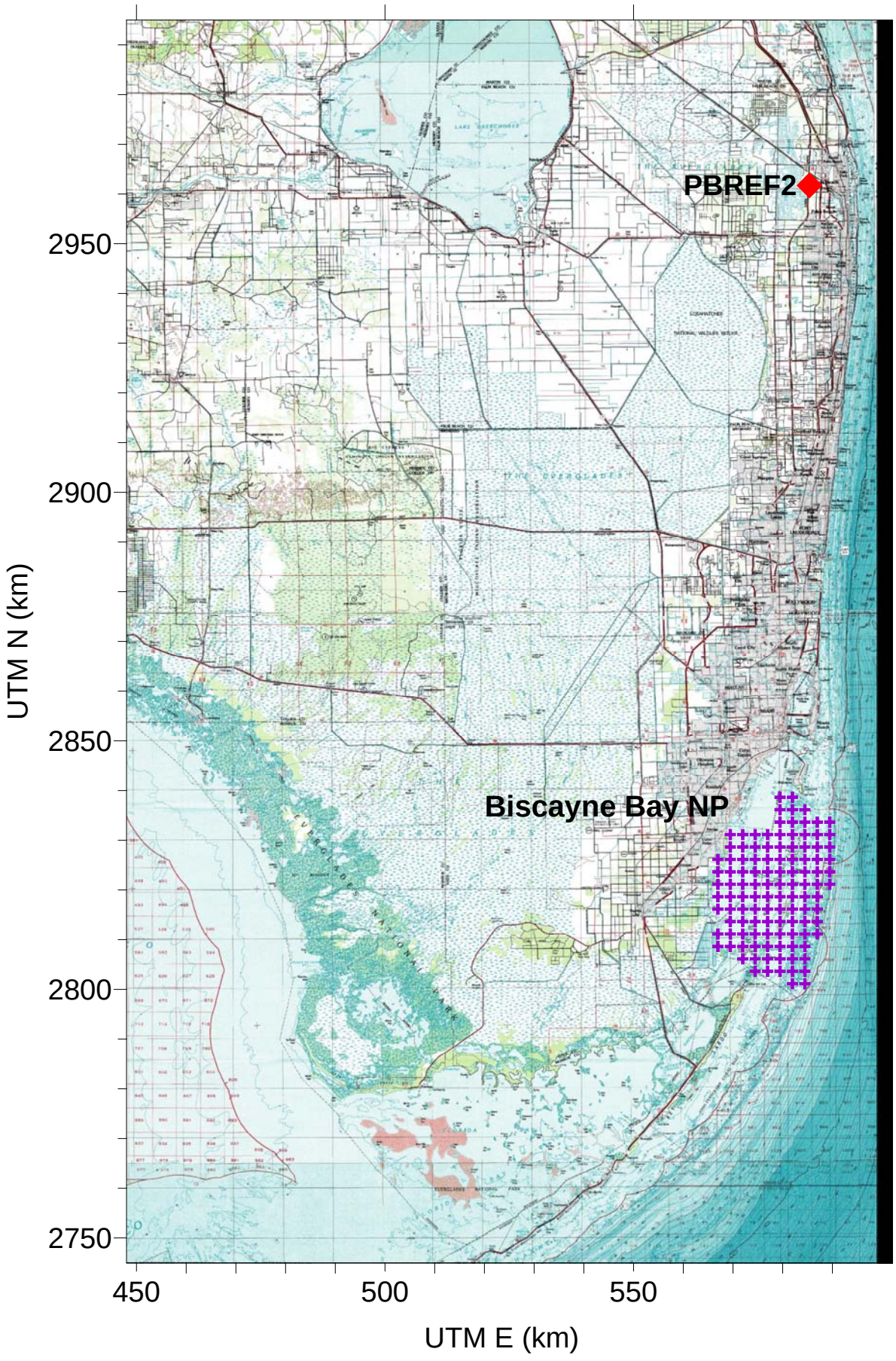
Solid Waste Authority of Palm Beach County

Everglades NP Class I Receptor Locations

MALCOLM PIRNIE, INC.

April 2010

FIGURE 5-2



MALCOLM PIRNIE	Solid Waste Authority of Palm Beach County	**Biscayne NP Receptor Locations**	MALCOLM PIRNIE, INC. April 2010 FIGURE 5-3

6. Results

As discussed in Section 5, a modeling analysis using the CALPUFF modeling system and following current guidance along with the approved Class I protocol was completed for the proposed PBREF2 facility to demonstrate that the potential impacts will not cause or contribute to a violation of an ambient air quality standard or PSD increment, nor will they adversely affect the AQRVs at either Everglades NP or the Biscayne NP. The modeling analysis was conducted using the estimated emissions and stack parameters from the maximum design load scenario. This section describes the results for the following analyses:

- Significant Impact Analysis
  - Class I – Everglades NP
  - Class II – Biscayne NP
- PSD Increment Analysis
  - Class I – Everglades NP
  - Class II – Biscayne NP
- AQRV Analysis – Sulfur and Nitrogen Deposition (Loading)
- AQRV Analysis - Visibility Impairment
- NAAQS Analysis for Lead

6.1. Significant Impact Analysis

In the significant impact analysis, the CALPUFF model was used to determine whether the potential emissions from the proposed PBREF2 would have a significant impact at the Everglades NP and the Biscayne NP. The maximum predicted impacts (highest first-high, (H1H) for short-term averaging period) for PM_{10}, NO_2, and SO_2 at the Everglades NP from the three years of meteorological data (2001-2003) were compared to the proposed Class I SILs. The modeling results are presented in Table 6-1. The predicted impacts are well below the Class I SILs. Therefore, the proposed PBREF2 will not cause or contribute to an exceedance of the Class I increment at Everglades NP.

For the Class II area Biscayne NP, the maximum predicted impacts from the proposed facility were compared to the PSD Class II SILs in Table 6-2. The predicted impacts from the proposed PBREF2 at Biscayne NP over the three years of meteorological data were well below the Class II SILs. Therefore, the proposed PBREF2 will not cause or contribute to an exceedance of the ambient air quality standards or the Class II PSD increments at Biscayne NP.

Table 6-1:
Comparison of Modeled Concentrations (ug/m3) to Proposed Class I Significant Impact Levels – Everglades NP

Pollutant	Averaging Period	Proposed Class I SIL ($\mu g/m^3$)[1]	Maximum Modeled Concentration ($\mu g/m^3$)	% of SIL
NO_2	Annual	0.1	0.0079	7.9%
SO_2	3-hour	1.0	0.246	24.6%
	24-hour	0.2	0.091	45.5%
	Annual	0.1	0.0031	3.1%
PM_{10}	24-hour	0.3	0.018	6%
	Annual	0.2	0.0007	0.4%

1. Federal Register, Vol. 61, July 23, 1996

Table 6-2:
Comparison of Modeled Concentrations (ug/m3) to Class II Significant Impact Levels – Biscayne NP

Pollutant	Averaging Period	Class II SIL ($\mu g/m^3$)	Maximum Modeled Concentration ($\mu g/m^3$)	% of SIL
NO_2	Annual	1	0.0047	0.5%
SO_2	3-hour	25	0.183	0.7%
	24-hour	5	0.070	1.4%
	Annual	1	0.0024	0.2%
PM_{10}	24-hour	5	0.015	0.3%
	Annual	1	0.0005	0.05%

6.2. PSD Increment Analysis

As part of the air quality analysis, the FLM requested that the impacts at each NP area be compared to the applicable PSD increments. The predicted impacts from the Everglades NP were compared to the Class I PSD increments and the Biscayne NP impacts to the Class II PSD increments. For the short-term averaging periods (3-hour and 24-hour), the highest second-high values were used in this analysis. For the annual averaging period, the maximum annual concentration was compared to the respective annual average increment. For both national parks, the predicted impacts for all modeled PSD pollutants (NO_2, SO_2, and PM_{10}), based on the potential emissions of the proposed facility's maximum design load, were well below their respective increments. The Class I increment modeling results for the Everglades NP are present in Table 6-3 and the Class II increment results for Biscayne NP are shown in Table 6-4.

Table 6-3:
PSD Class I Increment Analysis - Everglades NP

Pollutant	Averaging Period	Class I Increment[1,2] ($\mu g/m^3$)	Modeled Concentration ($\mu g/m^3$)	Percent of Increment Consumed
NO_2	Annual	2.5	0.0079	0.3%
SO_2	3-hour	25	0.191	0.8%
	24-hour	5	0.066	1.3%
	Annual	2	0.0031	0.2%
PM_{10}	24-hour	10	0.013	0.1%
	Annual	5	0.0007	0.01%

Notes:

1. Long-term (annual) increments are not to be exceeded.
2. Short-term (3-hour and 24-hour) increments are not to be exceeded more than once per year.

Table 6-4:
PSD Class II Increment Analysis - Biscayne NP

Pollutant	Averaging Period	Class II Increment ($\mu g/m^3$) [1,2]	Modeled Concentration ($\mu g/m^3$)	Percent of Increment Consumed
NO_2	Annual	25	0.0047	0.02%
SO_2	3-hour	512	0.146	0.03%
	24-hour	91	0.055	0.06%
	Annual	20	0.0024	0.01%
PM_{10}	24-hour	30	0.015	0.05%
	Annual	17	0.0005	0.003%

Notes:

1. Long-term (annual) increments are not to be exceeded.
2. Short-term (3-hour and 24-hour) increments are not to be exceeded more than once per year.

6.3. AQRV Analysis – Sulfur and Nitrogen Deposition

Sulfur and nitrogen deposition analyses were performed to determine if the proposed facility would have an adverse impact on the specific AQRVs for the Everglades and Biscayne National Parks. The total deposition (wet and dry fluxes) of sulfur dioxide (SO_2) and sulfate (SO_4) were used to determine the project S loading for comparison to the air quality related sulfur threshold value. The total deposition (wet and dry fluxes) of nitrogen oxides (NO_X – dry deposition only), nitrate (NO_3), and nitric acid (HNO_3) was used to determine the project N loading for comparison to the air quality-related nitrogen threshold value. Using the hourly CALPUFF flux model output for SO_2, SO_4, NO_X, NO_3, and HNO_3 and the POSTUTIL program to sum the wet and dry deposition values, the total S and N deposition flux ("loading"), in terms of kilogram/(hectare-year) was calculated through the CALPOST post-processing program. The maximum S and N loading from the proposed PBREF2 are presented in Table 6-5. The total S & N loading are below the DAT value of 0.01 kg/ha/yr established for sensitive areas, which includes the Everglades and Biscayne National Parks located in the eastern half of the United States.

