PSD APPLICATION

PREVENTION OF SIGNIFICANT DETERIORATION APPLICATION FOR

LANDFILL GAS-TO-ENERGY PLANT AT THE MEDLEY LANDFILL

WASTE MANAGEMENT, INC. OF FLORIDA

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$\mu g/m^3$	micrograms per cubic meter
°C	degrees Celsius
°F	degrees Fahrenheit
AAQS	ambient air quality standard
acfm	actual cubic feet per minute
AOR	annual operating report
AQRV	air quality-related value/visibility test
ATP	adenosine triphosphate
BACT	best available control technology
bhp	brake horsepower
BPI	Babcock Power Inc.
BPIP	Building Profile Input Program
Btu/lb	British thermal units per pound
Btu/scf	British thermal units per standard cubic feet
CAA	Clean Air Act
CAIR	clean air interstate rule
CAT	Caterpillar
CEC	cation exchange capacity
CEMS	continuous emission monitoring system
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
DAT	deposition analysis thresholds
ENP	Everglades National Park
EPA	U.S. Environmental Protection Agency
EPRI	Electric Power Research Institute
EU	emission unit
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FLAG	Federal Land Manager's Air Quality Relative Values Workgroup
FLM	Federal Land Manager
ft	foot
ft/msl	feet above mean sea level
g/bhp-hr	grams per brake horse power hour
g/kW-hr	grams per kilowatt-hour
GCCS	gas collection and control system
GEP	Good Engineering Practice
GPM	gallons per minute
H_2S	hydrogen sulfide
HAP	hazardous air pollutant
HSH	highest, second-highest
IC	internal combustion
IWAQM	Interagency Workgroup on Air Quality Models
km	kilometer
kW	kilowatt
LAER	lowest achievable emission rate
lb/hr	pounds per hour
lb/MMBtu	pound per million British thermal units
LFGTE	landfill gas-to-energy
LGF	landfill gas
m/s	meter per second
MACT	maximum achievable control technology
MMBtu/hr	British thermal units per hour
msl	mean sea level

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MSW	municipal solid waste
MW	megawatt
N_2	nitrogen
NAAQS	national ambient air quality standard
NED	National Elevation Dataset
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NH_3	ammonia
NMOC	non methane organic compounds
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPS	National Park Service
NSPS	new source performance standards
NSR	new source review
O_2	oxygen
O_3	ozone
Pb	lead
PM	particulate matter
PM_{10}	particulate matter less than 10 microns
$PM_{2.5}$	particulate matter less than 2.5 microns
ppm	parts per million
ppmv	parts per million by volume
ppmvd	parts per million by volume dry
PRIME	Plume Rise Model Enhancement
PSD	prevention of significant deterioration
RBLC	RACT/BACT/LAER Clearinghouse
RSCR	regenerative selective catalytic reduction
SAM	sulfuric acid mist
scfm	standard cubic feet per minute
SCR	selective catalytic reduction
SCRAM	Support Center for Regulatory Air Models
SIA	significant impact area
SIP	Florida's State Implementation Plan
SNCR	selective non-catalytic reduction
SO_2	sulfur dioxide
TPD	tons per day
TPY	tons per year
TSP	total suspended particulates
TTN	Technology Transfer Network
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
VISTAS	Visibility Improvement State and Tribal Association of the Southeast
VOC	volatile organic compounds
WMIF	Waste Management, Inc. of Florida

1.0 INTRODUCTION

Waste Management, Inc. of Florida (WMIF) is proposing to construct and operate a landfill gas-to-energy (LFGTE) project at the existing Medley Landfill located in Miami-Dade County. The project will use landfill gas (LFG) currently generated at the landfill, which is now being flared. This renewable energy project will have a gross electrical generation capacity of 9.6 megawatts (MW) of electricity and will consist of the following:

- Six (6) identical Caterpillar (CAT) Model G3520C (CAT 3520) lean-burn internal combustion (IC) engines and generator sets
- LFG temperature and moisture conditioning equipment

The Medley Landfill currently operates under Title V air operating Permit No. 0250615-011-AV, issued June 2009. Permitted air emission sources currently operating at the facility are the following:

- Emissions Unit (EU) 001 – 3,000 standard cubic feet per minute (scfm) open utility flare used primarily as backup
- EU 002 – Fugitive non-methane organic compounds (NMOC) and hazardous air pollutant (HAP) emissions associated with the landfill that are not collected by the landfill gas collection system
- EU 003 – Fugitive particulate matter (PM) emissions generated by vehicular traffic on unpaved roads within facility
- EU 005 – 6,000-scfm enclosed flare used as the primary flare

The Medley Landfill currently generates about 4,000 scfm of LFG, which is flared using the two flares (EU 005 and EU 001). Based on the LFG Recovery Projection Model (gas curve) dated October 2008 (attached in Appendix A), the facility will generate 7,317 scfm of LFG in 2013. Assuming 100 percent of the LFG will be collected, this project is designed to utilize 7,317 scfm of LFG. This project is a renewable energy project because it will utilize the LFG that would otherwise be flared, and will convert it into usable electrical energy, furthering the County's and the state of Florida's renewable energy goals. WMIF will use the existing flares as backup to the CAT engines, but proposes to move the two existing flares to a new location next to the CAT engines.

The Medley Landfill is currently a major source of air emissions under the new source review (NSR) prevention of significant deterioration (PSD) regulations. Therefore, the proposed project represents a modification to a major source of air emissions. The U.S. Environmental Protection Agency (EPA) has implemented regulations requiring NSR for new or modified sources that increase air emissions above certain threshold amounts for major sources. Because the significant emission rate threshold amounts will be exceeded by the proposed modification, the project is subject to review under the PSD regulations.

PSD regulations are promulgated under Title 40, Parts 52.21 and 51.166 of the Code of Federal Regulations (40 CFR 52.21 and 51.166) and implemented through delegation to the Florida Department of Environmental Protection (FDEP). Florida's PSD regulations are codified in Rule 62-212.400, Florida Administrative Code (F.A.C.), and have been approved by EPA. These Florida PSD regulations incorporate the requirements of EPA's PSD regulations.

The Medley Landfill is currently not a major source of HAPs, and the LFGTE project will not cause it to become a major source of HAPs. Therefore, a maximum achievable control technology (MACT) analysis is not required for the proposed LFGTE project.

Based on the potential increase in emissions from the proposed project, PSD review is required for each of the following regulated pollutants:

- PM with aerodynamic diameter less than or equal to 10 micrometers (PM_{10})
- PM with aerodynamic diameter less than or equal to 2.5 micrometers ($PM_{2.5}$)
- Nitrogen oxides (NO_x)
- Carbon monoxide (CO)

Miami-Dade County has been designated as an attainment area for all criteria pollutants, i.e., attainment for ozone (O_3), PM_{10}, $PM_{2.5}$, sulfur dioxide (SO_2), CO, and nitrogen dioxide (NO_2), and unclassifiable for lead (Pb). Therefore, the PSD review will follow regulations pertaining to these designations. For each pollutant subject to PSD review, the following analyses are required:

1. Ambient monitoring analysis, unless the net increase in emissions due to the proposed facility causes impacts that are below specified *de minimis* monitoring levels
2. Application of best available control technology (BACT) for each new emissions unit that emits the PSD pollutant
3. Air quality impact analysis, unless the net increase in emissions due to the proposed facility causes impacts that are below specified significant impact levels
4. Additional impact analysis (impact on soils, vegetation, visibility, and growth), including impacts on PSD Class I areas

This PSD permit application addresses these requirements and is organized into six additional sections:

- Description of the project, including air emission sources and pollution control equipment, is presented in Section 2.0
- Regulatory applicability analysis of the proposed project is presented in Section 3.0
- Ambient air monitoring analysis is presented in Section 4.0
- BACT analysis is presented in Section 5.0
- Air quality impact analysis is presented in Section 6.0
- Additional impact analysis is presented in Section 7.0

Supporting documentation is presented in the appendices.

2.0 PROJECT DESCRIPTION

2.1 General

WMIF is proposing to construct and operate a LFGTE facility at the existing Medley Landfill, which will use LFG as fuel for up to six CAT 3520 engines. The six engines will be capable of generating a total of 9.6 MW of power (1.6 MW per CAT 3520). The two existing flares will be retained as additional combustion devices for the LFG. Additionally, WMIF is proposing to move the existing enclosed and open flares from their current location to a location adjacent to the CAT engines. No new flares will be added to this facility.

The future maximum LFG production rate for the Medley Landfill is estimated to be 7,317 scfm (refer to Appendix A). The maximum hydrogen sulfide (H_2S) content of the LFG is estimated to be 830 parts per million by volume (ppmv), and the lower heating value is estimated to be 500 British thermal units per standard cubic foot (Btu/scf).

The proposed project will include routing LFG from the existing gas collection and control system (GCCS) to the CAT 3520 engines after being processed in a gas treatment system. If any of the CAT engines are not available, excess LFG not consumed by the engines will be flared using the existing 6,000-scfm enclosed flare and 3,000-scfm open flare. The current GCCS was installed and is operated in accordance with New Source Performance Standards (NSPS) found in 40 CFR 60, Subpart WWW, Standards of Performance for Municipal Solid Waste Landfills. Modifications to the system to accommodate the LFGTE plant (CAT 3520s) will be in accordance with Subpart WWW requirements. According to Subpart WWW, the LFG must be routed to an NSPS control device. Specifically, NSPS control systems described in 40 CFR 60.752(b)(2)(iii)(A), (B) and (C) are:

(A) An open flare designed and operated in accordance with §60.18.

(B) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume (ppmvd), dry basis as hexane at 3 percent oxygen (O_2). The reduction efficiency or parts per million by volume shall be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in 60.754(d).

(C) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions for any atmospheric vent from the gas treatment system shall be subject to the requirements of paragraph (b)(2)(iii)(A) or (B) above.

After the construction of the proposed project is completed, the collected LFG will be routed to the existing flares for combustion and/or through a LFG treatment system and then to the CAT 3520s. The gas treatment system will include the following:

- Initial gas dewatering, utilizing a moisture knock-out vessel
- Gas compressor and blowers
- Air-to-gas coolers
- Removal of particulate matter larger than 10 microns from the gas stream

This treatment system meets the current EPA definition of a treatment system. However, if EPA changes the definition of a treatment system, then the engines may become the compliance control device at that time, and would have to operate in accordance with 40 CFR 60.752(b)(2)(iii)(B). Additionally, in accordance with NSPS Subpart WWW, no LFG is to be vented to the atmosphere from the gas treatment system.

2.1.1 Facility Description

The Medley Landfill facility is located in Miami-Dade County approximately 19 kilometers (km) northwest of downtown Miami. Miami-Dade County is designated as "attainment/maintenance" area for ozone and an attainment area for all other criteria pollutants, in accordance with Rule 62-204.340, F.A.C. Figure 2-1 shows the general location of the Medley Landfill.

The Medley Landfill is an open Class I Landfill with a municipal solid waste (MSW) design capacity greater than 2.5 million megagrams by mass or 2.5 million cubic meters by volume. This landfill began receiving solid waste prior to 1980, and was modified or reconstructed between 1987 and 1993 when Cells 1, 2, and 3 were constructed with geosynthetic liners to accept an estimated 5 million cubic yards of MSW. Between 1997 and 2000, Phase 1, 2, and 3 were developed with geosynthetic liners to accept an estimated 7 million cubic yards of MSW. In 2003, the saddle fill was constructed with a geosynthetic liner to provide an additional 2 million cubic yards capacity. Annual waste acceptance is approximately 700,000 tons.

The NMOC emissions from the Medley Landfill have been determined to be greater than 50 megagrams per year, based on EPA's uncontrolled emission rate estimates (reference Permit No. 0250615-011-AV). The Miami-Dade County Department of Environmental Resources Management has stated that the Medley Landfill is a major source of criteria pollutants. The Medley Landfill operates a LFG GCCS that includes flares to control emissions.

The facility currently operates two flares – one 3,000-scfm open utility flare (EU-001) used primarily as backup, and one 6,000-scfm enclosed flare (EU-005) used as the primary flare. The open utility flare was installed in 1990. The enclosed flare was installed in 2003, at which time the open utility flare became a backup flare. Neither the enclosed flare nor the open flare is equipped with a bypass in which landfill gas can bypass the control device in an uncombusted manner.

This facility is subject to 40 CFR 60, Subpart WWW (Standards of Performance for Municipal Solid Waste Landfills), and Subpart A (General Provisions); 40 CFR 61 Subpart M (National Emission Standards for Asbestos); 40 CFR 63, Subpart AAAA (National Emission Standards for Hazardous Air Pollutants for Municipal Solid Waste Landfills), and Subpart A (General Provisions).

The property boundary of the Medley Landfill and the proposed LFGTE facility location is shown in Figure 2-2. A plot plan of the LFGTE plant is shown in Figure 2-3. Five of the CAT 3520s will be located in an enclosed building, and the exhaust from each engine will be routed to the atmosphere via five individual vertical exhaust stacks, each equipped with silencers. The sixth engine will be located outside the building with stack dimensions same as the other engines. Figure 2-3 also shows the new location of the existing flares.

The site elevation is nominally 3 feet (ft) with respect to mean sea level (MSL). The terrain surrounding the site is flat.

2.1.2 Overall Process Flow

An overall process flow diagram of the proposed LFGTE facility is shown in Figure 2-4. LFG collected at the landfill will be combusted in the proposed CAT engines and the remaining LFG will be routed to the flares. If one or more of the CAT engines are unavailable, the excess LFG not combusted in the CAT engines will be combusted in the flares. The LFG will be filtered, compressed, and treated to remove the moisture prior to combustion in the CAT engines.

2.1.3 CAT 3520C Engines

The CAT 3520 internal combustion engine is a lean-burn water-cooled engine with a design power generation rating of 2,233 brake horsepower (bhp). Each engine will be connected to an electric power generator with a maximum rating of 1.6 MW. Based on the technical data sheet for the CAT 3520 engine (presented in Appendix B), the maximum fuel consumption rating of each engine is 6,509 Btu/bhp-hr. Waste Management has been operating CAT 3520 engines at other landfills that it operates. Based on WMIF data, each engine will use 588 scfm of LFG. Based on a LFG heating value of 500 Btu/scf, the maximum heat input rating for each engine is 17.64 million British thermal units per hour (MMBtu/hr).

Exhaust gases from each engine will be exhausted through a 33-foot (ft) high stack. The exhaust parameters and other design parameters for the engine are presented in Appendix B.

2.1.4 Enclosed Flare (EU 005)

The Medley landfill currently has a 6,000-scfm enclosed flare (Model No. EF1355UI16, manufactured by LFG Specialties) which is used as the primary flare. The flare is rated at an overall 99-percent destruction efficiency for hydrocarbons and a 98-percent destruction efficiency for NMOC. This flare will be relocated adjacent to the LFGTE plant. The enclosed flare has a 12.5-ft diameter stack at a height of 55 ft above the ground. The flare is subject to a minimum temperature requirement of 1,400 degrees Fahrenheit (°F).

2.1.5 Open Flare (EU 001)

The Medley Landfill has a 3,000-scfm candle type open flare (Model No. CF1432I12, manufactured by LFG Specialties), which is used primarily as a backup flare. This flare will also be relocated adjacent to the LFGTE plant. The open flare has a 2-ft diameter stack at a height of 58 ft above ground. The flare is subject to a minimum exit velocity requirement of 18.3 meters per second.

2.2 Air Emissions

Based on WMIF's experience operating similar equipment at various other facilities and the best available control technology analysis, the maximum criteria pollutant emission rates from each CAT 3520 engine will be as follows:

- CO – 3.50 grams per brake horse power-hour (g/bhp-hr) or 17.2 pounds per hour (lb/hr)
- NO_x – 0.60 g/bhp-hr or 2.95 lb/hr
- $PM_{10}/PM_{2.5}$ – 0.000048 lb per standard cubic feet of methane (lb/scf CH_4), which is equivalent to 0.85 lb/hr or 0.173 g/bhp-hr
- SO_2 – 4.86 lb/hr, which is based on 588 scfm of LFG flow and LFG sulfur content of 830 ppmv
- VOC – 0.80 lb/hr (0.163 g/bhp-hr), which is based on 100 percent of NMOC emissions and NMOC concentration of 20 ppmvd as hexane at 3-percent O_2 in the exhaust gas.

Maximum estimated criteria pollutant emissions rates from the 6,000-scfm enclosed flare are as follows:

- CO – 0.20 pound per million British thermal units (lb/MMBtu) or 36.0 lb/hr
- NO_x – 0.06 lb/MMBtu or 10.8 lb/hr
- $PM_{10}/PM_{2.5}$ – 0.000017 lb/scf CH_4, which is equivalent to 3.06 lb/hr or 0.019 lb/MMBtu.
- SO_2 – 49.6 lb/hr, which is based on 6,000 scfm of LFG flow and LFG sulfur content of 830 ppmv
- VOC – 8.38 lb/hr, which is based on 100 percent of NMOC emissions and NMOC concentration of 20 ppmvd, as hexane, @ 3 percent O_2, in the exhaust gas.

Maximum estimated criteria pollutant emissions rates from the 3,000-scfm open flare are as follows:

- CO – 0.37 lb/MMBtu or 33.3 lb/hr
- NO_x – 0.068 lb/MMBtu or 6.12 lb/hr
- $PM_{10}/PM_{2.5}$ – 0.000017 lb/scf CH_4, which is equivalent to 1.53 lb/hr or 0.019 lb/MMBtu
- SO_2 – 24.8 lb/hr, which is based on 3,000 scfm of LFG flow and LFG sulfur content of 830 ppmv

- VOC – 0.48 lb/hr (0.0059 lb/MMBtu), which is based on NMOC concentration of 595 ppmvd, as hexane, in the LFG, and 98 percent destruction.

Hourly and annual potential emission rates for each CAT 3520 engine are presented in Table 2-1. Potential CO and NO_x emissions were estimated using emission factors that have been developed by Waste Management, based on operating similar units at other Waste Management sites. Potential PM_{10} and $PM_{2.5}$ emissions were estimated using emission factors published in AP-42, Chapter 2.4. VOC emissions were estimated based on the assumption that 100 percent of the NMOC emissions are VOCs. The calculation of potential NMOC emissions was based on compliance with the emission limit specified in NSPS Subpart WWW. Specifically, the subpart states the following in 60.752(b)(2)(iii):

> *(iii) Route all the collected gas to a control system that complies with the requirements in either paragraph (b)(2)(iii) (A), (B) or (C) of this section.*
>
> *(B) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency or parts per million by volume shall be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in §60.754(d).*

Based on these requirements, the NMOC mass emissions were calculated using the NMOC concentration of 20 ppmvd as hexane at 3-percent O_2 in the exhaust gases.

Potential SO_2 emissions were estimated based on a maximum H_2S content of the LFG of 830 ppmv and the assumption that all the H_2S is converted to SO_2 during combustion of the LFG.

Tables 2-2 and 2-3 present potential hourly criteria pollutant and NMOC emissions rates for the 6,000-scfm enclosed flare and 3,000-scfm open flare, respectively. For the flares, emissions rates are also presented on the basis of pounds per standard cubic foot (lb/scf) of LFG. CO and NO_x emissions were estimated using vendor supplied flare specifications. Potential PM_{10} and $PM_{2.5}$ emissions were estimated using emission factors published in AP-42, Chapter 2.4. VOC emissions were estimated based on an assumption that 100 percent of the NMOC emissions are VOCs. NMOC emissions for the open flare was estimated based on an NMOC concentration of 595 ppmvd as hexane in the LFG, based on Chapter 2.4 in AP-42, and assuming 98-percent destruction efficiency at the flare. Potential NMOC emission for the enclosed flare was estimated based on NMOC concentration of 20 ppmvd as hexane (at 3 percent O_2) in the exhaust air. The exhaust flow rate of the enclosed flare used in the calculation is based on stack test results for the period 2006 to 2010 (see Table C-3 in Appendix C).

Potential SO_2 emissions were estimated based on the maximum H_2S content of 830 ppmv and the assumption that all the H_2S is converted to SO_2 during combustion of the landfill gas.

Potential HAP emissions for the CAT 3520 engines and the flares were estimated based on emission factors published in Chapter 2.4 of AP-42, and are presented in Tables 2-4 and 2-5 for one CAT 3520 engine and the 6,000-scfm flare, respectively. Since the HAP emissions for the 3,000-scfm flare are the same as the 6,000-scfm flare on a lb/scf basis, a separate table was not generated for the 3,000-scfm flare.

The following operating scenarios have been considered when calculating the potential emissions from the proposed facility:

- All six CAT 3520s are operating with 3,528 scfm total LFG flow, and the primary flare (EU 005) is operating at 3,789 scfm; backup flare (EU 001) is not operating
- All six CAT 3520s are operating with 3,528 scfm total LFG flow; the primary flare (EU 005) is operating at 789 scfm; and the backup flare (EU 001) is operating at full capacity at 3,000 scfm
- The six CAT 3520s are shut down; the primary flare (EU 005) is operating at full capacity at 6,000 scfm; and the backup flare (EU 001) is operating at 1,317 scfm
- The six CAT 3520s are shut down; the primary flare (EU 005) is operating at 4,317 scfm; and the backup flare (EU 001) is operating at full capacity at 3,000 scfm

Table 2-6 presents the maximum potential emissions from the proposed facility. As shown in Table 2-6, the worst-case emissions scenario for CO, NO_X, $PM/PM_{10}/PM_{2.5}$, and SO_2 is when all six CAT 3520 engines are operating and both flares are operating, with the backup flare (EU 001) at full capacity (Scenario 2). The worst-case scenario for VOC/NMOC emissions is when all six CAT engines are operating and the enclosed flare is operating (Scenario 1).

3.0 AIR QUALITY REVIEW REQUIREMENTS

Federal and state air regulatory requirements for a major new or modified source of air pollution are discussed in Sections 3.1 through 3.5. The applicability of these regulations to the proposed Medley LFGTE Facility is presented in Section 3.6. These regulations must be satisfied before the proposed project can be approved.

3.1 National and State Ambient Air Quality Standards

The existing applicable national and Florida Ambient Air Quality Standards (AAQS) are presented in Table 3-1. Primary national AAQS were promulgated to protect the public health, and secondary national AAQS were promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Areas of the country in violation of AAQS are designated as nonattainment areas and new sources to be located in or near these areas may be subject to more stringent air permitting requirements.

Florida has adopted state AAQS in Rule 62-204.240, F.A.C. These standards are the same as the national AAQS, except in the case of SO_2. For SO_2, Florida has adopted the former 24-hour secondary standard of 260 micrograms per cubic meter ($\mu g/m^3$) and the former annual average secondary standard of 60 $\mu g/m^3$. In addition, Florida has not yet adopted the revised AAQS for O_3 or Pb. The EPA also recently promulgated a 1-hour NO_2 AAQS, which Florida has not yet adopted. The national AAQS for 1-hour average NO_2 concentrations is 100 parts per billion (ppb), equivalent to 188 $\mu g/m^3$. Finally, on June 2, 2010, EPA finalized the 1-hour average SO_2 standard, which is 75 ppb or 196 $\mu g/m^3$.

3.2 PSD Requirements

3.2.1 General Requirements

Under federal and state of Florida PSD review requirements, all new major sources (facilities) and all major modifications to existing major sources (facilities) of air pollutants regulated under the Clean Air Act (CAA) must be reviewed and a pre-construction permit issued. Florida's State Implementation Plan (SIP), which contains PSD regulations, has been approved by the EPA; therefore, PSD approval authority has been granted to FDEP.

A "major facility" is defined as any one of 28 named source categories that have the potential to emit 100 tons per year (TPY) or more, or any other stationary facility that has the potential to emit 250 TPY or more, of any pollutant regulated under the CAA. Potential to emit means the capability, at maximum design capacity, to emit a pollutant after the application of control equipment. Once a new source is determined to be a "major facility" for a particular pollutant, any pollutant emitted in amounts greater than the PSD significant emission rate is subject to PSD review. For an existing major source for which a modification is proposed, the modification is subject to PSD review if the net increase in emissions due to the modification is greater than the PSD significant emission rate for any pollutant (i.e., a major modification). The PSD significant emission rates are shown in Table 3-2.

The PSD regulations limit the amount of allowable air quality concentration increase over a specified "baseline" concentration for SO_2, PM_{10}, and NO_2. The magnitude of the allowable increment depends on the classification of the area in which a new source (or modification) will be located or have an impact. Three classifications are designated based on criteria established in the CAA Amendments. Congress promulgated areas as Class I (international parks, national wilderness areas, and memorial parks larger than 5,000 acres and national parks larger than 6,000 acres) or as Class II (all areas not designated as Class I). No Class III areas, which would be allowed greater deterioration than Class II areas, were designated. EPA's class designation and allowable PSD increments are presented in Table 3-1. The state of Florida has adopted EPA's class designations and allowable PSD increments for SO_2, PM_{10}, and NO_2.

PSD review is used to determine whether significant air quality deterioration will result from the new or modified facility. Federal PSD requirements are contained in 40 CFR 52.21, Prevention of Significant Deterioration of Air Quality. The state of Florida has adopted its own PSD regulations (Rule 62-212.400, F.A.C.), consistent with the federal PSD regulations. Major new facilities and major modifications are required to undergo the following analysis related to PSD for each pollutant emitted in significant amounts:

1. Control technology review
2. Source impact analysis
3. Air quality analysis (monitoring)
4. Source information
5. Additional impact analyses

In addition to these analyses, a new facility must also be reviewed with respect to Good Engineering Practice (GEP) stack height regulations. Discussions concerning each of these requirements are presented in the following subsections.

3.2.2 Control Technology Review

The control technology review requirements of the federal and state PSD regulations require that all applicable federal and state emission-limiting standards be met, and that BACT be applied to control emissions from the source. The BACT requirements are applicable to all regulated pollutants for which the increase in emissions from the facility exceeds the respective significant emission rate (see Table 3-2).

BACT is defined in 40 CFR 52.21 (b)(12) as:

> An emissions limitation (including a visible emission standard) based on the maximum degree of reduction of each pollutant subject to regulation under the Act which would be emitted by any proposed major stationary source or major modification which the

> Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts, and other costs, determination is achievable through application of production processes and available methods, systems, and techniques) for control of such pollutant. In no event shall application of best available control technology (BACT) result in emissions of any pollutant, which would exceed the emissions allowed by any applicable standard under 40 CFR Parts 60 and 61. If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular part of a source or facility would make the imposition of an emission standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of BACT. Such standard shall, to the degree possible, set forth the emissions reductions achievable by implementation of such design, equipment, work practice, or operation and shall provide for compliance by means, which achieve equivalent results.

BACT is defined in Rule 62-210.200(40), F.A.C., as:

(a) An emission limitation, including a visible emissions standard, based on the maximum degree of reduction of each pollutant emitted which the Department, on a case-by-case basis, 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
3. The emission limiting standards or BACT determinations of Florida and any other state 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.

(b) If the Department determines that technological or economic limitations on the application of measurement methodology to a particular part of an emissions unit or facility would make the imposition of an emission standard infeasible, a design, equipment, work practice, operational standard or combination thereof, may be prescribed instead to satisfy the requirement for the application of BACT. Such standard shall, to the degree possible, set forth the emissions reductions achievable by implementation of such design, equipment, work practice or operation.

(c) Each BACT determination shall include applicable test methods or shall provide for determining compliance with the standard(s) by means which achieve equivalent results.

(d) In no event shall application of BACT result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR Parts 60, 61, and 63.

BACT was promulgated within the framework of the PSD requirements in the 1977 amendments of the CAA [Public Law 95-95; Part C, Section 165(a)(4)]. The primary purpose of BACT is to optimize consumption of PSD air quality increments and thereby enlarge the potential for future economic growth without significantly degrading air quality (EPA, 1978; 1980). Guidelines for the evaluation of BACT can be found in EPA's *Guidelines for Determining Best Available Control Technology (BACT)* (EPA, 1978), in the PSD *Workshop Manual-Draft* (EPA, 1980), and in the *New Source Review Workshop Manual-Draft*

(EPA, 1990). These guidelines were promulgated by the EPA to provide a consistent approach to BACT and to ensure that the impacts of alternative emission control systems are measured by the same set of parameters. In addition, through implementation of these guidelines, BACT analyses must be conducted on a case-by-case basis, and BACT in one area may differ than BACT in another area. According to the EPA (1980), "BACT analyses for the same types of emissions unit and the same pollutants in different locations or situations may determine that different control strategies should be applied to the different sites, depending on site-specific factors. Therefore, BACT analyses must be conducted on a case-by-case basis."

BACT requirements are intended to ensure that the control systems incorporated in the design of a facility reflect the latest in control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the proposed facility. BACT cannot be less stringent than any applicable NSPS for a source. An evaluation of the air pollution control techniques and systems is required, including a cost-benefit analysis of alternative control technologies capable of achieving a higher degree of emission reduction than the proposed control technology. The cost-benefit analysis requires the documentation of the material, energy, and economic penalties associated with the proposed and alternative control systems, as well as the environmental benefits derived from these systems. A decision on BACT is to be based on sound judgment, balancing environmental benefits with energy, economic, and other impacts (EPA, 1978).

The EPA has issued a draft guidance document on the top-down approach entitled, *Top-Down Best Available Control Technology Guidance Document* (EPA, 1990). EPA's BACT guidelines include a "top-down" approach to determine the "best available control technology" for application at a particular facility. These guidelines discuss the BACT as a "case-by-case" analysis to identify the most stringent emission control technologies that have been applied to the same or similar source categories, and then to select a BACT emission rate, taking into account technical feasibility and energy, environmental, and economic impacts specific to the project. The most effective control alternative not rejected from the analysis is proposed as BACT.

EPA's BACT guidelines establish a specific five-step analytical process for conducting a BACT determination. The five steps consist of:

1. Identifying the potentially applicable control technologies for the proposed process or source
2. Evaluating the technical options for feasibility taking into consideration source-specific factors
3. Comparing the remaining control technologies based on effectiveness
4. Evaluating the remaining options taking into consideration energy, environmental and economic impacts
5. Selecting BACT based on the above analyses

3.2.3 Source Impact Analysis

A source impact analysis must be performed for a proposed major source or major modification subject to PSD review, and for each pollutant for which the increase in emissions exceeds the PSD significant emission rate (Table 3-2). PSD regulations specifically provide for the use of atmospheric dispersion models in performing impact analyses, estimating baselines and future air quality levels, and determining compliance with AAQS and allowable PSD increments. Models designated by the EPA must normally be used in performing the impact analysis. Specific applications for other than EPA-approved models require EPA's consultation and prior approval. Guidance for the use and application of dispersion models is presented in EPA's publication Guideline on Air Quality Models [Appendix W to 40 CFR 51, Federal Register (FR) dated November 9, 2005].

To address compliance with AAQS and PSD Class II increments, a source impact analysis must be performed for the criteria pollutants. However, this analysis is not required for a specific pollutant if the net increase in impacts as a result of the new source or modification is below significant impact levels, as presented in Table 3-1. The significant impact levels are threshold levels that are used to determine the level of air impact analyses needed for the project. If the new or modified source's impacts are predicted to be less than significant, then the source's impacts will not have a significant adverse affect on air quality, and additional modeling with other sources is not required. However, if the source's impacts are predicted to be greater than the significant impact levels, additional modeling with other sources is required to demonstrate compliance with AAQS and PSD increments.

For $PM_{2.5}$, EPA has proposed that one of three options could be significant impact levels (SILs) for the 24-hour and annual average, but does not presume that the levels are appropriate and recognizes that states could adopt different interim levels with appropriate records. Because SILs for the 1-hour NO_2 and SO_2 concentrations have not been either promulgated or proposed yet, states can provide interim levels until EPA promulgates the SILs for these pollutants. The presumed SILs for this project are discussed in Section 6.2.

The EPA has proposed significant impact levels for Class I areas as follows:

SO_2	3-hour	1 µg/m^3
	24-hour	0.2 µg/m^3
	Annual	0.1 µg/m^3
PM_{10}	24-hour	0.3 µg/m^3
	Annual	0.2 µg/m^3
NO_2	Annual	0.1 µg/m^3

Although these levels have not been officially promulgated as part of the PSD review process and may not be binding for states in performing PSD reviews, the proposed levels serve as a guideline in assessing a source's impact in a Class I area. EPA's action to incorporate Class I significant impact levels in the PSD process is part of implementing the NSR provisions of the 1990 CAA Amendments. Because the process of developing the regulations will be lengthy, the EPA believes that the proposed rules concerning the significant impact levels are appropriate to assist states in implementing the PSD permitting process. FDEP has accepted the use of these significant impact levels. Source impact analyses for PSD Class I areas are performed if the source is within 200 km of the Class I Area.

Various lengths of record for meteorological data can be used for impact analysis. A 5-year period is normally used when evaluating predicted concentrations for comparison to AAQS or PSD increments. The meteorological data are selected based on an evaluation of measured weather data from a nearby weather station that represents weather conditions at the project site. The criteria used in this evaluation include determining the distance of the project site to the weather station, comparing topographical and land use features between the locations, and determining availability of necessary weather parameters.

The term "baseline concentration" evolves from federal and state PSD regulations and refers to a concentration level corresponding to a specified baseline date and certain additional baseline sources.

By definition, in the PSD regulations as amended August 7, 1980, baseline concentration means the ambient concentration level that exists in the baseline area at the time of the applicable baseline date. A baseline concentration is determined for each pollutant for which a baseline date is established and includes:

1. The actual emissions representative of facilities in existence on the applicable date
2. The allowable emissions of major stationary facilities that commenced before January 6, 1975, for SO_2 and PM_{10} concentrations, or February 8, 1988, for NO_2 concentrations, but that were not in operation by the applicable baseline date

The following emissions are not included in the baseline concentration and therefore affect PSD increment consumption:

1. Actual emissions from any major stationary facility on which construction commenced after January 6, 1975, for SO_2 and PM_{10} concentrations, and after February 8, 1988, for NO_2 concentrations
2. Actual emission increases and decreases at any stationary facility occurring after the baseline date

In reference to the baseline concentration, the term "baseline date" actually includes three different dates:

1. The major facility baseline date, which is January 6, 1975, in the cases of SO_2 and PM_{10}, and February 8, 1988, in the case of NO_2
2. The minor facility baseline date, which is the earliest date after the trigger date on which a major stationary facility or major modification subject to PSD regulations submits a complete PSD application

3. The trigger date, which is August 7, 1977, for SO_2 and PM_{10}, and February 8, 1988, for NO_2

The minor source baseline date for SO_2 and PM [total suspended particulates (TSP)] has been set as December 27, 1977, for the entire state of Florida [Rules 62-204.200(22) and 204.360, F.A.C.]. The minor source baseline for NO_2 has been set as March 28, 1988 [Rules 62-204.200(22) and 204.360, F.A.C.]. It should be noted that references to PM (TSP) are also applicable to PM_{10}.

3.2.4 Air Quality Monitoring Requirements

In accordance with requirements of 40 CFR 52.21(m) and Rule 62-212.400(5)(f), any application for a PSD permit must contain an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility or major modification. For a new major facility, the affected pollutants are those that the facility would potentially emit in significant amounts. For a major modification, the pollutants are those for which the net emissions increase exceeds the significant emission rate (see Table 3-2).

Ambient air monitoring for a period of up to 1 year is generally appropriate to satisfy the PSD monitoring requirements. A minimum of 4 months of data is required. Existing data from the vicinity of the proposed source may be used if the data meet certain quality assurance requirements; otherwise, additional data may need to be gathered. Guidance in designing a PSD monitoring network is provided in EPA's *Ambient Monitoring Guidelines for Prevention of Significant Deterioration* (EPA, 1987a).

The regulations include an exemption that excludes or limits the pollutants for which an air quality analysis must be conducted. This exemption states that FDEP may exempt a proposed major stationary facility or major modification from the monitoring requirements, with respect to a particular pollutant, if the emissions increase of the pollutant from the facility or modification would cause, in any area, air quality impacts less than the *de minimis* levels presented in Table 3-2. If a facility's predicted impacts are less than the *de minimis* levels, preconstruction monitoring will not be required pursuant to Rule 62-212.400(3)(e), F.A.C.

For $PM_{2.5}$, EPA has proposed that one of three options could be used to establish the *de minimis* levels for the 24-hour average. These options are 2.3 $\mu g/m^3$, 8.0 $\mu g/m^3$, and 10 $\mu g/m^3$. The presumed *de minimis* level for this project is discussed in Section 4.0.

EPA has not yet proposed *de minimis* levels for the 1-hour averaging period for SO_2 or NO_2.

3.2.5 Source Information/GEP Stack Height

Source information must be provided to adequately describe the proposed project. The general type of information required for this project is presented in Section 2.0.

The 1977 CAA Amendments require that the degree of emission limitation required for control of any pollutant not be affected by a stack height that exceeds GEP or any other dispersion technique. On

July 8, 1985, the EPA promulgated final stack height regulations (EPA, 1985a). FDEP has adopted identical regulations (Rule 62-210.550, F.A.C.). GEP stack height is defined as the highest of:

1. 65 meters
2. A height established by applying the formula:

   Hg = H + 1.5L

   where: Hg = GEP stack height

   H = Height of the structure or nearby structure

   L = Lesser dimension (height or projected width) of nearby structure(s)
3. A height demonstrated by a fluid model or field study

"Nearby" is defined as a distance up to five times the lesser of the height or width dimensions of a structure or terrain feature, but not greater than 0.8 km. Although GEP stack height regulations require that the stack height used in modeling for determining compliance with AAQS and PSD increments not exceed the GEP stack height, the actual stack height may be greater.

The stack height regulations also allow increased GEP stack height beyond that resulting from the above formula in cases where plume impaction occurs. Plume impaction is defined as concentrations measured or predicted to occur when the plume interacts with elevated terrain. Elevated terrain is defined as terrain that exceeds the height calculated by the GEP stack height formula.

3.2.6 Additional Impact Analysis

The PSD and state of Florida regulations require additional impact analyses to analyze the impacts of the project emissions on soils, vegetation, and visibility [40 CFR 52.21(o) and Rule 62-212.400(8), F.A.C.]. The analysis of impacts due to associated growth in the area must also be addressed. To address such impacts, soil and vegetation types in the vicinity of the plant must be identified. Air pollution impact threshold levels for the soil and vegetation types in the area are identified and an assessment of air emissions impacts upon these values are prepared. Growth effects are addressed qualitatively, including impacts due to secondary emissions due to the project.

The analyses are conducted according to recommended procedures, such as those in the document entitled *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils and Animals* (EPA 1980), and other appropriate literature.

3.3 Air Quality Related Values

An air quality related values (AQRVs) analysis is required to assess the potential risk to AQRVs in PSD Class I areas. The Everglades National Park (ENP) is the closest Class I area to the proposed project, and is located about 19 km (12 miles) southwest of the Medley Landfill. There are no other Class I areas located within 200 km of the project site.

The U.S. Department of the Interior in 1978 administratively defined AQRVs to be:

> *All those values possessed by an area except those that are not affected by changes in air quality and include all those assets of an area whose vitality, significance, or integrity is dependent in some way upon the air environment. These values include visibility and those scenic, cultural, biological, and recreational resources of an area that are affected by air quality.*
>
> *Important attributes of an area are those values or assets that make an area significant as a national monument, preserve, or primitive area. They are the assets that are to be preserved if the area is to achieve the purposes for which it was set aside (Federal Register, 1978).*

AQRVs include visibility, freshwater and coastal wetlands, dominant plant communities, unique and rare plant communities, soils and associated periphyton, and the wildlife dependent on these communities for habitat. Rare, endemic, threatened, and endangered species of the national park and bioindicators of air pollution (e.g., lichens) must also be evaluated.

3.4 Nonattainment Rules

Based on the current nonattainment provisions (Rule 62-212.500, F.A.C.), all major new facilities and modifications to existing major facilities located in a nonattainment area must undergo nonattainment review. The proposed project will be located in Miami-Dade County, which is classified as an attainment or maintenance area for all criteria pollutants (Rule 62-204.340, F.A.C.).

3.5 Emission Standards

3.5.1 New Source Performance Standards

The NSPS are a set of national emission standards that apply to specific categories of new sources. As stated in the CAA Amendments of 1977, these standards "shall reflect the degree of emission limitation and the percentage reduction achievable through application of the best technological system of continuous emission reduction the Administrator determines has been adequately demonstrated." The NSPS are contained in 40 CFR 60. The proposed project is potentially subject to the NSPS described below.

Subpart WWW

The Medley Landfill is currently subject to 40 CFR 60 Subpart WWW – Standards of Performance for Municipal Solid Waste Landfills. After the proposed LFGTE is built, the Medley Landfill will continue to be subject to the requirements of Subpart WWW.

Subpart JJJJ

The CAT 3520 engines proposed for the project will be subject to NSPS, 40 CFR 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary spark ignition (SI) internal combustion engines (ICE) as specified in paragraphs (a)(1) through (5) of 40 CFR 60.4230. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator. Paragraph (a)(3) and (a)(4) state the following are subject to Subpart JJJJ:

> (3) Manufacturers of stationary SI ICE with a maximum engine power greater than 19 kW (25 HP) that are not gasoline fueled and are not rich burn engines fueled by LPG, where the manufacturer participates in the voluntary manufacturer certification program described in this subpart and where the date of manufacture is:
>
> (i) On or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 HP (except lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP);
>
> (ii) On or after January 1, 2008, for lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP;
>
> (iii) On or after July 1, 2008, for engines with a maximum engine power less than 500 HP; or
>
> (iv) On or after January 1, 2009, for emergency engines.
>
> (4) Owners and operators of stationary SI ICE that commence construction after June 12, 2006, where the stationary SI ICE are manufactured:
>
> (i) On or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 HP (except lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP);
>
> (ii) on or after January 1, 2008, for lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP;
>
> (iii) on or after July 1, 2008, for engines with a maximum engine power less than 500 HP; or
>
> (iv) on or after January 1, 2009, for emergency engines with a maximum engine power greater than 19 KW (25 HP).

Under Subpart JJJJ, subject engines must meet emission standards for NO_x, CO, and VOC. The specific emission limit is based on the size of the engine, fuel type, and whether it is a non-emergency or emergency engine. Compliance is demonstrated by either receiving a certification made by the manufacturer, or by routine compliance testing.

3.5.2 National Emission Standards for Hazardous Air Pollutants

EPA has issued National Emission Standards for Hazardous Air Pollutants (NESHAPs) for various source categories under 40 CFR 63. These standards are referred to as MACT standards because they require that MACT be applied to control the emissions of HAPs.

Currently, the Medley Landfill must comply with the following NESHAP regulations, as defined in 40 CFR Parts 61 and 63:

- NESHAP, 40 CFR 63, Subpart AAAA – National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills (Subpart AAAA)
- NESHAP, 40 CFR 61, Subpart M – National Emission Standard for Asbestos (Subpart M)

In addition, the CAT 3520 engines at the Medley Landfill are potentially subject to the requirements of NESHAP, 40 CFR 63, Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (Subpart ZZZZ). Subpart ZZZZ affects engines that are located both at major and area sources of HAPs emissions.

In accordance with 40 CFR 63.6590(c), a new affected engine located at an area source of HAP emissions must comply with 40 CFR 60, Subpart JJJJ, if the engine is a spark ignition engine. As stated in Subpart ZZZZ, no further requirements apply to the affected engines under the subpart.

3.5.3 Clean Air Interstate Rule

The Clean Air Interstate Rule (CAIR) was promulgated under 40 CFR 96 to reduce the emissions of precursor pollutants to O_3 and fine particulate formation, and therefore the interstate transport of O_3 and fine particulates. CAIR applies to electric utility steam generating units. The proposed project's CAT 3520 engines are not steam generating units and therefore will not be subject to CAIR.

3.5.4 Greenhouse Gas Rules

On October 30, 2009, EPA published a final regulation for the Mandatory Reporting of Greenhouse Gases in the Federal Register. The rule was incorporated into the Title 40, Part 98 of the Code of Federal Regulations (40 CFR 98). The Greenhouse Gas (GHG) Monitoring Rule requires annual reporting of GHGs by certain source categories, as well as suppliers of fuel, fossil fuels and industrial GHGs. Mandatory Reporting of GHGs from municipal solid waste landfills are codified in 40 CFR 98, Subpart HH.

On May 13, 2010, EPA released the final GHG Tailoring Rule. EPA is tailoring the applicability criteria that determine which stationary sources and modification projects become subject to permitting requirements for GHG emissions under the PSD and Title V programs of the CAA. This rulemaking is necessary because without it, PSD and Title V requirements would apply, as of January 2, 2011, at the 100 and 250 TPY levels, which are not feasible for GHGs because GHGs are emitted in much higher volumes. EPA wants to phase in the GHG permitting requirements in two steps.

In Step 1, beginning in January 2, 2011, the PSD program will apply to GHG emissions only if the source is subject to the PSD program (as a result of an application to construct or modify the source) due to the emission increase of a pollutant other than GHGs and the project has potential GHG emissions (or net emissions increase, if a modification project) of at least 75,000 TPY CO_2 equivalent (CO_2e). In Step 2, beginning July 1, 2011, in addition to sources described in Step 1, the PSD program will apply to new sources of GHGs with a potential to emit over 100,00 TPY CO_2e.

If subject to PSD for GHGs, BACT analysis will have to be conducted for GHG emissions. EPA has not determined BACT levels nor provided guidance in evaluation what constitutes BACT for CO_2 and other GHG emissions. Similar to other pollutants, BACT will be determined on a case-by-case basis, considering cost and effectiveness of the different control options. EPA is now developing these BACT guidelines. EPA will also begin another rulemaking process next year to address smaller CO_2 sources, but will not require permits for small emitters until at least April 30, 2016.

3.5.5 Florida Rules

There are no specific Florida emissions-limiting standards that apply to LFG-fired engines. FDEP has adopted EPA NSPS and NESHAP by reference in Rule 62-204.800(7). Therefore, the proposed project is required to meet the same emissions, performance testing, monitoring, reporting, and record keeping requirements as those described in Subsections 3.5.1 and 3.5.2. FDEP has the authority for implementing the NSPS and NESHAP requirements in Florida.

3.5.6 Florida Air Permitting Requirements

FDEP regulations require any new source to obtain an air permit prior to construction. Major new sources must meet the appropriate PSD and nonattainment requirements as discussed previously. Required permits and approvals for air pollution sources include NSR for nonattainment areas, PSD, NSPS, NESHAPs, permit to construct, and permit to operate. The requirements for construction permits and approvals are contained in Rules 62-4.030, 62-4.050, 62-4.210, 62-210.300(1), and 62-212.400, F.A.C. Specific emission standards are set forth in Chapter 62-296, F.A.C. Rules 62-296.320(4)(b) and (c) contain the general visible emissions standard and the unconfined particulate matter standard, respectively. The general visible emission standard limits the visible emissions to 20-percent opacity.

3.6 Source Applicability

3.6.1 Area Classification

The existing Medley Landfill is located in Miami-Dade County, which has been designated by the EPA and FDEP as an attainment or maintenance area for all criteria pollutants. Miami-Dade and surrounding counties are designated as PSD Class II areas for SO_2, PM_{10}, and NO_2. The nearest PSD Class I area to the site is the ENP, located about 19 km (12 miles) southwest of the Medley Landfill.

3.6.2 PSD Review

Pollutant Applicability

According to Title V operating permit No. 0250615-011-AV, the Medley Landfill is an existing major source of criteria pollutants. Therefore, the proposed project represents a modification of a major source. A PSD applicability analysis was conducted by comparing the worst-case potential emissions from Table 2-6 with the baseline actual emissions for the facility. The baseline actual emissions are based on the highest two-year average reported emissions for the period 2000 to 2009. The baseline actual emissions were developed based on actual annual operating report (AOR) emissions submitted to FDEP. The baseline emissions are presented in Appendix C, Tables C-1 and C-2.

The increase in emissions due to the proposed project, based on the difference between the facility potential emissions and the facility baseline actual emissions, is compared to the PSD significant emission rates in Table 3-3. As shown, PSD significant emissions rates are exceeded for CO, NO_x, PM_{10}, and $PM_{2.5}$ and therefore, PSD review is required for these pollutants.

Source Impact Analysis

A source impact analysis was performed for PM_{10}, $PM_{2.5}$, NO_x, and CO emissions resulting from the proposed project. This analysis is presented in Section 6.0. Additional impacts upon the PSD Class I area are also addressed and presented in Section 7.0.

Based on the source impact analysis, the increase in pollutant impacts due to the proposed project are predicted to be above the EPA PSD Class II significant impact levels for PM_{10} (annual and 24-hour averages), $PM_{2.5}$ (annual and 24-hour averages), NO_2 (annual and 1-hour averages), and CO (8-hour average). Therefore, additional modeling analysis of the impacts on the PSD Class II areas was performed for these pollutants and averaging times.

Based on the source impact analysis, the pollutant impacts due to the proposed project are predicted to be below the proposed EPA Class I significant impact levels. Therefore, additional modeling analysis of the impacts on the PSD Class I area was not required.

Ambient Monitoring Analysis

Based on the increase in emissions from the proposed project (see Table 3-3), a pre-construction ambient monitoring analysis is required for PM_{10}, $PM_{2.5}$, NO_x, and CO, and monitoring data are required to be submitted as part of the application. However, if the net increase in impacts of a pollutant is less than the applicable *de minimis* monitoring concentration, then an exemption from submittal of pre-construction ambient monitoring data may be obtained [40 CFR 52.21(i)(8)]. In addition, if the EPA has not established an acceptable ambient monitoring method for the pollutant, monitoring is not required.

As shown in Section 4.0, the increase in impacts due to the proposed project are predicted to be less than the PSD *de minimis* concentration levels for NO_2, but greater than the PSD *de minimis* concentration levels for PM_{10} and CO, and greater than the presumed *de minimis* concentration level for $PM_{2.5}$. However, in Section 4.0 WMIF has presented ambient monitoring data for these pollutants and requested waiver from performing preconstruction monitoring for these pollutants.

For O_3, the EPA has established a PSD *de minimis* monitoring level for a project based on an increase in VOC emissions of 100 TPY or more, which would require a pre-construction ambient monitoring analysis. Because the project's increase in VOC emissions are less than 100 TPY, pre-construction ambient monitoring analysis for O_3 (based on VOC emissions) is not required as part of the application.

GEP Stack Height Impact Analysis

The proposed CAT 3520 engines will have a minimum stack height of 33 ft. The maximum stack height will not exceed the *de minimis* GEP stack height of 65 meters (213 ft), and therefore, the project will be in compliance with the GEP stack height rules.

3.6.3 Emission Standards

NSPS Subpart JJJJ

The CAT 3520 engines are rated at 2,233 bhp each. Therefore, the CAT 3520 engines will be subject to NSPS, 40 CFR 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines [40 CFR 60.4230(a)(4)(i)]. The NSPS include emission limits for NO_x, CO, and VOC. Under Subpart JJJJ, the CAT 3520 engines must meet the following emission standards required by 40 CFR 60.4233(e), as defined by Table 1 of the subpart for engines with a maximum engine power of ≥500 hp and manufactured after July 1, 2007.

- NO_x = 3.0 g/bhp-hr or 220 ppmvd at 15-percent O_2
- CO = 5.0 g/bhp-hr or 610 ppmvd at 15 percent O_2
- VOC = 1.0 g/bhp-hr or 80 ppmvd at 15 percent O_2

The owner/operator may choose to meet either the g/bhp-hr limit or the ppmvd limit. For engines manufactured after July 1, 2010, the applicable NO_x standard becomes 2.0 g/bhp-hr or 150 ppmvd at 15-percent O_2.

Compliance is demonstrated by either receiving a certification made by the manufacturer, or by routine compliance testing. Caterpillar has indicated to Waste Management that they cannot certify the CAT 3520 engines when burning landfill gas as fuel. This is due to the variability of landfill gas composition and production. Therefore, to demonstrate compliance with Subpart JJJJ for the engines, WMIF will perform initial performance testing within 180 days of the engine start-up; and will perform subsequent performance testing every 8,760 hours or less of operation, as specified by 40 CFR 60.4243(a)(2)(iii). Testing will be in accordance with 40 CFR 60.4244 of the subpart. WMIF will comply with all applicable reporting and recordkeeping requirements of Subpart JJJJ for the CAT 3520 engines.

NESHAP Subpart ZZZZ

As described in Subsection 3.5.2, the proposed engines are potentially subject to NESHAP, 40 CFR 63, Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. The Medley Landfill is currently not a major source of HAP emissions, nor will it be a major source after the proposed project is completed. As shown in Table 2-6, the total HAP emissions from the Medley Landfill facility, which includes the proposed six CAT 3520 engines and the two existing flares, is well below 25 TPY. Additionally, based on the individual HAP emissions rates for the CAT 3520 engine and flare shown in Tables 2-4 and 2-5, respectively, the maximum hourly HAP emission rate for one CAT 3520 is 0.0066 lb/hr, and for the 6,000-scfm flare is 0.068 lb/hr. Therefore, the maximum individual HAP emissions from the Medley Landfill after the LFGTE facility is built are less than 10 TPY.

As defined by the NESHAP regulations, the facility is therefore classified as an "area source" of HAP emissions (i.e., not a major source of HAP emissions). In accordance with 40 CFR 63.6590(c), a new affected area source must meet the requirements of Subpart ZZZZ by complying with 40 CFR 60, Subpart JJJJ. As described above, Medley Landfill will comply with Subpart JJJJ. As stated in Subpart ZZZZ, no further requirements apply to the CAT 3520 engines under the subpart.

State of Florida Standards

The proposed project at the Medley Landfill is subject to the requirements for construction permits and approvals that are contained in Rules 62-4.030, 62-4.050, 62-4.210, 62-210.300(1), and 62 212.400, F.A.C. The project is subject to the general visible emission and the unconfined particulate matter standards in Rules 62-296.320(4)(b) and (c), respectively.

3.6.4 Other Clean Air Act Requirements

The 1990 CAA Amendments established a federally mandated air operating permitting program. The program requires states to adopt regulations consistent with the CAA and the implementing regulations promulgated by EPA in 40 CFR 70. The program applies to "Title V or Part 70" sources that include major stationary sources of air pollutants. The State of Florida has adopted the requirements of 40 CFR 70 in Chapter 62-213, F.A.C., which specifies that all applicable sources, such as those proposed for this project, have a Part 70 permit to operate. After construction of the proposed project, an application will be submitted to revise the existing Tile V permit of the Medley Landfill.

The 1990 CAA Amendments required both the EPA and the Occupational Safety and Health Administration (OSHA) to issue regulations that would help prevent accidental releases of hazardous chemicals. EPA was required to address the consequences of accidental releases beyond a facility's property while OSHA was required to address the consequences on the facility's property. The EPA met their obligation with the promulgation of 40 CFR 68, Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act Section 112(r)(7), in June 1996. The rule applies to all stationary sources that have a regulated substance present in a process in more than the listed threshold quantity. If the threshold quantity for a regulated substance is exceeded, then the facility would need to develop a risk management plan. The Medley Landfill currently does not have any regulated substance more than threshold quantity and the proposed project will not add any; therefore, the Medley Landfill does not need to develop a risk management plan as specified in the rule. However, the facility is subject to the general duty clause under Section 112(r)(1) of the CAA. The general duty clause directs owners and operators of stationary sources to identify hazards that may result from accidental releases, to design and maintain a safe facility, and to minimize the consequences of releases when they occur. The general duty clause applies to all stationary sources that have any "extremely hazardous substance" that are not limited to the list of regulated substances under Section 112(r) or under OSHA's regulations.

Medley Landfill is currently subject to 40 CFR 98, Subpart HH, Mandatory Reporting of GHGs from Municipal Solid Waste Landfills. The proposed project is currently not affected by the GHG Tayloring Rule, Step 1 of which begins January 2, 2011.

4.0 AMBIENT MONITORING ANALYSIS

In accordance with the requirements of 40 CFR 52.21(m) and Rule 62-212.400(7), F.A.C., an air quality analysis must be conducted for each criteria and non-criteria pollutant for which the modification would result in a significant net emissions increase. Criteria pollutants are those pollutants for which AAQS have been established. Non-criteria pollutants are those pollutants for which AAQS have not been established, but are regulated by federal NSPS. This analysis must be performed by the use of air quality monitoring data. In addition, if EPA has not established an acceptable ambient monitoring method for the pollutant, monitoring is not required.

Based on the potential increase in emissions due to the proposed project (see Table 3-3), pre-construction ambient monitoring analyses for PM_{10}, $PM_{2.5}$, NO_2, and CO may be required as part of the PSD application. However, ambient monitoring analyses are not required if it can be demonstrated that the proposed project's maximum air quality impacts will not exceed the PSD monitoring *de minimis* concentration levels. As presented in Section 6.0 and shown in Table 4-1, maximum impacts due to the project only are predicted to be less than the PSD *de minimis* concentration levels for NO_2, but greater than the PSD *de minimis* concentration levels for PM_{10} and CO, and greater than the presumed *de minimis* concentration level for $PM_{2.5}$.

For PM_{10}, the predicted maximum increase in 24-hour average concentrations due to the project only is 18.9 $\mu g/m^3$, compared to the *de minimis* level of 10 $\mu g/m^3$. For $PM_{2.5}$, the predicted maximum increase in 24-hour average concentrations due to the project only is 18.9 $\mu g/m^3$, compared to the presumed *de minimis* level of 2.3 $\mu g/m^3$, which is the lowest value proposed by EPA. For CO, the predicted maximum increase in 8-hour average concentrations due to the project only is 628 $\mu g/m^3$, compared to the *de minimis* level of 575 $\mu g/m^3$. As a result, a pre-construction ambient monitoring analysis is required for PM_{10}, $PM_{2.5}$, and CO as part of the application. WMIF requests a waiver from performing preconstruction monitoring for these pollutants and requests that the ambient data included as part of this application be used to satisfy the preconstruction monitoring requirement.

For O_3, EPA has established a PSD monitoring *de minimis* level based on an increase in VOC or NO_x emissions of 100 TPY or more, which would require a pre-construction ambient monitoring analysis for O_3. The potential increase of NO_x and VOC emissions due to the proposed project are less than 100 TPY for each. Therefore, exemptions from the preconstruction monitoring requirement for NO_2 and O_3 are requested in accordance with PSD regulations.

The ambient monitoring analysis for PM_{10}, $PM_{2.5}$, and CO is presented in the following sections. Background concentrations for PM_{10}, $PM_{2.5}$, and CO were based on these data to support the air impact analysis in Section 6.0.

4.1 PM_{10}/$PM_{2.5}$ Ambient Monitoring Analysis

Ambient PM_{10} monitoring data from existing monitoring stations are included in this application to satisfy the pre-construction monitoring requirements for PM_{10} and $PM_{2.5}$. Measured ambient PM_{10} and $PM_{2.5}$ data from the nearest monitors are presented in Table 4-2. The nearest monitor to the Medley Landfill site that measures PM_{10} concentrations is located in Miami (AIRS No. 12-086-1016), approximately 15 km east-southeast from the site. The next nearest site is in Hollywood, Broward County, approximately 24 km northeast from the site.

As shown in Table 4-2, the highest, second-highest 24-hour average PM_{10} concentration measured from 2007 through 2009 at the site in Miami-Dade County was 65 $\mu g/m^3$. This concentration is less than the existing 24-hour average PM_{10} AAQS of 150 $\mu g/m^3$.

The nearest monitor to the Medley Landfill site that measures $PM_{2.5}$ concentrations is also located in Miami (AIRS No. 12-086-0033), approximately 9.6 km north from the site. There is a second $PM_{2.5}$ monitoring site in Miami-Dade County (AIRS No. 12-086-1016), located approximately 15 km from the site and coincident with the PM_{10} monitoring site. Table 4-2 shows 98th percentile 24-hour values for $PM_{2.5}$, in $\mu g/m^3$, which is a value that is higher than 98 percent of 24-hour values for the year.

4.2 CO Ambient Monitoring Analysis

Ambient CO monitoring data from existing monitoring stations are included in this application to satisfy the pre-construction monitoring requirements and to support the air quality impact analysis. A summary of existing continuous ambient CO data for monitors located in the vicinity of the Medley Landfill is presented in Table 4-3. Data are presented for the last 3 years of record, 2007 to 2009. There are two CO monitors in Miami-Dade County (AIRS Nos. 12-086-1019 and 12-086-4002), both 14.6 km away from the project site. The next nearest monitor is in Broward County (AIRS Nos. 12-011-3002), located approximately 24 km northeast of the project site.

As shown in Table 4-3, the highest second-highest 1-hour and 8-hour concentrations measured at the Miami-Dade County monitors were 4,463 and 2,517 $\mu g/m^3$, respectively. These concentrations are less than the 1-hour and 8-hour average CO AAQS of 40,000 and 10,000 $\mu g/m^3$, respectively.

5.0 BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS

5.1 Introduction

The 1977 CAA Amendments established requirements for the approval of pre-construction permit applications under the PSD program. As discussed in Subsection 3.2, one of these requirements is that BACT be installed for applicable pollutants. This section presents the proposed BACT for these pollutants. The approach to the BACT analysis is based on the regulatory definitions of BACT, as well as consideration of EPA's current policy guidelines requiring a "top-down" approach. A BACT determination requires a site-specific analysis of the technical, economic, environmental, and energy impacts of the proposed and alternative control technologies (see Rule 62-212.400, F.A.C.).

The "top-down" approach consists of the following five steps, as described in the *New Source Review Workshop Manual-Draft* (EPA, 1990):

1) Identification of all available control technologies
2) Elimination of technically infeasible control options
3) Ranking of the technically feasible control technologies based on their effectiveness
4) Evaluation of the economic, environmental, and energy impacts of the feasible control options
5) Selection of BACT based on consideration of the above factors

The PSD regulations require that new major stationary sources and major modifications to existing major sources undergo a control technology review for each pollutant that may potentially be emitted above significant amounts. In the case of the proposed project, $PM_{10}/PM_{2.5}$, NO_x, and CO emissions require a BACT analysis utilizing the top-down approach. In each case, BACT is an emission limitation that meets the maximum degree of emission reduction after taking into account the proposed project's specific economic, environmental and energy impacts, as well as consideration of the application of the technologies proposed. If it is impractical to impose an emission limit, a work practice standard may be specified.

The following sections provide the required BACT analysis.

5.2 CAT 3520 Engines

5.2.1 Particulate Matter ($PM_{10}/PM_{2.5}$)

Previous BACT Determinations

Very low $PM_{10}/PM_{2.5}$ emissions will result from the combustion of LFG in the CAT 3520 engines. Spark ignition IC engines are generally low emitters of PM. NSPS Subpart JJJJ, which specifies performance standards for spark ignition engines, does not set any PM emission limits for engine manufacturers.

As part of the BACT analysis, a review was performed of previous BACT determinations for $PM/PM_{10}/PM_{2.5}$ emissions from LFG-fired IC engines listed in the RACT/BACT/LAER Clearinghouse (RBLC) on EPA's web page. From this information, BACT determinations issued within the last 10 years (i.e., since 2000) were identified. A summary of these BACT determinations is presented in Table 5-1.

From the review of previous BACT determinations, it is evident that the overwhelming majority of $PM_{10}/PM_{2.5}$ BACT determinations for LFG-fired IC engines are based on no add-on control technology. Those determinations that identify a control technology are based on good combustion practices or pretreatment of the LFG. BACT determinations for $PM_{10}/PM_{2.5}$ have been in the range of 0.049 to 1.52 g/bhp-hr. The most recent determinations in Florida set limits of 0.24 g/bhp-hr. In comparison, the proposed limit for the Medley Landfill is 0.17 g/bhp-hr.

Identification of Potentially Applicable Control Technologies

This section identifies potentially applicable $PM_{10}/PM_{2.5}$ control technologies, based upon the review conducted above, and review of the published literature regarding PM control devices. Since the same technologies are used to control PM_{10} and $PM_{2.5}$ emissions, they will be referred to collectively as "PM" in the remainder of this section.

Proper Maintenance

"Smoke" is defined as the collection of airborne solid and liquid particulates and gases emitted as products of incomplete combustion. In EPA Publication AP-42, Section 3.3, *Gasoline and Diesel Industrial Engines*, EPA identifies two types of smoke that may be emitted from IC engines during stable operations – blue smoke and black smoke, both of which indicate problems with the engine operation. Blue smoke is emitted when lubricating oil leaks into the combustion chamber of the engine and is partially burned. Lubricating oil leaks are the result of normal wear on piston rings and seals. The primary constituent of black smoke is agglomerated carbon particles (soot) formed in regions of the combustion mixtures that are oxygen deficient. Black smoke reflects inefficient combustion. Proper maintenance is the most effective method of preventing blue smoke emissions from all types of IC engines, while proper design minimizes black smoke.

Good Combustion Practices

As discussed above, the primary constituent of black smoke is agglomerated carbon particles formed in regions of the combustion mixtures that are oxygen deficient. Optimization of the combustion chamber designs and operation practices that improve the oxidation process and minimize incomplete combustion is the primary mechanism available for lowering PM emissions. This process is often referred to as "good combustion practices." Good combustion chamber design is inherent to modern IC engines.

