Derenzo and Associates, Inc.
Environmental Consultants

Tammy M'Wade

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Project No! 1150089-008-AC -
PSD-R-US #422

PREVENTION OF SIGNIFICANT DETERIORATION AIR CONSTRUCTION PERMIT APPLICATION FOR A LANDFILL GAS FUELED RECIPROCATING INTERNAL COMBUSTION ENGINE ELECTRICITY GENERATION FACILITY AT THE CENTRAL COUNTY SOLID WASTE DISPOSAL COMPLEX

Sarasota Energy, LLC
4620 Dylan Drive, Suite 200
Novi, Michigan 48377

June 12, 2013

DAI Project No. 1301043

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Tammy

Derenzo and Associates, Inc.

Environmental Consultants

Module AC012

June 26, 2013

Mr. Syed Arif, P.E.
Bureau of Air Regulation
Division of Air Resource Management
Department of Environmental Protection
STATE OF FLORIDA
2600 Blair Stone Road, MS 5505
Tallahassee, FL 32399-2400

Project No.
1150089-008-AC -
PSD-FL-US
422

Subject: Sarasota Energy, LLC
PSD Air Construction Permit Application

Dear Mr. Arif:

Derenzo and Associates, Inc. (Derenzo and Associates), on behalf of Sarasota Energy, LLC, is submitting to the Florida Department of Environmental Protection, Division of Air Resource Management four copies of an Air Construction Permit application for a new landfill gas (LFG) fueled internal combustion (IC) engine electricity generation facility at the Central County Solid Waste Disposal Complex in Sarasota County, Florida.

A check payable to the Florida Department of Environmental Protection for $7,500 is attached to page 3 of Appendix A of the enclosed document labeled Original to cover the Air Construction Permit application review services for a facility that is subject to Prevention of Significant Deterioration rules.

Appendix A of the enclosed documents provides a completed Department of Environmental Protection Division of Air Resources Management Application for Air Permit - Long Form for the proposed LFG-fueled IC engine electricity generation facility.

Sincerely,

DERENZO AND ASSOCIATES, INC.

David R. Derenzo
Services Director

enclosures

c: Jason Timmons, Sarasota County Public Utilities, w/enclosure
Emily Zambuto, IES/LES, w/enclosure
Mike Labramboise, IES/LES, w/enclosure

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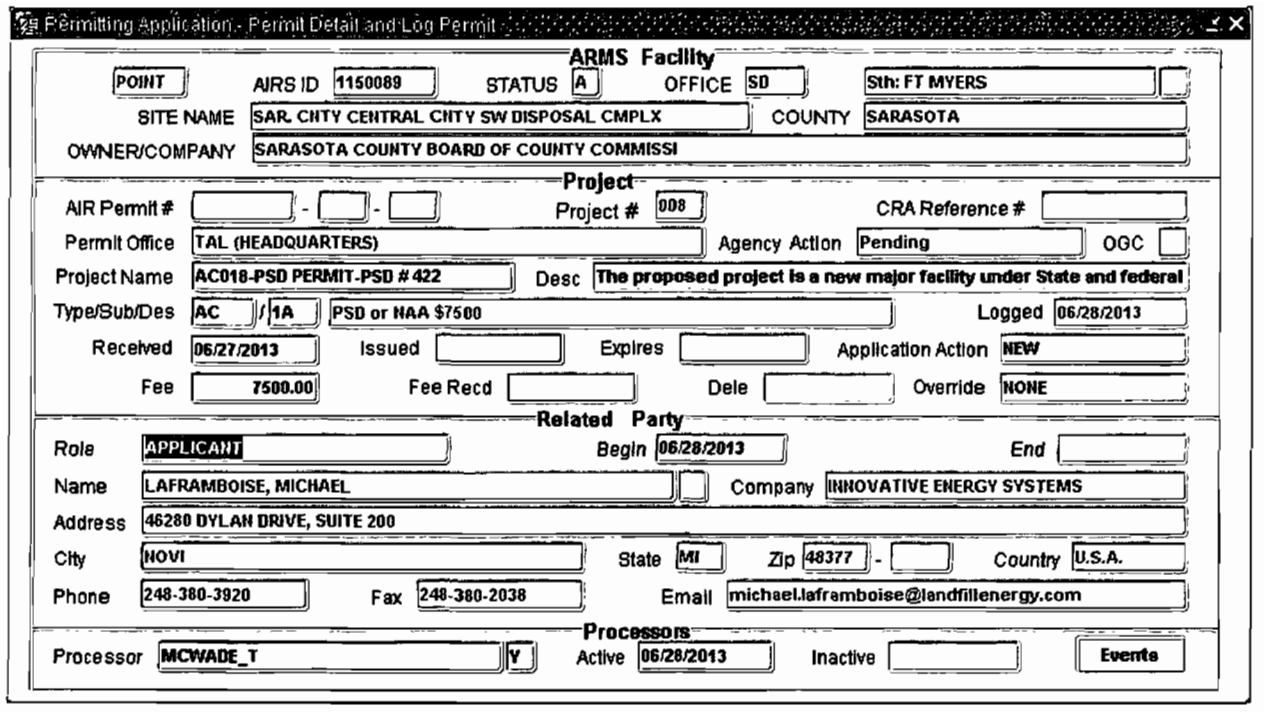
Permitting Application - Permit Detail and Log Permit
ARMS Facility
POINT
AIRS ID 1150089
STATUS A
OFFICE SD
Sth: FT MYERS
SITE NAME SAR. CNTY CENTRAL CNTY SW DISPOSAL CMPLX
COUNTY SARASOTA
OWNER/COMPANY SARASOTA COUNTY BOARD OF COUNTY COMMISSI
Project
AIR Permit #
Project # 008
CRA Reference #
Permit Office TAL (HEADQUARTERS)
Agency Action Pending
OGC
Project Name AC018-PSD PERMIT-PSD # 422
Desc The proposed project is a new major facility under State and federal
Type/Sub/Des AC / 1A PSD or NAA $7500
Logged 06/28/2013
Received 06/27/2013
Issued
Expires
Application Action NEW
Fee 7500.00
Fee Recd
Dele
Override NONE
Related Party
Role APPLICANT
Begin 06/28/2013
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Environmental Consultants

PREVENTION OF SIGNIFICANT DETERIORATION AIR CONSTRUCTION PERMIT APPLICATION FOR A LANDFILL GAS FUELED RECIPROCATING INTERNAL COMBUSTION ENGINE ELECTRICITY GENERATION FACILITY AT THE CENTRAL COUNTY SOLID WASTE DISPOSAL COMPLEX

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AT THE
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1.0 INTRODUCTION

Sarasota Energy, LLC (Sarasota Energy) plans to construct and operate an electricity generation facility that will result in the beneficial use of landfill gas (LFG) generated by the Central County Solid Waste Disposal Complex (the landfill). The proposed facility will:

1. Be located at the landfill in Nokomis, Sarasota County, Florida;

2. Use LFG to fuel reciprocating internal combustion (IC) engine operations;

3. Consist of LFG treatment equipment, lube oil storage tanks, and four (4) identical lean-burn IC engine and generator sets;

4. Have the potential to generate of 6.4 megawatts (MW) of electricity under base load operating conditions; and

5. Interconnect with the local utility distribution network through a nearby power line.

The electricity generated by the proposed facility will be sold under the provisions of a Power Purchase Agreement with the local utility.

Landfill gas that is currently being generated by the landfill as a result of the degradation of the solid wastes placed in the facility, and is not being utilized for its energy value, is directed by a voluntarily installed active LFG collection system (LGCS) to an open flare for control (i.e., destruction of methane and other hydrocarbons contained in the gas).

The combustion of LFG in the proposed IC engines has the potential to emit into the ambient environment nitrogen oxides (NO_X), carbon monoxide (CO), volatile organic compounds (VOC), sulfur oxides (SO_X), particulate matter (total; $PM_{2.5}$ particulates with diameters less than 2.5 microns; PM_{10} particulates with diameters less than 10 microns)

other compounds (nonmethane organic compounds, hazardous air pollutants, greenhouse gases) that are defined as regulated air pollutants by the State of Florida and U.S. Environmental Protection Agency (USEPA).

New facilities located in the State of Florida that have the potential to emit significant amounts of regulated air pollutants are required to submit permit application documents to the Florida Department of Environmental Protection Division of Air Resource Management (FDEP-DARM) for its review and approval (through the issuance of an Air Construction Permit) prior to the start of construction in accordance with the regulatory provisions of *62-210.300 Permits Required,* Florida Administrative Code (F.A.C.).

Sarasota Energy is requesting the issuance of an Air Construction Permit for the proposed LFG fueled IC engine electricity generation facility with the submittal of this permit application and its approval by the FDEP-DARM. An operating permit (i.e., a modification to the operating permit issued the landfill stationary source) will be applied for under the regulatory provisions of *Chapter 62-213 Operation Permits For Major Sources of Air Pollutants*, F.A.C., after the proposed LFG fueled IC engine electricity generation facility has commenced operation.

The proposed electricity generation facility will complete its construction activities and commence operations within approximately 18 months of the issuance date of an Air Construction Permit, which is expected to be issued by approximately October 2013.

This technical support document contains data and information required by the regulatory agency to support the issuance of an Air Construction Permit for the proposed LFG fueled IC engine electricity generation facility in accordance with application submittal provisions of *62-210.900 Forms and Instructions*, F.A.C., *62-212.300 General Preconstruction Review Requirements*, F.A.C., and *62-212.400 Prevention of Significant Deterioration*, F.A.C.

Derenzo and Associates, Inc. has been retained by Sarasota Energy to prepare Air Construction Permit Application documents for the proposed LFG fueled IC engine electricity generation facility.

Mr. Michael Laframboise, Vice President Construction and Technical Services for Innovative Energy Systems/Landfill Energy Systems (IES/LES, parent company of Sarasota Energy), authorized the preparation of the Air Construction Permit Application documents.

An agreement on the proposed project is being negotiated between the Sarasota County Board of County Commissioners (i.e., the landfill responsible official) and Sarasota

Energy. Therefore, since the submittal of an Air Construction Permit Application for the project has not been authorized by the landfill responsible official, Sarasota Energy is submitting this Air Construction Permit to the FDEP-DARM at its own risk as instructed by representatives of Sarasota County.

Appendix A provides a complete *Department of Environmental Protection Division of Air Resource Management Application for Air Permit – Long Form* for the proposed LFG fueled IC engine electricity generation facility.

Appendix B provides a detailed approximate schedule for construction of the proposed LFG fueled IC engine electricity generation facility.

2.0 PROPOSED ELECTRICITY GENERATION FACILITY

The electricity generation facility proposed by Sarasota Energy will consist of:

1. LFG treatment equipment (gas dewatering, filtration and compression equipment and processes);

2. Four (4) lean-burn IC engines that will be connected to individual electricity generators; and

3. Ancillary equipment that supports the electricity generation operations (e.g., engine lubrication oil storage tanks and LFG temperature and moisture conditioning equipment).

The LFG fueled IC engines will be housed in a single building constructed in a leased area (at the landfill facility) near the existing LFG collection system header and control system flare. A gas transmission (fuel supply) line (pipe) will be connected to the header of the existing LFG collection system and dedicated gas blowers/compressors will be used to draw methane-rich gas (fuel) from the existing LFG collection system to the proposed electricity generation facility.

A single meter (flow totalizer) will be installed and operated at the Sarasota Energy electricity generation facility to measure the total amount of LFG fuel that is supplied to power the four (4) IC engines (i.e., individual engine fuel use meters will not be installed).

The proposed electricity generation facility will be located within the boundaries of the landfill stationary source but not within the boundary of the approval waste disposal area.

The general classification of the land use surrounding the landfill is rural based on information and procedures utilized for air quality analysis (which are provided in Appendix I and will be submitted to the FDEP-DRAM as a separate document).

The land that surrounds the landfill is zoned for government use.

Appendix C provides general location and site drawings that illustrate the location of the landfill in Sarasota County and proposed electricity generation facility at the landfill.

Appendix D provides a process flow diagram and engineering specifications for the proposed electricity generation facility.

2.1 Landfill Gas Fuel

Section I. Emission Unit Additional Information Item 2. of the FDEP-DARM Application for Air Permit – Long Form requires that all permit applications provide a Fuel Analysis or Specification.

Appendix E provides results of chemical analyses performed on the LFG generated by the landfill in 2010, 2011 and 2012.

2.1.1 Physical Properties

Landfill gas primarily consists of methane, carbon dioxide and nitrogen. Oxygen, sulfur-bearing compounds, nonmethane organic compounds (NMOC) and hazardous air pollutants (HAPs) are present in the generated LFG in much smaller quantities. The quantities and types of compounds that are present in LFG are dependent on the composition of the wastes placed in the landfill and site-specific conditions (e.g., climatological influences).

Information provided by Sarasota County indicates that the lower heating value (i.e., LHV, which is the net heating value obtained by subtracting the latent heat of vaporization of water from the gross heating value) of the LFG being generated by the landfill is currently approximately 457 British thermal units per standard cubic foot of gas (i.e., approximately 50% methane).

The LHV of the LFG extracted from the landfill at the time full fuel demand is required for normal engine operations by the proposed electricity generation facility is expected to be approximately 450 British thermal units per standard cubic foot of gas (i.e., 500 Btu/scf HHV).

2.1.2 Heating Value Requirement

A fuel having a minimum LHV of approximately 350 Btu/scf (approximately 38% methane) is required to properly support the operation of the proposed electricity generation IC engines.

Based on considerations for variables in gas generation and composition, the LHV of the LFG generated at the landfill is expected to range from 400 to 500 Btu/scf (44% to 55% methane) over the operating life of the proposed electricity generation facility.

2.1.3 Treatment

The equipment and processes used to treat (dewater, filter and compress) the LFG received from the landfill (prior to its combustion as fuel in the proposed IC engines) will consist of:

1. Initial two-stage inlet gas dewatering/filter vessels (the bottom chambers are used for moisture knock-out, top chambers are equipped with coalescing filter media to remove gas particles having diameters of 1-micron and larger).

2. Gas compressors/blowers.

3. Air-to-gas coolers, which will be used to reduce the elevated temperatures of LFG received from the compressors to approximately 10°F above ambient temperatures.

4. Final two-stage gas dewatering/filter vessels (the bottom chambers are used for moisture knock out, top chambers are equipped with coalescing filter media to remove gas particles having diameters of 1-micron and larger).

Components of the specified gas treatment system will not be equipped with atmospheric vents. Therefore, all of the LFG received by the system will be directed to the IC engines for use as a fuel.

Appendix D provides a process flow diagram and engineering specifications for the proposed LFG treatment system.

2.2 Engine / Generator Specifications

Table 1 presents equipment design, performance and operating specifications for the Caterpillar, Inc. (CAT®) Model G3520C gas IC engine and electricity generator.

Appendix F provides technical data (Caterpillar, Inc. equipment operating specifications) for the CAT® Model G3520C gas IC engine and its power generation rating.

Section I. Emission Unit Additional Information Item 5. of the FDEP-DARM Application for Air Permit – Long Form requires that all permit applications provide an Operation and Maintenance Plan for the proposed equipment.

Appendix G provides an Operation and Maintenance Plan developed for the CAT® G3520C gas IC engine.

2.2.1 CAT® G3520C Gas IC Engine

Four (4) identical lean-burn IC engines, CAT® Model G3520C gas IC engines, will be used to power electricity generators. This IC engine:

1. Is designed to fire low-pressure, lean fuel mixtures and produce low combustion by-product emissions. The IC engine is equipped with an air-to-fuel ratio controller that monitors performance parameters and automatically adjusts the air-to-fuel ratio and ignition timing to maintain efficient fuel combustion, which minimizes air pollutant emissions.

2. Will be fueled exclusively with LFG generated by and received from the landfill (natural gas will not be used to fuel the IC engine operations).

The CAT® G3520C gas IC engine has a power generation rating of 2,242 brake horsepower (bhp). The Caterpillar, Inc. technical data sheet specifies that the maximum LHV fuel operating requirement for the CAT® G3520C gas IC engine is approximately 14.60 million Btu per hour (MMBtu/hr), which is derived from the 243,311 Btu/min specification. However, the footnote presented in this data sheet indicates that the LHV rate specification has a tolerance of $\pm$ 2.5% (i.e., actual operating condition values may vary from those specified by the equipment manufacturer). Therefore, the actual LHV input rate of the CAT® G3520C gas IC engine may be as high as 14.96 MMBtu/hr (16.61 MMBtu/hr HHV).

At the specified LHV input rate of 14.96 MMBtu/hr and expected typical 450 Btu/scf LHV of the LFG fuel, the CAT® G3520C gas IC engines proposed for installation and operation by Sarasota Energy will each typically use approximately 554 scfm and 33,240 standard cubic feet per hour (scfh) of treated LFG fuel.

2.2.2 Electricity Generators

Each CAT® G3520C gas IC engine will be connected to a 1,600 kW electricity generator.

The proposed facility (four CAT® G3520C gas IC engines) will have a total electricity generation capacity of 6,400 kW (6.4 MW).

2.2.3 IC Engine Exhaust Configuration

Air pollutant emissions produced by the combustion of LFG fuel in the four (4) CAT® G3520C gas IC engines will be released into the ambient air through individual stacks connected to the IC engine exhaust manifolds. A noise muffler (for noise control) will be installed on each IC engine exhaust stack.

The fuel combustion system exhausts and noise mufflers will be located on the roof of the single building that houses the IC engines or adjacent to the outside wall closest to the IC engines position within the building.

Table 1 presents exhaust design and operating parameters for the CAT® Model G3520C gas IC engine.

2.3 LFG Fuel Requirement / Availability

The operation of four (4) CAT® G3520C gas IC engines under based load conditions (100% of capacity) and with fuel that has a LHV of approximately 450 Btu/scf will result in LFG fuel utilization rates of approximately 2,216 scfm and 3.2 million standard cubic feet per day (MMscf/day).

Approximately 1,700 scfm of LFG is currently being recovered from the landfill and available for use as fuel to power the proposed IC engine electricity generation operations. Therefore, with the issuance of an approved permit, construction activities will commence to accommodate the immediate installation and operation of three (3) of the four (4) IC engine electricity generator sets. Additional LFG that is sufficient to power the fourth IC engine generator set is expected to be available within approximately 12 months after the commencement of operations for the first three (3) IC engine generator sets. At that time, the fourth IC engine generator set will be installed and placed in operation.

The construction schedule that is provided in Appendix B only addresses activities for the installation of the initial three (3) IC engine generator sets. The fourth IC engine generator set is expected to be installed and made operational by the end of the first calendar quarter of 2015. However, the facility infrastructure (e.g., building size, supporting equipment)

that is initially constructed for the project will accommodate the operation of four (4) IC engine generator sets.

Supplying fuel to the proposed electricity generating facility will be the primary means of controlling and utilizing the LFG being generated by the landfill, which would otherwise be flared. Therefore, it is anticipated that the extent of future LFG flaring operations will be minimized as a result of the proposed IC engine generator set operations and its fuel use requirement.

The existing LFG flaring system will be periodically operated during periods of equipment downtime and maintenance, and continually operated when future LFG collection and extraction rates (from new waste placement) exceed the fuel supply requirement of the installed and operated engines.

2.4 Ancillary Equipment

Each of the proposed IC engines will be equipped with a stand-alone fan-cooled radiator.

Engine coolant for the radiators will be stored on-site in drum quantities.

Engine lube oil (new and used) will be stored in separate above ground holding tanks positioned on the premises of the proposed LFG fueled IC engine electricity generation facility. The new lube oil storage tank will have a capacity of approximately 2,000 gallons. The used oil storage tank will have a capacity of approximately 1,000-gallons.

3.0 LANDFILL FACILITY

The landfill is:

1. Owned by Sarasota County and operated by a hired contractor;

2. Located at 4000 Knights Trail Road in Nokomis, Sarasota County.

3.1 Gas Collection / Control System

Landfill gas produced from the decomposition of disposed waste materials in closed and capped cells (Phase I) is being collected by a reliable gas recovery system at the landfill. A blower station connected to the gas recovery system moves the collected LFG to a central location where it is currently directed to an open flare where methane, NMOC and HAPs contained in the gas are destroyed at high temperatures. The open flare operated at the

landfill has the capacity to control up to approximately 6.8 MMscf/day (4,700 scfm) of LFG.

3.2 MSW Landfill NSPS

The landfill has a permitted design capacity that is greater than 2.5 million megagrams by mass and 2.5 million cubic meters by volume. Therefore, the landfill is subject to the regulatory requirements of federal New Source Performance Standards for Municipal Solid Waste (MSW) Landfills (MSW Landfill NSPS, 40 CFR Part 60 Subpart WWW) as adopted by reference in Rule 62-204.800(8)(b), F.A.C. However, the landfill is not currently subject to the LFG collection and control system requirements of 40 CFR Part 60 Subpart WWW. Therefore, the LFG collection and control system that is currently operated at the landfill has been voluntarily installed.

3.3 Major Source Status

The landfill is currently designated a minor source of regulated air pollutants relative to FDEP-DARM attainment area New Source Review (NSR) air permitting requirements as defined by provisions of Rule 62-212.400, F.A.C and specified in the Title V Air Operation Permit Renewal, Final Permit issued the stationary source.

3.4 Title V Air Operation Permit

The FDEP-DARM issued the Sarasota County Board of County Commissioners Title V Air Operation Permit Renewal, Final Permit No.: 1150089-007AV on March 8, 2011, which is the effective date of the renewal permit, for the air pollutant equipment and processes operated at the landfill.

4.0 AIR POLLUTANT EMISSIONS

The proposed IC engine electricity generation facility will be a pollution control project where emission reductions are provided for the LFG generated by the landfill through its beneficial utilization as fuel by Sarasota Energy.

Table 2 presents a summary of the CAT® G3520C gas IC engine potential criteria air pollutant (NO_X, CO, SO_2, VOC, NMOC, PM_{10}, $PM_{2.5}$), HAPs [as specified in 62-210.200 Definitions (160) "Hazardous Air Pollutants (HAP)", F.A.C.] and greenhouse gas emissions as identified in 40 CFR Part 52.21 (Prevention of Significant Deterioration of Air Quality).

Appendix H provides regulated air pollutant emission rate calculations for the proposed CAT® G3520C gas IC engine operations.

4.1 Criteria Air Pollutants

The amounts of CO, NO_X and total VOC/NMOC that are emitted by the CAT® G3520C gas IC engine are dependent on fuel quality and the operating parameter specifications at which the equipment is set. Based on data provided by the engine manufacturer (which are provided in Appendix F), experience obtained by IES/LES from the operation of numerous identical LFG fueled IC engines and results of emission control analyses presented in Section 7.0 (Emission Control Analyses) of this document, the CAT® G3520C gas IC engine will have the following maximum CO, NO_X , VOC, NMOC and $PM_{10}/PM_{2.5}$ emission rates:

- 3.5 grams of CO per brake-horsepower hour (g/bhp-hr);
- 0.60 g/bhp-hr NO_X;
- 0.42 g/bhp-hr of total VOC;
- 0.52 g/bhp-hr of total NMOC; and
- 0.24 g/bhp-hr for $PM_{10}/PM_{2.5}$.

The 3.5 g/bhp-hr CO value is based on the results of Best Available Control Technology (BACT) analyses (Section 7.0 Emission Control Analyses).

The 0.60 g/bhp-hr NO_X value is based on the results of BACT analyses (Section 7.0 Emission Control Analyses).

The 0.42 g/bhp-hr total VOC value is based on a voluntary limitation that is 90% of the 40 ton per year (TpY) significant emission threshold presented in *62-212.400 Prevention of Significant Deterioration (PSD).* F.A.C. and *62-210.200 Definitions ... (282) "Significant Emission Rate"...* F.A.C.

The 0.52 g/bhp-hr total NMOC value is based on a voluntary limitation that is 90% of the 50 TpY significant emission threshold presented in *62-212.400 Prevention of Significant Deterioration (PSD).* F.A.C. and *62-210.200 Definitions ... (282) "Significant Emission Rate"...* F.A.C.

The 0.24 g/bhp-hr PM/PM10/PM2.5 value is based on the results of BACT analyses (Section 7.0 Emission Control Analyses).

The CAT® G3520C gas IC engine is designed to produce low NO_X emissions. These lower emissions are produced in part based on the high carbon dioxide content of LFG fuels that results in cooler combustion temperatures, which influence VOC destruction and control efficiencies. Experience with compliance demonstrations performed on low emission LFG fueled IC engines by IES/LES indicates that the 0.42 g/bhp-hr total VOC and 0.52 g/bhp-hr total NMOC emission rates are readily achievable.

The operation of the CAT® G3520C gas IC engine at the specified air pollutant emission rates under base load conditions (100% design capacity, 2,242 bhp) will result in maximum potential emissions of:

- 17.3 pounds per hour (lb/hr) and 75.8 TpY of CO (one engine)
  69.20 lb/hr and 303.1 TpY of CO (four engines)

- 2.97 lb/hr and 13.0 TpY of NO_X (one engine)
  11.88 lb/hr and 52.0 TpY of NO_X (four engines)

- 2.05 lb/hr and 9.0 TpY of total VOC (one engine)
  8.20 lb/hr and 36.0 TpY of total VOC (four engines)

- 2.57 lb/hr and 11.26 TpY of total NMOC (one engine)
  10.28 lb/hr and 45.0 TpY of total NMOC (four engines)

- 1.19 lb/hr and 5.20 TpY of PM/PM10/PM2.5 (one engine)
  4.76 lb/hr and 20.8 TpY of PM/PM10/PM2.5 (four engines)

Sulfur oxide emissions (SO_X) have the potential to be produced during the combustion of LFG since it contains sulfur-bearing compounds that are oxidized at normal engine operating temperatures. Therefore, the magnitude of potential SO_X emissions produced by the CAT® G3520C gas IC engine is dependent on the sulfur content of the fuel (as opposed to being dependent on combustion technology and controls).