Table 6-5:
AQRV S-N Deposition

NP Area	Parameter	Total Sulfur Deposition	Sulfur Deposition Threshold Value[1]
Everglades NP	Sulfur (S)	0.0031 kg/ha/yr	0.01 kg/ha/yr
Biscayne NP		0.0022 kg/ha/yr	0.01 kg/ha/yr
NP Area	**Parameter**	**Total Nitrogen Deposition**	**Nitrogen Deposition Threshold Value[2]**
Everglades NP	Nitrogen (N)	0.0028 kg/ha/yr	0.01 kg/ha/yr
Biscayne NP		0.0016 kg/ha/yr	0.01 kg/ha/yr

[1.] Threshold values derived from DAT equation listed in *Guidance on Nitrogen Deposition Analysis Thresholds* document.

6.4. AQRV Analysis – Visibility Impairment

A visibility impairment analysis was performed to determine if the proposed facility would have an adverse impact on visibility at the Everglades NP. Additionally, an analysis for Biscayne NP was conducted following the request of the NPS. Both CALPOST Method 2 and Method 8 (Mode 5) were used to determine the potential impacts on visibility at each park. Table 6-6 (Method 2) and Table 6-7 (Method 8) present the predicted worst-case 24-hour change in extinction values for both NP areas using the three years of the CALMET meteorological dataset.

According to the FLMs, factors such as the magnitude, frequency, duration, location, geographic extent, timing of predicted impact, as well as others from the impact analysis results are generally considered when determining whether an adverse impact is expected from the proposed project's emissions. Using the conservative Method 2 for visibility and hourly relative humidity adjustments, one single day was predicted to have a 24-hour change in extinction above the threshold of 0.5 dv, and in each case at each park, the single exceedance occurred at only one single receptor location. There was only one occurrence at a single receptor location at each NP when the predicted 24-hour change in extinction impact for visibility was just above the threshold of 5% (equivalent to 0.5 dv). There were no predicted percent changes in light extinctions greater than 10% for any 24-hour period.

The limited magnitude, duration, frequency, and occurrence of these impacts using the conservative Method 2 approach, as well as the fact that the predicted impacts from the proposed project were well below the SILs support the conclusion that the proposed PBREF2 emissions will not cause or contribute to an adverse impact to visibility at either the Everglades NP or the Biscayne NP.

Further analysis using the new IMPROVE equations (Method 8, Mode 5) supports this conclusion.

Table 6-6:
AQRV Visibility Impairment Using Method 2

NP Area	Parameter	Maximum Change in Extinction [1]	Change in Extinction Threshold Value
Everglades NP	Visibility, ΔB_{ext}	6.26%	5 %
	Visibility, Δdv	0.608	0.5 dv
Biscayne NP	Visibility, ΔB_{ext}	5.32%	5 %
	Visibility, Δdv	0.518	0.5 dv

Notes

1. A single day at a single receptor location was predicted to exceed the threshold for each NP using Method 2.

Table 6-7 shows that all of the predicted 24-hour change-in-extinction values applying Method 8 Mode 5 in CALPOST incorporating the new IMPROVE equation are well below the 0.5 dv (5%) threshold. Therefore, the proposed PBREF2 is not expected to cause or contribute to an adverse impact on visibility at either national park.

Table 6-7:
AQRV Visibility Impairment Using Method 8 (Mode 5)

NP Area	Parameter	Maximum Change in Extinction	Change in Extinction Threshold Value
Everglades NP	Visibility, ΔB_{ext}	2.77%	5 %
	Visibility, Ddv	0.273	0.5 dv
Biscayne NP	Visibility, ΔB_{ext}	2.27%	5 %
	Visibility, Ddv	0.224	0.5 dv

Notes:

1. No days exceeded the threshold when using Method 8 Mode 5.

6.5. NAAQS Analysis for Lead

The CALPUFF model was used to determine the potential impacts on the Everglades NP and the Biscayne NP areas due to the proposed lead emissions of the PBREF2 facility. The predicted modeling impacts of lead at the two national parks are presented in Table 6-8. The 24-hour predicted impacts from each receptor determined from the CALPUFF modeling analysis were used to calculate the 3-month rolling average for Pb. The predicted concentrations were then compared to the ambient air quality standard. The table shows that the predicted lead impacts at Biscayne NP and the Everglades NP are well below the lead NAAQS.

Table 6-8:
Predicted Lead Concentrations

Pollutant	Averaging Period	Predicted Concentration ($\mu g/m^3$)	
		Everglades NP	Biscayne NP
Lead (Pb)	3-month rolling	1.78E-05	2.04E-05
NAAQS - 3-month rolling average ($\mu g/m^3$)		0.15	
% of NAAQS (PBREF2 Contribution)		0.02%	0.02%
Background Concentration($\mu g/m^3$)		0.01	
Total Predicted Impact ($\mu g/m^3$)		0.010	0.010

Source: Final Lead rule signed October 15, 2008 [73 FR 67052, Nov. 12, 2008]; 40 CFR 50.15

7. Conclusions

Based on this Class I modeling analysis on the Everglades NP, the predicted impacts due to the proposed emissions from the proposed PBREF2 project under maximum design load operation will be insignificant at Everglades NP. The results of the Class I and AQRV analyses at Everglades NP are summarized below:

- The proposed Facility's impacts are well below the proposed Class I significance impact levels, and therefore, will not adversely affect the ambient air quality at the Everglades NP Class I Area. The predicted impacts are also well below the Class I increments.
- No adverse impacts on visibility are anticipated at Everglades NP due to the proposed project.
- The predicted sulfur and nitrogen loading (total deposition) from the emissions of the proposed Facility are well below the established threshold values.
- The predicted impacts for lead are well below the ambient air quality standard.

Additionally, based on the CALPUFF modeling analysis on the Biscayne NP (classified as a Class II area), the predicted ambient impacts from the proposed emissions are below the Class II SILs and PSD increments under maximum design load operation. Also, the modeling results show that the proposed facility will not have an adverse impact on the AQRVs at Biscayne NP.

The results of the analyses are summarized below:

- The proposed Facility will not adversely affect the ambient air quality at the Biscayne NP. The predicted impacts are well below the Class II SILs and PSD increments.
- No adverse impacts on visibility are anticipated at Biscayne NP due to the proposed project.
- The predicted sulfur and nitrogen loading (total deposition) from the emissions of the proposed Facility are well below the established threshold values.
- The predicted impacts for lead at Biscayne NP are well below the ambient air quality standard.

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Class I Air Dispersion Modeling Report

ATTACHMENT A1

Receptors Locations

Everglades NP
Biscayne NP

Table A1-1
Everglades NP Class I Receptors [1]

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
1	1660.1271	-1542.3806	0
2	1654.541	-1540.4909	0
3	1657.0825	-1540.0353	0
4	1659.6238	-1539.5791	0
5	1662.1651	-1539.1222	0
6	1664.7062	-1538.6646	0
7	1651.4984	-1538.1441	0
8	1654.0393	-1537.6895	0
9	1656.58	-1537.2341	0
10	1659.1206	-1536.778	0
11	1661.6611	-1536.3212	0
12	1664.2014	-1535.8638	0
13	1666.7416	-1535.4056	0
14	1669.2817	-1534.9467	0
15	1648.4573	-1535.7967	0
16	1650.9975	-1535.3429	0
17	1653.5376	-1534.8883	0
18	1656.0776	-1534.4331	0
19	1658.6174	-1533.9772	0
20	1661.1571	-1533.5205	0
21	1663.6967	-1533.0632	0
22	1666.2361	-1532.6052	0
23	1668.7755	-1532.1464	0
24	1671.3146	-1531.687	0
25	1673.8537	-1531.2269	0
26	1645.4177	-1533.4486	0
27	1647.9573	-1532.9956	0
28	1650.4967	-1532.5419	0
29	1653.036	-1532.0875	0
30	1655.5752	-1531.6324	0
31	1658.1143	-1531.1766	0
32	1660.6532	-1530.7201	0
33	1663.192	-1530.2629	0
34	1665.7307	-1529.805	0
35	1668.2692	-1529.3464	0
36	1670.8077	-1528.8871	0
37	1673.346	-1528.4272	0
38	1675.8841	-1527.9665	0
39	1642.3796	-1531.0998	0
40	1644.9185	-1530.6476	0
41	1647.4573	-1530.1947	0
42	1649.9959	-1529.7412	0
452	1616.72132	-1489.4501	0
453	1619.24877	-1489.005	0
454	1621.7761	-1488.5592	0
455	1624.30331	-1488.1128	1
456	1626.83039	-1487.6656	1
457	1629.35735	-1487.2177	1
458	1631.88419	-1486.7691	1
459	1634.41091	-1486.3198	1
460	1636.9375	-1485.8698	1
461	1639.46397	-1485.4192	1
462	1641.99031	-1484.9678	1
463	1644.51653	-1484.5158	1
464	1647.04263	-1484.063	1
465	1649.5686	-1483.6096	1
466	1652.09444	-1483.1554	1
467	1654.62016	-1482.7006	1
468	1657.14576	-1482.2451	1
469	1659.67123	-1481.7888	1
470	1662.19657	-1481.3319	1
471	1664.72179	-1480.8743	1
472	1667.24688	-1480.416	1
473	1669.77185	-1479.957	1
474	1672.29669	-1479.4973	1
475	1674.8214	-1479.0369	1
476	1616.22908	-1486.6528	0
477	1618.75576	-1486.2078	0
478	1621.28232	-1485.7622	1
479	1623.80876	-1485.3158	1
480	1626.33507	-1484.8687	1
481	1628.86127	-1484.421	1
482	1631.38734	-1483.9725	1
483	1633.91328	-1483.5234	1
484	1636.4391	-1483.0736	1
485	1638.9648	-1482.623	1
486	1641.49038	-1482.1718	1
487	1644.01583	-1481.7199	1
488	1646.54115	-1481.2673	1
489	1649.06635	-1480.814	1
490	1651.59143	-1480.36	1
491	1654.11638	-1479.9053	1
492	1656.64121	-1479.4499	1
493	1659.16591	-1478.9938	1