Add-On Controls

Add-on controls such as a particulate filter can capture exhaust gas particulates and prevent them from being released into the atmosphere. However, based on a review of EPA's AP-42, Section 2.4, Municipal Solid Waste Landfills, the RBLC database, and other recent permits and permit applications, no available add-on controls for PM were identified for LFG-fired IC engines. LFG has silicone based compounds called siloxanes in the gas stream. Siloxanes are oxidized to silicon dioxide, a sticky substance that is abrasive and can clog add-on controls, making them inoperable in a short period of time. Therefore post-combustion add-on control technologies are considered to be infeasible for LFG-fired IC engines.

Fuel Pre-Treatment

The LFG can be pre-treated (chilled) to remove moisture and condensable impurities and then reheated to ensure that the gas supplied to the engines is above the dew point temperature. Pre-treatment can also be applied to remove PM and siloxanes before the LFG is combusted. However, pre-treatment to remove siloxanes can be extremely expensive. Based on the RBLC database, none of the previous PM BACT determinations are based on siloxane removal systems.

Identification of Technically Feasible Control Alternatives

In this section, the technical feasibility of each potentially applicable control technology is assessed. Those technologies that are found to be technically infeasible will not be considered further in the BACT analysis.

Proper Maintenance

Proper maintenance is the most effective method of preventing blue smoke emissions from all types of IC engines and is considered technically feasible.

Good Combustion Practices

Good combustion practices are effective in minimizing PM emissions and are considered technically feasible. As shown in Table 5-1, good combustion practices along with LFG pretreatment have been determined to be BACT for $PM_{10}/PM_{2.5}$ emissions from LFG-fired IC engines.

Add-On Controls

Add-on controls are not considered to be technically feasible for the LFG-fired IC engines.

Fuel Pre-Treatment

Fuel pre-treatment processes are technically feasible. However, fuel treatment systems to remove siloxanes are very expensive. Therefore, considering low PM emissions from LFG-fired spark ignition IC engines, siloxane removal systems are cost prohibitive. Also, siloxane removal systems typically do not remove all siloxanes, and any small amount left in the gas stream could potentially clog post-combustion control devices. Siloxane removal systems are not considered for the proposed project.

WMIF is proposing to install an LFG pre-treatment system to condition the gas stream (remove condensable impurities) and remove PM larger than 10 microns in size.

Summary

Proper maintenance and good combustion practices are both considered to be technically feasible $PM/PM_{10}/PM_{2.5}$ controls for the CAT 3520 engines. Pre-treatment of LFG to remove condensable impurities and PM is also considered to be technically feasible.

Ranking of Technically Feasible Control Alternatives

Since proper maintenance and good combustion practices are compatible control strategies and can be applied together, these strategies are considered together in combination for the control of $PM_{10}/PM_{2.5}$; thus, a ranking is not required to establish the top technology.

Evaluation of Economic, Environmental, and Energy Impacts of Feasible Technologies

Energy Impacts

Proper maintenance and good combustion practices are not expected to cause any negative energy impacts. These techniques will have a positive energy impact in that engines employing these techniques will operate more efficiently and will burn less fuel or produce greater power output.

Environmental Impacts

Proper maintenance and good combustion practices are not expected to create any negative environmental impacts.

Economic Impacts

Proper maintenance and good combustion practices are standard practices for Waste Management and are not expected to create any adverse economic impacts.

Selection of BACT and Rationale

Based on the preceding analysis, BACT for $PM_{10}/PM_{2.5}$ emissions is LFG pretreatment to remove PM, good combustion practices and proper maintenance. The proposed BACT emission limit is 0.85 lb/hr (equivalent to 0.173 g/bhp-hr). This emission rate is based on the AP-42 PM emission factor (Table 2.4-5) of 48 lb/10^6 dscf of methane. The proposed BACT emission limit is lower than the recent BACT limits for LFG-fired IC engines in Florida. The most recent BACT limit in Florida is 0.24 g/bhp-hr.

NSPS Subpart JJJJ does not specify any emissions standards for PM. Subpart JJJJ specifies emissions standards for NO_x, CO, and VOC, and the proposed engines will be certified by the manufacturer to comply with the emissions standards for these pollutants.

5.2.2 *Nitrogen Oxides*

NO_x emissions from the CAT 3520 engines consist of nitric oxide (NO) and nitrogen dioxide (NO_2). NO_x is formed by the oxidation of nitrogen contained in the fuel (fuel NO_x), and by the combination of elemental nitrogen and oxygen in the high temperature-environment of the combustion zone (thermal NO_x). Essentially all NO_x emissions originate as NO, which subsequently oxidizes in the IC exhaust or in the atmosphere to the more stable NO_2 molecule. Factors affecting the generation of NO_x include flame temperature, residence time, quantity of excess air, and nitrogen content of the fuel.

Previous BACT Determinations

As part of the BACT analysis, a review was performed of previous NO_x BACT determinations for LFG-fired IC engines (Process ID 17.140) listed in the RBLC on EPA's web page. From this information, BACT determinations issued within the last 10 years (i.e., since 2000) were identified. A summary of these BACT determinations is presented in Table 5-2.

From the review of previous BACT determinations, it is evident that almost all NO_x BACT determinations for LFG-fired IC engines have been based on good combustion practice, lean burn design, or air/fuel ratio controller. Previous BACT determinations are in the range of 0.5 to 0.6 g/bhp-hr with majority of determinations at 0.6 g/bhp-hr.

Identification of Potentially Applicable Control Technologies

The BACT analysis was performed based on those available and feasible control technologies that can provide the maximum degree of emission reduction for NO_x emissions. Formation of thermal NO_x depends on the combustion temperature and becomes rapid above 1,400 degrees Celsius (°C) (2,550°F). The important parameters in thermal NO_x formation are combustion temperature, gas residence time, and local stoichiometric ratio of fuel and air. Fuel-bound NO_x is formed by the nitrogen in the fuel that reacts with the combustion air, and therefore depends on the nitrogen content of fuel.

The primary methods to reduce NO_x emissions are through either combustion process controls or through add-on catalytic or non-catalytic reactions.

Combustion Controls

Combustion controls are the primary engineering choice in reducing NO_x concentrations within an IC engine. Combustion controls include technologies designed to limit the formation of NO_x by controlling the combustion temperature and the mixing of air and fuel in the combustion zone. These technologies are generally limited in the amount of reduction possible. NO_x combustion controls for an IC engine include injection timing retard, pre-ignition chamber combustion, controlling air-to-fuel ratio, or de-rating of the engine. The method used depends on the size and purpose for each type engine.

The primary NO_x control for modern IC engines is "lean burning." Lean burn engines use as much as 75 percent more air than theoretically needed for complete combustion into the combustion chambers.

The extremely weak air-fuel mixtures lead to lower combustion temperatures and therefore lower NO_x formation. Lean burn gas engines are almost always turbocharged, resulting in high power and torque not achievable with engines operating at stoichiometric air-to-fuel ratios, due to high combustion temperatures.

The proposed CAT 3520 engines are lean burn engines and will be equipped with an electronic air/fuel ratio controller.

Selective Catalytic Reduction

Post-combustion or add-on NO_x control processes rely on chemical reactions using an add-on control device to reduce the concentration of NO_x after the combustion process is complete. Add-on controls include catalytic and non-catalytic conversion of NO_x, typically to nitrogen. Catalytic processes such as selective catalytic reduction (SCR) and regenerative SCR (RSCR) operate at lower temperatures (600 to 800°F) compared to non-catalytic processes. These technologies can achieve up to 90 percent NO_x removal and are primarily applicable to combustion turbines and boilers burning natural gas.

SCR and RSCR are demonstrated and proven catalytic NO_x removal processes for stationary sources. SCR is a widely used post-combustion NO_x-control technology that has been used on a variety of fuels (e.g., coal, natural gas, residual and distillate oil, and Orimulsion®) and applications (e.g., fossil steam units, combined-cycle units, diesel engines, and simple-cycle gas turbines).

The basic principle of SCR is the reduction of NO_x to nitrogen (N_2) and H_2O by the reaction of NO_x and ammonia (NH_3) within a catalyst bed. The primary reactions occurring in SCR require oxygen. The SCR catalyst typically has a finite life, and some NH_3 slips through without being reacted.

Several different catalysts are available for use at different exhaust gas temperatures. In use the longest and most common are base metal catalysts, which typically contain titanium and vanadium oxides, and which also may contain molybdenum, tungsten, and other elements. Base metal catalysts are useful for application to exhaust gases between 450 °F and 800 °F. For high temperature operation (675°F to over 1100°F), zeolite catalysts may be used. In clean, low temperature (350-550°F) applications, catalysts containing precious metals such as platinum and palladium are useful. The SCR system does not operate during start-up until the unit reaches the required operating temperature.

The mechanical operation of an SCR system is quite simple. It consists of a reactor chamber with a catalyst bed, composed of catalyst modules, and an NH_3 handling and injection system, with the NH_3 injected into the flue gas upstream of the catalyst. There are no moving parts. Other than spent catalyst, the SCR process produces no waste products. In practice, commercial SCR systems have met control targets of over 90 percent NO_x reduction in many cases.

Babcock Power Inc. (BPI) developed a new SCR system targeted for tail-end applications, which can be installed after final PM emission control. This relatively new technology, called regenerative SCR or "RSCR" utilizes beds of ceramic media to raise the temperature of the flue gas to a temperature needed for reaction. The technology is suitable for application to low flue gas temperatures in the 300 to 400°F range.

A common disadvantage for all catalyst systems is the chemical poisoning of the catalyst, also known as "catalyst fouling." LFG has silicone based compounds called siloxanes in the gas stream. Siloxanes are oxidized to silicon dioxide, a sticky substance that is abrasive and can foul or poison the catalyst very quickly. Fouling of the catalyst's surface by siloxane deposits inhibits the reduction of NO_x and hence failure of the process to meet air emission compliance standards. Frequent catalyst replacement is needed to maintain design efficiency, which can be quite expensive. Fouling of SCR catalysts can occur in as little as a day or two to several weeks or months, depending on the concentration of siloxanes in the gas stream and other factors. In the preamble for NSPS Subpart JJJJ, EPA states – "Both landfill and digester gases contain a family of silicon-based gases collectively called siloxanes. Combustion of siloxanes forms compounds that have been known to foul fuel systems, combustion chambers, and post-combustion catalysts."

As a result of this assessment, any catalyst-based control processes such as SCR or RSCR is considered to be technically infeasible for LFG-fired applications.

Based on previous BACT determinations, there are no applications of catalytic or non-catalytic post-combustion controls to LFG-fired IC engines. There currently is no known experience of conventional SCR installations on LFG-fired IC engines. However, SCR has been used for diesel-fired IC engines

Selective Non-Catalytic Reduction

Non-catalytic processes such as selective non-catalytic reduction (SNCR) use NH_3 or urea injection into the high temperature (generally about 1,800°F) combustion zone or flue gas. SNCR is a post-combustion NO_x control technology that reduces NO_x into nitrogen gas and water vapor by reacting the flue gas with a reagent. SNCR is "selective" in that the reagent reacts primarily with NO_x. The chemical reaction for this technology is driven by high temperatures (typically from 1,600 to 2,100°F) normally found in combustion sources. This technology is based on temperature ionizing the NH_3 or urea instead of using a catalyst or non-thermal plasma. The temperature window for SNCR is very important because outside of it, either more NH_3 slips through the system or more NO_x is generated than is being chemically reduced. NH_3 slip has the potential to affect combustor operation as well as ammonium bisulfate formation and subsequent corrosion on the downstream components. SNCR can achieve from 50- to 60-percent NO_x removal (depending on the fuel), and are primarily applicable to boilers that can maintain a relatively constant temperature for the reaction.

The exhaust gas temperature of the CAT 3520 engines is less than 900°F. In order to use the SNCR system, the exhaust gas from the CAT 3520 engines will have to be re-heated to at least 1,600°F. The re–heating energy cost can be significant. Therefore, the SNCR system is considered to be technically infeasible for the CAT 3520 engines. There have been no applications of an SNCR system on an LFG-fired IC engine.

Evaluation of Technically Feasible Control Alternatives

Combustion controls have been applied successfully to LFG-fired IC engines and are the only technically feasible NO_x control option for NO_x emissions from LFG-fired IC engines. The proposed CAT 3520 engines will be equipped with air/fuel ratio controllers. Good combustion practices will be employed to ensure proper operation. Based on previous BACT determinations presented in Table 5-2, all BACT determinations for NO_x emissions from LFG-fired IC engines are based on lean burn design and good combustion practices. All recently issued NSPS and MACT standards for LFG-fired IC engines have been based on lean burn design and good combustion practices.

Ranking of Technically Feasible Control Alternatives

Since combustion control is the only feasible control technology, a ranking of control technologies is not required.

Evaluation of Economic, Environmental, and Energy Impacts of Feasible Technologies

Energy Impacts

Combustion controls are an integral part of the combustion process and are designed to maximize combustion efficiency while maintaining optimal emissions performance. The proposed engines will be equipped with air/fuel ratio controllers. Therefore, combustion controls are not expected to create any negative energy impacts.

Environmental Impacts

Lowering combustion temperature may lead to incomplete combustion and increase CO and VOC emissions, which are generated from incomplete combustion. However, modern engines such as the proposed CAT 3520 engines have electronic air/fuel ratio controls that are designed and operated to achieve the optimum balance between CO and NO_x emissions. No water or solid waste impacts occur with this technology. Therefore, no negative impacts on the environment are expected.

Economic Impacts

Combustion controls are part of the standard design of modern IC engines units and do not create any economic impacts.

Selection of BACT and Rationale

Based on the preceding analysis, WMIF proposes to use combustion controls with air/fuel ratio and lean burn design as the BACT for NO_x emissions. The proposed BACT emission limit is 0.60 g/bhp-hr. Based on previous BACT determinations, most of the NO_x BACT emission limits were also set at 0.60 g/bhp-hr. The most recent BACT limit in Florida is 0.6 g/bhp-hr. Caterpillar rates NO_x emissions from the CAT 3520 engines as 0.50 g/bhp-hr plus or minus 18 percent. The proposed NO_x emission limit is lower that the NSPS Subpart JJJJ limit, which specifies an emission standard of 3.0 g/bhp-hr for the proposed CAT 3520 engines. The proposed engines will be manufacturer-certified to comply with the NSPS Subpart JJJJ emissions standards.

5.2.3 Carbon Monoxide

Previous BACT Determinations

As part of the BACT analysis, a review was performed of previous CO BACT determinations for LFG-fired IC engines listed in the RBLC on EPA's web page. A summary of these determinations is presented in Table 5-3. From the review of previous BACT determinations, it is evident that CO BACT determinations for new LFG-fired IC engines have exclusively been based on good combustion practices. The BACT limits range from 2.5 to 3.0 g/bhp-hr, with the majority being set at 2.75 g/bhp-hr.

Identification of Potentially Applicable Control Technologies

CO emissions are a result of incomplete thermal oxidation of carbon contained within the fuel. Properly designed and operated engines typically emit low levels of CO. High levels of CO emissions could result from poor burner design or sub-optimal firing conditions. Carbon in the fuel which does not experience the required temperature or residence time at the required temperature will form CO or other organic compounds instead of being fully oxidized to CO_2. The important parameters in CO formation are combustion temperature, gas residence time, and local stoichiometric ratio of fuel and air (i.e., mixing of fuel and air).

Combustion Controls

CO emissions are generated from the incomplete combustion of carbon in the fuel. Optimization of the combustion chamber designs and operation practices that improve the oxidation process and minimize incomplete combustion is the primary mechanism available for lowering CO emissions. This process is often referred to as combustion controls. The combustion system design in modern IC engines provides all of the factors required to facilitate complete combustion. These factors include continuous mixing of air and fuel in the proper proportions, extended residence time, and consistent high temperatures in the combustion chamber. As a result, CO emissions from a properly designed engine are inherently low.

The proposed CAT3520 engines are designed for high-combustion efficiency, which will inherently minimize the production of CO. The engines are also equipped with electronic control to automatically adjust the ignition timing and air to fuel ratio to minimize incomplete combustion and maintain a proper balance between CO and NO_x emissions. Good combustion practices will be employed to ensure that the engines operate as designed. This includes maintaining the air/fuel ratio at the specified design point, having the proper air and fuel conditions at the burner, and maintaining the combustion air control system in proper working condition.

Oxidation Catalyst

Catalytic oxidation technology is primarily designed to reduce CO emissions (VOC emissions are also reduced to a lesser extent). Oxidation catalysts operate at elevated temperatures. In the presence of an oxidation catalyst, excess O_2 in the exhaust reacts with CO to form CO_2. No chemical reagent is necessary. The oxidation catalyst is typically a precious metal catalyst. None of the catalyst components is considered toxic.

Oxidation catalysts are susceptible to fine particles suspended in the exhaust gases that can foul and poison the catalyst. Catalyst poisoning reduces catalyst activity and pollutant removal efficiencies. The catalytic oxidation of CO in the combustion gases to CO_2 takes place at temperatures ranging from 500°F to 800°F.

The RSCR system offered by BPI (see description under NO_x analysis) offers the option to house an oxidation catalyst system, which can remove both CO and VOC with specially formulated catalyst. However, as described for a SCR system in the NO_x analysis, siloxanes in LFG will foul the CO oxidation catalyst. Therefore, a CO oxidation catalyst system is considered to be technically infeasible for LFG-fired IC engines. Based on previous BACT determinations, this technology has never been applied to an LFG-fired IC engine.

Evaluation of Technically Feasible Control Alternatives

Combustion controls and good combustion practices are the only technically feasible CO control technologies for the proposed CAT 3520 IC engines. Based on previous BACT determinations presented in Table 5-3, all BACT determinations for CO emissions from LFG-fired IC engines are based on good combustion practices.

Ranking of Technically Feasible Control Alternatives

Since combustion controls and good combustion practices are the only feasible control technologies, a ranking is not required.

Evaluation of Economic, Environmental, and Energy Impacts of Feasible Technologies

Energy Impacts

Combustion controls are an integral part of the combustion process and are designed to maximize combustion efficiency while maintaining optimal emissions performance. Therefore, combustion controls are not expected to create any energy impacts.

Environmental Impacts

Modern engines such as the proposed CAT 3520 engines are designed for high combustion efficiency and maintain an optimum balance between CO and NO_x emissions. Therefore, no negative impacts on the environment are expected. The proposed control technology creates no liquid or solid waste, nor impacts water usage.

Economic Impacts

Combustion controls are part of the standard design of modern CI engines units and do not create any economic impacts.

Selection of BACT and Rationale

Based on the preceding analysis, WMIF proposes to use combustion controls and good combustion practices as BACT for CO emissions. The proposed CO BACT emission limit is 3.5 g/bhp-hr. As shown in Table 5-3, the range of previous BACT emissions limits is 2.5 to 3.0 g/bhp-hr and the most recent BACT limit in Florida is 2.75 g/bhp-hr. This proposed CO emission rate is based Waste Management's experience with operating similar LFG-fired IC engines at other LFGTE facilities nationwide, and considering the south Florida environment, where ambient temperatures are on average higher than other locations in the country. It should be noted that Caterpillar states nominal CO emissions from the CAT 3520 engines as 2.5 g/bhp-hr; however, this is only representative of the first 100 hours of operation. After the first 100 hours, Caterpillar states not-to-exceed CO emissions from the CAT engines as 4.13 g/bhp-hr at 100-percent load.

The proposed BACT limit of 3.5 g/bhp-hr is lower than the NSPS Subpart JJJJ emissions standard of 4.0 g/bhp-hr for the proposed engines. The proposed engines are also subject to NESHAP Subpart ZZZZ, which specifies emissions standards for CO for IC engines. However, as mentioned in Section 3.5.2, if the affected engine complies with Subpart NSPS Subpart JJJJ, no further requirement applies under NESHAP Subpart ZZZZ.

6.0 AIR QUALITY IMPACT ANALYSIS

6.1 General

This section contains a summary of the methodologies and results of the air quality impact assessments performed to determine compliance of the proposed project with the national and Florida AAQS and PSD allowable increments. The ENP is the only PSD Class I area located within 300 km of the proposed project. This section also summarizes the methodologies and results of the air quality assessment performed to determine the proposed project's impact on the concentration levels and AQRVs of the ENP.

6.2 Significant Impact Analysis

6.2.1 General

The general modeling approach for the significant impact analysis followed the EPA and FDEP modeling guidelines for determining compliance with AAQS and allowable PSD increments. For each criteria pollutant subject to PSD review, a significant impact analysis is performed to determine whether the emission sources associated with the project, based on the proposed stack configuration and other modeling inputs, will result in predicted impacts that are in excess of the EPA significant impact levels (SILs) (see Table 3-1).

For the proposed project, the following pollutants are subject to PSD review (see Table 3-3):

- NO_x
- PM_{10}
- $PM_{2.5}$
- CO

Until PSD increments, SILs, and significant monitoring concentrations are finalized and the NSR implementation guideline is finalized, the analyses performed to address the proposed project's maximum $PM_{2.5}$ impacts followed the interim guidance outlined in EPA's March 23, 2010 memorandum entitled *EPA's Modeling Procedures for Demonstrating Compliance with the* $PM_{2.5}$ *AAQS*. When addressing compliance with the $PM_{2.5}$ AAQS, the procedures recommend that the total air quality be based on the highest 5-year average of predicted impacts from modeled sources added to the 3-year average of the 8th-highest measured 24-hour concentration for each year (i.e., 98th percentile) for the 24-hour AAQS and 3-year average of the annual average measured concentration for the annual AAQS. When addressing the project's impacts for comparison to the SILs, the procedures recommend that the project's impacts be based on the highest 5-year average of predicted annual and 24-hour values.

For $PM_{2.5}$, EPA has proposed that one of three options could be the SIL but does not presume that the levels are appropriate and recognizes that states could adopt different interim levels with appropriate records. For the 24-hour average, the proposed EPA SILs are 1.2, 4.0, and 5.0 µg/m^3; for the annual average, the proposed EPA SILs are 0.3, 0.8, and 1.0 µg/m^3. For this analysis, the lowest value from the three options was selected as the presumed SIL for the modeling analysis.

In addition to $PM_{2.5}$, significant impact analyses are also required for NO_2, PM_{10}, and CO. Because a SIL for the 1-hour NO_2 concentration currently does not exist, after discussion with FDEP, an interim SIL of 9.4 µg/m^3 was assumed for this analysis, which is 5 percent of the national ambient air quality standard (NAAQS) of 188 µg/m^3. Similar to the $PM_{2.5}$ modeling approach, when addressing the project's compacts for comparison to the SIL, the project's impacts can be based on the highest 5-year average of the maximum predicted 1-hour daily values. However, when addressing compliance with the 1-hour NO_2 NAAQS, the total air quality can be based on the highest 5-year average of 8th highest daily predicted 1-hour impacts added to the 3-year average of 8th highest daily measured 1-hour concentration for each year.

6.2.2 Site Vicinity

Current FDEP policies stipulate that for the annual average NO_2, PM_{10}, and CO significant impact analyses, the highest predicted annual average and highest short-term (i.e., 24-hours or less) concentrations are to be compared to the applicable SILs. If the maximum predicted impacts due to the project only are equal to or greater than the SIL, two additional cumulative source air modeling analyses are potentially required: the first is for demonstrating compliance with the AAQS, and the second is for demonstrating compliance with the allowable PSD Class II increments.

For $PM_{2.5}$, EPA's interim guidance suggests using the 5-year average of the predicted highest 24-hour concentrations from each year modeled for comparison to the SIL, which for this project is the lowest of the three EPA-proposed SILs. If the maximum impacts due to the project only are equal to or greater than the SIL in the vicinity of the project site, a more detailed cumulative source modeling analysis is required to demonstrate compliance with the NAAQS for $PM_{2.5}$. It should be noted that while EPA has proposed PSD increment levels for $PM_{2.5}$, an increment analysis is currently not required for $PM_{2.5}$.

For the 1-hour NO_2 significant impact analysis, the 5-year average of the predicted highest 1-hour concentrations from each year modeled is used for comparison to the presumed SIL. If the maximum impacts due to the project only are equal to or greater than the presumed SIL in the vicinity of the project site, a more detailed cumulative source modeling analysis is required to demonstrate compliance with the 1-hour AAQS for NO_2. EPA has not yet required that a PSD increment analysis be performed for the 1-hour average NO_2 concentration.

6.2.3 *PSD Class I Areas*

Generally, if a major new facility or major modification is located within 200 km of a PSD Class I area, then a significant impact analysis is performed to evaluate the impacts of the project alone at the PSD Class I area and to determine the need to perform Class I increment analyses.

The ENP is the only PSD Class I area located within 200 km of the Medley Landfill. The nearest boundary of the ENP is approximately 19 km southwest of the Medley Landfill.

If the maximum impacts due to the project only are less than EPA's proposed Class I SIL, the project would be considered to not have a significant impact at the PSD class I areas and assumed to comply with the PSD Class I increments. If the impacts due to the project only are equal to or greater than the PSD Class I SIL, then additional analyses with background sources are required to determine compliance with the allowable PSD Class I increments within the Class I area.

In addition to PSD Class I increment analysis, AQRV analyses of visibility impairment and acid deposition are generally required by the Federal Land Managers (FLM) of PSD Class I areas. Based on the project's annual emissions and distance from the Class I areas, the FLM may determine that modeling for the project would not show any significant additional impacts to the AQRV. However, as the proposed project is only 19 km from the ENP, it is assumed that AQRV analysis will be required for the ENP.

6.3 Cumulative Source Impact Analyses

6.3.1 *AAQS and PSD Class II Analysis*

As previously discussed, if the impacts due to the proposed project only are greater than the SIL on a pollutant-specific basis, then detailed air modeling analyses are required that incorporate the emissions of background sources and a non-modeled background concentration to determine a total concentration that is compared to the AAQS. If allowable PSD increments exist for a particular pollutant and averaging time, a second detailed analysis is required that includes PSD-affecting background sources for comparison to the allowable PSD increments.

As described in Section 6.10, the project's maximum concentrations are predicted to be greater than the respective SIL for the annual and 1-hour average NO_2 impacts, annual and 24-hour average PM_{10} impacts, annual and 24-hour average $PM_{2.5}$ impacts, and 8-hour average CO impact. Therefore, additional, detailed air modeling analyses must be performed for these pollutants and averaging times incorporating background sources that are located within the modeling domain as defined by the extent of the predicted Significant Impact Area plus 50 km.

For determining compliance with the AAQS for $PM_{2.5}$, EPA's interim modeling guidance suggests using the highest 5-year average of the modeled annual and highest 24-hour concentrations based on the 5-year meteorological record. For determining compliance with the 1-hour NO_2 NAAQS, the highest

5-year average of the modeled 8th-highest values (98th percentile) of yearly distribution of the 1-hour daily maximum concentration is used.

6.3.2 PSD Class I Analysis

EPA has proposed PSD Class I SILs for NO_2 for the annual averaging time, and for PM_{10} for the annual and 24-hour averaging times. There is no Class I SIL for $PM_{2.5}$ because PSD increments are only proposed and have not yet been promulgated for $PM_{2.5}$. For NO_2 and PM_{10} where maximum impacts are predicted to exceed the proposed Class I SIL, a cumulative source PSD Class I analysis is required. Since the project's maximum annual average NO_2 and annual and 24-hour PM_{10} impacts were predicted to be less than the PSD Class I SIL, additional cumulative source analyses to determine compliance with the allowable PSD Class I increments were not required. Although EPA has proposed $PM_{2.5}$ SILs, there is no requirement at this time to perform a significant impact analysis for $PM_{2.5}$.

6.4 Model Selection

The selection of one or more air quality models to estimate maximum air quality impacts must be based on the model's ability to simulate impacts in all key areas surrounding a project site. For predicting concentrations at receptors that are located within 50 km of a project site, EPA and FDEP recommend using the American Meteorological Society and EPA Regulatory Model (AERMOD) dispersion model. For this project, the AERMOD model was selected and used for predicting concentrations at locations within 50 km of the proposed project site. For sections of the ENP PSD Class I area that are located within 50 km of the project site, AERMOD was used to predict maximum pollutant impacts at that area.

The AERMOD model calculates hourly concentrations based on hourly meteorological data and is applicable for most applications, since it is recognized as containing the latest scientific algorithms for simulating plume behavior in all types of terrain. AERMOD Version 09292 is the most recent available version on EPA's Internet web site: Support Center for Regulatory Air Models (SCRAM) within the Technology Transfer Network (TTN). A listing of AERMOD features is presented in Table 6-1.

For modeling analyses that will undergo regulatory review, such as PSD permit applications, the following modeling features are recommended by EPA and are incorporated as the regulatory default options in AERMOD:

- Use of elevated terrain algorithms
- Stack-tip downwash
- Missing data processing routines
- 4-hour half-life for exponential decay of SO2 for urban sources
- Calm wind processing routines

EPA regulatory default options were used to address maximum impacts.

For sections of the ENP PSD Class I area that are beyond 50 km from the project site, the CALPUFF model was used to predict maximum pollutant impacts in those sections. In addition, CALPUFF was used to predict the project's potential impact on visibility in the form of regional haze at areas beyond 50 km from the project site and the annual deposition of total nitrogen at all areas of the ENP.

The CALPUFF model (Version 5.8, i.e., current EPA-approved version for regulatory use) is maintained by the EPA on the SCRAM internet website. A listing of CALPUFF model features is presented in Table 6-2. The CALPUFF model is a long-range transport model applicable for estimating the air quality impacts in areas that are more than 50 km from a source. The methods and assumptions used in the CALPUFF model are based on the latest recommendations for modeling analyses as presented in the following reports:

- The Interagency Workgroup on Air Quality Models (IWAQM), Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts (EPA, 1998)
- The Federal Land Manager's Air Quality Relative Values Workgroup (FLAG) Phase I Report (December 2000)
- Revised IMPROVE Algorithm for Estimating Light Extinction from Particle Speciation Data (Interagency Monitoring of Protected Visual Environments, November 2006)

6.5 Primary Land Use at the Medley Site

An analysis was performed to determine the primary land use in the vicinity of the Medley Landfill site. The analysis used the land use classification scheme proposed by Auer (1977) where urban land use is characterized by industrial, commercial, or compact residential properties. The land uses data within a 3-km radius of the Medley Landfill were obtained from the South Florida Water Management District for years 2004 to 2005. Land uses that were identified as either industrial, commercial, or compact residential (i.e. with no individual driveways) were characterized as urban. All other land uses were characterized as rural. The results of this analysis are shown in Figure 6-1. The land uses within a 3-km radius of the project site were determined to consist of 4,745 acres (or 68 percent of the total area) of urban land uses and 2,242 acres (32 percent) of rural land uses. Based on this analysis, AERMOD's urban source mode was considered to be appropriate for modeling the project.

6.6 Meteorological Data

6.6.1 Site Vicinity

Meteorological data used in AERMOD to predict air quality impacts consisted of a concurrent 5-year period of hourly surface weather observations from the National Weather Service (NWS) office located at the Miami International Airport (MIA) and upper air sounding data collected at Florida International University (FIU) in Miami. The 5-year period of the meteorological data is from 2001 through 2005. This meteorological data record is recommended by FDEP for air modeling applications conducted in Miami-Dade County. The weather office at MIA is located approximately 9 km southeast of the project site and represents the closest primary weather station to the project.

In addition to the meteorological parameters incorporated into the modeling analysis, AERMOD incorporates land use parameters for determining boundary layer parameters that are used by AERMOD for the dispersion calculations. AERSURFACE reads electronic land use data developed by the U.S. Geological Survey (USGS) and provides average land use values for albedo, Bowen ratio, and surface roughness within a specified radius. While current air modeling guidance suggests that the land use parameters selected for a modeling analysis be based on the data measurement site (i.e., MIA), EPA also requests that applicants for PSD air permits demonstrate that the land use parameters collected at an offsite airport are representative of the land use parameters that would exist at the project site.

In January 2008, EPA released recommendations for determining the land use characteristics of an area in its AERMOD Implementation Guide. The Guide, which was updated in March 2009, recommends the following procedures:

- Surface roughness length should be based on an inverse-distance weighted geometric mean for the default upwind distance of 1 km relative to the measurement site.
- The Bowen ratio should be based on a simple, unweighted geometric mean over a default 10-km by 10-km domain. There should be no direction or distance dependency for the data.
- The albedo should be based on a simple unweighted arithmetic mean for the same domain used for the Bowen ratio.

The average land use parameter values at MIA and the proposed project site are as follows:

Average land use around MIA:

- Albedo – 0.17
- Bowen ratio – 0.47 (average moisture)
- Surface roughness – 0.081 meter

Average land use around the Medley Landfill site:

- Albedo – 0.16
- Bowen ratio – 0.55 (average moisture)
- Surface roughness – 0.031 meter

While the average albedo and Bowen ratios for the two land use areas are essentially identical, the average surface roughness value of the two sites is quite different. The large difference in average surface roughness is common and is due to the obstruction-free cleared areas (i.e., mostly grass and pavement) that typically exist within 1 km of an airport's meteorological tower. Since significant differences in the surface roughness values input to AERMOD have been known to result in large variations in the maximum predicted impacts, the MIA meteorological record was processed with the Medley Landfill site land use parameters and additional modeling was performed to determine which meteorological data set (i.e., MIA versus Medley Landfill site albedo, Bowen ratio and surface roughness) produces the higher air impacts.

Using the AERSURFACE program, land use parameters for the Medley Landfill site were based on using a mid-point location for the proposed six CAT engines. The project-only emissions were then modeled using both land use sets and the data set that produced the higher impacts was used throughout the rest of the analysis.

6.6.2 PSD Class I Analysis

The CALPUFF air modeling analysis was conducted using a 4-km resolution gridded data record originally developed by the Visibility Improvement State and Tribal Association of the Southeast (VISTAS) for the purpose of conducting visibility impairment analyses under the Best Available Retrofit Technology (BART) rule. The FLM recompiled these data sets with CALMET Version 5.8 for use in PSD applications. Golder obtained these datasets from FDEP, and both FDEP and FLM have recommended their use for PSD projects. The period of record of the meteorological data is from 2001 to 2003.

6.7 Emission Inventory

6.7.1 Significant Impact Analysis

Summaries of the maximum pollutant emission rates for the CAT 3520 engines are presented in Table 2-1. Summaries of the maximum pollutant emission rates for the existing 6,000-SCFM enclosed and 3,000-SCFM open flares are presented in Tables 2-2 and 2-3, respectively. There are four scenarios under which the existing flares may be operated with the new engines. The four operating scenarios are described in Section 2.2. The maximum project-only annual emissions for each operating scenario were presented in Table 2-6. The hourly and annual emissions rates for CO, NO_x, and $PM_{10}/PM_{2.5}$ used in the modeling are presented in Table 6-3. The air modeling analysis demonstrated that Scenario No. 2 resulted in the highest air quality impacts, and therefore this scenario was used in subsequent modeling analysis. The physical stack and stack operating parameters for Scenario 2 are presented in Table 6-4. The two flares shown in the table currently exist. However, as the flares are being relocated within the site for this project, the flare emissions were included in the significant impact analyses.

Pollutant-specific significant impact analyses were performed for CO, NO_x, PM_{10}, and $PM_{2.5}$ emissions to address the combined impact of the engines and flares. The proposed CAT engines will each have a stack height of 33 ft and an inner stack diameter of 14.0 inches. Because the proposed stack heights are less than GEP, building downwash effects were included in the modeling analysis (see Section 6.8, Building Downwash).

6.7.2 *AAQS and PSD Class II Analyses*

The maximum impacts for the proposed project are predicted to be greater than the SIL for the following pollutants and averaging times:

- NO_2 – annual and 1-hour
- PM_{10}, $PM_{2.5}$ – annual and 24-hour
- CO – 8-hour

As a result, cumulative source impact analyses are required to determine compliance with the AAQS for each of these pollutant and averaging times. Cumulative source impact analyses are also required to determine compliance with the PSD Class II increments for annual average NO_2 and annual and 24-hour average PM_{10}. Because PSD increments for 1-hour average NO_2 and 1- and 8-hour average CO have not been promulgated, PSD Class II increment analyses for these pollutant and averaging times are not required.

The significant impact area (SIA) for each modeled pollutant and averaging time was determined based on the maximum distance up to which each pollutant had a predicted significant impact. The maximum radius of impact was used as the basis for determining the inventory of background sources to be included in the cumulative air impact analyses. The project's SIAs for NO_2, PM_{10}, $PM_{2.5}$, and CO impacts are predicted to be 5.5, 0.7, 2.7, and 0.3 km from the center of the modeling domain (approximate center of the CAT engine plant), respectively. FDEP modeling guidance requires that the background source inventory include sources located within and 50 km beyond the predicted SIA.

Data on background NO_2, PM_{10}, and CO sources were obtained from FDEP. Since there is currently no separate source inventory for $PM_{2.5}$ sources, the background source inventory for PM_{10} was also used for the $PM_{2.5}$, a conservative assumption. For each pollutant, facilities located within the SIA (i.e., referred to as the modeling area) were included in the modeling analysis. Facilities within the SIA plus 50 km were considered to be in the screening area.

In order to evaluate sources in the screening area that could significantly interact with the Project, facilities in the screening area were evaluated using the North Carolina screening technique (also known as the "20D approach"). Based on this technique, facilities whose annual emissions (i.e., TPY) are less than the threshold quantity, Q, are eliminated from the modeling analysis since they are not likely to significantly interact with the Project. Q is equal to 20 × (D – SIA), where D is the distance in km from the facility to the grid center of the modeling area.

In addition, the source inventories were evaluated to identify major emitting facilities located beyond the screening area but within 100 km of the Medley landfill. Facilities in this area that have the potential to emit more than 1,000 TPY were included in the modeling inventory.

Permit-allowable emission rates were used for the AAQS analysis. Actual emission rates are recommended for PSD Class II increment analysis. However, data on actual emission rates are more difficult to gather. As a conservative approach, potential or permit-allowable emission rates were used for the background sources used in the PM_{10} (annual and 24-hour averages) and NO_2 (annual average) PSD Class II increment analyses.

Listings of NO_x sources that were used in the cumulative modeling analyses and their locations relative to the project site are provided in Table 6-5. Similarly, listings of $PM_{10}/PM_{2.5}$ and CO sources that were used in the cumulative modeling analyses and their locations relative to the grid center of the modeling area are provided in Tables 6-6 and 6-7, respectively. A summary of the detailed NO_2, $PM_{10}/PM_{2.5}$, and CO source emissions and release parameters data included in the cumulative modeling analyses are presented in Tables F-1, F-2, and F-3, respectively, in Appendix F.

6.7.3 PSD Class I Analysis

The maximum predicted annual average NO_2 and PM_{10} impacts due to the proposed project were less than EPA's proposed PSD Class I SIL. Therefore, detailed modeling analyses to demonstrate compliance with the allowable PSD Class I increments were not required. As discussed previously, EPA has not required a PSD Class I increment analysis for $PM_{2.5}$ or 1-hour NO_2 concentrations be performed until the PSD increments are finalized.

6.8 Building Downwash Effects

The proposed CAT engine stacks were evaluated for determining compliance with Good Engineering Practice (GEP) regulations and the potential influence of nearby buildings and structures that could cause aerodynamic building downwash. For each stack that is below the GEP height, direction-specific building heights and maximum projected widths were determined using the Building Profile Input Program (BPIP, Version 04274) which incorporates the Plume Rise Model Enhancement (PRIME) downwash algorithm developed by the Electric Power Research Institute (EPRI). Direction-specific building information output by BPIP was input to AERMOD for processing.

The AERMOD model addresses the effects of aerodynamic downwash by utilizing downwash algorithms based on stack and building locations and heights that are input to the model. Proposed structures at the proposed project site were identified from a site plan. Only one significant building structure is proposed, which will house five of the six proposed CAT engines, office, and storage. The dimensions of the building are approximately 138.5 ft by 65.5 ft and 20 ft high. Building dimensions for the structures were entered into BPIP for the purpose of developing wind direction-specific building dimensions for input to AERMOD.

6.9 Receptor Locations

6.9.1 Site Vicinity

For the significant impact analysis, a Cartesian receptor grid was used with the grid origin located at UTM east and north coordinates of 565,900 and 2,859,900 meters, respectively, in UTM Zone 17, datum NAD83.

Receptors were located at the following intervals and distances:

- Every 50 meters along the project's fenceline
- Every 100 meters from the fenceline to 2 km
- Every 250 meters from 2 to 4 km
- Every 500 meters from 4 to 7 km
- Every 1,000 meters beyond 7 km, as needed, to determine the significant impact distance

The heights above mean sea level (msl) for all receptors were extracted from 1-second National Elevation Dataset (NED) data obtained from the US Geological Survey's seamless server. The NED data were extracted for all sources and receptors using AERMOD's terrain preprocessing program AERMAP, Version 09040.

For the cumulative source analyses, the extent of the receptor grid was limited by the project's pollutant-specific significant impact distance. The elevations for background sources were determined from 1-deg digital elevation model (DEM) data. Detailed receptor grids are shown in Appendix E.

6.9.2 PSD Class I Area

The proposed project's impacts at the ENP were predicted using an array of 901 discrete receptors obtained from the National Parks Service (NPS). When using CALPUFF to predict the maximum pollutant concentrations and visibility impairment from regional haze, ENP receptors located beyond 50 km from the proposed project site were used. Of the 901 ENP receptors, 806 are located beyond 50 km from the Medley Landfill site. The ENP receptors are shown in Appendix E.

6.10 NO_2 AAQS Modeling Approach

Based on current EPA guidance, demonstrations showing 1-hour NO_2 AAQS compliance are required for a project that undergoes PSD review if the project does not have a complete permit by April 12, 2010.

EPA's Guideline on Air Quality Models (GAQM) (Appendix W, 40 CFR 51, July 2009) recommends a multi-tiered screening approach for estimating annual NO_2 concentrations, where:

- Tier 1 assumes full conversion of NO_x to NO_2
- Tier 2 assumes a 75 percent ambient equilibrium ratio of NO_2 to NO_x
- Tier 3 allows detailed screening techniques on a case-by-case basis

In general, maximum NO_2 concentrations estimated using Tier 1 (total conversion) or Tier 2 (default equilibrium NO_2/NO_x ratio of 0.75) provide conservative estimates of NO_2 concentrations when assessing compliance with the annual standard of 100 µg/m^3. For stationary sources, annual average NO_2 concentrations are typically predicted to be well below the AAQS and, in many cases, less than the annual significant impact level. However, for the 1-hour average concentrations which are greatly affected by the widely varying meteorological conditions, modeling of the emission sources, such as those for this project, can show 1-hour average NO_2 concentrations to be high relative to the 1-hour AAQS of 188 µg/m^3 using the Tier 1 or the Tier 2 approach.

There is a clear need to perform a more detailed screening analysis, using less conservative assumptions and more realistic methods to account for NO_2 formation when assessing NO_2 concentrations from a source, such as the ozone limiting method (OLM) and the plume volume molar ratio method (PVMRM).

Both OLM and PVMRM are ambient ozone-based algorithms that limit the conversion of nitric oxide (NO) to NO_2 based on available ambient ozone. The PVMRM uses the same chemistry and ozone concentration data as OLM but also accounts for plume size to derive the amount of ozone available within the plume for the reaction between NO and ozone. In contrast, the OLM does not account for the plume size or in-plume concentrations. For a given NO_x emission rate and ambient ozone concentration, PVMRM controls the conversion of NO to NO_2 based on NO_x concentrations within the volume of the plume in contrast to OLM, which controls the conversion based on ground-level NO_x concentrations.

PVMRM is discussed in the Section 5.1, Appendix W, and was being tested to determine its suitability as a refined method when the GAQM was last updated in 2005. Since that time, the PVMRM algorithm has been implemented into AERMOD and is currently available in the most recent version of the model (Version 09292) as a "non-default" option. The addendum to the AERMOD User's Guide dated October 2009 provides the usage instructions for PVMRM.

EPA Region 10 has approved the use of the PVMRM option in 2006 for ambient air quality analyses prepared for the State of Alaska. The additional support material provided to the Alaska Department of Environmental Conservation (ADEC) included a sensitivity analysis using OLM and PVMRM options in AERMOD performed in September 2004, and an evaluation of bias using PVMRM option in AERMOD performed in June, 2005. Both of these studies helped EPA Region 10 to determine that the non-default PVMRM option in AERMOD is an acceptable technique to predict NO_2 concentration impacts from combustion sources emitting NO_x through a stack and results in unbiased concentration impacts. As a result of this determination, EPA Region 10 approved the PVMRM option for application in Alaska. The PVMRM method was most recently used for the Exxon Mobil Corporation's Point Thomson Drilling Operations air permit application (ADEC Technical Analysis Report for Permit AQ1201MSS01, April 2010).

The PVMRM method is also the recommended method to be used for predicting NO_2 concentrations elsewhere, such as in Alberta, Canada (Air Quality Modeling Guidelines, Government of Alberta).

For the proposed project, compliance with the 1-hour average NO_2 AAQS was demonstrated using the Tier 2 approach. As a result, a more detailed Tier 3 approach was not warranted.

6.11 $PM_{2.5}$ AAQS Modeling Approach

EPA published the PM_{10} surrogate policy in October 1997, which allowed permit applicants to base compliance with the applicable PM_{10} requirements as a surrogate approach for meeting $PM_{2.5}$ NSR requirements until the technical difficulties with respect to $PM_{2.5}$ monitoring, emissions estimation, and modeling were resolved. On February 11, 2010, EPA published its proposal to repeal the grandfathering provision and end the PM_{10} surrogate policy citing the fact that technical difficulties that necessitated the PM_{10} surrogate policy have mostly been resolved. For the project, modeling demonstration to show compliance with $PM_{2.5}$ AAQS is based on modeling procedures recommended in EPA's March 23, 2010 Memorandum, *Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ AAQS*, and does not rely upon the PM_{10} surrogate policy.

For this project, $PM_{2.5}$ dispersion modeling was performed based on a conservative assumption that PM_{10} emissions from the engines are $PM_{2.5}$ and the modeled impacts are compared to the $PM_{2.5}$ AAQS. The background $PM_{2.5}$ source inventory used was also the same as the background PM_{10} source inventory, another conservative assumption.

As mentioned in Section 6.2.1, SILs for $PM_{2.5}$ are not yet final and EPA has proposed three options for the $PM_{2.5}$ SILs for both the 24-hour and annual AAQS. According to EPA's March 2010 Memorandum, until the $PM_{2.5}$ SILs are finalized, the proposed SILs may not be presumed to be appropriate *de minimis* impact levels. However, EPA does not preclude states from adopting interim SIL levels, which may or may not match the EPA proposed levels. For the proposed project, the most stringent of the three EPA options were used as interim SILs to determine whether a cumulative impact analysis was necessary.

The $PM_{2.5}$ modeling procedure based on the EPA Memorandum is as follows:

- Compare the highest average concentration of the maximum modeled annual concentration averaged for the model years to the annual SIL.
- Compare the highest average concentration of the maximum modeled 24-hour concentration averaged for the model years to the 24-hour SIL.
- If modeled impacts due to project emissions exceed the SILs, perform a cumulative impact assessment for the appropriate averaging times using background sources from the SIA plus 50 km geographical extent.
- Determine background concentrations based on 3-year average of the annual $PM_{2.5}$ concentrations and the 3-year average of the 98th percentile 24-hour averages.
- Compare the average of the highest modeled individual year's annual averages and average of the first highest individual year's 24-hour averages plus monitored

background concentration to the respective AAQS. This is also known as the First Tier modeling analysis.

- Apply the Second Tier modeling analysis, which involves combining the monitored and modeled $PM_{2.5}$ concentrations on a daily basis, and re-sorting the total impacts over the year to determine the cumulative impact.

For the project's 24-hour average $PM_{2.5}$ NAAQS determination, the Second Tier modeling analysis was applied with combining the monitored and modeled concentrations on a daily basis. The following steps were followed:

- Maximum daily impacts at each receptor were generated by AERMOD using the "DAYTABLE" command.
- Using post-processing software developed by Golder, concentrations from the DAYTABLE output were sorted by day into a spreadsheet. The spreadsheet also summarized the maximum 24-hour values for each day at each receptor.
- Monitored concentrations for each day from the nearest $PM_{2.5}$ monitor were added to the maximum modeled concentrations.
- The total concentrations for each day of the year were sorted in decreasing order.
- The 98th percentile or 8th highest of the total daily concentrations for each year was compared to the 24-hour $PM_{2.5}$ AAQS.

Compliance with the 24-hour average $PM_{2.5}$ AAQS is achieved if the 98th percentile of the total daily concentrations for each year is below the standard of 35 $\mu g/m^3$. Comparing the 98th percentile of total daily concentrations for each year to the AAQS is more conservative than comparing the average values over the modeling years.

6.12 Background Concentrations

For AAQS analyses, representative non-modeled background concentrations must be added to the modeled impacts to determine total air quality impacts. The total impacts are then compared with the appropriate AAQS to demonstrate compliance. By definition, "background" includes other point sources not included in the modeling analysis (i.e., distant sources or small sources), non-project related fugitive emission sources, and natural background sources. Ambient background concentrations for the most recent 3 years available (2007-2009) were obtained for NO_2, PM_{10}, $PM_{2.5}$, and CO. PM_{10} and $PM_{2.5}$ air quality data were summarized in Table 4-2. CO data were summarized in Table 4-3.

For purposes of ambient background concentrations for use in the modeling analysis, the highest annual and the HSH 24-hour average PM_{10} concentrations of 27 $\mu g/m^3$ and 65 $\mu g/m^3$, respectively, recorded at the Miami-Dade County monitor during 2008 were selected.

For purposes of ambient background concentrations for use in the modeling analysis, the 3-year average annual and 98^{th} percentile 24-hour average $PM_{2.5}$ concentrations of 7.3 $\mu g/m^3$ and 21.5 $\mu g/m^3$, respectively, recorded at the nearest monitor during 2008 were selected.

For purposes of an ambient background concentration for use in the modeling analysis, the second highest 1-hour and 8-hour average CO concentrations of 4,463 µg/m^3 and 2,403 µg/m^3, respectively, recorded at Monitor ID No. 12-086-1019 in Miami-Dade County were selected. The annual average NO_2 background concentrations of 20.7 µg/m^3 is based on the highest annual measured concentration at the nearest NO_2 monitor for the most recent 3-year period (2007-2009).

As presented in the following table, for the 1-hour average NO_2 concentration, the ambient background concentration of 80.7 µg/m^3 was used and is based on the 3-year average of the 98th percentile of the daily maximum concentrations measured at the nearest NO_2 monitor to the project.

Location	Year	1-Hour Average NO_2 Measurements 98th Percentile, Daily Maximums (µg/m^3)
Metro Annex 864 NW 23rd St. Monitor ID 12-086-4002 (Distance = 14.7 km, Direction = 115°)	2009 2008 2007	76.7 79.0 86.5 Average = 80.7

The background concentration was added to the modeled source concentrations to obtain total concentrations that were compared to the AAQS.

For the Second Tier analysis (see Section 6.11, $PM_{2.5}$ Modeling Approach) used to demonstrate compliance with the 24-hour average $PM_{2.5}$ AAQS, daily monitored concentrations were obtained from the nearest $PM_{2.5}$ monitor to the project with available data for the modeling period. For periods when there were several days of missing data, the highest 24-hour concentration measured before or after the period of missing monitoring concentrations was used. A summary of the monitored 24-hour concentrations at this monitor is presented in the following table.

Location	Rank	2001 (µg/m^3)	2002 (µg/m^3)	2003 (µg/m^3)	2004 (µg/m^3)	2005 (µg/m^3)
7700 NW 186 Street Monitor ID 12-086-0033 (Distance = 9.6 km, Direction = north)	1st	38.4	25.0	28.4	64.0	25.1
	2nd	30.3	23.6	21.0	27.8	23.7
	3rd	26.5	20.5	20.6	27.8	21.1
	4th	25.5	19.7	20.4	27.8	19.9
	5th	22.5	19.0	19.8	27.8	19.8
	6th	19.4	18.4	19.7	27.8	19.1
	7th	19.0	18.3	19.5	27.8	18.8
	8th	19.0	18.0	19.3	24.4	18.8

6.13 Modeling Results

6.13.1 Significant Impact Analysis in the Site Vicinity

The maximum predicted impacts for the four proposed plant operating scenarios presented in Table 6-3 are compared to the EPA Class II SIL in Table 6-8. The results of this analysis indicated that operating

Scenario No. 2 produced the highest air pollutant impacts for all pollutants. Therefore, the emission and source configuration for Scenario No. 2 were used for the remainder of the analysis.

A comparison of maximum impacts due to the project only for the MIA land use parameters and Medley Landfill site land use parameters is presented in Table 6-9 (using Scenario 2). While the higher annual average concentrations were predicted to be slightly higher using the MIA land use parameters, higher concentrations were predicted using the proposed site land use parameters for the short-term averaging times. Because the shorter averaging times are considered more critical with regards to demonstrating compliance with AAQS, the MIA meteorological data with land use values from the Medley Landfill site were used in the subsequent air modeling analysis.

As mentioned in Section 6.7.2, the maximum project-only impacts presented in Table 6-9 are predicted to be greater than the SIL for the following pollutants and averaging times:

- NO_2 – annual and 1-hour
- PM_{10}, $PM_{2.5}$ – annual and 24-hour
- CO – 8-hour

As a result, detailed cumulative source impact analyses are required to determine compliance with the AAQS for each of these pollutant and averaging times. Cumulative source impact analysis are also required to determine compliance with the PSD Class II increments for annual average NO_2 and annual and 24-hour average PM_{10}. Because PSD increments for 1-hour average NO_2 and 1- and 8-hour average CO have not been promulgated, PSD Class II increment analyses for these pollutant and averaging times are not required.

6.13.2 Significant Impact Analysis at PSD Class I Areas

The proposed project's maximum predicted annual and 24-hour average PM_{10} and annual average NO_2 concentrations at the ENP PSD Class I area are summarized in Table 6-10. As shown, the maximum project-only impacts are predicted to be less than EPA's proposed Class I SIL for all pollutants and averaging times. As a result, the proposed project poses an insignificant impact at the ENP and additional cumulative source modeling is not required.

6.13.3 AAQS Analyses

A summary of the NO_2 CO, PM_{10}, and $PM_{2.5}$ AAQS analyses is presented in Table 6-11. The maximum predicted annual average NO_2 concentration is 8.0 $\mu g/m^3$, which when added to the background concentration of 20.7 $\mu g/m^3$ yields a total annual concentration of 28.7 $\mu g/m^3$. This concentration is less than the annual average NO_2 AAQS of 100 $\mu g/m^3$.

The maximum predicted 98th percentile 1-hour NO_2 concentration is 102.1 μg/m^3, which when added to the background concentration of 80.7 μg/m^3 yields a total concentration of 182.8 μg/m^3. This concentration is less than the 1-hour NO_2 AAQS of 188 μg/m^3.

The predicted highest, second highest 8-hour CO concentration is 513.6 μg/m^3, which when added to the background concentration of 2,517.6 μg/m^3 yields a total concentration of 3,031.2 μg/m^3. This concentration is less than the 8-hour average CO AAQS of 10,000 μg/m^3.

The maximum predicted annual average PM_{10} concentration is 2.7 μg/m^3, which when added to the background concentration of 27 μg/m^3 yields a total annual concentration of 29.7 μg/m^3. This is less than the annual average PM_{10} AAQS of 50 μg/m^3. The predicted highest 6th-highest 24-hour PM_{10} concentration is 13.4 μg/m^3, which when added to the background concentration of 65 μg/m^3 yields a total concentration of 78.4 μg/m^3. This concentration is less than the 24-hour average PM_{10} AAQS of 150 μg/m^3.

The 5-year average of the predicted annual average $PM_{2.5}$ concentrations is 2.4 μg/m^3, which when added to a non-modeled background concentration of 7.9 μg/m^3 yields a total annual concentration of 10.3 μg/m^3, which is less than the AAQS of 15 μg/m^3. The 5-year average of the maximum predicted 24-hour $PM_{2.5}$ concentrations is 18.4 μg/m^3, which when added to the background concentration of 21.5 μg/m^3 yields a total concentration of 39.9 μg/m^3 which is greater than the AAQS of 35 μg/m^3. Because the addition of the maximum modeled and measured concentration failed to demonstrate compliance with the 24-hour $PM_{2.5}$ AAQS, a procedural refinement was performed whereas the modeled and measured $PM_{2.5}$ concentrations are summed on a daily basis. The paired "total" $PM_{2.5}$ concentrations were sorted for each year and the results, shown in Table 6-12, are the top eight concentrations, representing the 98th percentile $PM_{2.5}$ concentrations. The highest predicted 98th-percentile concentration for any year is 33.8 μg/m^3, which is less than the AAQS of 35.0 μg/m^3.

6.13.4 PSD Class II Increment Analyses

A summary of the PM_{10} and NO_2 PSD Class II increment analyses is presented in Table 6-13. The predicted highest annual average and highest-second highest 24-hour PM_{10} increment are 2.7 and 16.4 μg/m^3, respectively, which is less than the allowable PSD Class II increments of 17 and 30 μg/m^3, respectively.

The predicted maximum annual average NO_2 increment is 8.0 μg/m^3, which is less than the allowable PSD Class II increment of 25 μg/m^3.

6.14 Conclusions

Based on the air impact analyses conducted in support of the PSD construction application for the LFGTE project at the Medley Landfill, the maximum pollutant concentrations due to the project only are predicted to be greater than the PSD Class II SILs for NO_2, PM_{10}, $PM_{2.5}$, and CO for 8-hour averaging time. As a result, additional modeling analyses with background sources were performed to determine compliance with the AAQS for these pollutants and averaging times. Based on the analyses, the project is expected to comply with the AAQS. The analyses also predicted that the maximum pollutant concentrations due to the project only will comply with the allowable PSD Class II increments of NO_2 (annual average) and PM_{10} (annual and 4-hour averages).

Based on the PSD Class I significant impact analysis, the maximum pollutant concentrations due to the project are predicted to be less than the PSD Class I SIL for all pollutants and that further modeling was not required.

The results of the air modeling analyses demonstrate that the project will comply with all applicable AAQS and will not have a significant adverse effect on human health and welfare.

7.0 ADDITIONAL IMPACT ANALYSIS

This section presents the impacts that the proposed project will have on associated growth; impacts to vegetation, soils, and visibility in the vicinity of the Medley Landfill site; and impacts on air quality related values (AQRVs) at the ENP PSD Class I area. Specifically, this section addresses FDEP Rules 62-212.400(4)(e), (8)(a) and (b), and (9), F.A.C., which require the following:

> (4) Source Information.
>
> (e) The air quality impacts, and the nature and extent of any or all general commercial, residential, industrial, and other growth which has occurred since August 7, 1977, in the area the source or modification would affect.
>
> (8) Additional Impact Analyses.
>
> (a) The owner or operator shall provide an analysis of the impairment to visibility, soils and vegetation that would occur as a result of the source or modification and general commercial, residential, industrial and other growth associated with the source or modification. The owner or operator need not provide an analysis of the impact on vegetation having no significant commercial or recreational value.
>
> (b) The owner or operator shall provide an analysis of the air quality impact projected for the area as a result of general commercial, residential, industrial and other growth associated with the source or modification.
>
> (9) Sources Impacting Federal Class I Areas. Sources impacting Federal Class I areas are subject to the additional requirements provided in 40 CFR 52.21(p), adopted by reference in Rule 62-204.800, F.A.C.

The requirements in 40 CFR 52.21(p) include an analysis of AQRV's in the Class I area, and the analysis of visibility impacts on the Class I area. AQRV's potentially include impacts on soils, vegetation, wildlife and visibility.

7.1 Historical Growth and Impacts Due to Associated Growth

7.1.1 Introduction

The general trends in residential, commercial, and industrial growth that have occurred in Miami-Dade County since August 7, 1977 are presented in Subsections 7.1.2 through 7.1.4. Information is presented from a variety of available sources [i.e., Florida Statistical Abstract (UF/BEBR, 2009), FDEP, etc.] that characterize Miami-Dade County as a whole. Information on air emissions and quality obtained from FDEP and EPA is presented in Subsection 7.1.5.

Subsection 7.1.6 presents a discussion of the impacts on the local air quality due to industrial, commercial, or residential growth associated with the construction and operation of the proposed project.

The proposed project is located in northeast Miami-Dade County. Monroe County is adjacent to the south and west, Collier County to the northwest, and Broward County to the north. Miami-Dade County is the second largest county in Florida, comprising a 2,430-square mile area with 1,945 square miles of land.

7.1.2 *Residential Growth*

Population and Household Trends

As an indicator of residential growth, the trends in the population and number of household units in Miami-Dade County since 1977 are shown in Figure 7-1. The County experienced a 61-percent increase in population for the years 1977 through 2008. During this period, there was an increase in population of about 943,000. Similarly, for the same time period the number of households in the County increased by about 344,000 since 1977, or 65 percent.

7.1.3 *Commercial Growth*

Retail Trade and Wholesale Trade

As an indicator of commercial growth in Miami-Dade County, the trends in the number of commercial facilities and employees involved in retail and wholesale trade are presented in Figure 7-2. The retail trade sector comprises establishments engaged in retailing merchandise. The retailing process is the final step in the distribution of merchandise. Retailers are, therefore, organized to sell merchandise in small quantities to the general public. The wholesale trade sector comprises establishments engaged in wholesaling merchandise. This sector includes merchant wholesalers who buy and own the goods they sell; manufacturers' sales branches and offices that sell products manufactured domestically by their own company; and agents and brokers who collect a commission or fee for arranging the sale of merchandise owned by others.

Since 1977, retail trade in Miami-Dade County has increased by about 2,900 establishments and 14,000 employees or 36 and 13 percent, respectively. For the same period, wholesale trade has increased in the County by 5,300 establishments and 24,800 employees, or 137 and 57 percent, respectively.

Labor Force

The trend in the labor force in Miami-Dade County since 1977 is shown in Figure 7-3. The sectors employing the largest number of persons in Miami-Dade County have been in agriculture, services, and government. Between 1977 and 2008, approximately 501,000 persons were added to the available work force, for an increase of 81 percent.

Tourism

Another indicator of commercial growth in Miami-Dade County is the tourism industry. As an indicator of tourism growth in the County, the trend in the number of hotels and motels and the number of units at the hotels and motels are presented in Figure 7-4.

This industry comprises establishments primarily engaged in marketing and promoting communities and facilities to businesses and leisure travelers through a range of activities, such as assisting organizations in locating meeting and convention sites; providing travel information on area attractions, lodging accommodations, restaurants; providing maps; and organizing group tours of local historical, recreational, and cultural attractions.

Between 1978 and 2009, there was a 29-percent decrease in the number of units at the hotels and motels in the County. The actual number of hotels and motels decreased by about 48-percent.

Transportation

As an indicator of transportation growth, the trend in the number of vehicle miles travelled (VMT) by motor vehicles on major roadways in Miami-Dade County is presented in Figure 7-5.

The County's main arteries are Interstate 95, the Florida Turnpike, U.S. Highway 1, and the Palmetto Expressway, which run north-south through the eastern section of the County. Major highways running east-west include the Airport and Dolphin Expressways and a portion of the Palmetto Expressway. Other major highways in the County are U.S. Highways 441, 98, and 27. The closest major roads to the Medley Landfill site are U.S. Highway 27 and the Florida Turnpike.

Between 1977 and 2008, there was an increase of more than 20,600,000 VMT annually, or 62 percent increase, on major roadways in the County.

7.1.4 Industrial Growth

Manufacturing and Agricultural Industries

As an indicator of industrial growth, the trend in the number of employees in the manufacturing industry in Miami-Dade County since 1977 is shown in Figure 7-6. As shown, the manufacturing industry experienced a 46 percent decrease in employment from 1977 through 2008. The agricultural industry however, experienced an increase in employment in the same period. As shown in Figure 7-6, the agricultural industry experienced an increase of about 7,000 employees or 329 percent from 1977 through 2008.

Utilities

Existing power plants in Miami-Dade County include the following:

- FPL's Turkey Point Plant
- FPL's Cutler Plant

- City of Homestead Utility
- Miami-Dade Resource Recovery Facility

Together, these power plants have an electrical generating capacity of over 3,700 megawatts (MW). Compared to the County's total generation capacity of about 2,400 MW in 1977, the generation capacity in the County has increased by about 56-percent. The increased generation capacity is mostly due to FPL's 1,150-MW Turkey Point Unit 5, which began operation in 2007.

7.1.5 Air Quality Discussion

<u>Air Emissions from Stationary Sources</u>

The locations of major air pollutant facilities in Miami-Dade County were presented in Section 6.0. Based on actual emissions reported for 2002 (latest year of available data) by EPA on its AIRSdata website, total emissions from stationary sources in the County are as follows:

- SO2: 34,067 TPY
- PM_{10}: 24,023 TPY
- $PM_{2.5}$: 7,424 TPY
- NO_x: 86,065 TPY
- CO: 635,181 TPY
- VOC: 122,724 TPY

Tables 6-5 through 6-7 present the major $PM_{10}/PM_{2.5}$, NO_x, and CO emissions sources in Miami-Dade County.