Results of site-specific chemical composition analyses, which are provided in Appendix E, indicate that the LFG generated by the landfill has a total sulfur content that is less than 100 parts per million by volume (ppmv). Therefore, to account for uncertainties and variability in the future sulfur content of the LFG, data developed by USEPA (which are presented in *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources*, AP-42, Section 2.4, Municipal Solid Waste

Landfills) and a cap of 90% of the 40 TpY sulfur dioxide (SO_2) emission threshold presented in *62-210.200 Definitions ... (282) "Significant Emission Rate"...* F.A.C. were used to establish a SO_2 emission limit for the CAT® G3520C gas IC engines. The hydrogen sulfide (H_2S) default LFG concentration of 35.5 ppmv was replaced with a higher value of approximately 274 ppmv, which results in total potential SO_2 emissions for the IC engine operations of 36 TpY (i.e., the maximum sulfur content of the LFG to be used as IC engine is required to be equal to or less than 289 ppmv as H_2S).

A LFG sulfur content of 289 ppmv as H_2S is equivalent to a SO_X (as SO_2) emission rate of 48 pounds per million cubic feet (lb/MMscf) of fuel based on the complete oxidation of the fuel-bound sulfur compounds during the combustion process.

The operation of CAT® G3520C gas IC engines at the specified SO_2 emission rate under base load conditions (100% design capacity) results in maximum potential emissions of:

- 2.05 lb/hr and 9.0 TpY of SO_2 (one engine)
  8.20 lb/hr and 36.0 TpY of SO_2 (four engines)

Appendix H provides calculations for the CAT® G3520C gas IC engine potential SO_2 emission rates.

4.2 Hazardous Air Pollutants

Hazardous Air Pollutants have the potential to be produced during the combustion of LFG used as fuel by the IC engines since:

1. HAP compounds are present in the gas generated by the landfill and the fuel combustion process is not 100% complete (i.e., a small portion of the HAPs pass through the fuel combustion system).

2. Chlorinated compounds that are present in LFG have the potential to form hydrogen chloride (HCl, a regulated HAP) when they are combusted.

3. The presence of methane and elevated temperatures (700 °F – 900 °F) in the IC engine exhaust produce formaldehyde (CH_2O, a regulated HAP).

Appendix H provides calculations for the CAT® G3520C gas IC engine potential HAPs emissions.

4.2.1 LFG Constituent Contributions

Results of site-specific chemical composition analyses, which are provided in Appendix E, indicate that a limited number of VOC constituents are present in the LFG above the thresholds of the analytical method (0.025 ppmv or 0.1 ppmv, which is dependent on the chemical). Those LFG constituents that have been measured are present in concentrations that are relatively low (i.e., <1.0 ppmv). Therefore, data developed by USEPA (which are presented in *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources*, AP-42, Section 2.4, Municipal Solid Waste Landfills) were use to estimate the total potential HAP content of the LFG to be used as IC engine fuel.

Table 2.4-3 of AP-42 provides *Control Efficiencies for LFG Constituents* that specifies IC engines typically reduce (control) halogenated species by 93 percent and non-halogenated species by 86.1 percent. These LFG constituent control efficiencies were considered in the HAP potential emission determinations that were performed for the IC engine operations

The total HAP potential emissions (LFG constituents) of the IC engines based on the AP-42 data (as function of LFG fuel utilization) is 3.04 lb/MMscf. The operation of CAT® G3520C gas IC engines under base load conditions (100% design capacity) with the specified LFG constituent HAP emission factor results in maximum potential emissions of:

- 0.13 lb/hr and 0.57 TpY of LFG constituent HAPS (one engine)
  0.52 lb/hr and 2.3 TpY of LFG constituent HAPS (four engines)

4.2.2 LFG Combustion HCl Contributions

The contribution of HCl to the HAP potential emissions of the IC engines was estimated based on a conversion of the individual chlorinated compound measurements presented in the AP-42 default list of LFG constituents to HCl as a result of the high temperature combustion environment and exhaust processes. The results of this analysis indicate that the HCl exhaust rate of the proposed IC engines (as function of LFG fuel utilization) is 11.17 lb/MMscf. The operation of CAT® G3520C gas IC engines under base load conditions (100% design capacity) with the specified HCl emission factor results in maximum potential emissions of:

- 0.48 lb/hr and 2.09 TpY of HCl (one engine)
  1.92 lb/hr and 8.36 TpY of HCl (four engines)

4.2.3 Formaldehyde Contributions

The CAT® G3520C gas IC engine manufacturer recognizes that CH_2O is produced in the combustion of LFG and has developed an emission factor for the equipment of 0.42 g/bhp-hr (see Appendix F). The operation of CAT® G3520C gas IC engines under base load conditions (100% design capacity) with the specified CH_2O emission factor results in maximum potential emissions of:

- 2.08 lb/hr and 9.09 TpY of CH_2O (one engine)
  8.32 lb/hr and 36.40 TpY of CH_2O (four engines)

4.3 Greenhouse Gases

The amounts of greenhouse gases (GHG) that are emitted by the CAT® G3520C gas IC engine are dependent on fuel quality and the operating parameter specifications at which the equipment is set. Based on data presented in promulgated rules that are applicable to GHG emission rate documentation and reporting, the four (4) CAT® G3520C gas IC engine will have the following maximum GHG emission rates:

- 33,428 TpY of carbon dioxide (CO_2)
- 44 TpY of methane (CH_4) as equivalent CO_2 (CO_2e)
- 124 TpY of nitrous oxide (N_2O) as CO_2e

Appendix H provides calculations for the CAT® G3520C gas IC engine potential GHG emissions.

5.0 FLORIDA RULES AND REGULATIONS

The following text presents portions of F.A.C., Chapter 62 regulatory requirements and associated compliance information that are applicable to the permitting and operation of the LFG fueled IC engine electricity generation facility proposed by Sarasota Energy.

5.1 Permits

5.1.1 Procedures to Obtain Permits and Other Authorizations

62-4.050 Procedure to Obtain Permits and Other Authorizations; Applications., F.A.C, specifies that:

(1) Any person desiring to obtain a permit ... shall apply on forms prescribed by the Department and shall submit ... additional information as the Department ... may require.

Appendix A provides an Application for Air Permit – Long Form documents that has been completed for the proposed Sarasota Energy LFG fueled IC engine electricity generation facility.

(2) All applications and supporting documents shall be filed in quadruplicate ...

The appropriate number of air construction permit applications is being provided to the FDEP-DARM based on guidance received from the regulatory agency.

(3) ... All applications for a Department permit shall be certified by a professional engineer registered in the State of Florida ...

Appendix A provides a State of Florida professional engineer certification for the Air Construction Permit.

(4) Processing fees are as follows:
(a) Air Pollution Permits.
1. Construction Permit Fee for an Emission Unit Requiring a Prevention of Significant Deterioration ... Preconstruction Review ... shall be $7,500.

IES/LES has issued a check for $7,500 (made payable to the Florida Department of Environmental Protection) that is attached to the original set of air construction permit application forms provided in Appendix A.

5.2 Air Pollution Control – General Provisions

5.2.1 Designation of Attainment, Nonattainment and Maintenance Areas

62-204.340 Designation of Attainment, Nonattainment, and Maintenance Areas., F.A.C, specifies that:

(1) Designation of Areas Meeting Ambient Air Quality Standards (Attainment Areas).
(a) All of the state except those areas designated as nonattainment under paragraph 62-204.340(2)(a), F.A.C., is designated as attainment for the air pollutant ozone.
(b) All of the state except those areas designated as nonattainment under paragraph 62-204.340(2)(b), F.A.C., ... is designated as attainment for the air pollutant PM10.

(c) All of the state except those areas designated as nonattainment under paragraph 62-204.340(2)(c), F.A.C., ... is designated as attainment for the air pollutant sulfur dioxide.

(d) All of the state except those areas designated as nonattainment under paragraph 62-204.340(2)(d), F.A.C., is designated as attainment for the air pollutant carbon monoxide.

(e) All of the state except those areas designated as nonattainment under paragraph 62-204.340(2)(e), F.A.C., is designated as attainment for the air pollutant nitrogen dioxide.

62-204.340(2)(a) – (e), F.A.C, do not list the existence of any ozone, PM10, SO_2, CO and/or NO_2 nonattainment areas in the State of Florida.

(3) Designation of Areas Which Cannot Be Classified as Attainment or Nonattainment (Unclassified Areas).

(a) All of the state except those areas designated as nonattainment under paragraph 62-204.340(2)(b), F.A.C., is designated as unclassifiable for the air pollutant PM10.

(b) The following areas are designated as unclassifiable for the air pollutant sulfur dioxide.

62-204.340(3)(a) and (b), F.A.C, do not list Sarasota County as a PM10 and/or SO_2 unclassified area.

(4) Designation of Air Quality Maintenance Areas.

(a) Each of the following areas is designated as an air quality maintenance area for the air pollutant ozone: ...

(b) Each of the following areas is designated as an air quality maintenance area for the air pollutant particulate matter: ...

62-204.340(4)(b) and (b), F.A.C, does not list Sarasota County as an ozone and/or particulate air quality maintenance area.

5.2.2 Federal Regulations Adopted by Reference

62-204.800 Federal Regulations Adopted by Reference., F.A.C., lists the following federal regulations that are applicable to the proposed project through its use of LFG fueled reciprocating internal combustion engines (RICE):

(3) ... Approval and Promulgation of Implementation Plans ...

(b) ...Subpart K, Florida ...Delegation of Authority to issue federal PSD permits.

(8) ... Standards of Performance for New Stationary Sources ...
(b) ...75. 40 CFR 60, Subpart WWW, Municipal Solid Waste Landfills ...

Section 6.2.1 (MSW Landfill NSPS) of this document provides details that indicate the proposed LFG fueled IC engine electricity generation facility will operate in compliance with 40 CFR 60, Subpart WWW requirements (i.e., the NMOC control standard is not currently applicable to the operation of the proposed LFG treatment system and IC engines).

...80.40 CFR 60, Subpart JJJJ, Standards of Performance for Stationary Park Ignition Combustion Engines ...

Section 6.2.2 (Spark Ignition Internal Combustion Engine NSPS) of this document provides details that indicate the proposed LFG fueled IC engine electricity generation facility will operate in compliance with 40 CFR 60, Subpart JJJJ requirements.

(11) ... National Emission Standards for Hazardous Air Pollutants ...
(b) ...59. 40 CFR 63, Subpart AAAA, Municipal Solid Waste Landfills ...

Section 6.3.1 (MSW Landfill NESHAP) of this document provides information that indicates the proposed LFG fueled IC engine electricity generation facility will operate in compliance with 40 CFR 63, Subpart AAAA requirements. (i.e., the rule is not currently applicable to the operation of the proposed LFG treatment system and IC engines).

...82. 40 CFR 63, Subpart ZZZZ, Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

Section 6.3.2 (RICE NESHAP) of this document provides information that indicates the proposed LFG fueled IC engine electricity generation facility will operate in compliance with 40 CFR 63, Subpart ZZZZ requirements.

(16) ... Part 72, Permits Regulation ...
(a) ...
1. 40 CFR 72, Subpart A, Acid Rain Program General Provisions ...

Section 6.4 (Federal Acid Rain Program) of this document provides information that indicates the proposed LFG fueled IC engine electricity generation facility will operate in compliance with 40 CFR 72, Subpart A - I requirements.

(23) ... Title 40, Code of federal Regulations, Part 81, Designation of Areas for Air Quality Planning Purpose

5.3 Stationary Sources – General Requirements

5.3.1 Definitions

62-210.200 Definitions., F.A.C., specifies that:

(77) "Class I Area" – The following areas are designated as Class I areas.
(a) Areas designated at 40 CFR Part 81, Subpart D, adopted and incorporated by reference at Rule 62-204.800, F.A.C.
(b) Bradwell Bay National Wilderness Area. (which is located a distance of approximately 210 km from the proposed project site)

The Class I areas designated at 40 CFR Part 81 for Florida are the:

- Chassahowitzka Wilderness Area (which is located a distance of approximately 155 km from the proposed project site).
- Everglades National Park (which is located a distance of approximately 180 km from the proposed project site).
- St. Marks Wilderness Area (which is located a distance of approximately 360 km from the proposed project site).

(78) "Class II Area" – All areas of the state are designated Class II except for those areas designated Class I.

62-212.400 Prevention of Significant Determination (PSD). requires that source impact analyses be performed to demonstrate that appropriate air pollutant emissions from the project do not result in the exceedance of associated ambient air quality standards and concentration increases in all Class II areas of the State.

(139) "Facility" means *... All of the emission units which are located on one or more contiguous or adjacent properties, and which are under the control of the same person (or persons under common control).*

While the Sarasota Energy electricity generation facility will be located on leased land at the landfill, the electricity generation equipment and processes will be owned and operated by Sarasota Energy and not under the control of the Sarasota

County who owns the landfill (i.e., the Sarasota Energy electricity generation facility and landfill will be separate).

Sarasota Energy will be fueled exclusively with methane-rich gas generated by the landfill (i.e., no natural gas capabilities). Since all of the fuel utilized by Sarasota Energy will be supplied by the landfill, the landfill has an implied control over the electricity generation operations of the proposed facility (i.e., Sarasota Energy would not have the capability to generate electricity without the existence of the landfill). Therefore, Sarasota Energy is part of the landfill stationary source and its approved Air Construction Permit is required to be incorporated into the landfill Title V Operating Permit.

(194) "Major Stationary Source"-
(a) A major stationary source is: ...
(2) Any stationary source which emits, or has the potential to emit , 250 tons per year or more of a PSD pollutant ...

Section 4.1 (Criteria Air Pollutants) of this document and Table 2 present information that indicate the proposed LFG fueled IC engine electricity generation facility is subject to federal PSD permitting requirements since its potential CO emissions are equal to or greater than 250 tons per year.

(282) "Significant Emission Rate"-
(a) With respect to any emissions increase or any net emissions increase, or the potential of a facility to emit any of the following pollutant, significant emissions rate means a rate of pollutant emissions that would equal or exceed:
1. A rate listed at 40 CFR 52.21(b)(23)(i), adopted and incorporated by reference at Rule 62-204.800, F.A.C; specifically, any of the following rates:
a. Carbon monoxide: 100 tons per year (tpy);
b. Nitrogen oxides: 40 tpy;
c. Sulfur dioxides: 40 tpy;
d. Particulate matter: 25 tpy;
e. PM10: 15 tpy;
f. PM25: 10 tpy ...
q. Municipal solid waste landfills emissions (measured as nonmethane organic compounds): ... (50 tons per year) ...

Section 4.1 (Criteria Air Pollutants) of this document and Table 2 present information that indicate the proposed LFG fueled IC engine electricity generation facility will have significant emission rates of NO_X and PM10/PM 2.5.

5.3.2 Permits Required

62-210.300 Permits Required., F.A.C., specifies that ...

(3) Exemptions ...
(a) Categorical Exemptions ...
(16) Petroleum lubrication systems. ...
(b) Generic and Temporary Exemptions.
(1) Generic Emission Unit Exemptions. An emission unit or pollutant-emitting activity that is not entitled to a categorical exemption ... shall be exempt from any requirement to obtain an air construction permit ... if it meets all of the following criteria:
a. It would be subject to no unit-specific applicable requirements.
b. Its emissions, in combination with the emissions of other units and activities at the facility, would not cause the facility to emit or have the potential to emit any pollutant in such amounts as to create a Title V source.
c. It would neither emit nor have the potential to emit ... 1,000 pounds per year or more of any HAP, 2,500 pounds per year or more of total HAP, or 5.0 tons per year or more of any other regulated pollutant
d. In the case of a proposed new emission unit at an existing facility, the emissions of such unit, in combination with the emissions of any other proposed new or modified units and activities at the facility, would result in a modification subject to the preconstruction review requirements ...
e. In the case of a proposed new pollutant emitting activity, such activity would not constitute a modification of any existing non-exempt emissions unit at a non-Title V source or any existing non-insignificant emissions unit at a Title V source.

The proposed IC engine lube oil (new and used) storage tanks and coolant handling process are exempt from air construction permit requirements based on the type and quantities of stored materials (and their very low vapor pressures) and the regulatory provisions specified in the preceding text.

5.3.3 Public Notice and Comment

62-210.350 Public Notice and Comment., F.A.C., specifies that:

(1) Public Notice of Proposed Agency Action.
(a) A notice of proposed agency action on permit applications, where the proposed agency action is to issue the permit, shall be published by the applicant for:
1. An air construction permit ...
(2) Additional Public Notice Requirements for Emission Units Subject to Prevention of Significant Deterioration ...

(a) Before taking final agency action on a construction permit application for any new or modified facility ...

2. A 30-day period for submittal of public comments ...

3. ... notifying the public of the opportunity for submitting comments and requesting a public hearing ...

Section 4.1 (Criteria Air Pollutants) of this document and Table 2 present information that indicate the proposed LFG fueled IC engine electricity generation facility is a major source of CO under State and federal PSD regulations, and is subject to the specified noticing and public comment requirements.

5.3.4 Stack Height Policy

62-210.550 Stack Height Policy., F.A.C, specifies that:

(1) ... The degree of emission limitation required of any emission unit for control of any air pollutant on a continuous basis shall not be affected by so much of any emission unit's stack height that exceeds good engineering practice ...

The LFG fueled IC engines will be housed in a single building with dimensions of 100 feet wide by 105 feet long by 15 feet high. Therefore, good engineering practice stack height for the proposed emission units is 37.5 feet (i.e., the building height plus 1.5 times the lesser dimension of building height or width). The installed IC engine exhaust stack heights will be based on the results of acceptable source impact analyses that are expected to be well below the specified good engineering practice stack height.

5.3.5 Forms and Instructions

62-210.900 Forms and Instructions., F.A.C., specifies that:

The forms used by the Department in the stationary source control program are adopted and incorporated by reference in this section ...

(1) Application for Air Permit – Long Form, Form and Instructions ...

Appendix A provides an Application for Air Permit – Long Form documents that has been completed for the proposed Sarasota Energy LFG fueled IC engine electricity generation facility.

5.4 Prevention of Significant Deterioration

62-212.400 Prevention of Significant Deterioration (PSD)., F.A.C, specifies that:

(2) Applicability ...
(a) The requirements of subsection 62-212.400(4) through (12) ... apply to the construction of any major stationary source or the modification of any existing major stationary source ...
2. Baseline Actual-to-Potential Applicability Test for the Construction of New Emission Units ...
(4) Source Information...
(5) Source Impact Analysis...
(6) Air Quality Models...
(7) Air Quality Analysis...
(8) Additional Impact Analyses...
(9) Source Impacting Federal Class I Areas...
(10) Control Technology Review...
(11) Public Participation...
(12) Source Obligation...

The information and data provided in Appendix A (i.e., required air construction permit application forms) and materials and analyses provided in the remaining portions of this air construction permit address the PSD permit application requirement specified in 62-212.400(4) through (12).

5.5 General Pollutant Emission Limiting Standards

62-296.320 General Pollutant Emission Limiting Standards., F.A.C, specifies that ...

(2) Objectionable Odor Prohibited – No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor.

Based on the:

1. Small amounts of IC engine chemical concentration emissions compared to published odor thresholds (i.e., LFG combustion is an approved procedure for the control of landfill gas);

2. Additional dilution of the relatively small chemical concentration emissions prior to ground-level ambient air impacts;

3. Relatively large distances between the proposed air pollutant emission equipment and impact receptors; and

4. Experience of Sarasota Energy with the operation of numerous LFG fueled IC engine electricity generation facilities (i.e., no adverse odor impacts have ever been recorded as a results of these IC engine operations);

impacts of odorous emissions from the combustion of LFG fuel in the proposed CAT® G3520C gas IC engines will be insignificant (i.e., no odor impacts).

(4) General Particulate Emission Limiting Standards ...
(b) General Visible Emission Standard.
1. No person shall cause, let, permit, suffer or allow to be discharged into the atmosphere the emissions of air pollutants from any activity, the density of which is equal to or greater than ...(20 percent opacity).

Experience obtained by manufacturers and operators of LFG fueled IC engines indicates that visible emissions from the CAT® G3520C gas IC engines will be insignificant (emissions are not expected to be visible during normal engine operations).

(c) Unconfined Emissions of Particulate Matter.
1. No person shall cause, let, permit, suffer or allow the emission of unconfined particulate matter from any activity ...without taking reasonable precautions to prevent such emissions...
3. Reasonable precautions include the following:
a. Paving and maintenance of roads, parking areas and yards.
b. Application of water or chemicals to control emissions from such activities as ... grading roads, construction, and land clearing.

Sarasota Energy will take appropriate precautions to prevent unconfined emissions of particulate emissions during the construction and operating activities of the proposed LFG fueled electricity generation facility.

5.6 General Compliance Test Requirements

62-297.310 General Compliance Test Requirements., F.A.C, specifies that ...

(6) Required Stack Sampling Facilities ...

(a) Permanent Test Facilities. The owner or operator of an emission unit for which a compliance test, other than a visible emissions test, is required on at least an annual basis, shall install and maintain permanent stack sampling facilities.

Sarasota Energy will:

1. Install sampling ports on each IC engine exhaust stack that have a minimum inside diameter of three (3) inches and can be sealed when they are not in use.

2. Install sampling ports in each IC engine exhaust stack that are two (2) stack diameters (36 inches) downstream and at least 0.5 stack diameters (9 inches) upstream from any flow disturbance.

3. Install two sampling ports in each IC engine exhaust stack (each port 90 degrees apart).

4. Utilize the roof (or a man lift) as the work platform for the IC engine exhaust stack compliance tests. A ladder will be used to access IC engine sampling ports position on roof stacks. These sampling ports will be located approximately six feet above the roof work platform.

5. Provide access to the building roof with a ladder that will be stored at the facility.

6. Provide appropriate electricity outlets to supply power to the sampling equipment. An adequate number of extension cords, which are required to transfer electricity from the supply outlets to the sampling, will be stored at the facility.

(7) Frequency of Compliance Tests ...

(a) General Compliance Testing...

1. The owner or operator of a new or modified emissions unit that is subject to an emission limiting standard shall conduct a compliance test that demonstrates compliance with the applicable emission limiting standard prior to obtaining an operation permit for such emissions unit ...

4. During each federal fiscal year (October 1 – September 30), unless otherwise specified ... the owner or operator of each emission unit shall have a formal compliance test conducted for:

a. Visible emissions, if there is any applicable standard;

b. Each of the following pollutants, if there is an applicable standard, and if the emission units or has that potential to emit ... 100 tons per year or more of any regulated air pollutant...

c. Each NESHAP pollutant, if there is an applicable emission standard.

Section 4.1 (Criteria Air Pollutants) of this document and Table 2 present information that indicates annual CO emission compliances test are required to be performed on the LFG fueled IC engines.

Provisions of 40 CFR Part 60, Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines) require that CO, NO_X and VOC emission performance tests be initially conducted on affected IC engines and subsequently at designated intervals (i.e., once every 8,760 hours of operation).

6.0 FEDERAL RULES AND REGULATIONS

The following text presents portions of federal regulatory requirements and associated compliance information that are applicable to the permitting and operation of the LFG fueled IC engine electricity generation facility proposed by Sarasota Energy. Federal air permitting and regulated air pollutant emission rules are also presented to provide clarifications on the non-applicability of specific regulatory requirements to the proposed project.

6.1 PSD and Title V GHG Tailoring Rule

Beginning July 1, 2011, new facilities that emit at least 100,000 TpY of total GHG on a carbon dioxide equivalent basis (CO_2e) and modifications at existing major stationary sources that increase GHG emissions by at least 75,000 TpY CO_2e are subject to air permitting requirements under the federal PSD and Title V GHG Tailoring Rule promulgated by USEPA.

Based on the magnitude of the GHG emissions that will be produced by the Sarasota Energy LFG fueled electricity generating facility (approximately 33,600 TpY CO_2e), the proposed project is not subject to review and approval under requirements of the PSD and Title V GHG Tailoring Rule.

USEPA was deferred the applicability of the PSD and Title V GHG Tailoring Rule for biogenic CO_2 emission sources. In the Federal Register dated July 20, 2011, USEPA specified that:

... This action defers for a period of three (3) years the application of Prevention of Significant Deterioration (PSD) and Title V permitting requirements to biogenic carbon dioxide (CO_2) emissions from bioenergy and other biogenic stationary sources.

The USEPA took this action in recognition of the fact that the ... *use of certain types of biomass can be part of the national strategy to reduce dependence of fossil fuels* [and] ... *to foster the expansion of renewable resources and promote bioenergy projects.*

The July 20, 2011 Federal Register specifies that electric utilities burning biomass fuels (NAICS codes beginning 221) and solid waste landfills (NAICS 562213) as examples of sources affected by the biogenic CO_2 permitting deferral.