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
43	1652.5345	-1529.2869	0
44	1655.0729	-1528.832	0
45	1657.6112	-1528.3763	0
46	1660.1493	-1527.92	0
47	1662.6874	-1527.4629	0
48	1665.2253	-1527.0052	0
49	1667.7631	-1526.5467	0
50	1670.3007	-1526.0876	0
51	1672.8383	-1525.6277	0
52	1675.3757	-1525.1672	0
53	1677.9129	-1524.7059	0
54	1680.4501	-1524.244	0
55	1639.3429	-1528.7503	0
56	1641.8812	-1528.2989	0
57	1644.4193	-1527.8469	0
58	1646.9573	-1527.3942	0
59	1649.4952	-1526.9408	0
60	1652.033	-1526.4866	0
61	1654.5706	-1526.0318	0
62	1657.1081	-1525.5763	0
63	1659.6455	-1525.1201	0
64	1662.1828	-1524.6632	0
65	1664.7199	-1524.2056	0
66	1667.257	-1523.7473	0
67	1669.7938	-1523.2882	0
68	1672.3306	-1522.8285	0
69	1674.8672	-1522.3681	0
70	1677.4037	-1521.907	0
71	1679.9401	-1521.4452	0
72	1682.4764	-1520.9827	0
73	1685.0125	-1520.5195	0
74	1636.3077	-1526.4001	0
75	1638.8453	-1525.9496	0
76	1641.3828	-1525.4984	0
77	1643.9202	-1525.0465	0
78	1646.4574	-1524.5939	0
79	1648.9945	-1524.1406	0
80	1651.5315	-1523.6866	0
81	1654.0684	-1523.232	0
82	1656.6052	-1522.7766	0
83	1659.1418	-1522.3205	0
84	1661.6783	-1521.8637	0
85	1664.2146	-1521.4063	0
86	1666.7509	-1520.9481	0
87	1669.287	-1520.4892	0
88	1671.823	-1520.0297	0

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
494	1661.69048	-1478.537	1
495	1664.21493	-1478.0796	1
496	1666.73926	-1477.6214	1
497	1669.26345	-1477.1625	1
498	1671.78752	-1476.703	1
499	1674.31147	-1476.2427	1
500	1615.73688	-1483.8557	0
501	1618.2628	-1483.4109	1
502	1620.78859	-1482.9653	1
503	1623.31426	-1482.5191	1
504	1625.8398	-1482.0722	1
505	1628.36523	-1481.6246	1
506	1630.89053	-1481.1763	1
507	1633.4157	-1480.7273	1
508	1635.94076	-1480.2776	1
509	1638.46569	-1479.8272	1
510	1640.99049	-1479.3761	1
511	1643.51517	-1478.9243	1
512	1646.03973	-1478.4718	1
513	1648.56416	-1478.0187	1
514	1651.08847	-1477.5648	1
515	1653.61265	-1477.1103	1
516	1656.13671	-1476.655	1
517	1658.66064	-1476.1991	1
518	1661.18445	-1475.7424	1
519	1663.70813	-1475.2851	1
520	1666.23168	-1474.8271	1
521	1668.75511	-1474.3683	1
522	1671.27841	-1473.9089	1
523	1673.80159	-1473.4488	1
524	1612.71947	-1481.5029	0
525	1615.24474	-1481.0589	0
526	1617.76988	-1480.6142	1
527	1620.29491	-1480.1688	1
528	1622.81981	-1479.7227	1
529	1625.34458	-1479.2759	1
530	1627.86924	-1478.8284	1
531	1630.39377	-1478.3803	1
532	1632.91818	-1477.9314	1
533	1635.44246	-1477.4819	1
534	1637.96662	-1477.0316	1
535	1640.49066	-1476.5806	1
536	1643.01457	-1476.129	1
537	1645.53835	-1475.6767	1
538	1648.06202	-1475.2236	1
539	1650.58556	-1474.7699	1

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
89	1674.3589	-1519.5694	0
90	1676.8946	-1519.1084	0
91	1679.4302	-1518.6468	0
92	1681.9657	-1518.1844	0
93	1684.501	-1517.7214	0
94	1687.0363	-1517.2576	0
95	1689.5714	-1516.7932	0
96	1635.8109	-1523.5995	0
97	1638.3478	-1523.1492	0
98	1640.8845	-1522.6981	0
99	1643.4211	-1522.2464	0
100	1645.9576	-1521.7939	0
101	1648.4939	-1521.3408	0
102	1651.0302	-1520.8869	0
103	1653.5663	-1520.4324	0
104	1656.1022	-1519.9771	0
105	1658.6381	-1519.5212	0
106	1661.1738	-1519.0646	0
107	1663.7094	-1518.6072	0
108	1666.2449	-1518.1492	0
109	1668.7802	-1517.6905	0
110	1671.3154	-1517.231	0
111	1673.8505	-1516.7709	0
112	1676.3855	-1516.3101	0
113	1678.9203	-1515.8486	0
114	1681.4551	-1515.3864	0
115	1683.9896	-1514.9234	0
116	1686.5241	-1514.4598	0
117	1689.0584	-1513.9955	0
118	1632.778	-1521.2488	0
119	1635.3142	-1520.7993	0
120	1637.8503	-1520.349	0
121	1640.3862	-1519.8981	0
122	1642.9221	-1519.4465	0
123	1645.4578	-1518.9942	0
124	1647.9934	-1518.5412	0
125	1650.5288	-1518.0875	0
126	1653.0641	-1517.6331	0
127	1655.5993	-1517.178	0
128	1658.1344	-1516.7222	0
129	1660.6694	-1516.2657	0
130	1663.2042	-1515.8085	0
131	1665.7389	-1515.3506	0
132	1668.2735	-1514.892	0
133	1670.8079	-1514.4327	0
134	1673.3423	-1513.9727	0

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
540	1653.10897	-1474.3155	1
541	1655.63226	-1473.8604	1
542	1658.15542	-1473.4046	1
543	1660.67846	-1472.9481	1
544	1663.20137	-1472.4909	1
545	1665.72416	-1472.033	1
546	1668.24682	-1471.5744	1
547	1670.76935	-1471.1151	1
548	1673.29176	-1470.6552	1
549	1612.22814	-1478.7062	0
550	1614.75264	-1478.2623	1
551	1617.27702	-1477.8178	1
552	1619.80127	-1477.3725	1
553	1622.3254	-1476.9266	1
554	1624.84941	-1476.4799	1
555	1627.37329	-1476.0326	1
556	1629.89706	-1475.5845	1
557	1632.42069	-1475.1358	1
558	1634.94421	-1474.6864	1
559	1637.4676	-1474.2363	1
560	1639.99087	-1473.7855	1
561	1642.51401	-1473.334	1
562	1645.03703	-1472.8818	1
563	1647.55992	-1472.4289	1
564	1650.08269	-1471.9753	1
565	1652.60534	-1471.521	1
566	1655.12786	-1471.066	1
567	1657.65025	-1470.6104	1
568	1660.17252	-1470.154	1
569	1662.69466	-1469.6969	1
570	1665.21668	-1469.2392	1
571	1667.73857	-1468.7807	1
572	1670.26034	-1468.3216	1
573	1672.78198	-1467.8618	1
574	1609.21301	-1476.3528	0
575	1611.73686	-1475.9098	1
576	1614.26059	-1475.4661	1
577	1616.7842	-1475.0216	1
578	1619.30768	-1474.5765	1
579	1621.83104	-1474.1307	1
580	1624.35428	-1473.6842	1
581	1626.8774	-1473.237	1
582	1629.40039	-1472.7891	1
583	1631.92326	-1472.3405	1
584	1634.44601	-1471.8912	1
585	1636.96863	-1471.4412	1

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
135	1675.8765	-1513.512	0
136	1678.4105	-1513.0507	0
137	1680.9445	-1512.5886	0
138	1683.4783	-1512.1258	0
139	1686.012	-1511.6623	0
140	1688.5455	-1511.1982	0
141	1691.079	-1510.7333	1
142	1629.7466	-1518.8974	0
143	1632.2821	-1518.4487	0
144	1634.8175	-1517.9993	0
145	1637.3528	-1517.5492	0
146	1639.888	-1517.0984	0
147	1642.4231	-1516.6469	0
148	1644.958	-1516.1948	0
149	1647.4928	-1515.7419	0
150	1650.0275	-1515.2883	0
151	1652.5621	-1514.8341	0
152	1655.0965	-1514.3791	0
153	1657.6308	-1513.9234	0
154	1660.165	-1513.4671	0
155	1662.6991	-1513.01	0
156	1665.233	-1512.5523	0
157	1667.7668	-1512.0938	0
158	1670.3005	-1511.6347	0
159	1672.834	-1511.1748	1
160	1675.3675	-1510.7143	1
161	1677.9008	-1510.253	0
162	1680.4339	-1509.7911	0
163	1682.967	-1509.3285	0
164	1685.4999	-1508.8651	0
165	1688.0327	-1508.4011	0
166	1690.5654	-1507.9364	0
167	1693.0979	-1507.471	0
168	1626.7166	-1516.5452	0
169	1629.2515	-1516.0974	0
170	1631.7863	-1515.6488	1
171	1634.3209	-1515.1996	0
172	1636.8554	-1514.7496	0
173	1639.3899	-1514.299	1
174	1641.9241	-1513.8476	0
175	1644.4583	-1513.3956	0
176	1646.9924	-1512.9429	0
177	1649.5263	-1512.4894	0
178	1652.0601	-1512.0353	0
179	1654.5937	-1511.5805	0
180	1657.1273	-1511.125	0