<u>Air Emissions from Mobile Sources</u>

The trends in the air emissions of CO, VOC, and NO_x from mobile sources in Miami-Dade County are presented in Figure 7-7. Between 1977 and 2005, there were significant decreases in these emissions. The decreases in CO, VOC, and NO_x emissions were about 1,860 tons per day (TPD), 200 TPD, and 81 TPD, respectively, which represent decreases from 1977 emissions of 68, 71, and 40 percent, respectively.

<u>Air Monitoring Data</u>

As part of the 1977 CAA amendments, EPA first published a list of non-attainment areas in September, 1978, and Miami-Dade County was among the counties listed as non-attainment for ozone (O_3), which had a 1-hour average NAAQS of 120 ppb. Miami-Dade County, along with Broward and Palm Beach Counties, were designated as a "moderate" O_3 non-attainment area. Since 1977, the NAAQS for O_3 has been lowered twice: to 0.08 parts per million (ppm) in 1997, and to 0.075 ppm in 2008.

Air quality in the county has improved since 1977, and EPA redesignated the County as ozone attainment in April, 1995. Miami-Dade County has been classified as attainment or maintenance for all other criteria pollutants since 1977.

Miami-Dade County currently has ambient air monitoring stations for all criteria air pollutants including lead. These data indicate that the maximum air quality concentrations currently measured in the County comply with and are well below the applicable AAQS. Ozone and fine particulate matter are the two pollutants closest to the established NAAQS. These monitoring stations are located in areas where the highest concentrations of a measured pollutant are expected due to the combined effect of emissions from stationary and mobile sources, as well as the effects of meteorology. Therefore, the ambient concentrations in areas not monitored should have pollutant concentrations less than the monitored concentrations from these sites.

O_3 Concentrations

The current NAAQS for ozone is 75 ppb for an 8-hour average. The standard is achieved when the 3-year average of 99th percentile values (fourth highest) is 0.075 ppm or less. There are currently two active O_3 monitors in the Miami-Dade County – Rosenstiel School (monitor ID 0027) and Perdue Medical Center (monitor ID 0029). The Rosenstiel School site is located along the Rickenbacker Causeway near the Miami Seaquarium. The Perdue Medical Center site is located in the southern part of the County. Out of these two active monitors, Rosenstiel School is closest to the Medley Landfill, approximately 23 km away. A third site, Thompson Park was located in the northwest section of the County on Krome Avenue near US 27 south of the Miami-Dade/Broward County line. This site was closed in 2003. Figure 7-8 shows 8-hour average O_3 measurements (99^{th} percentile, 3-year average) at these sites since 1995. As shown, the measured O_3 concentrations have been below the NAAQS.

SO_2 Concentrations

The primary NAAQS for SO_2 are 0.14 ppm and 0.03 ppm for 24-hour and annual averaging times, respectively. The secondary NAAQS for SO_2 is 0.50 ppm for 3-hour averaging time. The annual standard is not to be exceeded. The 3-hour and 24-hour standards are not to be exceeded more than once per year. Both the State of Florida and Miami-Dade County have set SO_2 standards that are more stringent than the NAAQS. State of Florida standards are 0.02, 0.10, and 0.5 ppm for annual, 24-hour, and 3-hour averaging times, respectively. Miami Dade County standards are 0.007, 0.04, and 0.13 ppm for the annual, 24-hour, and 3-hour averaging times, respectively.

There is currently one active SO_2 monitor in Miami-Dade County, located in Pennsuco (monitor ID 0019) at the northeast corner of County Road 821 and State Road 27. This station, located only 6 km from the Medley Landfill, has operated since 1987. Figure 7-9 presents the measured SO_2 concentrations at the

Pennsuco monitor since 1987. As shown, the measured SO_2 concentrations have been and continue to be well below the NAAQS, State of Florida and Miami-Dade County standards.

PM_{10} Concentrations

In 1988, EPA revoked the NAAQS for TSP and introduced the PM_{10} annual and 24-hour average standards of 50 and 150 µg/m^3, respectively. Since 1989, PM in the form of PM_{10} has been collected at the air monitoring stations due to the promulgation of the PM_{10} standards. The annual arithmetic mean PM_{10} standard is 50 µg/m^3. The 24-hour average PM_{10} standard is 150 µg/m^3. Only one exceedance is allowed per year for the 24-hour average standard, while none are allowed for the annual standard.

Only one PM_{10} monitor is currently active in Miami-Dade County – the Miami Fire Station (Miami-1016) site near the Santa Clara Metrorail Station. Three sites – Homestead Fire Station (Homestead-6001), Fire Station 17, and Miami-3001 were shutdown in 2003. The trends in the 24-hour and annual average PM_{10} concentrations at these locations since 1989 are presented in Figures 7-10 and 7-11, respectively.

As shown in these figures, measured PM_{10} concentrations have been below the AAQS since 1990. The PM_{10} concentrations have been and continue to be below the AAQS over the last decade.

$PM_{2.5}$ Concentrations

In 1997, EPA established new annual and 24-hour NAAQS for $PM_{2.5}$ as the indicator for fine particles and set the standards at 15 µg/m^3 and 65 µg/m^3 for the annual and 24-hour averaging periods, respectively. In 2006, EPA revised these standards to 15 µg/m^3 and 35 µg/m^3 for the annual and 24-hour averaging times, respectively. At the same time, EPA revoked the annual PM_{10} NAAQS, but retained the 24-hour PM_{10} NAAQS of 150 µg/m^3.

Based on data from EPA's AirData website, there are three $PM_{2.5}$ monitors in Miami-Dade County that are currently active. The Miami fire station site (monitor ID 1016) is near the Santa Clara Metrorail station, the Homestead fire station (monitor ID 6001) site is near Homestead, and the station at 7700 NW 186th Street is near the Country Club (monitor ID 0033). The trends in the 24-hour and annual average $PM_{2.5}$ concentrations at these locations since 1999 are presented in Figures 7-12 and 7-13, respectively.

As shown in these figures, measured $PM_{2.5}$ concentrations have been below the AAQS.

NO_2 Concentrations

The annual arithmetic mean primary and secondary NAAQS for NO_2 is 0.053 ppm (53 ppb). In February, 2010, EPA finalized a new 1-hour average NO_2 NAAQS of 100 ppb. The 1-hour standard is met if the 3-year average of the 98th percentile of the annual distribution of daily maximum 1-hour average concentrations is less than the standard. There are two NO_2 monitors active in Miami-Dade County – the

Rosenstiel School site (monitor ID 0027) is located along the Rickenbacker Causeway near the Seaquarium and the Metro Annex site (monitor ID 4002) is located northwest of downtown Miami, west of I-95 and north of County Road 836. The Metro Annex site is the closest to the Medley Landfill, approximately 15 km southeast of the landfill.

The trends in the annual average NO_2 concentrations measured at the two Miami-Dade monitors are presented in Figure 7-14. As shown in this figure, measured NO_2 concentrations have been well below the AAQS. These monitors have also been collecting 1-hour measurements for the last 10 years. However, the 98th percentile of the daily maximum 1-hour concentrations are not available yet in EPA's AirData website.

CO Concentrations

The primary NAAQS for CO are 35 ppm and 9 ppm for 1-hour and 8-hour averaging times, respectively. Not more than one exceedance of the CO standards is permitted in any year. Currently, four CO monitoring sites are active in Miami-Dade County. The Metro Annex site (monitor ID 4002) is located northwest of downtown Miami, west of I-95 and north of State Road 836. The site on 2201 SW 4 Street (monitor ID 1019) is about 2 miles west of the downtown area. The third site is at the northwest corner of Intersection of SW 88 Street and SW 127th avenue (monitor ID 0034) near the Calusa Country Club. The fourth site at 16000 South Dixie Highway is along the Palmetto Golf Course (monitor ID 0031).

The trends in the 1- and 8-hour average CO concentrations at the four Miami-Dade monitors since 1981 are presented in Figures 7-15 and 7-16, respectively. As shown, concentrations at the Metro Annex and Dixie Highway sites were high until 1985. However, the trend is generally downward ever since and all four monitors have shown CO concentrations well below the NAAQS.

7.1.6 Impacts of Associated Growth

The Medley Landfill is located in a predominantly industrial area on NW 98th Avenue approximately 2 km west of the intersection of Palmetto Expressway and U.S. 27. Construction of the proposed project at the existing Medley Landfill will occur over a period of approximately 12 to 18 months. The workforce needed to construct the project will be a small fraction of the population already present in the immediate area. Most of the construction workers will commute to the site. So there will be some increase in vehicular traffic due to the movement of commute and construction vehicles. However, this additional traffic is expected to be a small fraction compared to the number of vehicles that currently travel to and from the facility.

During operation, the additional workforce needed to operate the CAT 3520 engines will be a small fraction of the current workforce at the Medley Landfill. Therefore, while there would be a small increase in vehicular traffic to and from the facility, the increase will represent a very small fraction of the current vehicular traffic. Therefore, it is expected that the effect of operation of the project on local air quality levels would be minimal.

The air quality data measured in Miami-Dade County indicates that the maximum air quality concentrations are well below the NAAQS. As demonstrated in Section 6.0, the maximum air quality impacts resulting from the proposed project will comply with the PSD increments and NAAQS. As a result, the air quality concentrations in the region are expected to remain below the NAAQS after the project becomes operational.

7.2 Potential Air Quality Effect Levels on Soils, Vegetation and Wildlife

7.2.1 Soils

The potential and hypothesized effects of atmospheric deposition on soils include:

- Increased soil acidification
- Alteration in cation exchange
- Loss of base cations
- Mobilization of trace metals

The potential sensitivity of specific soils to atmospheric inputs is related to two factors. First, the physical ability of a soil to conduct water vertically through the soil profile is important in influencing the interaction with deposition. Second, the ability of the soil to resist chemical changes, as measured in terms of pH and soil cation exchange capacity (CEC), is important in determining how a soil responds to atmospheric inputs.

7.2.2 Vegetation

The concentrations of the pollutants, duration of exposure, and frequency of exposure influence the response of vegetation to atmospheric pollutants. The pattern of pollutant exposure expected from the facility is that of a few episodes of relatively high ground-level concentration, which occur during certain meteorological conditions, interspersed with long periods of extremely low ground-level concentrations. If there are any effects of stack emissions on plants, they will be from the short-term, higher doses. A dose is the product of the concentration of the pollutant and duration of the exposure.

In general, the effects of air pollutants on vegetation occur primarily from SO_2, NO_2, O_3, and PM. Effects from minor air contaminants, such as fluoride, chlorine, hydrogen chloride, ethylene, ammonia, hydrogen sulfide, CO, and pesticides, have also been reported in the literature. The effects of air pollutants are dependent both on the concentration of the contaminant and the duration of the exposure. The term "injury," as opposed to damage, is commonly used to describe all plant responses to air contaminants and will be used in the context of this analysis. Air contaminants are thought to interact primarily with plant foliage, which is considered to be the major pathway of exposure.

Injury to vegetation from exposure to various levels of air contaminants can be termed acute, physiological, or chronic. Acute injury occurs as a result of a short-term exposure to a high contaminant concentration and is typically manifested by visible injury symptoms ranging from chlorosis (discoloration) to necrosis (dead areas). Physiological or latent injury occurs as the result of a long-term exposure to contaminant concentrations below those that result in acute injury symptoms. Chronic injury results from repeated exposure to low concentrations over extended periods of time, often without any visible symptoms, but with some effect on the overall growth and productivity of the plant. In this assessment, 100 percent of the particular air pollutant in the ambient air was assumed to interact with the vegetation, which is a very conservative approach.

Sulfur Dioxide

Sulfur is an essential plant nutrient usually taken up as sulfate ions by the roots from the soil solution. When SO_2 in the atmosphere enters the foliage through pores in the leaves, it reacts with water in the leaf interior to form sulfite ions. Sulfite ions are highly toxic. They interact with enzymes, compete with normal metabolites, and interfere with a variety of cellular functions (Horsman and Wellburn, 1976). However, within the leaf, sulfite is oxidized to sulfate ions, which can then be used by the plant as a nutrient. Small amounts of sulfite may be oxidized before they prove harmful.

Observed SO_2 effect levels for several plant species and plant sensitivity groupings are presented in Tables 7-1 and 7-2, respectively. SO_2 gas at elevated levels has long been known to cause injury to plants. Acute SO_2 injury usually develops within a few hours or days of exposure, and symptoms include marginal, flecked, and/or intercostal necrotic areas that appear water-soaked and dullish green initially. This injury generally occurs to younger leaves. Chronic injury is usually evident by signs of chlorosis, bronzing, premature senescence, reduced growth, and possible tissue necrosis (EPA, 1982). Background levels of SO_2 range from 2.5 to 25 $\mu g/m^3$.

Many studies have been conducted to determine the effects of high-concentration, short-term SO_2 exposure on natural community vegetation. Sensitive plants include ragweed, legumes, blackberry, southern pine, and red and black oak. These species are injured by exposure to 3-hour SO_2 concentrations of 790 to 1,570 $\mu g/m^3$. Intermediate plants include locust and sweetgum. These species are injured by exposure to 3-hour SO_2 concentrations of 1,570 to 2,100 $\mu g/m^3$. Resistant species (injured at concentrations above 2,100 $\mu g/m^3$ for 3 hours) include white oak and dogwood (EPA, 1982).

A study of native Floridian species (Woltz and Howe, 1981) demonstrated that cypress, slash pine, live oak, and mangrove exposed to 1,300 $\mu g/m^3$ SO_2 for 8 hours were not visibly damaged. This finding supports the levels cited by other researchers on the effects of SO_2 on vegetation. A corroborative study (McLaughlin and Lee, 1974) demonstrated that approximately 20 percent of a cross-section of plants ranging from sensitive to tolerant was visibly injured at 3-hour SO_2 concentration of 920 μg/m^3. Jack pine seedlings exposed to SO_2 concentrations of 470 to 520 μg/m^3 for 24 hours demonstrated inhibition of foliar lipid synthesis; however, this inhibition was reversible (Malhotra and Kahn, 1978). Black oak exposed to 1,310 μg/m^3 SO_2 for 24 hours a day for 1 week demonstrated a 48-percent reduction in photosynthesis (Carlson, 1979).

SO_2 is considered to be the primary factor causing the death of lichens in most urban and industrial areas. The first indications of damage from SO_2 include the inhibition of nitrogen fixation, increased electrolyte leakage, and decreased photosynthesis and respiration followed by discoloration and death of the algal component of the lichen (Fields, 1988). Sensitive species are damaged or killed by annual average levels of SO_2 ranging from 8 to 30 μg/m^3, and very few lichens can tolerate levels exceeding 125 μg/m^3 (Johnson, 1979; DeWit, 1976; Hawsworth and Rose, 1970; LeBlanc et al., 1972). In another study, two lichen species exhibited signs of SO_2 damage in the form of decreased biomass gain and photosynthetic rate as well as membrane leakage when exposed to concentrations of 200 to 400 μg/m^3 for 6 hours/week for 10 weeks (Hart et al., 1988).

Acidic precipitation is formed from SO_2 emissions during the burning of fossil fuels. This pollutant is oxidized to sulfur trioxide in the atmosphere and dissolves in rain to form sulfuric acid mist (SAM), which falls as acidic precipitation (Ravera, 1989). Although concentration data are not available, SAM has been reported to yield necrotic spotting on the upper surfaces of leaves (Middleton et al., 1950).

Nitrogen Dioxide

NO_2 can injure plant tissue with symptoms usually appearing as irregular white to brown collapsed lesions between the leaf veins and near the margins. Conversely, non-injurious levels of NO_2 can be absorbed by plants, enzymatically transformed into ammonia, and incorporated into plant constituents such as amino acids (Matsumaru, et al., 1979).

For plants that have been determined to be more sensitive to NO_2 exposure than others, acute exposure (1, 4, and 8 hours) caused 5 percent predicted foliar injury at concentrations ranging from 3,800 to 15,000 μg/m^3 (Heck and Tingey, 1979). Chronic exposure of selected plants (some considered NO_2 sensitive) to NO_2 concentrations of 2,000 to 4,000 μg/m^3 for 213 to 1,900 hours caused reductions in yield of up to 37 percent and some chlorosis (Zahn, 1975). Short-term exposure to NO_x at concentrations of 564 μg/m^3 caused adverse effects in lichen species (Holopainen and Karenlampi, 1984).

Particulate Matter

Although information pertaining to the effects of PM on plants is scarce, baseline concentrations are available (Mandoli and Dubey, 1988). Ten species of native Indian plants were exposed to levels of PM that ranged from 210 to 366 $\mu g/m^3$ for an 8-hour averaging period. Damage in the form of a higher leaf area/dry weight ratio was observed at varying degrees for most plants tested. Concentrations of PM lower than 163 $\mu g/m^3$ did not appear to be injurious to the tested plants.

Carbon Monoxide

Information pertaining to the effects of CO on plants is scarce. The main effect of high concentrations of CO is the inhibition of cytochrome *c* oxidase, the terminal oxidase in the mitochondrial electron transfer chain. Inhibition of cytochrome *c* oxidase depletes the supply of adenosine triphosphate (ATP), the principal donor of free energy required for cell functions. However, this inhibition only occurs at extremely high concentrations of CO. Pollok, et al. (1989) reported that exposure to a $CO:O_2$ ratio of 25 (equivalent to an ambient CO concentration of 6.85×10^6 $\mu g/m^3$) resulted in stomatal closure in the leaves of the sunflower (*Helianthus annuus*). Naik, et al. (1992) reported cytochrome *c* oxidase inhibition in corn, sorghum, millet, and Guinea grass at $CO:O_2$ ratios of 2.5 (equivalent to an ambient CO concentration of 6.85×10^5 $\mu g/m^3$). These plants were considered the species most sensitive to CO-induced inhibition of cytochrome c oxidase.

Ozone

O_3 can cause various damage to broad-leaved plants including: tissue collapse, interveinal necrosis, and markings on the upper surface leaves know as stippling (pigmented yellow, light tan, red brown, dark brown, red, or purple), flecking (silver or bleached straw white), mottling, chlorosis or bronzing, and bleaching. O_3 can also stunt plant growth and bud formation. On certain plants such as citrus, grape, and tobacco, it is common for leaves to wither and drop early.

7.2.3 Wildlife

A wide range of physiological and ecological effects to fauna has been reported for gaseous and particulate pollutants (Newman, 1981; Newman and Schreiber, 1988). The most severe of these effects have been observed at concentrations above the secondary AAQS. Physiological and behavioral effects have been observed in experimental animals at or below these standards. For impacts on wildlife, the lowest threshold values of SO_2, NO_x, and particulates that are reported to cause physiological changes are shown in Table 7-3.

7.3 Impacts on Soils, Vegetation, Wildlife, and Visibility in the Project's Vicinity

7.3.1 Impact Analysis Methodology

A screening approach was used that compared the proposed project's maximum predicted ambient concentrations of air pollutants of concern in the vicinity of the site and the ENP PSD Class I Area with effect threshold limits for both vegetation and wildlife as reported in the scientific literature. A literature search was conducted to determine the effects of air contaminants on plant species as well as those species reported to occur in the vicinity of the site and in the PSD Class I area. It is recognized that effect threshold information is not available for all species found in these areas, although studies have been performed on a few of the common species and on other species known to be sensitive indicators of effects. Species of lichens, which are symbiotic organisms comprised of green or blue-green algae and fungi, have been used worldwide as air pollution monitors because relatively low levels of sulfur-, nitrogen-, and fluorine-containing pollutants adversely affect many species, altering lichen community composition, growth rates, reproduction, physiology, and morphological appearance (Blett et al., 2003).

7.3.2 Impacts on Vegetation and Soils

The Medley Landfill is located in an industrial area approximately 2 km west of the intersection of Palmetto Expressway (US 826) and US 27. There is very little vegetation existing within 2 km of the landfill.

The AAQS were established to protect both public health and welfare. Public welfare is protected by the secondary AAQS, which Florida has adopted. Secondary standards set limits to protect public welfare, including protection against visibility impairment, and damage to animals, crops, vegetation, and buildings (EPA, 2007).

The SO_2 emissions increase due to the proposed project is less than the PSD significant emission rate, and as a result an air quality impact analysis for SO_2 is not required for the project. Since the project's impacts of NO_x, $PM_{10}/PM_{2.5}$, and CO on the local air quality are predicted to be less than the AAQS and less than the effect levels on soils and vegetation, the project's impacts on soils, vegetation, and wildlife in the vicinity of the site are expected to be negligible. With regard to O_3 concentrations, the Project's VOC and NO_x emissions (precursors to O_3 formation) represent an insignificant increase in VOC and NO_x emissions for Miami-Dade County as a whole.

7.3.3 Impacts on Wildlife

The major air quality risk to wildlife in the United States is from continuous exposure to pollutants above the National AAQS. This occurs in non-attainment areas (e.g., Los Angeles Basin). Risks to wildlife also may occur for wildlife living in the vicinity of an emission source that experiences frequent upsets or episodic conditions resulting from malfunctioning equipment, unique meteorological conditions, or startup operations (Newman and Schreiber, 1988). Under these conditions, chronic effects (e.g., particulate contamination) and acute effects (e.g., injury to health) have been observed (Newman, 1981).

Although air pollution impacts to wildlife have been reported in the literature, many of the incidents involved acute exposures to pollutants, usually caused by unusual or highly concentrated releases or unique weather conditions. It is highly unlikely that emissions from the Medley Landfill facility will cause adverse effects to wildlife due to the project's low impacts, which are predicted to be below the AAQS based on worst-case operation. Coupled with low population of wildlife in the vicinity of the landfill and the mobility of wildlife, the potential for exposure of wildlife to the project's impacts is extremely unlikely, and no effects upon wildlife are expected due to the project.

7.3.4 Impacts on Visibility

No visibility impairment in the vicinity of the Medley Landfill is expected due to the types and quantities of emissions from the proposed CAT 3520 engines. The opacity of emissions from the engines will be 20 percent or less under normal operation.

7.4 Impacts on the Everglades National Park (ENP) PSD Class I Area

7.4.1 Identification of AQRVs

An AQRV analysis was conducted to assess the potential risk to AQRVs at the ENP due to the emissions from the proposed project. The ENP is the nearest Class I area to the site, located approximately 19 km southwest of the Medley Landfill.

The U.S. Department of the Interior in 1978 defined AQRVs to be:

> All those values possessed by an area except those that are not affected by changes in air quality and include all those assets of an area whose vitality, significance, or integrity is dependent in some way upon the air environment. These values include visibility and those scenic, cultural, biological, and recreational resources of an area that are affected by air quality.
>
> Important attributes of an area are those values or assets that make an area significant as a national monument, preserve, or primitive area. They are the assets that are to be preserved if the area is to achieve the purposes for which it was set aside (Federal Register, 1978).

The AQRVs include visibility, freshwater and coastal wetlands, dominant plant communities, unique and rare plant communities, soils and associated periphyton, and the wildlife dependent on these communities for habitat. Rare, endemic, threatened, and endangered species of the national park and bioindicators of air pollution (e.g., lichens) are also evaluated.

The deposition of sulfur and nitrogen in the ENP is an AQRV. Because the increase in SO_2 emissions due to the proposed project is less than the EPA significant emission rate, the deposition of total sulfur on the ENP is not considered to be significant and was not further evaluated.

The CAA Amendments of 1977 provide for implementation of guidelines to prevent visibility impairment in Class I areas. The guidelines are intended to protect the aesthetic quality of these pristine areas from reduction in visual range and atmospheric discoloration due to various pollutants. Visibility can take the form of plume blight for nearby areas (i.e., distances within 50 km) or regional haze for long distances (i.e., distances beyond 50 km).

Sources of air pollution can cause visible plumes if emissions of PM_{10} and NO_x are sufficiently large. A plume will be visible if its constituents scatter or absorb sufficient light so that the plume is brighter or darker than its viewing background (e.g., the sky or a terrain feature, such as a mountain). PSD Class I areas, such as national parks and wilderness areas, are afforded special visibility protection designed to prevent plume visual impacts to observers within a Class I area.

Visibility is an AQRV for the ENP. Because the nearest distance from the ENP to the Medley Landfill site is less than 50 km, the change in visibility is analyzed as plume blight. However, the ENP also extends beyond 50 km from the Medley Landfill. As a result, the change in visibility for the proposed project is also analyzed as regional haze for the portions of the ENP that are beyond 50 km.

7.4.2 Concentrations Predicted at the ENP Class I Area

The SO_2 emissions increase due to the proposed project is less than the significant emission rate. As a result, an air quality analysis for SO_2 is not required for the project. The maximum concentrations for NO_2, PM_{10}, and CO at the ENP due to the proposed project only were determined and these are shown in Table 7-4 for the annual, 24-hour, 8-hour, 3-hour and 1-hour averaging times. These maximum concentrations were compared to the potential effect levels for vegetation and wildlife in Subsection 7.2.

7.4.3 Impacts to Soils

The soils of the ENP are generally classified as histosols or entisols. Histosols (peat soils) are organic and have extremely high buffering capacities based on their CEC, base saturation, and bulk density. Therefore, they would be relatively insensitive to atmospheric inputs. The entisols are shallow sandy soils overlying limestone, such as the soils found in the pinelands. The direct connection of these soils with subsurface limestone tends to neutralize any acidic inputs. Moreover, the groundwater table is highly buffered due to the interaction with subsurface limestone formations, which results in high alkalinity (as $CaCO_3$).

The relatively low sensitivity of the soils to acid inputs, coupled with the low ground-level concentrations of air pollutants predicted for the proposed project, precludes any significant impact on soils at the ENP.

7.4.4 Impacts to Vegetation

Nitrogen Dioxide

The maximum 1-, 3-, and 8-hour average NO_2 concentrations due to the proposed project were predicted to be 1.74, 1.01, and 0.49 µg/m^3, respectively, at the ENP. These concentrations are approximately 0.01 to 0.05 percent of the levels that could potentially injure 5 percent of vascular plant foliage (i.e., 3,800 to 15,000 µg/m^3; see Subsection 7.2.2), and 0.3 percent of the concentration that caused adverse effects in lichen species in acute exposure scenarios (564 µg/m^3; see previous subsections). For a chronic exposure, the maximum annual NO_2 concentration due to the project is predicted to be 0.017 µg/m^3 at the Class I area, which is less than 0.00085 percent of the levels that caused minimal yield loss and chlorosis in plant tissue (i.e., 2,000 µg/m^3; see Subsection 7.2.2).

Although it has been shown that simultaneous exposure to SO_2 and NO_2 results in synergistic plant injury (Ashenden and Williams, 1980), the magnitude of this response is generally only 3 to 4 times greater than either gas alone, and usually occurs at unnaturally high levels of each gas. Therefore, the project's predicted concentrations at the ENP are still far below the levels that potentially cause plant injury for either acute or chronic exposure.

Particulate Matter

The maximum 8-hour PM_{10} concentration due to the proposed project was predicted to be 0.18 µg/m^3 at the ENP. This impact is 0.086 percent of the values that affected plant foliage (i.e., 210 µg/m^3, see Subsection 7.2.2). As a result, no significant effects to vegetative AQRVs within the ENP are expected as a result of the project's PM emissions.

Carbon Monoxide

The maximum 1-hour average CO concentration due to the proposed project was predicted to be 13.1 µg/m^3 at the ENP, which is less than 0.0002 percent of the minimum value that caused inhibition in laboratory studies (i.e., 6.85×10^6 µg/m^3, see Subsection 7.2.2). The amount of damage sustained at this level, if any, for 1 hour would have negligible effects over an entire growing season. The maximum predicted annual concentration of 0.13 µg/m^3 reflects a more realistic, yet conservative, CO impact level for the Class I area. This maximum concentration is predicted to be less than 0.00002 percent of the value that caused cytochrome *c* oxidase inhibition (6.85×10^5 µg/m^3).

VOC and NO_x Emissions and Impacts to Ozone

VOC and NO_x emissions are precursors to O_3 formation. As discussed in Subsection 7.1.5, based on the O_3 monitoring concentrations measured in Miami-Dade County, the maximum O_3 concentrations in the region remain in compliance with the NAAQS. VOC and NO_x emission increases due to the proposed project are 16.6 and 74.8 TPY, respectively, which are projected to increase county-wide VOC and NO_x emissions (see Subsection 7.1.5) by only 0.01 and 0.09-percent, respectively. These increases are negligible and any potential change in O_3 concentrations due to the proposed project is expected to be minimal.

Summary

In summary, the phytotoxic effects of the proposed project's emissions within the ENP are expected to be minimal. It is important to note that emissions were evaluated with the assumption that 100 percent of the exposure concentrations were available for plant uptake. This is rarely the case in a natural ecosystem.

7.4.5 Impacts to Wildlife

The proposed project's emissions are low and predicted impacts are well below the AAQS, which are protective of soils, vegetation, and wildlife resources. The maximum predicted impacts of the project in the Class I area are up to six orders of magnitude lower than values causing potential impacts to wildlife, shown in Table 7-3. No significant effects on wildlife AQRVs from SO_2, NO_x, CO, PM, or VOCs are expected.

7.4.6 Impacts Upon Visibility

Introduction

The visibility impairment assessment due to the project at the ENP was conducted in two parts: impacts occurring within 50 km of the Medley landfill, and impacts occurring more than 50 km from the Landfill. Currently, there are several air quality modeling approaches recommended by the Interagency Workgroup on Air Quality Models (IWAQM) to perform these analyses. The IWAQM consists of EPA and Federal Land Managers (FLMs) of Class I areas that are responsible for ensuring that AQRVs are not adversely impacted by new and existing sources. These recommendations have been summarized in guidelines required by the 1977 CAA Amendments and are contained in two documents:

- Interagency Workgroup on Air Quality Models (IWAQM), Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts (EPA, 1998), referred to as the IWAQM Phase 2 report; and
- Federal Land Managers' Air Quality Related Values Workgroup (FLAG), Phase I Report, USFS, NPS, USFWS (December, 2000), referred to as the FLAG document.

The methods and assumptions recommended in these documents were used to assess visibility impairment due to the proposed project.

Visibility Analysis at ENP within 50 km of the Site

Methodology The analysis to determine the potential adverse plume visibility effects in the ENP was based on recommendations in the FLAG document using the screening approach suggested in the Workbook for Plume Visual Impact Screening and Analysis (EPA, 1992). EPA has computerized this approach in a program called the VISCREEN model. The VISCREEN model is currently recommended for use by the EPA to assess visual plume impacts in regulatory applications. The VISCREEN model can be used to calculate potential plume impact of specific pollutant emissions for specific transport and meteorological dispersion conditions. The model can be applied in two successive levels of screening (i.e., referred to as Levels 1 and 2) without the need for extensive source, meteorological, or pollutant input. If the screening calculations demonstrate that during "worst-case" meteorological conditions a plume is imperceptible or, if perceptible, is not likely to be considered objectionable ("adverse" or "significant" in the language of the EPA PSD and visibility regulations), further analysis of plume visual impact would not be required as part of the air quality review of the source. However, if the screening analyses demonstrate that the criteria are exceeded, plume visual impacts cannot be ruled out, and more detailed analyses to ascertain the magnitude, frequency, location, and timing of plume visual impacts would be required.

The Level 1 screening analysis is designed to provide a conservative estimate of plume visual impacts (i.e., impacts that would be greater than those calculated with more realistic input and modeling assumptions). This analysis assumes worst-case meteorological conditions of stable stability (Pasquill-Gifford stability Class F) and a 1 meter per second (m/s) wind speed persisting for 12 hours in one direction towards the PSD Class I area. The input required for the Level 1 analysis is limited to the following parameters:

- Emission rates of PM_{10} and NO_x
- Distance between the emission source and (a) the observer; (b) the closest Class I area boundary; and (c) the most distant Class I area boundary
- Background visual range appropriate for the region in which the Class I area is located
- If available, emission rates of NO_2, soot, and primary sulfate (SO_4)

Visibility impacts are then determined for two parameters:

- Contrast of a plume against a viewing background such as the sky or a terrain feature
- Perceptibility of a plume on the basis of the color difference between the plume and the viewing background (Delta E)

Results are provided by the model for several scenarios based on the background view, the viewing angle, visibility improvement due to plumes located both inside and outside the Class I area, and the sun angle. The critical values for contrast and Delta E are 0.05 and 2.00, respectively. If these levels are not exceeded by the proposed source, the source is considered to pass the Level 1 visibility analysis, and the source is considered to not have a significant impact on the Class I area.

Results of Level 1 Analysis

The input parameters and results of the Level 1 analysis for the project are presented in Figure 7-17. The maximum short-term average emission rates used in the analysis are presented in Section 2.0.

The terrain between the Medley Landfill and the ENP PSD Class I area, and within the ENP, can be considered as generally flat. With no terrain feature that can be used as a viewing background, the visibility impacts were determined using the sky as the only viewing background. It should also be noted that these critical visual impacts are estimated for locations inside of the Class I area. Since no integral vistas have been identified for the ENP, this evaluation did not evaluate vistas located outside the Class I area.

From the FLAG report, the background visual range for the ENP was assumed to be 177.8 km. Other parameters input to the model were based upon default values given in the Workbook and incorporated into the computer model.

As shown in Figure 7-17, the proposed project's emissions are calculated to result in visibility impacts that are below the Level 1 visibility screening criteria at the ENP. Because results from the Level 1 screening analysis are below the visibility criteria, a Level 2 screening analysis was not performed. .

<u>Visibility Analysis at ENP Beyond 50 km from the Site</u>

Methodology –

Based on the FLAG document, current regional haze guidelines characterize a change in visibility by the change in the light-extinction coefficient (b_{ext}). The b_{ext} is the attenuation of light per unit distance due to the scattering and absorption by gases and particles in the atmosphere. A change in the extinction coefficient produces a perceived visual change. An index that simply quantifies the percent change in visibility due to the operation of a source is calculated as:

$$\Delta\% = (b_{exts} / b_{extb}) \times 100$$

where:

b_{exts} = the extinction coefficient calculated for the source

b_{extb} = the background extinction coefficient

The purpose of the visibility analysis is to calculate the extinction at each receptor for each day (24-hour period) of the year due to the proposed project. The visibility test looks for a change in extinction of 5 percent or greater for any day of the year.

The visibility analysis for the proposed project at portions of the ENP located beyond 50 km from the Medley Landfill was performed with the CALPUFF model and the CALPUFF post-processing program CALPOST. The analysis was conducted in accordance with the most recent guidance from the FLAG document. The CALPUFF postprocessor model CALPOST is used to calculate the combined visibility effects from the different pollutants that are emitted from the project. Daily background extinction coefficients are calculated on an hour-by-hour basis using hourly relative humidity data from CALMET and hygroscopic and non-hygroscopic extinction components specified in the FLAG document (i.e., visibility Method 2). For the ENP, the hygroscopic and non-hygroscopic components are 0.9 and 8.5 inverse megameter (Mm^{-1}).

The CALPOST post-processor is then used to calculate the percent change in light extinction for each day of the year. The visibility impairment criterion is 5.0 percent.

Results

The results of the visibility analysis at the ENP are presented in Table 7-5. Using Method 2, the project's maximum change in visibility is predicted to be 0.79 percent. This value is well below the FLM's recommended screening criterion of 5 percent change. As a result, the project is not expected to have an adverse impact on the existing regional haze at the PSD Class I area of the ENP.

7.4.7 Sulfur and Nitrogen Deposition

General Methods

As part of the AQRV analyses, the total nitrogen (N) deposition rate was predicted for the proposed project at the ENP. Total sulfur deposition was not predicted because SO_2 emissions due to the proposed project are below EPA's significant emission rate. The N deposition analysis criterion is based on the annual averaging period. The total deposition is estimated in units of kilograms per hectare per year (kg/ha/yr) of N. The CALPUFF model is used to predict wet and dry deposition fluxes of various oxides of these elements.

For N deposition, the species include:

- Particulate ammonium nitrate (from species NO_3), wet and dry deposition
- Nitric acid (species HNO_3), wet and dry deposition

- Nitrogen oxides (NO_x), dry deposition
- Ammonium sulfate (species SO_4), wet and dry deposition

The CALPUFF model produces results in units of micrograms per square meter per second (µg/m^2/s), which are then converted to units of kg/ha/yr.

Deposition analysis thresholds (DATs) for total N and S deposition of 0.01 kg/ha/yr were provided by the FLM (January 2002). A DAT is the additional amount of N or S deposition within a Class I area below which estimated impacts from a new or modified source are considered insignificant. The maximum N deposition predicted for the project is, therefore, compared to the DATs or significant impact levels.

Results

The maximum predicted total annual N and S depositions predicted for the Medley Landfill project in the PSD Class I area of the ENP are summarized in Table 7-6. The maximum annual N deposition rate for the project is predicted to be 0.0004 kg/ha/yr, which is well below the N DAT of 0.01 kg/ha/yr.

TABLES

TABLE 2-1
POTENTIAL EMISSIONS FROM PROPOSED CATERPILLAR 3520 ENGINES
RENEWABLE ENERGY PROJECT AT THE MEDLEY LANDFILL

Pollutants	Emission Factor	Ref.	Activity Factor[a] (per engine): Engine Power (bhp)	Fuel Consumption (Btu/bhp-hr)	Fuel Consumption (scfm)	LFG Methane Content (%)	Maximum Heat Input (MMBtu/hr)	Operating Hours	Potential Emissions (per engine): (lb/hr)	(TPY)
Carbon Monoxide (CO)	3.50 g/bhp-hr	b	2,233	6,509	588	50	17.64	8,760	17.2	75.5
Nitrogen Oxides (NOx)	0.60 g/bhp-hr	b	2,233	6,509	588	50	17.64	8,760	2.95	12.9
Particulate Matter (PM)	0.000048 lb/scf CH_4	c	2,233	6,509	588	50	17.64	8,760	0.85	3.71
Particulate Matter (PM_{10})	0.000048 lb/scf CH_4	c	2,233	6,509	588	50	17.64	8,760	0.85	3.71
Particulate Matter ($PM_{2.5}$)	0.000048 lb/scf CH_4	c	2,233	6,509	588	50	17.64	8,760	0.85	3.71
Sulfur Dioxide (SO_2)	4.86 lb/hr	e	2,233	6,509	588	50	17.64	8,760	4.86	21.3
Volatile Organic Compounds (VOC)	0.80 lb/hr	d	2,233	6,509	588	50	17.64	8,760	0.80	3.52
Non-Methane Organic Compounds (NMOC)	0.80 lb/hr	d	2,233	6,509	588	50	17.64	8,760	0.80	3.52

[a] Activity factors are based on manufacturer provided power output of 2,233 brake horsepower (bhp) and fuel consumption of 6,509 Btu/bhp-hr, Caterpillar, 2010.

[b] Based on Waste Management data, 2010.

[c] Based on AP-42, Chapter 2.4, Table 2.4-5. PM and $PM_{2.5}$ emissions are assumed to be equal to estimated PM_{10} emissions.

[d] NMOC emission rate is based on compliance with NSPS Subpart WWW, which requires NMOC outlet concentration to be less than 20 ppmvd as hexane, at 3% oxygen.
Assuming exhaust gas moisture content is 7%. NMOC emissions calculated as following:

Exhaust flow rate =	12,476	acfm, based on Caterpillar data.
Exhaust temperature =	898	°F, based on Caterpillar data.
Oxygen content of dry air (O_2, dry) =	9	%, dry, based on Caterpillar data.
NMOC, ppm actual =	13.30	[20 ppmvd x (20.9-O_2, dry)/(20.9-3)]
Molecular weight of NMOC as hexane =	86.18	lb/lb-mol (AP-42 table 2.4-1)
NMOC emissions =	0.80	lb/hr: NMOC (ppmv actual) x Volume flow (acfm) x 86.18 (MW of NMOC) x 2116.2 lb/ft^2 (pressure) / [1545.4 (gas constant, R) x Actual Temp. (°R)] x 60 min/hr

[e] SO_2 emission rate is based on H_2S concentration in LFG and design LFG flow rate to the engine.

LFG H_2S concentration =	830	ppmv, based on OLI data.
LFG gas flow to engine =	588	scfm, design LFG flow for CAT 3520, based on WM data.
Standard Temperature =	68	°F
Molecular weight of H_2S =	34	lb/lb-mol (AP-42, Table 2.4-1)
SO_2 emissions =	4.86	lb/hr: H_2S (ppmv actual) x Volume flow (scfm) x 34 (MW of H_2S) x 2116.2 lb/ft^2 (pressure)

TABLE 2-2
POTENTIAL EMISSIONS FROM EXISTING 6,000 SCFM ENCLOSED FLARE (EU ID 005)
MEDLEY LANDFILL, INC., MEDLEY, FLORIDA

Pollutants	Emission Factor		Ref.	Activity Factor[a] LFG Flow (scfm)	LFG Heating Value (Btu/scf)	LFG Methane Content (%)	Heat Input (MMBtu/hr)	Operating Hours	Potential Emissions (lb/hr)	(lb/scf)
Carbon Monoxide (CO)	0.20	lb/MMBtu	b	6,000	500	50	180.0	8,760	36.0	1.00E-04
Nitrogen Oxides (NOx)	0.06	lb/MMBtu	b	6,000	500	50	180.0	8,760	10.80	3.00E-05
Particulate Matter (PM)	0.000017	lb/scf CH_4	c	6,000	500	50	180.0	8,760	3.06	8.50E-06
Particulate Matter (PM_{10})	0.000017	lb/scf CH_4	c	6,000	500	50	180.0	8,760	3.06	8.50E-06
Particulate Matter ($PM_{2.5}$)	0.000017	lb/scf CH_4	c	6,000	500	50	180.0	8,760	3.06	8.50E-06
Non-Methane Organic Compounds (NMOC)	20	ppmvd @ 3% O_2	d	6,000	500	50	180.0	8,760	8.38	2.33E-05
Volatile Organic Compounds (VOC)	100	% of NMOC	e	6,000	500	50	180.0	8,760	8.38	2.33E-05
Sulfur Dioxide (SO_2)	830	ppmv, H_2S	f	6,000	500	50	180.0	8,760	49.6	1.38E-04

[a] Activity factors are based on LFG flow of 6,000 scfm to the flare and LFG heating value of 450 Btu/scf, HHV.

[b] Based on manufacturer emissions guarantee.

[c] Based on AP-42, Chapter 2.4, Table 2.4-5. PM and $PM_{2.5}$ emissions are assumed to be equal to estimated PM_{10} emissions.

[d] NMOC emission rate is based on compliance with NSPS Subpart WWW, which requires NMOC outlet concentration to be less than 20 ppmvd as hexane, at 3% oxygen.
NMOC emissions calculated as following:

LFG gas flow into flare =	5,470	scfm, based on test on 3/24/08 (maximum value from test data from last 5 years).
Exhaust flow rate =	284,286	acfm, based on test on 3/24/08 (maximum value from test data from last 5 years).
Potential exhaust flow rate =	311,831	acfm, prorated for 6,000 scfm LFG flow.
Exhaust temperature =	1,830	°F, based on test on 3/24/08.
Exhaust air moisture content =	7.7	°F, based on test on 3/24/08.
Oxygen content of dry air (O_2, dry) =	12.5	%, dry, based on test on 3/24/08.
Max. Potential NMOC concentration =	20.0	ppmvd @ 3% O_2 as hexane [based on 40 CFR 60, Subpart WWW].
	8.69	ppmv, actual [ppmvd @ 3% O_2 x (20.9-O_2, dry)/(20.9-3) x (1-moisture content(%)/100)]
Molecular weight of NMOC as hexane =	86.18	lb/lb-mol (AP-42 table 2.4-1)
Potential NMOC emissions =	8.38	lb/hr. NMOC (ppmv actual) x Volume flow (acfm) x 86.18 (MW of NMOC) x 2116.2 lb/ft2 (pressure) / [1545.4 (gas constant, R) x Actual Temp. (°R)] x 60 min/hr

[e] 100% of NMOC assumed as VOC.

[f] SO_2 emission rate is based on H_2S concentration in LFG and design LFG flow rate to the flare.

LFG H_2S concentration =	830	ppmv, based on OLI data.
LFG gas flow into flare =	6,000	scfm, design LFG flow.
Standard Temperature =	68	°F
Molecular weight of H_2S =	34	lb/lb-mol (AP-42, Table 2.4-1)
SO_2 emissions =	49.6	lb/hr: H_2S (ppmv actual) x Volume flow (scfm) x 34 (MW of H_2S) x 2116.2 lb/ft^2 (pressure) / [1545.4 (gas constant, R) x Standard Temp. (°R)] x 60 min/hr x MW of SO_2/MW of H_2S

TABLE 2-3
POTENTIAL EMISSIONS FROM EXISTING 3,000 SCFM OPEN FLARE (EU ID 001)
MEDLEY LANDFILL, INC., MEDLEY, FLORIDA

Pollutants	Emission Factor	Ref.	Activity Factor[a] LFG Flow (scfm)	Value (Btu/scf)	Methane Content (%)	Heat Input (MMBtu/hr)	Operating Hours	Potential Emissions (lb/hr)	(lb/scf)
Carbon Monoxide (CO)	0.37 lb/MMBtu	b	3,000	500	50	90.0	8,760	33.3	1.85E-04
Nitrogen Oxides (NOx)	0.068 lb/MMBtu	b	3,000	500	50	90.0	8,760	6.12	3.40E-05
Particulate Matter (PM)	0.000017 lb/scf CH_4	c	3,000	500	50	90.0	8,760	1.53	8.50E-06
Particulate Matter (PM_{10})	0.000017 lb/scf CH_4	c	3,000	500	50	90.0	8,760	1.53	8.50E-06
Particulate Matter ($PM_{2.5}$)	0.000017 lb/scf CH_4	c	3,000	500	50	90.0	8,760	1.53	8.50E-06
Non-Methane Organic Compounds (NMOC)	595 ppmv	d	3,000	500	50	90.0	8,760	0.48	2.66E-06
Volatile Organic Compounds (VOC)	595 ppmv, NMOC	e	3,000	500	50	90.0	8,760	0.48	2.66E-06
Sulfur Dioxide (SO_2)	830 ppmv, H_2S	f	3,000	500	50	90.0	8,760	24.8	1.38E-04

[a] Activity factors are based on LFG flow of 2,000 scfm to the flare and LFG heating value of 500 Btu/scf, HHV.

[b] Based on manufacturer emissions guarantee.

[c] Based on AP-42, Chapter 2.4, Table 2.4-5. PM and $PM_{2.5}$ emissions are assumed to be equal to estimated PM_{10} emissions.

[d] NMOC emission rate is based on compliance with NSPS Subpart WWW, which requires 98% reduction of NMOC emissions
NMOC emissions calculated as following:

LFG NMOC concentration =	595	ppmv as hexane, based on AP-42 Chapter 2.4.
LFG gas flow into flare =	3,000	scfm, design LFG flow.
Standard Temperature =	68	°F
Molecular weight of NMOC as hexane =	86.18	lb/lb-mol (AP-42 table 2.4-1)
Uncontrolled NMOC emissions (lb/hr) =	23.94	lb/hr, NMOC (ppmv actual) x Volume flow (acfm) x 86.18 (MW of NMOC) x 2116.2 lb/ft2 (pressure) / [1545.4 (gas constant, R) x Actual Temp. (°R)] x 60 min/hr
Flare destruction efficiency =	98.0	%, based on NSPS Subpart WWW requirement.
Controlled NMOC emissions (lb/hr) =	0.48	lb/hr, Uncontrolled emissions x (1 - destruction efficiency/100)

[e] 100% of NMOC assumed as VOC.

[f] SO_2 emission rate is based on H_2S concentration in LFG and design LFG flow rate into the flare.

LFG H_2S concentration =	830	ppmv, based on OLI data.
LFG gas flow into flare =	3,000	scfm, design LFG flow.
Standard Temperature =	68	°F
Molecular weight of H_2S =	34	lb/lb-mol (AP-42 table 2.4-1)
SO_2 emissions (lb/hr) =	24.8	lb/hr, H_2S (ppmv actual) x Volume flow (scfm) x 34 (MW of H_2S) x 2116.2 lb/ft^2 (pressure) / [1545.4 (gas constant, R) x Standard Temp. (°R)] x 60 min/hr x MW of SO_2/MW of H_2S

TABLE 2-4
POTENTIAL HAZARDOUS AIR POLLUTANT EMISSIONS FROM PROPOSED CAT 3520 ENGINES
MEDLEY LANDFILL, INC., MEDLEY, FLORIDA

Hazardous Air Pollutants	Molecular Weight[b]	Concentration in LFG[b]	Activity Factor (per engine)[a] LFG Flow (scfm)	Activity Factor (per engine)[a] LFG Heating Value (Btu/scf)	Activity Factor (per engine)[a] Heat Input (MMBtu/hr)	Activity Factor (per engine)[a] Operating Hours	Destruction Efficiency[c] (%)	Potential Emissions[d] (per engine) (lb/hr)	Potential Emissions[d] (per engine) (TPY)
1,1,1-Trichloroethane	133.4	0.48 ppmv	588	500	17.64	8,760	98	1.2E-04	5.1E-04
1,1,2,2-Tetrachloroethane	167.9	1.11 ppmv	588	500	17.64	8,760	98	3.4E-04	1.5E-03
1,1-Dichloroethane	99.0	2.35 ppmv	588	500	17.64	8,760	98	4.3E-04	1.9E-03
1,1-Dichloroethene	96.9	0.20 ppmv	588	500	17.64	8,760	98	3.5E-05	1.6E-04
1,2-Dichloroethane	99.0	0.41 ppmv	588	500	17.64	8,760	98	7.4E-05	3.3E-04
1,2-Dichloropropane	113.0	0.18 ppmv	588	500	17.64	8,760	98	3.7E-05	1.6E-04
Acrylonitrile	113.0	6.33 ppmv	588	500	17.64	8,760	98	1.3E-03	5.7E-03
Benzene (no co-disposal)	78.1	0.97 ppmv	588	500	17.64	8,760	98	1.4E-04	6.1E-04
Carbon Disulfide	76.1	0.58 ppmv	588	500	17.64	8,760	98	8.1E-05	3.5E-04
Carbon Tetrachloride	153.8	0.00 ppmv	588	500	17.64	8,760	98	1.1E-06	4.9E-06
Carbonyl Sulfide	60.1	0.49 ppmv	588	500	17.64	8,760	98	5.4E-05	2.4E-04
Chlorobenzene	112.6	0.25 ppmv	588	500	17.64	8,760	98	5.1E-05	2.3E-04
Chloroethane	64.5	1.25 ppmv	588	500	17.64	8,760	98	1.5E-04	6.5E-04
Chloroform	119.4	0.03 ppmv	588	500	17.64	8,760	98	6.6E-06	2.9E-05
Chloromethane	50.5	1.21 ppmv	588	500	17.64	8,760	98	1.1E-04	4.9E-04
Dichloromethane	84.9	14.30 ppmv	588	500	17.64	8,760	98	2.2E-03	9.7E-03
Ethylbenzene	112.6	4.61 ppmv	588	500	17.64	8,760	98	9.5E-04	4.2E-03
Hexane	86.2	6.57 ppmv	588	500	17.64	8,760	98	1.0E-03	4.5E-03
Mercury	200.6	0.00029 ppmv	588	500	17.64	8,760	98	1.1E-07	4.7E-07
Methyl Ethyl Ketone	72.1	7.09 ppmv	588	500	17.64	8,760	98	9.4E-04	4.1E-03
Methyl Isobutyl Ketone	100.2	1.87 ppmv	588	500	17.64	8,760	98	3.4E-04	1.5E-03
Perchloroethylene	165.8	3.73 ppmv	588	500	17.64	8,760	98	1.1E-03	5.0E-03
Toluene	92.1	39.30 ppmv	588	500	17.64	8,760	98	6.6E-03	2.9E-02
Trichloroethylene	131.4	2.82 ppmv	588	500	17.64	8,760	98	6.8E-04	3.0E-03
Vinyl Chloride	62.5	7.34 ppmv	588	500	17.64	8,760	98	8.4E-04	3.7E-03
Xylene	106.2	12.10 ppmv	588	500	17.64	8,760	98	2.4E-03	1.0E-02
							Total =	2.0E-02	8.8E-02

[a] Activity factors are based on LFG flow of 484 scfm to each engine and LFG heating value of 500 Btu/scf, HHV.

[b] Based on information provided in AP-42 Chapter 2.4, Table 2.4-1.

[c] Destruction efficiency based on NSPS Subpart WWW requirements.

[d] Emission rates are based on pollutant concentration in LFG and design LFG flow rate into the flare. Example calculation presented below:

LFG Toluene concentration =	39.3 ppmv, based on OLI data.
LFG gas flow into engine =	588 scfm, design LFG flow.
Standard Temperature =	68 °F
Molecular weight of Toluene =	92.1 lb/lb-mol (AP-42 table 2.4-1)
Uncontrolled Toluene emissions =	0.33 lb/hr: H_2S (ppmv actual) x Volume flow (scfm) x 92.1 (MW of Toluene) x 2116.2 lb/ft^2 (pressure) / [1545.4 (gas constant, R) x Actual Temp. (°R)] x 60 min/hr
Destruction efficiency =	98.0 %, based on NSPS Subpart WWW requirement.
Controlled Toluene emissions =	0.0066 lb/hr: Controlled emissions x (1 - destruction efficiency/100)

Golder Associates

TABLE 2-5
POTENTIAL HAZARDOUS AIR POLLUTANT EMISSIONS FROM EXISTING 6,000 SCFM FLARE (EU 005)
MEDLEY LANDFILL, INC., MEDLEY, FLORIDA

Hazardous Air Pollutants	Molecular Weight[b]	Concentration in LFG[b]	Activity Factor[a] LFG Flow (scfm)	LFG Heating Value (Btu/scf)	Heat Input (MMBtu/hr)	Operating Hours	Flare Destruction Efficiency[c] (%)	Potential Emissions[d] (lb/hr)	(lb/scf)
1,1,1-Trichloroethane	133.4	0.48 ppmv	6,000	500	180.0	8,760	98	1.2E-03	3.3E-09
1,1,2,2-Tetrachloroethane	167.9	1.11 ppmv	6,000	500	180.0	8,760	98	3.5E-03	9.7E-09
1,1-Dichloroethane	99.0	2.35 ppmv	6,000	500	180.0	8,760	98	4.3E-03	1.2E-08
1,1-Dichloroethene	96.9	0.20 ppmv	6,000	500	180.0	8,760	98	3.6E-04	1.0E-09
1,2-Dichloroethane	99.0	0.41 ppmv	6,000	500	180.0	8,760	98	7.6E-04	2.1E-09
1,2-Dichloropropane	113.0	0.18 ppmv	6,000	500	180.0	8,760	98	3.8E-04	1.1E-09
Acrylonitrile	113.0	6.33 ppmv	6,000	500	180.0	8,760	98	1.3E-02	3.7E-08
Benzene (no co-disposal)	78.1	0.97 ppmv	6,000	500	180.0	8,760	98	1.4E-03	3.9E-09
Carbon Disulfide	76.1	0.58 ppmv	6,000	500	180.0	8,760	98	8.2E-04	2.3E-09
Carbon Tetrachloride	153.8	0.00 ppmv	6,000	500	180.0	8,760	98	1.1E-05	3.2E-11
Carbonyl Sulfide	60.1	0.49 ppmv	6,000	500	180.0	8,760	98	5.5E-04	1.5E-09
Chlorobenzene	112.6	0.25 ppmv	6,000	500	180.0	8,760	98	5.3E-04	1.5E-09
Chloroethane	64.5	1.25 ppmv	6,000	500	180.0	8,760	98	1.5E-03	4.2E-09
Chloroform	119.4	0.03 ppmv	6,000	500	180.0	8,760	98	6.7E-05	1.9E-10
Chloromethane	50.5	1.21 ppmv	6,000	500	180.0	8,760	98	1.1E-03	3.2E-09
Dichloromethane	84.9	14.30 ppmv	6,000	500	180.0	8,760	98	2.3E-02	6.3E-08
Ethylbenzene	112.6	4.61 ppmv	6,000	500	180.0	8,760	98	9.7E-03	2.7E-08
Hexane	86.2	6.57 ppmv	6,000	500	180.0	8,760	98	1.1E-02	2.9E-08
Mercury	200.6	0.00029 ppmv	6,000	500	180.0	8,760	98	1.1E-06	3.0E-12
Methyl Ethyl Ketone	72.1	7.09 ppmv	6,000	500	180.0	8,760	98	9.5E-03	2.7E-08
Methyl Isobutyl Ketone	100.2	1.87 ppmv	6,000	500	180.0	8,760	98	3.5E-03	9.7E-09
Perchloroethylene	165.8	3.73 ppmv	6,000	500	180.0	8,760	98	1.2E-02	3.2E-08
Toluene	92.1	39.30 ppmv	6,000	500	180.0	8,760	98	6.8E-02	1.9E-07
Trichloroethylene	131.4	2.82 ppmv	6,000	500	180.0	8,760	98	6.9E-03	1.9E-08
Vinyl Chloride	62.5	7.34 ppmv	6,000	500	180.0	8,760	98	8.6E-03	2.4E-08
Xylene	106.2	12.10 ppmv	6,000	500	180.0	8,760	98	2.4E-02	6.7E-08
							Total =	2.0E-01	5.7E-07

[a] Activity factors are based on LFG flow of 6,000 scfm to the enclosed flare and LFG heating value of 450 Btu/scf, HHV.
[b] Based on information provided in AP-42 Chapter 2.4, Table 2.4-1.
[c] Flare destruction efficiency based on NSPS Subpart WWW requirements.
[d] Emission rates are based on pollutant concentration in LFG and design LFG flow rate into the flare. Example calculation presented below:

LFG Toluene concentration =	39.3	ppmv, based on OLI data.
LFG gas flow into flare =	6,000	scfm, design LFG flow.
Standard Temperature =	68	°F
Molecular weight of Toluene =	92.1	lb/lb-mol (AP-42 table 2.4-1)
Uncontrolled Toluene emissions =	3.4	lb/hr, H_2S (ppmv actual) x Volume flow (scfm) x 92.1 (MW of Toluene) x 2116.2 lb/ft^2 (pressure) / [1545.4 (gas constant, R) x Actual Temp. (°R)] x 60 min/hr
Flare destruction efficiency =	98.0	%, based on NSPS Subpart WWW requirement.
Controlled Toluene emissions =	0.068	lb/hr, Controlled emissions x (1 - destruction efficiency/100)

TABLE 2-6
POTENTIAL ANNUAL EMISSIONS FOR DESIGN LFG FLOW (7,317 scfm)
MEDLEY LANDFILL, INC., MEDLEY, FLORIDA

Source	No. of Units	LFG Flow per Unit (scfm)	Total LFG Flow (scfm)	Units	Pollutant CO	NO_X	PM	PM_{10}	$PM_{2.5}$	SO_2	VOC	NMOC	HAP
Emission Factors													
CAT 3520 Engine	--	--	--	TPY/unit	75.5	12.9	3.71	3.71	3.71	21.3	3.52	3.52	0.088
6,000 scfm Enclosed Flare	--	--	--	lb/scf	1.00E-04	3.00E-05	8.50E-06	8.50E-06	8.50E-06	1.38E-04	2.33E-05	2.33E-05	5.68E-07
3,000 scfm Open Flare	--	--	--	lb/scf	1.85E-04	3.40E-05	8.50E-06	8.50E-06	8.50E-06	1.38E-04	2.66E-06	2.66E-06	5.68E-07
Potential Emissions of Annual Operating Scenarios (TPY)													
Scenario 1: Six CAT 3520 engines + 3,789 scfm LFG combusted in the enclosed flare													
CAT 3520 Engine	6	588	3,528	TPY	452.8	77.6	22.3	22.3	22.3	127.7	21.1	21.1	0.53
6,000 scfm Enclosed Flare	1	3,789	3,789	TPY	99.6	29.9	8.5	8.5	8.5	137.2	23.2	23.2	0.6
3,000 scfm Open Flare	1	0	0	TPY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			7,317		552.4	107.5	30.7	30.7	30.7	264.9	44.3	44.3	1.09
Scenario 2: Six CAT 3520 engines + 3,789 scfm LFG combusted in the flares													
CAT 3520 Engine	6	588	3,528	TPY	452.8	77.6	22.3	22.3	22.3	127.7	21.1	21.1	0.5
6,000 scfm Enclosed Flare	1	789	789	TPY	20.7	6.2	1.8	1.8	1.8	28.6	4.8	4.8	0.1
3,000 scfm Open Flare	1	3,000	3,000	TPY	145.9	26.8	6.7	6.7	6.7	108.6	2.1	2.1	0.4
			7,317		619.4	110.6	30.7	30.7	30.7	264.9	28.1	28.1	1.09
Scenario 3: 6,000 scfm LFG in enclosed flare + 1,317 scfm LFG in open flare													
CAT 3520 Engine	0	588	0	TPY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6,000 scfm Enclosed Flare	1	6,000	6,000	TPY	157.7	47.3	13.4	13.4	13.4	217.2	36.7	36.7	0.9
3,000 scfm Open Flare	1	1,317	1,317	TPY	64.0	11.8	2.9	2.9	2.9	47.7	0.9	0.9	0.2
			7,317		221.7	59.1	16.3	16.3	16.3	264.9	37.6	37.6	1.09
Scenario 4: 3,000 scfm LFG in open flare + 4,317 scfm LFG in enclosed flare													
CAT 3520 Engine	0	588	0	TPY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6,000 scfm Enclosed Flare	1	4,317	4,317	TPY	113.5	34.0	9.6	9.6	9.6	156.3	26.4	26.4	0.6
3,000 scfm Open Flare	1	3,000	3,000	TPY	145.9	26.8	6.7	6.7	6.7	108.6	2.1	2.1	0.4
			7,317		259.3	60.8	16.3	16.3	16.3	264.9	28.5	28.5	1.09
Worst-Case Scenario Annual Emissions (TPY)					**619.4**	**110.6**	**30.7**	**30.7**	**30.7**	**264.9**	**44.3**	**44.3**	**1.1**
Worst-Case Scenario CAT Engine Emissions (TPY)					**452.8**	**77.6**	**22.3**	**22.3**	**22.3**	**127.7**	**21.1**	**21.1**	**0.5**
Worst-Case Scenario Flare Emissions (TPY)					**166.6**	**33.0**	**8.5**	**8.5**	**8.5**	**137.2**	**23.2**	**23.2**	**0.6**

TABLE 3-1
NATIONAL AND STATE AAQS, ALLOWABLE PSD INCREMENTS, AND SIGNIFICANT IMPACT LEVELS (µg/m³)

Pollutant	Averaging Time	National AAQS		Florida AAQS[a]	PSD Increments[a]		Significant Impact Levels[b]	
		Primary Standard	Secondary Standard		Class I	Class II	Class I	Class II
Particulate Matter[c]								
PM_{10}	Annual Arithmetic Mean	50	50	50	4	17	0.2	1
	24-Hour Maximum	150	150	150	8	30	0.3	5
$PM_{2.5}$	Annual Arithmetic Mean	15	15	NA	NA	NA	NA	NA
	24-Hour Maximum	35	35	NA	NA	NA	NA	NA
Sulfur Dioxide	Annual Arithmetic Mean	NA	NA	60	2	20	0.1	1
	24-Hour Maximum	NA	NA	260	5	91	0.2	5
	3-Hour Maximum	NA	1,300	1,300	25	512	1.0	25
	1-Hour Maximum[g]	196	NA	NA	NA	NA	NA	NA
Carbon Monoxide	8-Hour Maximum	10,000	10,000	10,000	NA	NA	NA	500
	1-Hour Maximum	40,000	40,000	40,000	NA	NA	NA	2,000
Nitrogen Dioxide	Annual Arithmetic Mean	100	100	100	2.5	25	0.1	1
	1-Hour Maximum[e]	189	NA	NA	NA	NA	NA	NA
Ozone[d]	1-Hour Maximum[f]	235	235	235	NA	NA	NA	NA
	8-Hour Maximum	147	147	NA	NA	NA	NA	NA
Lead	Calendar Quarter Arithmetic Mean	1.5	1.5	1.5	NA	NA	NA	NA
	3-Month Average	0.15	0.15	NA	NA	NA	NA	NA

Note: NA = Not applicable, i.e., no standard exists.
Particulate matter (PM_{10}) = particulate matter with aerodynamic diameter less than or equal to 10 micrometers.
Particulate matter ($PM_{2.5}$) = particulate matter with aerodynamic diameter less than or equal to 2.5 micrometers.

[a] Short-term maximum concentrations are not to be exceeded more than once per year, except for PM_{10} and O_3 AAQS, which are based on expected exceedances.
[b] Maximum concentrations are not to be exceeded.
[c] On October 17, 2006, EPA promulgated revised PM_{10} and $PM_{2.5}$ AAQS. The $PM_{2.5}$ AAQS had been promulgated on July 18, 1997. For PM_{10}, the annual standard was revoked and the 24-hour standard was retained. The 24-hour $PM_{2.5}$ standard was revised to 35 µg/m³ based on the 3-year averages of the 98th percentile values. The annual $PM_{2.5}$ standard of 15 µg/m³, based on 3-year averages at community monitors, was retained. FDEP has not yet adopted the revised standards, which must be implemented in the 2009-2010 timeframe.
[d] On March 27, 2008, EPA promulgated revised AAQS for ozone. The O_3 standard was modified to be 0.075 ppm (147 µg/m³) for the 8-hour average; achieved when the 3-year average of 99th percentile values is 0.075 ppm or less. FDEP has not yet adopted the revised standards.
[e] The 1-hour NO_2 standard is met when the 3-year average of the 98th percentile of the daily 1-hour maximum values is less than 189 µg/m³.
[f] 0.12 ppm; achieved when the expected number of days per year with concentrations above the standard is fewer than 1.
[g] On June 2, 2010, the 1-hour average SO_2 standard was finalized, which is 75 ppb or 196 µg/m³ (3-year average 99th percentile).