6.2 New Source Performance Standards

6.2.1 Municipal Solid Waste Landfill NSPS

40 CFR Part 60 Subpart WWW Standards of Performance for MSW Landfills (MSW Landfill NSPS) regulate LFG (NMOC) emissions that are generated by affected landfills. *§60.752 Standards for air emissions from municipal solid waste landfills* specifies that:

(b)(2) ... the owner or operator shall: (iii) route all of the collected gas to a control system that complies with either ...

(A) An open flare ...

(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 ...

(C) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use ...

The Central County Solid Waste Disposal Complex has a permitted design capacity that is greater than 2.5 million megagrams by mass and 2.5 million cubic meters by volume. Therefore, the landfill is subject to the regulatory requirements of the MSW Landfill NSPS. However, the landfill is not currently subject to the mandatory LFG collection and control system requirements of 40 CFR Part 60 Subpart WWW (40 CFR 60.752(b)(2)). Therefore, the LFG treatment system and IC engines proposed for operation at Sarasota Energy are not currently subject to the NMOC control requirements of the MSW Landfill NSPS.

6.2.2 Spark Ignition Internal Combustion Engine NSPS

40 CFR Part 60 Subpart JJJJ Standards of Performance for Stationary Spark Ignition

Internal Combustion Engines specifies that:

> *Owners and operators who purchase stationary landfill ... SI engines that are manufactured after July 1, 2007, that are greater than or equal to 500 HP must limit their exhaust emissions of NO_X to 3.0 g/HP-hr, emissions of CO to 5.0 g/HP-hr, and emissions of VOC to 1.0 g/HP-hr ...*

The LFG fueled CAT® G3520 IC engines proposed for use at Sarasota Energy will be manufactured after July 1, 2007. Therefore, as required by the rule, the company will:

1. Demonstrate compliance with the specified air pollutant emission rate limits through the completion of equipment performance tests in accordance with the dates of the rule.

2. Provide the FDEP-DARM with an appropriate commencement of construction and operations notifications.

6.3 National Emission Standard for Hazardous Air Pollutants

The proposed LFG fueled IC engine electricity generation facility has the potential to emit:

1. HAPs from the incomplete combustion of these chemicals that are present in the LFG.

2. Inorganic HAP compounds (primarily HCl) from the combustion of chlorinated compounds that are present in LFG.

3. Formaldehyde (CH_2O, a regulated HAP) as a result of the presence of methane and elevated temperatures (700 ^{o}F – 900 ^{o}F) in the IC engine exhaust.

6.3.1 Municipal Solid Waste Landfill NESHAP

The Central County Solid Waste Disposal Complex has a permitted design capacity that is greater than 2.5 million megagrams by mass and 2.5 million cubic meters by volume. Therefore, the landfill is subject to the regulatory requirements of the MSW Landfill NSPS that make it subject to the regulatory requirements of National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills (40 CFR Part 63 Subpart AAAA, MSW Landfill NESHAP). However, the landfill is not currently subject to the LFG collection and control system requirements of 40 CFR Part 60 Subpart WWW (40 CFR 60.752(b)(2)). Therefore, the LFG treatment system and IC engines proposed for

operation at Sarasota Energy are not currently subject to the regulatory requirements of the MSW Landfill NESHAP.

6.3.2 Reciprocating Internal Combustion Engine NESHAP

The reciprocating IC engine National Emission Standard for Hazardous Air Pollutants (40 CFR Part 63 Subpart ZZZZ, RICE NESHAP) applies to major sources of HAPs that operate RICE rated for 500 bhp or greater. Major is defined as a facility that has the potential to emit in excess of 25 TpY of any combination of HAP compounds or 10 TpY of any single HAP.

The CAT® G3520 IC engine has a power rating that exceed 500 bph, and based on the information presented in Section 4.2 (Hazardous Air Pollutants) of this document, the proposed project will be a major facility of HAPs (i.e., the potential emissions of combined HAPs is 47.0 TpY and any single HAP, formaldehyde, is 36.4 TpY).

40 CFR Part 60.4230 specifies that the date that construction commences is the date the engine is ordered by the owner or operator.

40 CFR Part 63.9590(a) specifies that an affected source is any new stationary RICE located at a major or area source of HAP emissions.

40 CFR Part 63.9590(a)(2) specifies that a new stationary RICE is a stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that commenced construction of the stationary RICE on or after December 19, 2002.

The provisions of 40 CFR Part 63 Subpart ZZZZ require that:

> *A new or reconstructed stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis must meet the initial notification requirements of §63.6645(h) and the requirements of §§63.6625(c), 63.6650(g), and 63.6655(c). These stationary RICE do not have to meet the emission limitations and operating limitations of this subpart.*
>
> *If you are operating a new or reconstructed stationary RICE which fires landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, you must monitor and record your fuel usage daily with separate fuel meters to measure the volumetric flow rate of each fuel. In addition, you must operate your stationary RICE in a manner which reasonably minimizes HAP emissions.*

If you are operating as a new or reconstructed stationary RICE which fires landfill gas or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis, you must submit an annual report according to Table 7 of this subpart by the date specified unless the Administrator has approved a different schedule, according to the information described in paragraphs (b)(1) through (b)(5) of this section. You must report the data specified in (g)(1) through (g)(3) of this section.

(1) Fuel flow rate of each fuel and the heating values that were used in your calculations. You must also demonstrate that the percentage of heat input provided by landfill gas or digester gas is equivalent to 10 percent or more of the total fuel consumption on an annual basis.

(2) The operating limits provided in your federally enforceable permit, and any deviations from these limits.

(3) Any problems or errors suspected with the meters.

6.4 Federal Acid Rain Program

The federal Acid Rain Program (40 CFR Part 72) has been promulgated pursuant to requirements of Title IV of the 1990 Clean Air Act Amendments. 40 CFR 72.6(a), Applicability, specifies that ... *Each of the following units shall be an affected unit, and any source that includes such a unit shall be an affected source, subject to the requirements of the Acid Rain Program...*

The definitions presented in 40 CFR 72.2 specify that:

- *Unit means a fossil fuel-fired combustion device.*
- *Fossil fuel means natural gas, petroleum, coal, or any form of solid, liquid, or gaseous fuel derived from such material.*
- *Natural gas means a naturally occurring fluid mixture of hydrocarbons (e.g., methane, ethane, or propane) produced in geological formations beneath the Earth's surface that maintains a gaseous state at standard atmospheric temperature and pressure under ordinary conditions ... Natural gas does not include the following gaseous fuels: landfill gas ...*

Therefore, the federal Acid Rain Program is not applicable to the proposed project since the IC engine generator sets will be:

1. Fueled exclusively with LFG, which is excluded from the definition of natural gas and is not a fossil fuel.

2. Not an affected unit under the regulation, which is defined as a fossil fuel-fired combustion device.

7.0 SOURCE IMPACT ANALYSIS / AIR QUALITY ANALYSIS

62-212.40 Prevention of Significant Deterioration (PSD) requires that new major sources provide a source impact analysis and air quality analysis.

Appendix I provides results of Source Impact Analysis and Air Quality Analysis that have been performed for the proposed project, which will be submitted to the FDEP-DRAM as a separate document.

8.0 ADDITIONAL AIR IMPACT ANALYSES

62-212.40 Prevention of Significant Deterioration (PSD) requires that new major sources address air quality issues that pertain to visibility degradation, and vegetation, soil and growth impacts.

8.1 Visibility Degradation

New major sources that have the potential to impair visibility in any Class I area are required to perform analyses to demonstrate the acceptability of the proposed air pollutant emissions. An adverse impact is considered visibility impairment that interferes with the management, protection, preservation, or enjoyment of the visual experience of a visitor to the Class I area.

The nearest Class I area to the proposed electricity generation facility in Nokomis, Florida is the Chassahowitzka Wilderness Area that is located approximately 155 kilometers (approximately 96 miles) north of the proposed project site.

The Everglades National Park Class I area is located approximately 180 km from the project site.

The Bradwell Bay National Wilderness Area Class I area is located approximately 210 km from the project site.

The St. Marks National Wilderness Area Class I area is located approximately 360 km from the project site.

Guidance issued Derenzo and Associates by USEPA for similar PSD permit application projects indicates that visibility and air quality impact analyses are not required for Class I areas that are located greater than 300 km from the proposed project. Therefore, analyses are required for the proposed project to evaluation visibility and air quality impact on the Chassahowitzka Wilderness Area, Everglades National Park and Bradwell Bay National Wilderness Area.

Based on the general experience of USEPA and state regulatory agencies with visibility analyses performed for similar emission sources and the distance from the site proposed by Sarasota Energy to the Chassahowitzka Wilderness Area (the closest Class I area), it is expected that the plume from the proposed electricity generation IC engines will not have an adverse impact on visibility in any of the identified Class I areas. The Class I area visibility criteria established by USEPA and specified in *62-212.400 Prevention of Significant Deterioration.*, F.A.C., are expected to be maintained under general and worst-case emission and transport scenarios.

62-212.40 Prevention of Significant Deterioration (PSD) requires that new major sources provide analyses to address Sources Impacting Federal Class I Areas (i.e., the impairment to visibility at appropriate Class I areas that results from the operation of the proposed IC engine generator sets). Appendix J provides analyses for Sources Impacting Federal Class I Areas, which will be submitted to the FDEP-DRAM as a separate document.

The Bradwell Bay National Wilderness Area is not designated in federally promulgated rules as a Federal Class I area but is designated in F.A.C. rules as a Class I area. Therefore, visibility impairment analyses will also be included for this location.

8.2 Vegetation and Soil Impacts

The effects that air pollutants have on vegetation can be classified into three general categories: acute, chronic and long term. Acute effects are those that result from relatively short exposures (i.e., less than one month) to high concentrations of pollutant emissions. Chronic effects occur when organisms are exposed for months or even years to certain threshold levels of pollutants. Long-term effects include abnormal changes in ecosystems and subtle physiological alterations in organisms. Acute and chronic effects are caused by pollutants acting directly on the organism, whereas, long-term effects can be indirectly caused by secondary agents such as changes in the pH of the soil.

The USEPA Air Quality Planning and Standards, Air Strategies and Standards Division, has developed secondary NAAQS for the protection of *the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the*

ambient air. The values set for the secondary NAAQS incorporate the protection of ecosystems, which includes vegetation and soil.

The results of Source Impact Analysis / Air Quality Analysis (Appendix I to be provided as a separate document) will present maximum CO, NO_X and PM10/PM2.5 impacts that are predicted to occur from the proposed electricity generation facility emissions and expected to be below the associated secondary NAAQS.

The proposed electricity generation facility will be a pollution control project where control is provided for LFG generated by the landfill through its beneficial utilization. Control of the LFG will result in reductions in the amounts of total VOC and NMOC that are generated by the landfill.

A time dependent amount of LFG is generated at the landfill, which is required to be controlled through its combustion. Both flaring and IC engines create LFG combustion by-product air pollutant emissions. Therefore, the effect on the air quality that surrounds the facilities is similar whether the LFG is flared or burned as IC engine fuel (a specific quantity of LFG will be combusted in either device).

Therefore, based on the preceding information, no significant or adverse impact on vegetation and soil is expected to occur from the proposed electricity generation facility.

8.3 Growth Impacts

The proposed electricity generating facility will employ up to two (2) people. This work force will be obtained from existing residences in the general Nokomis, Florida area.

The location of the proposed electricity generation facility is the result of the generation of LFG at the landfill. Therefore, the availability of existing alternative fuel resources had no influence in the selection of the proposed facility site. The construction and operation of the Sarasota Energy electricity generation facility will not produce commercial growth in the Nokomis, Florida area at levels greater than normal rates, which are dependent on general economical conditions. The proposed facility will interconnect to the local utility distribution network through a nearby power line. This power will be used to satisfy electricity demands within the general area. Therefore, insignificant amounts of air pollutant emissions from residential and commercial construction and growth, and other activities associated with the proposed facility will occur.

Based on the location of the landfill (i.e., a rural area), emission configuration of the proposed electricity generation facility and magnitude of associated air quality impacts, a significant portion of the applicable PSD increments is expected to be available to the

Nokomis, Florida area. Therefore, sufficient air resources are expected to be available to support future growth in the Nokomis, Florida area relative to PSD increment consuming pollutants.

8.4 Alternative Sites Analysis

Based on the location of the fuel source for the proposed electricity generation facility (i.e., the LFG fuel for the proposed project is generated by the landfill), it is not feasible (or practicable) to construct the air pollutant emission and power generation processes at another site that is removed or distant from the fuel source.

Approximately 1,700 scfm of unused LFG is currently being generated by the landfill. Flaring is being utilized to control this unused LFG that wastes the energy value of the methane-rich gas.

The size of the proposed electricity generation facility is governed by the amount of fuel that can be recovered from the landfill. The number and size of the engine generator sets (power generation mechanism) has been selected based on its ability to best utilize the LFG fuel generated by the landfill (i.e., fit the gas generation curve that increases with added waste placement and decreases with the closure of the landfill). Therefore, alternative sizes and production processes for the proposed project result in electricity generation inefficiencies (i.e., inefficiencies in the utilization of available LFG as a fuel).

The proposed facility will produce 6.4 MW of electricity and will interconnect to the local utility distribution network through a nearby power line. This transfer of electricity may offset an equivalent amount of power that would otherwise be produced using non-renewable fossil fuels. While increases in CO and NO_X emissions will occur at the proposed electricity generation facility, decreases in these emissions may occur at an offsite power plant.

The USEPA has acknowledged the benefits of using LFG as a fuel by creating the Landfill Methane Outreach Program (LMOP), which promotes the use of LFG as a renewable green energy source.

9.0 SOURCES IMPACTING FEDERAL CLASS I AREAS

62-212.40 Prevention of Significant Deterioration (PSD) requires that new major sources provide visibility impairment analyses for sources impacting Federal Class I areas.

Appendix J provides results of analyses for sources impacting Federal Class I Areas that have been performed for the proposed project, which will be submitted to the FDEP-DRAM as a separate document.

10.0 CONTROL TECHNOLOGY REVIEW

62-212.40 Prevention of Significant Deterioration (PSD) requires that new major sources provide a Control Technology Review for appropriate air pollutant emissions from the proposed project.

Appendix K provides the results of the Control Technology Review (BACT) performed for the proposed project.

The results of these emission control analyses indicate that:

- CO BACT for the proposed project LFG fueled G3520C IC engines is proper equipment design, maintenance and operational practices to achieve a not-to-exceed emission rate of 3.5 g/bhp-hr as determined to be achieved in practice.

- NO_X BACT for the proposed project LFG fueled G3520C IC engines is proper equipment design, maintenance and operation and use of air-to-fuel ratio controllers to achieve a not-to-exceed emission rate of 0.6 g/bhp-hr as determined to be achieved in practice.

- $PM_{10}/PM_{2.5}$ BACT for the proposed project LFG fueled G3520C IC engines is proper equipment design, maintenance and operation practices to achieve a not-to-exceed emission rate of 0.24 g/bhp-hr as determined to be achieved in practice.

Table 1. Design and operating specifications for the proposed LFG fueled IC engine generator sets

Specification per unit	CAT® G3520C IC Engine Generator Set	
Number of identical units	1	4
Power generation (bhp)	2,242	8,968
Electricity generation (kW)	1,600	6,400
Heat input rate (LHV MMBtu/hr) Mfg. Data[1,2]	14.96	59.85
Fuel consumption[3] (scfm)	554	2,216
Exhaust gas temperature (°F)	900	-
Average exhaust flowrate[4] (acfm)	13,700	-
Average exhaust flowrate[4,5] (dscfm)	4,700	-
Average exhaust oxygen content (% dry)	8.8	-
Average exhaust exist velocity (fps)	129	-
Exhaust stack diameter (inches)	18	-
Exhaust stack release height[6] (feet)	*	-
Building height (feet)	15	-

Notes

1. See Appendix F (243,311 Btu/min LHV, 14.6 MMBtu/hr)
2. See Appendix F (14.6 MMBtu/hr LHV plus 2.5% tolerance)
3. Based on fuel LHV of 450 Btu/scf and engine LHV input rate of 14.96 MMBtu/hr.
4. Based on results from tests performed on identical IC engines.
5. Corrected to dry standards conditions (70°F).
6. To be determined based on the results of acceptable air quality impact demonstration analyses.

Table 2. Criteria air pollutant, HAPs and GHG potential emission rates for the proposed CAT® G3520C gas IC engine electricity generation facility

	Single CAT® G3520C[A]		Total Facility[1,A]	
Air Pollutant	(lb/hr)	(TpY)	(lb/hr)	(TpY)
Criteria Air Pollutants				
NO_X	2.97	13.0	11.86	52.0
CO	17.30	75.8	69.20	303.1
SO_2	2.05	9.0	8.21	36.0
Total VOC	2.05	9.0	8.21	36.0
Total NMOC	2.57	12.3	10.28	45.0
PM2.5/PM10	1.19	5.2	4.76	20.8
HAPs				
LFG Constituents	0.13	0.57	0.52	2.3
HCl	0.48	2.09	1.91	8.4
Formaldehyde	2.08	9.09	8.30	36.4
Total	2.69	11.75	10.73	47.1
GHG				
CO_2	-	8,357	-	33,428
$CH_4 - CO_2e$	-	11	-	44
$NO - CO_2e$	-	31	-	124
Total	-	8,399	-	33,596

Notes

1. Based on continuous operation of four (4) CAT® G3520C at maximum capacity.

A. Air pollutant emission rate calculations are provided in Appendix H.

CO_2e = carbon dioxide equivalent

APPENDIX A

FDEP-DARM Application
For
Air Permit – Long Form

Department of Environmental Protection

Division of Air Resource Management

APPLICATION FOR AIR PERMIT - LONG FORM

I. APPLICATION INFORMATION

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

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

Air Operation Permit – Use this form to apply for:

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

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: Sarasota Energy, LLC	
2. Site Name: Sarasota Energy	
3. Facility Identification Number: 1150089 (ID for Central County Solid Waste Disposal Complex)	
4. Facility Location... Street Address or Other Locator: 4000 Knights Trail Road City: Nokomis County: Sarasota Zip Code: 34275	
5. Relocatable Facility? ☐ Yes ☒ No	6. Existing Title V Permitted Facility? ☐ Yes ☒ No (landfill – yes)

Application Contact

1. Application Contact Name: Michael Laframboise
2. Application Contact Mailing Address... Organization/Firm: Innovative Energy Systems/Landfill Energy Systems Street Address: 46280 Dylan Drive, Suite 200 City: Novi State: MI Zip Code: 48377
3. Application Contact Telephone Numbers... Telephone: (248) 380 - 3920 ext. Fax: (248) 380 - 2038
4. Application Contact E-mail Address: Michael.Laframboise@landfillenergy.com

Application Processing Information (DEP Use)

1. Date of Receipt of Application: 6-27-13	3. PSD Number (if applicable):
2. Project Number(s): 1150089-008-AC	4. Siting Number (if applicable):

PSD #422

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

The proposed project is a new major facility under State and federal Prevention of Significant Deterioration (PSD) permitting programs that is required to apply for an Air Construction Permit.

Based on guidance issued by the FDEP-DARM (Mr. Syed Arif), Sarasota Energy is requesting the issuance of an Air Construction Permit for its landfill gas (treated gas) fueled internal combustion engine electricity generation facility at the Central County Solid Waste Disposal Complex. A separate application will be submitted to the FDEP-DARM at an appropriate time to incorporated the applicable requirements of Sarasota Energy into the Title V Air Operating Permit issued the Central County Solid Waste Disposal Complex.

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Processing Fee
EU1	Landfill gas (treated gas) fueled IC engine generating facility (4 identical IC engine-generator sets)	AC1A	$7,500

Application Processing Fee

Check one: [X] 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 : Dennis Plaster
   Vice President of Operations
2. Owner/Authorized Representative Mailing Address...
   Organization/Firm: Innovative Energy Systems/Landfill Energy Systems
   Street Address: 2999 Judge Road
   City: Oakfield State: NY Zip Code: 14125
3. Owner/Authorized Representative Telephone Numbers...
   Telephone: (585) 948 - 8580 ext. Fax: (585) 948 - 8586
4. Owner/Authorized Representative E-mail Address: dplaster@ieslfge.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

   6/20/13
   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:

APPLICATION INFORMATION

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: Jeffery L. Pope
   Registration Number:
2. Professional Engineer Mailing Address...
   Organization/Firm: Burns & McDonnell
   Street Address: 1431 Opus Place, Suite 400
   City: Downers Grove State: IL Zip Code: 60515
3. Professional Engineer Telephone Numbers...
   Telephone: (630) 724 - 3328 ext. Fax: (630) 724 - 3201
4. Professional Engineer E-mail Address: jpope@burnsmcd.com
5. Professional Engineer Statement:

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

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

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

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

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

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

Signature

(seal)

JEFFERY LYNN POPE LICENSE No. 53815 STATE OF FLORIDA PROFESSIONAL ENGINEER

6/24/13
Date

* Attach any exception to certification statement.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates... Zone 17 East (km) 362850 North (km) 3008950		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) 27/11/47.153 Longitude (DD/MM/SS) 82/23/4.863	
3. Governmental Facility Code: 0	4. Facility Status Code: C	5. Facility Major Group SIC Code: 49	6. Facility SIC(s): 4953
7. Facility Comment : The proposed electricity generation facility will be located on leased land at the Central County Solid Waste Disposal Complex			

Facility Contact

1. Facility Contact Name: Michael Laframboise Vice President Construction and Technical Services
2. Facility Contact Mailing Address... Organization/Firm: Innovative Energy Systems/Landfill Energy Systems Street Address: 46280 Dylan Drive, Suite 200 City: Novi State: MI Zip Code: 48377
3. Facility Contact Telephone Numbers: Telephone: (248) 380 - 3920 ext. Fax: (248) 380 - 2038
4. Facility Contact E-mail Address: Michael.Laframboise@landfillenergy.com

Facility Primary Responsible Official

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

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

FACILITY INFORMATION

Facility Regulatory Classifications

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

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

12. Facility Regulatory Classifications Comment:

The proposed electricity generation facility will be:

1. Subject to Title V Operating Permit requirements based on Subpart WWW requirements for the landfill stationary source and the potential to emit of regulated air pollutants produced by the project.

2. A major source of HAPs based on the actual/potential formaldehyde emissions of the project.

3. A major source under State and federal PSD regulations based on the potential to emit of the carbon monoxide (CO) produced by the project

FACILITY INFORMATION

List of Pollutants Emitted by Facility

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?
CO	A	N
NOx	B	N
VOC	B	Y
NMOC	B	Y
SO2	B	Y
PM (total)	B	N
PM10	B	N
PM2.5	B	N
HAPS (total)	A	N
Formaldehyde (H095)	A	N
Hydrogen Chloride (H106)	B	N
Greenhouse Gases	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
VOC	Y			36	ESCPSD
NMOC	Y			45	ESCPSD
SO2	Y			36	ESCPSD

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

The 36 ton/year VOC and SO2 emissions caps are based on voluntary limits that are 90% of the 40 tons/year significant emission threshold defined in State rules.

The 45 tons/year NMOC emission cap is based on a voluntary limit that is 90% of the 50 tons/year significant emission threshold defined in State rules.

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)
   [X] Attached, Document ID: Appendix C [ ] 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)
   [X] Attached, Document ID: Appendix D [ ] 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)
   [X] Attached, Document ID:Section 5.5 [ ] Previously Submitted, Date:_____

Additional Requirements for Air Construction Permit Applications

1. Area Map Showing Facility Location:
   [X] Attached, Document ID: Appendix C [ ] Not Applicable (existing permitted facility)

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

3. Rule Applicability Analysis:
   [X] Attached, Document ID: Sections 5 and 6

4. List of Exempt Emissions Units:
   [X] Attached, Document ID: Section 5.3.2 [ ] Not Applicable (no exempt units at facility)

5. Fugitive Emissions Identification:
   [ ] Attached, Document ID:_____ [X] Not Applicable

6. Air Quality Analysis (Rule 62-212.400(7), F.A.C.):
   [ ] Attached, Document ID:_____ [ ] Not Applicable Appendix I – to be provided

7. Source Impact Analysis (Rule 62-212.400(5), F.A.C.):
   [ ] Attached, Document ID:_____ [ ] Not Applicable Appendix I – to be provided

8. Air Quality Impact since 1977 (Rule 62-212.400(4)(e), F.A.C.):
   [ ] Attached, Document ID: Section 8.0 [ ] Not Applicable

9. Additional Impact Analyses (Rules 62-212.400(8) and 62-212.500(4)(e), F.A.C.):
   [ ] Attached, Document ID: Section 8.0 [ ] Not Applicable

10. Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.):
    [ ] Attached, Document ID:_____ [X] 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

Based on guidance issued by the FDEP-DARM (Mr. Syed Arif), Sarasota Energy is requesting the issuance of an Air Construction Permit for its landfill gas (treated gas) fueled internal combustion engine electricity generation facility at the Central County Solid Waste Disposal Complex. A separate application will be submitted to the FDEP-DARM at an appropriate time to incorporate the applicable requirements of Sarasota Energy into the Title V Air Operating Permit issued the Central County Solid Waste Disposal Complex.