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
586	1639.49113	-1470.9906	1
587	1642.0135	-1470.5392	1
588	1644.53575	-1470.0871	1
589	1647.05788	-1469.6344	1
590	1649.57988	-1469.1809	1
591	1652.10175	-1468.7268	1
592	1654.6235	-1468.2719	1
593	1657.14513	-1467.8164	1
594	1659.66663	-1467.3602	1
595	1662.18801	-1466.9033	1
596	1664.70925	-1466.4457	1
597	1667.23038	-1465.9874	1
598	1669.75137	-1465.5284	1
599	1672.27224	-1465.0687	1
600	1674.79299	-1464.6083	1
601	1608.72255	-1473.5566	0
602	1611.24563	-1473.1137	1
603	1613.76859	-1472.6701	1
604	1616.29143	-1472.2258	1
605	1618.81414	-1471.7808	1
606	1621.33674	-1471.3351	1
607	1623.8592	-1470.8887	1
608	1626.38155	-1470.4417	1
609	1628.90378	-1469.9939	1
610	1631.42588	-1469.5454	1
611	1633.94785	-1469.0963	1
612	1636.46971	-1468.6465	1
613	1638.99144	-1468.1959	1
614	1641.51304	-1467.7447	1
615	1644.03452	-1467.2928	1
616	1646.55588	-1466.8401	1
617	1649.07711	-1466.3868	1
618	1651.59822	-1465.9328	1
619	1654.1192	-1465.4781	1
620	1656.64006	-1465.0227	1
621	1659.16079	-1464.5667	1
622	1661.6814	-1464.1099	1
623	1664.20188	-1463.6524	1
624	1666.72223	-1463.1942	1
625	1669.24246	-1462.7354	1
626	1671.76256	-1462.2758	1
627	1674.28254	-1461.8156	1
628	1605.7097	-1471.2026	0
629	1608.23213	-1470.7605	0
630	1610.75445	-1470.3178	0
631	1613.27664	-1469.8743	1

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
181	1659.6607	-1510.6687	0
182	1662.194	-1510.2118	0
183	1664.7271	-1509.7542	0
184	1667.2602	-1509.2959	0
185	1669.7931	-1508.8369	0
186	1672.3259	-1508.3772	0
187	1674.8585	-1507.9168	0
188	1677.391	-1507.4557	0
189	1679.9235	-1506.9939	0
190	1682.4557	-1506.5314	0
191	1684.9879	-1506.0682	0
192	1687.5199	-1505.6043	0
193	1690.0518	-1505.1397	0
194	1692.5836	-1504.6745	0
195	1695.1152	-1504.2085	0
196	1623.688	-1514.1924	0
197	1626.2223	-1513.7454	0
198	1628.7564	-1513.2977	1
199	1631.2904	-1512.8493	1
200	1633.8243	-1512.4001	1
201	1636.3581	-1511.9503	1
202	1638.8917	-1511.4998	1
203	1641.4253	-1511.0486	1
204	1643.9587	-1510.5967	1
205	1646.4919	-1510.1441	1
206	1649.0251	-1509.6908	0
207	1651.5581	-1509.2368	0
208	1654.091	-1508.7821	0
209	1656.6238	-1508.3268	0
210	1659.1564	-1507.8707	1
211	1661.6889	-1507.4139	1
212	1664.2213	-1506.9564	1
213	1666.7536	-1506.4983	0
214	1669.2857	-1506.0394	0
215	1671.8177	-1505.5798	0
216	1674.3496	-1505.1196	0
217	1676.8814	-1504.6586	0
218	1679.413	-1504.1969	0
219	1681.9445	-1503.7346	0
220	1684.4759	-1503.2715	0
221	1687.0072	-1502.8078	0
222	1689.5383	-1502.3434	0
223	1692.0693	-1501.8782	0
224	1694.6002	-1501.4124	1
225	1697.1309	-1500.9459	0
226	1620.661	-1511.8389	0

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
632	1615.7987	-1469.4302	1
633	1618.32065	-1468.9853	1
634	1620.84247	-1468.5398	1
635	1623.36417	-1468.0935	0
636	1625.88575	-1467.6466	1
637	1628.40721	-1467.199	1
638	1630.92854	-1466.7507	1
639	1633.44975	-1466.3016	1
640	1635.97083	-1465.8519	1
641	1638.49179	-1465.4015	1
642	1641.01263	-1464.9505	1
643	1643.53334	-1464.4987	1
644	1646.05393	-1464.0462	1
645	1648.57439	-1463.593	1
646	1651.09473	-1463.1391	1
647	1653.61495	-1462.6846	1
648	1656.13503	-1462.2293	1
649	1658.655	-1461.7734	1
650	1661.17484	-1461.3168	1
651	1663.69455	-1460.8594	1
652	1666.21413	-1460.4014	1
653	1668.73359	-1459.9427	1
654	1671.25293	-1459.4833	1
655	1673.77214	-1459.0232	1
656	1602.69831	-1468.848	0
657	1605.2201	-1468.4068	0
658	1607.74177	-1467.9648	1
659	1610.26331	-1467.5222	1
660	1612.78473	-1467.0789	1
661	1615.30603	-1466.6348	1
662	1617.82721	-1466.1901	0
663	1620.34826	-1465.7447	1
664	1622.86919	-1465.2986	1
665	1625.39	-1464.8518	1
666	1627.91069	-1464.4043	1
667	1630.43125	-1463.9561	1
668	1632.95169	-1463.5073	1
669	1635.472	-1463.0577	1
670	1637.9922	-1462.6074	1
671	1640.51226	-1462.1565	1
672	1643.03221	-1461.7048	1
673	1645.55203	-1461.2525	1
674	1648.07172	-1460.7995	1
675	1650.59129	-1460.3457	1
676	1653.11074	-1459.8913	1
677	1655.63006	-1459.4362	1

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
227	1623.1946	-1511.3927	0
228	1625.7281	-1510.9458	1
229	1628.2614	-1510.4982	1
230	1630.7947	-1510.05	1
231	1633.3278	-1509.601	1
232	1635.8608	-1509.1513	1
233	1638.3937	-1508.7009	1
234	1640.9264	-1508.2499	1
235	1643.4591	-1507.7981	1
236	1645.9915	-1507.3457	1
237	1648.5239	-1506.8925	1
238	1651.0562	-1506.4386	1
239	1653.5883	-1505.9841	1
240	1656.1203	-1505.5288	1
241	1658.6522	-1505.0729	0
242	1661.1839	-1504.6163	1
243	1663.7155	-1504.1589	1
244	1666.247	-1503.7009	1
245	1668.7784	-1503.2422	1
246	1671.3097	-1502.7827	1
247	1673.8408	-1502.3226	0
248	1676.3718	-1501.8618	0
249	1678.9026	-1501.4003	0
250	1681.4334	-1500.9381	0
251	1683.964	-1500.4752	0
252	1686.4945	-1500.0116	0
253	1689.0248	-1499.5473	0
254	1691.5551	-1499.0823	0
255	1694.0852	-1498.6166	1
256	1696.6151	-1498.1502	0
257	1699.145	-1497.6831	0
258	1620.1684	-1509.0393	0
259	1622.7012	-1508.5933	1
260	1625.2339	-1508.1465	1
261	1627.7665	-1507.6991	1
262	1630.299	-1507.2509	1
263	1632.8313	-1506.8021	1
264	1635.3636	-1506.3526	1
265	1637.8957	-1505.9023	1
266	1640.4276	-1505.4514	1
267	1642.9595	-1504.9998	1
268	1645.4912	-1504.5475	1
269	1648.0228	-1504.0944	1
270	1650.5543	-1503.6407	1
271	1653.0857	-1503.1863	1
272	1655.6169	-1502.7312	1

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
678	1658.14925	-1458.9804	1
679	1660.66832	-1458.5239	1
680	1663.18727	-1458.0667	1
681	1665.70609	-1457.6088	1
682	1668.22478	-1457.1502	1
683	1670.74334	-1456.691	1
684	1673.26178	-1456.231	1
685	1602.20953	-1466.0523	0
686	1604.73055	-1465.6111	0
687	1607.25144	-1465.1693	1
688	1609.77222	-1464.7268	1
689	1612.29287	-1464.2837	1
690	1614.8134	-1463.8398	1
691	1617.33381	-1463.3952	1
692	1619.85409	-1462.9499	1
693	1622.37426	-1462.504	1
694	1624.8943	-1462.0573	1
695	1627.41421	-1461.6099	1
696	1629.93401	-1461.1619	1
697	1632.45368	-1460.7132	1
698	1634.97323	-1460.2637	1
699	1637.49265	-1459.8136	1
700	1640.01195	-1459.3628	1
701	1642.53112	-1458.9113	1
702	1645.05018	-1458.4591	1
703	1647.5691	-1458.0062	1
704	1650.0879	-1457.5526	1
705	1652.60658	-1457.0983	1
706	1655.12513	-1456.6433	1
707	1657.64356	-1456.1877	1
708	1660.16186	-1455.7313	1
709	1662.68004	-1455.2743	1
710	1665.19809	-1454.8165	1
711	1667.71601	-1454.3581	1
712	1670.23381	-1453.8989	1
713	1672.75148	-1453.4391	1
714	1675.26902	-1452.9786	1
715	1599.20043	-1463.6971	0
716	1601.72079	-1463.2568	0
717	1604.24104	-1462.8158	0
718	1606.76117	-1462.3741	1
719	1609.28117	-1461.9318	1
720	1611.80106	-1461.4887	1
721	1614.32082	-1461.045	1
722	1616.84046	-1460.6005	1
723	1619.35997	-1460.1554	1