Sources: Federal Register, Vol. 43, No. 118, June 19, 1978, 40 CFR 50; 40 CFR 52.21, Florida Chapter 62.204, F.A.C.

TABLE 3-2
PSD SIGNIFICANT EMISSION RATES AND *DE MINIMIS* MONITORING CONCENTRATIONS

Pollutant	Regulated Under	Significant Emission Rate (TPY)	*De Minimis* Monitoring Concentration[a] ($\mu g/m^3$)
Sulfur Dioxide (SO_2)	NAAQS, NSPS	40	13, 24-hour
Total Particulate Matter (PM)	NSPS	25	10, 24-hour
Particulate Matter <10 microns (PM_{10})	NAAQS	15	10, 24-hour
Fine Particulate Matter ($PM_{2.5}$)	NAAQS	10; or 40 SO_2 or NO_x	2.3, 24-hour [c]
Nitrogen Oxides (NO_X)	NAAQS, NSPS	40	14, annual
Carbon Monoxide (CO)	NAAQS, NSPS	100	575, 8-hour
Volatile Organic Compounds (VOC)	NAAQS, NSPS	40	100 TPY[b]
Lead	NAAQS	0.6	0.1, 3-month
Sulfuric Acid Mist (SAM)	NSPS	7	NM
Total Fluorides	NSPS	3	0.25, 24-hour
Total Reduced Sulfur	NSPS	10	10, 1-hour
Reduced Sulfur Compounds	NSPS	10	10, 1-hour
Hydrogen Sulfide	NSPS	10	0.2, 1-hour
Mercury	NESHAP	0.1	0.25, 24-hour
MWC Organics	NSPS	3.5×10^{-6}	NM
MWC Metals	NSPS	15	NM
MWC Acid Gases	NSPS	40	NM
MSW Landfill Gases	NSPS	50	NM

[a] Short-term concentrations are not to be exceeded.

[b] No *de minimis* concentration; an increase in VOC or NO_x emissions of 100 TPY or more will require monitoring analysis for ozone.

[c] Proposed (Option 3 of three significant monitoring concentrations proposed), Federal Register, September 21, 2007.

Note: Ambient monitoring requirements for any pollutant may be exempted if the impact of the increase in emissions is below the *de minimis* monitoring concentrations.

MSW = municipal solid waste
MWC = municipal waste combustor
NAAQS = National Ambient Air Quality Standards
NESHAP = National Emission Standards for Hazardous Air Pollutants
NM = no ambient measurement method established, therefore no *de minimis* concentration has been established.
NSPS = New Source Performance Standards

Source: 40 CFR 52.21

TABLE 3-3
PSD APPLICABILITY ANALYSIS
MEDLEY LANDFILL, INC., MEDLEY, FLORIDA

Emission Source	Pollutant Emission Rate (TPY)						
	CO	NO_X	PM	PM_{10}	$PM_{2.5}$	SO_2	VOC
Proposed Facility Potential Emissions[a]							
CAT Engine emissions	452.8	77.6	22.3	22.3	22.3	127.7	21.1
Flare emissions	166.6	33.0	8.5	8.5	8.5	137.2	23.2
Total facility potential emissions	619.4	110.6	30.7	30.7	30.7	264.9	44.3
Baseline Actual[b]							
Highest two-year average	164.3	32.6	8.51	8.51	8.51	225.9	7.21
Increase Due to Project (Potential Actual - Baseline)	**455.1**	**78.1**	**22.2**	**22.2**	**22.2**	**39.0**	**37.1**
PSD Significant Emission Rate	100	40	25	15	10	40	40
PSD Review Triggered? (Y/N)	Yes	Yes	No	Yes	Yes	No	No

Note: Baseline PM_{10} and $PM_{2.5}$ emissions assumed to be the same as baseline PM emissions.

[a] Rerpesents worst-case emission scenario from Table 2-6.

[b] See Table C-2.

TABLE 4-1
MAXIMUM PREDICTED IMPACTS FOR PROJECT ONLY
COMPARED TO EPA *DE MINIMIS* CONCENTRATION LEVELS

Pollutant	Averaging Time	Maximum Concentration [a] (µg/m³)	*De Minimis* Concentration (µg/m³)	*Preconstruction* Monitoring Required ? (Yes/No)
NO_2	Annual	8.0	14	No
CO	8-Hour	629.4	575	Yes
PM_{10}	24-Hour	18.9	10	Yes
$PM_{2.5}$ [c]	24-Hour	18.9	2.3	Yes
O_3 (as VOC)	NA	37.1 TPY[b]	100 TPY[b]	No
O_3 (as NOx)	NA	78.1 TPY[b]	100 TPY[b]	No

[a] Maximum impact due to the proposed project only (see Table 6-9).
[b] Values shown are emissions increase due to the proposed project, in TPY. No *de minimis* concentration for ozone. An increase in emissions of 100 TPY or more requires a monitoring analysis for ozone.
[c] Proposed (Option 3 of three significant monitoring concentrations proposed), Federal Register, September 21, 2007.

TABLE 4-2
SUMMARY OF MEASURED PM_{10}/$PM_{2.5}$ CONCENTRATIONS FOR MONITORS NEAR MEDLEY LANDFILL, 2007 TO 2009

		Measurement Period		Concentration (µg/m³)			
				24-Hour			Annual
Site No.	Location	Year	Months	Highest	2nd Highest	98th Percentile	Average
PM_{10}	**Florida AAQS [a]:**			**NA**	**150 µg/m³**	**NA**	**50 µg/m³**
12-086-1016	NW 20 St & 12 Ave Fire Station, Miami-Dade, FL	2009	Jan-Dec	76	65	NA	23.0
		2008	Jan-Dec	72	51	NA	27.0
		2007	Jan-Dec	53	53	NA	24.0
12-011-3002	2701 Plunkett Street Hollywood, Broward, FL	2009	Jan-Dec	35	34	NA	17.6
		2008	Jan-Dec	82	64	NA	20.0
		2007	Jan-Dec	122	106	NA	22.0
$PM_{2.5}$	**Florida AAQS [a]:**			**NA**	**NA**	**35 µg/m³**	**15 µg/m³**
12-086-0033	7700 NW 186 Street, Miami-Dade, FL	2009	Jan-Dec	14.2	13.7	13.6	6.4
		2008	Jan-Dec	36.6	30.8	30.8	7.9
		2007	Jan-Dec	31.9	28.4	20.0	7.6
12-086-1016	Nw 20 St & 12 Ave Fire Station, Miami-Dade, FL	2009	Jan-Dec	19.7	19.0	14.5	7.5
		2008	Jan-Dec	35.9	22.8	18.5	8.4
		2007	Jan-Dec	42.1	35.3	21.4	8.9
12-011-3002	2701 Plunkett Street Hollywood, Broward, FL	2009	Jan-Dec	10.2	10.2	10.2	6.5
		2008	Jan-Dec	30.0	24.5	24.5	8.3
		2007	Jan-Dec	41.7	36.2	21.3	8.1

Note: NA = not applicable.
AAQS = ambient air quality standard.

[a] On October 17, 2006, EPA promulgated revised PM_{10} and $PM_{2.5}$ AAQS. The $PM_{2.5}$ AAQS had been promulgated on July 18, 1997. For PM_{10}, the annual standard was revoked and the 24-hour standard was retained. The 24-hour $PM_{2.5}$ standard was revised to 35 µg/m³ based on the 3-year averages of the 98th percentile values. The annual $PM_{2.5}$ standard of 15 µg/m³, based on 3-year averages at community monitors, was retained. FDEP has not yet adopted the revised standards, which must be implemented in the 2009-2010 timeframe.

Source: EPA, 2010.

TABLE 4-3
SUMMARY OF MAXIMUM MEASURED CO CONCENTRATIONS IN VICINITY OF MEDLEY LANDFILL, 2007 TO 2009

		Measurement Period		Concentration (μg/m^3)			
				1-Hour		8-Hour	
Site No.	Location	Year	Months	Highest	2nd Highest	Highest	2nd Highest
Carbon Monoxide	**Florida AAQS:**			**NA**	**40,000**	**NA**	**10,000**
12-086-1019	2201 SW 4 St, Miami-Dade, FL	2009	Jan-Dec	3,662	3,089	2,060	1,945
		2008	Jan-Dec	4,463	4,463	2,746	2,403
		2007	Jan-Dec	5,378	4,234	2,403	2,289
12-086-4002	Metro Annex 864 NW 3rd Street, Miami-Dade, FL	2009	Jan-Dec	3,318	3,089	2,632	2,517
		2008	Jan-Dec	3,204	2,975	2,403	1,831
		2007	Jan-Dec	4,348	3,890	2,403	2,289
12-011-3002	2701 Plunkett Street Hollywood, Broward, FL	2009	Jan-Dec	2,060	2,060	1,716	1,716
		2008	Jan-Dec	2,746	2,403	1,831	1,716
		2007	Jan-Dec	3,433	2,975	2,060	1,831

Note: NA = not applicable.
AAQS = ambient air quality standard.

Source: EPA Air Data, 2010.

TABLE 5-1
SUMMARY OF PM_{10}/$PM_{2.5}$ BACT DETERMINATIONS FOR LFG-FIRED IC ENGINES (2000-2009)

Facility Name	State	Permit Issued	Process Info	Fuel	Heat Input		Control Method	Emission Limit		Equivalent Rate		Pollutant
Sampson County Disposal LLC	Sampson, NC	9/9/2009	8 CAT 3520 Engines, 1,600 kW each	LFG	2,233.0	HP	GCP	0.15	g/bhp-hr	0.15	g/bhp-hr	PM_{10}
University Of New Hampshire	Strafford, NH	07/25/2007	LFG Engines	LFG	14.3	MMBtu/hr	Inlet Air Filter	0.10	g/bhp-hr	0.10	g/bhp-hr	PM_{10}
Waste Management Midpenn	Glenns, VA	05/29/2007	8 Caterpillar 3516s, 1,148 HP	LFG	10.1	MMBtu/hr	GCP	16.8	T/YR	1.52	g/bhp-hr	PM_{10}
Waste Management Midpenn	Glenns, VA	05/29/2007	8 Caterpillar 3516s, 1,148 HP	LFG	10.1	MMBtu/hr	GCP	16.8	T/YR	1.52	g/bhp-hr	$PM_{2.5}$
Brevard County - Central Disposal Facility	Brevard, FL	03/06/2007	Six 1.6 MW IC Engines, 2146 HP	LFG	1.6	MW	--	0.24	g/bhp-hr	0.24	g/bhp-hr	PM_{10}
Osceola Road Solid Waste Management Facility	FL	01/17/2007	Six 1.6 MW IC Engines, 2146 HP	LFG	1.6	MW	--	0.24	g/bhp-hr	0.24	g/bhp-hr	PM_{10}
Monmouth County Reclamation Center	Monmouth, NJ	12/12/2006	LFG Engine	LFG	183,263,744.0	SCF/YR	--	0.58	lb/hr			PM_{10}
Manchester Renewable Power Corporation	Ocean, NJ	10/06/2006	6 LFGFired Reciprocating Engines	LFG	2,233.0	HP	--	0.20	g/bhp-hr	0.20	g/bhp-hr	PM_{10}
Manchester Renewable Power Corporation	Ocean, NJ	10/06/2006	6 LFGFired Reciprocating Engines	LFG	2,233.0	HP	--	0.98	lb/hr	0.20	g/bhp-hr	$PM_{2.5}$
Burlington County Resource Recovery Complex	Burlington, NJ	08/03/2006	5 LFG Fired IC Engines	LFG	12.5	MMBtu/hr	--	0.75	lb/hr			PM_{10}
Trail Ridge Landfill, Inc	Duval, FL	02/24/2006	IC Engines	LFG	1.6	MW	--	0.24	g/bhp-hr	0.24	g/bhp-hr	PM_{10}
Ridgewood Rhode Island Generation LLC	Providence, RI	01/05/2005	4-CAT 3520C Engines	LFG	2,229.0	HP	GCP	0.10	g/bhp-hr	0.10	g/bhp-hr	PM_{10}
New LFG Fueled Power Generation Facility	Bexar, TX	07/23/2004	8 CAT G3520C Engines, 2172 BHP	LFG	2,172.0	HP	maintenance	0.71	lb/hr	0.15	g/bhp-hr	PM_{10}
Ingenco	Chesapeake, VA	12/17/2003	36 Dual-fuel IC Engines	LFG	550.0	HP	Proper maintenance	0.11	lb/MMBtu			PM_{10}
Carbon Limestone LFG	Mahoning, OH	04/10/2003	16 IC Engines, 14 MMBtu/hr	LFG	1,877.0	HP	--	0.40	lb/hr	0.097	g/bhp-hr	PM_{10}
Chino Basin Desalter Authority	San Bernardino, CA	06/18/2002	LFG Fired IC Engines	LFG	10.8	MMBtu/hr	--	0.20	lb/hr			PM_{10}
Reliant Security LFGTE	Montgomery, TX	01/31/2002	4 Generator Engines, 1,664 KW	LFG	2,231.0	HP	GCP	0.84	T/YR	0.039	g/bhp-hr	PM_{10}
Reliant Energy Galveston Plant	Galveston, TX	01/24/2002	7 Jenbacher Engines, 12 MW Total	LFG	2,343.0	HP	--	0.49	lb/hr	0.095	g/bhp-hr	PM_{10}

Source: EPA 20010 (RBLC database)

Note: GCP= good combustion practices

TABLE 5-2
SUMMARY OF NO_x BACT DETERMINATIONS FOR LFG-FIRED IC ENGINES (2000-2009)

Facility Name	State	Permit Issued	Process Info	Fuel	Heat Input		Control Method	Emission Limit		Equivalent Rate		Pollutant
Sampson County Disposal LLC	Sampson, NC	9/9/2009	8 CAT 3520 Engines, 1,600 kW each	LFG	2,233.0	HP	GCP	0.50	g/bhp-hr	0.50	g/bhp-hr	BACT-PSD
Pine Tree Landfill	Pennobscot, ME	10/15/2007	LFG Fired Engines, 10.8 MMBtu/hr	LFG	1,359.0	HP	--	1.94	lb/hr	0.65	lb/hr	BACT-PSD
University Of New Hampshire	Strafford, NH	07/25/2007	LFG Fired Engines	LFG	14.3	MMBTU/H	Combustion Controls	0.5	g/bhp-hr	0.5	g/bhp-hr	LAER
Waste Management Midpenn	Glenns, VA	05/29/2007	8 Caterpillar Engine/Generators	LFG	10.1	MMBtu/hr	GCP	128.30	TPY	128.30	TPY	BACT-PSD
Brevard County - Central Disposal Facility	Brevard, FL	03/06/2007	Six 1.6 MW IC Engines	LFG	1.6	MW	GC	0.60	g/bhp-hr	0.6	g/bhp-hr	BACT-PSD
Osceola Road Solid Waste Management Facility	FL	01/17/2007	IC Engines	LFG	1.6	MW	GC	0.60	g/bhp-hr	0.6	g/bhp-hr	BACT-PSD
Bethel Landfill	Hampton, VA	07/25/2006	Engine/Generators Recovery System	LFG	10.1	MMBtu/hr	Low Emission Engines	3.80	lb/hr	3.80	lb/hr	BACT-PSD
Trail Ridge Landfill, Inc	Duval, FL	02/24/2006	Internal Combustion Engines	LFG	1.6	MW	GC	0.60	g/bhp-hr	0.6	g/bhp-hr	BACT-PSD
Monmouth County Reclamation Center	Monmouth, NJ	12/12/2006	LFG Fired Engine	LFG	183,263,744.0	SCF/YR	--	0.53	g/bhp-hr	0.53	g/bhp-hr	LAER
Manchester Renewable Power Corporation	Ocean, NJ	10/06/2006	6 LFG Fired Engines	LFG			A/F Controller	0.5	g/bhp-hr	0.5	g/bhp-hr	LAER
Burlington County Resource Recovery Complex	Burlington, NJ	08/03/2006	5 LFG Fired Engines	LFG	12.5	MMBTU/H	GCP	0.6	g/bhp-hr	0.6	g/bhp-hr	LAER
Ridgewood Rhode Island Generation LLC	Providence, RI	01/05/2005	4-CAT 3520C Lean Burn Engines	LFG	2,229.0	HP	A/F Controller	0.5	g/bhp-hr	0.5	g/bhp-hr	LAER
New LFG Fueled Power Generation Facility	Bexar, TX	07/23/2004	8 CAT G3520C Engines, 2172 BHP	LFG	2,172.0	HP	Lean Burn Design	2.87	lb/hr	0.6	g/bhp-hr	BACT-PSD
Carlton Farms Landfill	Wayne, MI	12/23/2003	Six Internal Combustion Engines	LFG	8.6	MMBtu/hr	GCP	4.52	lb/hr	4.52	lb/hr	BACT-PSD
Ingenco	Chesapeake, VA	12/17/2003	36 Dual Fuel IC Engines	LFG	550.0	HP	A/F Controller	2.1	lb/MMBtu	2.1	lb/MMBtu	Other Case-by-Case
Northwest Regional Landfill	Maricopa, AZ	10/27/2003	IC Engine	LFG	1,410	HP	--	0.60	g/bhp-hr	0.60	g/bhp-hr	BACT-PSD
Carbon Limestone LFG	Mahoning, OH	04/10/2003	16 IC Engines, 14 MMBtu/hr	LFG	1,877.0	HP	Lean Burn Design	4.9	lb/hr	1.2	g/bhp-hr	BACT-PSD
Chino Basin Desalter Authority	San Bernardino, CA	06/18/2002	LFG or DG Fired IC Engines	DG	10.8	MMBTU/H	A/F Controller	0.6	g/bhp-hr	0.6	g/bhp-hr	BACT-PSD
MM San Bernardino Energy, LLC	San Bernardino, CA	05/16/2002	LFG Fired ICE, 1850 BHP	LFG	14.7	MMBtu/hr	A/F Controller	0.60	g/bhp-hr	0.6	g/bhp-hr	BACT-PSD
Reliant Security LFGTE	Montgomery, TX	01/31/2002	4 Generator Engines, 1,664 KW	LFG	2,231.0	HP	GCP	0.6	g/bhp-hr	0.6	g/bhp-hr	BACT-PSD
Reliant Energy Galveston Plant	Galveston, TX	01/24/2002	7 Jenbacher Engines, 12 MW Total	LFG	2,343.0	HP	--	3.1	lb/hr	0.6	g/bhp-hr	Other Case-by-Case
Green Knight/Plainfield Landfill Gas	Northampton, PA	08/04/2001	Turbine, Simple Cycle, (3)	LFG	3.0	MW	GCP	7.5	lb/hr	7.5	lb/hr	BACT-PSD

Source: EPA 2008 (RBLC database)

Note: GCP = good combustion practices; GC = good combustion; LFG = Landfill gas; DG = Digester gas

TABLE 5-3
SUMMARY OF CO BACT DETERMINATIONS FOR LFG-FIRED IC ENGINES (2000-2009)

Facility Name	State	Permit Issued	Process Info	Fuel	Heat Input		Control Method	Emission Limit		Equivalent Rate		Pollutant
Sampson County Disposal LLC	Sampson, NC	9/9/2009	8 CAT 3520 Engines, 1,600 kW each	LFG	2,233.0	HP	GCP	2.75	g/bhp-hr	2.75	g/bhp-hr	BACT-PSD
Pine Tree Landfill	Pennobscot, ME	10/15/2007	LFG Fired Engines, 10.8 MMBtu/hr	LFG	1,359.0	HP	--	2.75	g/bhp-hr	2.75	g/bhp-hr	BACT-PSD
Waste Management Midpenn	Glenns, VA	05/29/2007	8 Caterpillar Engine/Generators	LFG	10	MMBtu/hr	GCP	239.00	TPY	239.00	TPY	BACT-PSD
Brevard County - Central Disposal Facility	Brevard, FL	03/06/2007	Six 1.6 MW IC Engines	LFG	2	MW	GC	2.75	g/bhp-hr	2.75	g/bhp-hr	BACT-PSD
Osceola Road Solid Waste Management Facility	FL	01/17/2007	IC Engines	LFG	2	MW	GC	2.75	g/bhp-hr	2.75	g/bhp-hr	BACT-PSD
Bethel Landfill	Hampton, VA	07/25/2006	Engine/Generators Recovery System	LFG	10	MMBtu/hr	--	6.8	lb/hr	6.8	lb/hr	BACT-PSD
Trail Ridge Landfill, Inc	Duval, FL	02/24/2006	IC Engines	LFG	2	MW	GC	2.75	g/bhp-hr	2.75	g/bhp-hr	BACT-PSD
Pine Tree Landfill	Penobscot	10/15/2007	LFG Fired Engines	LFG	11	MMBtu/hr	--	2.75	g/bhp-hr	2.75	g/bhp-hr	BACT-PSD
University Of New Hampshire	Strafford	07/25/2007	LFG Engines	LFG	14	MMBtu/hr	GCP	2.75	g/bhp-hr	2.75	g/bhp-hr	BACT-PSD
Brevard County Solid Waste Mgmt Landfill	Brevard	03/06/2007	Six 1.6 MW IC Engines	LFG	2	MW	GC	2.75	g/bhp-hr	2.75	g/bhp-hr	BACT-PSD
Osceola Road Solid Waste Management Facility		01/17/2007	IC Engines	LFG	2	MW	GC	2.75	g/bhp-hr	2.75	g/bhp-hr	BACT-PSD
Monmouth County Reclamation Center	Monmouth	12/12/2006	LFG Engines	LFG	183,263,744	SCF/YR	--	2.53	g/bhp-hr	2.53	g/bhp-hr	Other Case-by-Case
Manchester Renewable Power Corporation	Ocean	10/06/2006	6 LFG Fueled Reciprocating Engines	LFG			--	2.75	g/bhp-hr	2.75	g/bhp-hr	BACT-PSD
Burlington County Resource Recovery Complex	Burlington	08/03/2006	5 LFG Fired IC Engines	LFG	13	MMBtu/hr	--	2.5	g/bhp-hr	2.5	g/bhp-hr	Other Case-by-Case
Trail Ridge Landfill, Inc	Duval	02/24/2006	IC Engines	LFG	2	MW	GC	2.75	g/bhp-hr	2.75	g/bhp-hr	BACT-PSD
Ridgewood Rhode Island Generation LLC	Providence	01/05/2005	4-CAT 3520C Engines	LFG	2,229	HP	GCP	2.75	g/bhp-hr	2.75	g/bhp-hr	BACT-PSD
New LFG Fueled Power Generation Facility	Bexar	07/23/2004	8 CAT G3520C Engines, 2172 BHP	LFG			Proper Operation & Maintenance	13.41	lb/hr	2.8	g/bhp-hr	BACT-PSD
Ingenco	Chesapeake	12/17/2003	IC Engines, Dual Fuel, (36)	LFG	550	HP	LFG heat Input Ratio < 50%	3.2	LB/MMBTU	7.7	g/bhp-hr	Other Case-by-Case
Carlton Farms Landfill	Wayne, MI	12/23/2003	6 IC Engines	LFG	8.6	MMBtu/hr	GCP	7.28	lb/hr	7.28	lb/hr	BACT-PSD
Northwest Regional Landfill	Maricopa, AZ	10/27/2003	IC Engine	LFG	1,410	HP	--	2.50	g/bhp-hr	2.50	g/bhp-hr	BACT-PSD
Carbon Limestone LFG	Mahoning	04/10/2003	16 IC Engines, 14 MMbtu/Hr	LFG	1,877.0	HP	--	9.4	lb/hr	2.27	g/bhp-hr	BACT-PSD
Chino Basin Desalter Authority	San Bernardino	06/18/2002	LFG Fired IC Engines	DG	11	MMBtu/hr	A/F Controller	2.5	g/bhp-hr	2.5	g/bhp-hr	BACT-PSD
MM San Bernardino Energy, LLC	San Bernardino, CA	05/16/2002	LFG or DG Fired IC Engines	LFG	15	MMBtu/hr, 1850 BHP	A/F Controller	2.50	g/bhp-hr	2.50	g/bhp-hr	BACT-PSD
Reliant Security LFGTE	Montgomery	01/31/2002	4 Generator Engines, 1,664 KW	LFG	2,231.0	HP	GCP	3	g/bhp-hr	3.0	g/bhp-hr	BACT-PSD
Reliant Energy Galveston Plant	Galveston	01/24/2002	7 Jenbacher Engines, 12 MW Total	LFG	2,343.0	HP	--	15.5	lb/hr	3.0	g/bhp-hr	Other Case-by-Case
Green Knight/Plainfield Landfill Gas	Northampton, PA	08/04/2001	Turbine, Simple Cycle, (3)	LFG	3	MW	GCP	14.4	lb/hr	14.4	lb/hr	BACT-PSD

Source: EPA 2008 (RBLC database)

Note: GCP = good combustion practices; GC = good combustion; LFG = Landfill gas; DG = Digester gas; A/F Controller - Air/Fuel Controller.

TABLE 6-1

MAJOR FEATURES OF THE AERMOD MODEL, VERSION 09292

AERMOD Model Features
• Plume dispersion/growth rates are determined by the profile of vertical and horizontal turbulence, vary with height, and use a continuous growth function.
• In a convective atmosphere, uses three separate algorithms to describe plume behavior as it comes in contact with the mixed layer lid; in a stable atmosphere, uses a mechanically mixed layer near the surface.
• Polar or Cartesian coordinate systems for receptor locations can be included directly or by an external file reference.
• Urban model dispersion is input as a function of city size and population density; sources can also be modeled individually as urban sources.
• Stable plume rise: uses Briggs equations with winds and temperature gradients at stack top up to half-way up to plume rise. Convective plume rise: plume superimposed on random convective velocities.
• Procedures suggested by Briggs (1974) for evaluating stack-tip downwash.
• Has capability of simulating point, volume, area, and multi-sized area sources.
• Accounts for the effects of vertical variations in wind and turbulence (Brower et al., 1998).
• Uses measured and computed boundary layer parameters and similarity relationships to develop vertical profiles of wind, temperature, and turbulence (Brower et al., 1998).
• Concentration estimates for 1-hour to annual average times.
• Creates vertical profiles of wind, temperature, and turbulence using all available measurement levels.
• Terrain features are depicted by use of a controlling hill elevation and a receptor point elevation.
• Modeling domain surface characteristics are determined by selected direction and month/season values of surface roughness length, albedo, and Bowen ratio.
• Contains both a mechanical and convective mixed layer height, the latter based on the hourly accumulation of sensible heat flux.
• The method of Pasquill (1976) to account for buoyancy-induced dispersion.
• A default regulatory option to set various model options and parameters to EPA-recommended values.
• Contains procedures for calm-wind and missing data for the processing of short term averages.

Note: AERMOD = The American Meteorological Society and EPA Regulatory Model.

Source: Paine et al., 2007.

TABLE 6-2
MAJOR FEATURES OF THE CALPUFF MODEL, VERSION 5.8

CALPUFF Model Features
• Source types: Point, line (including buoyancy effects), volume, area (buoyant, non-buoyant).
• Non-steady-state emissions and meteorological conditions (time-dependent source and emission data; gridded 3-dimensional wind and temperature fields; spatially-variable fields of mixing heights, friction velocity, precipitation, Monin-Obukhov length; vertically and horizontally-varying turbulence and dispersion rates; time-dependent source and emission data for point, area, and volume sources; temporal or wind-dependent scaling factors for emission rates).
• Efficient sampling function (integrated puff formulation; elongated puff (slug) formation).
• Dispersion coefficient options (Pasquill-Gifford (PG) values for rural areas; McElroy-Pooler values (MP) for urban areas; CTDM values for neutral/stable; direct measurements or estimated values).
• Vertical wind shear (puff splitting; differential advection and dispersion).
• Plume rise (buoyant and momentum rise; stack-tip effects; building downwash effects; partial plume penetration above mixing layer).
• Building downwash effects (Huber-Snyder method; Schulman-Scire method, PRIME).
• Complex terrain effects (steering effects in CALMET wind field; puff height adjustments using ISC model method or plume path coefficient; enhanced vertical dispersion used in CTDMPLUS).
• Subgrid scale complex terrain (CTSG option) (CTDM flow module; dividing streamline as in CTDMPLUS).
• Dry deposition (gases and particles; options for diurnal cycle per pollutant, space and time variations with a resistance model, or none).
• Overwater and coastal interaction effects (overwater boundary layer parameters; abrupt change in meteorological conditions, plume dispersion at coastal boundary; fumigation; option to use Thermal Internal Boundary Layers (TIBL) into coastal grid cells).
• Chemical transformation options (Pseudo-first-order chemical mechanisms for SO_2, SO_4, HNO_3, and NO_3; Pseudo-first-order chemical mechanisms for SO_2, SO_4, NO, NO_2, HNO_3, and NO_3 (RIVAD/ARM3 method); user-specified diurnal cycles of transformation rates; no chemical conversions).
• Wet removal (scavenging coefficient approach; removal rate as a function of precipitation intensity and type).
• Graphical user interface.
• Interface utilities (scan ISC-PRIME and AUSPLUME meteorological data files for problems; translate ISC-PRIME and AUSPLUME input files to CALPUFF input files).

Note: CALPUFF = California Puff Model

Source: EPA, 2007.

TABLE 6-3
MODELED EMISSION RATES FOR THE MEDLEY LANDFILL, INC., MEDLEY, FLORIDA

Source	No. of Units	CO Short-Term & Annual (TPY)	CO Short-Term & Annual (lb/hr)	CO Short-Term & Annual (g/s)	NO_X Short-Term & Annual (TPY)	NO_X Short-Term & Annual (lb/hr)	NO_X Short-Term & Annual (g/s)	$PM/PM_{10}/PM_{2.5}$ Short-Term & Annual (TPY)	$PM/PM_{10}/PM_{2.5}$ Short-Term & Annual (lb/hr)	$PM/PM_{10}/PM_{2.5}$ Short-Term & Annual (g/s)
Scenario 1: Six CAT 3520 engines + 3,789 scfm LFG combusted in the enclosed flare										
CAT 3520 Engine[a]	6	452.80	103.38	13.03	77.62	17.72	2.23	22.25	5.08	0.64
6,000 scfm Enclosed Flare	1	99.57	22.73	2.86	29.87	6.82	0.86	8.46	1.93	0.24
3,000 scfm Open Flare	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scenario 2: Six CAT 3520 engines + 3,789 scfm LFG combusted in the flares										
CAT 3520 Engine[a]	6	452.80	103.38	13.03	77.62	17.72	2.23	22.25	5.08	0.64
6,000 scfm Enclosed Flare	1	20.73	4.73	0.60	6.22	1.42	0.18	1.76	0.40	0.05
3,000 scfm Open Flare	1	145.85	33.30	4.20	26.81	6.12	0.77	6.70	1.53	0.19
Scenario 3: 6,000 scfm LFG in enclosed flare + 1,317 scfm LFG in open flare										
CAT 3520 Engine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6,000 scfm Enclosed Flare	1	157.68	36.00	4.54	47.30	10.80	1.36	13.40	3.06	0.39
3,000 scfm Open Flare	1	64.03	14.62	1.84	11.77	2.69	0.34	2.94	0.67	0.08
Scenario 4: 3,000 scfm LFG in open flare + 4,317 scfm LFG in enclosed flare										
CAT 3520 Engine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6,000 scfm Enclosed Flare	1	113.45	25.90	3.26	34.04	7.77	0.98	9.64	2.20	0.28
3,000 scfm Open Flare	1	145.85	33.30	4.20	26.81	6.12	0.77	6.70	1.53	0.19

[a] Emissions shown for the CAT 3520 Engines are total for all six units.

TABLE 6-4
MODEL PARAMETERS USED FOR THE SIGNIFICANT IMPACT ANALYSIS, MEDLEY LANDFILL INC

Source Description	Model ID	UTM NAD83		Stack Parameters									
				Physical				Operating					
		East	North	Height		Diameter		Temperature		Exhuast Flow	Velocity		
		(m)	(m)	(ft)	(m)	(ft)	(m)	(^{o}F)	(K)	(acfm)	(fps)	(m/s)	
CAT 3520 Engine 1	ENG1	565,902	2,859,867	33.0	10.1	1.2	0.36	910	760.9	12,476	188.1	57.32	
CAT 3520 Engine 2	ENG2	565,898	2,859,867	33.0	10.1	1.2	0.36	910	760.9	12,476	188.1	57.32	
CAT 3520 Engine 3	ENG3	565,893	2,859,867	33.0	10.1	1.2	0.36	910	760.9	12,476	188.1	57.32	
CAT 3520 Engine 4	ENG4	565,889	2,859,867	33.0	10.1	1.2	0.36	910	760.9	12,476	188.1	57.32	
CAT 3520 Engine 5	ENG5	565,884	2,859,867	33.0	10.1	1.2	0.36	910	760.9	12,476	188.1	57.32	
CAT 3520 Engine 6	ENG6	565,871	2,859,872	33.0	10.1	1.2	0.36	910	760.9	12,476	188.1	57.32	
6,000 scfm Enclosed Flare	EU005	565,813	2,859,885	55.0	16.8	12.5	3.81	1830	1272.0	284,276[a]	38.6	11.77	
3,000 scfm Open Flare	EU001	565,813	2,859,846	58.0	17.7	2.0	0.61	1832	1273.0 [b]	11,319	60.1	18.30	

Source: Caterpillar, 2010; WM, 2010.

[a] Based on stack test on 3/24/08 (see Table C-3).

[b] Based on Air Quality Modeling Guidelines from Texas. This is also default parameter used in AERMOD for flare modeling.

TABLE 6-5

SUMMARY OF THE NO_x FACILITIES CONSIDERED FOR INCLUSION IN THE AAQS AND PSD CLASS II AIR MODELING ANALYSES

AIRS Number	Facility	County	UTM Coordinates East (km)	UTM Coordinates North (km)	Relative to Medley Landfill [a] X (km)	Relative to Medley Landfill [a] Y (km)	Distance (km)	Direction (deg)	Maximum NO_x Emissions (TPY)	Q, (TPY) Emission Threshold [b,c] (Dist - SID) x 20	Include in Modeling Analysis ?
Modeling Area [d]											
0250615	Waste Mangement - Medley Landfill	Miami-Dade	565.9	2,859.9	0.0	0.0	0.00	0	40.2	SIA	YES
0251196	Aviation Engine Service Inc.	Miami-Dade	566.6	2,859.6	0.7	-0.3	0.79	110	47.0	SIA	YES
0250022	U.S. Foundry Manufacturing Corp.	Miami-Dade	567.3	2,859.8	1.4	-0.1	1.40	94	11.1	SIA	YES
0250640	AAR Landing Gear Services	Miami-Dade	564.6	2,860.6	-1.3	0.7	1.52	298	7.4	SIA	YES
0250488	Benada Aluminum of Florida	Miami-Dade	567.4	2,859.4	1.5	-0.5	1.58	108	0.7	SIA	YES
0251194	Hometown Bagel - Bagelmania	Miami-Dade	564.5	2,861.7	-1.4	1.8	2.27	320	0.0	SIA	YES
0250492	Industrial Metal Spraying	Miami-Dade	568.4	2,859.2	2.5	-0.7	2.60	106	0.5	SIA	YES
0250348	Miami Dade RRF/Montenay	Miami-Dade	563.8	2,857.6	-2.1	-2.3	3.08	222	2,459.6	SIA	YES
0250020	Titan America-Pennsuco Cement	Miami-Dade	562.3	2,861.7	-3.6	1.8	4.05	296	1,228.6	SIA	YES
0250005	General Asphalt - Plant No. 1	Miami-Dade	568.8	2,855.4	2.9	-4.5	5.35	147	100.0	SIA	YES
Screening Area [d]											
0250378	Quikrete Miami	Miami-Dade	562.0	2,863.9	-3.9	4.0	5.59	316	1.0	1.7	NO
0250281	Hialeah/Preston Water Treatment Plant	Miami-Dade	571.2	2,856.8	5.3	-3.1	6.12	120	11.0	12.4	YES
0251186	Aerothrust Corp	Miami-Dade	569.2	2,853.1	3.3	-6.8	7.54	154	100.0	40.8	YES
0251286	Quality Technology Services - Miami	Miami-Dade	562.5	2,853.1	-3.4	-6.8	7.62	207	15.2	42.3	NO
0250608	H & R Paving	Miami-Dade	563.8	2,852.1	-2.1	-7.8	8.04	195	5.0	50.7	NO
0250393	Miami International Airport	Miami-Dade	570.6	2,853.4	4.7	-6.5	8.04	144	48.2	50.9	NO
0250624	General Asphalt Plant Wdhma	Miami-Dade	569.7	2,868.3	3.8	8.4	9.23	24	81.3	74.6	YES
0250665	H & J Asphalt Plant	Miami-Dade	575.1	2,855.0	9.2	-4.9	10.42	118	6.6	98.5	NO
0250945	Taallowmasters	Miami-Dade	558.7	2,852.3	-7.3	-7.6	10.47	224	6.7	99.5	NO
0250014	Miami Cement Plant	Miami-Dade	557.8	2,851.7	-8.1	-8.2	11.51	224	2,600.3	120.2	YES
7775221	Ranger Construction, South - Miami No. 2.	Miami-Dade	558.1	2,868.9	-7.8	9.0	11.93	319	8.0	128.6	NO
0250252	Miami Plant	Miami-Dade	557.0	2,869.3	-8.9	9.4	12.94	317	12.8	148.9	NO
0250603	Miami Dade Solid Wste Mgmt/No Dade Lf	Miami-Dade	570.7	2,872.1	4.8	12.2	13.14	21	259.6	152.7	YES
0250232	Jackson Memorial Hospital	Miami-Dade	578.0	2,852.7	12.1	-7.2	14.09	121	18.5	171.7	NO
0250157	VA Medical Center	Miami-Dade	578.6	2,852.6	12.7	-7.3	14.65	120	68.7	183.0	NO
0250664	Flowers Baking Company of Miami	Miami-Dade	579.2	2,868.9	13.3	9.0	16.02	56	2.0	210.3	NO
0250314	Alexander ORR Water Treatment Plant	Miami-Dade	567.5	2,843.4	1.6	-16.5	16.62	175	436.0	222.4	YES
0250600	North District Wastewater Treatment Plant	Miami-Dade	584.6	2,866.9	18.7	7.0	19.99	69	229.4	289.8	NO
0112370	Broward County Interim Contingency Lf	Broward	557.6	2,880.1	-8.3	20.2	21.89	338	6.7	327.8	NO
0250476	Central District Wastewater Treatment Plant	Miami-Dade	584.6	2,847.8	18.7	-12.1	22.31	123	151.4	336.1	NO
7775212	Weekley Asphalt Paving, Inc., Plant No 1	Broward	557.3	2,880.6	-8.6	20.7	22.41	337	5.5	338.2	NO
0250257	Krome Quarry	Miami-Dade	550.2	2,842.4	-15.7	-17.5	23.53	222	30.9	360.6	NO
0110002	Memorial Regio Hosp./So. Broward Hosp. Dist.	Broward	581.2	2,877.9	15.3	18.0	23.62	40	7.1	362.4	NO
0112410	Sfwmd Pump Station S-9/S-9a	Broward	555.5	2,882.3	-10.4	22.4	24.73	335	243.0	384.6	NO
0250001	FP&L -Cutler Power Plant	Miami-Dade	569.9	2,835.0	4.0	-24.9	25.24	171	2,242.6	394.8	YES
0111014	Angstrom Graphics	Broward	585.3	2,878.6	19.4	18.7	26.95	46	1.2	428.9	NO
0112119	Wheelabrator South Broward	Broward	579.5	2,883.3	13.6	23.4	27.12	30	1,497.0	432.4	YES
0110037	Ft. Lauderdale Power Plant	Broward	580.1	2,883.6	14.2	23.7	27.61	31	10,395.6	442.2	YES
0110050	Motiva Enterprises - South	Broward	586.8	2,884.6	20.9	24.7	32.36	40	10.0	537.1	NO
0112688	Vencenergy Logistics Port Everglades Term	Broward	587.0	2,885.2	21.1	25.3	32.96	40	17.7	549.2	NO
0110054	Citgo - Port Everglades Terminal	Broward	586.9	2,885.7	21.0	25.8	33.27	39	7.9	555.3	NO
0110036	FP&L - Port Everglades Power Plant	Broward	587.4	2,885.3	21.5	25.4	33.28	40	59,031.9	555.6	YES
0110053	Transmontaige Port Everglades (South)	Broward	587.1	2,885.6	21.2	25.7	33.32	40	11.8	556.3	NO
0110069	Transmontaigne - North Terminal	Broward	586.4	2,886.3	20.5	26.4	33.39	38	3.5	557.9	NO
0110034	High Sierra Terminaling, LLC	Broward	586.5	2,886.5	20.6	26.6	33.63	38	9.3	562.6	NO
0250520	South District Wastewater Treatment Plant	Miami-Dade	565.8	2,825.6	-0.1	-34.3	34.32	180	526.5	576.3	NO
0250623	Miami Dade Solid Waste Mgmt. / South Dade LF	Miami-Dade	565.5	2,825.1	-0.4	-34.8	34.79	181	33.6	585.8	NO
0250553	Homestead Air Reserve Base	Miami-Dade	559.9	2,820.1	-6.0	-39.8	40.25	189	2.7	695.0	NO
0112152	Gold Coast Crematory	Broward	584.7	2,897.8	18.8	37.9	42.29	26	10.2	735.8	NO
0111019	Holy Cross Hospital	Broward	587.1	2,896.5	21.2	36.6	42.31	30	10.9	736.2	NO
0250013	Gordon W. Ivey Power Plant	Miami-Dade	552.8	2,817.5	-13.2	-42.4	44.37	197	435.7	777.5	NO
0250003	Turkey Point Power Plant	Miami-Dade	566.8	2,813.2	0.9	-46.7	46.67	179	18,967.2	823.3	YES
0110003	W R Grace & Co	Broward	585.7	2,902.8	19.8	42.9	47.27	25	1.2	835.4	NO

TABLE 6-5
SUMMARY OF THE NO_x FACILITIES CONSIDERED FOR INCLUSION IN THE AAQS AND PSD CLASS II AIR MODELING ANALYSES

AIRS Number	Facility	County	UTM Coordinates East (km)	UTM Coordinates North (km)	Relative to Medley Landfill [a] X (km)	Relative to Medley Landfill [a] Y (km)	Relative to Medley Landfill [a] Distance (km)	Relative to Medley Landfill [a] Direction (deg)	Maximum NO_x Emissions (TPY)	Q, (TPY) Emission Threshold [b,c] (Dist - SID) x 20	Include in Modeling Analysis ?
0112357	Broward County/North Regional Wwtf	Broward	583.5	2,905.0	17.6	45.1	48.42	21	88.3	858.4	NO
0110038	Bonsal American	Broward	586.2	2,904.6	20.3	44.7	49.09	24	22.1	871.9	NO
0112702	Neptune Society Pompano Beach	Broward	584.8	2,907.0	18.9	47.1	50.71	22	1.3	904.2	NO
0112120	Wheelabrator North Broward	Broward	583.9	2,907.6	18.0	47.7	50.98	21	1,399.2	909.7	YES
0112094	Central Disposal	Broward	583.2	2,908.0	17.3	48.1	51.12	20	74.8	912.3	NO
0110005	Pavex Deerfield Plant	Broward	584.3	2,908.0	18.4	48.1	51.50	21	5.0	920.0	NO
0110045	Hardrives / Deerfield Plant	Broward	583.8	2,909.1	17.9	49.2	52.38	20	10.8	937.6	NO
0250587	Asphalt Group, Inc.	Miami-Dade	563.5	2,806.9	-2.4	-53.0	53.05	183	19.4	951.1	NO
Beyond Screening Area out to 100 km [d]											
0990354	SFWMD - Pump Station S-7	Palm Beach	545.8	2,912.8	-20.1	52.9	56.56	339	235.5	1,021.3	NO
0210031	Raccoon Point	Collier	509.6	2,873.2	-56.3	13.3	57.85	283	543.7	1,047.0	NO
0990015	Boca Raton Resort And Club	Palm Beach	592.0	2,913.7	26.1	53.8	59.84	26	12.4	1,086.7	NO
0990119	Boca Raton Community Hospital	Palm Beach	589.5	2,915.7	23.6	55.8	60.56	23	12.3	1,101.2	NO
0990550	SFWMD - Pump Station G-335	Palm Beach	552.6	2,922.0	-13.3	62.1	63.50	348	60.7	1,160.0	NO
0990614	SFWMD - Pump Station G-370	Palm Beach	540.5	2,919.5	-25.4	59.6	64.79	337	248.5	1,185.8	NO
0110351	SFWMD Pump Station S-8 & G-404	Broward	522.3	2,912.2	-43.6	52.3	68.09	320	771.2	1,251.8	NO
0990350	Sfwmd / Pump Station S-6	Palm Beach	596.2	2,927.8	30.3	67.9	74.36	24	494.6	1,377.2	NO
0990095	Bethesda Memorial Hospital	Palm Beach	592.6	2,931.9	26.7	72.0	76.81	20	34.2	1,426.3	NO
0990615	SFWMD - Pump Station G-372	Palm Beach	519.3	2,923.6	-46.6	63.7	78.91	324	245.4	1,468.2	NO
0990549	SFWMD - Pump Station G-310	Palm Beach	554.2	2,940.5	-11.7	80.5	81.40	352	498.0	1,517.9	NO
0990621	SFWMD - Pump Station S-362	Palm Beach	567.2	2,945.0	1.3	85.1	85.09	1	249.2	1,591.8	NO
0990016	Atlantic Sugar Mill	Palm Beach	553.0	2,945.4	-12.9	85.5	86.46	351	1,110.6	1,619.1	NO
0990045	L.W. Utilities / Tom G. Smith Pwr Plant	Palm Beach	592.8	2,943.7	26.9	83.8	88.01	18	5,863.6	1,650.2	YES
0990005	Okeelanta Sugar Refinery	Palm Beach	524.9	2,940.1	-41.0	80.2	90.07	333	84.4	1,691.4	NO
0990332	Okeelanta Cogeneration Plant - New Hope Power Co.	Palm Beach	524.4	2,940.0	-41.5	80.1	90.27	333	1,498.0	1,695.3	NO
0990620	SFWMD - Pump Station S-319	Palm Beach	566.3	2,951.2	0.4	91.3	91.32	0	241.4	1,716.4	NO
0990349	SFWMD - Pump Station S-5a	Palm Beach	562.6	2,951.3	-3.3	91.4	91.46	358	249.4	1,719.2	NO
0990530	Hubbard / East Coast Paving (Wpb)	Palm Beach	562.8	2,952.0	-3.1	92.1	92.12	358	29.4	1,732.5	NO
0990310	Community Asphalt / Wpb Plant	Palm Beach	582.3	2,950.9	16.4	91.0	92.47	10	33.9	1,739.3	NO
0990087	Ranger Construction / (Royal Palm Beach)	Palm Beach	579.9	2,951.7	14.0	91.8	92.86	9	24.8	1,747.2	NO
0990646	Fp&L / West County Energy Center	Palm Beach	562.2	2,952.9	-3.7	93.0	93.08	358	665.6	1,751.6	NO
0990333	Compressor Station No. 21	Palm Beach	584.3	2,952.8	18.4	92.9	94.74	11	156.2	1,784.8	NO
0990566	Indian Trail Improvement District - Aci	Palm Beach	565.7	2,956.4	-0.2	96.5	96.49	360	22.1	1,819.8	NO
0990026	Sugar Cane Growers Co-Op	Palm Beach	534.9	2,953.9	-31.0	94.0	98.95	342	3,470.7	1,869.0	YES

Note: NA = Not applicable, ND = No data, SID = Significant impact distance for the project, SIA = Significant Impact Area

[a] Medley Landfill East and North Coordinates (km) are: 565.9 2,859.9 km

[b] The significant impact distance for the project is estimated to be: 5.5 km

[c] Based on the North Carolina Screening Threshold method, a background facility is included in the modeling analysis if the facility is beyond the modeling area and its emission rate is greater than the product of (Distance-SID) x 20.

[d] "Modeling Area" is the area in which the project is predicted to have a significant impact (5.5 km). EPA recommends that all sources within this area be modeled. "Screening Area" is the significant impact distance for the Medley Landfill of 5.5 km, plus 50 km beyond the modeling area. EPA recommends that sources be modeled that are expected to have a significant impact in the modeling area. "Beyond Screening Area out to 100 km" is the distance between the facilities and out to 100 km in which large sources are included in the modeling.

TABLE 6-6
SUMMARY OF THE PM_{10}/$PM_{2.5}$ FACILITIES CONSIDERED FOR INCLUSION IN THE AIR MODELING ANALYSES

AIRS Number	Facility	County	UTM Coordinates East (km)	UTM Coordinates North (km)	Relative to Medley Landfill [a] X (km)	Y (km)	Distance (km)	Direction (deg)	Maximum PM_{10} Emissions (TPY)	Q, (TPY) Emission Threshold [b,c] (Dist - SID) x 20	Include in Modeling Analysis ?
Modeling Area [d]											
0250615	Waste Management - Medley Landfill	Miami-Dade	565.9	2,859.9	0.0	0.0	0.00	0	40.2	SIA	YES
0250022	U.S. Foundry Manufacturing Corp.	Miami-Dade	567.3	2859.8	1.4	-0.1	1.40	94	63.7	SIA	YES
0250640	AAR Landing Gear Services	Miami-Dade	564.6	2860.6	-1.3	0.7	1.52	298	0.4	SIA	YES
0250488	Benada Aluminum of Florida	Miami-Dade	567.4	2859.4	1.5	-0.5	1.58	108	0.1	SIA	YES
Screening Area [d]											
0250348	Miami Dade RRF/Montenay	Miami-Dade	563.8	2857.6	-2.1	-2.3	3.08	222	227.6	7.6	YES
0250020	Titan America-Pennsuco Cement	Miami-Dade	562.3	2861.7	-3.6	1.8	4.05	296	322.3	27.0	YES
0250005	General Asphalt Co., Inc.	Miami-Dade	568.8	2855.4	2.9	-4.5	5.35	147	11.7	53.1	NO
0250281	Hialeah/Preston Water Treatment Plant	Miami-Dade	571.2	2856.8	5.3	-3.1	6.12	120	10.6	68.4	NO
0250006	Florida Rock Industries, Inc.	Miami-Dade	561.1	2853.2	-4.8	-6.7	8.24	216	2.1	110.8	NO
0250659	Cemex Construction Materials FL, LLC	Miami-Dade	558.5	2864.6	-7.4	4.7	8.79	302	6.0	121.8	NO
0250624	General Asphalt Co., Inc. - WDHMA	Miami-Dade	569.7	2868.3	3.8	8.4	9.23	24	1.7	130.6	NO
0250530	Trademark Metals Recycling	Miami-Dade	574.5	2864.1	8.6	4.2	9.53	64	2.4	136.6	NO
0250665	H & J Asphalt, Inc.	Miami-Dade	575.1	2855.0	9.2	-4.9	10.42	118	1.5	154.5	NO
0250258	White Rock Quarries	Miami-Dade	560.0	2868.8	-5.9	8.9	10.68	326	37.2	159.6	NO
0250014	Cemex - Miami Cement Plant	Miami-Dade	557.5	2852.0	-8.4	-7.9	11.50	227	292.9	176.1	YES
0250827	Goodrich Corporation	Miami-Dade	574.5	2867.6	8.6	7.7	11.54	48	1.7	176.9	NO
0251262	Tarmac America, LLC	Miami-Dade	576.7	2855.1	10.8	-4.8	11.79	114	32.0	181.9	NO
0250603	North Dade Landfill	Miami-Dade	570.7	2872.1	4.8	12.2	13.14	21	5.0	208.7	NO
0250407	Exteria Building Products, LLC	Miami-Dade	577.5	2867.5	11.6	7.6	13.86	57	1.4	223.1	NO
0250232	Jackson Memorial Hospital	Miami-Dade	578.0	2852.7	12.1	-7.2	14.09	121	1.4	227.7	NO
0250157	Department of Veterans Affairs	Miami-Dade	578.6	2852.6	12.7	-7.3	14.65	120	4.4	239.0	NO
0250314	Miami-Dade Water and Sewer Dept.	Miami-Dade	568.7	2843.4	2.8	-16.5	16.74	170	8.6	280.9	NO
0112051	Cemex - Pembroke Pines Ready-Mix	Broward	562.5	2876.6	-3.4	16.7	17.05	348	1.0	287.0	NO
0250600	Miami-Dade Water and Sewer Dept.	Miami-Dade	584.6	2866.9	18.7	7.0	19.99	69	5.5	345.8	NO
0112370	Broward Co. Waste & Recycling Serv.	Broward	557.6	2880.1	-8.3	20.2	21.89	338	1.5	383.8	NO
0250476	Central District Water Treatment Plant	Miami-Dade	584.5	2847.8	18.6	-12.1	22.21	123	2.3	390.3	NO
0250257	Rinker Materials of Florida, Inc.	Miami-Dade	550.2	2842.4	-15.7	-17.5	23.53	222	14.3	416.6	NO
0112410	SFWMD - Pump Station No. S-9/S-9A	Broward	555.5	2882.3	-10.4	22.4	24.73	335	1.3	440.6	NO
0250001	FPL - Cutler Power Plant (PCU)	Miami-Dade	569.9	2835.0	4.0	-24.9	25.24	171	1.6	450.8	NO
0112119	Wheelabrator South Broward, Inc.	Broward	579.6	2883.3	13.7	23.4	27.12	30	103.2	488.4	NO
0110037	FPL - Fort Lauderdale Power Plant (PFL)	Broward	580.1	2883.6	14.2	23.7	27.61	31	851.4	498.1	YES
0111001	Banazak Concrete Corp.	Broward	576.5	2885.5	10.6	25.6	27.71	22	1.0	500.2	NO
0110036	FPL - Port Everglades Power Plant (PPE)	Broward	587.4	2885.3	21.5	25.4	33.28	40	6898.3	611.6	YES
0112074	Transflo Terminal Services, Inc. (TTSI)	Broward	583.0	2888.7	17.1	28.8	33.49	31	13.5	615.9	NO
0110034	High Sierra Terminaling, LLC	Broward	586.3	2886.5	20.4	26.6	33.51	38	3.0	616.2	NO
0250520	South District Water Treatment Plant	Miami-Dade	565.8	2825.6	-0.1	-34.3	34.32	180	1.7	632.3	NO
0250623	South Dade Landfill	Miami-Dade	565.5	2825.1	-0.4	-34.8	34.79	181	14.1	641.8	NO
0112127	Steel Fabricators, LLC	Broward	585.4	2896.0	19.5	36.0	40.97	28	6.8	765.3	NO
0112187	Conrad Yelvington Distributors, Inc.	Broward	584.6	2899.1	18.7	39.2	43.40	25	17.3	814.0	NO
0250003	FPL - Turkey Point Power Plant (PTF)	Miami-Dade	566.8	2813.3	0.9	-46.6	46.65	179	336.4	879.0	NO
0112120	Wheelabrator North Broward, Inc.	Broward	583.2	2903.6	17.3	43.6	46.95	22	96.8	884.9	NO
0112702	Neptune Management Corp.	Broward	584.8	2907.0	18.9	47.1	50.71	22	2.1	960.2	NO

TABLE 6-6
SUMMARY OF THE $PM_{10}/PM_{2.5}$ FACILITIES CONSIDERED FOR INCLUSION IN THE AIR MODELING ANALYSES

AIRS Number	Facility	County	UTM Coordinates East (km)	UTM Coordinates North (km)	Relative to Medley Landfill[a] X (km)	Y (km)	Distance (km)	Direction (deg)	Maximum PM_{10} Emissions (TPY)	Q, (TPY) Emission Threshold[b,c] (Dist - SID) x 20	Include in Modeling Analysis ?
0112094	Waste Management Inc. - Central Disposal	Broward	583.2	2908.0	17.3	48.1	51.12	20	23.0	968.3	NO
Beyond Screening Area out to 100 km[d]											
0210031	Breitburn Florida, LLC	Collier	509.6	2873.2	-56.3	13.3	57.85	283	12.3	1103.0	NO
0990614	SFWMD - Pump Station G-370	Palm Beach	540.5	2919.5	-25.4	59.6	64.79	337	10.4	1241.8	NO
0110351	SFWMD - Pump Station S-8 & G-404	Broward	522.3	2912.2	-43.6	52.3	68.09	320	23.0	1307.8	NO
0990016	Atlantic Holding, LLC	Palm Beach	552.9	2945.3	-13.0	85.4	86.44	351	95.0	1674.7	NO
0990045	City of Lake Worth Utilities	Palm Beach	592.8	2943.7	26.9	83.8	88.01	18	329.0	1706.2	NO
0990005	Okeelanta Corp.	Palm Beach	524.7	2939.5	-41.2	79.6	89.65	333	30.3	1739.1	NO
0990332	New Hope Power Company	Palm Beach	524.6	2939.9	-41.3	80.0	90.07	333	267.5	1747.4	NO
0990348	Palm Beach Aggregates, LLC	Palm Beach	562.4	2952.2	-3.5	92.3	92.38	358	114.3	1793.5	NO
0990310	Community Asphalt Corp.	Palm Beach	582.3	2950.9	16.4	91.0	92.47	10	95.0	1795.3	NO
0990087	Ranger Construction Industries, Inc.	Palm Beach	579.9	2951.7	14.0	91.8	92.86	9	19.4	1803.2	NO
0990646	FPL - West County Energy Center	Palm Beach	562.2	2952.9	-3.7	93.0	93.03	358	132.3	1806.7	NO
0990566	Indian Trail Improvement District	Palm Beach	565.7	2956.4	-0.2	96.5	96.49	360	22.1	1875.8	NO
0990026	Sugar Cane Growers Co-op	Palm Beach	534.9	2953.9	-31.0	94.0	98.95	342	257.0	1925.0	NO

Note: NA = Not applicable, ND = No data, SID = Significant impact distance for the project, SIA = Significant Impact Area

[a] Medley Landfill East and North Coordinates (km) are: 565.9 2859.90 km

[b] The significant impact distance for the project is estimated to be: 2.7 km

[c] Based on the North Carolina Screening Threshold method, a background facility is included in the modeling analysis if the facility is beyond the modeling area and its emission rate is greater than the product of (Distance-SID) x 20.

[d] "Modeling Area" is the area in which the project is predicted to have a significant impact (2.7 km). EPA recommends that all sources within this area be modeled.
"Screening Area" is the significant impact distance for the Medley Landfill Facility of 2.7 km, plus 50 km beyond the modeling area. EPA recommends that sources be modeled that are expected to have a significant impact in the modeling area. "Beyond Screening Area out to 100 km" is the distance between the facilities and out to 100 km in which large sources are included in the modeling.