III. EMISSIONS UNIT INFORMATION

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

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

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

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

EMISSIONS UNIT INFORMATION
Section [1] of [1]

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:

Four (4) CAT G3520C IC engine electricity generator sets (each has its own exhaust stack)

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, Inc. Model Number: G3520C

10. Generator Nameplate Rating: 1.6 MW (each generator, 6.4 MW total facility capacity)

11. Emissions Unit Comment:

ICE1 – stack1 (1.6 MW)
ICE2 – stack2 (1.6 MW)
ICE3 – stack3 (1.6 MW)
ICE4 – stack4 (1.6 MW)

EMISSIONS UNIT INFORMATION
Section [1] of [1]

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: 1,500 MMscf/yr	
2. Maximum Production Rate: 6.4 MW (per four IC engine generator sets)	
3. Maximum Heat Input Rate: 59.84 million Btu/hr - LHV (for 4 IC engines)	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: 24 hours/day 52 weeks/year	7 days/week 8,760 hours/year
6. Operating Capacity/Schedule Comment: 14.96 MMBtu (LHV)/hr/engine - maximum heat input 1.6 MW/hr/engine – maximum electricity generation 713 scfm/engine – maximum landfill gas (treated gas) fuel use	

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: ICE1 – ICE4	2. Emission Point Type Code: 1	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: Four (4) identical IC engine generator sets (which comprise the emission unit), each engine has an exhaust stack (4 exhaust stacks, 1 for each engine)		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: V	6. Stack Height: To be determined	7. Exit Diameter: 1.5 feet
8. Exit Temperature: 900 °F	9. Actual Volumetric Flow Rate: 13,700 acfm	10. Water Vapor: 12 %
11. Maximum Dry Standard Flow Rate: 4,700 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: Stack1 – ICE1 Stack2 – ICE2 Stack3 – ICE3 Stack4 – ICE4		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): Landfill gas (treated gas) will be used exclusively to fuel the 4 IC engines generator sets. IC engine air pollutant emissions are related to equipment operations at base load (i.e., 2,242 bhp-hr) or maximum fuel use (pound per million cubic feet of gas used, lb/MMscf)		
2. Source Classification Code (SCC): 20100802	3. SCC Units: MMcf of gas	
4. Maximum Hourly Rate: 0.1711	5. Maximum Annual Rate: 1499.0	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: 0.032	8. Maximum % Ash: 0	9. Million Btu per SCC Unit: 350 (LHV)
10. Segment Comment: Maximum hourly and annual fuel use rates for the operation of 4 IC engines are based on the use of a fuel with a LHV of 350 Btu/scf (i.e., the lowest fuel quality on which the equipment cab be operated).		

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:		

D. SEGMENT (PROCESS/FUEL) INFORMATION (CONTINUED)

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:		

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
CO			EL
NOx			EL
VOC			EL
NMOC			EL
SO2			EL
PM (total)			EL
PM10			EL
PM2.5			EL
HAPS (total)			EL
Formaldehyde			EL
Hydrogen Chloride			EL
Greenhouse gases			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: CO	2. Total Percent Efficiency of Control:
3. Potential Emissions: 69.2 lb/hour 303.1 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: BACT	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 Appendix H of air construction permit application documents.

11. Potential, Fugitive, and Actual Emissions Comment:

17.3 lb/hr/engine, 75.8 tons/year/engine (refer to Section 4.0 and Appendix H of the air construction permit application documents)

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: 11.86 lb/hour 52.0 tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 0.6 g/bhp-hr Reference: BACT	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 Appendix H of air construction permit application documents.

11. Potential, Fugitive, and Actual Emissions Comment:

2.97 lb/hr/engine, 13.0 tons/year/engine (refer to Section 4.0 and Appendix H of the air construction permit application documents)

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: 8.22 lb/hour 36.0 tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference: CAP at 90% of 40 tons/year State significance threshold	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 Appendix H of air construction permit application documents.	
11. Potential, Fugitive, and Actual Emissions Comment: 2.06 lb/hr/engine, 9.01 tons/year/engine (refer to Section 4.0 and Appendix H of the air construction permit application documents)	

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: 10.28 lb/hour 45.0 tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference: CAP at 90% of 50 tons/year State significance threshold	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 Appendix H of air construction permit application documents.	
11. Potential, Fugitive, and Actual Emissions Comment: 2.57 lb/hr/engine, 11.26 tons/year/engine (refer to Section 4.0 and Appendix H of the air construction permit application documents)	

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: 8.21 lb/hour 36.0 tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference: CAP at 90% of 40 tons/year State significance threshold	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 Appendix H of air construction permit application documents.	
11. Potential, Fugitive, and Actual Emissions Comment: 2.05 lb/hr/engine, 8.99 tons/year/engine (refer to Section 4.0 and Appendix H of the air construction permit application documents)	

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 (total)	2. Total Percent Efficiency of Control:
3. Potential Emissions: 4.74 lb/hour 20.8 tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 0.24 g/bhp-hr Reference: BACT	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 Appendix H of air construction permit application documents.

11. Potential, Fugitive, and Actual Emissions Comment:

1.19 lb/hr/engine, 5.20 tons/year/engine (refer to Section 4.0 and Appendix H of the air construction permit application documents)

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	2. Total Percent Efficiency of Control:
3. Potential Emissions: 4.74 lb/hour 20.8 tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 0.24 g/bhp-hr Reference: BACT	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 Appendix H of air construction permit application documents.

11. Potential, Fugitive, and Actual Emissions Comment:

1.19 lb/hr/engine, 5.20 tons/year/engine (refer to Section 4.0 and Appendix H of the air construction permit application documents)

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: PM2.5	2. Total Percent Efficiency of Control:
3. Potential Emissions: 4.74 lb/hour 20.8 tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 0.24 g/bhp-hr Reference: BACT	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 Appendix H of air construction permit application documents.

11. Potential, Fugitive, and Actual Emissions Comment:

1.19 lb/hr/engine, 5.20 tons/year/engine (refer to Section 4.0 and Appendix H of the air construction permit application documents)

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: HAPs (total)	2. Total Percent Efficiency of Control:
3. Potential Emissions: 8.45 lb/hour 37.0 tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference: calculations	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 Appendix H of air construction permit application documents.

11. Potential, Fugitive, and Actual Emissions Comment:

2.11 lb/hr/engine, 9.25 tons/year/engine (refer to Section 4.0 and Appendix H of the air construction permit application documents)

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: Formaldehyde	2. Total Percent Efficiency of Control:
3. Potential Emissions: 8.30 lb/hour 36.4 tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 0.42 g/bhp-hr Reference: Equipment manufacturer data	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 Appendix H of the air construction permit application documents.

11. Potential, Fugitive, and Actual Emissions Comment:

2.08 lb/hr/engine, 9.09 tons/year/engine (refer to Section 4.0 and Appendix H of the air construction permit application documents)

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: Hydrogen chloride	2. Total Percent Efficiency of Control:
3. Potential Emissions: 0.13 lb/hour 0.6 tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 0.75 lb/MMscf Reference: AP-42	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:

Refer to Appendix H of air construction permit application documents.

11. Potential, Fugitive, and Actual Emissions Comment:

0.03 lb/hr/engine, 0.14 tons/year/engine (refer to Section 4.0 and Appendix H of the air construction permit application documents)

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: Greenhouse gases	2. Total Percent Efficiency of Control:
3. Potential Emissions: 7,670.3 lb/hour 33,596 tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference: 40 CFR Part 98 Table C-1 and C-2	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 Appendix H of air construction permit application documents.

11. Potential, Fugitive, and Actual Emissions Comment:

1,917.6 lb/hr/engine, 8,399 tons/year/engine (refer to Section 4.0 and Appendix H of the air construction permit application documents)

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: RULE	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: CO - 3.5 g/bhp-hr	4. Equivalent Allowable Emissions: 69.20 lb/hour 303.1 tons/year
5. Method of Compliance: Source test as part of 40 CFR Part 60 Subpart JJJJ requirements for the IC engines	
6. Allowable Emissions Comment (Description of Operating Method): Rule 62-212.400	

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: CO – 5.0 g/bhp-hr	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance: Source test as part of 40 CFR Part 60 Subpart JJJJ requirements for the IC engines	
6. Allowable Emissions Comment (Description of Operating Method): 40 CFR part 60 Subpart JJJJ	

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: RULE	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: NOx – 0.6 g/bhp-hr	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance: Source test as part of 40 CFR Part 60 Subpart JJJJ requirements for the IC engines	
6. Allowable Emissions Comment (Description of Operating Method): Rule 62-212.400	

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 2 of 2

1. Basis for Allowable Emissions Code: RULE	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: NOx – 3.0 g/bhp-hr	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance: Source test as part of 40 CFR Part 60 Subpart JJJJ requirements for the IC engines	
6. Allowable Emissions Comment (Description of Operating Method): 40 CFR part 60 Subpart JJJJ	

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: RULE	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: VOC – 8.22 lb/hr	4. Equivalent Allowable Emissions: 8.22 lb/hour 36.0 tons/year
5. Method of Compliance: Source test as part of 40 CFR Part 60 Subpart JJJJ requirements for the IC engines	
6. Allowable Emissions Comment (Description of Operating Method): Rule 62-212.400 - VOC emissions $\leq$ 36 tons per year cap to remain insignificant	

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: VOC – 1.0 g/bhp-hr	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance: Source test as part of 40 CFR Part 60 Subpart JJJJ requirements for the IC engines	
6. Allowable Emissions Comment (Description of Operating Method): 40 CFR part 60 Subpart JJJJ	

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: NMOC – 10.28 lb/hr	4. Equivalent Allowable Emissions: 10.28 lb/hour 45.0 tons/year
5. Method of Compliance: Engine fuel NMOC analysis	
6. Allowable Emissions Comment (Description of Operating Method): Rule 62-212.400 – NMOC emissions ≤ 45 tons per year cap to remain insignificant	

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: SO2 – 8.21 lb/hr	4. Equivalent Allowable Emissions: 8.22 lb/hour 36.0 tons/year
5. Method of Compliance: IC engine fuel sulfur content analysis	
6. Allowable Emissions Comment (Description of Operating Method): Rule 62-212.400 – SO2 emissions ≤ 36 tons/year cap to remain insignificant	

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: PM – 0.24 g/bhp-hr	4. Equivalent Allowable Emissions: 4.74 lb/hour 20.8 tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method): Rule 62-212.400	

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: PM10 – 0.24 g/bhp-hr	4. Equivalent Allowable Emissions: 4.74 lb/hour 20.8 tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method): Rule 62-212.400	

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: PM2.5 – 0.24 g/bhp-hr	4. Equivalent Allowable Emissions: 4.74 lb/hour 20.8 tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method): Rule 62-212.400	

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: HAPs (total) – 10.73 lb/hr	4. Equivalent Allowable Emissions: 10.73 lb/hour 47.0 tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

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: Formaldehyde – 8.30 lb/hr	4. Equivalent Allowable Emissions: 8.30 lb/hour 36.4 tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

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: Hydrogen chloride – 1.91 lb/hr	4. Equivalent Allowable Emissions: 1.91 lb/hour 8.40 tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

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):	

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: VE20	2. Basis for Allowable Opacity: [X] Rule [ ] Other
3. Allowable Opacity: Normal Conditions: 20 % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment: Rule 62-296.320 Experience obtained by IES/LES with the operation of numerous LFG fueled IC engines indicates that visible emissions from this equipment are insignificant (i.e., emissions are not expected to be visible during normal engine operations).	

Visible Emissions Limitation: Visible Emissions Limitation __ of ____

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

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor ___ of ___

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

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)
   [X] Attached, Document ID: Appendix D [ ] 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)
   [X] Attached, Document ID: Appendix E [ ] 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)
   [X] Attached, Document ID: Appendix K [ ] 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: _____ [X] 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)
   [X] Attached, Document ID: Appendix G [ ] 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: _____
   _____
   [X] Not Applicable

7. Other Information Required by Rule or Statute:
   [X] Attached, Document ID: Sections 1 -10 [ ] 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)): [X] Attached, Document ID: Appendix K [ ] Not Applicable
2.	Good Engineering Practice Stack Height Analysis (Rules 62-212.400(4)(d) and 62-212.500(4)(f), F.A.C.): [X] Attached, Document ID: Section 5.3.4 [ ] Not Applicable
3.	Description of Stack Sampling Facilities: (Required for proposed new stack sampling facilities only) [X] Attached, Document ID: Section 5.6 [ ] 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

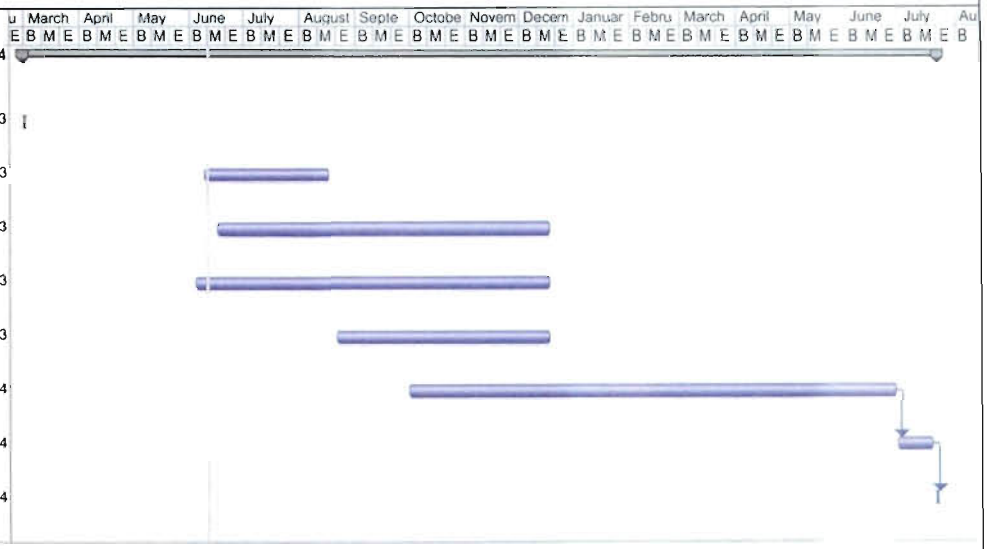
Additional Requirements Comment

APPENDIX B

Sarasota Energy, LLC
Construction Schedule

Sarasota Central Energy Project

ID	Task Name	Duration	Start	Finish
1	**Sarasota Central Energy Project**	**362 days**	**Fri 3/1/13**	**Mon 7/21/14**
2	Project Award	1 day	Fri 3/1/13	Fri 3/1/13
3	Gas Rights Contract Negotiations	50 days	Mon 6/10/13	Fri 8/16/13
4	Air Permitting/Solid Waste Permit	132 days	Mon 6/17/13	Tue 12/17/13
5	Engineering	140 days	Wed 6/5/13	Tue 12/17/13
6	Building Permit	84 days	Thu 8/22/13	Tue 12/17/13
7	Equipment Procurement / Construction	194 days	Tue 10/1/13	Fri 6/27/14
8	Start Up	15 days	Mon 6/30/14	Fri 7/18/14
9	Cod	1 day	Mon 7/21/14	Mon 7/21/14

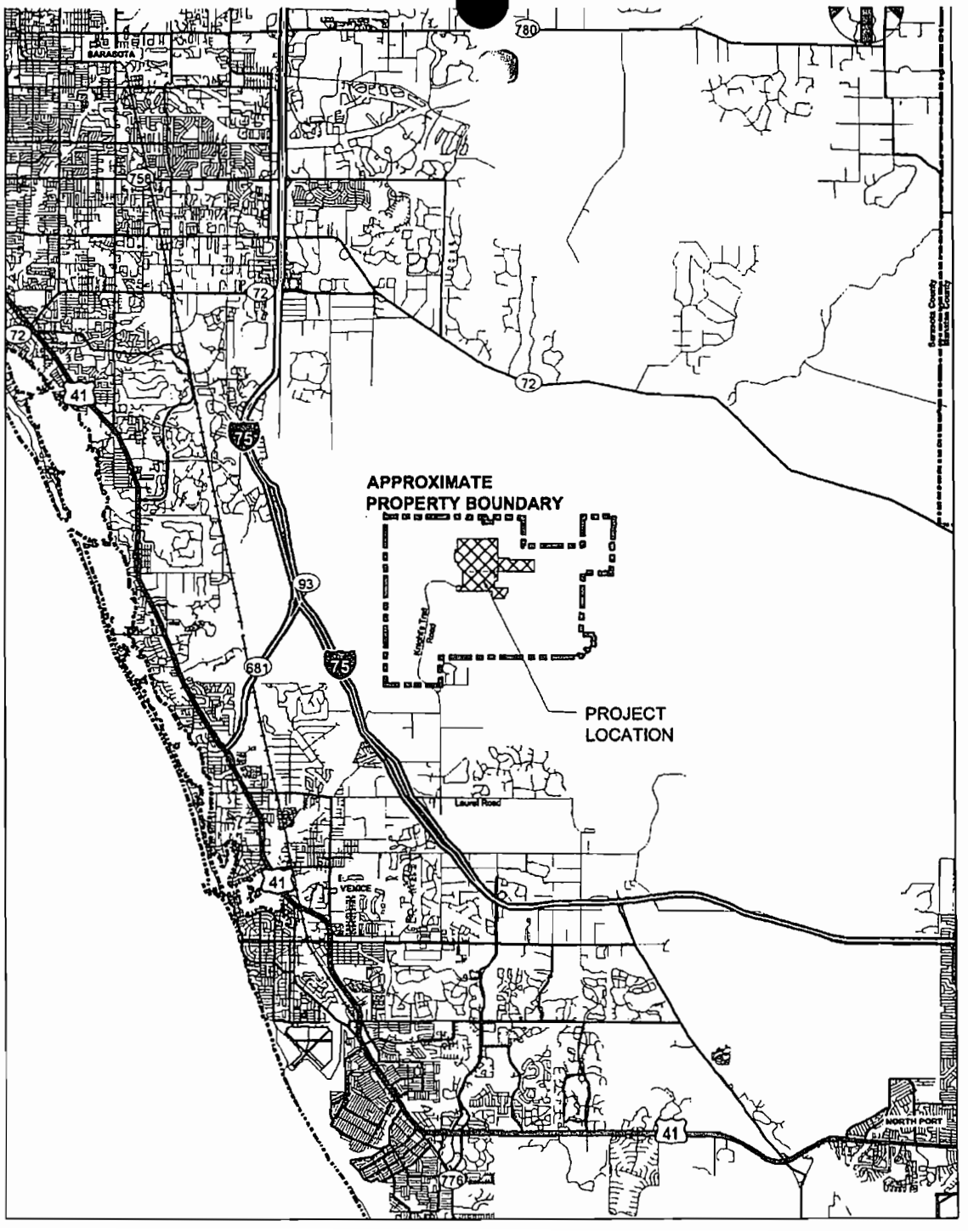


Project: Sarasota Central Energy Proje
Date: Tue 6/11/13

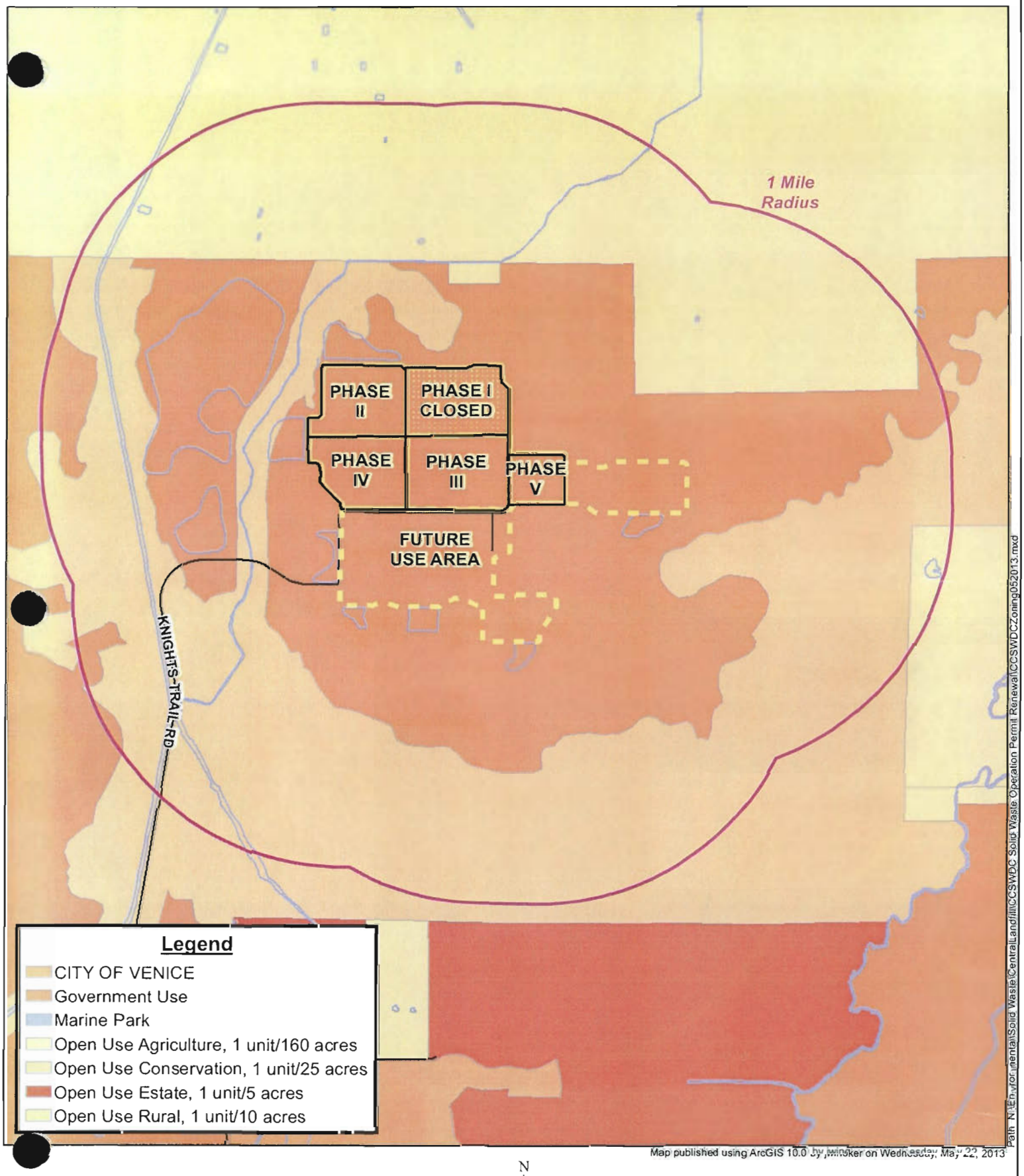
Task — Progress — Summary — External Tasks — Deadline
Split — Milestone — Project Summary — External Milestone

APPENDIX C

Sarasota Energy, LLC
Area Location
And
Site Drawings


APPROXIMATE
PROPERTY BOUNDARY
PROJECT
LOCATION
SARASOTA
VENICE
NORTH PORT
780
756
72
41
75
93
681
776
Laurel Road
Knight Trail Road

Central County Solid Waste Disposal Complex
Zoning



Map published using ArcGIS 10.0 by jwinsker on Wednesday, May 22, 2013

Path: N:\Environmental\Solid Waste\Central Landfill\CSWDC Solid Waste Operation Permit Renewal\CSWDCZoning052013.mxd

Aerial Imagery Provided by Pictometry International
Sarasota County, FL
February 2013
4" Resolution
N.A.D. 1983 HARN State Plane Florida West FIPS 0902 (U.S Survey Feet)

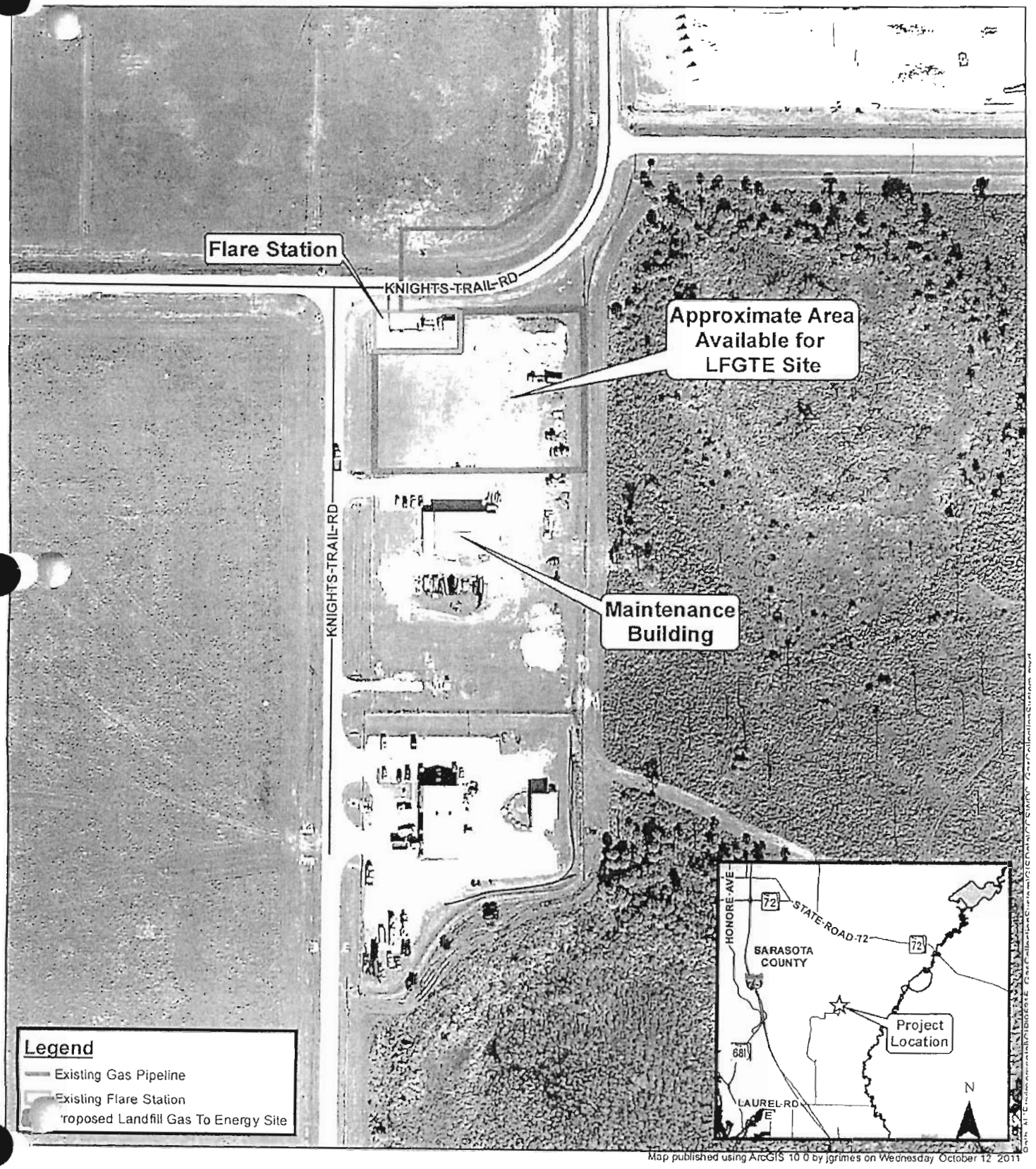
N W E S

0 0.25 0.5
Miles

This map is produced from Sarasota County GIS, and is representative information only
The County does not warrantee, guarantee, or assume any responsibility for geographic information completeness and/or accuracy.
This map should not be used as guide for navigation