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
273	1658.148	-1502.2754	1
274	1660.679	-1501.8189	1
275	1663.2098	-1501.3617	1
276	1665.7406	-1500.9038	1
277	1668.2712	-1500.4452	1
278	1670.8016	-1499.9859	1
279	1673.332	-1499.526	1
280	1675.8622	-1499.0653	1
281	1678.3923	-1498.6039	1
282	1680.9223	-1498.1418	0
283	1683.4521	-1497.6791	0
284	1685.9818	-1497.2156	0
285	1688.5114	-1496.7514	1
286	1691.0409	-1496.2866	0
287	1693.5702	-1495.821	0
288	1617.1436	-1506.6853	0
289	1619.6758	-1506.2401	0
290	1622.2078	-1505.7941	1
291	1624.7398	-1505.3475	1
292	1627.2716	-1504.9002	1
293	1629.8033	-1504.4522	1
294	1632.3349	-1504.0035	1
295	1634.8664	-1503.5541	1
296	1637.3977	-1503.104	1
297	1639.9289	-1502.6532	1
298	1642.46	-1502.2017	0
299	1644.9909	-1501.7495	0
300	1647.5218	-1501.2967	1
301	1650.0525	-1500.8431	1
302	1652.5831	-1500.3888	1
303	1655.1135	-1499.9338	1
304	1657.6439	-1499.4782	1
305	1660.1741	-1499.0218	1
306	1662.7042	-1498.5648	1
307	1665.2341	-1498.107	1
308	1667.764	-1497.6486	1
309	1670.2937	-1497.1894	1
310	1672.8233	-1496.7296	1
311	1675.3527	-1496.269	1
312	1677.882	-1495.8078	1
313	1680.4112	-1495.3459	0
314	1682.9403	-1494.8832	0
315	1685.4692	-1494.4199	1
316	1687.9981	-1493.9559	1
317	1690.5268	-1493.4912	0
318	1693.0553	-1493.0258	0

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
724	1621.87937	-1459.7096	1
725	1644.54837	-1455.6659	1
726	1647.06653	-1455.2132	1
727	1649.58456	-1454.7597	1
728	1652.10247	-1454.3056	1
729	1654.62026	-1453.8507	1
730	1657.13791	-1453.3952	1
731	1659.65545	-1452.939	1
732	1662.17285	-1452.4821	1
733	1664.69014	-1452.0245	1
734	1667.20729	-1451.5662	1
735	1669.72432	-1451.1072	1
736	1672.24122	-1450.6475	1
737	1596.19278	-1461.3412	0
738	1598.7125	-1460.9017	0
739	1601.2321	-1460.4616	1
740	1603.75158	-1460.0207	1
741	1606.27094	-1459.5792	1
742	1608.79018	-1459.137	1
743	1611.30929	-1458.6941	1
744	1613.82828	-1458.2504	1
745	1616.34716	-1457.8061	1
746	1618.8659	-1457.3611	1
747	1621.38453	-1456.9154	1
748	1644.04661	-1452.873	1
749	1646.564	-1452.4204	1
750	1649.08127	-1451.9671	1
751	1651.59841	-1451.5131	1
752	1654.11543	-1451.0584	1
753	1656.63232	-1450.603	1
754	1659.14908	-1450.1469	1
755	1661.66572	-1449.6902	1
756	1664.18223	-1449.2327	1
757	1666.69862	-1448.7745	1
758	1669.21488	-1448.3157	1
759	1671.73102	-1447.8561	1
760	1674.24703	-1447.3959	1
761	1676.76291	-1446.935	1
762	1593.1866	-1458.9846	0
763	1595.70568	-1458.546	0
764	1598.22463	-1458.1067	0
765	1600.74346	-1457.6667	1
766	1603.26217	-1457.2259	1
767	1605.78076	-1456.7845	1
768	1608.29923	-1456.3425	1
769	1610.81757	-1455.8997	1

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
319	1616.6518	-1503.8861	0
320	1619.1832	-1503.4411	0
321	1621.7145	-1502.9953	1
322	1624.2457	-1502.5488	1
323	1626.7768	-1502.1016	1
324	1629.3077	-1501.6538	1
325	1631.8385	-1501.2052	1
326	1634.3692	-1500.7559	1
327	1636.8998	-1500.306	1
328	1639.4302	-1499.8553	0
329	1641.9605	-1499.404	0
330	1644.4907	-1498.9519	0
331	1647.0208	-1498.4992	1
332	1649.5507	-1498.0457	1
333	1652.0805	-1497.5916	1
334	1654.6102	-1497.1368	1
335	1657.1398	-1496.6812	1
336	1659.6692	-1496.225	1
337	1662.1986	-1495.7681	1
338	1664.7277	-1495.3105	1
339	1667.2568	-1494.8522	1
340	1669.7857	-1494.3932	1
341	1672.3146	-1493.9334	1
342	1674.8432	-1493.4731	1
343	1677.3718	-1493.012	1
344	1679.9002	-1492.5502	1
345	1682.4285	-1492.0877	1
346	1684.9567	-1491.6245	1
347	1687.4848	-1491.1606	1
348	1690.0127	-1490.6961	1
349	1692.5405	-1490.2308	1
350	1618.6908	-1500.6423	0
351	1621.2213	-1500.1967	1
352	1623.7517	-1499.7503	1
353	1626.282	-1499.3033	1
354	1628.8122	-1498.8556	1
355	1631.3422	-1498.4071	0
356	1633.8721	-1497.958	0
357	1636.4019	-1497.5082	1
358	1638.9316	-1497.0577	1
359	1641.4611	-1496.6065	0
360	1643.9905	-1496.1545	1
361	1646.5198	-1495.7019	1
362	1649.049	-1495.2486	1
363	1651.5781	-1494.7946	1
364	1654.107	-1494.3399	1

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
770	1613.3358	-1455.4562	1
771	1615.8539	-1455.012	1
772	1618.37188	-1454.5672	1
773	1643.54491	-1450.0804	1
774	1646.06153	-1449.6279	1
775	1648.57802	-1449.1748	1
776	1651.0944	-1448.7209	1
777	1653.61064	-1448.2663	1
778	1656.12677	-1447.8111	1
779	1658.64276	-1447.3551	1
780	1661.15864	-1446.8985	1
781	1663.67438	-1446.4412	1
782	1666.19	-1445.9832	1
783	1668.70549	-1445.5245	1
784	1671.22086	-1445.0651	1
785	1673.7361	-1444.605	1
786	1676.25122	-1444.1442	1
787	1590.18189	-1456.6274	0
788	1592.70032	-1456.1896	0
789	1595.21862	-1455.7511	0
790	1597.7368	-1455.3119	1
791	1600.25487	-1454.872	1
792	1602.77281	-1454.4314	1
793	1605.29063	-1453.9902	1
794	1607.80833	-1453.5482	1
795	1610.3259	-1453.1055	1
796	1612.84336	-1452.6622	1
797	1615.36069	-1452.2182	1
798	1643.04325	-1447.2881	1
799	1645.5591	-1446.8357	1
800	1648.07483	-1446.3827	1
801	1650.59043	-1445.929	1
802	1653.10591	-1445.4745	1
803	1655.62127	-1445.0194	1
804	1658.13649	-1444.5636	1
805	1660.6516	-1444.1071	1
806	1663.16658	-1443.6499	1
807	1665.68143	-1443.1921	1
808	1668.19615	-1442.7335	1
809	1670.71075	-1442.2742	1
810	1673.22523	-1441.8143	1
811	1675.73957	-1441.3536	1
812	1587.17864	-1454.2694	0
813	1589.69642	-1453.8324	0
814	1592.21407	-1453.3947	1
815	1594.73161	-1452.9564	1

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
365	1656.6358	-1493.8846	1
366	1659.1644	-1493.4285	1
367	1661.693	-1492.9717	1
368	1664.2214	-1492.5142	1
369	1666.7497	-1492.056	1
370	1669.2779	-1491.5972	1
371	1671.8059	-1491.1376	1
372	1674.3338	-1490.6774	1
373	1676.8616	-1490.2164	1
374	1679.3893	-1489.7548	1
375	1681.9168	-1489.2924	1
376	1684.4442	-1488.8294	1
377	1686.9715	-1488.3656	1
378	1689.4987	-1487.9012	1
379	1692.0257	-1487.4361	1
380	1618.1983	-1497.8439	0
381	1620.7281	-1497.3984	1
382	1623.2577	-1496.9522	1
383	1625.7872	-1496.5053	1
384	1628.3166	-1496.0577	1
385	1630.8459	-1495.6094	1
386	1633.3751	-1495.1604	0
387	1635.9041	-1494.7107	0
388	1638.433	-1494.2603	0
389	1640.9618	-1493.8092	1
390	1643.4904	-1493.3575	1
391	1646.0189	-1492.905	1
392	1648.5473	-1492.4518	1
393	1651.0756	-1491.998	1
394	1653.6038	-1491.5434	1
395	1656.1318	-1491.0882	1
396	1658.6597	-1490.6322	1
397	1661.1875	-1490.1756	1
398	1663.7151	-1489.7182	1
399	1666.2427	-1489.2602	1
400	1668.7701	-1488.8015	1
401	1671.2973	-1488.342	1
402	1673.8245	-1487.8819	1
403	1676.3515	-1487.4211	1
404	1617.7059	-1495.0457	0
405	1620.2349	-1494.6003	1
406	1622.7638	-1494.1542	1
407	1625.2926	-1493.7075	1
408	1627.8212	-1493.26	0
409	1630.3497	-1492.8119	1
410	1632.8781	-1492.363	0

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
816	1597.24902	-1452.5173	1
817	1599.76632	-1452.0776	1
818	1602.28349	-1451.6371	1
819	1604.80054	-1451.196	1
820	1607.31747	-1450.7542	1
821	1609.83428	-1450.3117	1
822	1612.35097	-1449.8685	1
823	1614.86753	-1449.4246	1
824	1642.54163	-1444.496	1
825	1645.05672	-1444.0438	1
826	1647.57168	-1443.5909	1
827	1650.08652	-1443.1373	1
828	1652.60123	-1442.683	1
829	1655.11581	-1442.228	1
830	1657.63027	-1441.7724	1
831	1660.14461	-1441.316	1
832	1662.65882	-1440.859	1
833	1665.1729	-1440.4012	1
834	1667.68686	-1439.9428	1
835	1670.20069	-1439.4837	1
836	1672.7144	-1439.0239	1
837	1675.22798	-1438.5634	1
838	1584.17685	-1451.9107	0
839	1586.69398	-1451.4746	0
840	1589.21099	-1451.0377	0
841	1591.72787	-1450.6002	0
842	1594.24464	-1450.162	1
843	1596.76129	-1449.7231	1
844	1599.27781	-1449.2835	1
845	1601.79422	-1448.8431	1
846	1604.3105	-1448.4022	1
847	1606.82666	-1447.9605	1
848	1609.3427	-1447.5181	1
849	1642.04007	-1441.7042	1
850	1644.55438	-1441.2521	1
851	1647.06858	-1440.7993	1
852	1649.58265	-1440.3459	1
853	1652.09659	-1439.8917	1
854	1654.61041	-1439.4369	1
855	1657.1241	-1438.9814	1
856	1659.63767	-1438.5252	1
857	1662.15111	-1438.0683	1
858	1664.66443	-1437.6107	1
859	1667.17762	-1437.1524	1
860	1669.69068	-1436.6934	1
861	1672.20362	-1436.2337	1