TABLE 6-7
SUMMARY OF THE CO FACILITIES CONSIDERED FOR INCLUSION IN THE AAQS MODELING ANALYSIS

			UTM Coordinates		Relative to Medely Landfill [a]				Maximum CO	Q, (TPY) Emission	Include in
AIRS Number	Facility	County	East (km)	North (km)	X (km)	Y (km)	Distance (km)	Direction (deg)	Emissions (TPY)	Threshold [b,c] (Dist - SID) x 20	Modeling Analysis ?
Modeling Area [d]											
0250615	Waste Mangement - Medley Landfill	Miami-Dade	565.9	2,859.9	0.0	0.0	0.00	0	40.2	SIA	YES
Screening Area [d]											
0250022	U S Foundry Manufacturing Corp.	Miami-Dade	567.3	2,859.8	1.4	-0.1	1.40	94	171.3	22.1	YES
0250640	AARLanding Gear Services	Miami-Dade	564.6	2,860.6	-1.3	0.7	1.52	298	2.6	24.3	NO
0250348	Miami-Dade County RRF/Covanta	Miami-Dade	563.8	2,857.6	-2.1	-2.3	3.08	222	1,070.8	55.6	YES
0250020	Tarmac-Pennsuco Cement	Miami-Dade	562.3	2,861.7	-3.6	1.8	4.05	296	2,522.9	75.0	YES
0250005	General Asphalt Plant No.1	Miami-Dade	568.8	2,855.4	2.9	-4.5	5.35	147	43.6	101.1	NO
0250682	National Communications, LLC	Miami-Dade	569.5	2,864.7	3.6	4.8	5.96	37	2.5	113.1	NO
0250281	Hialeah/Preston Water Treatment Plant	Miami-Dade	571.3	2,856.8	5.4	-3.1	6.17	120	189.7	117.4	YES
0251286	Quality Technology Services-Miami	Miami-Dade	562.5	2,853.1	-3.4	-6.8	7.62	207	1.3	146.3	NO
0250608	H & R Paving	Miami-Dade	563.8	2,852.1	-2.1	-7.8	8.04	195	9.8	154.7	NO
0250393	Miami International Airport	Miami-Dade	570.6	2,853.4	4.7	-6.5	8.04	144	9.4	154.9	NO
0250624	General Asphalt Plant Wdhma	Miami-Dade	569.7	2,868.3	3.8	8.4	9.23	24	13.6	178.6	NO
0250665	H & J Asphalt Plant	Miami-Dade	575.1	2,855.0	9.2	-4.9	10.42	118	17.7	202.5	NO
0250250	Pet Heaven Memorial Park	Miami-Dade	562.9	2,849.8	-3.0	-10.1	10.54	197	22.0	204.7	NO
0250014	Miami Cement Plant	Miami-Dade	557.7	2,851.8	-8.2	-8.1	11.51	225	1,827.6	224.1	YES
7775221	Ranger Construction, South - Miami No. 2.	Miami-Dade	558.1	2,868.9	-7.8	9.0	11.93	319	14.7	232.6	NO
0250252	Miami Plant	Miami-Dade	557.0	2,869.3	-8.9	9.4	12.94	317	28.9	252.9	NO
0250603	Miami Dade Solid Wste Mgmt/North Dade Lf	Miami-Dade	570.7	2,872.1	4.8	12.2	13.14	21	534.2	256.7	YES
0250232	Jackson Memorial Hospital	Miami-Dade	578.0	2,852.7	12.1	-7.2	14.09	121	7.7	275.7	NO
0250157	Va Medical Center	Miami-Dade	578.6	2,852.6	12.7	-7.3	14.65	120	27.2	287.0	NO
0250664	Flowers Baking Company Of Miami	Miami-Dade	579.2	2,868.9	13.3	9.0	16.02	56	1.8	314.3	NO
0250314	Alexander Orr Water Treatment Plant	Miami-Dade	568.7	2,843.4	2.8	-16.5	16.74	170	200.4	328.9	NO
0250600	North District Wastewater Treatmnt Plant	Miami-Dade	584.6	2,866.9	18.7	7.0	19.99	69	44.4	393.8	NO
0112370	Broward County Interim Contingency Lf	Broward	557.6	2,880.1	-8.3	20.2	21.89	338	36.5	431.8	NO
0250476	Central District Wastewater Trtmnt Plant	Miami-Dade	584.5	2,847.8	18.6	-12.1	22.21	123	94.5	438.3	NO
7775212	Weekley Asphalt Paving, Inc., Plant No 1	Broward	557.3	2,880.6	-8.6	20.7	22.41	337	13.7	442.2	NO
0250257	Krome Quarry	Miami-Dade	550.2	2,842.4	-15.7	-17.5	23.53	222	6.7	464.6	NO
0110002	Memorial Regio Hosp/So Broward Hosp Dist	Broward	581.2	2,877.9	15.3	18.0	23.62	40	1.1	466.4	NO
0112410	Sfwmd Pump Station S-9/S-9a	Broward	555.5	2,882.3	-10.4	22.4	24.73	335	62.0	488.6	NO
0250001	Cutler Power Plant	Miami-Dade	569.9	2,835.0	4.0	-24.9	25.24	171	445.0	498.8	NO
0111014	Angstrom Graphics	Broward	585.3	2,878.6	19.4	18.7	26.95	46	1.0	532.9	NO
0112119	Wheelabrator South Broward	Broward	579.5	2,883.3	13.6	23.4	27.12	30	445.5	536.4	NO
0110037	Ft. Lauderdale Power Plant	Broward	580.1	2,883.6	14.2	23.7	27.64	31	2,866.5	546.7	YES
0110050	Motiva Enterprises - South	Broward	586.8	2,884.6	20.9	24.7	32.36	40	25.0	641.1	NO
0112688	Vecenergy Logistics Port Everglades Term	Broward	587.0	2,885.2	21.1	25.3	32.96	40	19.0	653.2	NO
0110054	Citgo - Port Everglades Terminal	Broward	586.9	2,885.7	21.0	25.8	33.27	39	19.8	659.3	NO
0110036	Port Everglades Power Plant	Broward	587.4	2,885.3	21.5	25.4	33.28	40	925.6	659.6	YES
0110053	Transmontaigne Port Everglades (South)	Broward	587.1	2,885.6	21.2	25.7	33.32	40	29.4	660.3	NO
0110069	Transmontaigne - North Terminal	Broward	586.4	2,886.3	20.5	26.4	33.39	38	2.8	661.9	NO
0110034	High Sierra Terminaling, Llc	Broward	586.4	2,886.5	20.5	26.6	33.58	38	51.9	665.5	NO
0250520	South District Wastewater Treatmnt Plant	Miami-Dade	565.8	2,825.6	-0.1	-34.3	34.32	180	56.0	680.3	NO
0250623	Miami Dade Solid Waste Mgmt/Sout Dade Lf	Miami-Dade	565.5	2,825.1	-0.4	-34.8	34.79	181	625.1	689.8	NO
0250553	Homestead Air Reserve Base	Miami-Dade	559.9	2,820.1	-6.0	-39.8	40.25	189	2.5	799.0	NO
0112146	Atlantic Burial Casket Co. Dba Abco	Broward	584.6	2,897.8	18.7	37.9	42.23	26	1.9	838.5	NO
0112152	Gold Coast Crematory	Broward	584.7	2,897.8	18.8	37.9	42.29	26	2.1	839.8	NO
0250013	Gordon W. Ivey Power Plant	Miami-Dade	552.8	2,817.5	-13.2	-42.4	44.37	197	266.4	881.5	NO
0250003	Turkey Point Power Plant	Miami-Dade	566.8	2,813.2	0.9	-46.7	46.66	179	1,487.9	927.2	YES
0112357	Broward County/North Regional Wwtf	Broward	583.5	2,905.0	17.6	45.1	48.42	21	25.8	962.4	NO
0110038	Bonsal American	Broward	586.2	2,904.6	20.3	44.7	49.09	24	9.8	975.9	NO

TABLE 6-7
SUMMARY OF THE CO FACILITIES CONSIDERED FOR INCLUSION IN THE AAQS MODELING ANALYSIS

AIRS Number	Facility	County	UTM Coordinates East (km)	UTM Coordinates North (km)	Relative to Medely Landfill[a] X (km)	Y (km)	Distance (km)	Direction (deg)	Maximum CO Emissions (TPY)	Q, (TPY) Emission Threshold[b,c] (Dist - SID) x 20	Include in Modeling Analysis ?
0112702	Neptune Society Pompano Beach	Broward	584.8	2,907.0	18.9	47.1	50.71	22	4.4	1008.2	NO
Beyond Screening Area out to 100 km[d]											
0112120	Wheelabrator North Broward	Broward	583.9	2,907.6	18.0	47.7	50.98	21	417.3	1013.7	NO
0112094	Central Disposal	Broward	583.2	2,908.0	17.3	48.1	51.12	20	338.4	1016.3	NO
0110005	Pavex Deerfield Plant	Broward	584.3	2,908.0	18.4	48.1	51.50	21	11.0	1024.0	NO
0110045	Hardrives / Deerfield Plant	Broward	583.8	2,909.1	17.9	49.2	52.38	20	15.8	1041.6	NO
0250587	Asphalt Group, Inc.	Miami-Dade	563.5	2,806.9	-2.4	-53.0	53.05	183	20.5	1055.1	NO
0990354	Sfwmd / Pump Station S-7	Palm Beach	545.8	2,912.8	-20.1	52.9	56.56	339	66.3	1125.3	NO
0210031	Raccoon Point	Collier	509.6	2,873.2	-56.3	13.3	57.85	283	219.3	1151.0	NO
0990550	Sfwmd / Pump Station G-335	Palm Beach	552.6	2,922.0	-13.3	62.1	63.50	348	16.1	1264.0	NO
0990614	Sfwmd / Pump Station G-370	Palm Beach	540.5	2,919.5	-25.4	59.6	64.79	337	82.2	1289.8	NO
0110351	Sfwmd Pump Station S-8 & G-404	Broward	522.3	2,912.2	-43.6	52.3	68.09	320	257.7	1355.8	NO
0990347	Pbc Southern Region Water Reclamation	Palm Beach	581.9	2,929.7	16.0	69.8	71.55	13	10.3	1425.0	NO
0990350	Sfwmd / Pump Station S-6	Palm Beach	596.2	2,927.8	30.3	67.9	74.36	24	54.7	1481.2	NO
0990615	Sfwmd / Pump Station G-372	Palm Beach	519.3	2,923.6	-46.6	63.7	78.91	324	80.4	1572.2	NO
0990549	Sfwmd / Pump Station G-310	Palm Beach	554.2	2,940.5	-11.7	80.5	81.40	352	71.3	1621.9	NO
0990562	South Florida Shavings Co.	Palm Beach	578.8	2,941.5	12.9	81.6	82.59	9	13.3	1645.8	NO
0990621	Sfwmd / Pump Station S-362	Palm Beach	567.2	2,945.0	1.3	85.1	85.09	1	82.4	1695.8	NO
0990016	Atlantic Sugar Mill	Palm Beach	553.0	2,945.4	-12.9	85.5	86.45	351	5,924.4	1723.0	YES
0990045	L.W. Utilities / Tom G. Smith Pwr Plant	Palm Beach	592.8	2,943.7	26.9	83.8	88.01	18	671.5	1754.2	NO
0990005	Okeelanta Sugar Refinery	Palm Beach	524.9	2,940.1	-41.0	80.2	90.07	333	92.4	1795.4	NO
0990332	New Hope Power Company	Palm Beach	524.4	2,940.0	-41.5	80.1	90.27	333	5,689.4	1799.3	YES
0990620	Sfwmd / Pump Station S-319	Palm Beach	566.3	2,951.2	0.4	91.3	91.32	0	79.8	1820.4	NO
0990349	Sfwmd / Pump Station S-5a	Palm Beach	562.6	2,951.3	-3.3	91.4	91.46	358	66.3	1823.2	NO
0990530	Hubbard / East Coast Paving (Wpb)	Palm Beach	562.8	2,952.0	-3.1	92.1	92.12	358	36.5	1836.5	NO
0990310	Community Asphalt / Wpb Plant	Palm Beach	582.3	2,950.9	16.4	91.0	92.47	10	49.0	1843.3	NO
0990087	Ranger Construction / (Royal Palm Beach)	Palm Beach	579.9	2,951.7	14.0	91.8	92.86	9	16.9	1851.2	NO
0990646	Fp&L / West County Energy Center	Palm Beach	562.2	2,952.9	-3.7	93.0	93.05	358	1,729.7	1855.1	NO
0990333	Compressor Station No. 21	Palm Beach	584.3	2,952.8	18.4	92.9	94.74	11	56.6	1888.8	NO
0990026	Sugar Cane Growers Co-Op	Palm Beach	534.9	2,953.9	-31.0	94.0	98.95	342	21,396.6	1973.0	YES

Note: NA = Not applicable, ND = No data, SID = Significant impact distance for the project, SIA = Significant Impact Area

[a] Medley Landfill East and North Coordinates (km) are: 565.9 2,859.9 km

[b] The significant impact distance for the project is estimated to be: 0.3 km

[c] Based on the North Carolina Screening Threshold method, a background facility is included in the modeling analysis if the facility is beyond the modeling area and its emission rate is greater than the product of (Distance-SID) x 20.

[d] "Modeling Area" is the area in which the project is predicted to have a significant impact (0.3 km). EPA recommends that all sources within this area be modeled.
"Screening Area" is the significant impact distance for the Medley Lanfill of 0.3 km, plus 50 km beyond the modeling area. EPA recommends that sources be modeled that are expected to have a significant impact in the modeling area. "Beyond Screening Area out to 100 km" is the distance between the facilities and out to 100 km in which large sources are included in the modeling.

TABLE 6-8
SUMMARY OF MAXIMUM CONCENTRATIONS PREDICTED FOR PROPOSED PROJECT COMPARED TO EPA CLASS II SIGNIFICANT IMPACT LEVELS, MIA LAND USE

Pollutant	Averaging Time	Maximum Concentration ($\mu g/m^3$) [a]				EPA Class II Significant Impact Levels (ug/m^3)
		Scenario 1	Scenario 2	Scenario 3	Scenario 4	
PM_{10}	Annual	2.2	2.3	0.1	0.3	1
	24-Hour	17.6	17.8	0.8	1.5	5
$PM_{2.5}$ [b]	Annual	2.2	2.3	0.1	0.3	0.3
	24-Hour	17.6	17.8	0.8	1.5	1.2
NO_2 (Tier 1) [d]	Annual	7.6	8.0	0.5	1.0	1
	1-Hour	154.2	154.3	29.4	26.3	9.4
NO_2 (Tier 2) [c,d]	Annual	5.7	6.0	0.4	0.8	1
	1-Hour	115.7	115.7	22.0	19.8	9.4
CO	8-Hour	578.8	579.5	34.6	49.0	500
	1-Hour	900.0	900.2	104.0	108.5	2,000

[a] Based on highest predicted concentrations from AERMOD using five years of meteorological data for 2001 to 2005 consisting of surface and upper air data from the National Weather Service stations at Miami International Airport and Florida International University, respectively.

[b] SIL based on most stringent of EPA's currently proposed SILs.

[c] Based on Tier 1 results and annual national default NO_2 to NO_x ratio of 0.75.

[d] Proposed 1-hour interim SIL which is based on 5% of NAAQS.

TABLE 6-9
LAND USE COMPARISON AND SUMMARY OF MAXIMUM CONCENTRATIONS PREDICTED FOR PROPOSED PROJECT COMPARED TO EPA CLASS II SIGNIFICANT IMPACT LEVELS

Pollutant	Averaging Time	Maximum Concentration ($\mu g/m^3$) [a]	EPA Class II Significant Impact Levels (ug/m^3)
MIA Land Use			
PM_{10}	Annual	2.3	1
	24-Hour	17.8	5
$PM_{2.5}$ [b]	Annual	2.3	0.3
	24-Hour	17.8	1.2
NO_2 (Tier 1) [d]	Annual	8.0	1
	1-Hour	154.3	9.4
NO_2 (Tier 2) [c,d]	Annual	6.0	1
	1-Hour	115.7	9.4
CO	8-Hour	579.5	500
	1-Hour	900.2	2,000
Site Land Use			
PM_{10}	Annual	2.2	1
	24-Hour	18.9	5
$PM_{2.5}$ [b]	Annual	2.2	0.3
	24-Hour	18.9	1.2
NO_2 (Tier 1) [d]	Annual	7.5	1
	1-Hour	162.7	9.4
NO_2 (Tier 2) [c,d]	Annual	5.6	1
	1-Hour	122.0	9.4
CO	8-Hour	629.4	500
	1-Hour	947.5	2,000

[a] Concentrations are based on highest predicted concentrations from AERMOD using five years of meteorological data for 2001 to 2005 consisting of surface and upper air data from the National Weather Service stations at Miami International Airport and Florida International University, respectively. All concentrations predicted based on Scenario 2 emission configuration.

[b] Interim SIL based on most stringent of currently proposed EPA SILs.

[c] Based on Tier 1 results and annual national default NO_2 to NO_x ratio of 0.75.

[d] Proposed 1-hour interim SIL which is based on 5% of NAAQS.

TABLE 6-10
SUMMARY OF MAXIMUM CONCENTRATIONS PREDICTED FOR PROPOSED PROJECT AT THE ENP COMPARED TO EPA PROPOSED PSD CLASS I SIGNIFICANT IMPACT LEVELS

Pollutant	Averaging Time	Maximum Concentration ($\mu g/m^3$) [a, b]	EPA Class I Significant Impact Levels (ug/m^3)
PM_{10}	Annual	0.0070	0.2
	24-Hour	0.087	0.3
NO_2 (Tier 1)	Annual	0.024	0.1
NO_2 (Tier 2)[c]	Annual	0.018	0.1

[a] Based on highest predicted concentrations from AERMOD using five years of meteorological data for 2001 to 2005 consisting of surface and upper air data from the National Weather Service stations at Miami International Airport and Florida International University, respectively.

[b] Based on the worst case emissions, Scenario 2.

[c] Based on Tier 1 results and annual national default NO_2 to NO_x ratio of 0.75.

TABLE 6-11
MAXIMUM PREDICTED PM_{10}, $PM_{2.5}$, NO_2 AND CO IMPACTS COMPARED TO THE AAQS

Averaging Time and Rank	Maximum Concentration (µg/m³) Total	Modeled Sources[a]	Background	Receptor Location UTM- East (m)	UTM- North (m)	Time Period (YYMMDDHH)	AAQS (µg/m³)
NO_2[b, c]							
Annual, Highest	27.5	6.8	20.7	565,754	2,860,013	01123124	100
	28.7	8.0	20.7	565,754	2,860,013	02123124	
	28.4	7.7	20.7	565,754	2,860,013	03123124	
	26.8	6.1	20.7	565,707	2,860,013	04123124	
	27.8	7.1	20.7	565,754	2,860,013	05123124	
1-Hour, 98th Percentile[d]	--	100.1	--	565,812	2,859,750	--	188
	--	111.1	--	565,812	2,859,750	--	
	--	108.0	--	565,812	2,859,750	--	
	--	86.5	--	565,812	2,859,750	--	
	--	105.0	--	565,812	2,859,750	--	
5-Year Average	**182.8**	**102.1**	**80.7**				
CO							
8-Hour, HSH	3,031.2	513.6	2,517.6	565,961	2,859,752	01122616	10,000
	2,984.5	466.9	2,517.6	565,801	2,860,014	02030224	
	3,016.8	499.2	2,517.6	565,801	2,860,014	03021616	
	2,939.0	421.4	2,517.6	566,057	2,859,888	04090416	
	3,003.0	485.4	2,517.6	565,801	2,860,014	05070924	
PM_{10}							
Annual, Highest	29.4	2.4	27.0	565,754	2,860,013	00123124	50
	29.7	2.7	27.0	565,754	2,860,013	00123124	
	29.5	2.5	27.0	565,754	2,860,013	00123124	
	29.1	2.1	27.0	565,707	2,860,013	00123124	
	29.3	2.3	27.0	565,754	2,860,013	00123124	
24-Hour, H6H	78.4	13.4	65.0	0	0	00000000	150
$PM_{2.5}$							
Annual, Highest	--	2.4	--	565,754	2,860,013	00123124	15
	--	2.7	--	565,754	2,860,013	00123124	
	--	2.4	--	565,754	2,860,013	00123124	
	--	2.1	--	565,707	2,860,013	00123124	
	--	2.2	--	565,754	2,860,013	00123124	
5-Year Average	**10.3**	**2.4**	**7.9**				
						(YYYYMMDD)	
24-Hour, 98th Percentile[e]	--	23.7	--	--	--	20010123	35
	--	16.4	--	--	--	20020926	
	--	19.0	--	--	--	20030221	
	--	15.2	--	--	--	20040414	
	--	17.5	--	--	--	20050407	
5-Year Average	**39.9**	**18.4**	**21.5**				

Note: YYMMDDHH = Year, Month, Day, Hour Ending
YYYYMMDD = Year, Month, Day
HSH = Highest, second-highest
H6H = Highest, sixth-highest

[a] Concentrations are based on concentrations predicted using 5 years of meteorological data from 2001 to 2005 of surface and upper air data from the National Weather Service stations at Miami International Airport and Florida International University, respectively.
[b] A NO_X to NO_2 converstion factor of 75% applies based on EPA's Guidline on Air Quality Models.
[c] The AAQS standard (188 µg/m³). The AAQS 1-hour NO2 standard is met when the 3-year average of the 98th percentile of the daily 1-hour maximum values is less than 188 µg/m³. Therefore, the 8th highest 1-hour maximum modeled concentration (from 2001 - 2005) was added to a monitoring background based on the 3-year average of the 98th percentile value of the maximum daily 1-hr NO2 monitoring values.
[d] The 98th percentile (8th highest) of the daily maximum 1-hour concentrations.
[e] The 98th percentile (8th highest) of the daily maximum 24-hour concentrations.

TABLE 6-12
8TH HIGHEST TOTAL FOR 24-HOUR $PM_{2.5}$ IMPACTS BASED ON TEMPORAL PAIRING OF MODELED AND MONITORED VALUES

Averaging Time and Rank	Rank	Maximum Concentration (μg/m³) Total[b]	Modeled Sources[a]	Background	Time Period (YYYYMMDD)
$PM_{2.5}$					
24-Hour, 98th Percentile					
2001	1	42.6	4.2	38.4	20010705
	2	36.9	11.4	25.5	20010125
	3	35.0	23.7	11.3	20010123
	4	35.0	4.7	30.3	20010618
	5	32.1	15.6	16.5	20010122
	6	31.9	18.0	13.9	20010312
	7	31.0	13.5	17.5	20010417
	8	30.8	4.3	26.5	20010524
2002	1	30.8	5.8	25.0	20020705
	2	29.9	6.3	23.6	20021216
	3	28.7	8.2	20.5	20020405
	4	27.5	11.5	16.0	20021122
	5	27.0	9.0	18.0	20020204
	6	25.9	10.7	15.2	20020217
	7	25.6	12.3	13.3	20020227
	8	25.2	6.2	19.0	20021127
2003	1	32.9	12.5	20.4	20030320
	2	31.7	3.3	28.4	20031024
	3	29.1	13.9	15.2	20030808
	4	28.9	9.9	19.0	20030529
	5	28.2	9.2	19.0	20030530
	6	28.2	8.4	19.8	20031023
	7	26.6	6.0	20.6	20030322
	8	26.5	8.4	18.1	20030310
2004	1	67.7	3.7	64.0	20040101
	2	39.6	15.2	24.4	20040414
	3	38.7	10.9	27.8	20040409
	4	37.5	9.7	27.8	20040407
	5	36.5	8.7	27.8	20040404
	6	34.2	14.4	19.8	20040218
	7	34.1	9.7	24.4	20040412
	8	33.8	6.0	27.8	20040408
2005	1	35.7	16.6	19.1	20051221
	2	31.0	12.6	18.4	20050525
	3	29.3	4.2	25.1	20050315
	4	28.8	13.6	15.2	20051222
	5	28.3	15.4	12.9	20050322
	6	27.8	16.3	11.5	20050117
	7	27.8	4.1	23.7	20050512
	8	27.5	14.0	13.5	20050327

Note: YYYYMMDD = Year, Month, Day
HSH = Highest, second-highest
NA = Not Applicable

[a] Concentrations are based on concentrations predicted using 5 years of meteorological data from 2001 to 2005 of surface and upper air data from the National Weather Service stations at Miami International Airport.

[b] Based on temporal pairing of the 24-hour modeled and monitored values.

TABLE 6-13
MAXIMUM PREDICTED PM_{10} AND NO_2 IMPACTS FROM ALL SOURCES, COMPARED TO THE ALLOWABLE PSD CLASS II INCREMENTS

Averaging Time and Rank	Maximum Concentration [a] (µg/m³)	Receptor Location UTM- East (m)	Receptor Location UTM- North (m)	Time Period (YYMMDDHH)	PSD Class II Increment (µg/m³)
PM_{10}					
Annual, Highest	2.4	565,754	2,860,013	00123124	17
	2.7	565,754	2,860,013	00123124	
	2.4	565,754	2,860,013	00123124	
	2.1	565,707	2,860,013	00123124	
	2.2	565,754	2,860,013	00123124	
24-Hour, HSH	16.1	566,011	2,859,752	01030524	30
	16.4	565,801	2,860,014	02030224	
	14.9	565,961	2,859,752	03120624	
	12.6	566,057	2,859,888	04090424	
	16.2	565,961	2,859,752	05011724	
NO_2					
Annual, Highest	6.8	565,754	2,860,013	01123124	25
	8.0	565,754	2,860,013	02123124	
	7.7	565,754	2,860,013	03123124	
	6.1	565,707	2,860,013	04123124	
	7.1	565,754	2,860,013	05123124	

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, second-highest
NA = Not Applicable

[a] Concentrations are based on concentrations predicted using 5 years of meteorological data from 2001 to 2005 of surface and upper air data from the National Weather Service stations at Miami International Airport .

TABLE 7-1
SO_2 EFFECTS LEVELS FOR VARIOUS PLANT SPECIES

Plant Species	Observed Effect Level ($\mu g/m^3$)	Exposure (Time)	Reference
Sensitive to tolerant	920 (20 percent displayed visible injury)	3 hours	McLaughlin and Lee, 1974
Lichens	200-400	6 hr/wk for 10 weeks	Hart *et al.*, 1988
Cypress, slash pine, live oak, mangrove	1,300	8 hours	Woltz and Howe, 1981
Jack pine seedlings	470-520	24 hours	Malhotra and Kahn, 1978
Black oak	1,310	Continuously for 1 week	Carlson, 1979

TABLE 7-2
SENSITIVITY GROUPINGS OF VEGETATION BASED ON VISIBLE INJURY AT DIFFERENT SO_2 EXPOSURES[a]

Sensitivity Grouping	SO_2 Concentration		Plants
	1-Hour	3-Hour	
Sensitive	1,310 - 2,620 µg/m³ (0.5 - 1.0 ppm)	790 - 1,570 µg/m³ (0.3 - 0.6 ppm)	Ragweeds Legumes Blackberry Southern pines Red and black oaks White ash Sumacs
Intermediate	2,620 - 5,240 µg/m³ (1.0 - 2.0 ppm)	1,570 - 2,100 µg/m³ (0.6 - 0.8 ppm)	Maples Locust Sweetgum Cherry Elms Tuliptree Many crop and garden species
Resistant	>5,240 µg/m³ (>2.0 ppm)	>2,100 µg/m³ (>0.8 ppm)	White oaks Potato Upland cotton Corn Dogwood Peach

[a] Based on observations over a 20-year period of visible injury occurring on over 120 species growing in the vicinities of coal-fired power plants in the southeastern United States.

Source: EPA, 1982a.

TABLE 7-3
EXAMPLES OF REPORTED EFFECTS OF AIR POLLUTANTS AT CONCENTRATIONS BELOW NATIONAL SECONDARY AMBIENT AIR QUALITY STANDARDS

Pollutant	Reported Effect	Concentration (μg/m³)	Exposure
Sulfur Dioxide[a]	Respiratory stress in guinea pigs	427 to 854	1 hour
	Respiratory stress in rats	267	7 hours/day; 5 day/week for 10 weeks
	Decreased abundance in deer mice	13 to 157	continually for 5 months
Nitrogen Dioxide[b,c]	Respiratory stress in mice	1,917	3 hours
	Respiratory stress in guinea pigs	96 to 958	8 hours/day for 122 days
Particulates[a]	Respiratory stress, reduced respiratory disease defenses	120 PbO_3	continually for 2 months
	Decreased respiratory disease defenses in rats, same with hamsters	100 $NiCl_2$	2 hours

Sources:
[a] Newman and Schreiber, 1988.
[b] Gardner and Graham, 1976.
[c] Trzeciak et al., 1977.

TABLE 7-4
MAXIMUM POLLUTANT CONCENTRATIONS PREDICTED AT ADDITIONAL PSD CLASS I AREAS FOR THE AQRV ANALYSIS

Pollutant	Averaging Time	Maximum Concentrations at PSD Class I Area (ug/m^3)	
		AERMOD (<50 km)	CALPUFF (>50 km)[a]
NO_2 [b]	Annual	0.018	0.001
	24-Hour	0.237	0.022
	8-Hour	0.487	0.059
	3-Hour	1.013	0.074
	1-Hour	1.735	0.103
PM_{10}	Annual	0.007	0.001
	24-Hour	0.087	0.013
	8-Hour	0.178	0.031
	3-Hour	0.370	0.040
	1-Hour	0.636	0.057
CO	Annual	0.134	0.013
	24-Hour	1.772	0.268
	8-Hour	3.660	0.640
	3-Hour	7.609	0.825
	1-Hour	13.052	1.170

[a] Concentrations are based on highest predicted concentrations from CALPUFF using 3 years of meteorological data for 2001 to 2003.
[b] NO_x to NO_2 conversion factor of 0.75 applied to modeled NO_x impacts based on EPA Modeling Guidelines

TABLE 7-5
MAXIMUM 24-HOUR VISIBILITY IMPAIRMENT PREDICTED FOR THE PROPOSED PROJECT AT THE EVERGLADES NP PSD CLASS I AREA

Background Extinction Calculations	Visibility Impairment (%) [a]			Visibility Impairment Criteria (%)
	2001	2002	2003	
Method 2 with RHMAX = 95 Percent	0.62	0.68	0.79	5.0

[a] Concentrations are highest predicted using CALPUFF V5.8 with CALMET V5.8 4-km Domains, 2001 to 2003.
Background extinctions calculated using FLAG Document (December 2000) and stated method.

TABLE 7-6
MAXIMUM ANNUAL NITROGEN DEPOSITION PREDICTED FOR THE PROPOSED PROJECT AT THE PSD CLASS I AREAS

Species	Total Deposition (Wet & Dry)		Year	Deposition Analysis Threshold [b]
	($g/m^2/s$)	(kg/ha/yr)[a]		(kg/ha/yr)
Nitrogen (N) Deposition	9.85E-13	0.0003	2001	0.01
	1.28E-12	0.0004	2002	0.01
	1.20E-12	0.0004	2003	0.01

[a] Conversion factor is used to convert $g/m^2/s$ to kg/hectare (ha)/yr with the following units:

$$g/m^2/s \times 0.001\ kg/g \times 10{,}000\ m^2/hectare \times 3{,}600\ sec/hr \times 8{,}760\ hr/yr = kg/ha/yr$$

or

$$g/m^2/s \times 3.154E{+}08 = kg/ha/yr$$

[b] Deposition analysis thresholds (DAT) for nitrogen deposition provided by the U.S. Fish and Wildlife Service, January 2002. A DAT is the additional amount of N or S deposition within a Class I area, below which estimated impacts from a proposed new or modified source are considered insignificant.

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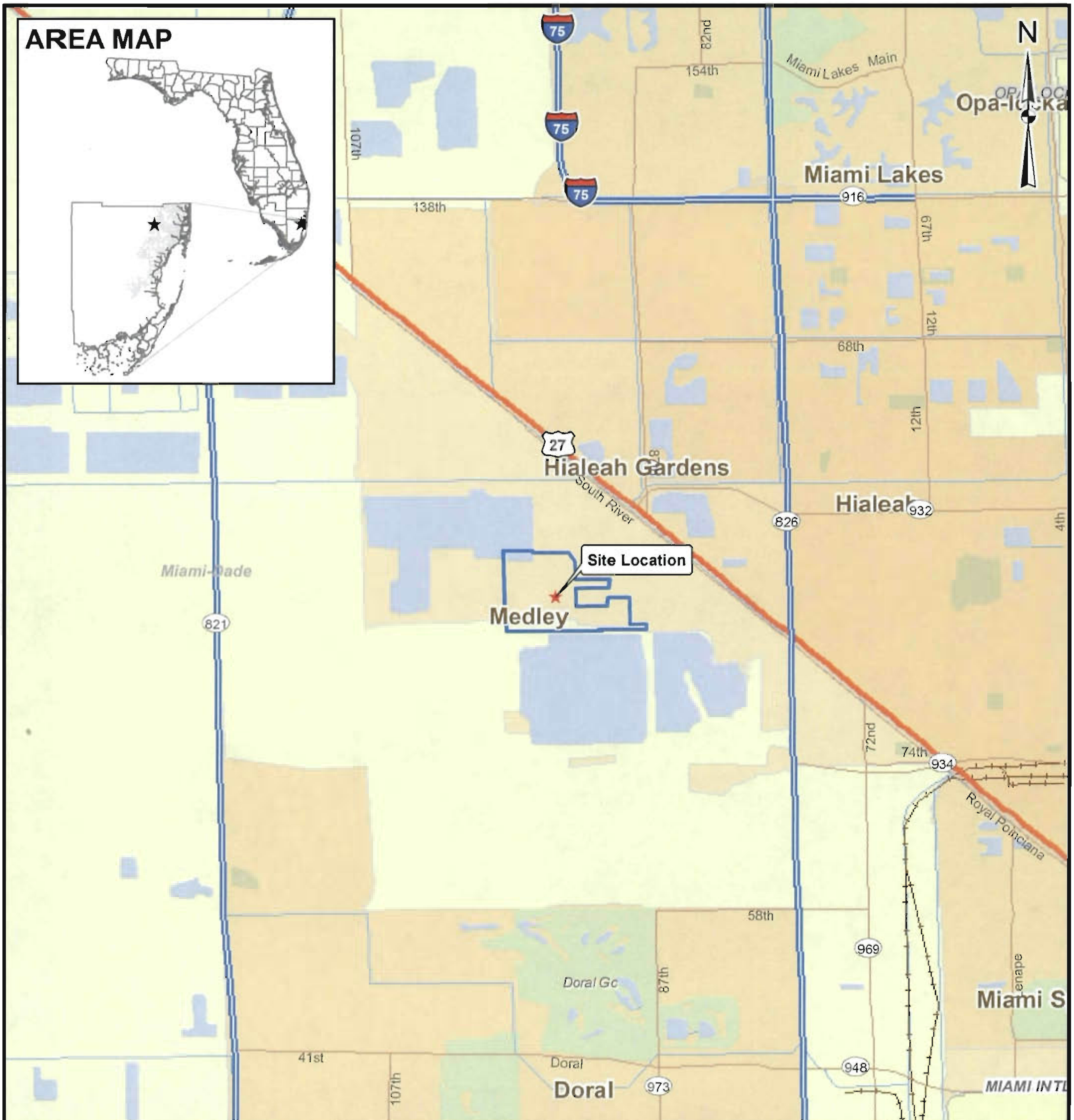
FIGURES



LEGEND

★ Medley Landfill Location

Property Boundary

REFERENCES

1. Medley Landfill Location, Waste Managment Inc., 2010.

0 0.5 1 2 Miles

Golder Associates
Gainesville, Florida

SCALE	AS SHOWN
DATE	8/1/2008
DESIGN	SKM
GIS	NRL
CHECK	XXX
REVIEW	XXX

FILE No. 09387674_A002

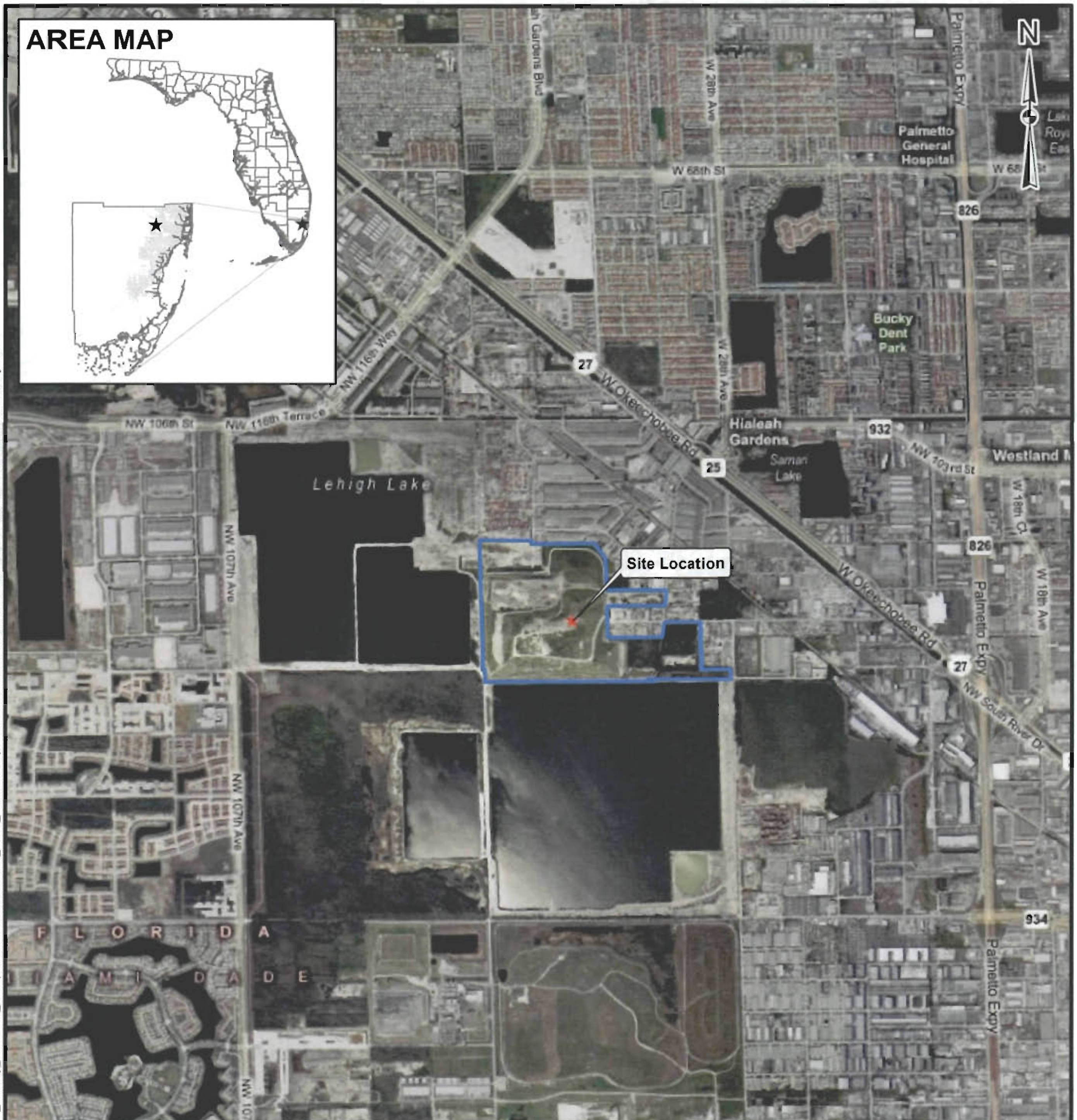
PROJECT No. 093-87674 REV. 0

GENERAL LOCATION

WASTE MANAGEMENT INC. OF FLORIDA

FIGURE **2-1**

Map Document: G:\PROJECTS\2009\093-87674_WasteManagement\A_Medley_PSD\Rev_0\MapDocuments\09387674_A002_GeneralLocationMap.mxd / Modified 5/13/2010 3:10:59 PM / Plotted 5/13/2010 3:15:59 PM by rlamar



LEGEND

- ★ Medley Landfill Location
- ▭ Property Boundary

REFERENCES

1. Medley Landfill Location, Waste Managment Inc., 2010.
2. Aerial Imagery, Microsoft Virtual Earth Online, 2010.

0 1,500 3,000 6,000 Feet

Golder Associates
Gainesville, Florida

SCALE	AS SHOWN
DATE	8/1/2008
DESIGN	SKM
GIS	NRL
CHECK	XXX
REVIEW	XXX

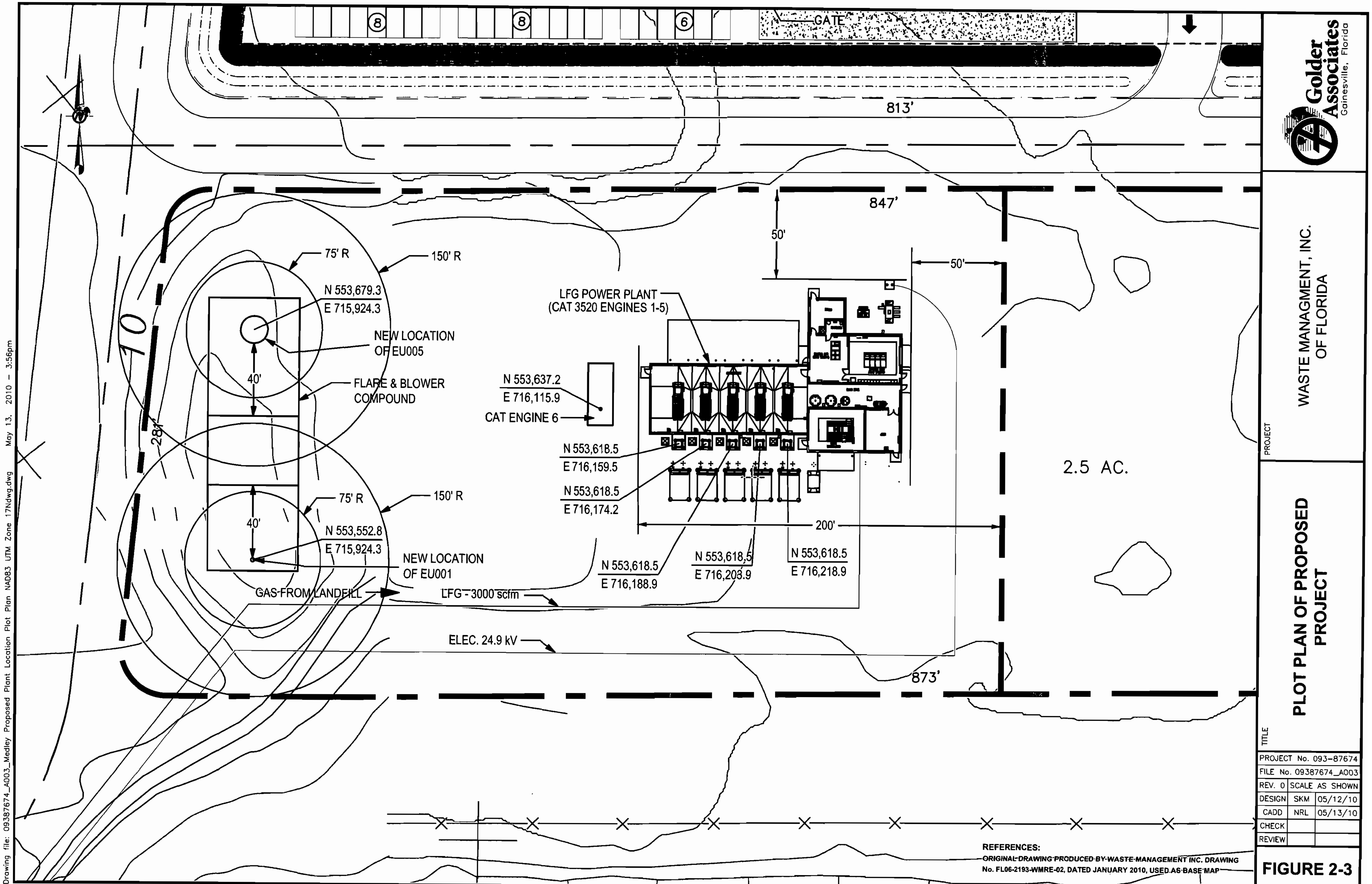
FILE No. 09387674_A001
PROJECT No. 093-87674 REV. 0

SITE LOCATION

WASTE MANAGEMENT INC. OF FLORIDA

FIGURE 2-2

Map Document: G:\PROJECTS\2009\093-87674_WasteManagement\A_Medley_PSD\Rev_0\MapDocuments\09387674_A001_LocationMap.mxd / Modified 5/13/2010 2:54:25 PM / Plotted 5/13/2010 2:56:07 PM by rlamar



Drawing file: 09387674_A003_Medley Proposed Plant Location Plot Plan NAD83 UTM Zone 17Ndwg.dwg May 13, 2010 - 3:56pm

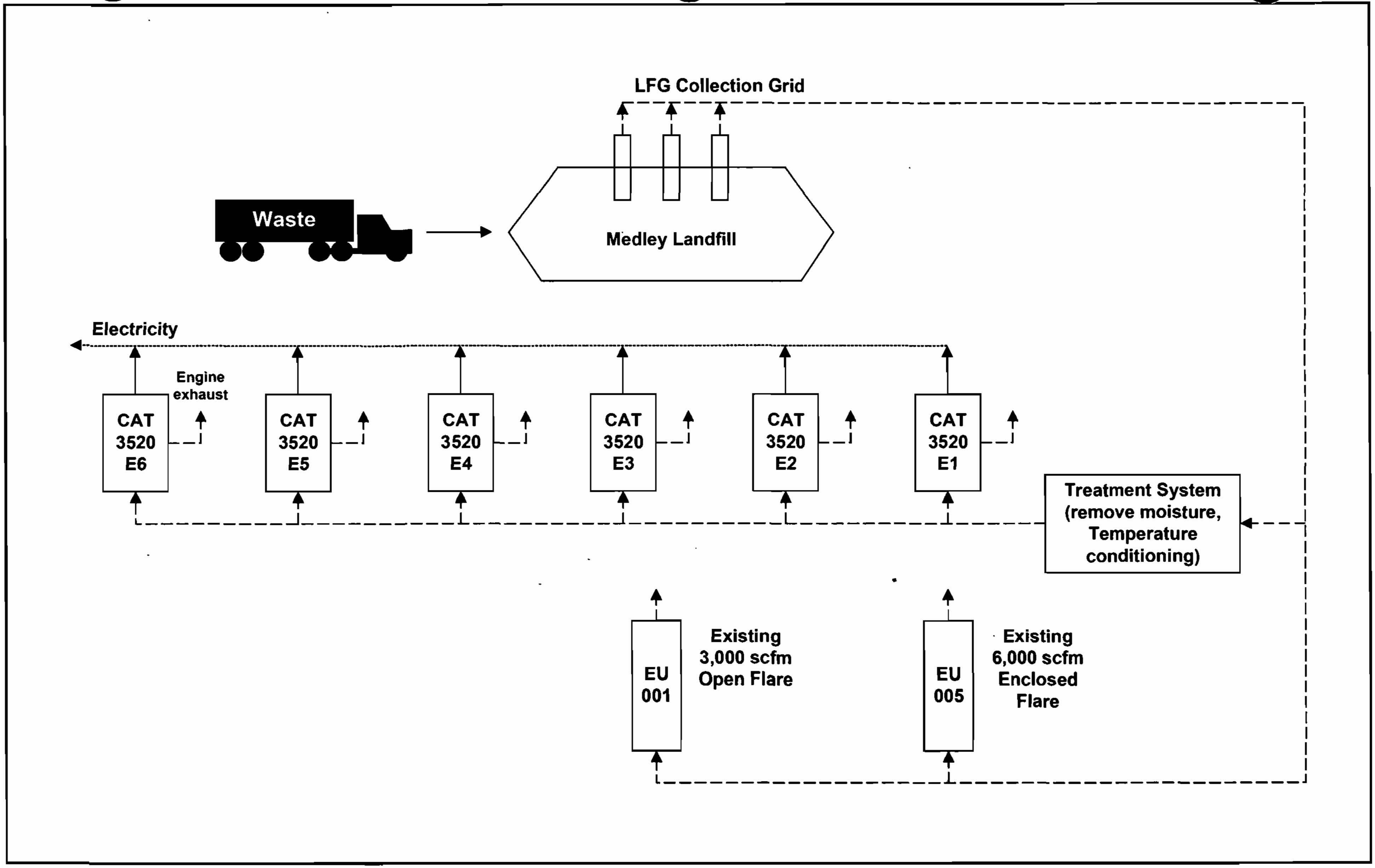
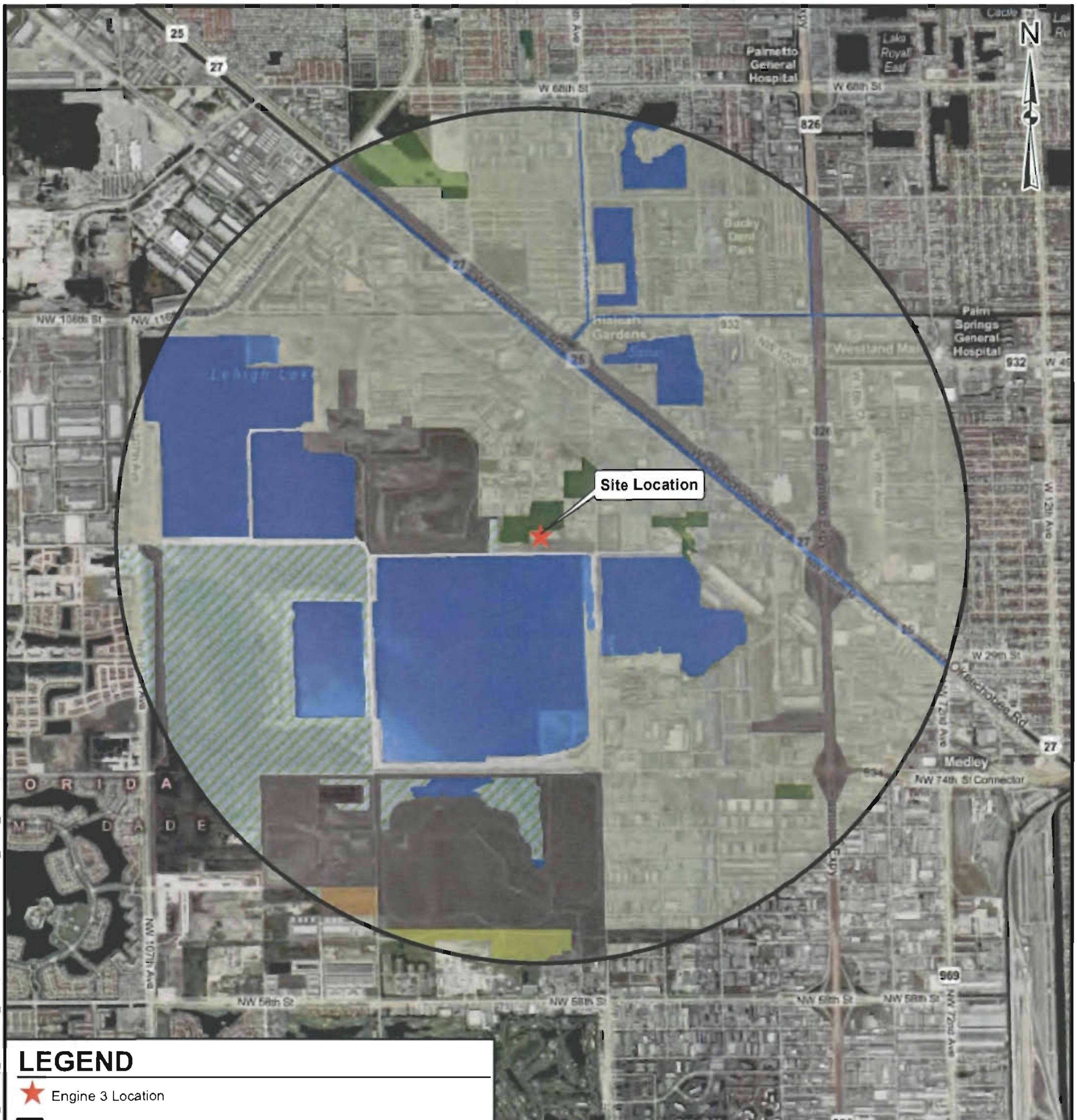


Figure 2-4
Process Flow Diagram
Medley Landfill, Inc.
Medley, Florida

Process Flow Legend
Solid/Liquid ⟶
Gas - - - ⟶
Electricity ········ ⟶

Golder Associates



LEGEND

★ Engine 3 Location

▭ 3km Buffer

- AGRICULTURE (R)
- BARREN LAND (R)
- RANGELAND (R)
- TRANSPORTATION, COMMUNICATION AND UTILITIES (U)
- UPLAND FORESTS (R)
- URBAN AND BUILT-UP (U)
- WATER (R)
- WETLANDS (R)

R = Rural
U = Urban

REFERENCES

1. Medley Landfill Location, Waste Managment Inc., 2010.
2. Land Use, SFWMD, 2005.

0 0.5 1 2 Kilometers

Golder Associates, Gainesville, Florida	SCALE: AS SHOWN	**LAND USE WITHIN 3 KILOMETERS OF MEDLEY LANDFILL**		
	DATE: 7/1/2010			
	DESIGN: SRM			
	GIS: NRL			
FILE No. 09387674_A004	CHECK: PT	WASTE MANAGEMENT INC. OF FLORIDA	FIGURE	**6-1**
PROJECT No. 093-87674 REV. 0	REVIEW: XXX			

Map Document: G:\PROJECTS\2009\093-87674_WasteManagement\A_Medley_PSD\Rev_0\MapDocuments\09387674_A004_3kmLandUse.mxd / Modified 5/21/2010 11:32:05 AM / Plotted 7/1/2010 8:18:27 AM by rlamar

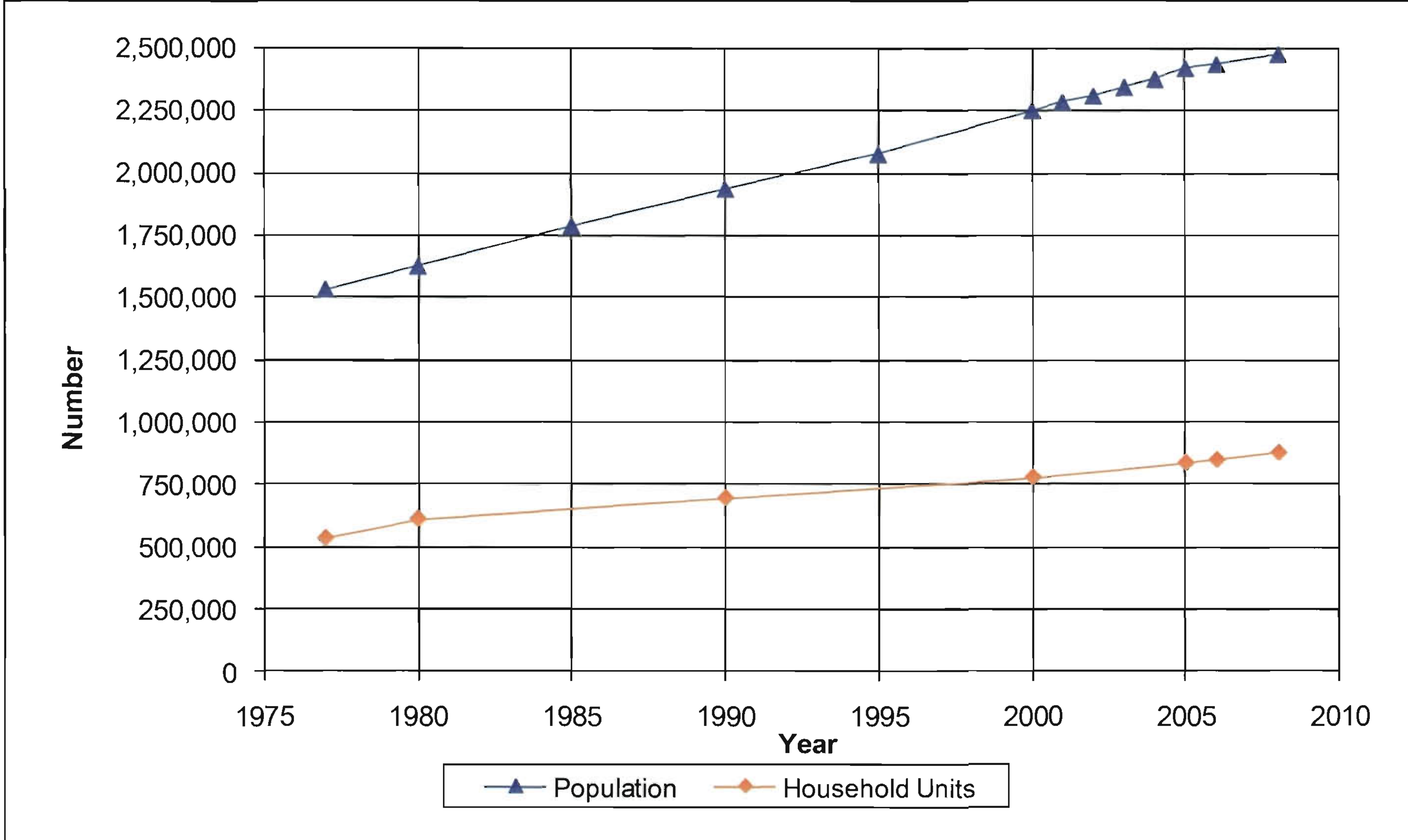


Figure 7-1
Population and Household Unit Trends in Miami-Dade County

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Source: Florida Statistical Abstract 1992, 1998, 2001, 2006, 2007, and 2009.

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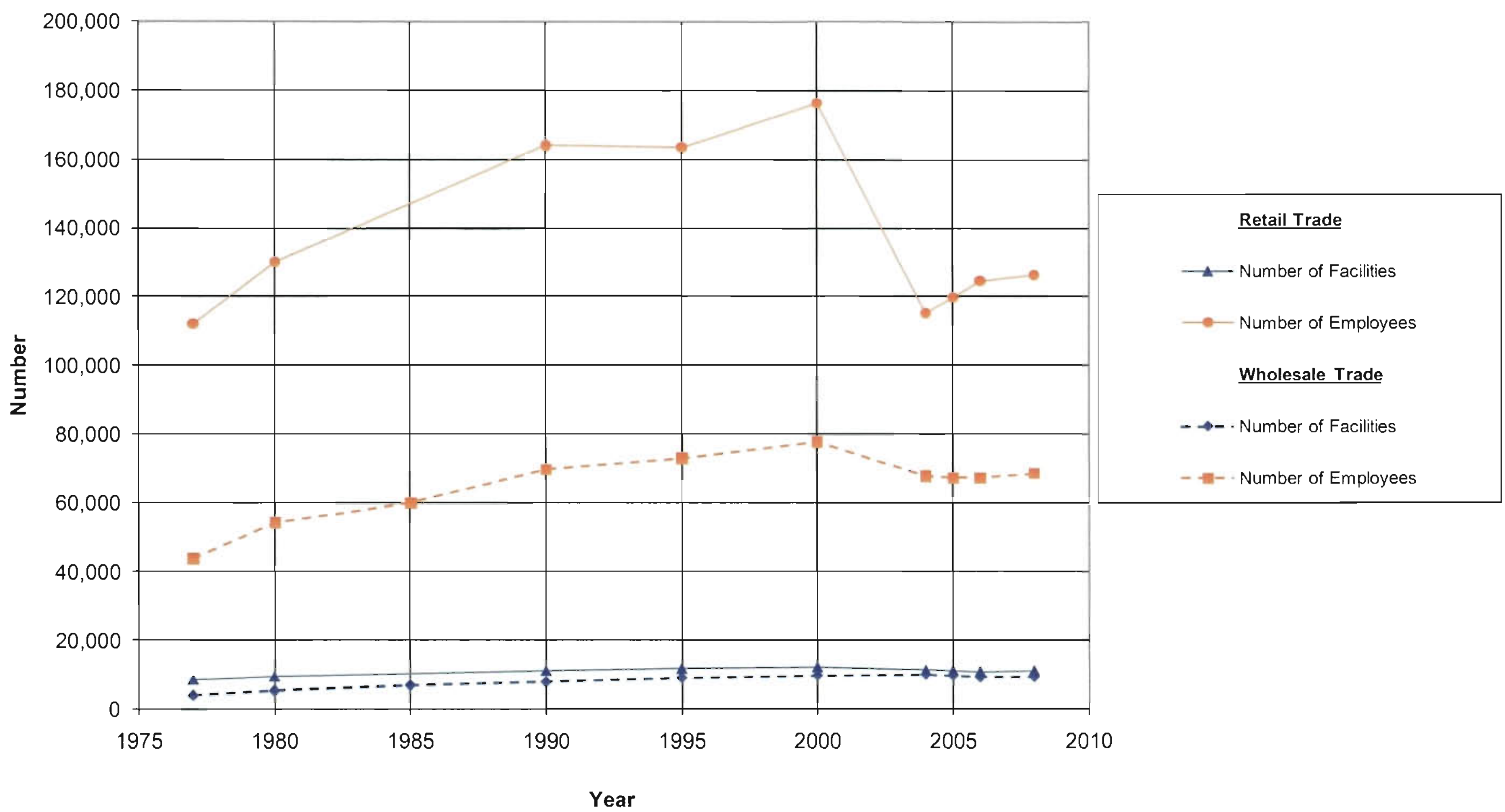

Figure 7-2
Retail and Wholesale Trade Trends in Miami-Dade County

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Source: Florida Statistical Abstract 1992, 1998, 2001, 2006, 2007, and 2009.

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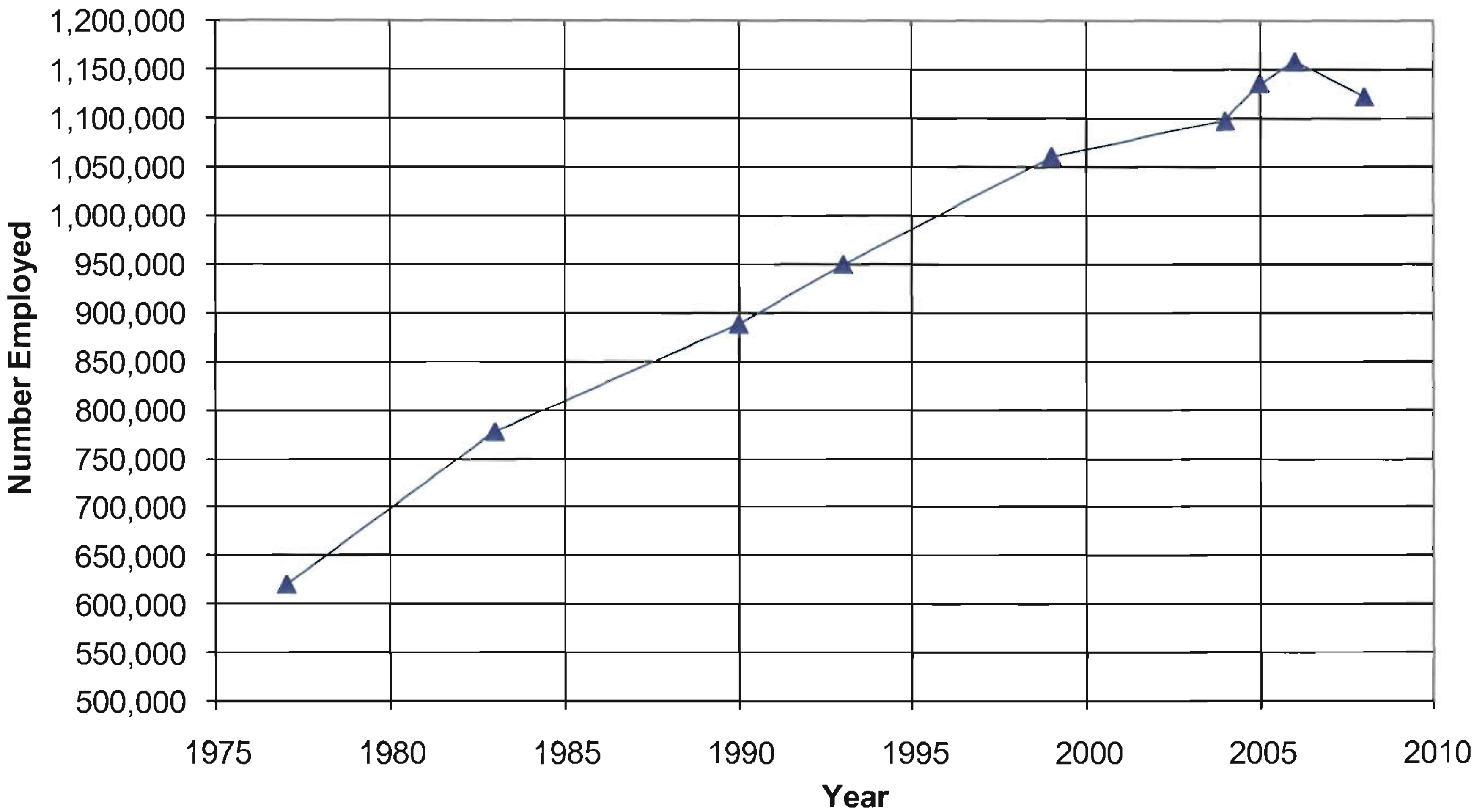

Figure 7-3
Labor Force Trend in Miami-Dade County

Y:\Projects\2009\093-87674 WM Medley PSD\Final\Figures\Figure 7-3.docx

Source: Florida Statistical Abstract 1992, 1998, 2001, 2006, 2007, and 2009.

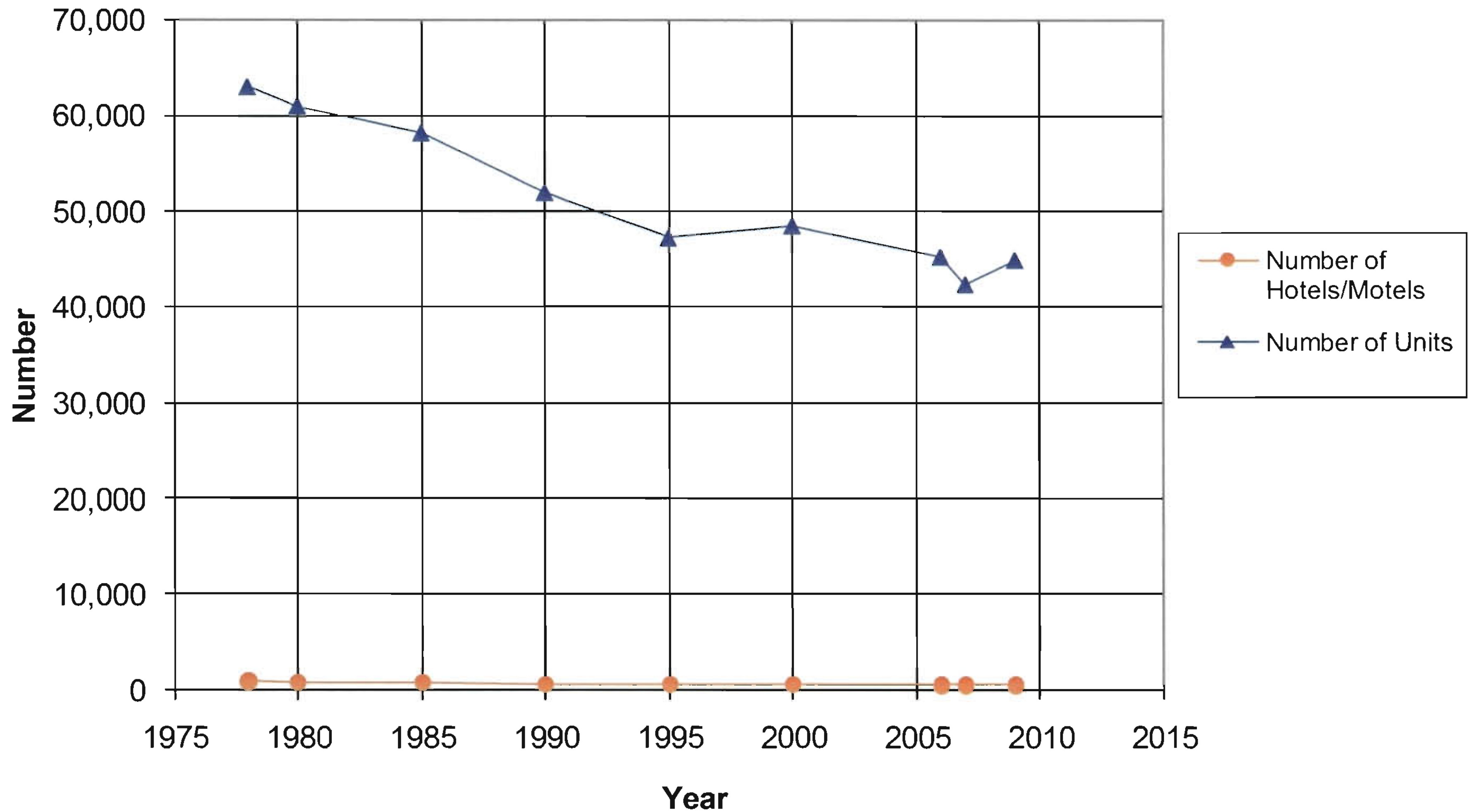

Figure 7-4
Hotel and Motel Trend in Miami-Dade County

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Source: Florida Statistical Abstract 1992, 1998, 2001, 2006, 2007, and 2009.