Central County Solid Waste Disposal Complex
Landfill Gas to Energy Facility

CIP# 95215



Map published using ArcGIS 10.0 by jgrimes on Wednesday, October 12, 2011

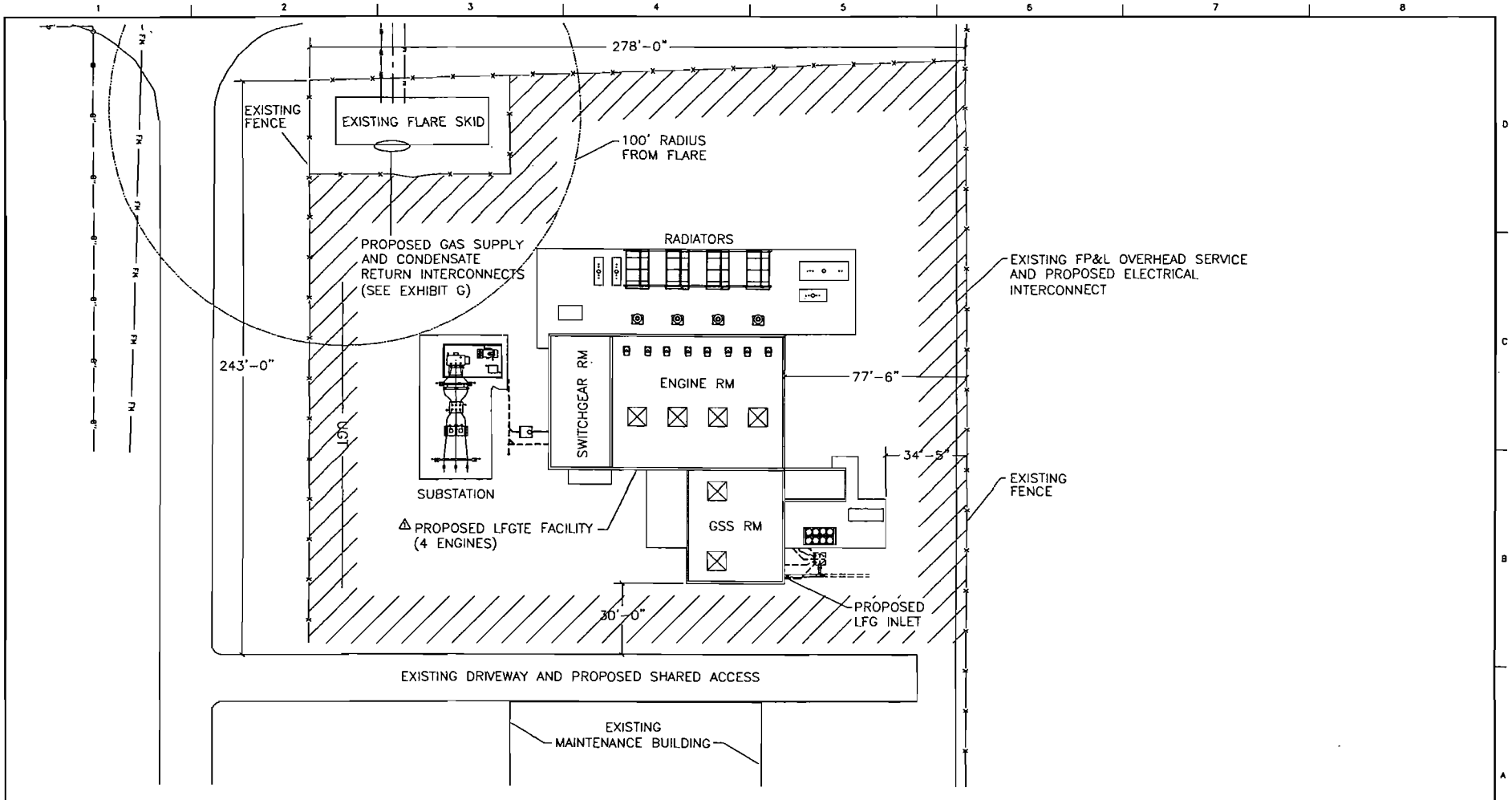
Sarasota County

Aerial Imagery Provided by PhotoScience
Sarasota County, FL
December 2010 to January 2011

N
W E

0 100 200

This map is produced from Sarasota County GIS, and is representative information only. The County does not warrant, guarantee, or



REVISION	DATE	DESCRIPTION
1	4/25/13	ROTATED PROPOSED LFGTE FACILITY 90 DEG CW

ISSUE	DATE	DESCRIPTION
A	7 APR 11	EXHIBIT D ISSUE

PROJECT MANAGER	
DESIGNED BY	
DRAWN BY	
CHECKED BY	
PROJECT NUMBER	125411

HDR

Central County Solid Waste Disposal Complex

PRELIMINARY

SARASOTA COUNTY FLORIDA

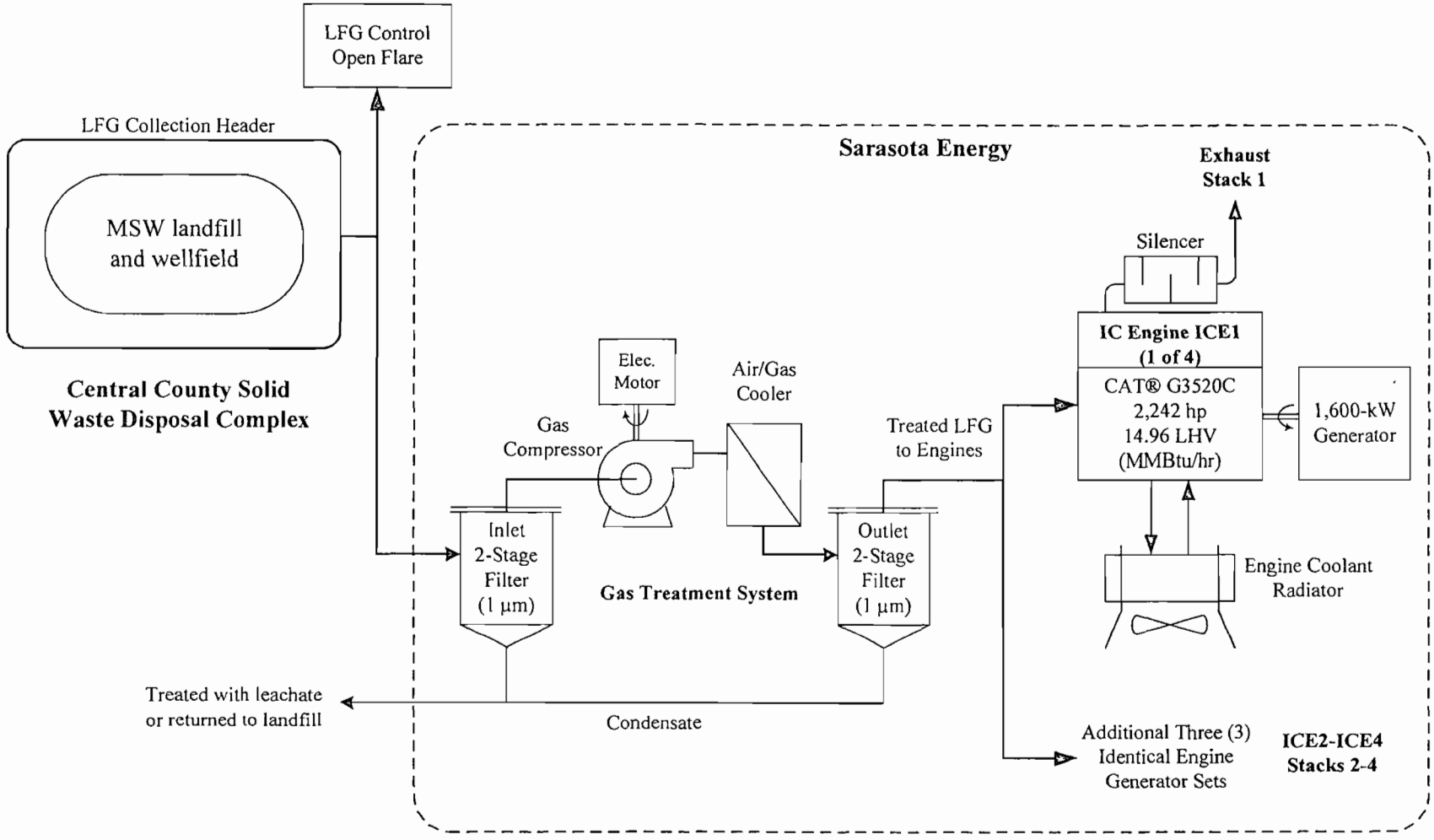
EXHIBIT D
PROPOSED FACILITY SITE AND INTERCONNECTIONS

0 1" 2"
AT FULL SIZE 24x36 LENGTH EQUALS TWO INCHES. ADJUST SCALE ACCORDINGLY.

FILENAME	125411-CCA-M1001
SCALE	1" = 20'-0"
SHEET	M1001

APPENDIX D

Sarasota Energy, LLC
Process Flow Diagram
And
Engineering Specifications



1/24/13	**Sarasota Energy, LLC** **LFG Electricity Generation Facility**		
	Scale None	Sheet 1 of 1	Derenzo and Associates Project No. 1301043

APPENDIX E

Central County Solid Waste Disposal Complex
LFG Analyses

Research Triangle Park Laboratories, Inc.
7201 ACC Blvd., Suite 104
Raleigh, NC 27617

919 510-0228 Telephone
919 510-0141 Fax
Web Site: www.rtp-labs.com

RTP Labs
ISO 17025 Compliant
PA Registration #68-1664
DEA Registered

November 3, 2010

HDR Engineering
200 W. Forsyth St. Ste 800
Jacksonville, FL 32202

Attn: Cliff Koenig

PROJECT: "Sarasota Central Cty Landfill"
RTP Labs ID: 10-333

Enclosed with this letter is the report on the chemical analyses for the samples received on October 1, 2010 for normal turnaround. Two Tedlar bags, two Siloxane sorbent tubes and two Summa canisters were received in good condition with the chain-of-custody form completed. The samples were analyzed by the following test methods:

1. Fixed gases by EPA Method 3C GC/TCD for CO_2, O_2, N_2, methane, % concentration;
2. Sulfur compounds by EPA Modified Method 15/16 GC/FPD;
3. Siloxanes by In-House GC/MS Method.
4. Ammonia; Chlorine; Fluorine by Colorimetric.

If you have any questions, please give me a call at (919) 510-0228.

Sincerely,

Alston Sykes

Alston Sykes, Principal Chemist

Attachments: Test results, COC form.

Research Triangle Park Laboratories, Inc.
7201 ACC Blvd., Suite 104
Raleigh, NC 27617

919 510-0228 Telephone
919 510-0141 Fax
Web Site: www.rtp-labs.com

RTPLabs

ISO 17025 Compliant
PA Registration #68-1664
DEA Registered

Laboratory Report

Client: HDR
Sample Date: 09/30/2010
Date Received: 10/01/2010

Contact: Cliff Koenig
Matrix: Tedlar Bag/Can/Sorbent
Analysis Date: 10/01-27/2010

Client Proj. #: Sarasota Central LF
RTP Labs Proj. #:10-333

Compound	Tedlar bag #1	Tedlar bag #2	Test Method
Hydrogen Sulfide H_2S	60 ppmv	67 ppmv	Sulfurs GC/FPD
Carbonyl Sulfide COS	<1 ppmv	<1 ppmv	Sulfurs GC/FPD
Dimethyl Sulfide $(CH_3)_2S$	<1 ppmv	<1 ppmv	Sulfurs GC/FPD
Ethyl Mercaptan C_2H_5SH	<1 ppmv	<1 ppmv	Sulfurs GC/FPD
Methyl Mercaptan (CH_4S)	<1 ppmv	<1 ppmv	Sulfurs GC/FPD
Carbon Disulfide (CS_2)	<1 ppmv	<1 ppmv	Sulfurs GC/FPD
Dimethyl Disulfide ($C_2H_6S_2$)	<1 ppmv	<1 ppmv	Sulfurs GC/FPD
	Tube #1	**Tube #2**	
Hexamethyldisiloxane (L2)	2.2 µg	<1.0 µg	GC/MS
Hexamethylcyclotrisiloxane (D3)	9.2 µg	6.5 µg	GC/MS
Octamethyltrisiloxane (L3)	1.3 µg	2.3 µg	GC/MS
Octamethylcyclotetrasiloxane (D4)	113.0 µg	416 µg	GC/MS
Decamethyltetrasiloxane (L4)	<1.0 µg	<1.0 µg	GC/MS
Decamethylcyclopentasiloxane (D5)	16.5 µg	80.4 µg	GC/MS
Dodecamethylpentasiloxane, (L5)	<1.0 µg	<1.0 µg	GC/MS
Dodecamethylcyclohexasiloxane (D6)	<1.0 µg	<1.0 µg	GC/MS
	Can 02304	**Can 93016**	
Methane	51.8 %	62.0 %	3C GC/TCD
Oxygen	<1 %	<1 %	3C GC/TCD
Nitrogen	<1 %	<1 %	3C GC/TCD
Carbon Dioxide	44.0 %	38.0 %	3C GC/TCD
Ammonia	<10 ppmv	<10 ppmv	Colorimetric
Chlorine	<10 ppmv	<10 ppmv	Colorimetric
Fluorine	<10 ppmv	<10 ppmv	Colorimetric

Research Triangle Park Laboratories, Inc
7201 ACC Blvd., Suite 104
Raleigh, North Carolina 27617
Phone: 919-510-0228 Fax: 919-510-0141
Web Site: www.rtp-labs.com

Chain of Custody Record

RTP Labs

Client (Billing):	Send Report To Attention:	Phone Number:	Fax Number:	Date:
HDR ENGINEERING	CLIFF KOENIG	904-598-8900	904-598-8908	9/30/10
Address:		**E-Mail:**		Page 1 of 1
200 W. FORSYTH ST. SUITE 800		cliff.koenig@hdrinc.com		
City	**State**	**Zip Code**		
JACKSONVILLE	FL	32202		
Contract/Purchase Order No.:	**Project Name:**			
	SARASOTA CENTRAL COUNTY LANDFILL			

Requested Analyses

RTP Labs Project Tracking Number: 10-333

Comments: Samples #5 & 6 Next Day Air
Samples #1-4 sent 2 day shipping

	Sample ID No. & Description	Date Sampled	TIME AM (PM)	Matrix: Air Ambient	Matrix: Air Source	Matrix: Liquid/Solid	Compliance Test	Preservatives	# of Containers	EPA Method 3C	EPA Method 15/16	SILOXANES	Air Samples: Summa Canisters: Vacuum or Pressure: Field Initial	Field Final	Lab Receipt	Lab Final psig	Tracking # Sample: Fraction
1	02304 / SUMMA CANISTER	9/30/10	1404				X		1	X			30	4.5			01
2	93016 / SUMMA CANISTER	9/30/10	1423				X		1	X			30	5.0			02
3	SILOXANES TUBE 1	9/30/10	1231				X		1			X					03
4	SILOXANES TUBE 2	9/30/10	1332				X		1			X					04
5	TB 1	9/30/10	1503				X		1		X				Recd 10/1/10		05
6	TB 2	9/30/10	1505				X		1		X				Recd 10/1/10		06
7																	
8																	
9																	
10																	

Turn Around Time Requested for Report: Business Days; *Rush Multipliers (Xx)
☐ 1 day*(4x) ☐ 2 days*(3x) ☐ 3 days*(2x) ☐ 5 days*(1.5x) ☒ 10 days*(1.1x) ☒ 15 days

Data Pack: Std ☐ Full ☐ 1.1x surcharge

Electronic Deliverable: ☐ 1.1x surcharge

QC Requirements: Screen ☐ Standard ☐

EPA Level IV for Compliance ☐
Requires approved QAPP sent to lab

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
[signature]	9/30/10	4:02	Only Tedlar Bags TA1 & TB2	10/1/10	11:00
			Summa Can	10/4/10	11:34

File chain_RTP.doc/als revision 5/20/2006

Research Triangle Park Laboratories, Inc.
7201 ACC Blvd., Suite 104
Raleigh, NC 27617
919 510-0228 Telephone
919 510-0141 Fax
Web Site: www.rtp-labs.com

RTP Labs
ISO 17025 Compliant
PA Registration #68-1664
DEA Registered

ANALYTICAL SOLUTION, INC. (AnSol) www.analyticalsolutininc.com

7/7/11

Analytical Report

Sample log # : L0609a.doc

Purchase Order #:	*COC-Request*	Customer Project:	*174-3572*
Company :	***HDR Engineering***	Requester :	***Cliff Koenig***
Address :	*200 West Forsyth St.*	Phone:	*904-598-8931*
	Suite 800	Fax:	
	Jacksonville, FL 32202	E-mail :	
Sample Description :	*Biogas*	Received Date :	*6/9/11*
Number of Samples :	*2*	Total Report Page:	*4*

Note: This report is security signed and submitted to the requester through E-mail. Please let us know if your need a hard copy report by mail or fax.

Report Summary:

Please find results in the following page.

The calculation is based on standard conditions at 60°F and 14.73 psia, where applied.

Submitted by: Sherman S. Chao, Ph.D.

Tel: (630) 230-9378, Fax: (630) 230-9376

Disclaimer:

Neither AnSol nor any person acting on behalf of AnSol assumes any liability with respect to the use of, or for damages resulting from the use of, any information presented in this report.

GAS COMPONENT ANALYSIS

Sample ID:	Conc. Unit	L0609a01	L0609a03
	Description:	LFG, 6/8/11, 1132	LFG, 6/8/11, 1150
Methane	%	48.2	49.0
Carbon dioxide	%	34.9	35.7
Nitrogen	%	15.0	13.8
Oxygen	%	1.87	1.47
GHV, dry (14.73 psi) *	Btu/scf	489	498
Relative density *		0.966	0.966
Ammonia	ppmv	6.0	1.3
Total organic silicon	ppmv	9.2	9.5
	mg/M^3	10.9	11.3
Total Sulfur	ppmv	73	71
	mg/M^3	98	96
Total organic chlorine	ppmv	5.3	4.9
	mg/M^3	7.9	7.4
Total organic fluorine	ppmv	4.5	4.5
	mg/M^3	3.6	3.6

* Calculation is based on the content of major components. Some results may be reported with additional significance for reference.

Compound Speciation – Siloxanes

	L0609a01		L0609a03	
	LFG, 6/8/11, 1132		LFG, 6/8/11, 1150	
	ppmv as Si	ppmv	ppmv as Si	ppmv
Tetramethyl silane	<0.02	<0.02	<0.02	<0.02
Trimethyl silanol	0.99	0.99	1.07	1.07
Hexamethyldisiloxane (L2)	0.192	0.096	0.202	0.101
Hexamethylcyclotrisiloxane (D3)	0.72	0.239	0.46	0.152
Octamethyltrisiloxane (L3)	0.023	0.008	0.032	0.011
Octamethylcyclotetrasiloxane (D4)	5.31	1.33	5.72	1.43
Decamethyltetrasiloxane (L4)	0.021	0.005	0.015	0.004
Decamethylcyclopentasiloxane (D5)	1.65	0.33	1.80	0.36
Dodecamethylpentasiloxane (L5)	<0.02	<0.005	<0.02	<0.005
Dodecamethylcyclohexasiloxane (D6)	0.100	0.017	0.074	0.012
Others. as L2	0.23	0.115	0.12	0.06
Total:	9.23		9.49	
Total (Si, mg /M^3):	10.94		11.25	

Note: Some results may be reported with additional significance for reference.

Compound Speciation – Sulfur

Sulfur Compounds, ppmv as S	L0609a01	L0609a03
	LFG, 6/8/11, 1132	LFG, 6/8/11, 1150
Hydrogen sulfide	69.4	66.4
Carbonyl sulfide	0.36	0.27
Methyl mercaptan	<0.05	<0.05
Ethyl mercaptan	0.33	0.39
Dimethyl sulfide	0.43	0.37
Carbon disulfide *	0.20	0.13
i-Propyl mercaptan	0.20	0.30
t-Butyl mercaptan	<0.05	<0.05
n-Propyl mercaptan	0.08	0.06
Methyl ethyl sulfide	0.09	0.12
Thiophene	0.10	0.10
Diethyl sulfide	<0.05	<0.05
Dimethyl disulfide *	0.11	0.10
Ethyl methyl disulfide *	<0.05	<0.05
Diethyl disulfide *	<0.05	<0.05
Others (as S)	1.20	2.36
Total S (ppmv):	72.5	70.6
(mg/M^3):	98.1	95.5

Note: Some results were reported with additional significance for reference. The normal detection limit of each sulfur compound is 0.1 ppmv.