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
411	1635.4063	-1491.9135	1
412	1637.9344	-1491.4632	1
413	1640.4624	-1491.0123	1
414	1642.9903	-1490.5606	1
415	1645.5181	-1490.1083	1
416	1648.0457	-1489.6553	1
417	1650.5732	-1489.2016	1
418	1653.1006	-1488.7471	1
419	1655.6279	-1488.292	1
420	1658.155	-1487.8362	1
421	1660.682	-1487.3797	1
422	1663.2089	-1486.9225	1
423	1665.7357	-1486.4646	1
424	1668.2623	-1486.006	1
425	1670.7888	-1485.5468	1
426	1673.3152	-1485.0868	1
427	1675.8414	-1484.6261	1
428	1617.2136	-1492.2478	0
429	1619.7418	-1491.8025	0
430	1622.2699	-1491.3566	0
431	1624.7979	-1490.91	1
432	1627.3258	-1490.4627	1
433	1629.8535	-1490.0146	1
434	1632.3811	-1489.5659	1
435	1634.9086	-1489.1165	1
436	1637.4359	-1488.6664	1
437	1639.9632	-1488.2156	1
438	1642.4903	-1487.7641	1
439	1645.0173	-1487.3119	1
440	1647.5442	-1486.859	1
441	1650.0709	-1486.4054	1
442	1652.5975	-1485.9511	1
443	1655.124	-1485.4962	1
444	1657.6504	-1485.0405	1
445	1660.1766	-1484.5841	1
446	1662.7027	-1484.1271	1
447	1665.2287	-1483.6693	1
448	1667.7546	-1483.2109	1
449	1670.2803	-1482.7517	1
450	1672.8059	-1482.2919	1
451	1675.3314	-1481.8314	1

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
862	1674.71643	-1435.7733	1
863	1581.17653	-1449.5514	0
864	1583.69301	-1449.1161	0
865	1586.20937	-1448.68	0
866	1588.7256	-1448.2433	0
867	1591.24172	-1447.8059	1
868	1593.75772	-1447.3678	1
869	1596.2736	-1446.9291	1
870	1598.78936	-1446.4896	1
871	1601.30499	-1446.0494	1
872	1603.82051	-1445.6086	1
873	1575.66172	-1447.6252	0
874	1578.17767	-1447.1913	0
875	1580.6935	-1446.7568	0
876	1583.20921	-1446.3217	0
877	1585.7248	-1445.8858	1
878	1588.24027	-1445.4492	0
879	1590.75562	-1445.0119	0
880	1593.27085	-1444.574	1
881	1595.78596	-1444.1353	1
882	1598.30094	-1443.696	1
883	1575.18027	-1444.8306	0
884	1577.69545	-1444.3969	0
885	1580.21051	-1443.9626	0
886	1582.72546	-1443.5275	1
887	1585.24028	-1443.0918	1
888	1587.75498	-1442.6553	0
889	1590.26956	-1442.2182	1
890	1592.78402	-1441.7804	1
891	1595.29836	-1441.3418	1
892	1597.81258	-1440.9026	1
893	1577.21328	-1441.6028	1
894	1579.72758	-1441.1686	1
895	1582.24175	-1440.7336	1
896	1589.78355	-1439.4247	1
897	1592.29724	-1438.987	1
898	1594.81081	-1438.5486	1
899	1597.32426	-1438.1096	1
900	1579.24468	-1438.3748	1
901	1581.75809	-1437.94	1

1. LCC coordinates were derived from provided NPS Lat/Long coordinates.

Table A1-2
Biscayne NP Receptors [1]

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
1	1717.3752	-1477.4745	0
2	1719.8858	-1477.0203	0
3	1709.3868	-1476.3111	0
4	1711.8974	-1475.8577	0
5	1714.408	-1475.404	0
6	1716.9185	-1474.9501	0
7	1719.4289	-1474.496	0
8	1706.4204	-1474.24	0
9	1708.9308	-1473.7868	0
10	1711.4412	-1473.3334	0
11	1713.9515	-1472.8798	0
12	1716.4618	-1472.426	0
13	1718.9721	-1471.9719	0
14	1700.9441	-1472.6215	0
15	1703.4544	-1472.1688	0
16	1705.9647	-1471.7159	0
17	1708.4749	-1471.2627	0
18	1710.9851	-1470.8094	0
19	1713.4952	-1470.3558	0
20	1716.0052	-1469.902	0
21	1718.5153	-1469.448	0
22	1700.4889	-1470.0975	0
23	1702.999	-1469.6448	0
24	1705.509	-1469.192	0
25	1708.019	-1468.7389	0
26	1710.529	-1468.2856	0
27	1713.0389	-1467.8321	0
28	1715.5487	-1467.3783	0
29	1718.0585	-1466.9244	0
30	1720.5683	-1466.4702	0
31	1702.5436	-1467.1211	0
32	1705.0534	-1466.6683	0
33	1707.5632	-1466.2152	0
34	1710.0729	-1465.762	0
35	1712.5826	-1465.3085	0
36	1715.0922	-1464.8548	0
37	1717.6018	-1464.401	0
38	1720.1113	-1463.9468	0
39	1699.5786	-1465.0502	0
40	1702.0883	-1464.5976	0
41	1704.5979	-1464.1448	0
42	1707.1074	-1463.6918	0

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
58	1701.17779	-1459.5513	0
59	1703.68695	-1459.0986	0
60	1706.19607	-1458.6457	0
61	1708.70513	-1458.1926	0
62	1711.21415	-1457.7393	0
63	1713.72312	-1457.2858	0
64	1716.23204	-1456.832	0
65	1718.7409	-1456.3781	0
66	1721.24972	-1455.9239	0
67	1698.21362	-1457.4809	0
68	1700.72262	-1457.0284	0
69	1703.23156	-1456.5758	0
70	1705.74046	-1456.123	0
71	1708.24931	-1455.6699	0
72	1710.75811	-1455.2167	0
73	1713.26685	-1454.7632	0
74	1715.77556	-1454.3095	0
75	1718.2842	-1453.8556	0
76	1720.7928	-1453.4015	0
77	1697.75873	-1454.9582	0
78	1700.2675	-1454.5059	0
79	1702.77623	-1454.0533	0
80	1705.2849	-1453.6005	0
81	1707.79354	-1453.1475	0
82	1710.30211	-1452.6943	0
83	1712.81064	-1452.2409	0
84	1715.31911	-1451.7872	0
85	1717.82755	-1451.3334	0
86	1720.33593	-1450.8793	0
87	1699.81243	-1451.9835	0
88	1702.32094	-1451.531	0
89	1704.8294	-1451.0782	0
90	1707.3378	-1450.6253	0
91	1709.84617	-1450.1721	0
92	1712.35448	-1449.7187	0
93	1714.86274	-1449.2652	0
94	1717.37095	-1448.8114	0
95	1719.87911	-1448.3573	0
96	1699.35742	-1449.4613	0
97	1701.86571	-1449.0089	0
98	1704.37394	-1448.5562	0
99	1706.88214	-1448.1033	0

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
43	1709.617	-1463.2386	0
44	1712.1264	-1462.7852	0
45	1714.6358	-1462.3316	0
46	1717.1452	-1461.8777	0
47	1719.6545	-1461.4237	0
48	1699.1236	-1462.5268	0
49	1701.633	-1462.0743	0
50	1704.1424	-1461.6216	0
51	1706.6517	-1461.1687	0
52	1709.161	-1460.7155	0
53	1711.6703	-1460.2621	0
54	1714.1794	-1459.8086	0
55	1716.6886	-1459.3548	0
56	1719.1977	-1458.9008	0
57	1698.6686	-1460.0037	0

Recept No.	LCC X (km)	LCC Y (km)	Elev. (m)
100	1709.39028	-1447.6502	0
101	1711.89837	-1447.1968	0
102	1714.40641	-1446.7433	0
103	1716.9144	-1446.2896	0
104	1719.42235	-1445.8356	0
105	1708.93444	-1445.1284	0
106	1711.44231	-1444.6752	0
107	1713.95014	-1444.2217	0
108	1716.45791	-1443.768	0
109	1718.96564	-1443.3141	0
110	1708.47865	-1442.6069	0
111	1710.9863	-1442.1537	0
112	1713.49391	-1441.7003	0
113	1708.02291	-1440.0857	0
114	1710.53036	-1439.6325	0

1. LCC coordinates were derived from the NPS boundaries.

Solid Waste Authority of Palm Beach County
Class I Air Dispersion Modeling Report

ATTACHMENT A2

PM Speciation Spreadsheet

352056

Attachment A2 - PM Speciation

	total PM	filterable	condensable		condensable split * H_2SO_4	condensable - H_2SO_4
Assumed %				**Calc %**		
(lb/hr)	--	14.1	23.9		23.9	
	Total PM10:	14.1				derived

Methodology:

Known: PM10 emission rate, H2SO4 emissions
Assumed speciation:
H2SO4 assigned to SO4

PM10 emissions are classified as fine filterable.