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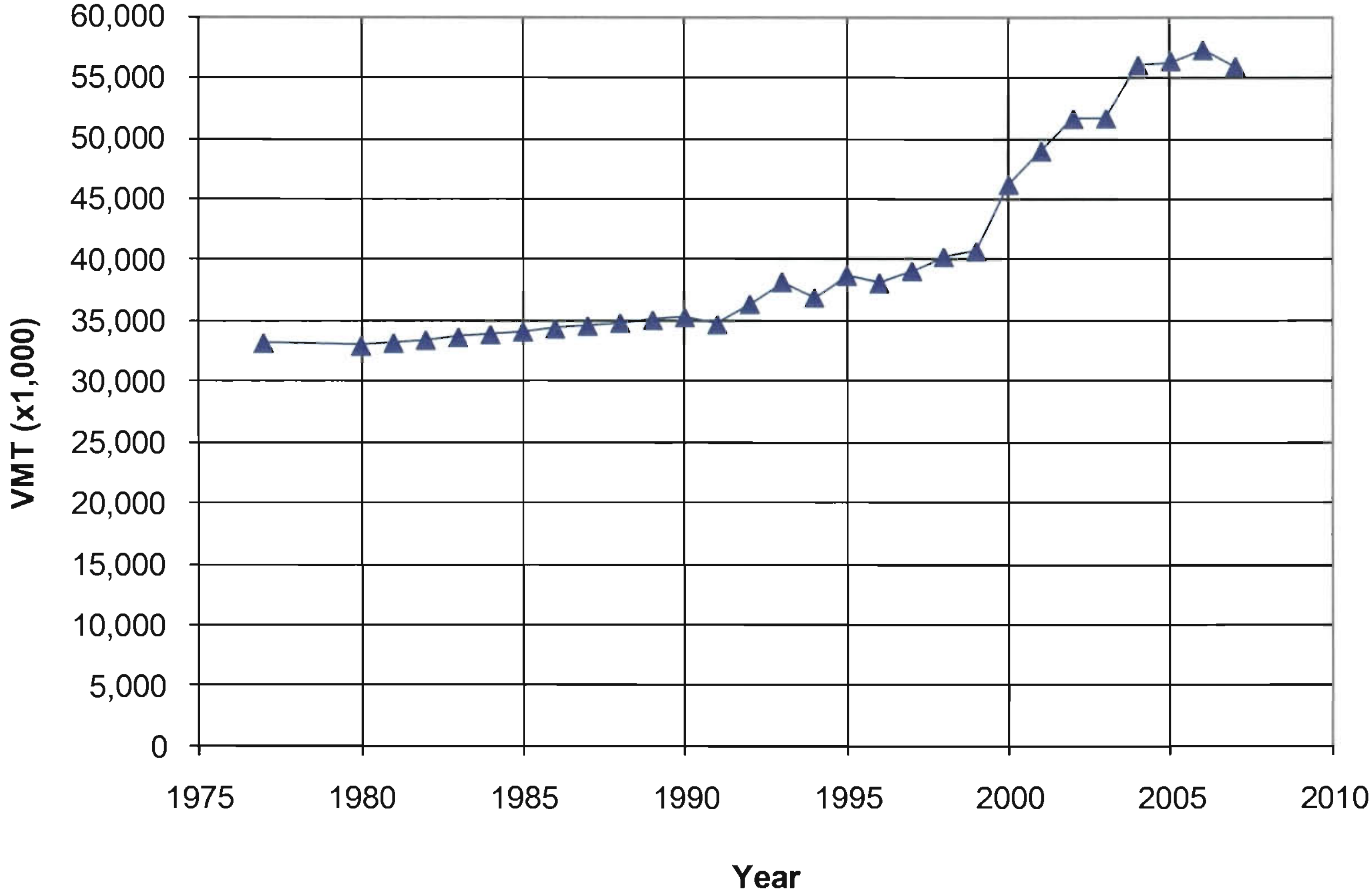

Figure 7-5
Vehicle Miles Traveled (VMT) Estimates for Motor Vehicles for Miami-Dade County

Y:\Projects\2009\093-87674 WM Medley PSD\Final\Figures\Figure 7-5.docx

Source: Florida Statistical Abstract 1992, 1998, 2001, 2006, 2007, and 2009.

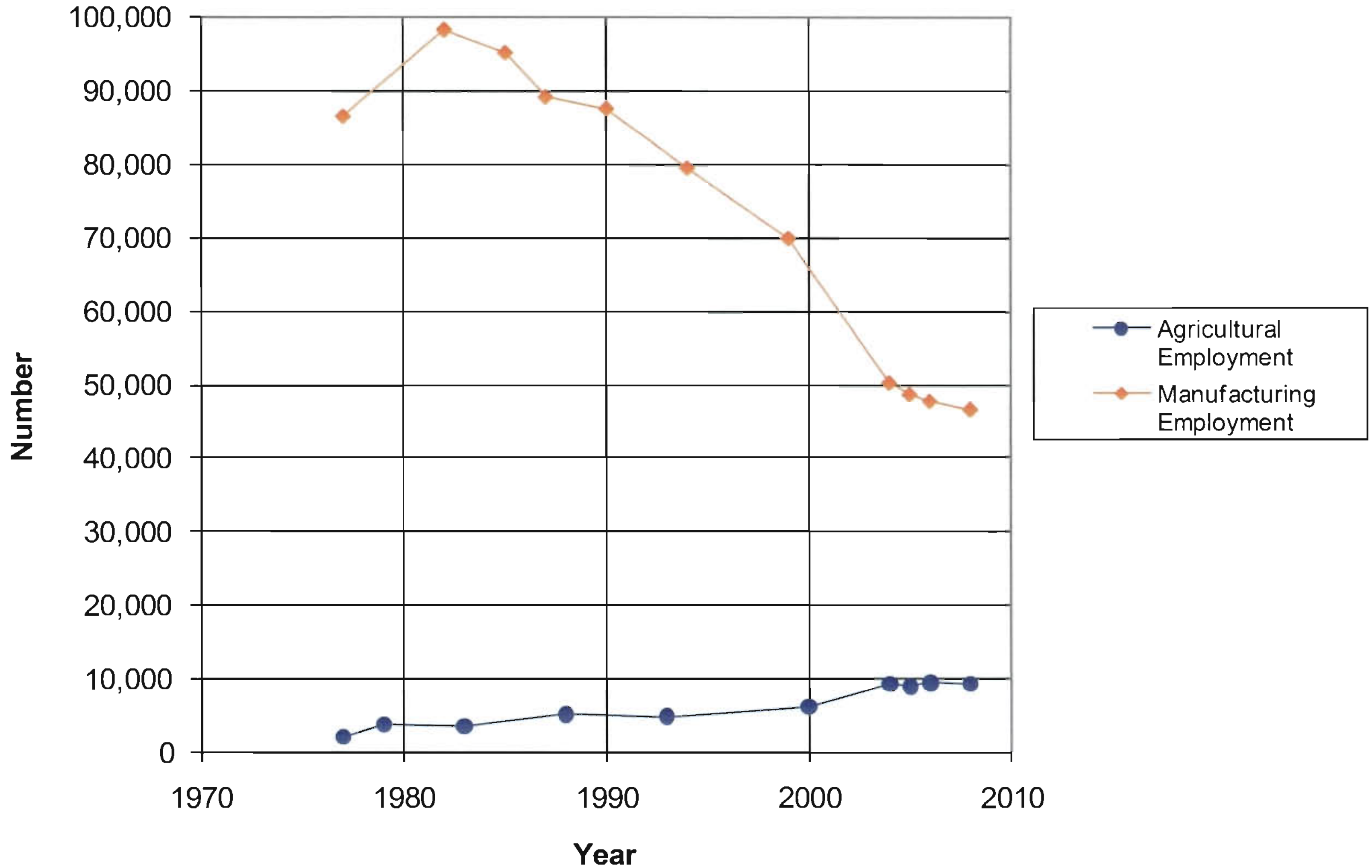

Figure 7-6
Manufacturing and Agriculture Trends in Miami-Dade County

Y:\Projects\2009\093-87674 WM Medley PSD\Final\Figures\Figure 7-6.docx

Source: Florida Statistical Abstract 1992, 1998, 2001, 2006, 2007, and 2009.

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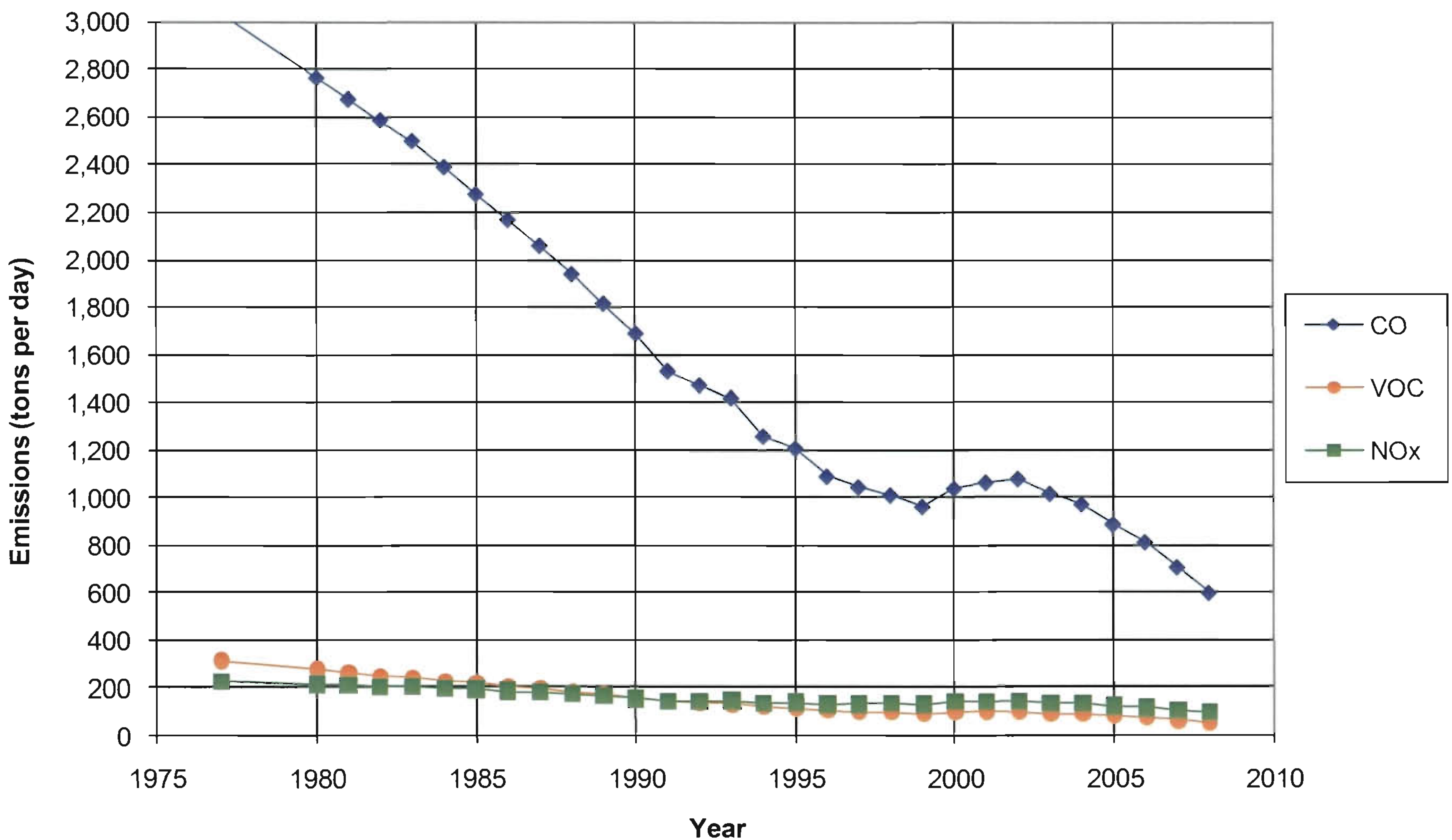

Figure 7-7
Mobile Source Emissions of CO, VOC, and NO_x in Miami-Dade County

Y:\Projects\2009\093-87674 WM Medley PSD\Final\Figures\Figure 7-7.docx

Source: MOBILE6 output, 1997-2005.

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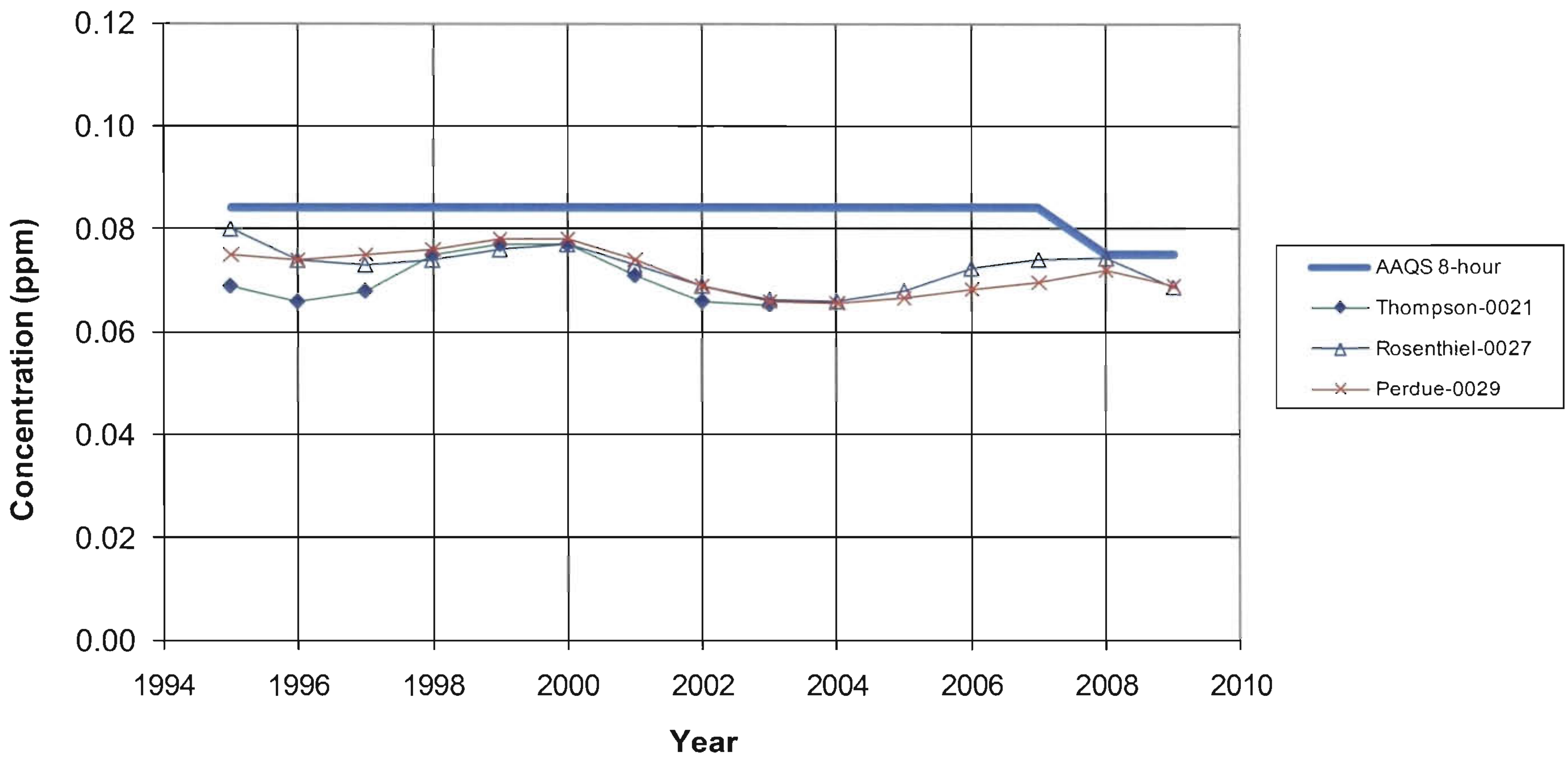

Figure 7-8
Measured 8-Hour Average Ozone Concentrations (3-Year Average of the 4th Highest Values) from 1995 to 2009 – Miami-Dade County
Y:\Projects\2009\093-87674 WM Medley PSD\Final\Figures\Figure 7-8.docx

Source: FDEP Quick Look Reports 1984-2009.

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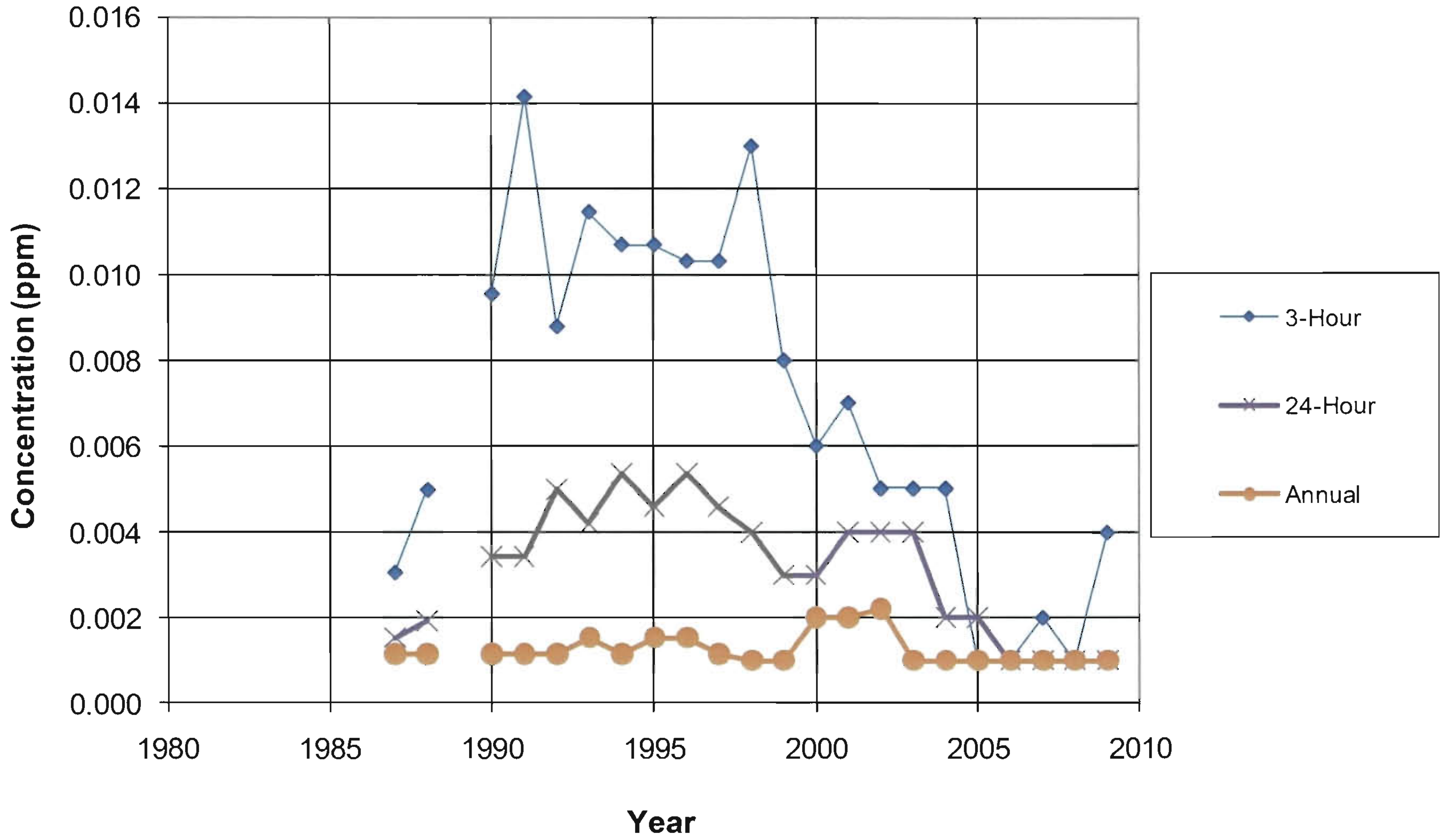


Figure 7-9
Measured SO_2 Concentrations (2nd Highest Values for 3- and 24-hour) at Monitor ID 0019 from 1987 to 2009 – Miami-Dade County

Y:\Projects\2009\093-87674 WM Medley PSD\Final\Figures\Figure 7-9.docx

Source: FDEP Quick Look Reports 1984-2009.

Golder Associates

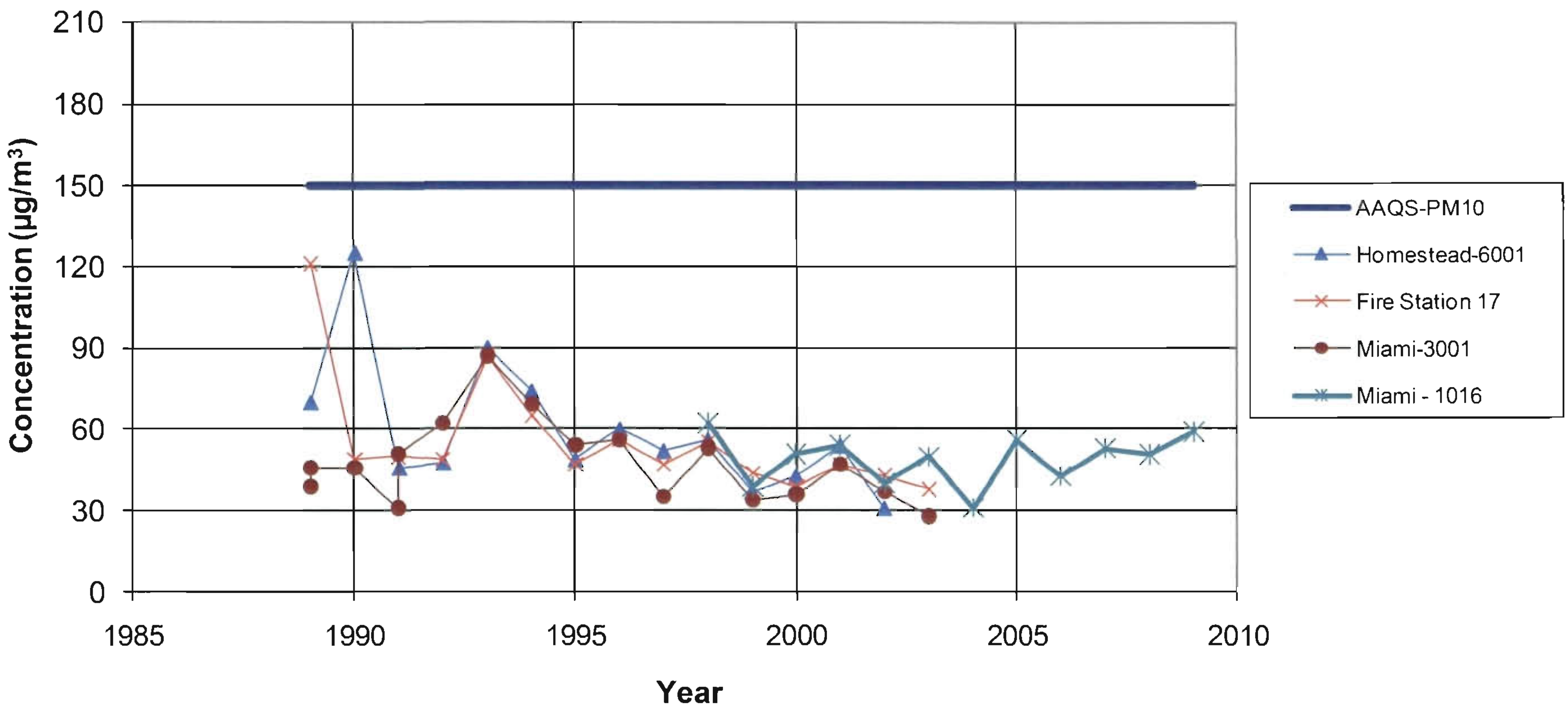


Figure 7-10
Measured 24-Hour Average PM_{10} Concentrations (1989 to 2009) (2nd Highest Values) – Miami-Dade County

Y:\Projects\2009\093-87674 WM Medley PSD\Final\Figures\Figure 7-10.docx

Source: FDEP Quick Look Reports 1984-2009.

Golder Associates

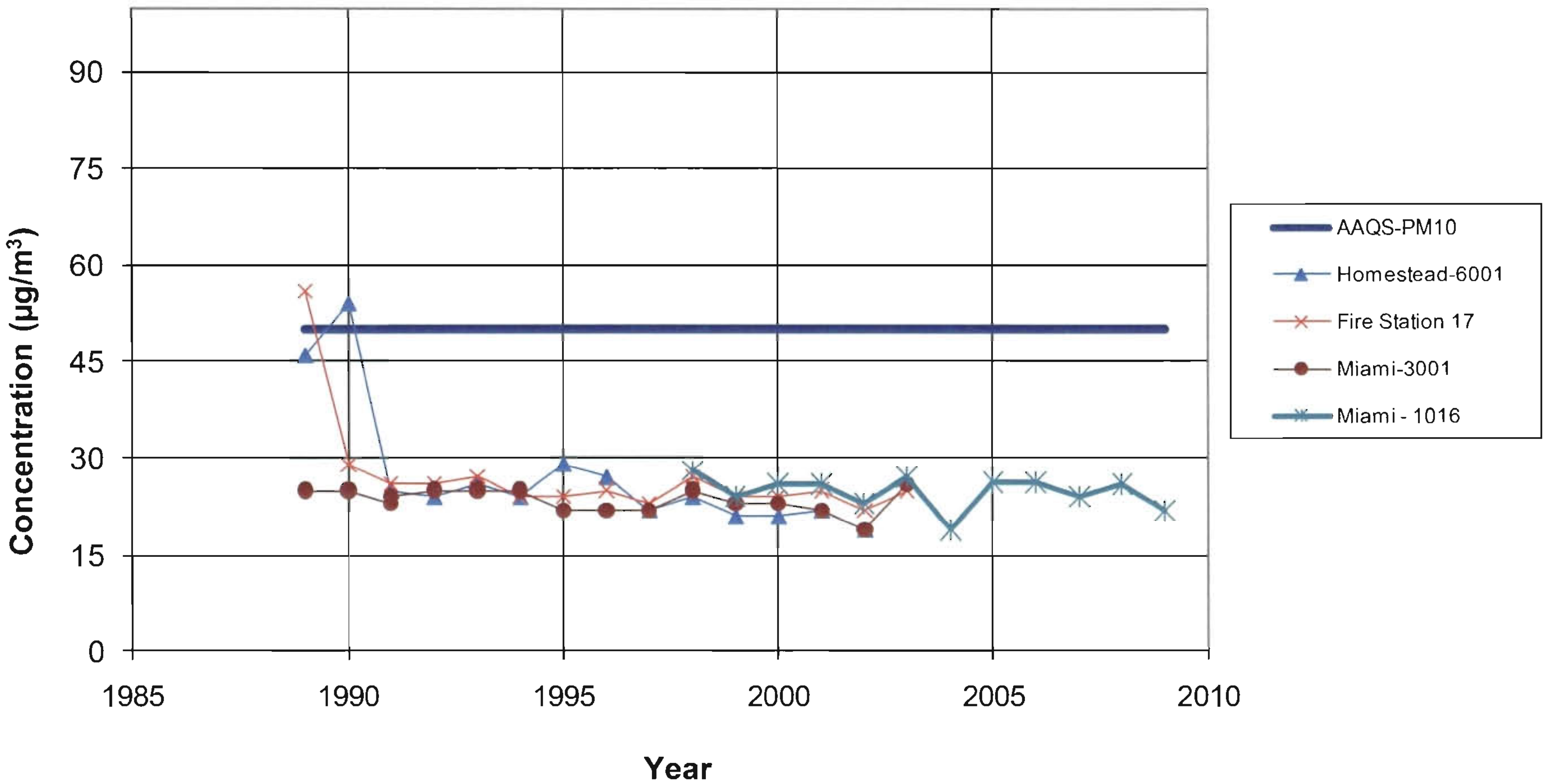


Figure 7-11
Measured Annual Average PM_{10} Concentrations (1989 to 2009) – Miami-Dade County
Y:\Projects\2009\093-87674 WM Medley PSD\Final\Figures\Figure 7-11.docx

Source: FDEP Quick Look Reports 1984-2009.

Golder Associates

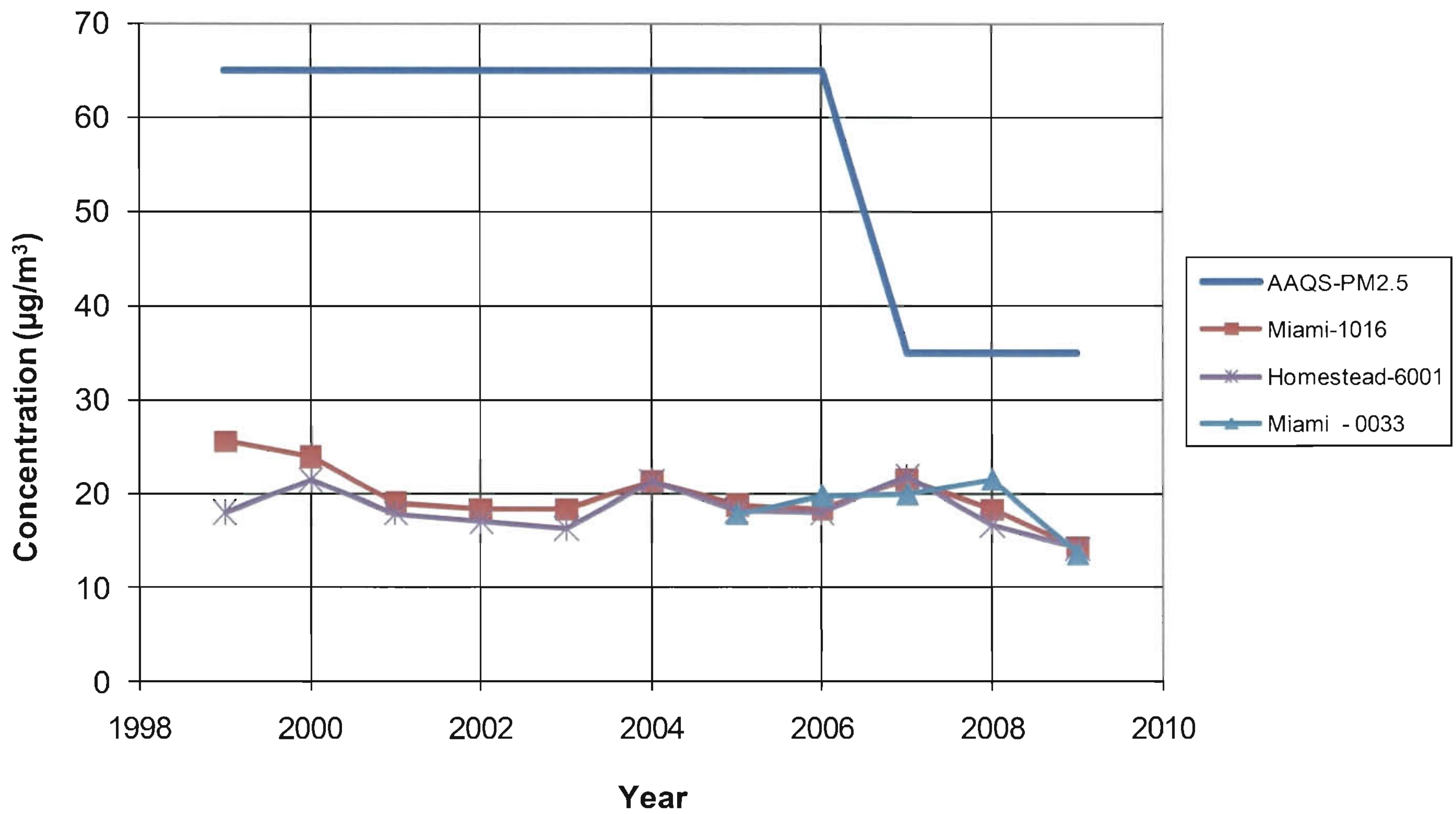


Figure 7-12
Measured 24-Hour Average $PM_{2.5}$ Concentrations (1999 to 2009) (98th Percentile Values) – Miami-Dade County
Y:\Projects\2009\093-87674 WM Medley PSD\Final\Figures\Figure 7-12.docx

Source: FDEP Quick Look Reports 1984-2009.

Golder Associates

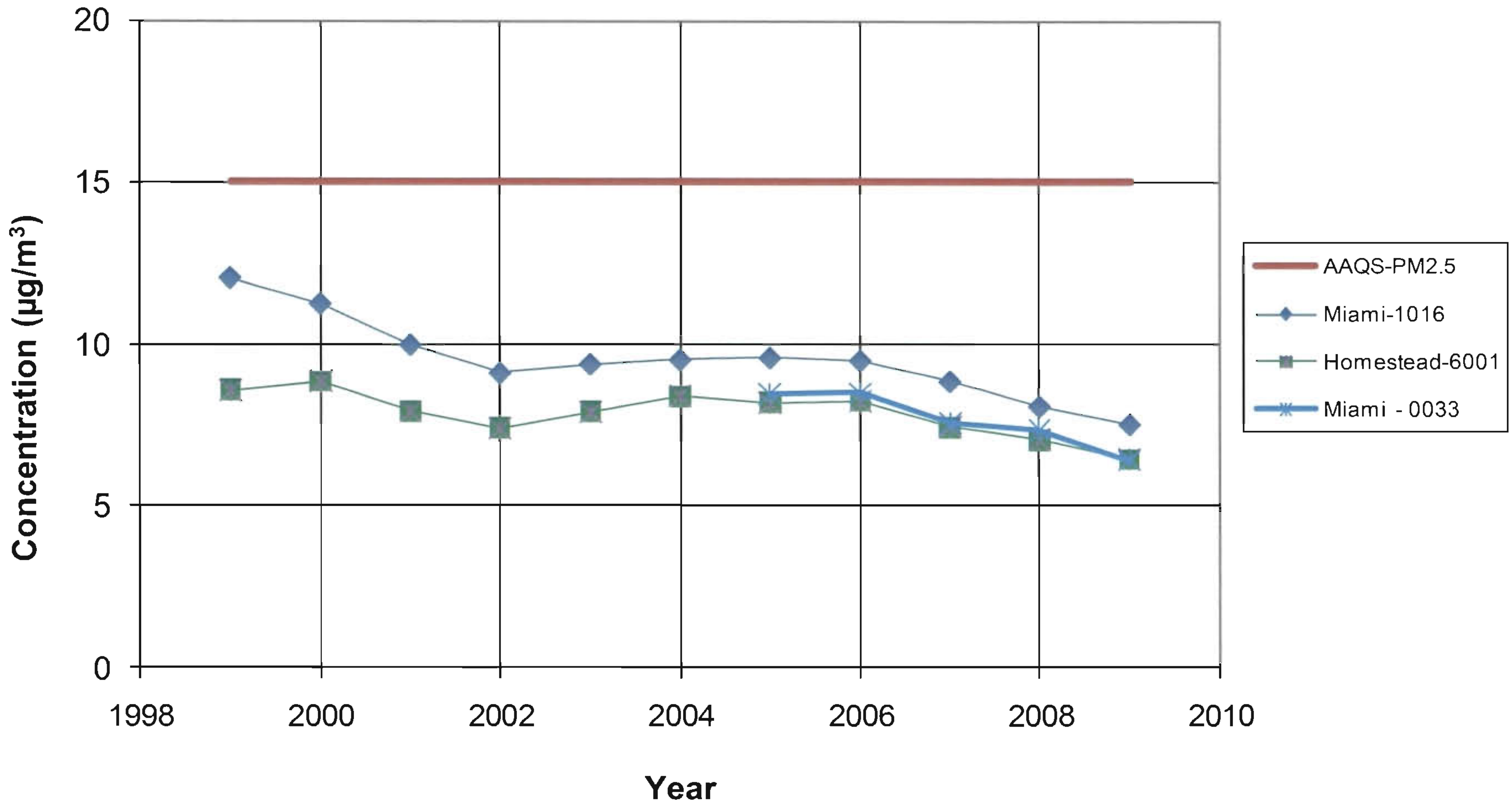


Figure 7-13
Measured Annual Average $PM_{2.5}$ Concentrations (1999 to 2009) – Miami-Dade County
Y:\Projects\2009\093-87674 WM Medley PSD\Final\Figures\Figure 7-13.docx

Source: FDEP Quick Look Reports 1984-2009.

Golder Associates

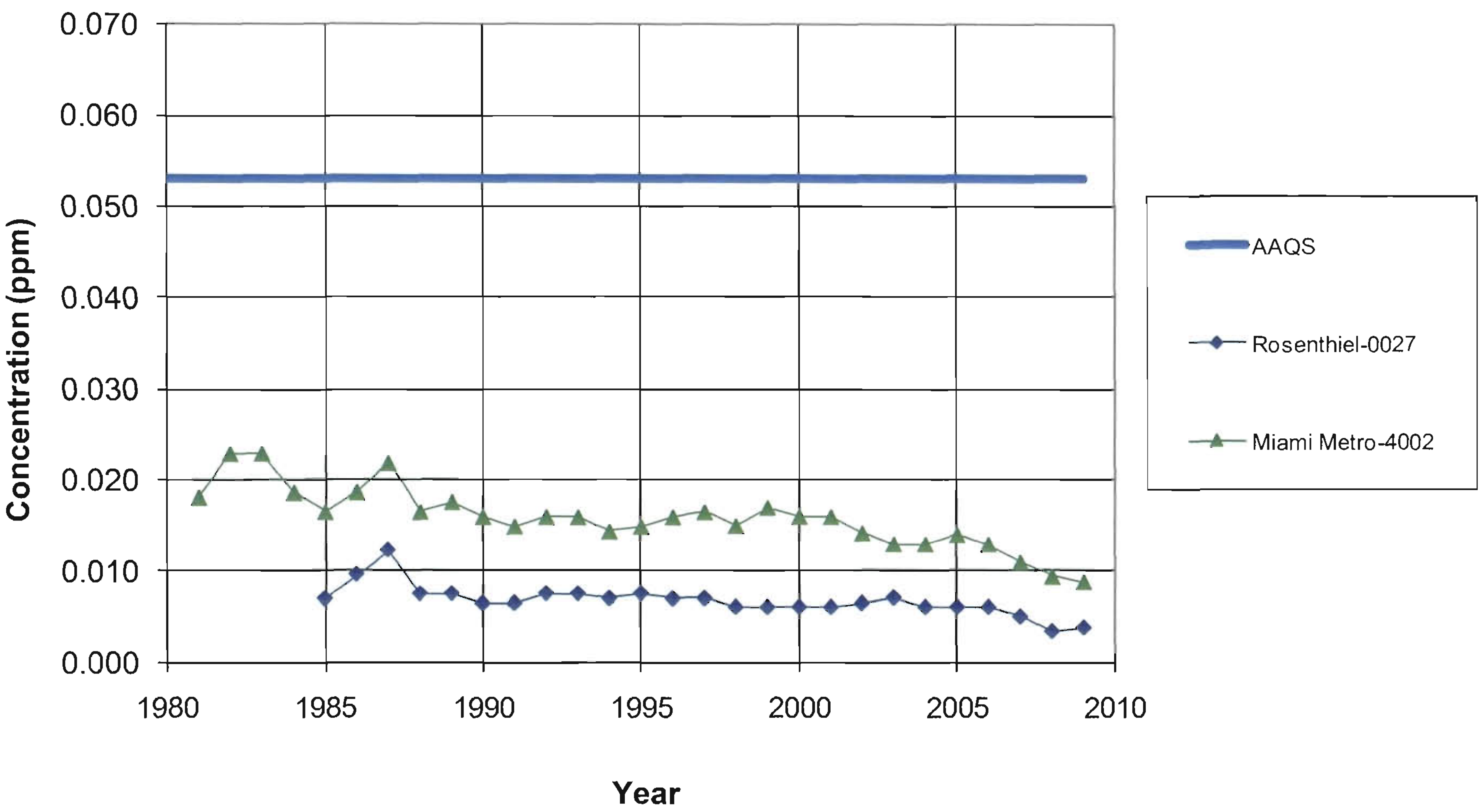


Figure 7-14
Measured Annual Average Nitrogen Dioxide Concentrations from 1981 to 2009 – Miami-Dade County
Y:\Projects\2009\093-87674 WM Medley PSD\Final\Figures\Figure 7-14.docx

Source: FDEP Quick Look Reports 1984-2009.

Golder Associates

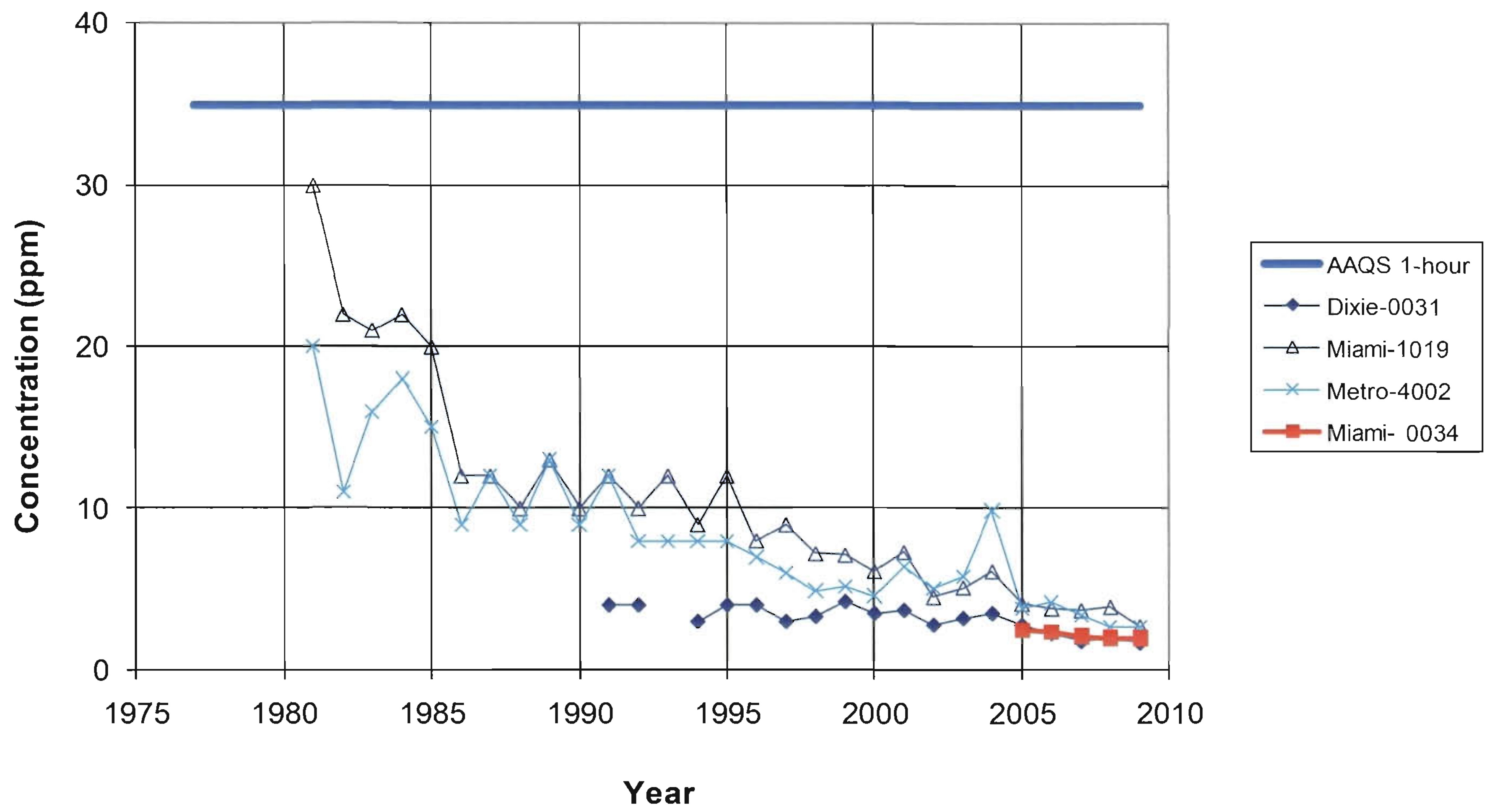


Figure 7-15
Measured 1-Hour Average Carbon Monoxide Concentrations (2nd Highest Values) from 1981 to 2009 – Miami-Dade County

Y:\Projects\2009\093-87674 WM Medley PSD\Final\Figures\Figure 7-15.docx

Source: FDEP Quick Look Reports 1984-2009.

Golder Associates

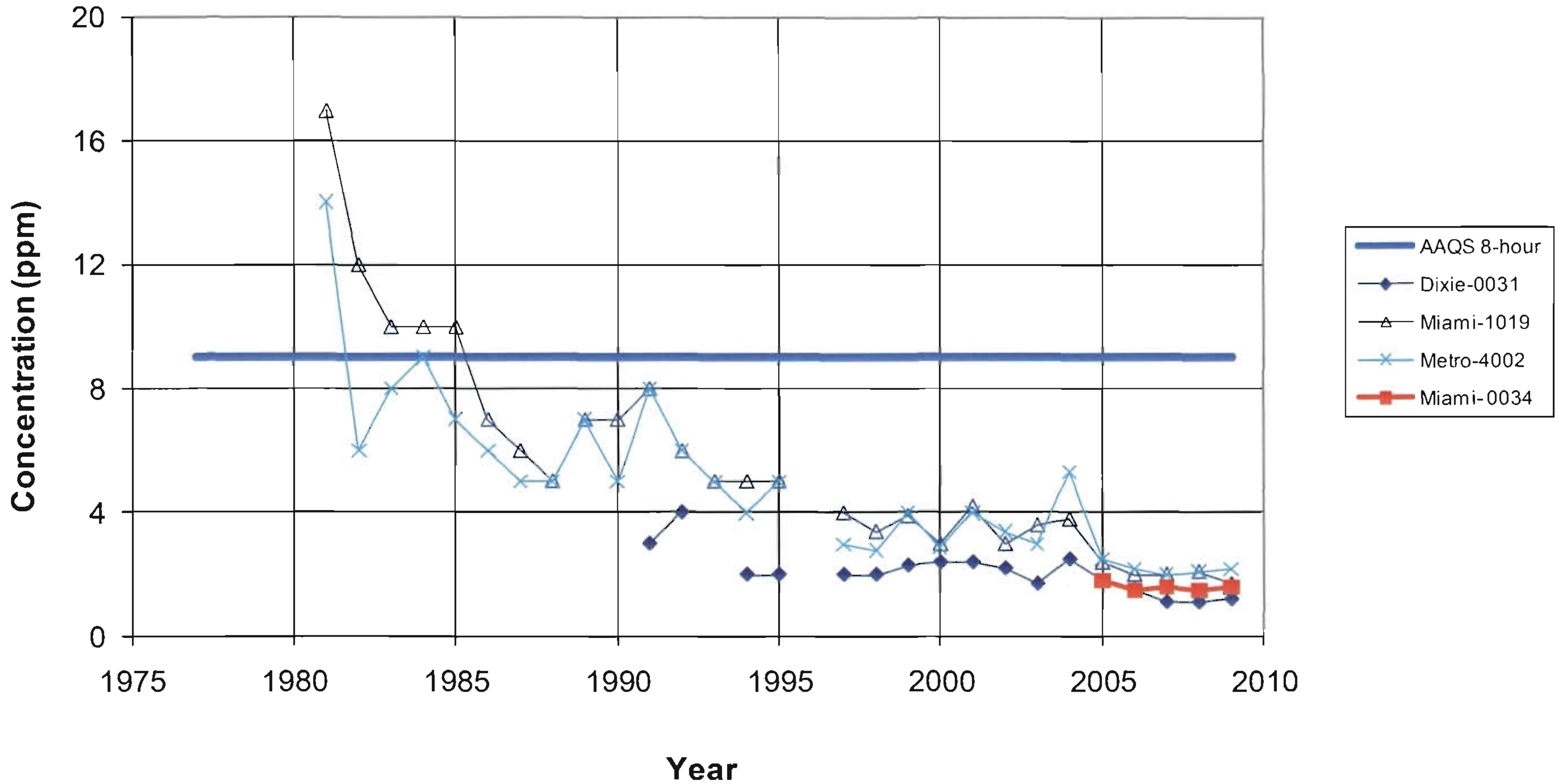


Figure 7-16
Measured 8-Hour Average Carbon Monoxide Concentrations (2nd Highest Values) from 1981 to 2009 – Miami-Dade County
Y:\Projects\2009\093-87674 WM Medley PSD\Final\Figures\Figure 7-16.docx

Source: FDEP Quick Look Reports 1984-2009.

Golder Associates

FIGURE 7-17

Visual Effects Screening Analysis for
Source: WM MEDLEY 6 ENGINES
Class I Area: ENP

*** Level-1 Screening ***

Input Emissions for

Particulates	5.10	LB /HR
NOx (as NO2)	18.00	LB /HR
Primary NO2	.00	LB /HR
Soot	.00	LB /HR
Primary SO4	.00	LB /HR

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

Background Ozone:	.04	ppm
Background Visual Range:	177.80	km
Source-Observer Distance:	21.20	km
Min. Source-Class I Distance:	21.20	km
Max. Source-Class I Distance:	120.00	km
Plume-Source-Observer Angle:	11.25	degrees

Stability: 6
Wind Speed: 1.00 m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	155.	37.7	14.	2.00	1.333	.05	.017
SKY	140.	155.	37.7	14.	2.00	.647	.05	-.013
TERRAIN	10.	84.	21.2	84.	2.00	1.904	.05	.011
TERRAIN	140.	84.	21.2	84.	2.00	.119	.05	.001

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	1.	1.0	168.	2.00	6.415*	.05	.105*
SKY	140.	1.	1.0	168.	2.00	2.100*	.05	-.060*
TERRAIN	10.	1.	1.0	168.	2.00	13.537*	.05	.125*
TERRAIN	140.	1.	1.0	168.	2.00	2.010*	.05	.036

APPENDIX A

LFG RECOVERY PROJECTION MODEL
(GAS CURVE)

Carlson Environmental Consultants, PC

400 West Windsor Street
Monroe, NC 28112
704-506-7312
704-283-9755 fax

October 14, 2008

MEMORANDUM

TO: David Thorley, WMI
Rich Nolan, Medley

FROM: Kris Carlson, P.E., CEC

SUBJECT: LFG Recovery Projection Model
Medley Landfill and Recycling Center – Medley, FL

Per your request, please find attached to this memorandum one (1) LFG model depicting projected LFG generation and possible LFG collection rates for the Medley Landfill and Recycling Center. Please note that this model is a first-order model, similar to the U.S. Environmental Protection Agency (EPA) Landfill Gas Emissions Model (LandGEM). WMI provided the historical and future waste intake and the model inputs for "k" and "Lo" based upon U.S. EPA AP-42 Section 2.4 defaults.

For modeling purposes only, CEC estimated that the LFG collection system would be maintained and expanded aggressively and the landfill will be capped as soon as waste cells are filled to final grade. The average collection efficiency assumed was 75 percent during active landfill operations, with the LFG collection increasing to 90 percent after landfill closure. These estimates do not include any "factor of safety" added to them.

This report has been prepared in accordance with the care and skill generally exercised by reputable LFG professionals, under similar circumstances, in this or similar localities. No other warranty, express or implied, is made as to the professional opinions presented herein. Please note that these LFG models, like any other mathematical projection, should be used only as a tool, and not an absolute declaration of the rate of LFG generation or LFG recovery potential. Changes in the landfill property use and conditions (for example, variations in rainfall, water levels, landfill operations, LFG expansions, final cover systems, or other factors) may affect LFG generation and future gas recovery at the site. CEC does not guarantee the quantity or the quality of available landfill gas.

I appreciate the opportunity to provide LFG consulting services to the Medley Landfill. Please feel free to give me a call at (704) 506-7312 if I can be of further service to you.

Attachment

S:\Carlson Env\Projects\Waste Management\Medley\Medley LFGModeling 2008.doc

LFG RECOVERY/GENERATION PROJECTION
MEDLEY LANDFILL AND RECYCLING CENTER - MEDLEY, FL

Year	Disposal Rate (tons/yr)	Refuse In-Place (tons)	Estimated LFG Generation Potential (scfm)	Est. LFG System Coverage (%)	Est. LFG Recovery from Existing and Planned LFG System (scfm)
1980	640,000	640,000	0	0%	0
1981	640,000	1,280,000	299	0%	0
1982	640,000	1,920,000	587	0%	0
1983	640,000	2,560,000	864	0%	0
1984	640,000	3,200,000	1,129	0%	0
1985	640,000	3,840,000	1,385	0%	0
1986	640,000	4,480,000	1,630	0%	0
1987	640,000	5,120,000	1,865	0%	0
1988	640,000	5,760,000	2,092	0%	0
1989	640,000	6,400,000	2,309	0%	0
1990	640,000	7,040,000	2,518	0%	0
1991	640,000	7,680,000	2,719	0%	0
1992	640,000	8,320,000	2,912	0%	0
1993	640,000	8,960,000	3,097	0%	0
1994	640,000	9,600,000	3,275	0%	0
1995	640,000	10,240,000	3,446	0%	0
1996	640,000	10,880,000	3,611	75%	2,708
1997	640,000	11,520,000	3,769	75%	2,826
1998	640,000	12,160,000	3,920	75%	2,940
1999	640,000	12,800,000	4,066	75%	3,050
2000	640,000	13,440,000	4,206	75%	3,155
2001	640,000	14,080,000	4,341	75%	3,256
2002	640,000	14,720,000	4,470	75%	3,352
2003	640,000	15,360,000	4,594	75%	3,446
2004	739,513	16,099,513	4,714	75%	3,535
2005	830,841	16,930,354	4,875	75%	3,656
2006	892,021	17,822,375	5,072	75%	3,804
2007	773,094	18,595,469	5,291	75%	3,968
2008	775,000	19,370,469	5,445	75%	4,084
2009	775,000	20,145,469	5,594	75%	4,196
2010	775,000	20,920,469	5,738	75%	4,303
2011	775,000	21,695,469	5,875	75%	4,407
2012	775,000	22,470,469	6,008	75%	4,506
2013	775,000	23,245,469	6,135	75%	4,601
2014	775,000	24,020,469	6,257	75%	4,693
2015	775,000	24,795,469	6,374	75%	4,781
2016	775,000	25,570,469	6,487	75%	4,865
2017	775,000	26,345,469	6,595	75%	4,947
2018	775,000	27,120,469	6,699	75%	5,025
2019	775,000	27,895,469	6,799	75%	5,100
2020	775,000	28,670,469	6,895	75%	5,172
2021	775,000	29,445,469	6,988	75%	5,241
2022	775,000	30,220,469	7,076	75%	5,307
2023	775,000	30,995,469	7,162	75%	5,371
2024	763,114	31,758,583	7,244	75%	5,433

LFG RECOVERY/GENERATION PROJECTION
MEDLEY LANDFILL AND RECYCLING CENTER - MEDLEY, FL

Year	Disposal Rate (tons/yr)	Refuse In-Place (tons)	Estimated LFG Generation Potential (scfm)	Est. LFG System Coverage (%)	Est. LFG Recovery from Existing and Planned LFG System (scfm)
2025	0	31,758,583	7,317	90%	6,585
2026	0	31,758,583	7,030	90%	6,327
2027	0	31,758,583	6,754	90%	6,079
2028	0	31,758,583	6,489	90%	5,840
2029	0	31,758,583	6,235	90%	5,611
2030	0	31,758,583	5,990	90%	5,391
2031	0	31,758,583	5,755	90%	5,180
2032	0	31,758,583	5,530	90%	4,977
2033	0	31,758,583	5,313	90%	4,782
2034	0	31,758,583	5,105	90%	4,594
2035	0	31,758,583	4,904	90%	4,414
2036	0	31,758,583	4,712	90%	4,241
2037	0	31,758,583	4,527	90%	4,075
2038	0	31,758,583	4,350	90%	3,915
2039	0	31,758,583	4,179	90%	3,761
2040	0	31,758,583	4,015	90%	3,614
2041	0	31,758,583	3,858	90%	3,472
2042	0	31,758,583	3,707	90%	3,336
2043	0	31,758,583	3,561	90%	3,205
2044	0	31,758,583	3,422	90%	3,080
2045	0	31,758,583	3,288	90%	2,959
2046	0	31,758,583	3,159	90%	2,843
2047	0	31,758,583	3,035	90%	2,731
2048	0	31,758,583	2,916	90%	2,624
2049	0	31,758,583	2,801	90%	2,521
2050	0	31,758,583	2,692	90%	2,422
2051	0	31,758,583	2,586	90%	2,327
2052	0	31,758,583	2,485	90%	2,236
2053	0	31,758,583	2,387	90%	2,149
2054	0	31,758,583	2,294	90%	2,064
2055	0	31,758,583	2,204	90%	1,983
2056	0	31,758,583	2,117	90%	1,906
2057	0	31,758,583	2,034	90%	1,831
2058	0	31,758,583	1,955	90%	1,759
2059	0	31,758,583	1,878	90%	1,690
2060	0	31,758,583	1,804	90%	1,624
2061	0	31,758,583	1,734	90%	1,560
2062	0	31,758,583	1,666	90%	1,499
2063	0	31,758,583	1,600	90%	1,440
2064	0	31,758,583	1,537	90%	1,384
2065	0	31,758,583	1,477	90%	1,329
2066	0	31,758,583	1,419	90%	1,277
2067	0	31,758,583	1,364	90%	1,227
2068	0	31,758,583	1,310	90%	1,179
2069	0	31,758,583	1,259	90%	1,133

LFG RECOVERY/GENERATION PROJECTION
MEDLEY LANDFILL AND RECYCLING CENTER - MEDLEY, FL

Year	Disposal Rate (tons/yr)	Refuse In-Place (tons)	Estimated LFG Generation Potential (scfm)	Est. LFG System Coverage (%)	Est. LFG Recovery from Existing and Planned LFG System (scfm)
2070	0	31,758,583	1,209	90%	1,088
2071	0	31,758,583	1,162	90%	1,046
2072	0	31,758,583	1,116	90%	1,005
2073	0	31,758,583	1,073	90%	965
2074	0	31,758,583	1,031	90%	928
2075	0	31,758,583	990	90%	891
2076	0	31,758,583	951	90%	856
2077	0	31,758,583	914	90%	823
2078	0	31,758,583	878	90%	790
2079	0	31,758,583	844	90%	759
2080	0	31,758,583	811	90%	730
2081	0	31,758,583	779	90%	701
2082	0	31,758,583	748	90%	674
2083	0	31,758,583	719	90%	647
2084	0	31,758,583	691	90%	622
2085	0	31,758,583	664	90%	597
2086	0	31,758,583	638	90%	574
2087	0	31,758,583	613	90%	551
2088	0	31,758,583	589	90%	530
2089	0	31,758,583	566	90%	509
2090	0	31,758,583	543	90%	489
2091	0	31,758,583	522	90%	470
2092	0	31,758,583	502	90%	451
2093	0	31,758,583	482	90%	434
2094	0	31,758,583	463	90%	417
2095	0	31,758,583	445	90%	400
2096	0	31,758,583	427	90%	385
2097	0	31,758,583	411	90%	370
2098	0	31,758,583	395	90%	355
2099	0	31,758,583	379	90%	341
2100	0	31,758,583	364	90%	328

Methane Content of LFG Adjusted to: 50%
Selected Decay Rate Constant (k): 0.040 1/yr
Selected Ultimate Methane Recovery Rate (Lo): 3,200 cu ft/ton

APPENDIX B

CAT 3520 TECHNICAL DATA SHEETS

TABLE B-1
RENEWABLE ENERGY PROJECT AT THE MEDLEY LANDFILL
CAT 3520 DATA INPUT SHEET

Parameter	Value		Source
Annual operating hours	8,760	hrs/yr	Design
Design flow of LFG	7,317	scfm	WM Data
LFG Methane Content	50	%	WM Data
LFG Heating Value	500	Btu/scf, LHV	Based on Methane content
H_2S concentration of LFG	830	ppm	WM Data
CAT 3520 Power Output	2,233	bhp	CAT Data from WM
CAT 3520 Fuel Consumption	6,509	Btu/bhp-hr	CAT Data from WM
CAT 3520 Design LFG Flow	588	scfm	WM data
CAT 3520 Exhaust Temperature	898	^{o}F	CAT Data from WM
CAT 3520 Exhaust Air Flow	12,476	acfm	CAT Data from WM
CAT 3520 Exhaust Mass Flow	22,318	lb/hr	CAT Data from WM
CAT 3520 Exhaust Air O_2 Content	9	%, dry	CAT Data from WM
CAT 3520 Exhaust Air Moisture Content	7	%	Assumed

G3520C GAS ENGINE TECHNICAL DATA CATERPILLAR®

ENGINE SPEED:	1200	FUEL:	LOW ENERGY (1.43 CH4:CO2 RATIO)
COMPRESSION RATIO:	11.3:1	FUEL SYSTEM:	CAT LOW PRESSURE WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 1 MAX. INLET (°F):	218	FUEL PRESS. RANGE (PSIG):	1.5 - 5.0
AFTERCOOLER - STAGE 2 MAX. INLET (°F):	130	MIN. METHANE NUMBER:	135
JACKET WATER - MAX. OUTLET (°F):	230	RATED ALTITUDE (FT):	1378
COOLING SYSTEM:	JW+1AC, OC+2AC	AT AIR TO TURBO. TEMP. (°F):	77
IGNITION SYSTEM:	ADEM3	NOx EMISSION LEVEL:	0.5 g/bhp-hr
SPARK PLUG TYPE:	J-GAP	FUEL LHV (BTU/SCF):	456
EXHAUST MANIFOLD:	DRY	APPLICATION:	GENSET
COMBUSTION:	LOW EMISSION		

RATING AND EFFICIENCY		NOTES	LOAD	100%	75%	50%
ENGINE POWER	(WITHOUT FAN)	(1)	BHP	2233	1675	1116
GENERATOR POWER	(WITHOUT FAN)	(2)	EKW	1600	1200	800
ENGINE EFFICIENCY	(ISO 3046/1)	(3)	%	40.1	38.6	36.1
ENGINE EFFICIENCY	(NOMINAL)	(3)	%	39.1	37.7	35.2
THERMAL EFFICIENCY	(NOMINAL)	(4)	%	41.3	40.6	42.2
TOTAL EFFICIENCY	(NOMINAL)	(5)	%	80.4	78.3	77.4

ENGINE DATA						
FUEL CONSUMPTION	(ISO 3046/1)	(6)	BTU/bhp-hr	6354	6592	7047
FUEL CONSUMPTION	(NOMINAL)	(6)	BTU/bhp-hr	6509	6753	7219
AIR FLOW (77 °F, 14.7 psi)		(7)	SCFM	4512	3415	2286
AIR FLOW		(7)	lb/hr	20006	15141	10136
COMPRESSOR OUT PRESSURE			in. HG (abs)	105.8	80.8	55.5
COMPRESSOR OUT TEMPERATURE			°F	375	306	220
AFTERCOOLER AIR OUT TEMPERATURE			°F	142	138	135
INLET MAN. PRESSURE		(8)	in. HG (abs)	94.4	71.5	48.9
INLET MAN. TEMPERATURE	(MEASURED IN PLENUM)	(9)	°F	142	138	135
TIMING		(10)	°BTDC	27	27	27
EXHAUST STACK TEMPERATURE		(11)	°F	898	943	984
EXHAUST GAS FLOW (@ stack temp.)		(12)	CFM	12476	9780	6770
EXHAUST MASS FLOW		(12)	lb/hr	22318	16940	11418

EMISSIONS DATA					
NOx (as NO2)	(13)	g/bhp-hr	0.5	0.5	0.5
NTE CO	(14)	g/bhp-hr	4.13	4.25	4.4
NOMINAL CO	(15)	g/bhp-hr	2.5	2.5	2.5
THC (molecular weight of 15.84)	(14)	g/bhp-hr	5.84	6.49	7.51
NMHC (molecular weight of 15.84)	(14)	g/bhp-hr	0.88	0.98	1.13
EXHAUST O2	(16)	% DRY	9.0	8.8	8.6
LAMBDA	(16)		1.71	1.67	1.57

HEAT BALANCE DATA					
LHV INPUT	(17)	BTU/min	242216	188451	134313
HEAT REJECTION TO JACKET	(18)	BTU/min	28738	23806	21929
HEAT REJECTION TO ATMOSPHERE	(19)	BTU/min	7210	6034	4857
HEAT REJECTION TO LUBE OIL	(20)	BTU/min	10108	9524	8917
HEAT REJECTION TO EXHAUST (LHV to 77°F)	(21)	BTU/min	76779	65253	45101
HEAT REJECTION TO EXHAUST (LHV to 350°F)	(21)	BTU/min	57574	47602	34587
HEAT REJECTION TO A/C - STAGE 1	(22)	BTU/min	13823	5157	102
HEAT REJECTION TO A/C - STAGE 2	(23)	BTU/min	8895	5684	4086

CONDITIONS AND DEFINITIONS

ENGINE RATING OBTAINED AND PRESENTED IN ACCORDANCE WITH ISO 3046/1. DATA REPRESENTS CONDITIONS OF 77°F, 29.6 IN HG BAROMETRIC PRESSURE, 30% RELATIVE HUMIDITY, 10 IN H2O AIR FILTER RESTRICTION, AND 20 IN H2O EXHAUST STACK PRESSURE. ENGINE EFFICIENCY AND FUEL CONSUMPTION SPECIFICALLY NOTED AS ISO 3046/1 ARE REPRESENTED WITH 5 IN H2O AIR FILTER RESTRICTION AND 0 IN H2O EXHAUST STACK PRESSURE. CONSULT ALTITUDE CURVES FOR APPLICATIONS ABOVE MAXIMUM RATED ALTITUDE AND/OR TEMPERATURE. NO OVERLOAD PERMITTED AT RATING SHOWN.

EMISSION LEVELS ARE BASED ON THE ENGINE OPERATING AT STEADY STATE CONDITIONS AND ADJUSTED TO THE SPECIFIED NOx LEVEL AT 100% LOAD. EMISSION TOLERANCES SPECIFIED ARE DEPENDENT UPON FUEL QUALITY. METHANE NUMBER CANNOT VARY MORE THAN ± 3. PUBLISHED PART LOAD DATA IS WITH AIR FUEL RATIO CONTROL.