* 1.0 ppmv component as sulfur = 0.50 ppmv sulfur compound

eurofins | Air Toxics

Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: Sarasota 1

Lab ID#: 1305442A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	25	290	120	1400
Freon 114	25	36	170	250
Chloromethane	100	180	210	380
Chlorodifluoromethane	100	640	350	2300
Methylene Chloride	25	30	87	100
cis-1,2-Dichloroethene	25	210	99	840
1,2-Dichloroethane	25	85	100	340
Trichloroethene	25	97	130	520
Tetrachloroethene	25	140	170	950
Chlorobenzene	25	56	120	260
1,4-Dichlorobenzene	25	200	150	1200

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Client Sample ID: Sarasota 1

Lab ID#: 1305442A-01A

EPA METHOD TO-15 GC/MS

File Name:	**14052310**	**Date of Collection:**	**5/21/13 12:45:00 PM**
Dil. Factor:	**5.00**	**Date of Analysis:**	**5/23/13 09:26 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	25	290	120	1400
Freon 114	25	36	170	250
Chloromethane	100	180	210	380
Vinyl Chloride	25	Not Detected	64	Not Detected
Chlorodifluoromethane	100	640	350	2300
Dichlorofluoromethane	100	Not Detected	420	Not Detected
Chloroethane	100	Not Detected	260	Not Detected
Freon 11	25	Not Detected	140	Not Detected
Freon 113	25	Not Detected	190	Not Detected
1,1-Dichloroethene	25	Not Detected	99	Not Detected
Methylene Chloride	25	30	87	100
trans-1,2-Dichloroethene	25	Not Detected	99	Not Detected
1,1-Dichloroethane	25	Not Detected	100	Not Detected
cis-1,2-Dichloroethene	25	210	99	840
Chloroform	25	Not Detected	120	Not Detected
1,1,1-Trichloroethane	25	Not Detected	140	Not Detected
Carbon Tetrachloride	25	Not Detected	160	Not Detected
1,2-Dichloroethane	25	85	100	340
Trichloroethene	25	97	130	520
1,2-Dichloropropane	25	Not Detected	120	Not Detected
Bromodichloromethane	25	Not Detected	170	Not Detected
cis-1,3-Dichloropropene	25	Not Detected	110	Not Detected
trans-1,3-Dichloropropene	25	Not Detected	110	Not Detected
1,1,2-Trichloroethane	25	Not Detected	140	Not Detected
Tetrachloroethene	25	140	170	950
Dibromochloromethane	25	Not Detected	210	Not Detected
Chlorobenzene	25	56	120	260
1,1,2,2-Tetrachloroethane	25	Not Detected	170	Not Detected
1,3-Dichlorobenzene	25	Not Detected	150	Not Detected
1,4-Dichlorobenzene	25	200	150	1200
alpha-Chlorotoluene	25	Not Detected	130	Not Detected
1,2-Dichlorobenzene	25	Not Detected	150	Not Detected
1,2,4-Trichlorobenzene	100	Not Detected	740	Not Detected
Hexachlorobutadiene	100	Not Detected	1100	Not Detected

Container Type: 1 Liter Tedlar Bag

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1305442A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14052309**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/23/13 08:57 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
Chlorodifluoromethane	20	Not Detected	71	Not Detected
Dichlorofluoromethane	20	Not Detected	84	Not Detected
Chloroethane	20	Not Detected	53	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
Dibromochloromethane	5.0	Not Detected	42	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: CCV

Lab ID#: 1305442A-03A

EPA METHOD TO-15 GC/MS

File Name:	**14052302**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 5/23/13 04:30 PM**

Compound	%Recovery
Freon 12	115
Freon 114	107
Chloromethane	110
Vinyl Chloride	84
Chlorodifluoromethane	95
Dichlorofluoromethane	101
Chloroethane	101
Freon 11	113
Freon 113	95
1,1-Dichloroethene	102
Methylene Chloride	113
trans-1,2-Dichloroethene	104
1,1-Dichloroethane	108
cis-1,2-Dichloroethene	103
Chloroform	108
1,1,1-Trichloroethane	108
Carbon Tetrachloride	110
1,2-Dichloroethane	125
Trichloroethene	110
1,2-Dichloropropane	109
Bromodichloromethane	116
cis-1,3-Dichloropropene	99
trans-1,3-Dichloropropene	105
1,1,2-Trichloroethane	111
Tetrachloroethene	108
Dibromochloromethane	119
Chlorobenzene	108
1,1,2,2-Tetrachloroethane	113
1,3-Dichlorobenzene	105
1,4-Dichlorobenzene	106
alpha-Chlorotoluene	116
1,2-Dichlorobenzene	106
1,2,4-Trichlorobenzene	89
Hexachlorobutadiene	99

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: LCS
Lab ID#: 1305442A-04A
EPA METHOD TO-15 GC/MS

File Name:	**14052303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/23/13 05:05 PM**	

Compound	%Recovery
Freon 12	111
Freon 114	100
Chloromethane	116
Vinyl Chloride	85
Chlorodifluoromethane	Not Spiked
Dichlorofluoromethane	Not Spiked
Chloroethane	95
Freon 11	112
Freon 113	91
1,1-Dichloroethene	108
Methylene Chloride	109
trans-1,2-Dichloroethene	112
1,1-Dichloroethane	105
cis-1,2-Dichloroethene	99
Chloroform	107
1,1,1-Trichloroethane	105
Carbon Tetrachloride	108
1,2-Dichloroethane	118
Trichloroethene	105
1,2-Dichloropropane	105
Bromodichloromethane	110
cis-1,3-Dichloropropene	92
trans-1,3-Dichloropropene	93
1,1,2-Trichloroethane	104
Tetrachloroethene	104
Dibromochloromethane	110
Chlorobenzene	103
1,1,2,2-Tetrachloroethane	115
1,3-Dichlorobenzene	105
1,4-Dichlorobenzene	104
alpha-Chlorotoluene	99
1,2-Dichlorobenzene	107
1,2,4-Trichlorobenzene	90
Hexachlorobutadiene	102

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: LCSD
Lab ID#: 1305442A-04AA
EPA METHOD TO-15 GC/MS

File Name:	**14052304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/23/13 05:33 PM**	

Compound	%Recovery
Freon 12	111
Freon 114	104
Chloromethane	115
Vinyl Chloride	85
Chlorodifluoromethane	Not Spiked
Dichlorofluoromethane	Not Spiked
Chloroethane	99
Freon 11	113
Freon 113	93
1,1-Dichloroethene	110
Methylene Chloride	113
trans-1,2-Dichloroethene	113
1,1-Dichloroethane	107
cis-1,2-Dichloroethene	99
Chloroform	107
1,1,1-Trichloroethane	107
Carbon Tetrachloride	106
1,2-Dichloroethane	118
Trichloroethene	107
1,2-Dichloropropane	105
Bromodichloromethane	111
cis-1,3-Dichloropropene	91
trans-1,3-Dichloropropene	95
1,1,2-Trichloroethane	106
Tetrachloroethene	104
Dibromochloromethane	109
Chlorobenzene	104
1,1,2,2-Tetrachloroethane	111
1,3-Dichlorobenzene	105
1,4-Dichlorobenzene	102
alpha-Chlorotoluene	100
1,2-Dichlorobenzene	106
1,2,4-Trichlorobenzene	94
Hexachlorobutadiene	103

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	102	70-130

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Summary of Detected Compounds
SULFUR GASES BY ASTM D-5504 GC/SCD

Client Sample ID: Sarasota 1

Lab ID#: 1305442B-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	1600	91000
Methyl Mercaptan	1600	2500
Dimethyl Sulfide	1600	1800

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Client Sample ID: Sarasota 1

Lab ID#: 1305442B-01A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	**k052217**	**Date of Collection:**	**5/21/13 12:45:00 PM**
Dil. Factor:	**400**	**Date of Analysis:**	**5/22/13 10:48 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	1600	91000
Carbonyl Sulfide	1600	Not Detected
Methyl Mercaptan	1600	2500
Ethyl Mercaptan	1600	Not Detected
Dimethyl Sulfide	1600	1800
Carbon Disulfide	2000	Not Detected
Isopropyl Mercaptan	1600	Not Detected
tert-Butyl Mercaptan	1600	Not Detected
n-Propyl Mercaptan	1600	Not Detected
Ethyl Methyl Sulfide	1600	Not Detected
Thiophene	1600	Not Detected
Isobutyl Mercaptan	1600	Not Detected
Diethyl Sulfide	1600	Not Detected
n-Butyl Mercaptan	1600	Not Detected
Dimethyl Disulfide	1600	Not Detected
3-Methylthiophene	1600	Not Detected
Tetrahydrothiophene	1600	Not Detected
2-Ethylthiophene	1600	Not Detected
2,5-Dimethylthiophene	1600	Not Detected
Diethyl Disulfide	1600	Not Detected

Container Type: 1 Liter Tedlar Bag

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Client Sample ID: Lab Blank

Lab ID#: 1305442B-02A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	**k052205**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/21/13 09:20 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	4.0	Not Detected
Carbonyl Sulfide	4.0	Not Detected
Methyl Mercaptan	4.0	Not Detected
Ethyl Mercaptan	4.0	Not Detected
Dimethyl Sulfide	4.0	Not Detected
Carbon Disulfide	5.0	Not Detected
Isopropyl Mercaptan	4.0	Not Detected
tert-Butyl Mercaptan	4.0	Not Detected
n-Propyl Mercaptan	4.0	Not Detected
Ethyl Methyl Sulfide	4.0	Not Detected
Thiophene	4.0	Not Detected
Isobutyl Mercaptan	4.0	Not Detected
Diethyl Sulfide	4.0	Not Detected
n-Butyl Mercaptan	4.0	Not Detected
Dimethyl Disulfide	4.0	Not Detected
3-Methylthiophene	4.0	Not Detected
Tetrahydrothiophene	4.0	Not Detected
2-Ethylthiophene	4.0	Not Detected
2,5-Dimethylthiophene	4.0	Not Detected
Diethyl Disulfide	4.0	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1305442B-03A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	**k052203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/21/13 08:29 PM**	

Compound	%Recovery
Hydrogen Sulfide	76
Carbonyl Sulfide	80
Methyl Mercaptan	75
Ethyl Mercaptan	77
Dimethyl Sulfide	74
Carbon Disulfide	77
Isopropyl Mercaptan	76
tert-Butyl Mercaptan	74
n-Propyl Mercaptan	75
Ethyl Methyl Sulfide	79
Thiophene	76
Isobutyl Mercaptan	74
Diethyl Sulfide	80
n-Butyl Mercaptan	78
Dimethyl Disulfide	84
3-Methylthiophene	88
Tetrahydrothiophene	82
2-Ethylthiophene	92
2,5-Dimethylthiophene	92
Diethyl Disulfide	98

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1305442B-03AA

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	**k052204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/21/13 08:53 PM**	

Compound	%Recovery
Hydrogen Sulfide	82
Carbonyl Sulfide	81
Methyl Mercaptan	80
Ethyl Mercaptan	82
Dimethyl Sulfide	79
Carbon Disulfide	81
Isopropyl Mercaptan	86
tert-Butyl Mercaptan	80
n-Propyl Mercaptan	82
Ethyl Methyl Sulfide	83
Thiophene	82
Isobutyl Mercaptan	83
Diethyl Sulfide	83
n-Butyl Mercaptan	84
Dimethyl Disulfide	87
3-Methylthiophene	99
Tetrahydrothiophene	75
2-Ethylthiophene	89
2,5-Dimethylthiophene	90
Diethyl Disulfide	89

Container Type: NA - Not Applicable

APPENDIX F

Caterpillar, Inc.
Model G3520C Gas IC Engine
And
Generator Set Technical Data

G3520C

GAS ENGINE TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1200	FUEL:	Low Energy
COMPRESSION RATIO:	11.3	FUEL SYSTEM:	CAT LOW PRESSURE
AFTERCOOLER - STAGE 2 INLET (°F):	130		WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 1 INLET (°F):	217	FUEL PRESSURE RANGE(psig):	1.5-5.0
JACKET WATER OUTLET (°F):	230	FUEL METHANE NUMBER:	140
ASPIRATION:	TA	FUEL LHV (Btu/scf):	500
COOLING SYSTEM:	JW+1AC, OC+2AC	ALTITUDE CAPABILITY AT 77°F INLET AIR TEMP. (ft):	1378
IGNITION SYSTEM:	ADEM3	APPLICATION:	Genset
EXHAUST MANIFOLD:	DRY	POWER FACTOR:	0.8
COMBUSTION:	Low Emission	VOLTAGE(V):	480-4160
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5		

RATING		NOTES	LOAD	100%	75%	50%
GENSET POWER	(WITHOUT FAN)	(1)(2)	ekW	1600	1200	800
GENSET POWER	(WITHOUT FAN)	(1)(2)	KVA	2000	1500	1000
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	2242	1683	1128
GENERATOR EFFICIENCY		(1)	%	95.7	95.6	95.1
GENSET EFFECIENCY	(ISO 3046/1)	(3)	%	38.3	37.0	34.5
GENSET EFFECIENCY	(NOMINAL)	(3)	%	37.4	36.1	33.7
ENGINE EFFICIENCY	(NOMINAL)	(3)	%	39.1	37.8	35.4
THERMAL EFFICIENCY	(NOMINAL)	(4)	%	39.8	39.1	40.5
TOTAL EFFICIENCY	(NOMINAL)	(5)	%	77.2	75.2	74.2
ENGINE DATA						
GENSET FUEL CONSUMPTION	(ISO 3046/1)	(6)	Btu/ekW-hr	8907	9221	9895
GENSET FUEL CONSUMPTION	(NOMINAL)	(6)	Btu/ekW-hr	9124	9446	10137
ENGINE FUEL CONSUMPTION	NOMINAL	(6)	Btu/bhp-hr	6511	6734	7189
AIR FLOW (77°F, 14.7 psia)	(WET)	(7)	scfm	4441	3372	2284
AIR FLOW	(WET)	(7)	lb/hr	19691	14952	10130
COMPRESSOR OUT PRESSURE			in Hg(abs)	107.2	80.7	54.8
COMPRESSOR OUT TEMPERATURE			°F	378	304	218
AFTERCOOLER AIR OUT TEMPERATURE			°F	142	138	136
INLET MAN. PRESSURE		(8)	in Hg(abs)	93.5	71.0	49.1
INLET MAN. TEMPERATURE	(MEASURED IN PLENUM)	(9)	°F	142	138	136
TIMING		(10)	°BTDC	28	28	28
EXHAUST TEMPERATURE - ENGINE OUTLET		(11)	°F	903	949	986
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(12)	ft3/min	12723	10008	7001
EXHAUST GAS MASS FLOW	(WET)	(12)	lb/hr	21863	16638	11336
MAX INLET RESTRICTION		(13)	in H2O	10.04	10.04	10.04
MAX EXHAUST RESTRICTION		(13)	in H2O	20.07	20.07	20.07
EMISSIONS DATA - ENGINE OUT						
NOx (as NO2)		(14)(15)	g/bhp-hr	0.50	0.50	0.50
CO		(14)(16)	g/bhp-hr	4.22	4.35	4.49
THC (mol. wt. of 15.84)		(14)(16)	g/bhp-hr	5.63	6.37	7.49
NMHC (mol. wt. of 15.84)		(14)(16)	g/bhp-hr	0.85	0.96	1.12
NMNEHC (VOCs) (mol. wt. of 15.84)		(14)(16)(17)	g/bhp-hr	0.56	0.64	0.75
HCHO (Formaldehyde)		(14)(16)	g/bhp-hr	0.42	0.43	0.43
CO2		(14)(16)	g/bhp-hr	747	773	794
EXHAUST OXYGEN		(14)(18)	% DRY	8.8	8.5	8.4
LAMBDA		(14)(18)		1.68	1.64	1.55
ENERGY BALANCE DATA						
LHV INPUT		(19)	Btu/min	243311	188925	135157
HEAT REJECTION TO JACKET WATER (JW)		(20)(27)	Btu/min	29209	23554	22109
HEAT REJECTION TO ATMOSPHERE		(21)	Btu/min	7210	6013	4823
HEAT REJECTION TO LUBE OIL (OC)		(22)(28)	Btu/min	7791	6995	6197
HEAT REJECTION TO EXHAUST (LHV TO 77°F)		(23)	Btu/min	80267	67378	48301
HEAT REJECTION TO EXHAUST (LHV TO 350°F)		(23)	Btu/min	54199	44836	32646
HEAT REJECTION TO A/C - STAGE 1 (1AC)		(24)(27)	Btu/min	13343	5446	7
HEAT REJECTION TO A/C - STAGE 2 (2AC)		(25)(28)	Btu/min	8434	6176	3904
PUMP POWER		(26)	Btu/min	1977	1977	1977

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1. (Standard reference conditions of 77°F, 29.60 in Hg barometric pressure, 500 ft. altitude.) No overload permitted at rating shown. Consult altitude curves for applications above maximum rated altitude and/or temperature.

Emission levels are at engine exhaust flange prior to any after treatment. Values are based on engine operating at steady state conditions, adjusted to the specified NOx level at 100% load. Tolerances specified are dependent upon fuel quality. Fuel methane number cannot vary more than ± 3.

For notes information consult page three.

FUEL USAGE GUIDE

CAT METHANE NUMBER	110	120	130	140	150
SET POINT TIMING	-	24	26	28	30
DERATION FACTOR	0	1	1	1	1

ALTITUDE DERATION FACTORS AT RATED SPEED

INLET AIR TEMP °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	0.73	0.70	0.68	0.65	0.62	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	1	0.96	0.92	0.89	0.85	0.82	0.79	0.76	0.73	0.70	0.67	0.65	0.62
100	1	0.98	0.94	0.90	0.87	0.84	0.80	0.77	0.74	0.71	0.69	0.66	0.63
90	1	0.99	0.96	0.92	0.89	0.85	0.82	0.79	0.76	0.73	0.70	0.67	0.64
80	1	1	0.97	0.94	0.90	0.87	0.83	0.80	0.77	0.74	0.71	0.68	0.65
70	1	1	0.99	0.96	0.92	0.88	0.85	0.82	0.79	0.75	0.72	0.69	0.67
60	1	1	1	0.97	0.94	0.90	0.87	0.83	0.80	0.77	0.74	0.71	0.68
50	1	1	1	0.99	0.96	0.92	0.88	0.85	0.82	0.78	0.75	0.72	0.69

ALTITUDE (FEET ABOVE SEA LEVEL)

AFTERCOOLER HEAT REJECTION FACTORS (ACHRF)

INLET AIR TEMP °F	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	1.33	1.37	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39
120	1.26	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	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
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	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	1	1	1	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1	1	1	1	1
50	1	1	1	1	1	1	1	1	1	1	1	1	1

ALTITUDE (FEET ABOVE SEA LEVEL)

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.

ACTUAL ENGINE RATING:

To determine the actual rating of the engine at site conditions, one must consider separately, limitations due to fuel characteristics and air system limitations. The Fuel Usage Guide deration establishes fuel limitations. The Altitude/Temperature deration factors and RPC (reference the Caterpillar Methane Program) establish air system limitations. RPC comes into play when the Altitude/Temperature deration is less than 1.0 (100%). Under this condition, add the two factors together. When the site conditions do not require an Altitude/Temperature derate (factor is 1.0), it is assumed the turbocharger has sufficient capability to overcome the low fuel relative power, and RPC is ignored. To determine the actual power available, take the lowest rating between 1) and 2).

1) Fuel Usage Guide Deration
2) 1-((1-Altitude/Temperature Deration) + (1-RPC))

AFTERCOOLER HEAT REJECTION FACTORS(ACHRF):

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 inlet air 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 (ACHRF) to adjust for inlet air temp and altitude conditions. See Notes 27 and 28 below for application of this factor in calculating the heat exchanger sizing criteria. Failure to properly account for these factors could result in detonation and cause the engine to shutdown or fail.

NOTES:

1. Generator efficiencies, power factor, and voltage are based on standard generator. [Genset Power (ekW) is calculated as: Engine Power (bkW) x Generator Efficiency], [Genset Power (kVA) is calculated as: Engine Power (bkW) x Generator Efficiency / Power Factor]
2. Rating is with two engine driven water pumps. Tolerance is (+)3, (-)0% of full load.
3. ISO 3046/1 Genset efficiency tolerance is (+)0, (-)5% of full load % efficiency value. Nominal genset and engine efficiency tolerance is ± 2.5% of full load % efficiency value.
4. Thermal Efficiency is calculated as: (Heat rejection to jacket water + Heat Rejection to A/C Stage 1 + Heat rejection to exhaust to 350°F) / LHV Input
5. Total efficiency is calculated as: Genset Efficiency + Thermal Efficiency. Tolerance is ±10% of full load data.
6. ISO 3046/1 Genset fuel consumption tolerance is (+)5, (-)0% of full load data. Nominal genset and engine fuel consumption tolerance is ± 2.5% of full load data.
7. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.
8. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.
9. Inlet manifold temperature is a nominal value with a tolerance of ± 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 temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.
12. Exhaust flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 6 %.
13. Inlet and Exhaust Restrictions are maximum allowed values at the corresponding loads. Increasing restrictions beyond what is specified will result in a significant engine derate.
14. Emissions data is at engine exhaust flange prior to any after treatment.
15. NOx tolerances are ± 18% of specified value.
16. CO, CO2, THC, NMHC, NMNEHC, and HCHO values are "Not to Exceed" levels. THC, NMHC, and NMNEHC do not include aldehydes.
17. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ
18. Exhaust Oxygen tolerance is ± 0.5; Lambda tolerance is ± 0.05. Lambda and Exhaust Oxygen level are the result of adjusting the engine to operate at the specified NOx level.
19. LHV rate tolerance is ± 2.5%.
20. Heat rejection to jacket water value displayed includes heat to jacket water alone. Value is based on treated water. Tolerance is ± 10% of full load data.
21. Heat rejection to atmosphere based on treated water. Tolerance is ± 50% of full load data.
22. Lube oil heat rate based on treated water. Tolerance is ± 20% of full load data.
23. Exhaust heat rate based on treated water. Tolerance is ± 10% of full load data.
24. Heat rejection to A/C - Stage 1 based on treated water. Tolerance is ±5% of full load data.
25. Heat rejection to A/C - Stage 2 based on treated water. Tolerance is ±5% of full load data.
26. Pump power includes engine driven jacket water and aftercooler water pumps. Engine brake power includes effects of pump power.
27. Total Jacket Water Circuit heat rejection is calculated as: (JW x 1.1) + (1AC x 1.05) + [0.9 x (1AC + 2AC) x (ACHRF - 1) x 1.05]. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.
28. Total Second Stage Aftercooler Circuit heat rejection is calculated as: (OC x 1.2) + (2AC x 1.05) + [(1AC + 2AC) x 0.1 x (ACHRF - 1) x 1.05]. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.

FREE FIELD MECHANICAL & EXHAUST NOISE

MECHANICAL: Sound Power (1/3 Octave Frequencies)

Gen Power Without Fan	Percent Load	Engine Power	Overall	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz
ekW	%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1600	100	2242	116.6	77.2	87.0	87.7	90.3	96.5	98.1	98.9	101.2	93.8	102.6
1200	75	1683	115.5	76.3	84.2	84.9	88.9	93.3	97.2	94.3	99.0	92.5	100.8
800	50	1128	113.7	73.8	81.0	80.4	87.2	90.5	93.2	92.4	98.1	90.5	99.6

MECHANICAL: Sound Power (1/3 Octave Frequencies)

Gen Power Without Fan	Percent Load	Engine Power	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
ekW	%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1600	100	2242	107.9	105.6	108.6	105.5	103.2	102.6	101.3	101.0	101.1	106.1	109.8
1200	75	1683	107.9	103.4	105.7	104.3	101.2	101.1	100.1	100.1	100.7	110.6	99.2
800	50	1128	108.2	101.3	104.2	105.6	99.7	100.1	98.8	98.9	102.7	98.0	95.2

EXHAUST: Sound Power (1/3 Octave Frequencies)

Gen Power Without Fan	Percent Load	Engine Power	Overall	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz
ekW	%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1600	100	2242	117.6	107.2	98.1	98.0	88.1	106.8	97.7	106.0	100.2	94.2	102.5
1200	75	1683	117.1	106.8	96.7	96.0	92.9	110.8	99.0	105.5	97.8	95.8	102.1
800	50	1128	114.8	106.3	95.0	93.9	89.4	108.0	96.1	101.8	94.2	94.8	98.8

EXHAUST: Sound Power (1/3 Octave Frequencies)

Gen Power Without Fan	Percent Load	Engine Power	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
ekW	%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
1600	100	2242	100.4	102.1	101.7	101.9	104.9	106.9	107.2	107.4	105.8	104.7	107.9
1200	75	1683	97.9	100.9	101.6	98.9	103.0	105.2	105.9	106.6	105.3	101.0	105.8
800	50	1128	94.7	97.6	98.5	95.1	101.0	103.9	103.9	103.9	101.3	101.5	100.8

SOUND PARAMETER DEFINITION:

Sound Power Level Data - DM8702-01

Sound power is defined as the total sound energy emanating from a source irrespective of direction or distance. Sound power level data is presented under two index headings:
Sound power level -- Mechanical
Sound power level -- Exhaust

Mechanical: Sound power level data is calculated in accordance with ISO 6798. The data is recorded with the exhaust sound source isolated.

Exhaust: Sound power level data is calculated in accordance with ISO 6798 Annex A.

Measurements made in accordance with ISO 6798 for engine and exhaust sound level only. No cooling system noise is included unless specifically indicated. Sound level data is indicative of noise levels recorded on one engine sample in a survey grade 3 environment.

How an engine is packaged, installed and the site acoustical environment will affect the site specific sound levels. For site specific sound level guarantees, sound data collection needs to be done on-site or under similar conditions.

APPENDIX G

Model G3520C Gas IC Engine
Operation and Maintenance Plan

OPERATING AND MAINTENANCE PLAN

Table of Contents

1.0 Purpose

The purpose of this Operating and Maintenance Plan is to establish appropriate process operating, preventative maintenance and recordkeeping procedures to maintain compliance with applicable air pollutant emission limits for the four (4) landfill gas (LFG) treated gas fueled engines operated at Sarasota Energy, LLC (Sarasota Energy).

This Operating and Maintenance Plan has been developed in accordance with regulatory requirements of the FDEP-DARM.

A copy of the most recent Engine Malfunction Abatement/ Preventative Maintenance Plan will be kept on file at Sarasota Energy.

2.0 Facility and General Process Information

Sarasota Energy operates four (4) Caterpillar (CAT®) G3520C reciprocating internal combustion (IC) engines that are fueled with LFG (treated gas) and connected to electricity generators (IC engine generator sets). The IC engine generator sets are identified as ICE1 – ICE4.

The LFG generated at the Central County Solid Waste Disposal Complex (which is the source of the fuel used by Sarasota Energy) is collected using a system of wells, gas headers and blowers, which have been installed and are operated by the landfill owner. The LFG is dewatered, filtered and compressed (treated) before being supplied as fuel to operate the IC engine generator sets. The electricity generated by the Sarasota Energy is supplied for distribution by the local utility through a nearby power line.

3.0 Gas Collection/Treatment System Operation

LFG received from the landfill is initially de-watered in knockout tanks that are located upstream of the Sarasota Energy gas treatment system where a portion of the condensate in the LFG is removed.

After the initial knockout tank de-watering, the LFG is treated in equipment and processes operated by Sarasota Energy that consist of:

1. A primary filter vessel that contains a coalescing filter, which is designed to remove particles in the gas stream that are 1.0 micron and larger. Condensate collected by the coalescing filter falls to the bottom of the vessel where it flows by gravity to a sump that transfers the liquid back to the landfill for processing.

2. Gas blowers for compression of the de-watered LFG.

3. An air-to-gas cooler to reduce the temperature of the gas (which is heated by the blower during gas compression).

4. A polishing filter vessel that contains a coalescing filter, which is designed to remove particles that are 1.0 micron and larger. Condensate collected by the coalescing filter falls to the bottom of the vessel where it flows by gravity to a sump that transfers the liquid back to the landfill for processing.

The following sections describe normal operating ranges for each system in the gas treatment process.

3.1 Knockout Chamber Liquid Level

The primary and polishing filters typically operate without any noticeable condensate accumulation (no water is typically indicated to be present in the vessels). Noticeable water (condensate) accumulation is an indication that the upstream LFG de-watering equipment may have malfunctioned.