	FILTERABLE							CONDENSABLE			
						fine filterable					
Breakdown Categories	**CALPUFF Species Name**	**Diameter (µm)**	**Mass Fraction %**	**Filterable (lb/hr)**	**Coarse Filterable Inorganic (lb/hr)**	**Inorganic (100% of fine filterable) (lb/hr)**	**Elemental Carbon (0% of fine filterable) (lb/hr)**	**H_2SO_4 (lb/hr)**	**Organic Condensable (lb/hr)**	**Inorganic Condensable (lb/hr)**	**Diameter (µm)**
coarse (30%)	PM800	6.00 - 10.00	15.0%	2.12	**2.1150**						6.00 - 10.00
	PM425	2.50-6.00	9.0%	1.27	**1.2690**						2.50-6.00
fine (70%)	PM187	1.25-2.50	11.0%	1.55		**1.5510**		5.9750			1.25-2.50
	PM112	1.00-1.25	3.0%	0.42		**0.4230**		5.9750			1.00-1.25
	PM081	0.625-1.00	4.0%	0.56		**0.5640**		5.9750	**0.0000**		0.625-1.00
	PM056	<0.625	58.0%	8.18		**8.1780**		5.9750	**0.0000**		<0.625
total		**Wurzburg Split**	100%	**14.1**	**3.38**	**10.72**		**23.90**	**0.000**		
					PMC	**SOIL**	**EC**	**SO_4**	**SOA**	**SOIL**	
									[OC]	**[PMF]**	
Ext. coefficient					0.6	1	10	3*f(RH)	4	1	

Solid Waste Authority of Palm Beach County
Class I Air Dispersion Modeling Report

ATTACHMENT A3

SILs and Increment Analysis Results

TABLE A3-1

Solid Waste Authority of Palm Beach County Renewal Energy Facility No. 2
Maximum Predicted Class I Area Modeling Impacts - Comparison to SILs
CALPUFF Air Dispersion Modeling - Everglades National Park

Pollutant & Avg. Time	Meteorological Year Concentrations, ug/m^3			PSD Class I Area Significance Level (ug/m^3)
	2001	2002	2003	
NOx				
Annual	0.0046	0.0079	0.0054	0.1
SO_2				
3-hour	0.240	0.195	0.246	1
24-hour	0.091	0.069	0.058	0.2
Annual	0.0025	0.0029	0.0031	0.1
PM				
24-hour	0.018	0.017	0.012	0.3
Annual	0.0005	0.0006	0.0007	0.2

* Significance Levels reported in Federal Register, Vol. 61, July 23, 1996

TABLE A3-2

Solid Waste Authority of Palm Beach County Renewal Energy Facility No. 2
Maximum Predicted Class II Area Modeling Impacts - Comparison to SILs
CALPUFF Air Dispersion Modeling - Biscayne National Park

Pollutant & Avg. Time	Meteorological Year Concentrations, ug/m^3			PSD Class II Area Significance Level (ug/m^3)
	2001	2002	2003	
NOx				
Annual	0.0033	0.0040	0.0047	1
SO_2				
3-hour	0.149	0.159	0.183	25
24-hour	0.045	0.058	0.070	5
Annual	0.0016	0.0021	0.0024	1
PM				
24-hour	0.010	0.013	0.015	5
Annual	0.0003	0.0005	0.0005	1

* Significance Levels reported in Federal Register, Vol. 61, July 23, 1996

TABLE A3-3

Solid Waste Authority of Palm Beach County Renewal Energy Facility No. 2
Comparison of Maximum Predicted Impacts to Class I PSD Increments
CALPUFF Air Dispersion Modeling - Everglades National Park

Pollutant & Avg. Time	Meteorological Year Concentrations, ug/m^3			PSD Class I Area Increments (ug/m^3)
	2001	2002	2003	
NOx				
Annual	0.0046	0.0079	0.0054	2.5
SO_2				
3-hour [1]	0.170	0.191	0.178	25
24-hour [1]	0.059	0.066	0.053	5
Annual	0.0025	0.0029	0.0031	2
PM				
24-hour [1]	0.012	0.013	0.011	10
Annual	0.0005	0.0006	0.0007	5

* Significance Levels reported in Federal Register, Vol. 61: 38250; July 23, 1996

1. Highest 2nd High (H2H) value is presented for the short-term averaging periods.

TABLE A3-4

Solid Waste Authority of Palm Beach County Renewal Energy Facility No. 2
Comparison of Maximum Predicted Impacts to Class II PSD Increments
CALPUFF Air Dispersion Modeling - Biscayne National Park

Pollutant & Avg. Time	Meteorological Year Concentrations, ug/m^3			PSD Class II Area Increments (ug/m^3)
	2001	2002	2003	
NOx				
Annual	0.0033	0.0040	0.0047	25
SO_2				
3-hour [1]	0.136	0.139	0.146	512
24-hour [1]	0.037	0.051	0.055	91
Annual	0.0016	0.0021	0.0024	20
PM				
24-hour [1]	0.008	0.012	0.015	30
Annual	0.0003	0.0005	0.0005	17

* Significance Levels reported in Federal Register, Vol. 61: 38250; July 23, 1996

1. Highest 2nd High (H2H) value is presented for the short-term averaging periods.

Solid Waste Authority of Palm Beach County
Class I Air Dispersion Modeling Report

ATTACHMENT A4

AQRV Analysis Results

Visibility Impairment (Method 2 & 8)
S-N Deposition

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TABLE A4-1

Solid Waste Authority of Palm Beach County Renewal Energy Facility No. 2

AQRV Analysis: Predicted S-N Deposition

CALPUFF Air Dispersion Modeling - Biscayne and Everglades National Parks

2001-2003 CALMET Meteorological Data Set - VISTAS Subdomain 2

Deposition Impacts (kg/ha/yr)

Everglades National Park & Biscayne Bay National Park

Sulfate Deposition			Nitrate Deposition		
Compound	**Modeled Flux Impact ($g/m^2/s$)**	**Modeled Deposition Impact (kg/ha/yr)**	**Compound**	**Modeled Flux Impact ($g/m^2/s$)**	**Modeled Deposition Impact (kg/ha/yr)**
Everglades Total S	**9.94E-12**	0.0031	**Everglade Total N**	**8.95E-12**	0.0028
Biscayne Bay Total S	**7.05E-12**	0.0022	**Biscayne Bay Total N**	**5.13E-12**	0.0016
Sulfate DAT Value [1] (Screening Value)		**0.01**	**Nitrate DAT Value [1] (Screening Value)**		**0.01**

1. Depostion Analysis Threshold Equation (DAT): DAT = B_N (0.5) * 0.04
   where: B_N = Natural Background N & S depostion value (0.50 kg/ha/yr in the Eastern US)
   Variability Factor = 0.5 (50% on Natural Background Nitrogen deposition)
   Cumulative Factor = 0.04 (4% safety factor)

TABLE A4-2a

Solid Waste Authority of Palm Beach County Renewal Energy Facility No. 2

AQRV Analysis: Predicted S-N Deposition

CALPUFF Air Dispersion Modeling - Biscayne and Everglades National Parks

2001 CALMET Meteorological Data Set - VISTAS Subdomain 2

Deposition Impacts (kg/ha/yr)

Everglades National Park & Biscayne Bay National Park

Sulfate Deposition			Nitrate Deposition		
Compound	**Modeled Flux Impact ($g/m^2/s$)**	**Modeled Deposition Impact (kg/ha/yr)**	**Compound**	**Modeled Flux Impact ($g/m^2/s$)**	**Modeled Deposition Impact (kg/ha/yr)**
Everglades Total S	**6.92E-12**	0.002	**Everglade Total N**	**6.07E-12**	0.002
Biscayne Bay Total S	**4.72E-12**	0.001	**Biscayne Bay Total N**	**3.17E-12**	0.001
Sulfate DAT Value [1] (Screening Value)		**0.01**	**Nitrate DAT Value [1] (Screening Value)**		**0.01**

1. Depostion Analysis Threshold Equation (DAT): DAT = B_N (0.5) * 0.04
   where: B_N = Natural Background N & S depostion value (0.50 kg/ha/yr in the Eastern US)
   Variability Factor = 0.5 (50% on Natural Background Nitrogen deposition)
   Cumulative Factor = 0.04 (4% safety factor)

TABLE A4-2b

Solid Waste Authority of Palm Beach County Renewal Energy Facility No. 2

AQRV Analysis: Predicted S-N Deposition

CALPUFF Air Dispersion Modeling - Biscayne and Everglades National Parks

2002 CALMET Meteorological Data Set - VISTAS Subdomain 2

Deposition Impacts (kg/ha/yr)

Everglades National Park & Biscayne Bay National Park

Sulfate Deposition			Nitrate Deposition		
Compound	**Modeled Flux Impact ($g/m^2/s$)**	**Modeled Deposition Impact (kg/ha/yr)**	**Compound**	**Modeled Flux Impact ($g/m^2/s$)**	**Modeled Deposition Impact (kg/ha/yr)**
Everglades Total S	**9.94E-12**	0.003	**Everglade Total N**	**8.95E-12**	0.003
Biscayne Bay Total S	**6.67E-12**	0.002	**Biscayne Bay Total N**	**5.13E-12**	0.002
Sulfate DAT Value [1] (Screening Value)		**0.01**	**Nitrate DAT Value [1] (Screening Value)**		**0.01**

1. Depostion Analysis Threshold Equation (DAT): DAT = B_N (0.5) * 0.04
   where: B_N = Natural Background N & S depostion value (0.50 kg/ha/yr in the Eastern US)
   Variability Factor = 0.5 (50% on Natural Background Nitrogen deposition)
   Cumulative Factor = 0.04 (4% safety factor)

TABLE A4-2c

Solid Waste Authority of Palm Beach County Renewal Energy Facility No. 2

AQRV Analysis: Predicted S-N Deposition

CALPUFF Air Dispersion Modeling - Biscayne and Everglades National Parks

2003 CALMET Meteorological Data Set - VISTAS Subdomain 2

Deposition Impacts (kg/ha/yr)

Everglades National Park & Biscayne Bay National Park

Sulfate Deposition			Nitrate Deposition		
Compound	**Modeled Flux Impact ($g/m^2/s$)**	**Modeled Deposition Impact (kg/ha/yr)**	**Compound**	**Modeled Flux Impact ($g/m^2/s$)**	**Modeled Deposition Impact (kg/ha/yr)**
Everglades Total S	**8.83E-12**	0.003	**Everglade Total N**	**8.57E-12**	0.003
Biscayne Bay Total S	**7.05E-12**	0.002	**Biscayne Bay Total N**	**3.94E-12**	0.001
Sulfate DAT Value [1] (Screening Value)		**0.01**	**Nitrate DAT Value [1] (Screening Value)**		**0.01**