ENGINE RATING IS WITH 2 ENGINE DRIVEN WATER PUMPS. PUMP POWER IS NOT INCLUDED IN HEAT BALANCE DATA.

FOR NOTES INFORMATION CONSULT PAGE THREE.

FUEL USAGE GUIDE

CAT METHANE NUMBER	40	50	60	70	80	90	100	110	120	130	140	150
IGNITION TIMING	-	-	-	-	-	-	-	-	24	26	28	30
DERATION FACTOR	0	0	0	0	0	0	0	0	1.00	1.00	1.00	1.00

ALTITUDE DERATION FACTORS

AIR TO TURBO (°F)	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	0.96	0.93	0.89	0.86	0.83	0.79	0.76	0.74	0.71	0.68	0.65	0.63	0.60
120	0.98	0.94	0.91	0.87	0.84	0.81	0.78	0.75	0.72	0.69	0.66	0.64	0.61
110	0.99	0.96	0.92	0.89	0.86	0.82	0.79	0.76	0.73	0.70	0.68	0.65	0.62
100	1.00	0.97	0.94	0.90	0.87	0.84	0.81	0.77	0.74	0.72	0.69	0.66	0.63
90	1.00	0.99	0.96	0.92	0.89	0.85	0.82	0.79	0.76	0.73	0.70	0.67	0.65
80	1.00	1.00	0.97	0.94	0.90	0.87	0.84	0.80	0.77	0.74	0.71	0.68	0.66
70	1.00	1.00	0.99	0.96	0.92	0.89	0.85	0.82	0.79	0.76	0.73	0.70	0.67
60	1.00	1.00	1.00	0.97	0.94	0.90	0.87	0.83	0.80	0.77	0.74	0.71	0.68
50	1.00	1.00	1.00	0.99	0.96	0.92	0.88	0.85	0.82	0.79	0.76	0.73	0.70

ALTITUDE (FEET ABOVE SEA LEVEL)

AFTERCOOLER HEAT REJECTION FACTORS

AIR TO TURBO (°F)	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	1.33	1.37	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
120	1.28	1.31	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
110	1.19	1.24	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26
100	1.13	1.17	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
90	1.06	1.11	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
80	1.00	1.04	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

ALTITUDE (FEET ABOVE SEA LEVEL)

FREE FIELD MECHANICAL & EXHAUST NOISE

100% Load Data			dB(A)	(dB)							
			Overal SPL	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 khz
Free Field Mechanical	DISTANCE FROM THE ENGINE (FEET)	3.2	108.5	51.5	78.7	88.2	92.9	99.9	97.3	93.2	99.2
		22.9	91.6	34.6	59.0	68.1	74.0	83.0	79.4	75.1	85.2
		49.2	85.0	28.0	55.2	64.7	69.4	76.4	73.8	69.7	75.7
Free Field Exhaust	DISTANCE FROM THE ENGINE (FEET)	4.9	106.1	67.5	96.5	96.0	86.5	88.7	90.1	95.8	92.7
		22.9	92.7	54.1	73.1	82.6	75.1	75.3	76.7	82.2	79.3
		49.2	86.1	47.5	66.5	78.0	88.5	68.7	70.1	75.8	72.7

Octave Band Center Frequency (OBCF)

FUEL USAGE GUIDE:

This table shows the derate factor required for a given fuel. Note that deration occurs as the methane number decreases. Methane number is a scale to measure detonation characteristics of various fuels. The methane number of a fuel is determined by using the Caterpillar Methane Number Calculation program.

ALTITUDE DERATION FACTORS:

This table shows the deration required for various air inlet temperatures and altitudes. Use this information along with the fuel usage guide chart to help determine actual engine power for your site.

INLET AND EXHAUST RESTRICTION CORRECTIONS FOR ALTITUDE CAPABILITY:

To determine the appropriate altitude derate factor to be applied to this engine for inlet or exhaust restrictions differing from the standard conditions listed on page 1, a correction to the site altitude can be made to adjust for this difference. Add 141 feet to the site altitude for each additional inch of H2O of exhaust stack pressure greater than spec sheet conditions. Add 282 feet to the site altitude for each additional inch of H2O of inlet restriction greater than spec sheet conditions. If site inlet restriction or exhaust stack pressure are less than spec sheet conditions, the same trends apply to lower the site altitude.

ACTUAL ENGINE RATING:

It is important to note that the Altitude/Temperature deration and the Fuel Usage Guide deration are not cumulative. They are not to be added together. The same is true for the Low Energy Fuel deration (reference the Caterpillar Methane Number Program) and the Fuel Usage Guide deration. However, the Altitude/Temperature deration and Low Energy Fuel deration are cumulative; and they must be added together in the method shown below. To determine the actual power available, take the lowest rating between 1) and 2).

1) (Altitude/Temperature Deration) + (Low Energy Fuel Deration)
2) Fuel Usage Guide Deration

Note: For NA's always add the Low Energy Fuel deration to the Altitude/Temperature deration. For TA engines only add the Low Energy Fuel deration to the Altitude/Temperature deration whenever the Altitude/Temperature deration is less than 1.0 (100%). This will give the actual rating for the engine at the conditions specified.

AFTERCOOLER HEAT REJECTION FACTORS:

Aftercooler heat rejection is given for standard conditions of 77°F and 500 ft altitude. To maintain a constant air inlet manifold temperature, as the air to turbo temperature goes up, so must the heat rejection. As altitude increases, the turbocharger must work harder to overcome the lower atmospheric pressure. This increases the amount of heat that must be removed from the inlet air by the aftercooler. Use the aftercooler heat rejection factor to adjust for ambient and altitude conditions. Multiply this factor by the standard aftercooler heat rejection. Failure to properly account for these factors could result in detonation and cause the engine to shutdown or fail. For 2 Stage Aftercoolers with separate circuits, the 1st stage will collect 90% of the additional heat.

SOUND DATA:

Data determined by methods similar to ISO Standard DIS-8528-10. Accuracy Grade 3. SPL = Sound Pressure Level.

NOTES

1 ENGINE RATING IS WITH 2 ENGINE DRIVEN WATER PUMPS. TOLERANCE IS ± 3% OF FULL LOAD.

2 GENERATOR POWER DETERMINED WITH AN ASSUMED GENERATOR EFFICIENCY OF 96.1% AND POWER FACTOR OF 0.8 [GENERATOR POWER = ENGINE POWER x GENERATOR EFFICIENCY].

3 ISO 3046/1 ENGINE EFFICIENCY TOLERANCE IS (+)0, (-)5% OF FULL LOAD % EFFICIENCY VALUE. NOMINAL ENGINE EFFICIENCY TOLERANCE IS ± 2.5% OF FULL LOAD % EFFICIENCY VALUE.

4 THERMAL EFFICIENCY: JACKET HEAT + STAGE 1 A/C HEAT + EXH. HEAT TO 350°F.

5 TOTAL EFFICIENCY = ENGINE EFF. + THERMAL EFF. TOLERANCE IS ± 10% OF FULL LOAD DATA.

6 ISO 3046/1 FUEL CONSUMPTION TOLERANCE IS (+)5, (-)0% OF FULL LOAD DATA. NOMINAL FUEL CONSUMPTION TOLERANCE IS ± 2.5 % OF FULL LOAD DATA.

7 UNDRIED AIR. FLOW TOLERANCE IS ± 5 %

8 INLET MANIFOLD PRESSURE TOLERANCE IS ± 5 %

9 INLET MANIFOLD TEMPERATURE TOLERANCE IS ± 9°F.

10 TIMING INDICATED IS FOR USE WITH THE MINIMUM FUEL METHANE NUMBER SPECIFIED. CONSULT THE APPROPRIATE FUEL USAGE GUIDE FOR TIMING AT OTHER METHANE NUMBERS.

11 EXHAUST STACK TEMPERATURE TOLERANCE IS (+)63°F, (-)54°F.

12 WET EXHAUST. FLOW TOLERANCE IS ± 6 %

13 NOX TOLERANCES ARE ± 18 % OF SPECIFIED VALUE.

14 NTE CO, CO2, THC, and NMHC VALUES ARE "NOT TO EXCEED".

15 NOMINAL CO IS A NOMINAL VALUE AND IS REPRESENTATIVE OF A NEW ENGINE DURING THE FIRST 100 HOURS OF ENGINE OPERATION.

16 O2% TOLERANCE IS ± 0.5; LAMBDA TOLERANCE IS ± 0.05. LAMBDA AND O2 LEVEL ARE THE RESULT OF ADJUSTING THE ENGINE TO OPERATE AT THE SPECIFIED NOX LEVEL.

17 LHV RATE TOLERANCE IS ± 2.5%.

18 TOTAL JW HEAT (based on treated water) = JACKET HEAT + STAGE 1 A/C HEAT + 0.90 x (STAGE 1 + STAGE 2) x (ACHRF-1). TOLERANCE IS ± 10 % OF FULL LOAD DATA.

19 RADIATION HEAT RATE BASED ON TREATED WATER. TOLERANCE IS ± 50% OF FULL LOAD DATA.

20 LUBE OIL HEAT RATE BASED ON TREATED WATER. TOLERANCE IS ± 20% OF FULL LOAD DATA.

21 EXHAUST HEAT RATE BASED ON TREATED WATER. TOLERANCE IS ± 10% OF FULL LOAD DATA.

22 STAGE 1 A/C HEAT (based on treated water) = STAGE 1 A/C HEAT + 0.90 x (STAGE 1 + STAGE 2) x (ACHRF-1). TOLERANCE IS ± 5 % OF FULL LOAD DATA.

23 STAGE 2 A/C HEAT (based on treated water) = (STAGE 2 A/C HEAT + (STAGE 1 + STAGE 2) x 0.10 x (ACHRF - 1)) + LUBE OIL HEAT. TOLERANCE IS ± 5 % OF FULL LOAD DATA.

GAS GENERATOR SET

CATERPILLAR®

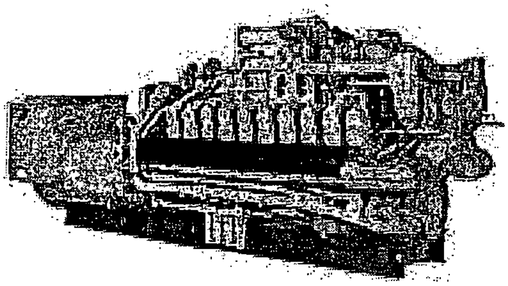


Image shown may not reflect actual package

LOW ENERGY FUEL
CONTINUOUS
1600 ekW / 2000 kVA
60 HZ 1200 RPM 480 VOLTS

Caterpillar is leading the power generation marketplace with Power Solutions engineered to deliver unmatched flexibility, expandability,

BENEFITS

EMISSIONS
- Meets most worldwide emissions requirements down to .5 g/bhp-hr NOx level without aftertreatment

FULL RANGE OF ATTACHMENTS
- Wide range of bolt-on system expansion attachments, factory designed and tested
- Flexible packaging options for easy and cost effective installation

PROVEN SYSTEM
- Fully protype tested
- Field proven in a wide range of applications worldwide
- Certified torsional vibration analysis available

WORLDWIDE PRODUCT SUPPORT
- Caterpillar® dealers provide extensive post sales support including maintenance and repair agreement
- Caterpillar dealers have over 1,600 dealer branch stores operating in 200 countries
- CAT® S.O.S SM program cost effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by-products

CAT ® G3520C GAS ENGINE
- Robust high speed diesel block design provides prolonged life and lower owning operating costs
- Designed for maximum performance on low pressure gaseous fuel supply
- Simple open chamber combustion system for reliability and fuel flexibility
- Leading edge technology in ignition system and air/fuel ratio control for lower emission and engine efficiency
- One electronic control module handles all engine functions: ignition, goveming, air/fuel ratio control and engine protection

CAT SR4B GENERATOR
- Designed to match performance and output characteristics of Caterpillar gas engines
- Industry leading mechanical and electrical design
- High efficiency

CAT EMCP II+ CONTROL PANeL
- Simple user friendly interface and navigation
- Digital monitoring, metering and protection setting
- Fully-featured power metering and protective relaying
- UL 508A Listed
- Remote control and monitor capability options

Factory Installed Standard & Optional Equipment

System	Standard	Optional
Gas Engine Control Module (GECM)	Fuel/air ratio control; Start/stop logic; gas purge cycle, staged shutdown; Engine Protection System: detonation sensitive timing; high exhaust temperature shutdown; Governor: Transient richening and turbo bypass control; Ignition.	
Air Inlet	Two element, single-stage air cleaner with enclosure and service indicator	Air cleaner with precleaner; Mounting stand
Control Panel	EMCP II+	Local alarm module; Remote annuciator; Communications Module (PL1000T, PL1000E); Synchronizing module; Engine failure relay;
Cooling	Engine driven water pumps for jacket water and aftercooler; Jacket water and SCAC thermostats; ANSI/DN customer flange connections for JW inlet and outlet Cat flanges on SCAC circuit	coolant level drain line with valves, fan with guard; Inlet/Outlet connections.
Exhaust	Dry exhaust manifolds, insulated and shielded; Center section cooled turbocharger with Cat flanged outlet; Individual exhaust port and turbocharger outlet wired to Integrated Temperature Sensing Module (ITSM) with GECM providing alarms and shutdowns.	Flange; Exhaust expander; Elbow; Flexible fitting; Muffler and spark-arresting muffler with companion flanges.
Fuel	Electronic fuel metering valve; Throttle plate, 24V DC actuator, controlled by GECM; Fuel system is sized for 10.8 to 25.6 MJ/NM3 (275 to 650 Btu/cu ft) dry pipeline natural gas with pressure of 10.0 to 34.5 kPa (1.5 to 5 psi) to the engine fuel control valve.	Fuel filter; Gas pressure regulator; Gas shutoff valve, 24V, ETR (Energized-To-Run)
Generator	SR4B generator, includes: Caterpillar's Digital Voltage Regulator (CDVR) with 3-phase sensing and KVAR/PF control; Reactive droop; Bus bar connections; Winding temperature detectors; Anti-condensation space heater.	Medium and high voltage generators and attachments; Low voltage extension box; Cable access box; Air filter for generator; Bearing temperature detectors; Manual voltage control; European bus bar,
Governing	Electronic speed governor as part of GECM; Electronically-controlled 24V DC actuator connected to throttle shaft.	Woodward load sharing module
Ignition	Electronic Ignition System controlled by GECM; Individual cylinder Detonation Sensitive Timing (DST).	
Lubrication	Lubricating oil; Gear type lube oil pump; Oil filter, filler and dip Integral lube oil cooler; Oil drain valve; Crankcase breather.	Oil level regualtor; Prelube pump; Positive crankcase ventilation system
Mounting	330 mm structural steel base (for low and medium voltage units); Spring-type anti-vibration mounts (shipped loose)	
Starting / Charging	24V starting motors; Battery with cables and rack (shipped lo Battery disconnect switch; 60A, 24V charging alternator (standard on 60Hz 1800rpm only)	Charging alternator; Battery charger; Oversized battery; Lacket water heater;
General	Paint - Caterpillar Yellow except rails & radiators; Damper guard; Operation and Maintenance Manuals; Parts Book	Crankcase explosion relief valve; Engine barring group; EEC D.O.I and other certifications

SPECIFICATIONS

CAT GAS ENGINE

G3520C SCAC 4-stroke-cycle watercooled gas engine

Number of Cylinders	V20
Bore — mm (in)	170 (6.7)
Stroke — mm (in)	190 (7.5)
Displacement — L (cu in)	86.3 (5266)
Compression Ratio	11.3:1
Aspiration	Turbocharged Separate Circuit Aftercooled
Cooling Type	Two stage aftercooler, JW + O/C + A/C 1 combined
Fuel System	Low Pressure
Governor Type	Electronic (ADEM ™ II

CAT SR4B GENERATOR

Frame size	868
Excitation	Permanent Magnet
Pitch	0.75
Number of poles	6
Number of bearings	2
Number of leads	6
Insulation	Class H
IP rating	Drip proof IP22
Alignment	Pilot shaft
Overspeed capability -- % of rated	125%
Waveform deviation line to line, no load	less than 3.0%
Paralleling kit droop transformer	Standard
Voltage regulator	CDVR
Voltage level adjustment	+/- 5.0%
Voltage regulation, steady state	+/- 0.5%
Voltage regulation with 3% speed change	+/- 0.5%
Telephone Influence Factor (TIF)	less than 50

Consult your Caterpillar dealer for available voltage

CAT EMCPII+ CONTROL PANAL

- Power by 24 volts DC
- NEMA 12, IP44 dust-proof enclosure
- Lockable hinged door
- Single-location customer connection
- Auto start/stop control switch
- Voltage adjustment potentiomenter
- True RMS AC metering, 3 phase
- Pruge cycle and staged shutdown logic
- Digital indication for:
  - RPM
  - Operating hours
  - Oil pressure
  - Coolant temperature
  - DC voltage
  - L-L volts, L-N volts, phase amps, Hz, ekW, kVA, kVAR, kWhr, %kW, pf
  - System diagnostic codes
- Shutdown with indicating lights;
  - Low oil pressure
  - High coolant temperature
  - High oil temperature
  - Overspeed
  - Overcrank
  - Emergency stop
  - High inlet air temperature (for TA engine only)
  - Detonation sensitive timing (for LE engine only)
- Programmable protective relaying functions:
  - Under / Over voltage
  - Under / Over frequency
  - Overcurrent
  - Reverse power
- Spare indicator LEDs
- Spare alarm/shutdown inputs

Materials and specifications are subject to change without notice.
The International System of Units (SI) is used in this publication.

Continuous 1600 ekW 2000 kVA 60 Hz 1800 RPM 480V

CATERPILLAR®

TECHNICAL DATA

G3520C Gas Generator Set			DM 5859		DM 5860	
Emission level (NOx)	mg/Nm³	g/bhp-hr	440	1.0	220	0.5
Aftercooler SCAC (Stage 2)	Deg C	Deg F	54	130	54	130
Package Performance (1)						
Power Rating @ 0.8 pf (w/ 2 water pumps and w/o fan)	ekW	Continuous	1600		1600	
Power Rating @ 0.8 pf (w/ 2 water pumps and w/o fan)	kVA	Continuous	2000		2000	
Power Rating @ 1.0 pf (w/ 2 water pumps and w/o fan)	ekW	Continuous	1613		1613	
Electric Efficiency @ 1.0 pf (ISO 3046/1) **(2)**	%		39.7%		38.9%	
Mechanical Power (w/ 2 water pumps and w/o fan)	bkW	bhp	1665	2233	1665	2233
Fuel Consumption (3)						
100% load w/o fan	Nm³/hr	scf/hr	812	30 390	832	31 115
75% load w/o fan	Nm³/hr	scf/hr	639	23 898	647	24 214
50% load w/o fan	Nm³/hr	scf/hr	435	16 236	461	17 247
Altitude Capability (4)						
At 25 Deg C (77 Deg F) ambient, above sea level	M	ft	880	2888	420	1378
Cooling System						
Ambient air temperature	Deg C	Deg F	25	77	25	77
Jacket water temperature (Maximum outlet)	Deg C	Deg F	110	230	110	230
Exhaust System						
Combustion air inlet flow rate	Nm³/min	SCFM	112	4317	117	4512
Exhaust stack gas temperature	Deg C	Deg F	488	910	481	898
Exhaust gas flow rate	Nm³/min	CFM	121	12 063	127	12 476
Exhaust flange size (internal diameter)	mm	in	360	14	360	14
Heat Rejection (5)						
Heat rejection to jacket water and oil cooler and AC - Stag	kW	Btu/min	907	51 594	926	52 669
Heat rejection to AC - Stage 2	kW	Btu/min	153	8675	156	8895
Heat rejection to exhaust (LHV to 350 Deg F)	kW	Btu/min	994	56 564	1011	57 574
Heat rejection to exhaust (LHV to 120 Deg C)	kW	Btu/min	1176	66 938	1201	68 360
Heat rejection to atmosphere from engine	kW	Btu/min	127	7210	127	7210
Heat rejection to atmosphere from generator	kW	Btu/min	66.7	3797	66.7	3797
Generator						
Frame			868		868	
Temperature rise	Deg C	Deg F	105	221	105	221
Motor starting capability @ 30% voltage dip **(6)**	skVA		4079		4079	
Lubrication System						
Standard sump refill with filter change	L	gal	541	143	541	143
Emissions (7)						
NOx @ 5% O2 (dry)	mg/Nm³	g/bhp-hr	440	1.0	220	0.5
CO @ 5% O2 (dry)	mg/Nm³	g/bhp-hr	1100	2.5	1100	2.5
THC @ 5% O2 (dry)	mg/Nm³	g/bhp-hr	2522	5.56	2601	5.84
NMHC @ 5% O2 (dry)	mg/Nm³	g/bhp-hr	379	0.84	391	0.88
Exhaust O2 (dry)	%		8.7		9	

DEFINITIONS AND CONDITIONS

(1) **Continuous** --- Maximum output available for an unlimited time

Ratings are based on pipeline natural gas having a Low Heat Value (LHV) of 18 MJ/NM3 (456 Btu/ft3) and 120 Caterpillar Methane Number. For values in excess of altitude, ambient temperature, inlet/exhaust restriction, or different from the conditions listed, contact your local Caterpillar dealer.

(2) **Efficiency** of standard generator is used. For higher efficiency generators, contact your local Caterpillar dealer.

(3) **Ratings and fuel consumption** are based on ISO3046/1 standard reference conditions of 25 deg C (77 deg F) of ambient temperature and 100 kPa (29.61 in Hg) of total barometic pressure, 30% relative humidity with 0, +5% fuel tolerance.

(4) **Altitude** capability is based on 2.5 kPa air filter and 5.0 kPa exhaust stack restrictions.

(5) **Heat Rejection** --- Values based on nominal data with fuel tolerence of +/-2.5% and 2.5 kPa inlet and 5.0 kPa exhaust restrictions.

(6) Assume synchronous driver

(7) **Emissions data** measurements are consistent with those described in EPA CFR 40 Part 89 Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state engine operating conditions of 25 deg C (77 deg F), 96.28 kPa (28.43 in Hg) and fuel having a LHV of 35.6 MJ/NM3 (905 Btu/cu ft) and 80 Caterpillar Methane Number at 101.60 kPa (30.00 in Hg) absolute and 0 deg C (32 deg F). Emission darta shown is subject to instrumentation, measurement, facility, and engine fuel system adjustment.

DIMENSIONS

Package Dimensions		
Length	6367.1 mm	250.67 in
Width	1996.5 mm	78.60 in
Height	2465.1 mm	97.05 in
Est. Shipping Weight	18 350 kg	40 455 lb

Note: Do not use for installation design. See general dimension drawings for detail (Drawing # 267-7367).

Performance Number: DM5859, DM5860
Feature Code: 520GE38
Generator Argt: 158-6422
Source US Sourced

29-Jan-09

http://www.cat-electricpower.com/

Printed in U.S.A.

APPENDIX C

BASELINE ACTUAL EMISSIONS

TABLE C-1
ACTUAL ANNUAL EMISSIONS FROM ANNUAL OPERATING REPORTS (2000 - 2009)
MEDLEY LANDFILL (FACILITY ID NO. 0251625), MEDLEY, FLORIDA

Data Source	EU ID No.	SCC	Operating Hours (hrs/yr)	Annual Activity Factor	Actual Annual Emissions (TPY)							
					CO	NO_X	PM	PM_{10}	SO_2	VOC	NMOC	HAP
2000 AOR	001	5-02-006-01	8,705	545.8 MMcf LFG/yr	86.59	4.63	0.00	0.00	22.24	0.258	0.00	0.00
2000 TOTAL					86.59	4.63	0.00	0.00	22.24	0.26	0.00	0.00
2001 AOR	001	5-02-006-01	8,352	657.2 MMcf LFG/yr	112.67	5.84	0.00	0.00	27.46	0.318	0.00	0.00
2001 TOTAL					112.67	5.84	0.00	0.00	27.46	0.32	0.00	0.00
2002 AOR	001	5-02-006-01	8,634	1,276.15 MMcf LFG/yr	215.90	11.54	0.00	0.00	129.51	0.626	0.00	0.00
2002 TOTAL					215.90	11.54	0.00	0.00	129.51	0.63	0.00	0.00
2003 AOR	001 005	5-02-006-02 5-02-006-01	8,760 2,184		0.00 30.0	0.00 9.1	0.00 0.00	0.00 2.40	0.00 55.3	0.21 0.29	0.53 0.74	0.00 4.60
2003 TOTAL					30.00	9.10	0.00	2.40	55.3	0.50	1.27	4.60
2004 AOR	001 005	5-02-006-01 5-02-006-01	62 8,407	0 MMcf LFG/yr 36.3 MMcf LFG/yr	0.00 125.0	0.00 37.5	0.00 9.8	0.00 0.00	0.00 250	0.00 3.07	0.00 0.00	0.00 0.00
2004 TOTAL					125.00	37.50	9.80	0.00	250.00	3.07	0.00	0.00
2005 AOR	001 005	5-02-006-01 5-02-006-01	15 8,507	2.7 MMcf LFG/yr 2,042.0 MMcf LFG/yr	0.2 92	0.04 27.6	0.01 7.2	0.00 0.00	0.27 201.6	0.0 2.8	0.00 0.00	0.0 17.0
2005 TOTAL					92.20	27.64	7.21	0.00	201.87	2.80	0.00	17.00
2006 AOR	001 005	5-02-006-01 5-02-006-01	93 8,575	14.26 MMcf LFG/yr 1,863.0 MMcf LFG/yr	0.79 84.55	0.24 25.37	0.05 6.86	0.00 0.00	1.5 200.85	0.004 0.49	0.00 1.25	0.0011 0.15
2006 TOTAL					85.34	25.61	6.91	0.00	202.35	0.49	1.25	0.15
2007 AOR (Revised)	001 005	5-02-006-01 5-02-006-01	5 8,345	0.78 MMcf LFG/yr 2,182.0 MMcf LFG/yr	0.07 119.7	0.01 35.91	0.0 8.27	0.00 0.00	0.08 241.93	0.00 0.59	0.00 0.00	0.0001 0.18
2007 TOTAL					119.77	35.92	8.27	0.00	242.01	0.59	0.00	0.18
2008 AOR	001 005	5-02-006-01 5-02-006-01	2 8,546	0.336 MMcf LFG/yr 1,994.0 MMcf LFG/yr	0.0282 82.33	0.00518 24.7	0.00117 6.92	0.00 0.00	0.0106 69.9	0.00016 0.975	0.00 0.00	0.000048 0.293
2008 TOTAL					82.36	24.71	6.92	0.00	69.91	0.98	0.00	0.29
2009 AOR	001 002 005	5-02-006-01 5-02-006-01 5-02-006-01	2 8,760 7,956	0.336 MMcf LFG/yr 85.0 MMcf LFG/yr 1,127.0 MMcf LFG/yr	0.0282 -- 93.90	0.00518 -- 15.2	0.00117 -- 4.26	0.00 -- 4.26	0.0106 -- 36.2	0.00016 12.90 0.55	0.00 33.10 18.50	0.000048 5.37 0.17
2009 TOTAL					93.93	15.21	4.26	4.26	36.21	13.45	51.60	5.54

Golder Associates

TABLE C-2
ACTUAL ANNUAL EMISSIONS, TWO-YEAR AVERAGES (2000 - 2009)
MEDLEY LANDFILL (FACILITY ID NO. 0251625), MEDLEY, FLORIDA

Data Source	2-Year Average Annual Emissions (TPY)							
	CO	NO_X	PM	PM_{10}	SO_2	VOC	NMOC	HAP
2000 - 2001 Average	99.6	5.2	0.0	0.0	24.9	0.3	0.0	0.0
2001 - 2002 Average	164.3	8.7	0.0	0.0	78.5	0.5	0.0	0.0
2002 - 2003 Average	123.0	10.3	0.0	1.2	92.4	0.6	0.6	2.3
2003 - 2004 Average	77.5	23.3	4.9	1.2	152.7	1.8	0.6	2.3
2004 - 2005 Average	108.6	32.6	8.5	0.0	225.9	2.9	0.0	8.5
2005 - 2006 Average	88.8	26.6	7.1	0.0	202.1	1.6	0.6	8.6
2006 - 2007 Average	102.6	30.8	7.6	0.0	222.2	0.5	0.6	0.2
2007 - 2008 Average	101.1	30.3	7.6	0.0	156.0	0.8	0.0	0.2
2008 - 2009 Average	88.1	20.0	5.6	2.1	53.1	7.2	25.8	2.9
Highest Consecutive 2-Year Average	164.3	32.6	8.5	2.1	225.9	7.2	25.8	8.6

TABLE C-3
ENCLOSED FLARE TEST DATA SUMMARY
MEDLEY LANDFILL (FACILITY ID NO. 0251625), MEDLEY, FLORIDA

	Test Dates				
	4/1/2010	4/6/2009	3/24/2008	3/26/2007	4/11/2006
Average Flare Temperature (°F)	1,580	1,639	1,830	1,648	1,708
LFG Flow Rate (scfm)	2,217	2,767	5,470	4,887	3,900
Heat Input (MMBtu/hr, HHV)	61.36	79.62	151.4	136.64	96.52
Stack Flow rate (scfh, dry)	1,710,000	1,910,000	3,630,000	3,280,000	2,610,000
O_2 Content (%, dry)	13.54	12.45	12.47	12.47	13.37
Moisture Content (%)	7.8	9.4	7.7	7.61	6.91
Stack Diameter (ft)	12.5	12.5	12.5	12.5	12.5
Stack Area (ft^2)	122.72	122.72	122.72	122.72	122.72
NMOC as hexane (ppmvd @3% O_2)	0.48	0.25	0.22	0.43	0.19
Stack Flow rate (scfh, wet)	1,854,664	2,108,168	3,932,828	3,550,168	2,803,738
Stack Flow rate (scfm, wet)	30,911	35,136	65,547	59,169	46,729
Stack Flow rate (acfm, wet)	119,429	139,679	284,286	236,230	191,872

APPENDIX D

DETAILED SOURCE DATA USED IN THE AAQS AND PSD CLASS II MODELING

TABLE D-1
SUMMARY OF NO_x SOURCES INCLUDED IN THE AAQS AND PSD CLASS II MODELING ANALYSES

Facility ID	Facility Name / Emission Unit Description	EU ID	Modeling ID Name	UTM Location X (m)	UTM Location Y (m)	Height ft	Height m	Diameter ft	Diameter m	Temperature °F	Temperature K	Velocity ft/s	Velocity m/s	Stack Parameter Data Source	NO_x Emission Rate 1-Hour (lb/hr)	NO_x Emission Rate 1-Hour (g/sec)	Emissions Data Source	Modeled In AAQS	Modeled In PSD Class II
0251196	Aviation Engine Service Inc.																		
	Jet Engine Test Cell	002	AVJET	566,640	2,859,630	30.0	9.14 [a]	5.0	1.52 [a]	800.0	699.8 [a]	50.0	15.24 [a]	FDEP Data 5/10/10, See Footnote	10.7	1.35	FDEP Data 5/10/10	Yes	Yes
0250022	U.S. Foundry Manufacturing Corp.																		
	Gray Iron Foundry Cupola	003		567,300	2,859,800	50.0	15.24	2.5	0.76	480.0	522.0	143.6	43.8	FDEP Data 5/10/10, 0250022-011-AV	2.54	0.32	FDEP Data 5/10/10	Yes	Yes
	Molding Line Loop 4	004		567,300	2,859,800	–	–	–	–	–	–	–	–	No data, Grouped with EU 003	0.015	0.0018	FDEP Data 5/10/10 - AOR 2009	Yes	Yes
	U.S. Foundry Emission Units		USFNDRY	567,300	2,859,800	50.0	15.24	2.5	0.76	480.0	522.0	143.6	43.77		2.55	0.32		Yes	Yes
0250640	AAR Landing Gear Services																		
	Natural Gas Ovens	005	AAROVEN	564,560	2,860,610	35.0	10.67	2.0	0.61	500.0	533.2 [a]	50.0	15.24 [a]	FDEP Data 5/10/10, See Footnote	0.50	0.064	0250640-021-AV, 5.15 MMBtu/hr, AP-42 Table 1.4-1	Yes	Yes
0250488	Benada Aluminum of Florida																		
	Heat Treat Oven	002		567,400	2,859,400	5.0	1.52	1.0	0.30	500.0	533.2 [a]	50.0	15.24 [a]	FDEP Data 5/10/10, See Footnote	0.35	0.044	0250488-008-AV - 3.6 MMBtu/hr, AP-42 Table 1.4-1	Yes	Yes
	Two Fire Tubes	004		567,400	2,859,400	–	–	–	–	–	–	–	–	No data, grouped with EU 002 parameters	0.26	0.033	0250488-008-AV - 2.7 + 0.0012 MMBtu/hr, AP-42 Table 1.4-1	Yes	Yes
	Heat Treat Oven and Two Fire Tubes		BAFHTOFT	567,400	2,859,400	5.0	1.52	1.0	0.30	500.0	533.15	50.0	15.24		0.62	0.078		Yes	Yes
	Paint Bake Oven	003	BAFPBO	567,400	2,859,400	12.0	3.66	1.0	0.30	500.0	533.2 [a]	50.0	15.24 [a]	FDEP Data 5/10/10, See Footnote	0.59	0.074	0250488-008-AV - 3.0 MMBtu/hr each (2), AP-42 Table 1.4-1	Yes	Yes
	Paint Hook Cleaning Oven	005	BAFPHO	567,400	2,859,400	35.0	10.67	3.0	0.91	500.0	533.2 [a]	50.0	15.24 [a]	FDEP Data 5/10/10, See Footnote	0.70	0.088	0250488-008-AV - 3.58 MMBtu/hr each (2), AP-42 Table 1.4-1	Yes	Yes
0251194	Bagelmania																		
	Baking of bread,bagels and rolls	001	BAGEL	564,450	2,861,650	45.0	13.72	2.0	0.61	500.0	533.2 [a]	50.0	15.24 [a]	FDEP Data 5/10/10, See Footnote	0.90	0.11	0251194-002-AO - 9.14 MMBtu/hr total EU 001, AP-42 Table 1.4-1	Yes	Yes
0250492	Industrial Metal Spraying																		
	Spray Booths	001	IMSBOOTH	568,400	2,859,200	20.0	6.10	2.8	0.85	77	298.2	50.0	15.24 [a]	FDEP Data 5/10/10, See Footnote	0.49	0.062	FDEP Data 5/10/10 - Potential	Yes	Yes
0250348	Miami Dade RRF/Montenay																		
	RDF Spreader Stoker Unit No. 1	001		563,830	2,857,620	250.0	76.20	8.4	2.57	300.0	422.0	67.6	20.61	0250348-009-AV	143.7	18.11	Golder (0037532Y/F2) App. for 0250348-004-AV	Yes	Yes
	RDF Spreader Stoker Unit No. 2	002		563,830	2,857,620	250.0	76.20	8.4	2.57	300.0	422.0	67.6	20.61	0250348-009-AV	143.7	18.11	Golder (0037532Y/F2) App. for 0250348-004-AV	Yes	Yes
	RDF Spreader Stoker Unit No. 3	003		563,830	2,857,620	250.0	76.20	8.4	2.57	300.0	422.0	67.6	20.61	0250348-009-AV	143.7	18.11	Golder (0037532Y/F2) App. for 0250348-004-AV	Yes	Yes
	RDF Spreader Stoker Unit No. 4	004		563,830	2,857,620	250.0	76.20	8.4	2.57	300.0	422.0	67.6	20.61	0250348-009-AV	143.7	18.11	Golder (0037532Y/F2) App. for 0250348-004-AV	Yes	Yes
	RDF Spreader Stoker Unit Nos. 1-4		RRFU14	563,830	2,857,620	250.0	76.20	8.4	2.57	300.0	422.0	67.6	20.61		574.8	72.4		Yes	Yes
0250020	Titan America-Pennsuco Cement																		
	Raw Mill & Pyroprocessing System	028	TARAWML	562,270	2,861,700	410.0	124.97	14.0	4.27	200.0	366.5	55.8	17.00	Golder (0537642) - 515,000 acfm	720.00	90.72	0250020-021-AV	Yes	Yes
0250005	General Asphalt - Plant No. 1																		
	Asphalt Batch Plant	001	GENASPH	568,800	2,855,400	25	7.62	3.8	1.16	164.0	346.5	101.0	30.78	FDEP Data 5/10/10	22.83	2.88	0250005-007-AO - facility wide limit of 100 TPY	Yes	Yes
0250281	Hialeah/Preston Water Treatment Plant																		
	Lime Recalc. Kiln	001	HPWTPLM	570,700	2,856,760	75.0	22.86	3.0	0.91	105.0	313.7	2.4	0.73	FDEP Data 5/10/10	2.50	0.32	0250281-010-AV	Yes	Yes
0251186	Aerothrust Corp																		
	One (1) Test Cell - Jet Engines	001	AERJETST	569,200	2,853,120	40.0	12.19	17.5	5.33	500.0	533.2 [a]	50.0	15.24 [a]	FDEP Data 5/10/10, See Footnote	22.83	2.88	0251186-001-AO - facility wide limit of 100 TPY	Yes	Yes
0250624	General Asphalt WDHMA																		
	Counter Flow Drum Mix Asphalt Plant	001	GNASWDH	568,800	2,855,400	30	9.14	4.6	1.40	277.0	409.3	62.0	18.90	FDEP Data 5/10/10	22.83	2.88	0250624-007-AO - facility wide limit of 100 TPY	Yes	Yes
0250014	Cemex - Miami Cement Plant																		
	Stone Dryer & Soil Thermal Treatment Fac.	014	CEMSTONE	558,200	2,851,300	80.0	24.38	4.5	1.37	800.0	699.8	38.0	11.58	0250014-028-AV	0.079	0.010	FDEP Data 5/10/10 - 2008 AOR	Yes	Yes
	In Line Kiln/Raw Mill/Clinker Cooler	018	CEMKLN	557,490	2,852,050	359.0	109.42	8.0	2.44	464.0	513.2	160.9	49.04	FDEP Data 5/10/10	648.00	81.65	0250014-028-AV	Yes	Yes
0250603	Miami Dade Solid Wste Mgmt/No Dade Lf																		
	Enclosed Flare Model GF-1000	002	NDLFLR	570,670	2,872,140	30.0	9.14	6.9	2.10	999.0	810.4	35.6	10.85	FDEP Data 5/10/10	1.67	0.21	FDEP Data 5/10/10 - Potential	Yes	Yes
	18 Detroit Diesel Dual Fuel Generator Engines	003	NDLGEN	570,670	2,872,140	33.0	10.06	1.3	0.41	850.0	727.6	156.0	47.55	FDEP Data 5/10/10	141.00	17.77	FDEP Data 5/10/10 - Potential	Yes	Yes
0250314	Alexander ORR Water Treatment Plant																		
	Engine No. 5	005		565,920	2,843,330	–	–	–	–	77.0	298.2	–	–	FDEP Data 5/10/10	15.52	1.96	FDEP Data 5/10/10 - 2008 AOR	Yes	Yes
	Engine No. 6	006		565,920	2,843,330	28.0	8.53	1.2	0.37	250.0	394.3	–	–	FDEP Data 5/10/10	65.23	8.22	FDEP Data 5/10/10 - Potential	Yes	Yes
	Rotary Lime Recalcining Kiln	007		565,920	2,843,330	–	–	3.0	0.91	170.0	349.8	166.0	50.60	FDEP Data 5/10/10	18.80	2.37	0250314-015-AV	Yes	Yes
	Engines and Rotary Kiln[c]		AORREGRK	565,920	2,843,330	28.0	8.53	3.0	0.91	170.0	349.8	166.0	50.60		99.55	12.54		Yes	Yes

TABLE D-1
SUMMARY OF NO_x SOURCES INCLUDED IN THE AAQS AND PSD CLASS II MODELING ANALYSES

Facility ID	Facility Name / Emission Unit Description	EU ID	Modeling ID Name	UTM Location X (m)	UTM Location Y (m)	Stack Parameters Height ft	Height m	Diameter ft	Diameter m	Temperature °F	Temperature K	Velocity ft/s	Velocity m/s	Stack Parameter Data Source	NO_x Emission Rate 1-Hour (lb/hr)	1-Hour (g/sec)	Emissions Data Source	Modeled In AAQS	PSD Class II
0250001	FP&L -Cutler Power Plant																		
	FFFSG - Unit No. 5	003		569,870	2,834,975	150.0	45.72	14.0	4.27	285.0	413.7	50.7	15.44	0250001-003-AV and Application - 467,837 acfm	188.0	23.69	0250001-003-AV - Built in 1954	Yes	Yes
	FFFSG - Unit No. 6	004		569,870	2,834,975	150.0	45.72	14.0	4.27	285.0	413.7	60.7	18.50	0250001-003-AV and Application - 560,464 acfm	324.0	40.82	0250001-003-AV - Built in 1955	Yes	Yes
	FFFSG - Unit Nos. 5 & 6		FPLCUTLR	569,870	2,834,975	150.0	45.72	14.0	4.27	285.0	413.7	50.7	15.44	Gouped based on Unit 5 parameters	512.0	64.51		Yes	Yes
0112119	Wheelabrator South Broward																		
	MSW Combustor & Auxiliary Burners- Unit 1	001		579,540	2,883,340	195.0	59.44	7.5	2.29	300.0	422.0	63.8	19.43	0112119-014-AV - 169,000 acfm	114.0	14.36	0112119-014-AV	Yes	Yes
	MSW Combustor & Auxiliary Burners- Unit 2	002		579,540	2,883,340	195.0	59.44	7.5	2.29	300.0	422.0	63.8	19.43	0112119-014-AV - 169,000 acfm	114.0	14.36	0112119-014-AV	Yes	Yes
	MSW Combustor & Auxiliary Burners- Unit 3	003		579,540	2,883,340	195.0	59.44	7.5	2.29	300.0	422.0	63.8	19.43	0112119-014-AV - 169,000 acfm	114.0	14.36	0112119-014-AV	Yes	Yes
	MSW Combustor & Auxiliary Burners- Unit Nos. 1-3		WHLSU13	579,540	2,883,340	195.0	59.44	7.5	2.29	300.0	422.0	63.8	19.43		342.0	43.1		Yes	Yes
0110037	Florida Power & Light (PFL) - Fort Lauderdale																		
	CTs 1-4 PSD	035-038	LAUDU45	579,390	2,883,360	150	45.7	18.0	5.5	330.0	438.7	158.7	48.37	FDEP Data 5/10/10	1688.00	212.7	0110037-005-AV - 4,868 TPY TOTAL	Yes	Yes
	GT 1-12 (0.5% fuel oil)	003	LDGT1_12	579,390	2,883,360	45	13.7	15.6	4.8	860.0	733.2	93.3	28.44	FDEP Data 5/10/10	631.00	79.5	0110037-005-AV	Yes	Yes
	GT 13-24 (0.5% fuel oil)	015	LDGT1324	579,390	2,883,360	45	13.7	15.6	4.8	860.0	733.2	93.3	28.44	FDEP Data 5/10/10	631.00	79.5	0110037-005-AV	Yes	Yes
0110036	FPL - Port Everglades Plant																		
	Units 1&2 at 2.5%s fuel oil	--	PTEVU12	587,400	2,885,300	343.0	104.5	14.0	4.27	289.0	415.9	88.1	26.72	0110036-009-AV	1,656.0	208.7	0110036-009-AV	Yes	Yes
	Units 3&4 at 2.5%s fuel oil	--	PTEVU34	587,400	2,885,300	343.0	104.5	18.1	5.52	287.0	414.8	81.8	23.88	0110036-009-AV	4,240.0	534.2	0110036-009-AV	Yes	Yes
	GT 1-12 (0.5% fuel oil)	--	PTEVGTS	587,400	2,885,300	45.0	13.4	15.6	4.75	860.0	733.2	93.3	28.43	0110036-009-AV	7,581.6	955.3	0110036-009-AV	Yes	Yes
0250003	Turkey Point Power Plant																		
	Boiler- Unit 1	001		567,200	2,813,200	400.0	121.9	18.1	5.5	275.0	408.2	77.0	23.46	0250003-011-AV	2041.0	257.2	0250003-011-AV	Yes	Yes
	Boiler- Unit 2	002		567,200	2,813,200	400.0	121.9	18.1	5.5	275.0	408.2	77.0	23.46	0250003-011-AV	2041.0	257.2	0250003-011-AV	Yes	Yes
	Boilers - Units 1 and 2		TPU12	567,200	2,813,200	400.0	121.9	18.1	5.5	275.0	408.2	77.0	23.46		4082.0	514.3		Yes	Yes
	Unit 5A CT with HRSG	009		566,590	2,813,210	131.0	39.9	19.0	5.8	202.0	367.6	59.0	17.98	FDEP Data 5/10/10	62.1	7.8	0250003-011-AV	Yes	Yes
	Unit 5B CT with HRSG	010		566,590	2,813,210	131.0	39.9	19.0	5.8					FDEP Data 5/10/10	62.1	7.8	0250003-011-AV	Yes	Yes
	Unit 5C CT with HRSG	011		566,590	2,813,210	131.0	39.9	19.0	5.8	202.0	367.6	59.0	17.98	FDEP Data 5/10/10	62.1	7.8	0250003-011-AV	Yes	Yes
	Unit 5D CT with HRSG	012		566,590	2,813,210	131.0	39.9	19.0	5.8	202.0	367.6	59.0	17.98	FDEP Data 5/10/10	62.1	7.8	0250003-011-AV	Yes	Yes
	Unit 5		TPU5AD	566,590	2,813,210	131.00	39.93	19.00	5.79	202.00	367.59	59.00	17.98		248.4	31.3		Yes	Yes
0112120	Wheelabrator North Broward																		
	MSW Combustor & Auxiliary Burners- Unit 1	001		579,540	2,883,340	195.0	59.44	7.5	2.29	300.0	422.0	63.8	19.43	0112120-009-AV - 169,000 acfm	106.5	13.42	0112119-014-AV	Yes	Yes
	MSW Combustor & Auxiliary Burners- Unit 2	002		579,540	2,883,340	195.0	59.44	7.5	2.29	300.0	422.0	63.8	19.43	0112120-009-AV - 169,000 acfm	106.5	13.42	0112119-014-AV	Yes	Yes
	MSW Combustor & Auxiliary Burners- Unit 3	003		579,540	2,883,340	195.0	59.44	7.5	2.29	300.0	422.0	63.8	19.43	0112120-009-AV - 169,000 acfm	106.5	13.42	0112119-014-AV	Yes	Yes
	MSW Combustor & Auxiliary Burners- Unit Nos. 1-3		WHLNU13	579,540	2,883,340	195.0	59.44	7.5	2.29	300.0	422.0	63.8	19.43		319.5	40.3		Yes	Yes
0990045	City of Lake Worth Utilities																		
	Diesel Generator Units 1-5	001-005	LAKWTHDG	592,800	2,943,700	16.5	5.0	1.83	0.6	667.0	625.9	121.7	37.10	0990045-005-AV Appl. (Golder 07389508) - 12,208 acfm	499.0	62.87	0990045-005-AV Appl. (Golder 07389508)	Yes	Yes
	Gas Turbine No.1	006	LAKWTHGT	592,800	2,943,700	46.0	14.0	16.0	4.9	837.0	720.4	81.5	24.85	0990045-005-AV Appl. (Golder 07389508) - 983,593 acfm	391.5	49.33	0990045-005-AV Appl. (Golder 07389508)	Yes	Yes
	Unit 3, S-3	009	LAKWTHU3	592,800	2,943,700	113.0	34.4	7.0	2.1	293.0	418.2	51.4	15.67	0990045-005-AV Appl. (Golder 07389508) - 118,719 acfm	162.6	20.49	0990045-005-AV Appl. (Golder 07389508)	Yes	Yes
	Combined Cycle Unit, S-5	011	LAKWTHU5	592,800	2,943,700	75.0	22.9	10.0	3.0	404.0	479.8	87.5	26.68	0990045-005-AV Appl. (Golder 07389508) - 412,466 acfm	285.8	36.01	0990045-005-AV Appl. (Golder 07389508)	Yes	Yes
0990026	Sugar Cane Growers Co-Op																		
	On-crop season [b]																		
	Unit 1	001	SCBLR1N	534,900	2,953,300	150.0	45.72	7.0	2.13	156.0	342.0	49.6	15.12	BART for SCGCF, Golder 063-7534	159.2	20.05	From Southeast Renewable Fuels (Golder 0938-7660)	Yes	Yes
	Unit 2	002	SCBLR2N	534,900	2,953,300	150.0	45.72	7.0	2.13	156.0	342.0	51.1	15.58	BART for SCGCF, Golder 063-7534	128.6	16.20	From Southeast Renewable Fuels (Golder 0938-7660)	Yes	Yes
	Unit 3	003	SCBLR3N	534,900	2,953,300	180.0	54.86	5.3	1.62	156.0	342.0	40.3	12.28	HBCA Appl for SCGCF, Golder 063-7534	102.9	12.97	From Southeast Renewable Fuels (Golder 0938-7660)	Yes	Yes
	Unit 4	004	SCBLR4N	534,900	2,953,300	180.0	54.86	8.9	2.72	162.0	345.4	54.1	16.49	BART for SCGCF, Golder 063-7534	257.0	32.38	From Southeast Renewable Fuels (Golder 0938-7660)	Yes	Yes
	Unit 5	005	SCBLR5N	534,900	2,953,300	150.0	45.72	7.0	2.13	160.0	344.3	77.1	23.50	BART for SCGCF, Golder 063-7534	188.6	23.76	From Southeast Renewable Fuels (Golder 0938-7660)	Yes	Yes
	Unit 8	008	SCBLR8N	534,900	2,953,300	155.0	47.24	9.5	2.90	154.0	340.9	37.6	11.46	HBCA Appl for SCGCF, Golder 063-7534	123.0	15.50	From Southeast Renewable Fuels (Golder 0938-7660)	Yes	Yes
	Off-crop season [b]																		
	Unit 1	001	SCBLR1F	534,900	2,953,300	150.0	45.72	7.0	2.13	156.0	342.0	49.6	15.12	BART for SCGCF, Golder 063-7534	159.2	20.05	From Southeast Renewable Fuels (Golder 0938-7660)	No	No
	Unit 4	004	SCBLR4F	534,900	2,953,300	180.0	54.86	8.9	2.72	162.0	345.4	54.1	16.49	BART for SCGCF, Golder 063-7534	257.0	32.38	From Southeast Renewable Fuels (Golder 0938-7660)	No	No

[a] Based on engineering estimates. Actual data not available.
[b] Facilities or sources within facilities that operate only during the October 1 through April 31 crop season. For sources identified operating during off-crop season, the season is May through September.

TABLE D-2
SUMMARY OF $PM_{10}/PM_{2.5}$ SOURCES INCLUDED IN THE AAQS AND PSD CLASS II MODELING ANALYSES

Facility ID	Facility Name Emission Unit Description	EU ID	Modeling ID Name	UTM Location X (m)	UTM Location Y (m)	Stack Parameters Height ft	Height m	Diameter ft	Diameter m	Temperature °F	Temperature K	Velocity ft/s	Velocity m/s	Stack Parameter Data Source	PM_{10} Emission Rate 24-Hour/Annual (lb/hr)	(g/sec)	Emissions Data Source	Modeled In AAQS	Modeled In PSD Class II
0250022	U.S. Foundry Manufacturing Corp.																		
	Gray Iron Foundry Cupola	003		567,300	2,859,800	50.0	15.24	2.5	0.76	460.0	510.9	220.7	67.27	0250022-011-AV	2.20	0.28	0250022-011-AV - 0.1 lb/ton and 22 ton/hr	Yes	Yes
	Molding Line Loop 4[b]	004		567,300	2,859,800	–	–	–	–	–	–	–	–	No data, grouped with EU 003 parameters	9.09	1.14	0250022-011-AV - dust loading 0.01 gr/scf, 106,000 scfm	Yes	Yes
	Core Making[b]	009		567,300	2,859,800	–	–	–	–	–	–	–	–	No data, grouped with EU 003 parameters	0.0069	0.00087	FDEP Data 5/10/10 - 2009 AOR	Yes	Yes
	Finishing Area[b]	010		567,300	2,859,800	–	–	–	–	–	–	–	–	No data, grouped with EU 003 parameters	0.18	0.023	FDEP Data 5/10/10 - 2009 AOR	Yes	Yes
	Cupola, Molding Line 4, Core Making, and Finishing area		USFMIRON	567,300	2,859,800	50.0	15.2	2.5	0.8	460.0	510.9	220.7	67.3		11.47	1.45			
	DISA Cold Box Core Machine	015	USFMDISA	567,300	2,859,800	28.0	8.53	1.0	0.30	77.0	298.2	59.7	18.20	FDEP Data 5/10/10	0.0048	0.00061	0250022-011-AV - dust loading 0.2 gr/scf and 99.9% control	Yes	Yes
	Molding Loop 3A	019	USFMML3A	567,300	2,859,800	51.7	15.75	5.4	1.65	500.0	533.2 *	51.5	15.68	FDEP Data 5/10/10 and 0250022-011-AV	3.06	0.39	0250022-011-AV - dust loading 0.005 gr/scf, 71,150 cfm	Yes	Yes
0250640	AAR Landing Gear Services																		
	Shot Peen & Blasting Machine	004		564,560	2,860,610	–	–	–	–	–	–	–	–	No data, grouped with EU 005 parameters	3.66	0.46	0250640-021-AV - dust loading 0.01 gr/cf, 42,700 cfm	Yes	Yes
	Ovens - Natural Gas	005		564,560	2,860,610	35.0	10.67	2.0	0.61	500.0	533.2 *	44.0	13.42	0250640-021-AV	0.040	0.0051	0250640-021-AV - 0.0076 lb/MMBtu, 5.3 MMBtu/hr	Yes	Yes
	Shot Peen, Blasting Machine, and Ovens		AARGEAR	564,560	2,860,610	35.0	10.67	2.0	0.61	500.0	533.2	44.0	13.42		3.70	0.47		Yes	Yes
0250488	Benada Aluminum of Florida																		
	Heat Treat Oven	002		567,400	2,859,400	5.0	1.52	1.0	0.30	500.0	533.2 *	50.0	15.24 *	FDEP Data 5/10/10, See Footnote	0.027	0.0034	0250488-008-AV - 3.6 MMBtu/hr, AP-42 Table 1.4-2	Yes	Yes
	Two Fire Tubes	004		567,400	2,859,400	–	–	–	–	–	–	–	–	No data, grouped with EU 002 parameters	0.020	0.0025	0250488-008-AV - 2.7 + 0.0012 MMBtu/hr, AP-42 Table 1.4-2	Yes	Yes
	Heat Treat Oven and Two Fire Tubes		BAFHTOFT	567,400	2,859,400	5.0	1.52	1.0	0.30	500.0	533.15	50.0	15.24		0.047	0.0059		Yes	Yes
	Paint Bake Oven	003	BAFPBO	567,400	2,859,400	12.0	3.66	1.0	0.30	500.0	533.2 *	50.0	15.24 *	FDEP Data 5/10/10, See Footnote	0.045	0.0056	0250488-008-AV - 3.0 MMBtu/hr each (2), AP-42 Table 1.4-2	Yes	Yes
	Paint Hook Cleaning Oven	005	BAFPHO	567,400	2,859,400	35.0	10.67	3.0	0.91	500.0	533.2 *	50.0	15.24 *	FDEP Data 5/10/10, See Footnote	0.053	0.0067	0250488-008-AV - 3.58 MMBtu/hr each (2), AP-42 Table 1.4-2	Yes	Yes
0250348	Miami Dade RRF/Montenay																		
	RDF Spreader Stoker Unit No. 1	001		563,830	2,857,620	250.0	76.20	8.4	2.57	300.0	422.0	67.6	20.61	0250348-009-AV	8.3	1.05	Golder (0037532Y/F2) App. for 0250348-004-AV	Yes	Yes
	RDF Spreader Stoker Unit No. 2	002		563,830	2,857,620	250.0	76.20	8.4	2.57	300.0	422.0	67.6	20.61	0250348-009-AV	8.3	1.05	Golder (0037532Y/F2) App. for 0250348-004-AV	Yes	Yes
	RDF Spreader Stoker Unit No. 3	003		563,830	2,857,620	250.0	76.20	8.4	2.57	300.0	422.0	67.6	20.61	0250348-009-AV	8.3	1.05	Golder (0037532Y/F2) App. for 0250348-004-AV	Yes	Yes
	RDF Spreader Stoker Unit No. 4	004		563,830	2,857,620	250.0	76.20	8.4	2.57	300.0	422.0	67.6	20.61	0250348-009-AV	8.3	1.05	Golder (0037532Y/F2) App. for 0250348-004-AV	Yes	Yes
	RDF Spreader Stoker Unit Nos. 1-4		RRFU14	563,830	2,857,620	250.0	76.20	8.4	2.57	300.0	422.0	67.6	20.61		33.2	4.2		Yes	Yes
	MSW to RDF Processing - Unit 6	006		563,830	2,857,620	55.0	16.76	–	–	215.0	374.8	–	–	FDEP Data 5/10/10, Grouped EUs 006 - 010	4.55	0.57	Golder (10387512) 2009 AOR - 0.01 gr/scf, 106,000 dscfm - $PM_{2.5}$ is assumed to be 50% of PM_{10}	Yes	Yes
	Bulky Waste to Biomass - Unit 7	007		563,830	2,857,620	55.0	16.76	–	–	77.0	298.2	–	–	FDEP Data 5/10/10, Grouped EUs 006 - 010	4.85	0.61	Golder (10387512) 2009 AOR - 0.01 gr/scf, 113,000 dscfm - $PM_{2.5}$ is assumed to be 50% of PM_{10}	Yes	Yes
	Ash Building and Handling System	008		563,830	2,857,620	–	–	–	–	77.0	298.2	–	–	FDEP Data 5/10/10, Grouped EUs 006 - 010	0.09	0.011	Golder (10387512) 2009 AOR - 0.01 gr/scf, 2,000 dscfm - $PM_{2.5}$ is assumed to be 50% of PM_{10}	Yes	Yes
	Two Lime Storage Silos	009		563,830	2,857,620	–	–	–	–	–	–	–	–	Grouped EUs 006 - 010	0.037	0.0046	Golder (10387512) 2009 AOR - 0.01 gr/scf, 850 dscfm - $PM_{2.5}$ is assumed to be 50% of PM_{10}	Yes	Yes
	Acivated Carbon Storage Silos	010		563,830	2,857,620	–	–	–	–	–	–	–	–	Grouped EUs 006 - 010	0.09	0.011	Golder (10387512) 2009 AOR - 0.01 gr/scf, 2,000 dscfm - $PM_{2.5}$ is assumed to be 50% of PM_{10}	Yes	Yes
	RDF Processing[c]		RRFRDF	563,830	2,857,620	55.0	16.76	5.0	1.52	77.0	298.2	95.9	29.24	Golder (0037532Y/F2) App. for 0250348-004-AV	9.6	1.21	Golder (0037532Y/F2) App. for 0250348-004-AV	Yes	Yes
0250020	Titan America-Pennsuco Cement																		
	Finish Mill No. 1: Baghouse F113	–		562,270	2,861,700	106.0	32.31	1.0	0.30	110.0	316.5	250.4	76.32	Golder (0537642) - 11,800 acfm	1.01	0.13	Golder (0537642) - dust loading 0.01 gr/acf, 11,800 acfm	Yes	Yes
	Finish Mill No. 1: Baghouse F130	–		562,270	2,861,700	106.0	32.31	1.0	0.30	110.0	316.5	349.7	106.59	Golder (0537642) - 16,480 acfm	1.41	0.18	Golder (0537642) - dust loading 0.01 gr/acf, 16,480 acfm	Yes	Yes
	Finish Mill No. 1	010	TAFM1	562,270	2,861,700	106.0	32.31	1.0	0.30	110.0	316.5	250.4	76.32	All parameters grouped into Baghouse F130	2.42	0.31		Yes	Yes
	Finish Mill No. 2: Baghouse F213	–		562,270	2,861,700	106.0	32.31	1.0	0.30	110.0	316.5	250.4	76.32	Golder (0537642) - 11,800 acfm	1.01	0.13	Golder (0537642) - dust loading 0.01 gr/acf, 11,800 acfm	Yes	Yes
	Finish Mill No. 2: Baghouse F230	–		562,270	2,861,700	106.0	32.31	1.0	0.30	110.0	316.5	349.7	106.59	Golder (0537642) - 16,480 acfm	1.41	0.18	Golder (0537642) - dust loading 0.01 gr/acf, 16,480 acfm	Yes	Yes
	Finish Mill No. 2	011	TAFM2	562,270	2,861,700	106.0	32.31	1.0	0.30	110.0	316.5	250.4	76.32	All parameters grouped into Baghouse F230	2.42	0.31		Yes	Yes
	Finish Mill No. 3: Baghouse F313			562,270	2,861,700	106.0	32.31	1.5	0.46	110.0	316.5	75.5	23.00	Golder (0537642) - 8,000 acfm	0.69	0.09	Golder (0537642) - dust loading 0.01 gr/acf, 8,000 acfm	Yes	Yes
	Finish Mill No. 3: Baghouse F332			562,270	2,861,700	106.0	32.31	1.5	0.46	110.0	316.5	235.8	71.87	Golder (0537642) - 25,000 acfm	2.14	0.27	Golder (0537642) - dust loading 0.01 gr/acf, 25,000 acfm	Yes	Yes
	Finish Mill No. 3: O'Sepa Baghouse 533.BF340			562,270	2,861,700	85.0	25.91	4.5	1.37	169.0	349.3	81.5	24.85	Golder (0537642) - 77,800 acfm	5.32	0.67	Golder (0537642) - dust loading 0.0095 gr/dscf, 65,307 dscfm	Yes	Yes
	Finish Mill No. 3	012	TAFM3	562,270	2,861,700	85.0	25.9	4.5	1.4	169.0	349.3	75.5	23.0	All parameters grouped into O'Sepa Baghouse	8.15	1.03		Yes	Yes
	Finish Mill No. 4: Baghouse F432			562,270	2,861,700	106.0	32.31	2.0	0.61	110.0	316.5	79.6	24.26	Golder (0537642) - 15,000 acfm	1.29	0.16	Golder (0537642) - dust loading 0.01 gr/acf, 15,000 acfm	Yes	Yes
	Finish Mill No. 4: Baghouse F430			562,270	2,861,700	106.0	32.31	1.0	0.30	110.0	316.5	679.1	206.98	Golder (0537642) - 32,000 acfm	2.74	0.35	Golder (0537642) - dust loading 0.01 gr/acf, 32,000 acfm	Yes	Yes
	Finish Mill No. 4: O'Sepa Baghouse F730			562,270	2,861,700	–	–	–	–	169.0	349.3	–	–	Golder (0537642)	8.00	1.01	Golder (0537642) - dust loading 0.0095 gr/dscf, 98,213 dscfm	Yes	Yes
	Finish Mill No. 4	013	TAFM4	562,270	2,861,700	106.0	32.3	2.0	0.61	110.0	316.5	79.58	24.26	All parameters grouped into Baghouse F430 and F432	12.03	1.52		Yes	Yes
	Finish Mill No. 6: Baghouse 516.BF510			562,270	2,861,700	35.0	10.67	–	–	110.0	316.5	–	–	Golder (0537642)	0.15	0.02	Golder (0537642) - dust loading 0.0095 gr/dscf, 1,806 dscfm	Yes	Yes
	Finish Mill No. 6: Baghouse 536.BF500			562,270	2,861,700	110.0	33.53	2.0	0.61	175.0	352.6	137.4	41.88	Golder (0537642) - 25,900 acfm	1.75	0.22	Golder (0537642) - dust loading 0.0095 gr/dscf, 21,536 dscfm	Yes	Yes
	Finish Mill No. 6: O'Sepa Baghouse 536.BF340			562,270	2,861,700	110.0	33.53	2.0	0.61	175.0	352.6	516.2	157.34	Golder (0537642) - 97,300 acfm	6.59	0.83	Golder (0537642) - dust loading 0.0095 gr/dscf, 80,905 dscfm	Yes	Yes
	Finish Mill No. 6	030	TAFM6	562,270	2,861,700	110.0	33.5	2.0	0.6	175.0	352.6	137.4	41.9	All parameters grouped into Baghouse F430	8.49	1.07		Yes	Yes
	Cement Storage Silo Nos. 1 - 12	014	TASILO12	562,270	2,861,700	147.0	44.81	2.4	0.73	80.0	299.8	66.3	20.21	FDEP Data 5/10/10, Golder (0537642) - 18,000 acfm	3.7	0.46	Golder (0537642) - Attachment TM-EU6-F1.8	Yes	Yes
	Cement Distribution - Rail and Truck Loadouts	015	TARLTRK	562,270	2,861,700	71.0	21.64	1.4	0.43	80.0	299.8	27.1	8.25	FDEP Data 5/10/10, Golder (0537642) - 2,500 acfm	1.2	0.15	Golder (0537642) - Attachment TM-EU6-F1.8	Yes	Yes
	Cement Distribution - Packhouse	016	TAPKHS	562,270	2,861,700	40.0	12.19	2.4	0.73	80.0	299.8	55.3	16.84	FDEP Data 5/10/10, Golder (0537642) - 15,000 acfm	2.2	0.27	Golder (0537642) - Attachment TM-EU6-F1.8	Yes	Yes
	Coal Handling System: Coal Feed Bin	–		562,270	2,861,700	126.0	38.40	0.9	0.27	92.0	306.5	37.5	11.42	Golder (0537642) - 1,400 acfm	0.11	0.014	Golder (0537642) - dust loading 0.0095 gr/dscf, 1,339 dscfm	Yes	Yes
	Coal Handling System: Pet Coke Feed Bin	–		562,270	2,861,700	126.0	38.40	0.9	0.27	92.0	306.5	37.0	11.29	Golder (0537642) - 1,400 acfm	0.11	0.014	Golder (0537642) - dust loading 0.0095 gr/dscf, 1,339 dscfm	Yes	Yes
	Coal Handling System: Coal Mill Feed	–		562,270	2,861,700	75.0	22.86	14.0	4.27	92.0	306.5	0.6	0.18	Golder (0537642) - 5,550 acfm	0.48	0.060	Golder (0537642) - dust loading 0.01 gr/acf, 5,550 acfm	Yes	Yes
	Coal Handling System: Coal Mill	–		562,270	2,861,700	410.0	124.97	1.3	0.38	176.0	353.2	–	–	Golder (0537642)	–	–	Golder (0537642) - Emissions accounted for in EU 026	Yes	Yes
	Coal Handling System: Coal (Transfer) Surge Bin Feeder	–		562,270	2,861,700	67.0	20.42	0.4	0.13	178.0	354.3	35.4	10.78	Golder (0537642) - 294 acfm	0.020	0.0025	Golder (0537642) - dust loading 0.0095 gr/dscf, 243 dscfm	Yes	Yes
	Coal Handling System: Coke (Transfer) Surge Bin Feeder	–		562,270	2,861,700	67.0	20.42	0.4	0.13	178.0	354.3	35.4	10.78	Golder (0537642) - 294 acfm	0.020	0.0025	Golder (0537642) - dust loading 0.0095 gr/dscf, 243 dscfm	Yes	Yes
	Coal Handling System	026	TACHS	562,270	2,861,700	75.0	22.86	14.0	4.27	92.0	306.5	0.6	0.18	All parameters grouped into the Coal Mill Feed	0.73	0.092		Yes	Yes
	Clinker Handling & Storage: Transfer Conveyors 441.BF540	–		562,270	2,861,700	53.0	16.15	1.3	0.38	250.0	394.3	61.3	18.69	Golder (0537642) - 4,600 acfm	0.28	0.035	Golder (0537642) - dust loading 0.0095 gr/dscf, 3,421 dscfm	Yes	Yes
	Clinker Handling & Storage: Clinker Silos	–		562,270	2,861,700	185.0	56.39	1.5	0.45	250.0	394.3	116.6	35.54	Golder (0537642) - 12,000 acfm	0.73	0.092	Golder (0537642) - dust loading 0.0095 gr/dscf, 8,924 dscfm	Yes	Yes
	Clinker Handling & Storage: Off-spec Clinker Silo and Conveyors	–		562,270	2,861,700	44.0	13.41	1.3	0.38	250.0	394.3	81.3	24.79	Golder (0537642) - 6,100 acfm	0.37	0.047	Golder (0537642) - dust loading 0.0095 gr/dscf, 4,536 dscfm	Yes	Yes
	Clinker Handling & Storage: Transfer Conveyors 481.BF540	–		562,270	2,861,700	103.0	31.39	1.6	0.50	250.0	394.3	37.1	11.31	Golder (0537642) - 4,700 acfm	0.28	0.036	Golder (0537642) - dust loading 0.0095 gr/dscf, 3,495 dscfm	Yes	Yes
	Clinker Handling & Storage: Transfer Conveyors 481.BF640	–		562,270	2,861,700	42.0	12.80	1.3	0.38	250.0	394.3	62.7	19.10	Golder (0537642) - 4,700 acfm	0.28	0.036	Golder (0537642) - dust loading 0.0095 gr/dscf, 3,495 dscfm	Yes	Yes
	Clinker Handling & Storage: Clinker Silos 2, 5 18 and Clinker Transfer	–		562,270	2,861,700	113.0	34.44	2.6	0.79	250.0	394.3	59.1	18.02	Golder (0537642) - 18,700 acfm	1.13	0.14	Golder (0537642) - dust loading 0.0095 gr/dscf, 13,906 dscfm	Yes	Yes
	Clinker Handling & Storage: Clinker Silos 12, 19, 20, 23, 28 and Clinker Transfer	–		562,270	2,861,700	130.0	39.62	1.0	0.30	77.0	298.2	127.3	38.81	Golder (0537642) - 6,000 acfm	0.51	0.06	Golder (0537642) - dust loading 0.01 gr/acf, 6,000 acfm	Yes	Yes
	Clinker Handling & Storage: Clinker Silos 21, 22, 23, 26, 27, 28	–		562,270	2,861,700	113.0	34.44	2.3	0.70	77.0	298.2	60.0	18.29	Golder (0537642) - 15,000 acfm	1.20	0.15	Golder (0537642) - dust loading 0.0095 gr/dscf, 14,749 dscfm	Yes	Yes
	Clinker Handling & Storage: Clinker Silos 17 and Clinker Transfer	–		562,270	2,861,700	160.0	48.77	1.0	0.30	77.0	298.2	106.1	32.34	Golder (0537642) - 5,000 acfm	0.40	0.050	Golder (0537642) - dust loading 0.0095 gr/dscf, 4,916 dscfm	Yes	Yes
	Clinker Handling & Storage	027	TACLINK	562,270	2,861,700	113.0	34.4	2.6	0.79	250.0	394.3	59.1	18.02	Grouped - Clkr. St. Silos 2, 5, 18 and Clkr. Trns.	5.19	0.65		Yes	Yes
	Kiln/Cooler/Raw Milld	–		562,270	2,861,700	410.0	124.97	14.0	4.27	200.0	366.5	55.8	17.00	Golder (0537642) - 515,000 acfm	22.5	2.84	Golder (0537642) - 0.053 lb/ton dry kiln feed (DKF), 425 TPH DKF	Yes	Yes
	Kiln Dust Conveyance and Storage Bin	–		562,270	2,861,700	125.0	38.10	1.3	0.38	300.0	422.0	56.7	17.27	Golder (0537642) - 4,250 acfm	0.24	0.030	Golder (0537642) - dust loading 0.0095 gr/dscf, 2,953 dscfm	Yes	Yes
	Clinker Feed (CF) Silo	–		562,270	2,861,700	241.0	73.46	1.1	0.34	178.0	354.3	63.1	19.22	Golder (0537642) - 3,760 acfm	0.25	0.032	Golder (0537642) - dust loading 0.0095 gr/dscf, 3,112 dscfm	Yes	Yes
	Raw Meal Conveyance (CF Silo)	–		562,270	2,861,700	84.0	25.60	1.1	0.34	178.0	354.3	67.1	20.45	Golder (0537642) - 4,000 acfm	0.27	0.034	Golder (0537642) - dust loading 0.0095 gr/dscf, 3,310 dscfm	Yes	Yes
	Raw Meal Conveyance (Preheat/Calciner Tower)	–		562,270	2,861,700	45.0	13.72	1.3	0.38	178.0	354.3	63.5	19.34	Golder (0537642) - 4,760 acfm	0.32	0.040	Golder (0537642) - dust loading 0.0095 gr/dscf, 3,939 dscfm	Yes	Yes
	Raw Meal Conveyance (Preheat/Calciner Tower)	–		562,270	2,861,700	353.0	107.59	1.3	0.38	175.0	352.6	54.7	16.66	Golder (0537642) - 4,100 acfm	0.28	0.035	Golder (0537642) - dust loading 0.0095 gr/dscf, 3,409 dscfm	Yes	Yes
	Kiln Dust Truck Loadout	–		562,270	2,861,700	46.0	14.02	0.8	0.25	175.0	352.6	107.8	32.86	Golder (0537642) - 3,500 acfm	0.24	0.030	Golder (0537642) - dust loading 0.0095 gr/dscf, 2,910 dscfm	Yes	Yes
	Raw Mill & Pyroprocessing System	028	TARAWML	562,270	2,861,700	410.0	125.0	14.0	4.3	200.0	366.5	55.8	17.0	Grouped - Kiln/Cooler/Raw Mill	24.10	3.04		Yes	Yes
	Raw Material Feed Bins and Conveyors 311.BF650	–		562,270	2,861,700	92.0	28.04	1.8	0.54	92.0	306.5	56.5	17.22	Golder (0537642) - 8,500 acfm	0.66	0.083	Golder (0537642) - dust loading 0.0095 gr/dscf, 8,130 dscfm	Yes	Yes
	Raw Material Conveyors (Feed Bins to Raw Mill) 311.BF750	–		562,270	2,861,700	17.0	5.18	2.1	0.63	92.0	306.5	38.3	11.67	Golder (0537642) - 7,750 acfm	0.60	0.076	Golder (0537642) - dust loading 0.0095 gr/dscf, 7,413 dscfm	Yes	Yes
	Raw Material Conveyors (Feed Bins to Raw Mill) 321.BF470	–		562,270	2,861,700	100.0	30.48	1.8	0.54	108.0	315.4	72.6	22.13	Golder (0537642) - 10,800 acfm	0.82	0.103	Golder (0537642) - dust loading 0.0095 gr/dscf, 10,039 dscfm	Yes	Yes
	Raw Material Conveyors (Feed Bins to Raw Mill) 311.BF950	–		562,270	2,861,700	68.0	20.73	2.3	0.70	108.0	315.4	46.8	14.26	Golder (0537642) - 11,700 acfm	0.89	0.112	Golder (0537642) - dust loading 0.0095 gr/dscf, 10,876 dscfm	Yes	Yes
	Raw Material Handling	029	TARAWMT	562,270	2,861,700	68.0	20.7	2.3	0.7	108.0	315.4	46.8	14.3	Grouped - Raw Material Conveyors 311.BF950	2.97	0.37		Yes	Yes