The chamber continuously drains to a sump; therefore, any condensate accumulation should be investigated. If condensate accumulation in the knockout vessels is greater than 50% (based on the water level indicated on the chamber sight glass), the electricity generation processes will be manually shutdown to avoid condensate carryover to the downstream components of the gas treatment system or the electricity generation engines. An investigation of the equipment will be performed and corrective actions implemented.

3.2 Blower Discharge Pressure

The pressure at the discharge of the blower is measured with an analog pressure gauge. The LFG blower should be operated such that the minimum pressure observed on the discharge side is greater than 1.5 pounds per square inch gauge (psig). Blower discharge pressures less than 1.6 psig are an indication of problems with the gas compression system.

If the blower discharge pressure is less than 1.6 psig, an investigation of the equipment will be performed and corrective actions implemented.

3.3 Coalescing Filter Differential Pressure

The pressure drop across each of the coalescing filters is monitored using an analog differential pressure gauge and a differential pressure switch. Large differential pressures (dP) indicate that the filters are wet or loaded with particulate matter and should be replaced. The dP across the primary and polishing filters should be less than or

equal to 3 pounds per square inch differential (psid), which is equivalent to 80 inches of water column (in. H_2O). If the pressure drop across either of the coalescing filters is greater than the specified value, the associated filters will be replaced.

The replacement filters will be of comparable design for critical air or gas service applications where high-efficiency removal of oil or water droplets and particulate solids is required. Sarasota Energy uses LG Liquid and Gas Coalescing Cartridges that measure 30 inches in length and 70 mm in diameter. The filters are rated for particulate matter removal to 0.3 microns (μm) and the nominal filter area is approximately 9.6 sq. ft.

3.4 Air-to-Gas Cooler Outlet Temperature

The temperature of the gas (fuel) at the outlet of the air-to-gas cooler is measured with an analog temperature gauge. The air-to-gas cooler is used to reduce the temperature of the fuel (which becomes elevated during the compression process). Outlet gas temperatures greater than 120°F are an indication of problems with the operation of the air-to-gas cooler. A temperature switch will sound an alarm if the outlet gas temperatures exceed 135°F.

If the outlet temperature of the air-to-gas cooler is greater than 120°F, an investigation of the equipment will be performed and corrective actions implemented.

4.0 Gas Collection/Treatment System Recordkeeping

4.1 Daily Inspections/Records

The following gas treatment system equipment and process components are monitored daily (when operators are normally scheduled to be on-site) to verify that the system is operating properly. Normal operating ranges and conditions for each parameter are presented in Section 3.0.

- Knockout chamber condensate accumulation
- Blower discharge pressure (at least 1 psig)
- Coalescing filter differential pressure (less than 80 in. w.c.)
- Air-to-gas cooler discharge temperature (less than 120°F)

Attachment A provides a form to be use for recording daily observations of facility and gas treatment system operations.

5.0 Engine Operation and Air Emission Controls

The CAT® G3520C gas IC engine is designed to fire low-pressure, lean fuel mixtures (e.g., LFG). The engine is equipped with an air-to-fuel ratio controller that monitors engine performance parameters and automatically adjusts the air-to-fuel ratio and ignition timing to maintain efficient fuel combustion. These calculations and adjustments are performed through software provided by the engine manufacturer, Caterpillar, Inc. (Caterpillar).

The engine/generator sets are not equipped with add-on emission control devices. Therefore, the units minimize air pollutant emissions through the proper operation of the engine and efficient fuel combustion, which:

- Reduces the formation of carbon monoxide (CO) and nitrogen oxide (NO_X) emissions.

- Destroys methane and nonmethane organic compounds (NMOC) in the treated LFG fuel (nonmethane hydrocarbons may be classified as volatile organic compounds and/or hazardous air pollutants).

The engine is equipped with numerous sensors that monitor critical operating parameters. An Engine Control Module (ECM) processes the data and adjusts operating variables (ignition timing, air/fuel ratio, engine speed), activates alarms to warn of an out-of-range variable or shuts down the engine.

5.1 Air / Fuel Ratio Control

Maintaining proper air/fuel ratio results in efficient fuel combustion and limits the formation of CO and NO_X. The engine is equipped with an inlet gas quality monitor that continuously monitors the inlet LFG fuel for methane and oxygen content. The ECM software continuously monitors fuel gas conditions, IC engine load and IC engine speed and automatically adjusts the air/fuel mix valve (raptor valve position) to achieve the desired air/fuel mix setting.

If the monitored LFG oxygen level increases, or the methane content decreases, beyond preset values, the affected IC engine automatically shuts down when the desired air/fuel mix ratio cannot be obtained. This prevents excess air pollutant emissions.

Abnormal fuel conditions and/or engine shutdown is logged/recorded by the ECM. The cause of the excess oxygen or decreased methane is investigated (this is typically caused from landfill wellfield maintenance or adjustments) and corrected by the plant operators and the engines are restarted.

5.2 On-Call Dial-Out System

The facility is not staffed around the clock. Therefore, the ECM is connected to a dial-out system that notifies the on-call plant operator of any engine shutdowns and certain faults and warnings during evening/weekend/holiday hours when the facility is not regularly staffed.

6.0 Engine Inspections and Preventative Maintenance

6.1 Daily Inspections

The plant operators perform daily visual inspections of the LFG fueled IC engines and log/record the following information (among other data) in facility records:

- LFG use rates and composition;
- Engine coolant temperature and pressure;
- Engine oil level, temperature, pressure;
- Combustion air and turbo temperatures;
- Generator load.

Attachment A provides a form that is used to record daily observations of the gas treatment system and IC engine/generator set operation. Completed forms are maintained on file at the facility.

6.2 Preventative Maintenance Schedule

The IC engines are maintained per the guidelines in the Caterpillar Operation and Maintenance Manual. The actual maintenance schedule is dependent on site-specific fuel gas conditions and observations of IC engine performance.

The following preventative maintenance is performed at approximately the specified intervals:

- Replace engine oil and filter (800 hours)
- Check and clean or replace spark plugs (1,000 hours)
- Engine valve inspections and adjustments (1,000 hours)
- Inspect cylinder heads, clean or replace as necessary (8,000-10,000 hours)

The replacement of IC engine parts (such as cylinder seals) is performed during top-end IC engine overhauls that are performed every 8,000 to 10,000 operating hours.

IC engine maintenance is documented on preventative maintenance sheets, which are maintained on-site in a file folder for each unit.

6.3 Engine Oil / Engine Coolant Temperature

Engine oil and engine coolant conditions do not directly influence air pollutant emissions. However, maintaining proper engine oil/coolant temperature and pressure is critical to the operation of the IC engine and preventing early or catastrophic mechanical failure.

The IC engine is equipped with sensors that monitor its oil temperature and oil pressure before and after the oil filter. Notification alarms are activated based on out-of-range conditions (e.g., high oil temperature, low or high oil pressure). An automatic IC engine shutdown will occur if the monitored parameter exceeds a critical setpoint.

Coolant temperature is monitored to assure proper circulation of coolant and cooling of the IC engine block. Notification alarms are activated based on out-of-range conditions (high or low coolant temperature). An automatic IC engine shutdown will occur if the coolant temperature exceeds its critical setpoint temperature.

Abnormal IC engine operations or shutdowns are logged by the ECM. The cause of the problem is investigated and corrected by the plant operators and the IC engine is restarted.

6.4 Oil Sampling Program

When IC engine oil is changed, a sample of the oil is sent to a contract laboratory for analysis of several properties. The oil analysis results are used to determine oil condition, the level of engine wear, or parts that may need attention (inspection or replacement). Depending upon the results of these analyses, the IC engine maintenance schedule may be adjusted from that presented in the manufacturer's guidelines.

6.5 Parts Inventory

Important IC engine and generator parts are available on-site and kept in inventory. A sample of these parts include air filters, oil filters, spark plugs, sensors, pumps, thermostats, engine block heads, new engine oil and coolant.

7.0 Operating Parameter Recordkeeping and Calculations

7.1 Operating Data

In addition to the IC engine operating data that is manually recorded by the plant operators on a daily basis (Plant Daily Reading form in Attachment A), Sarasota Energy maintains a data management system that monitors and records:

- Gas flow (total gas flow in scfm to the IC engines).
- Electricity generation for each generator (kWh).
- Accumulated operating hours for each IC engine.

At the end of each month, plant operators download the data from the data management system, make appropriate daily gas use and operating hour calculations and store this information in electronic records.

7.2 Landfill Gas Consumption Rate

The flowrate of treated LFG to the IC engines is measured by an orifice-type flowmeter installed between the polishing filter and the engines. The amount of treated LFG used by the IC engines is continuously recorded by a totalizer. The totalized value (standard cubic feet of gas) is recorded at the beginning and end of each month to determine the monthly consumption of LFG for all engines (combined). This information is entered into the monthly emissions spreadsheet, which is formatted to calculate a 12-month rolling total.

The calculated monthly and 12-month rolling total are compared to the limitations specified in the Construction Permit.

On an annual basis the accuracy of the flowmeter (components within the flowmeter system) is verified and, if needed, recalibrated. Information for the accuracy verification and/or recalibration in maintained on-site or recorded in the facility log book.

7.3 Landfill Gas Btu Content Determination

Sarasota Energy has installed, and operates, a Siemens Ultramat 23 continuous gas analyzer (Model 7MB2337-8DR10-5CQ1) that continually samples the treated LFG that is used to fuel the IC engines. The gas stream is analyzed for methane content (percent methane by volume, $\%CH_4$) using an infrared detector.

Plant operators manually record the LFG methane value measured by the Siemens Ultramat 23 continuous gas analyzer at least once per week. These values ($\%CH_4$ by

vol.) are averaged over the month and entered into the monthly emissions spreadsheet as a monthly average. The lower heating value (LHV) and higher heating value (HHV) of the LFG is calculated using the LHV for methane (910 Btu/scf) and the HHV for methane (1,012 Btu/scf), respectively:

LFG heat content LHV = (%CH_4) x (910 Btu/scf)
LFG heat content HHV = (%CH_4) x (1012 Btu/scf)

8.0 Personnel Responsibilities

The Plant Operator is responsible for operating the engines, regular inspections and monitoring (completing checklists), maintaining spare parts, preventative maintenance and recordkeeping as specified in this Plan. Major engine maintenance or malfunctions are reported to the Regional Manager.

The Regional Manager and Plant Operator will determine when revision of this Plan is necessary.

The Regional Manager and Plant Operator are responsible for ensuring that this Plan is maintained on file, is accessible and kept up-to-date.

Plan revisions will be documented using the revision history log (Attachment B).

9.0 Appendices

The following documents and materials are included as part of this Operating and Maintenance Plan:

Attachment A: Daily Readings Form
Attachment B: Operating and Maintenance Plan Revision History

ATTACHMENT A

DAILY READINGS FORM

Plant Daily Readings - Example

	Unit # 1	Unit # 2	Unit # 3	Unit # 4
Generator KW setpoint	kW	kW	kW	kW
Megawatt Hours (489 display)	MWh	MWh	MWh	MWh
Gas Flow		cfm	cfm	cfm
Total Gas Flow				scfm
Engine Oil Pressure	psi	psi	psi	psi
Engine Oil Differential Pressure	psi	psi	psi	psi
Engine Coolant Pressure	psi	psi	psi	psi
Engine Oil Temperature	F	F	F	F
Engine Coolant Temperature	F	F	F	F
Throttle Angle	%	%	%	%
Right Turbo Inlet Temperature	F	F	F	F
Left Turbo Inlet Temperature	F	F	F	F
Engine Hours	Hours	Hours	Hours	Hours
Gas Pressure	psi	psi	psi	psi
Crank Case Vent Vacuum	"H2O	"H2O	"H2O	"H2O
JW Temperature IN/OUT	F/ F	F/ F	F/ F	F/ F
M/U Oil Level (fill if below 6 gal)	gal	gal	gal	gal
Battery Charger Amps/Volts	a/ V	a/ V	a/ V	a/ V
Combustion Air Temperature	F	F	F	F
SCAC Temperature IN/OUT	F/ F	F/ F	F/ F	F/ F
Oil Dipstick Level	Add 1/4 1/2 3/4 Full	Add 1/4 1/2 3/4 Full	Add 1/4 1/2 3/4 Full	Add 1/4 1/2 3/4 Full

Bulk Oil Tanks	
New Oil: gallons	
Waste Oil: gallons	

Engine Room Temperature	F
Ambient Temperature	F
Air Compressor	
Hours/ F/ psi	

NOTES:

Date:

Time:

Operator:

TIE Screen	
Volts	
Amps	
Total kW	
kW Hour Total	
Parasitic Load	
Total Parasitic Load	
48V Battery Volts/Amps	/

Gas Readings / Treatment System	
Vacuum	
CH4	
CO2	
O2	
Balance	
Gas Header Pressure	psig
Gas Header Temp (after air/gas cooler)	°F
Blower discharge pressure	psig
Primary filter knockout condensate level	
Primary filter differential pressure	"H2O
Polishing filter knockout condensate level	
Polishing filter differential pressure	"H2O

ATTACHMENT B

OPERATING AND MAINTENANCE PLAN
REVISION HISTORY

Sarasota Energy, LLC

Operating and Maintenance Plan
Revision History

Date of Revision	Reason For Revision

APPENDIX H

Sarasota Energy, LLC.
Regulated Air Pollutant Emission Rate Calculations

Table H-1

Summary of Criteria Air Pollutant, HAPs and GHG Emission Rates
Landfill Gas Fueled IC Engine

CAT® G3520C IC Engine Specifications

Net Power Output	2,242	bhp	Min. LFG heat content (LHV):	350	Btu/scf
Heat input rate (LHV)	14.96	MMBtu/hr (1)	Max. fuel consumption (per hr)	42,753	scf/hr
Heat input rate (HHV)	16.63	MMBtu/hr	Max. fuel consumption (per min)	713	scfm
			Max. fuel consumption (daily)	1.026	MMscf/day

		Pollutant Emission Factors			Pollutant Emission Rates Single Engine		Pollutant Emission Rates Four (4) Engines	
Regulated Pollutant		(g/bhp-hr)	(lb/MMscf)	(lb/MMBtu)	(lb/hr)	(TpY)	(lb/hr)	(TpY)
Criteria Pollutants								
Nitrogen Oxides (2)	NO_X	0.60	--	0.198	2.97	13.0	11.86	52.0
Carbon Monoxide (2)	CO	3.50	--	1.156	17.3	75.8	69.20	303.1
Particulate Matter (2)	PM10/PM2.5	0.24	--	0.079	1.19	5.20	4.74	20.8
Volatile Organic Compounds (3)	VOC	0.42	--	0.137	2.05	8.99	8.21	36.0
Non-Methane Hydrocarbons (4)	NMOC	0.52	--	0.172	2.57	11.26	10.28	45.0
Sulfur Dioxide (3)	SO_2	--	48.0	0.137	2.05	8.99	8.21	36.0
Hazardous Air Pollutants (HAPs)								
LFG Constituents (5)	HAPs	--	3.04	0.009	0.13	0.57	0.52	2.3
Hydrogen Chloride (6)	HCl	--	11.17	0.032	0.48	2.09	1.91	8.4
Formaldehyde (7)	HCHO	0.42	--	0.139	2.08	9.09	8.30	36.4
Total								47.0
Greenhouse Gases (GHG) (8)								
Carbon Dioxide - CO2e	CO_2	--	--	--	--	8,357	--	33,428
Methane - CO2e	CH_4	--	--	--	--	11	--	44
Nitrous Oxide - CO2e	N_2O	--	--	--	--	31	--	124
Total								33,596

Notes

1 Engine heat input rate based on CAT G3520C gas engine spec sheet (which is provided in Appendix F) 'LHV Input' 243,311 Btu/min plus 2.5% tolerance

2 Emissions based on BACT determination

3 Emissions based on 90% of PSD significant emission increase threshold of 40 TpY.

4 Emissions based on 90% of PSD significant emission increase threshold of 50 TpY

5 HAPs from LFG constituents based on AP-42 default data (see the Tables H-4 and H-5)

6 HCl emissions based on conversion of chlorinated LFG constituents (see Table H-4)

7 HCHO emissions from CAT G3520C gas engine spec sheet (see Appendix F)

8 Greenhouse gas emissions (see Tables H-7 and H-8)

Table H-2

Sulfur Dioxide Emission Factor for LFG Combustion

LFG Influent Sulfur Compound	EPA AP-42 Concentrations (ppmv)	Utilized Concentrations (ppmv)	Molecular Formula	No. Sulfur Atoms	Sulfur Content as H_2S (ppmv)	Resulting SO_2 Emission Rate (lb./MMcf)
Hydrogen sulfide	35.50	274.2 [A]	H_2S	1	274.2 [C]	45.63 [D]
Carbon disulfide	0.58	0.58 [B]	CS_2	2	1.2	0.19
Carbonyl sulfide	0.49	0.49 [B]	CSO	1	0.5	0.08
Dimethyl sulfide	7.82	7.82 [B]	C_2H_6S	1	7.8	1.30
Ethyl mercaptan	2.28	2.28 [B]	C_2H_6S	1	2.3	0.38
Methyl mercaptan	2.49	2.49 [B]	CH_4S	1	2.5	0.41
Total					**288.5**	**48.00** [E]

Notes

A. Estimated worst-case hydrogen sulfide emissions.

B. Default concentration for LFG constituents from USEPA Compilation of Air Pollutant Emission Factors, Fifth Edition, Volume I: Stationary Point and Area Sources (AP-42), Table 2.4-1, which is provided at the end of this Appendix.

C. Determined by multiplying concentration by number of sulfur atoms in the molecule.

D. Sample calculation: SO_2 generation from hydrogen sulfide (H_2S):

(274.2 scf H_2S/MMcf LFG) (1 scf SO_2/scf H_2S) (64.06 lb.SO_2/mol) / (385.3 ft^3/mol)

= 45.6 lb SO_2/MMcf LFG

E. Calculation of SO_2 emission factor from sulfur content, as H_2S:

(288.5 scf H_2S/MMcf LFG) (1 scf SO_2/scf H_2S) (64.06 lb.SO_2/mol) / (385 ft^3/mol)

= 48.0 lb SO_2/MMcf LFG

Sulfur Dioxide Emission Factor for LFG Combustion

LFG sulfur content: **288.5 ppm as H_2S**

Fuel Sulfur Content Calculation (% Weight)

Expected fixed gas concentrations:

CH_4	>45.0% vol.
CO_2	<40.0% vol.
O_2	<3.0% vol.
Balance N_2	<12.0% vol.

Calculated LFG molecular weight:

$(16)(\%CH_4) + (44)(\%CO_2) + (32)(\%O_2) + (28)(\%N_2) =$ 29.1 g/mol

LFG sulfur content

(288.5 mol H_2S) / (10^6 mol LFG) (32 g S/mol H_2S) / (29.1 g LFG/mol) = 0.032% wt.

Sulfur Dioxide Emission Factor

Calculation of SO_2 emission factor from sulfur content, as H_2S:

(288.5 scf H_2S/MMcf LFG) (1 scf SO_2/scf H_2S) (64.06 lb.SO_2/mol) / (385 ft^3/mol)

= 48.0 lb SO_2/MMcf LFG

Table H-4

LFG Combustion Hydrogen Chloride Emission Factor

Influent Chlorine Compounds	Landfill Gas Concentration[1] (ppmv)	Molecular Formula	No. Chlorine Atoms	Destruction Effeciency[2] (%)	HCl Emission Factor (lb/MMcf)
1,1,1-trichloroethane	0.48	$C_2H_3Cl_3$	3	93.0%	0.13 [A]
1,1,2,2-tetra chloroethane	1.11	$C_2H_2Cl_4$	4	93.0%	0.39
1,1-dichloroethane	2.35	$C_2H_4Cl_2$	2	93.0%	0.41
1,1-dichloroethene	0.2	$C_2H_2Cl_2$	2	93.0%	0.04
1,2-dichloroethane	0.41	$C_2H_4Cl_2$	2	93.0%	0.07
1,2-dichloropropane	0.18	$C_3H_6Cl_2$	2	93.0%	0.03
Bromodichloromethane	3.13	$CBrCl_2$	2	93.0%	0.55
Carbon tetrachloride	0.004	CCl_4	4	93.0%	0.00
Chlorobenzene	0.25	C_6H_5Cl	1	93.0%	0.02
Chlorodifluoromethane	1.3	$CHFCl$	1	93.0%	0.11
Chloroethane	1.25	C_2H_5Cl	1	93.0%	0.11
Chloroform	0.03	$CHCl_3$	3	93.0%	0.01
Chloromethane	1.21	CH_3Cl	1	93.0%	0.11
Dichlorobenzene	0.21	$C_6H_4Cl_2$	2	93.0%	0.04
Dichlorodifluoromethane	15.7	CF_2Cl_2	2	93.0%	2.77
Dichlorofluoromethane	2.62	$CHFCl_2$	2	93.0%	0.46
Dichloromethane	14.3	CH_2Cl_2	2	93.0%	2.52
Fluorotrichloromethane	0.76	$CFCl_3$	3	93.0%	0.20
Perchloroethylene	3.73	C_2Cl_4	4	93.0%	1.31
Trichloroethylene	2.82	C_2HCl_3	3	93.0%	0.75
t-1,2-dichloroethane	2.84	$C_2H_2Cl_2$	2	93.0%	0.50
Vinyl chloride	7.34	C_2HCl	1	93.0%	0.65
Total hydrogen chloride emission factor (lb/MMcf)					**11.17**

Notes

1 From AP-42 default concentrations provided at the end of this Appendix.

2 AP-42 default control efficiency values for IC engines, Table 2.4-3.

A Assumes complete conversion of chloride to HCl, calculation for 1,1,1-trichloroethane (TCE):
(0.48 ft^3 TCE/MMcf LFG) (3 mol HCl/mol TCE) (36.46 lb. HCl/mol) (93%) / (385 ft^3/mol)
= 0.13 lb. HCl/MMcf LFG

LFG Combustion Hazardous Air Pollutant Emissions for each IC Engine (ENG01/S01 - ENG04/S04)

HAPs[1]	Landfill Gas Concentration[2] (ppmv)	(mg/m^3)	Molecular Weight	Destruction Effeciency[3] (%)	HAP Emission Factor (lb/MMcf)	HAP Emissions for 1 RICE (TpY)
1,1,1-trichloroethane	0.48	2.66	133.42	93.0%	0.012 [A]	2.18E-03
1,1,2,2-tetrachloroethane	1.11	7.75	167.85	93.0%	0.034	6.34E-03
1,1-dichloroethane	2.35	9.67	98.95	93.0%	0.042	7.92E-03
1,1-dichloroethene	0.2	0.81	96.94	93.0%	0.004	6.60E-04
1,2-dichloroethane	0.41	1.69	98.96	93.0%	0.007	1.38E-03
1,2-dichloropropane	0.18	0.85	112.98	93.0%	0.004	6.92E-04
Acrylonitrile	6.33	13.97	53.06	86.1%	0.121	2.27E-02
Benzene	1.91	6.20	78.11	86.1%	0.054	1.01E-02
Carbon disulfide	0.58	1.84	76.13	86.1%	0.016	2.99E-03
Carbon tetrachloride	0.004	0.03	153.84	93.0%	0.000	2.10E-05
Carbonyl sulfide	0.49	1.22	60.07	86.1%	0.011	1.99E-03
Chlorobenzene	0.25	1.17	112.56	93.0%	0.005	9.58E-04
Chloroethane	1.25	3.35	64.52	93.0%	0.015	2.75E-03
Chloroform	0.03	0.15	119.39	93.0%	0.001	1.22E-04
Chloromethane	1.21	2.54	50.49	93.0%	0.011	2.08E-03
Dichloromethane	14.3	50.50	84.94	93.0%	0.221	4.14E-02
Ethyl Benzene	4.61	20.35	106.16	86.1%	0.177	3.31E-02
Ethylene dibromide	0.001	0.01	187.88	86.1%	0.000	1.27E-05
Hexane	6.57	23.54	86.17	86.1%	0.204	3.83E-02
Mercury (total)	2.92E-04	0.00	200.61	0.0%	0.000	2.85E-05
Methyl isobutyl ketone	1.87	7.79	100.16	86.1%	0.068	1.27E-02
Perchloroethylene	3.73	25.72	165.83	93.0%	0.112	2.11E-02
Toluene	39.3	150.55	92.13	86.1%	1.307	2.45E-01
Trichloroethylene	2.82	15.41	131.40	93.0%	0.067	1.26E-02
Vinyl chloride	7.34	19.07	62.50	93.0%	0.083	1.56E-02
Xylene	12.1	53.41	106.16	86.1%	0.464	8.68E-02
Total HAP emissions for LFG constituents					**3.04**	**0.57**
Hydrogen chloride	NA	NA	36.46	0.0%	11.17 [B]	2.09
Formaldehyde	NA	NA	NA	NA	NA	9.09 [C]
Total HAP emissions						**11.75**

Notes

1 1990 CAA Amendments Section 112(b) HAP

2 AP-42 default concentrations, Tables 2.4-1 and 2.4-2 (see materials provided at end of this Appendix)

3 AP-42 default control efficiency values for IC engines, Table 2.4-3 (see materials provided at the end of this Appendix)

A Sample calculation, 1,1,1 trichloroethane (TCE) emissions
(0.48 ft^3 TCE/MMcf LFG) (133.42 lb. TCE/mol) (1-0.93) / (385 ft^3 TCE/mol)
≈ 0.012 lb. TCE/MMcf LFG