1. Depostion Analysis Threshold Equation (DAT): DAT = B_N (0.5) * 0.04
   where: B_N = Natural Background N & S depostion value (0.50 kg/ha/yr in the Eastern US)
   Variability Factor = 0.5 (50% on Natural Background Nitrogen deposition)
   Cumulative Factor = 0.04 (4% safety factor)

TABLE A4-3

Solid Waste Authority of Palm Beach County Renewal Energy Facility No. 2
Maximum Predicted 24-Hour Visibility Impairment
CALPUFF Air Dispersion Modeling - Everglades National Park

AQRV & Criteria	Meteorological Year & Maximum Change in Extinction (% and dv)			Change in Extinction Threshold Value (%, deciview)
	2001	2002	2003	
Method 2				
Visibility, Δbext	4.08%	**6.26%**	3.72%	5%
Visibility, Δdv	0.399	**0.608**	0.365	0.5 dv
Method 8, Mode 5				
Visibility, Δbext	1.82%	**2.77%**	1.71%	5%
Visibility, Δdv	0.180	**0.273**	0.169	0.5 dv

1. A single 24-hour period where the predicted visibility impairment was greater than 0.5 dv.

TABLE A4-4

Solid Waste Authority of Palm Beach County Renewal Energy Facility No. 2
Maximum Predicted 24-Hour Visibility Impairment
CALPUFF Air Dispersion Modeling - Biscayne National Park

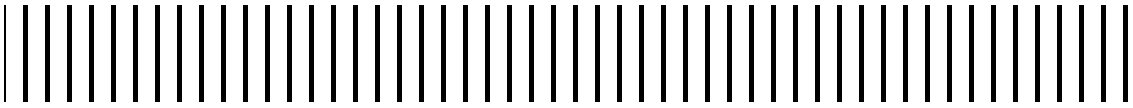
AQRV & Criteria	Meteorological Year & Maximum Change in Extinction (% and dv)			Change in Extinction Threshold Value (%, deciview)
	2001	2002	2003 [1]	
Method 2				
Visibility, Δbext	3.51%	3.60%	**5.32%**	5%
Visibility, Δdv	3.450	0.353	**0.518**	0.5 dv
Method 8, Mode 5				
Visibility, Δbext	1.46%	1.84%	**2.27%**	5%
Visibility, Δdv	0.145	0.183	**0.224**	0.5 dv

1. A single 24-hour period where the predicted visibility impairment was greater than 0.5 dv.

Solid Waste Authority of Palm Beach County
Class I Air Dispersion Modeling Report

ATTACHMENT A5

Computer Modeling Files Index



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PBREF2 Class I Air Quality Modeling Analyses File Index

Attachment A5 Modeling Files (\PBREF2)

This folder contains the modeling files for the proposed PBREF2. These modeling files were used in the Class I Analysis and Lead NAAQS Analysis.

Subfolders:

Ozone Data (\Ozone Data)

Three years of ozone data extracted from the downloaded dataset available from the VISTAS/SRC website (2001-2003). "xx" indicates the year of meteorological data. The ozone data was extracted using SUBDOMN preprocessor and then used in the CALPUFF runs.

Files:
ozonexx.dat

CALPUFF Analysis Model Runs (\CALPUFF)

CALPUFF Model Runs for three years of CALMET gridded data (input and output files) for Significance Analysis. "xx" indicates the year of meteorological data.

Sub Directories: 2001, 2002, 2003
CALPUFF Input Files:
PBEVxx.INP – CALPUFF input file for Everglades NP
PBBBxx.INP – CALPUFF input file for Biscayne NP

CALPUFF Output Files:
PBEVxx.CON – CALPUFF concentration file for Everglades NP
PBBBxxRH.DAT – CALPUFF hourly relative humidity file for Biscayne NP
PBEVxxRH.DAT – CALPUFF hourly relative humidity file for Everglades NP
PBBBxx.CON – CALPUFF concentration file for Biscayne NP
PBEVxx.WFX – CALPUFF wet deposition file for Everglades NP
PBBBxx.WFX – CALPUFF wet deposition file for Biscayne NP
PBEVxx.DFX – CALPUFF dry deposition file for Everglades NP
PBBBxx.DFX – CALPUFF dry deposition file for Biscayne NP
PBEVxx.LST – CALPUFF output list file for Everglades NP
PBBBxx.LST – CALPUFF output list file for Biscayne NP

POST UTIL Input Files:
EVPSTUxx.INP – POSTUTIL input file for Everglades NP
BBPSTUxx.INP – POSTUTIL input file for Biscayne NP
(calls PBEVxx.CON & PBBBxx.CON concentration files)

POSTUTIL Output Files:
EVPSTUxx.CON – POSTUTIL concentration file from POSTUTIL for Everglades NP
BBPSTUxx.CON – POSTUTIL concentration file from POSTUTIL for Biscayne NP
EVPSTUxx.LST – POSTUTIL output list file for Everglades NP
BBPSTUxx.LST – POSTUTIL output list file for Biscayne NP

CALPOST Post-Processing Input and Output Files (..\CALPOST)

PSD Significance Analysis:
CALPUFF's post-processer, CALPOST, was run for NO_2, PM_{10} and SO_2 for the three years of meteorological data for Significance Analysis. "xx" indicates the year of meteorological data.

Sub Directories: ..\CALPUFF\(Year)\ CALPOST\SILs
CALPOST Input Files:
PBEVxxNO.INP – CALPOST NO_2 SILs input file for Everglades NP
PBEVxxPM.INP – CALPOST PM_{10} SILs input file for Everglades NP
PBEVxxSO.INP – CALPOST SO_2 SILs input file for Everglades NP
PBBBxxNO.INP – CALPOST NO_2 SILs input file for Biscayne NP
PBBBxxPM.INP – CALPOST PM_{10} SILs input file for Biscayne NP
PBBBxxSO.INP – CALPOST SO_2 SILs input file for Biscayne NP

CALPOST Output Files:
PBEVxxNO.LST – CALPOST NO_2 SILs output file for Everglades NP
PBEVxxPM.LST – CALPOST PM_{10} SILs output file for Everglades NP
PBEVxxSO.LST – CALPOST SO_2 SILs output file for Everglades NP
PBBBxxNO.LST – CALPOST NO_2 SILs output file for Biscayne NP
PBBBxxPM.LST – CALPOST PM_{10} SILs output file for Biscayne NP
PBBBxxSO.LST – CALPOST SO_2 SILs output file for Biscayne NP

S-N Deposition Analysis:
CALPUFF's post-processer, CALPOST, was run for Nitrogen and Sulfur deposition for the three years of meteorological data. "xx" indicates the year of meteorological data.

Sub Directories: ..\CALPUFF\(Year)\CALPOST\Deposit
POST UTIL Input Files:
EVxxDEP.INP – POSTUTIL input file to combine wet and dry depositions for Everglades NP
BBxxDEP.INP – POSTUTIL input file to combine wet and dry depositions for Biscayne NP
(calls PBEVxx.WFX (.DFX) & PBBBxx.WFX (.DFX)deposition files)

POSTUTIL Output Files:
EVxxDEP.DAT – POSTUTIL output file with combined wet and dry depositions for Everglades NP
BBxxDEP.DAT – POSTUTIL output file with combined wet and dry depositions for Biscayne NP
EVxxDEP.LST – POSTUTIL output list file for Everglades NP
BBPxxDEP.LST – POSTUTIL output list file for Biscayne NP

CALPOST Input Files:
EVxxDEPN.INP – CALPOST N Deposition input file for Everglades NP
EVxxDEPS.INP – CALPOST S Deposition input file for Everglades NP
BBxxDEPN.INP – CALPOST N Deposition input file for Biscayne NP
BBxxDEPS.INP – CALPOST S Deposition input file for Biscayne NP

CALPOST Output Files:
EVxxDEPN.LST – CALPOST N Deposition output file for Everglades NP
EVxxDEPS.LST – CALPOST S Deposition output file for Everglades NP
BBxxDEPN.LST – CALPOST N Deposition output file for Biscayne NP
BBxxDEPS.LST – CALPOST S Deposition output file for Biscayne NP

Visibility Impairment Analysis:
CALPUFF's post-processer, CALPOST, was run for the visibility impairment analysis for the three years of meteorological data. Both Method 2 and Method 8 switches were used in CALPOST. "xx" indicates the year of meteorological data.

Sub Directories: ..\CALPUFF\(Year)\CALPOST\Visib95

CALPOST Input Files:
EVxxVM2.INP – CALPOST Visibility impairment (Method 2) input file for Everglades NP
EVxxVM8.INP – CALPOST Visibility impairment (Method 8) input file for Everglades NP
BBxxVM2.INP – CALPOST Visibility impairment (Method 2) input file for Biscayne NP
BBxxVM8.INP – CALPOST Visibility impairment (Method 8) input file for Biscayne NP

CALPOST Output Files:
EVxxVM2.LST – CALPOST Visibility impairment (Method 2) output file for Everglades NP
EVxxVM8.LST – CALPOST Visibility impairment (Method 8) output file for Everglades NP
BBxxVM2.LST – CALPOST Visibility impairment (Method 2) output file for Biscayne NP
BBxxVM8.LST – CALPOST Visibility impairment (Method 8) output file for Biscayne NP

Lead (Pb) (..\Lead)
CALPUFF modeling files for predicting the potential lead impacts on the Everglades and Biscayne NPs. Three years of met data (input and output files) for comparison to the rolling 3-month average NAAQS are included. "xx" indicates the year of meteorological data.

Sub Directories: 2001, 2002, 2003
Files:
EVPBxxM3.inp/.lst
BBPBxxM3.inp/lst

CALMET Gridded Meteorological Data (\SubDom2):
Three years of VISTAS CALMET data preprocessed and received from NPS and used for CALPUFF modeling runs (2001-2003). The data is divided into individually gridded monthly files for each of the three years.

Sub Directories: CMET2001, CMET2002, CMET 2003