Golder Associates

TABLE D-2

SUMMARY OF $PM_{10}/PM_{2.5}$ SOURCES INCLUDED IN THE AAQS AND PSD CLASS II MODELING ANALYSES

Facility ID	Facility Name / Emission Unit Description	EU ID	Modeling ID Name	UTM Location X (m)	UTM Location Y (m)	Stack Parameters Height ft	Height m	Diameter ft	Diameter m	Temperature °F	Temperature K	Velocity ft/s	Velocity m/s	Stack Parameter Data Source	PM_{10} Emission Rate 24-Hour/Annual (lb/hr)	(g/sec)	Emissions Data Source	Modeled In AAQS	Modeled In PSD Class II
0250014	Cemex - Miami Cement Plant																		
	Finish Grinding Mill No. 1	001		557,490	2,852,050	48.0	14.63	–	–	–	–	–	–	0250014-028-AV, Not enough data, grouped with EU 012	0.16	0.020	FDEP Data 5/10/10 - 2008 AOR	Yes	Yes
	Finish Grinding Mill No. 2	002		557,490	2,852,050	48.0	14.63	–	–	–	–	–	–	0250014-028-AV, Not enough data, grouped with EU 012	0.15	0.019	FDEP Data 5/10/10 - 2008 AOR	Yes	Yes
	Finish Grinding Mill No. 3	003		557,490	2,852,050	48.0	14.63	–	–	–	–	–	–	0250014-028-AV, Not enough data, grouped with EU 012	0.10	0.012	FDEP Data 5/10/10 - 2008 AOR	Yes	Yes
	Finish Grinding Mill No. 4	012		557,490	2,852,050	41.0	12.50	2.1	0.64	190.0	360.9	65.0	19.81	FDEP Data 5/10/10	0.15	0.019	FDEP Data 5/10/10 - 2008 AOR	Yes	Yes
	Finish Mill System: Finish Mill 6	028	CEMFGM6	557,490	2,852,050	–	–	–	–	–	–	–	–	No data, grouped with EU 012	5.57	0.70	FDEP Data 5/10/10 - 2008 AOR	Yes	Yes
	Finishi Grinding Mill Nox. 1 - 4		CEMFGM14	557,490	2,852,050	41.0	12.5	2.1	0.6	190.0	360.9	65.0	19.8		6.12	0.77		Yes	Yes
	Finish Grinding Mill No. 5	013	CEMFGM5	557,490	2,852,050	44.0	13.41	1.9	0.58	190.0	360.9	79.0	24.08	FDEP Data 5/10/10	0.21	0.026	FDEP Data 5/10/10 - 2008 AOR	Yes	Yes
	Cement Handling: Bulk Cement Storage Silos	004	CEMBCS	557,490	2,852,050	45.0	13.72	–	–	–	–	–	–	0250014-028-AV, Grouped with EU 017 and EU 021	1.10	0.14	FDEP Data 5/10/10 - 2008 AOR	Yes	Yes
	Cement Handling: Cement Truck Loading	015	CEMTRK	557,490	2,852,050	–	–	–	–	–	–	–	–	No data, grouped with EU 017 and EU 021	2.55	0.32	FDEP Data 5/10/10 - 2008 AOR	Yes	Yes
	Sweetwater Concrete Block & Batch plant	021	CEMCONC	557,490	2,852,050	30.0	9.14	3.0	0.91	–	–	–	–	FDEP Data 5/10/10, Grouped with EU 017	0.18	0.02	FDEP Data 5/10/10 - 2008 AOR	Yes	Yes
	Raw Materials Handling	017	CEMRMH	557,490	2,852,050	–	–	2.0	0.61	[b] 77.0	298.2	[b] 71.3	21.73	FDEP Data 5/10/10, See Footnote, Grouped with EU 021	11.52	1.45	0250014-028-AV - dust loading 0.01 gr/cf, 134,400 cfm (est. for grain loading and 11.52 lb/hr emission rate - equally distributed for 10 baghouses)	Yes	Yes
	Materials Handling		CEMRMH	557,490	2,852,050	45.0	13.72	2.0	0.61	77.0	298.2	71.3	21.73		15.35	1.93		Yes	Yes
	Stone Dryer & Soil Thermal Treatment Fac.	014	CEMSTONE	558,200	2,851,300	80.0	24.38	4.5	1.37	800.0	699.8	38.0	11.58	0250014-028-AV	3.3	0.42	0250014-028-AV	Yes	Yes
	In Line Kiln/Raw Mill/Clinker Cooler	018	CEMKLN	557,490	2,852,050	359.0	109.42	8.0	2.44	464.0	513.2	160.9	49.04	FDEP Data 5/10/10	32.3	4.07	0250014-028-AV	Yes	Yes
	Clinker Handling and Storage System	019		557,490	2,852,050	150.0	45.72	4.0	1.22	–	–	–	–	Not enough data, grouped with EU 020	10.25	1.29	FDEP Data 5/10/10	Yes	Yes
	Coal Mill System	020		557,490	2,852,050	160.0	48.77	3.0	0.91	176.0	353.2	49.5	15.09	FDEP Data 5/10/10	1.95	0.25	FDEP Data 5/10/10	Yes	Yes
	Clinker Handling / Coal Mill System		CEMCOAL	557,490	2,852,050	160.0	48.77	3.0	0.91	176.0	353.2	49.5	15.09		12.20	1.54		Yes	Yes
0110037	Florida Power & Light (PFL) - Fort Lauderdale																		
	CTs 1-4 PSD	035-038	LAUDU45	579,390	2,883,360	150	45.7	18.0	5.5	330.0	438.7	158.7	48.37	FDEP Data 5/10/10	232.00	29.2	0110037-005-AV - 424.7 TPY TOTAL	Yes	Yes
	GT 1-12 (0.5% fuel oil)	003	LDGT1 12	579,390	2,883,360	45	13.7	15.6	4.8	860.0	733.2	93.3	28.44	FDEP Data 5/10/10	65.00	8.2	FDEP Query Sep/2007	Yes	No
	GT 13-24 (0.5% fuel oil)	015	LDGT1324	579,390	2,883,360	45	13.7	15.6	4.8	860.0	733.2	93.3	28.44	FDEP Data 5/10/10	65.00	8.2	FDEP Query Sep/2007	Yes	No
	4&5 PSD Baseline	–	FTLAU45B	579,390	2,883,360	150	45.7	14.0	4.3	299.9	422.0	48.0	14.63	Golder 2004 - Southern Gardens 043-7524	-32.17	-4.1	Golder 2004 - Southern Gardens 043-7524	No	Yes
0110036	FPL - Port Everglades Plant																		
	Units 1&2 at 2.5%s fuel oil	–	PTEVU12	587,400	2,885,300	343.0	104.5	14.0	4.27	289.0	415.9	88.1	26.72	0110036-009-AV	144.0	18.1	0110036-009-AV	Yes	No
	Units 3&4 at 2.5%s fuel oil	–	PTEVU34	587,400	2,885,300	343.0	104.5	18.1	5.52	287.0	414.8	81.8	23.88	0110036-009-AV	250.8	31.6	0110036-009-AV	Yes	No
	GT 1-12 (0.5% fuel oil)	–	PTEVGTS	587,400	2,885,300	45.0	13.4	15.6	4.75	860.0	733.2	93.3	28.43	0110036-009-AV	36.2	4.6	0110036-009-AV -8,424 MMBtu/hr / AP-42, Table 3.1-2a (filterable) 0.0043 lb/MMBtu	Yes	No

[a] Engineering estimates are used when data is not available from other sources.

[b] If stack parameters are not available for sources at a facility, but are available for other modeled source, these stacks may be merged with others stacks located at the same facility to reduce modeling time. In this case, stacks may not have similar parameteres.

[c] Stack parameters and emissions information was not available for individual units (006 - 010), however, combined emissions were available from the premit application and were used to represent one combined stack.

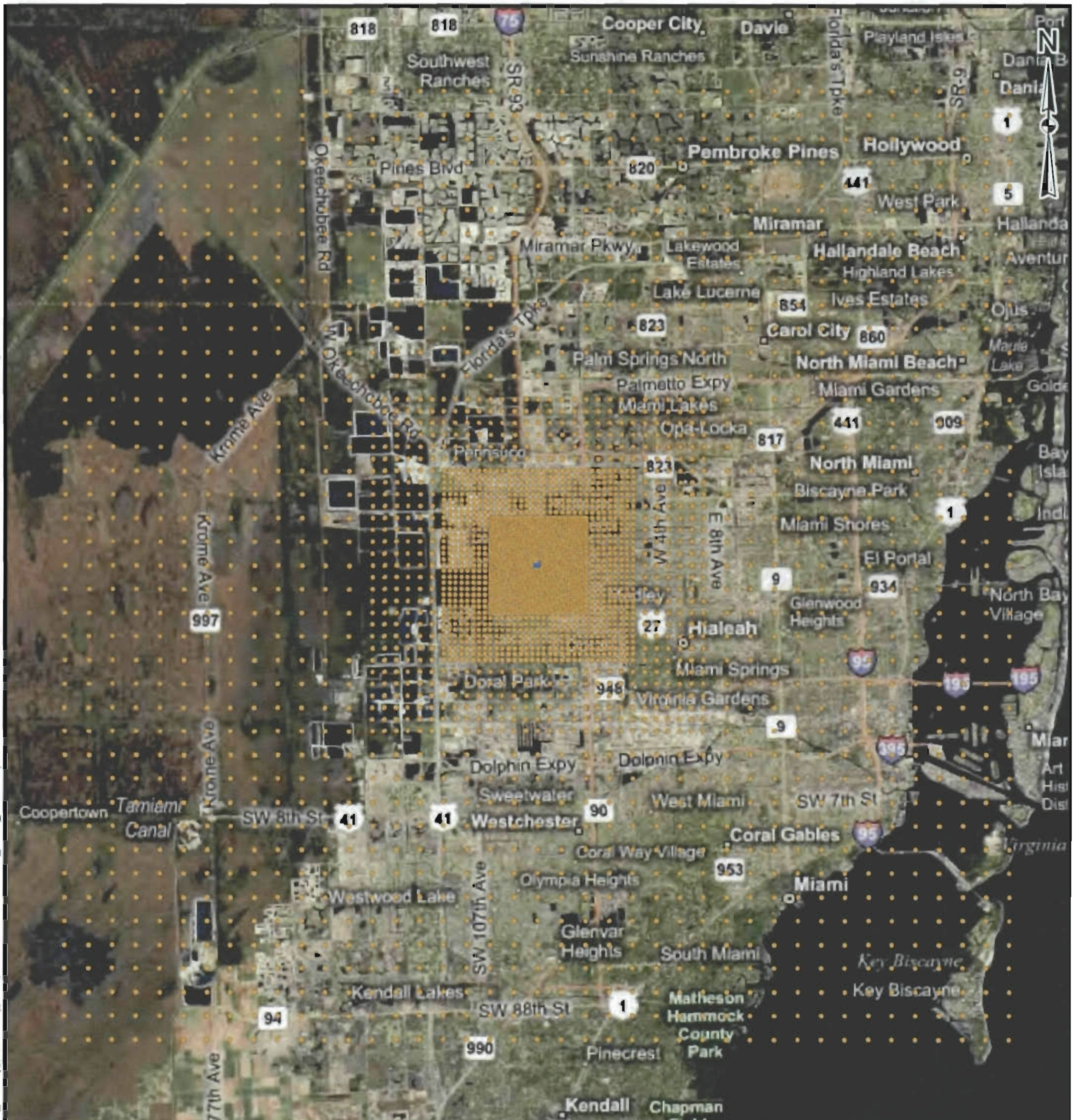
TABLE D-3
SUMMARY OF CO SOURCES INCLUDED IN THE AAQS MODELING ANALYSIS

Facility ID	Facility Name / Emission Unit Description	EU ID	Modeling ID Name	UTM Location X (m)	UTM Location Y (m)	Height ft	Height m	Diameter ft	Diameter m	Temperature °F	Temperature K	Velocity ft/s	Velocity m/s	Stack Parameter Data Source	CO Emission Rate 1-Hour (lb/hr)	CO Emission Rate 1-Hour (g/sec)	Emissions Data Source	Modeled Source? AAQS
0250022	U.S. Foundry Manufacturing Corp.																	
	Gray Iron Foundry Cupola	003		567,300	2,859,800	50.0	15.24	2.5	0.76	480.0	522.0	143.6	43.8	FDEP Data 5/10/10, 0250022-011-AV	36.8	4.64	FDEP Data 5/10/10	Yes
	Molding Line Loop 4	004		567,300	2,859,800	--	--	--	--	--	--	--	--	No data, Grouped with EU 003	1.60	0.20	FDEP Data 5/10/10 - AOR 2009	Yes
	U.S. Foundry Emission Units		USFNDRY	567,300	2,859,800	50.0	15.24	2.5	0.76	480.0	522.0	143.6	43.77		38.40	4.84		Yes
	Molding Loop 3A	019	USFMML3A	567,300	2,859,800	51.7	15.75	5.4	1.65	500.0	533.2 [a]	51.5	15.68	FDEP Data 5/10/10 and 0250022-011-AV - 71,150 cfm	0.68	0.085	FDEP Data 5/10/10 - AOR 2009	Yes
0250348	Miami Dade RRF/Montenay																	
	RDF Spreader Stoker Unit No. 1	001		563,830	2,857,620	250.0	76.20	8.4	2.57	300.0	422.0	67.6	20.61	0250348-009-AV	70.0	8.82	Golder (0037532Y/F2) App. for 0250348-004-AV	Yes
	RDF Spreader Stoker Unit No. 2	002		563,830	2,857,620	250.0	76.20	8.4	2.57	300.0	422.0	67.6	20.61	0250348-009-AV	70.0	8.82	Golder (0037532Y/F2) App. for 0250348-004-AV	Yes
	RDF Spreader Stoker Unit No. 3	003		563,830	2,857,620	250.0	76.20	8.4	2.57	300.0	422.0	67.6	20.61	0250348-009-AV	70.0	8.82	Golder (0037532Y/F2) App. for 0250348-004-AV	Yes
	RDF Spreader Stoker Unit No. 4	004		563,830	2,857,620	250.0	76.20	8.4	2.57	300.0	422.0	67.6	20.61	0250348-009-AV	70.0	8.82	Golder (0037532Y/F2) App. for 0250348-004-AV	Yes
	RDF Spreader Stoker Unit Nos. 1-4		RRFU14	563,830	2,857,620	250.0	76.20	8.4	2.57	300.0	422.0	67.6	20.61		279.9	35.3		Yes
0250020	Titan America-Pennsuco Cement																	
	Raw Mill & Pyroprocessing System	028	TARAWML	562,270	2,861,700	410.0	124.97	14.0	4.27	200.0	366.5	55.8	17.00	Golder (0537642) - 515,000 acfm	576.00	72.58	0250020-021-AV	Yes
0250281	Hialeah/Preston Water Treatment Plant																	
	Lime Recalc. Kiln	001	HPWTPLM	570,700	2,856,760	75.0	22.86	3.0	0.91	105.0	313.7	2.4	0.73	FDEP Data 5/10/10	9.67	1.22	FDEP Data 5/10/10	Yes
0250014	Cemex - Miami Cement Plant																	
	Stone Dryer & Soil Thermal Treatment Fac.	014	CEMSTONE	558,200	2,851,300	80.0	24.38	4.5	1.37	800.0	699.8	38.0	11.58	0250014-028-AV	0.14	0.017	FDEP Data 5/10/10 - 2008 AOR	Yes
	In Line Kiln/Raw Mill/Clinker Cooler	018	CEMKLN	557,490	2,852,050	359.0	109.42	8.0	2.44	464.0	513.2	160.9	49.04	FDEP Data 5/10/10	455.00	57.33	0250014-028-AV	Yes
0250603	Miami Dade Solid Wste Mgmt/No Dade Lf																	
	Enclosed Flare Model GF-1000	002	NDLFLR	570,670	2,872,140	30.0	9.14	6.9	2.10	999.0	810.4	35.6	10.85	FDEP Data 5/10/10	11.15	1.40	FDEP Data 5/10/10 - Potential	Yes
	18 Detroit Diesel Dual Fuel Generator Engines	003	NDLGEN	570,670	2,872,140	33.0	10.06	1.3	0.41	850.0	727.6	156.0	47.55	FDEP Data 5/10/10	113.00	14.24	FDEP Data 5/10/10 - Potential	Yes
0110037	Florida Power & Light (PFL) - Fort Lauderdale																	
	CTs 1-4 PSD	035-038	LAUDU45	579,390	2,883,360	150	45.7	18.0	5.5	330.0	438.7	158.7	48.37	FDEP Data 5/10/10	400.00	50.4	0110037-005-AV - 1,489 TPY TOTAL	Yes
	GT 1-12 (0.5% fuel oil)	003	LDGT1_12	579,390	2,883,360	45	13.7	15.6	4.8	860.0	733.2	93.3	28.44	FDEP Data 5/10/10	4.05	0.51	FDEP Data 5/10/10 - 2008 AOR	Yes
	GT 13-24 (0.5% fuel oil)	015	LDGT1324	579,390	2,883,360	45	13.7	15.6	4.8	860.0	733.2	93.3	28.44	FDEP Data 5/10/10	1.81	0.23	FDEP Data 5/10/10 - 2008 AOR	Yes
0110036	FPL - Port Everglades Plant																	
	Units 1&2 at 2.5%s fuel oil	--	PTEVU12	587,400	2,885,300	343.0	104.5	14.0	4.27	289.0	415.9	88.1	26.72	0110036-009-AV	38.61	4.86	FDEP Data 5/10/10 - 2008 AOR	Yes
	Units 3&4 at 2.5%s fuel oil	--	PTEVU34	587,400	2,885,300	343.0	104.5	18.1	5.52	287.0	414.8	81.8	23.88	0110036-009-AV	171.80	21.65	FDEP Data 5/10/10 - 2008 AOR	Yes
	GT 1-12 (0.5% fuel oil)	--	PTEVGTS	587,400	2,885,300	45.0	13.4	15.6	4.75	860.0	733.2	93.3	28.43	0110036-009-AV	0.89	0.11	FDEP Data 5/10/10 - 2008 AOR	Yes
0250003	Turkey Point Power Plant																	
	Boiler- Unit 1	001		567,200	2,813,200	400.0	121.9	18.1	5.5	275.0	408.2	77.0	23.46	0250003-011-AV	29.09	3.67	FDEP Data 5/10/10 - 2009 AOR	Yes
	Boiler- Unit 2	002		567,200	2,813,200	400.0	121.9	18.1	5.5	275.0	408.2	77.0	23.46	0250003-011-AV	35.52	4.48	FDEP Data 5/10/10 - 2009 AOR	Yes
	Boilers - Units 1 and 2		TPU12	567,200	2,813,200	400.0	121.9	18.1	5.5	275.0	408.2	77.0	23.46		64.61	8.14		Yes
	Unit 5A CT with HRSG	009		566,590	2,813,210	131.0	39.9	19.0	5.8	202.0	367.6	59.0	17.98	FDEP Data 5/10/10	38.30	4.83	0250003-011-AV	Yes
	Unit 5B CT with HRSG	010		566,590	2,813,210	131.0	39.9	19.0	5.8	--	--	--	--	FDEP Data 5/10/10	38.30	4.83	0250003-011-AV	Yes
	Unit 5C CT with HRSG	011		566,590	2,813,210	131.0	39.9	19.0	5.8	202.0	367.6	59.0	17.98	FDEP Data 5/10/10	38.30	4.83	0250003-011-AV	Yes
	Unit 5D CT with HRSG	012		566,590	2,813,210	131.0	39.9	19.0	5.8	202.0	367.6	59.0	17.98	FDEP Data 5/10/10	38.30	4.83	0250003-011-AV	Yes
	Unit 5		TPU5AD	566,590	2,813,210	131.00	39.93	19.00	5.79	202.00	367.59	59.00	17.98		153.20	19.30		Yes
0990016	Atlantic Sugar																	
	Unit 1	--	ATLSUG1	552,900	2,945,200	90.0	27.4	6.0	1.83	163.1	346.0	58.9	17.97	Golder Title V Renewal Application (043-7646)	144.60	18.22	FDEP Data 5/10/10 - Potential	Yes
	Unit 2	--	ATLSUG2	552,900	2,945,200	90.0	27.4	6.0	1.83	170.3	350.0	76.6	23.36	Golder Title V Renewal Application (043-7646)	144.60	18.22	FDEP Data 5/10/10 - Potential	Yes
	Unit 3	--	ATLSUG3	552,900	2,945,200	90.0	27.4	6.0	1.83	170.3	350.0	70.7	21.56	Golder Title V Renewal Application (043-7646)	198.90	25.06	FDEP Data 5/10/10 - Potential	Yes
	Unit 4	--	ATLSUG4	552,900	2,945,200	90.0	27.4	6.0	1.83	159.5	344.0	82.5	25.16	Golder Title V Renewal Application (043-7646)	220.97	27.84	FDEP Data 5/10/10 - Potential	Yes
	Units 1-4		ATLSUG14	552,900	2,945,200	90.0	27.4	6.0	1.83	163.1	346.0	58.9	17.97		709.07	89.34		Yes
	Unit 5	--	ATLSUG5	566,590	2,813,210	90.0	27.4	5.5	1.68	150.5	339.0	63.1	19.24	Golder Title V Renewal Application (043-7646)	1659.5	209.10	FDEP Data 5/10/10 - Potential	Yes
	Baseline																	
	Unit 1 PSD Baseline	--	ATLSUG1B	552,900	2,945,200	62.0	18.9	6.3	1.92	451.1	506.0	41.7	12.70	FPL Glades proj.	2.51	0.32	FDEP Data 5/10/10 - 2005 AOR	No
	Unit 2 PSD Baseline	--	ATLSUG2B	552,900	2,945,200	62.0	18.9	6.3	1.92	460.1	511.0	35.8	10.90	FPL Glades proj.	2.09	0.26	FDEP Data 5/10/10 - 2005 AOR	No
	Unit 3 PSD Baseline	--	ATLSUG3B	552,900	2,945,200	71.8	21.9	6.0	1.83	479.9	522.0	57.4	17.50	FPL Glades proj.	1.95	0.25	FDEP Data 5/10/10 - 2005 AOR	No
	Unit 4 PSD Baseline	--	ATLSUG4B	552,900	2,945,200	60.0	18.3	6.0	1.83	159.5	344.0	49.2	15.00	FPL Glades proj.	0.0022	0.00028	FDEP Data 5/10/10 - 2005 AOR	No
	Unit 5 PSD	--	ATLSUG5B	552,900	2,945,200	90.0	27.4	5.5	1.68	150.5	339.0	63.1	19.24	Golder Title V Renewal Application (043-7646)	32.80	4.13	FDEP Data 5/10/10 - 2005 AOR	No
0990332	New Hope Power Company																	
	Boiler A	--	BLRA	524,920	2,939,440	199.0	60.7	10.0	3.05	352.0	450.9	67.7	20.63	Golder (07387725)	4940.00	622.44	Golder (07387725)	Yes
	Boiler B	--	BLRB	524,920	2,939,440	199.0	60.7	10.0	3.05	352.0	450.9	67.7	20.63	Golder (07387725)	4940.00	622.44	Golder (07387725)	Yes
	Boiler C	--	BLRC	524,920	2,939,440	199.0	60.7	10.0	3.05	352.0	450.9	67.7	20.63	Golder (07387725)	4940.00	622.44	Golder (07387725)	Yes
	Boilers A - C		BLRABC	524,920	2,939,440	199.0	60.7	10.0	3.05	352.0	450.9	67.7	20.63		14820.00	1867.32		Yes
0990026	Sugar Cane Growers Co-Op																	
	On-crop season [b]																	
	Unit 1	001	SCBLR1N	534,900	2,953,300	150.0	45.72	7.0	2.13	156.0	342.0	49.6	15.12	BART for SCGCF, Golder 063-7534	2,170.99	273.55	Golder In-House	Yes
	Unit 2	002	SCBLR2N	534,900	2,953,300	150.0	45.72	7.0	2.13	156.0	342.0	51.1	15.58	BART for SCGCF, Golder 063-7534	2,170.99	273.55	Golder In-House	Yes
	Unit 3	003	SCBLR3N	534,900	2,953,300	180.0	54.86	5.3	1.62	156.0	342.0	40.3	12.28	HBCA Appl for SCGCF, Golder 063-7534	1,488.97	187.61	Golder In-House	Yes
	Unit 4	004	SCBLR4N	534,900	2,953,300	180.0	54.86	8.9	2.72	162.0	345.4	54.1	16.49	BART for SCGCF, Golder 063-7534	3,711.98	467.71	Golder In-House	Yes
	Unit 5	005	SCBLR5N	534,900	2,953,300	150.0	45.72	7.0	2.13	160.0	344.3	77.1	23.50	BART for SCGCF, Golder 063-7534	2,853.97	359.60	Golder In-House	Yes
	Unit 8	008	SCBLR8N	534,900	2,953,300	155.0	47.24	9.5	2.90	154.0	340.9	37.6	11.46	HBCA Appl for SCGCF, Golder 063-7534	2,772.00	349.27	0990026-012-AV	Yes
	Off-crop season [b]																	
	Unit 1	001	SCBLR1F	534,900	2,953,300	150.0	45.72	7.0	2.13	156.0	342.0	49.6	15.12	BART for SCGCF, Golder 063-7534	2,170.99	273.55	Golder In-House	No
	Unit 4	004	SCBLR4F	534,900	2,953,300	180.0	54.86	8.9	2.72	162.0	345.4	54.1	16.49	BART for SCGCF, Golder 063-7534	3,711.98	467.71	Golder In-House	No

[a] Engineering estimates are used when data is not available from other sources.
[b] Facilities or sources within facilities that operate only during the October 1 through April 31 crop season. For sources identified operating during off-crop season, the season is May through September.

APPENDIX E

RECEPTOR GRIDS



LEGEND

- Risk Receptors
- Plant Boundary

REFERENCES

1. Medley Landfill Location, Waste Management Inc., 2010.
2. Receptor Locations, Golder Assocates, Inc., 2010.

0 3 6 12 Kilometers

Golder Associates
Gainesville, Florida

SCALE	AS SHOWN
DATE	7/1/2010
DESIGN	SRM
GIS	NRL
CHECK	PT
REVIEW	XXX
FILE No.	09387674_A005
PROJECT No.	093-87674
REV.	0

LOCATION OF RECEPTOR GRID USED TO PREDICT MAXIMUM CONCENTRATIONS

WASTE MANAGEMENT INC. OF FLORIDA

FIGURE **E-1**

Map Document: G:\PROJECTS\2009\093-87674_WasteManagement\A_Medley_PSD\Rev_0\MapDocuments\09387674_A005_FullReceptorGrid.mxd / Modified 7/2/2010 11:59:25 AM / Plotted 7/2/2010 1:26:34 PM by rlamar

LEGEND

Plant Boundary Receptors

- Intermediate Boundary Receptors
- Primary Boundary Receptors
- Plant Boundary
- Flare and Blower Compound
- LFG Power Plant
- Proposed CAT Locations

REFERENCES

1. Plant Boundary, Waste Management Inc., 2010.
2. Receptor Locations, Golder Associates, Inc., 2010.

0 50 100 200 Meters

Golder Associates, Gainesville, Florida	SCALE: AS SHOWN	PLANT PROPERTY BOUNDARY WITH BOUNDARY RECEPTORS	
	DATE: 7/7/2010		
	DESIGN: SRM		
	GIS: NRL		
FILE No. 09387674_A006	CHECK: PT	WASTE MANAGEMENT INC. OF FLORIDA	FIGURE E-2
PROJECT No. 093-87674 REV. 0	REVIEW: XXX		

Map Document: G:\PROJECTS\2009\093-87674_WasteManagement\A_Medley_PSD\Rev_0\MapDocuments\09387674_A006_NearFieldReceptors.mxd / Modified 7/7/2010 11:22:45 AM / Plotted 7/7/2010 11:22:53 AM by rlamar

LEGEND

- Engine 3 Location
- Class 1 Receptors
- Class 1 Receptors within 50km
- Everglades NP
- 50km Buffer

REFERENCES

1. Class I Area, Class I Receptors, National Park Service, 2006.

0 12 24 48 Kilometers

Golder Associates
Gainesville, Florida

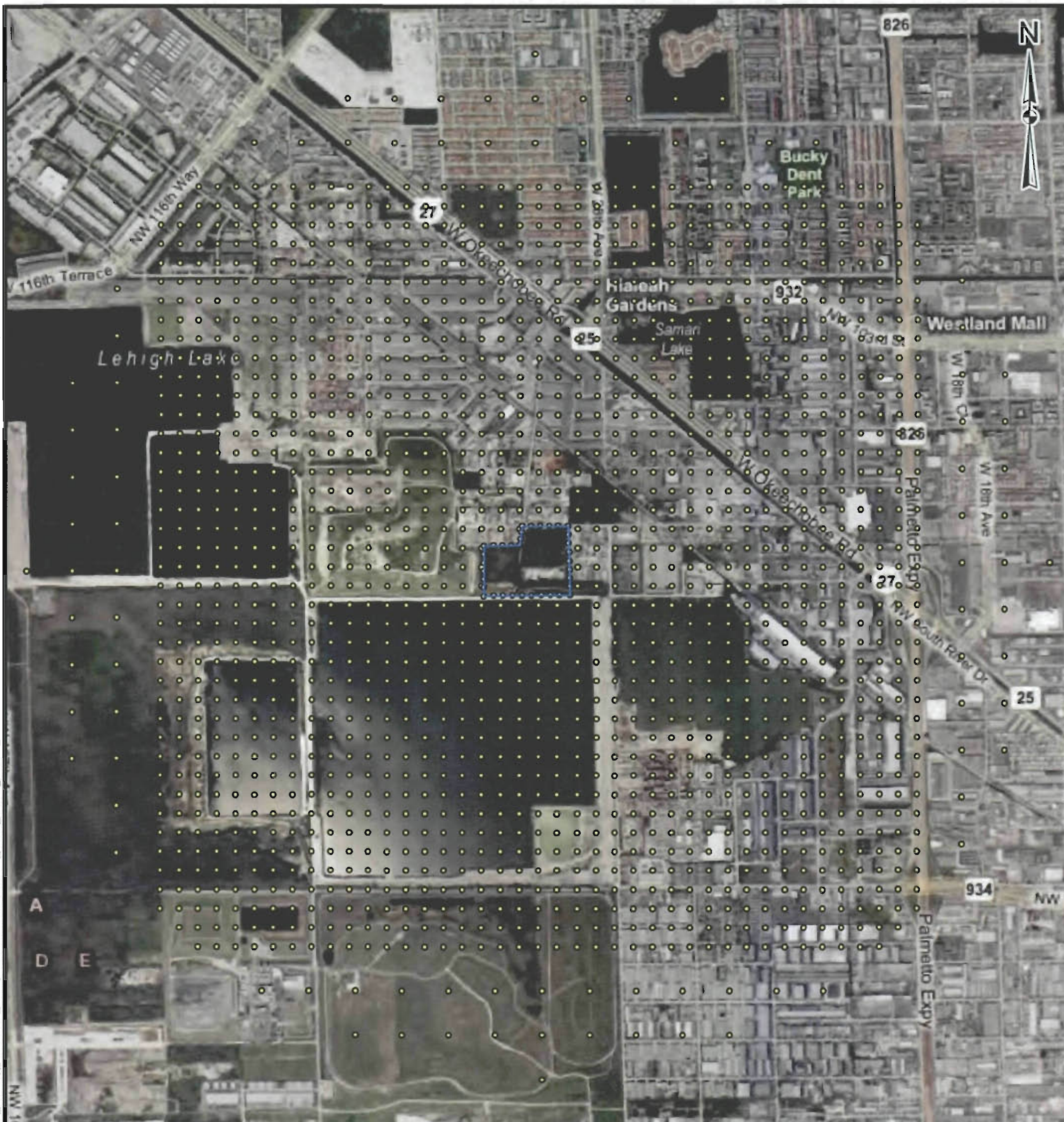
SCALE	AS SHOWN
DATE	7/2/2010
DESIGN	SRM
GIS	NRL
CHECK	PT
REVIEW	XXX
FILE No.	09387674_A007
PROJECT No.	093-87674
REV.	0

CLASS I RECEPTORS WITHIN 50km

WASTE MANAGEMENT INC. OF FLORIDA

FIGURE E-3

Map Document: G:\PROJECTS\2009\093-87674_WasteManagement\A_Medley_PSD\Rev_0\MapDocuments\09387674_A007_ClassI_Receptors.mxd / Modified 7/2/2010 1:59:22 PM / Plotted 7/2/2010 3:33:25 PM by rlamar



LEGEND

- PM10 / PM2.5 Receptors
- Plant Boundary

REFERENCES

1. Receptors, Golder Associates Inc., 2010.
2. Plant Boundary, Waste Management Inc., 2010.

0 375 750 1,500 Meters

Map Document: G:\PROJECTS\2009\093-87674_WasteManagement\A_Medley_PSD\Rev_0\MapDocuments\09387674_A008_PM10_PM2.5_AAQS.mxd / Modified 7/6/2010 9:28:28 AM / Plotted 7/7/2010 11:26:41 AM by rlamar

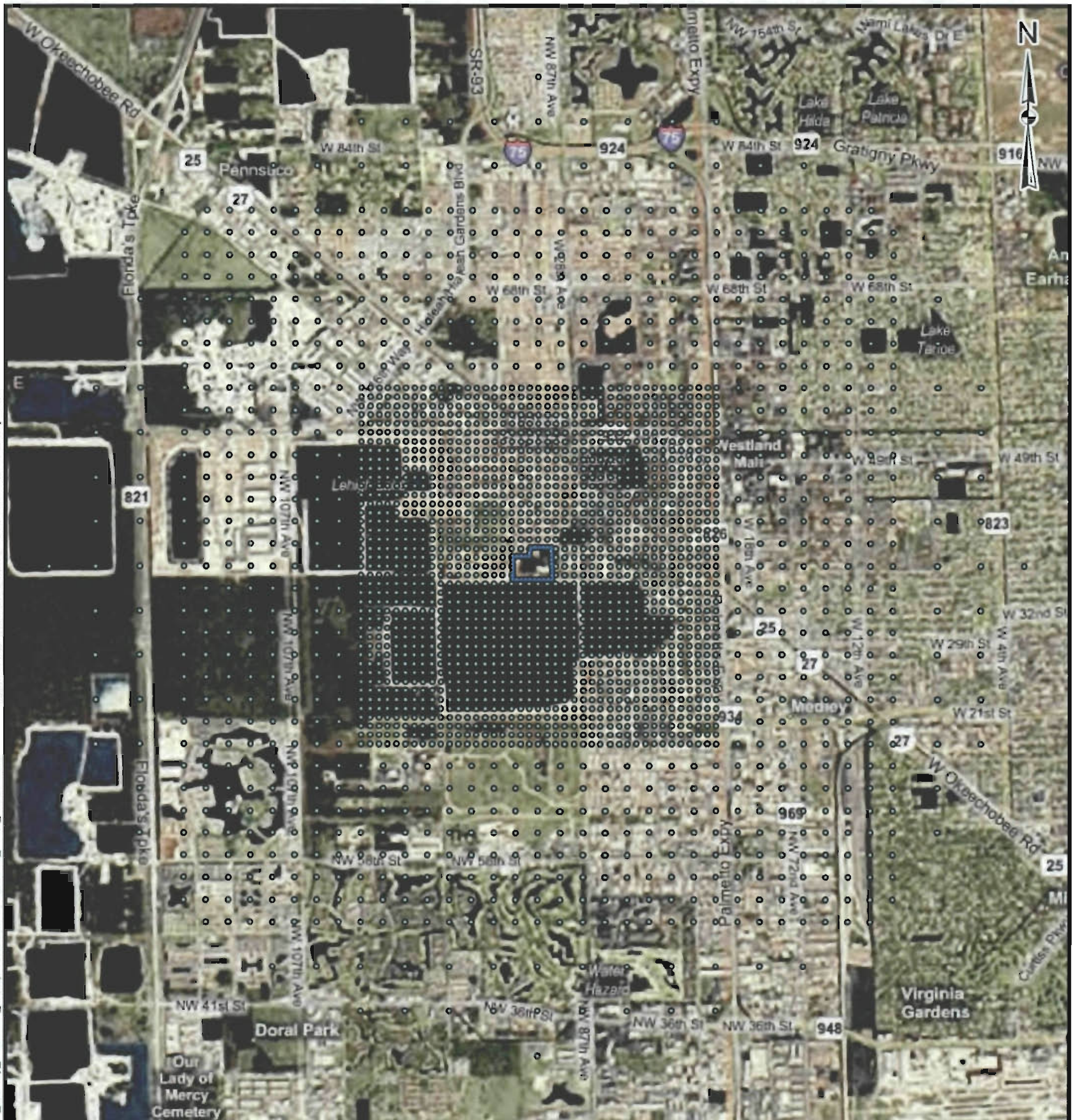
Golder Associates
Gainesville, Florida

SCALE	AS SHOWN		
DATE	7/7/2010		
DESIGN	SRM		
GIS	NRL		
FILE No. 09387674_A008	CHECK	PT	
PROJECT No. 093-87674 REV. 0	REVIEW	XXX	

RECEPTORS USED IN
PM10 / PM2.5 AAQS / PSD CLASS II ANALYSIS

WASTE MANAGEMENT INC. OF FLORIDA

FIGURE **E-4**



LEGEND

- NO_2 Receptors
- Plant Boundary

REFERENCES

1. Receptors, Golder Associates Inc., 2010.
2. Plant Boundary, Waste Management Inc., 2010.

0 800 1,600 3,200 Meters

Golder Associates
Gainesville, Florida

SCALE	AS SHOWN
DATE	7/7/2010
DESIGN	SRM
GIS	NRL
CHECK	PT
REVIEW	XXX

FILE No. 09387674_A009

PROJECT No. 093-87674 REV. 0

RECEPTORS USED IN NO_2 AAQS / PSD CLASS II ANALYSIS

WASTE MANAGEMENT INC. OF FLORIDA

FIGURE **E-5**

LEGEND

- CO Receptors
- Plant Boundary

REFERENCES

1. Receptors, Golder Associates Inc., 2010.
2. Plant Boundary, Waste Management Inc., 2010.

0 50 100 200 Meters

Map Document: G:\PROJECTS\2009\093-87674_WasteManagement\A_Medley_PSD\Rev_0\MapDocuments\09387674_A010_CO.mxd / Modified 7/6/2010 9:30:58 AM / Plotted 7/7/2010 11:31:59 AM by rlamar

Golder Associates
Gainesville, Florida

SCALE	AS SHOWN		
DATE	7/7/2010		
DESIGN	SRM		
GIS	NRL		
FILE No. 09387674_A010		CHECK	PT
PROJECT No. 093-87674	REV. 0	REVIEW	XXX

RECEPTORS USED IN CO AAQS ANALYSIS

WASTE MANAGEMENT INC. OF FLORIDA

FIGURE **E-6**

APPENDIX F

APPLICATION FOR AIR PERMIT – LONG FORM

Department of Environmental Protection

Division of Air Resource Management

APPLICATION FOR AIR PERMIT - LONG FORM

RECEIVED
AUG 16 2010
BUREAU OF AIR REGULATION

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: **Waste Management, Inc. of Florida**	
2. Site Name: **Medley Landfill**	
3. Facility Identification Number: **0250615**	
4. Facility Location... Street Address or Other Locator: **9350 NW 89th Ave.** City: **Medley** County: **Miami-Dade** Zip Code: **33178**	
5. Relocatable Facility? ☐ Yes ☒ No	6. Existing Title V Permitted Facility? ☒ Yes ☐ No

Application Contact

1. Application Contact Name: **James Kisiel, P.E., Project Manager**
2. Application Contact Mailing Address... Organization/Firm: **Waste Management, Inc.** Street Address: **1001 Fannin Street, Suite 4000** City: **Houston** State: **TX** Zip Code: **77002**
3. Application Contact Telephone Numbers... Telephone: **(713) 823-7068** ext. Fax: ( )
4. Application Contact E-mail Address: **JKisiel@wm.com**

Application Processing Information (DEP Use)

1. Date of Receipt of Application: 8/16/10	3. PSD Number (if applicable): 414
2. Project Number(s): 0250615-013-AC	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

Prevention of Significant Deterioration (PSD) Air Construction Permit Application for a proposed landfill gas-to-energy (LFGTE) project at the existing Medley Landfill. The project will include installation of six Caterpillar (CAT) lean-burn internal combustion (IC) engines and generator sets which use landfill gas (LFG) and have a gross electrical generation capacity of 1.6 megawatts (MW) each (9.6 total). Currently, the facility is operating under Title V Permit No. 0250615-011-AV.

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Processing Fee
	Six CAT IC Engines and Generator Sets	AC1A	$7,500

Application Processing Fee

Check one: ☒ Attached - Amount: $$7,500 ☐ Not Applicable

APPLICATION INFORMATION

Owner/Authorized Representative Statement

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

1.	Owner/Authorized Representative Name : **Tim Hawkins, South Florida Market Area Vice President**
2.	Owner/Authorized Representative Mailing Address... Organization/Firm: **Waste Management, Inc. of Florida** Street Address: **2700 NW 48th Street** City: **Pompano Beach** State: **FL** Zip Code: **33073**
3.	Owner/Authorized Representative Telephone Numbers... Telephone: **(954) 984-2035** ext. Fax: ( )
4.	Owner/Authorized Representative E-mail Address: **THawkins@wm.com**
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] Signature 8-11-10 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:

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 or CAIR source.

3. Application Responsible Official Mailing Address...
   Organization/Firm:
   Street Address:
   City: State: Zip Code:

4. Application Responsible Official Telephone Numbers...
   Telephone: ( ) ext. Fax: ( )

5. Application Responsible Official E-mail Address:

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 Date

APPLICATION INFORMATION

Professional Engineer Certification

1. Professional Engineer Name: **David A. Buff**
   Registration Number: **19011**
2. Professional Engineer Mailing Address...
   Organization/Firm: **Golder Associates Inc.****
   Street Address: **6026 NW 1st Place**
   City: **Gainesville** State: **FL** Zip Code: **32607**
3. Professional Engineer Telephone Numbers...
   Telephone: **(352) 336-5600** ext. **545** Fax: **(352) 336-6603**
4. Professional Engineer E-mail Address: **dbuff@golder.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.

David A. Buff — 8/13/10

Signature — Date

(seal)

* Attach any exception to certification statement.
**Board of Professional Engineers Certificate of Authorization #00001670.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates... Zone **17** East (km) **565.040** North (km) **2,860.020**		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) **25°51'31"** Longitude (DD/MM/SS) **80°21'03"**	
3. Governmental Facility Code: **0**	4. Facility Status Code: **C**	5. Facility Major Group SIC Code: **49**	6. Facility SIC(s): **4911**
7. Facility Comment : **The existing Medley Landfill Consists of the following regulated emission units:** **EU 001 – 3,000 scfm open flare used as backup** **EU 002 – NMOC and HAP emissions not collected by LFG collection system** **EU 003 – 6,000 scfm enclosed flare used as primary flare**			

Facility Contact

1. Facility Contact Name: **James Kisiel, P.E., Project Manager**
2. Facility Contact Mailing Address... Organization/Firm: **Waste Management Inc. of Florida** Street Address: **1001 Fannin Street, Suite 4000** City: **Houston** State: **TX** Zip Code: **77002**
3. Facility Contact Telephone Numbers: Telephone: **(713) 823-7068** ext. Fax: ( )
4. Facility Contact E-mail Address:

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 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:	

List of Pollutants Emitted by Facility

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?
Particulate Matter Total - PM	**B**	**N**
Particulate Matter - PM10	**B**	**N**
Particulate Matter - PM2.5	**B**	**N**
Sulfur Dioxide - SO2	**A**	**N**
Nitrogen Oxides - NOX	**A**	**N**
Carbon Monoxide - CO	**A**	**N**
Volatile Organic Compounds - VOC	**B**	**N**
Non-Methane Organic Compounds - NMOC	**B**	**N**

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

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: **PSD Report** ☐ 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: **PSD Report** ☐ 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: **WMI-FI-C3** ☐ Previously Submitted, Date:__________

Additional Requirements for Air Construction Permit Applications

1.	Area Map Showing Facility Location: ☒ Attached, Document ID: **PSD Report** ☐ Not Applicable (existing permitted facility)
2.	Description of Proposed Construction, Modification, or Plantwide Applicability Limit (PAL): ☒ Attached, Document ID: **PSD Report**
3.	Rule Applicability Analysis: ☒ Attached, Document ID: **PSD Report**
4.	List of Exempt Emissions Units: ☐ Attached, Document ID:__________ ☒ Not Applicable (no exempt units at facility)
5.	Fugitive Emissions Identification: ☒ Attached, Document ID: **PSD Report** ☐ Not Applicable
6.	Air Quality Analysis (Rule 62-212.400(7), F.A.C.): ☒ Attached, Document ID: **PSD Report** ☐ Not Applicable
7.	Source Impact Analysis (Rule 62-212.400(5), F.A.C.): ☒ Attached, Document ID: **PSD Report** ☐ Not Applicable
8.	Air Quality Impact since 1977 (Rule 62-212.400(4)(e), F.A.C.): ☒ Attached, Document ID: **PSD Report** ☐ Not Applicable
9.	Additional Impact Analyses (Rules 62-212.400(8) and 62-212.500(4)(e), F.A.C.): ☒ Attached, Document ID: **PSD 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.
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)

Additional Requirements Comment

ATTACHMENT WMI-FI-C3

PRECAUTIONS TO PREVENT EMISSIONS OF UNCONFINED PARTICULATE MATTER

ATTACHMENT WMI-FI-C3
PRECAUTIONS TO PREVENT EMISSIONS OF UNCONFINED PARTICULATE MATTER

The following precautions are taken to prevent emissions of unconfined particulate matter (PM):

- Paving and maintenance of roads, parking areas, and yards.
- Application of water chemicals to control emissions from such activities as demolition of buildings, grading roads, construction, and land clearing.
- Application of asphalt, water, oil, chemicals, or other dust suppressants to unpaved roads, yards, open stock piles, and similar activities.
- Removal of PM from roads and other paved areas under the control of the owner or operator of the facility to prevent reentrainment and from buildings or work areas to prevent particulate from becoming airborne.
- Landscaping or planting of vegetation.
- Use of hoods, fans, filters, and similar equipment to contain, capture, and/or vent PM.
- Confining abrasive blasting where possible.
- Enclosure or covering of conveyor systems.

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.

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:
   IC Engines

3. Emissions Unit Identification Number:

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

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

   ☐ Acid Rain Unit

   ☐ CAIR Unit

9. Package Unit:
   Manufacturer: **Caterpillar** Model Number: **G 3520C**

10. Generator Nameplate Rating: **9.6** MW

11. Emissions Unit Comment:
    Six lean-burn internal combustion engines and generator sets, which will burn LFG to generate 9.6 MW of electricity (gross, 1.6 MW per engine).

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:

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **3,528 scfm LFG (total 6 engines)**	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate: **105.84** million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: **24** hours/day **7** days/week **52** weeks/year **8,760** hours/year	
6. Operating Capacity/Schedule Comment: **See PSD Table 2-1.** **Maximum heat input rate for one engine = 17.64 MMBtu/hr** **Maximum heat input rate for 6 engines = 17.64 MMBtu/hr x 6 = 105.84 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: **CAT 3520 Engines 1-6**		2. Emission Point Type Code: **3**
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: **Emissions unit consists of six IC Engines.**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: **V**	6. Stack Height: **33** feet	7. Exit Diameter: **1.2** feet
8. Exit Temperature: **898**°F	9. Actual Volumetric Flow Rate: **12,476** acfm	10. Water Vapor: %
11. Maximum Dry Standard Flow Rate: dscfm		12. Nonstack Emission Point Height: feet
13. Emission Point UTM Coordinates... Zone: East (km): North (km):		14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)
15. Emission Point Comment: **Volumetric flow rate is for each engine. See PSD Table B-1.**		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Internal Combustion Engines – Electric Generation; Landfill Gas; Reciprocating**		
2. Source Classification Code (SCC): **2-01-008-02**	3. SCC Units: **MM Cubic Feet Burned**	
4. Maximum Hourly Rate: **0.212**	5. Maximum Annual Rate: **1,857.1**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: **500**
10. Segment Comment: **Maximum hourly rate = 588 scfm x 60 min/hr x (1/1,000,000) x 6 engines = 0.212 $MMft^3$/hr** **Maximum annual rate = 0.212 x 8,760 hr/yr = 1,857.1 $MMft^3$/yr**		

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
SO2			NS
NOx			EL
CO			EL
PM			NS
PM10			EL
PM2.5			EL
VOC			EL
NMOC			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: **SO2**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **29.16** lb/hour **127.7** tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **830 ppmv H_2S** Reference: **Refer to PSD Table 2-1.**	7. Emissions Method Code: **5**
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: **Refer to PSD Table 2-1.** **Hourly emissions = 4.86 lb/hr x 6 engines = 29.16 lb/hr** **Annual emissions = 21.29 TPY x 6 engines = 127.7 TPY**	
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: **830 ppmv H_2S**	4. Equivalent Allowable Emissions: **29.16** lb/hour **127.7** tons/year
5. Method of Compliance: **Daily monitoring of fuel sulfur content**	
6. Allowable Emissions Comment (Description of Operating Method): **Proposed Limit**	

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: **NOx**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **17.7** lb/hour **77.6** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.60 g/bhp-hr** Reference: **Refer to PSD Table 2-1.**	7. Emissions Method Code: **5**
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:

Emissions are for six IC engines, refer to PSD Table 2-1.

Hourly emissions = 2.95 lb/hr x 6 engines = 17.70 lb/hr

Annual emissions = 12.4 TPY x 6 engines = 77.6 TPY

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: **0.6 g/bhp-hr**	4. Equivalent Allowable Emissions: **17.7** lb/hour **77.6** tons/year
5. Method of Compliance: **Annual test using EPA Method 7 or 7E**	
6. Allowable Emissions Comment (Description of Operating Method): **Proposed BACT limit**	

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: **2.0 g/bhp-hr**	4. Equivalent Allowable Emissions: **59.1** lb/hour **258.9** tons/year
5. Method of Compliance: **Annual test using EPA Method 7 or 7E**	
6. Allowable Emissions Comment (Description of Operating Method): **40 CFR Subpart JJJJ limit.** **Allowable emission limit applicable if manufactured after July I, 2010.** **Equivalent hourly = 2.0 g/bhp-hr x 2,233 bph x lb/453.6 g x 6 engines = 59.1 lb/hr** **Equivalent annual = 59.1 lb/hr x 8,760 hrs/yr x ton/2000 lb = 258.9 TPY**	

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: **103.4** lb/hour **452.8** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **3.5 g/bhp-hr** Reference: **Refer to PSD Table 2-1.**	7. Emissions Method Code: **5**
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:

Emissions are for six IC engines, refer to PSD Table 2-1.

Hourly emissions = 17.23 lb/hr x 6 engines = 103.4 lb/hr

Annual emissions = 75.47 TPY x 6 engines = 452.8 TPY

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: **3.5 g/bhp-hr**	4. Equivalent Allowable Emissions: **103.4** lb/hour **452.8** tons/year
5. Method of Compliance: **Annual test using EPA Method 10.**	
6. Allowable Emissions Comment (Description of Operating Method): **Proposed BACT limit**	

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: **5.0 g/bhp-hr**	4. Equivalent Allowable Emissions: **147.7** lb/hour **646.9** tons/year
5. Method of Compliance: **Annual test using EPA Method 10**	
6. Allowable Emissions Comment (Description of Operating Method): **40 CFR Subpart JJJJ limit.** **Equivalent hourly = 5.0 g/bhp-hr x 2,233 bhp x lb/453.6 g x 6 engines = 147.7 lb/hr** **Equivalent annual = 147.7 lb/hr x 8,760 hrs/yr x ton/2000 lb = 646.9 TPY**	

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: **5.1** lb/hour **22.3** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.000048 lb/scf CH_4** Reference: **AP-42 Table 2.4-5**	7. Emissions Method Code: **3**
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: **Emissions are for six IC engines, refer to PSD Table 2-1.** **Hourly emissions = 0.85 lb/hr x 6 engines = 5.1 lb/hr** **Annual emissions = 3.71 TPY x 6 engines = 22.26 TPY**	
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:	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):	

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: **PM10/PM2.5**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **5.1** lb/hour **22.3** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.000048 lb/scf CH_4** Reference: **AP-42 Table 2.4-5**	7. Emissions Method Code: **3**
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:

Emissions are for six IC engines, refer to PSD Table 2-1.

Hourly emissions = 0.85 lb/hr x 6 engines = 5.1 lb/hr

Annual emissions = 3.71 TPY x 6 engines = 22.26 TPY

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: **0.000048 lb/scf CH_4**	4. Equivalent Allowable Emissions: **5.1** lb/hour **22.3** tons/year
5. Method of Compliance: **Annual test using EPA Method 201.**	
6. Allowable Emissions Comment (Description of Operating Method): **Proposed BACT limit**	

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: **4.8** lb/hour **21.1** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **100% of NMOC** Reference: **Refer to PSD Table 2-1.**	7. Emissions Method Code: **5**
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: **Emissions are for six IC engines, refer to PSD Table 2-1.** **Hourly emissions = 0.80 lb/hr x 6 engines = 4.80 lb/hr** **Annual emissions = 3.52 TPY x 6 engines = 21.12 TPY**	
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: **1.0 g/bhp-hr**	4. Equivalent Allowable Emissions: **29.5** lb/hour **129.2**tons/year
5. Method of Compliance: **EPA Method 25A**	
6. Allowable Emissions Comment (Description of Operating Method): **40 CFR Subpart JJJJ limit.** **Equivalent hourly = 1.0 g/bhp-hr x 2,233 bhp x lb/453.6 g x 6 engines = 29.5 lb/hr** **Equivalent annual = 29.5 lb/hr x 8,760 hrs/yr x ton/2000 lb = 129.2 TPY**	

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: **NMOC**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **4.8** lb/hour **21.1** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **20 ppmvd @ 3% O_2 as hexane** Reference: **NSPS Subpart WWW**	7. Emissions Method Code: **5**
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: **Emissions are for six IC engines, refer to PSD Table 2-1.** **Hourly emissions = 0.80 lb/hr x 6 engines = 4.80 lb/hr** **Annual emissions = 3.52 TPY x 6 engines = 21.12 TPY**	
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: **20 ppmvd @ 3% 0_2 as hexane**	4. Equivalent Allowable Emissions: **4.8** lb/hour **21.12** tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method): **NSPS Subpart WWW**	

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:	2. Basis for Allowable Opacity: ☒ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: **20%** Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **EPA Method 9**	
5. Visible Emissions Comment: **Rule 62-296.320 (4)(b), F.A.C.**	

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:	

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: PSD Report ☐ 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: PSD Report ☐ 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: PSD Report ☐ 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: ______ ☐ 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: ______ ☒ 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: PSD Report ☐ 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: PSD Report ☐ 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

Additional Requirements Comment