B Calculated HCl emission factor from AP-42 default data (see Table H-4)

C Based on engine manufacturer's data (see Table H-1)

LFG Combustion Hazardous Air Pollutant Emissions for all IC Engine (ENG01/S01 - ENG04/S04)

HAPs[1]	Landfill Gas Concentration[2] (ppmv)	(mg/m^3)	Molecular Weight	Destruction Effeciency[3] (%)	HAP Emission Factor (lb/MMcf)	HAP Emissions for 4 RICE (TpY)
1,1,1-trichloroethane	0.48	2.66	133.42	93.0%	0.012 [A]	8.72E-03
1,1,2,2-tetrachloroethane	1.11	7.75	167.85	93.0%	0.034	2.54E-02
1,1-dichloroethane	2.35	9.67	98.95	93.0%	0.042	3.17E-02
1,1-dichloroethene	0.2	0.81	96.94	93.0%	0.004	2.64E-03
1,2-dichloroethane	0.41	1.69	98.96	93.0%	0.007	5.53E-03
1,2-dichloropropane	0.18	0.85	112.98	93.0%	0.004	2.77E-03
Acrylonitrile	6.33	13.97	53.06	86.1%	0.121	9.08E-02
Benzene	1.91	6.20	78.11	86.1%	0.054	4.03E-02
Carbon disulfide	0.58	1.84	76.13	86.1%	0.016	1.19E-02
Carbon tetrachloride	0.004	0.03	153.84	93.0%	0.000	8.38E-05
Carbonyl sulfide	0.49	1.22	60.07	86.1%	0.011	7.96E-03
Chlorobenzene	0.25	1.17	112.56	93.0%	0.005	3.83E-03
Chloroethane	1.25	3.35	64.52	93.0%	0.015	1.10E-02
Chloroform	0.03	0.15	119.39	93.0%	0.001	4.88E-04
Chloromethane	1.21	2.54	50.49	93.0%	0.011	8.32E-03
Dichloromethane	14.3	50.50	84.94	93.0%	0.221	1.65E-01
Ethyl Benzene	4.61	20.35	106.16	86.1%	0.177	1.32E-01
Ethylene dibromide	0.001	0.01	187.88	86.1%	0.000	5.08E-05
Hexane	6.57	23.54	86.17	86.1%	0.204	1.53E-01
Mercury (total)	2.92E-04	0.00	200.61	0.0%	0.000	1.14E-04
Methyl isobutyl ketone	1.87	7.79	100.16	86.1%	0.068	5.07E-02
Perchloroethylene	3.73	25.72	165.83	93.0%	0.112	8.42E-02
Toluene	39.3	150.55	92.13	86.1%	1.307	9.79E-01
Trichloroethylene	2.82	15.41	131.40	93.0%	0.067	5.05E-02
Vinyl chloride	7.34	19.07	62.50	93.0%	0.083	6.25E-02
Xylene	12.1	53.41	106.16	86.1%	0.464	3.47E-01
Total HAP emissions for LFG constituents					**3.04**	**2.28**
Hydrogen chloride	NA	NA	36.46	0.0%	11.17 [B]	8.37
Formaldehyde	NA	NA	NA	NA	NA	36.37 [C]
Total HAP emissions						**47.02**

Notes

1 1990 CAA Amendments Section 112(b) HAP

2 AP-42 default concentrations, Tables 2.4-1 and 2.4-2 (see materials provided at end of this Appendix)

3 AP-42 default control efficiency values for IC engines, Table 2.4-3 (see materials provided at the end of this Appendix)

A Sample calculation, 1,1,1 trichloroethane (TCE) emissions
(0.48 ft^3 TCE/MMcf LFG) (133.42 lb. TCE/mol) (1-0.93) / (385 ft^3 TCE/mol)
= 0.012 lb. TCE/MMcf LFG

B Calculated HCl emission factor from AP-42 default data (see table H-4)

C Based on engine manufacturer's data (see Table H-1)

Table H-7

LFG Combustion Greenhouse Gas Emissions for Each IC Engine (ENG01/S01 - ENG04/S04)

Heat input rate (per unit): 16.6 MMBtu/hr HHV
Number of units: 1

Greenhouse Gas Emissions

Greenhouse Gases	Emission Factor (kg/MMBtu)	Emission Rate (MT/yr)	Global Warming Potential	Emission Rate CO_{2e} (MT/yr)	Emission Rate CO_{2e} (tons/yr)
Carbon dioxide (CO_2)	52.07	7,584	1	7,584	8,357
Methane (CH_4)	3.2E-03	0.5	21	10	11
Nitrous oxide (N_2O)	6.3E-04	0.1	310	28	31
Total					**8,399**

Heat values and GHG emission factors from 40 CFR Part 98 Table C-1 and C-2
Emission Rate, MT = (Heat input rate, MMBtu/yr) x (Emission factor, kg/MMBtu) / (1,000 kg/MT)
Emission Rate, MT CO_{2e}= (Emission Rate, MT/yr) x (GWP)

Greenhouse Emissions Reduced

Greenhouse Gases	Heating Value Methane (Btu/scf)	Emission Rate (MT/yr)	Global Warming Potential	Emission Rate CO_{2e} (MT/yr)	Emission Rate CO_{2e} (tons/yr)
Methane reduced	1,010	2,718	21	-57,073	-62,895

Methane reduced = (Btu/yr) (0.042 lb/scf) (0.907 MT/ton) / (1010 Btu/scf) / (2000 lb/ton)

Table H-8

LFG Combustion Greenhouse Gas Emissions for All IC Engines (ENG01/S01 - ENG04/S04)

Heat input rate (per unit): 16.6 MMBtu/hr HHV
Number of units: 4

Greenhouse Gas Emissions

Greenhouse Gases	Emission Factor (kg/MMBtu)	Emission Rate (MT/yr)	Global Warming Potential	Emission Rate CO_{2e} (MT/yr)	Emission Rate CO_{2e} (tons/yr)
Carbon dioxide (CO_2)	52.07	30,335	1	30,335	33,429
Methane (CH_4)	3.2E-03	1.9	21	39	43
Nitrous oxide (N_2O)	6.3E-04	0.4	310	114	125
Total					**33,598**

Heat values and GHG emission factors from 40 CFR Part 98 Table C-1 and C-2
Emission Rate, MT = (Heat input rate, MMBtu/yr) x (Emission factor, kg/MMBtu) / (1,000 kg/MT)
Emission Rate, MT CO_{2e}= (Emission Rate, MT/yr) x (GWP)

Greenhouse Emissions Reduced

Greenhouse Gases	Heating Value Methane (Btu/scf)	Emission Rate (MT/yr)	Global Warming Potential	Emission Rate CO_{2e} (MT/yr)	Emission Rate CO_{2e} (tons/yr)
Methane reduced	1,010	10,871	21	-228,293	-251,579

Methane reduced = (Btu/yr) (0.042 lb/scf) (0.907 MT/ton) / (1010 Btu/scf) / (2000 lb/ton)

Table H-9

LFG Combustion Hazardous Air Pollutant CAS Numbers

HAPs	CAS Number
1,1,1-trichloroethane	71-55-6
1,1,2,2-tetrachloroethane	79-34-5
1,1-dichloroethane	75-37-6
1,1-dichloroethene	75-38-7
1,2-dichloroethane	107-06-2
1,2-dichloropropane	78-87-5
Acrylonitrile	107-13-1
Benzene	71-43-2
Carbon disulfide	75-15-0
Carbon tetrachloride	56-23-5
Carbonyl sulfide	463-58-1
Chlorobenzene	108-90-7
Chloroethane	75-00-3
Chloroform	67-66-3
Chloromethane	74-87-3
Dichloromethane	75-09-2
Ethyl Benzene	100-41-4
Ethylene dibromide	106-93-4
Formaldehyde	50-00-0
Hexane	110-54-3
Hydrogen chloride	7647-01-0
Mercury (total)	7439-97-6
Methyl isobutyl ketone	108-10-1
Perchloroethylene	127-18-4
Toluene	108-88-3
Trichloroethylene	79-01-6
Vinyl chloride	75-01-4
Xylene	1330-20-7

Table 2.4-1. DEFAULT CONCENTRATIONS FOR LFG CONSTITUENTS[a]

(SCC 50100402, 50300603)

Compound	Molecular Weight	Default Concentration (ppmv)	Emission Factor Rating
1,1,1-Trichloroethane (methyl chloroform)[a]	133.41	0.48	B
1,1,2,2-Tetrachloroethane[a]	167.85	1.11	C
1,1-Dichloroethane (ethylidene dichloride)[a]	98.97	2.35	B
1,1-Dichloroethene (vinylidene chloride)[a]	96.94	0.20	B
1,2-Dichloroethane (ethylene dichloride)[a]	98.96	0.41	B
1,2-Dichloropropane (propylene dichloride)[a]	112.99	0.18	D
2-Propanol (isopropyl alcohol)	60.11	50.1	E
Acetone	58.08	7.01	B
Acrylonitrile[a]	53.06	6.33	D
Bromodichloromethane	163.83	3.13	C
Butane	58.12	5.03	C
Carbon disulfide[a]	76.13	0.58	C
Carbon monoxide[b]	28.01	141	E
Carbon tetrachloride[a]	153.84	0.004	B
Carbonyl sulfide[a]	60.07	0.49	D
Chlorobenzene[a]	112.56	0.25	C
Chlorodifluoromethane	86.47	1.30	C
Chloroethane (ethyl chloride)[a]	64.52	1.25	B
Chloroform[a]	119.39	0.03	B
Chloromethane	50.49	1.21	B
Dichlorobenzene[c]	147	0.21	E
Dichlorodifluoromethane	120.91	15.7	A
Dichlorofluoromethane	102.92	2.62	D
Dichloromethane (methylene chloride)[a]	84.94	14.3	A
Dimethyl sulfide (methyl sulfide)	62.13	7.82	C
Ethane	30.07	889	C
Ethanol	46.08	27.2	E
Ethyl mercaptan (ethanethiol)	62.13	2.28	D
Ethylbenzene[a]	106.16	4.61	B
Ethylene dibromide	187.88	0.001	E
Fluorotrichloromethane	137.38	0.76	B
Hexane[a]	86.18	6.57	B
Hydrogen sulfide	34.08	35.5	B
Mercury (total)[a,d]	200.61	2.92×10^{-4}	E

Table 2.4-1. (Concluded)

Compound	Molecular Weight	Default Concentration (ppmv)	Emission Factor Rating
Methyl ethyl ketone[a]	72.11	7.09	A
Methyl isobutyl ketone[a]	100.16	1.87	B
Methyl mercaptan	48.11	2.49	C
Pentane	72.15	3.29	C
Perchloroethylene (tetrachloroethylene)[a]	165.83	3.73	B
Propane	44.09	11.1	B
t-1,2-dichloroethene	96.94	2.84	B
Trichloroethylene (trichloroethene)[a]	131.40	2.82	B
Vinyl chloride[a]	62.50	7.34	B
Xylenes[a]	106.16	12.1	B

NOTE: This is not an all-inclusive list of potential LFG constituents, only those for which test data were available at multiple sites. References 10-67. Source Classification Codes in parentheses.

[a] Hazardous Air Pollutants listed in Title III of the 1990 Clean Air Act Amendments.

[b] Carbon monoxide is not a typical constituent of LFG, but does exist in instances involving landfill (underground) combustion. Therefore, this default value should be used with caution. Of 18 sites where CO was measured, only 2 showed detectable levels of CO.

[c] Source tests did not indicate whether this compound was the para- or ortho- isomer. The para isomer is a Title III-listed HAP.

[d] No data were available to speciate total Hg into the elemental and organic forms.

Table 2.4-2. DEFAULT CONCENTRATIONS OF BENZENE, NMOC, AND TOLUENE BASED ON WASTE DISPOSAL HISTORY[a]

(SCC 50100402, 50300603)

Pollutant	Molecular Weight	Default Concentration (ppmv)	Emission Factor Rating
Benzene[b]	78.11		
Co-disposal		11.1	D
No or Unknown co-disposal		1.91	B
NMOC (as hexane)[c]	86.18		
Co-disposal		2420	D
No or Unknown co-disposal		595	B
Toluene[b]	92.13		
Co-disposal		165	D
No or Unknown co-disposal		39.3	A

[a] References 10-54. Source Classification Codes in parentheses.

[b] Hazardous Air Pollutants listed in Title III of the 1990 Clean Air Act Amendments.

[c] For NSPS/Emission Guideline compliance purposes, the default concentration for NMOC as specified in the final rule must be used. For purposes not associated with NSPS/Emission Guideline compliance, the default VOC content at co-disposal sites = 85 percent by weight (2,060 ppmv as hexane); at No or Unknown sites = 39 percent by weight 235 ppmv as hexane).

Table 2.4-3. CONTROL EFFICIENCIES FOR LFG CONSTITUENTS[a]

Control Device	Constituent[b]	Control Efficiency (%)		
		Typical	Range	Rating
Boiler/Steam Turbine (50100423)	NMOC	98.0	96-99+	D
	Halogenated Species	99.6	87-99+	D
	Non-Halogenated Species	99.8	67-99+	D
Flare[c] (50100410) (50300601)	NMOC	99.2	90-99+	B
	Halogenated Species	98.0	91-99+	C
	Non-Halogenated Species	99.7	38-99+	C
Gas Turbine (50100420)	NMOC	94.4	90-99+	E
	Halogenated Species	99.7	98-99+	E
	Non-Halogenated Species	98.2	97-99+	E
IC Engine (50100421)	NMOC	97.2	94-99+	E
	Halogenated Species	93.0	90-99+	E
	Non-Halogenated Species	86.1	25-99+	E

[a] References 10-67. Source Classification Codes in parentheses.
[b] Halogenated species are those containing atoms of chlorine, bromine, fluorine, or iodine. For any equipment, the control efficiency for mercury should be assumed to be 0. See section 2.4.4.2 for methods to estimate emissions of SO_2, CO_2, and HCl.
[c] Where information on equipment was given in the reference, test data were taken from enclosed flares. Control efficiencies are assumed to be equally representative of open flares.

APPENDIX I

Sarasota Energy, LLC
Source Impact Analysis
Air Quality Analysis
(Document will be submitted under separate cover upon its completion)

APPENDIX J

Sarasota Energy, LLC
Sources Impacting Federal Class I Areas
(Document will be submitted under separate cover upon its completion)

APPENDIX K

Sarasota Energy, LLC
Control Technology Review

CONTROL TECHNOLOGY REVIEW

The Best Available Control Technology (BACT) analyses presented in this air construction permit application have been developed in accordance with guidance issued by the U.S. Environmental Protection Agency (USEPA) for the top-down method that consists of the following five steps:

Step 1 – Identify all available control technologies for each PSD pollutant subject to review.

Step 2 – Eliminate all technically infeasible control technologies.

Step 3 – Rank the remaining control technologies by control effectiveness.

Step 4 – Evaluate the feasible control technologies, beginning with the most efficient, with respect to economic, energy, and environmental impacts.

Step 5 – Select as BACT the most effective control technology that is not rejected based on adverse economic, environmental, and/or energy impacts.

The first step in performing the BACT analyses is the identification of all available control technologies for each PSD pollutant subject to review. Available control options were considered to be technologies or techniques that can be realistically installed or utilized on the proposed landfill gas (LFG) fueled IC engines. Therefore, appropriate information from the following sources was reviewed to assemble a list of available control options:

- The USEPA RBLC (RACT, BACT, LAER emission and control technology determination clearinghouse); and

- State air pollution control agencies based on their review of similar equipment and control analyses.

The USEPA RBLC database contains numerous emission and control technology determinations that have been made for a period of approximately 10 years through June 12, 2013 for the operation of LFG fueled IC engines. Appendix K-1 provides information on these air pollutant emission limit determinations.

The second step in performing the BACT analyses is to eliminate all technically infeasible control technologies. Each control technology that has been installed and successfully operated at a similar source was considered to be feasible. For control technologies that have not yet been demonstrated as feasible based on results of actual equipment operations, a determination of its availability and applicability for use on the proposed LFG fueled IC engines was performed. Availability is defined as being able to be obtained through commercial channels. Applicability is defined as being able to be reasonably installed and

operated on the proposed LFG fueled IC engines. The applicability analysis is required to provide physical, chemical or engineering data that proves the technology will not work successfully on the proposed LFG fueled IC engines.

The third step in performing the BACT analyses is to rank the remaining control technologies by control effectiveness.

The fourth step in performing the BACT analyses is an evaluation of the feasible control technologies beginning with the most efficient with respect to economic, energy and environmental impacts. If the top option is selected as BACT, and there are no significant environmental impacts, then the BACT review ends.

The fifth (and final) step in performing the BACT analyses is the selection of the most effective control technology that is not eliminated in the previous four (4) steps.

The BACT analyses presented in the air construction permit application are organized according the specified steps for each of the three (3) pollutants (CO, NO_X and $PM_{10}/PM_{2.5}$) that are subject to the control technology consideration.

CARBON MONOXIDE BACT ANALYSIS

Identification of CO Emission Control Technologies

The first step in performing the BACT analyses is the identification of all available control technologies for the PSD pollutant (carbon monoxide, CO) subject to review.

Based on recent experiences with PSD BACT analyses required for the approval of air permits by other state air pollution control agencies for landfill gas (LFG) fueled IC engines, which are identical to those specified for the proposed project, the following control technologies were selected for evaluation.

Thermal Oxidation – Flare

Thermal oxidation through the use of a flare is a process in which CO is controlled through its oxidation at a high temperature in the presence of oxygen to form carbon dioxide (CO_2).

$$2CO + O_2 + \text{heat} \rightarrow 2CO_2$$

The use of a flare for CO emission control would require the IC engine exhaust gas to be piped to a central location where it is combusted in an open flame through the use of a specially designed burner tip and auxiliary fuel source. Flares can be either open or enclosed. An open flare combusts the waste gas in the open air at the burner tip (typically a small shroud encloses the burner tip to lessen the impacts from wind). An enclosed flare combusts the waste gas with burners that are located at the base of an insulated cylindrical shell. In general, a flare can provide CO control efficiencies of up to 98%. However, the combustion of the auxiliary fuel can produce additional regulated criteria air pollutant emissions.

Thermal Oxidation – Recuperative Oxidizer

Thermal oxidation through the use of a recuperative oxidizer is similar to the flaring process except that the combustion takes place within a chamber and heat is recovered from the combustion process.

The use of a recuperative oxidizer for CO emission control would require the IC engine exhaust gas to be piped to a combustion chamber that is heated using an auxiliary fuel source. An air-to-air shell and tube heat exchanger installed after the exhaust gas combustion chamber uses the high temperature of the exhaust gas to preheat the incoming gas to minimize the amount of auxiliary fuel required for the devices operation. Typical recuperative oxidizers can achieve CO control efficiencies of up to 95% while operating at combustion temperatures of 1425 °F. Heat exchangers generally have an upper temperature limit of 1,200 °F, which allows for heat recovery efficiencies of up to 65%. However, impurities within LFG (when combusted) have the potential to foul the walls of the heat exchanger and reduce its heat

transfer efficiency. For the IC engine exhaust gas CO to be effectively oxidized, the oxygen (O_2) content in the specified combustion chamber must be greater than 16.5 % by volume. The O_2 content of the LFG fueled IC engine exhaust gas is approximately 8%. Therefore, additional excess air is required to be added to the specified combustion chamber.

Thermal Oxidation – Regenerative Oxidizer

A regenerative thermal oxidizer operates similarly to a recuperative thermal oxidizer except that the high temperature gas exhausted from the specified combustion chamber is used to preheat the incoming waste gas (engine exhaust gas) with a preheated, direct-contact heat exchanger, which typically consists of two (2) beds of ceramic material that has a high thermal tolerance.

The first ceramic bed preheats the incoming waste gas (engine exhaust gas). Hot gases from the combustion chamber are used to heat the second ceramic bed where the gas is cooled by the transfer of heat to the ceramic material. At preset intervals, the flow of gas through the system is reversed and the incoming gas is preheated by the ceramic bed that had been previously used to cool the hot combustion chamber effluent. This type of direct contact heat exchanging greatly minimizes the amount of auxiliary fuel that is required to operate the device. Typical regenerative oxidizers can achieve CO control efficiencies of up to 98% while operating at 1600 °F. The use of the direct contact heat exchanger allows for greater heat recovery efficiencies. Similar to recuperative oxidation, excess air must be added to the combustion chamber of the device so that its oxygen content is at least 16.5% by volume. Regenerative thermal oxidizers are also susceptible to plugging of the ceramic material by impurities produced by LFG combustion, which over time will reduce the thermal efficiency of the heat exchanger.

Oxidation Catalysts

Oxidation catalysts are used to reduce CO emissions in the exhausts of IC engines. The basic principle in the operation of the oxidation catalyst is the chemical reaction (oxidation) of CO in the presence of excess O_2, heat and a catalyst to form CO_2.

$$2CO + O_2 + \text{heat} \rightarrow_{cat} 2CO_2$$

The IC engine exhaust gas is required to be directed through a catalyst matrix that is generally composed of a precious metal (i.e., platinum or palladium). Oxidation catalysts can achieve CO reduction efficiencies in excess of 90%. However, they are susceptible to poisoning (i.e., encapsulation and deactivation of the catalyst) by impurities that may be present in the incoming waste gas.

Good Design and Operating Practices

Proper design and operation practices can limit the amount of CO that is generated by IC engine operations. Operating the IC engine at the proper air to fuel ratio ensures more complete combustion of the fuel and reduces CO emissions (which are a by-product of incomplete combustion). Engine timing is also important in reducing CO emissions. Fuel ignition must occur when the proper air to fuel mixture is achieved in the combustion cylinder. Fuel ignition prior to or after achieving the proper air to fuel mixture can result in incomplete combustion and generation of greater CO emissions.

Elimination of Technically Infeasible CO Control Options

The second step in performing the BACT analyses is to eliminate all technically infeasible control technologies.

None of the add-on CO emission control devices identified in the preceding information have been installed and successfully operated on a LFG fueled IC engine over a long-term basis.

All of the CO emissions control options identified in the preceding information are commercially available, though not specifically designed for use on IC engines that are fueled with LFG.

The following text provides an applicability analysis of the control technologies described in the preceding information.

Thermal Oxidation – Flare

The CAT® G3520C IC engine has an exhaust flowrate of approximately 5,319 standard cubic feet per minute (scfm), which results in a project (4 IC engines) total flowrate of 21,276 scfm.

13,700 acfm * (528 °R / ((900 + 460) °R) = 5,319 scfm

Where: 13,700 acfm is the actual exhaust flowrate based on operational experience
528 °R is the standard reference temperature
900 °F is the actual exhaust flowrate based on operational experience and equipment manufacturer specifications
460 ° is the conversion factor from °F to °R

The IC engine exhaust gas consists mainly (greater than 99% by volume) of nitrogen, CO_2, O_2 and less than 1% by volume of CO, sulfur dioxides (SO_2), NO_X and unburned hydrocarbons combined.

The total emission rates for the proposed project are:

- 69.2 lb/hr for CO
- 8.21 lb/hr for SO_2
- 11.86 lb/hr for NO_X
- 8.21 lb/hr for VOC

In order to determine the percent by volume of CO, SO_2, NO_X and VOC, the following formulas were used:

CO = (69.2 lb/hr) / (28 lb/lb-mol) * (385 ft^3/lb-mol) / (60 min/hr) / (21,276 scfm) * 100 = 0.075%

Where: 28 lb/lb-mol is the molecular weight of CO; and
385 ft^3/lb-mol is the ideal volume of one mole of gas

SO_2 = (8.21 lb/hr) / (64 lb/lb-mol) * (385 ft^3/lb-mol) / (60 min/hr) / (21,276 scfm) * 100= 0.004%

Where: 64 lb/lb-mol is the molecular weight of SO_2; and
385 ft^3/lb-mol is the ideal volume of one mole of gas

NO_X = (11.86 lb/hr) / (46 lb/lb-mol) * (385 ft^3/lb-mol) / (60 min/hr) / (21,276 scfm) * 100= 0.008%

Where: 46 lb/lb-mol is the molecular weight of NO_2; and
385 ft^3/lb-mol is the ideal volume of one mole of gas

VOC = (8.21 lb/hr) / (44 lb/lb-mol) * (385 ft^3/lb-mol) / (60 min/hr) / (21,276 scfm)*100= 0.005%

Where: 44 lb/lb-mol is the molecular weight of C_3H_8; and
385 ft^3/lb-mol is the ideal volume of one mole of gas

The sum of the CO, SO_2, NO_X and unburned hydrocarbon fraction of the IC engine exhaust gas is 0.092% by volume, which is less than 1.0% by volume.

The lower heating value of:

- Nitrogen, O_2 and CO_2 is 0.0 Btu/ft^3.
- CO is approximately 323 Btu/ft^3.

- SO_2 and NO_X is 0.0 Btu/ft^3.
- Unburned hydrocarbons is 2,371 Btu/ft^3 (based on the LHV for propane).

To determine the lower heating value of the IC engine exhaust gas, the following formula was used:

Exhaust LHV = 0.075 % CO by volume * 323 Btu/ft3 + 0.005% VOC by volume * 2,371 Btu/ft3 = 0.36 Btu/ft^3

The IC engine exhaust gas has little or no fuel heating value (its CO and hydrocarbon content is minimal and will not support combustion). For the purposes of this analysis, it was assumed that the IC engine exhaust gas has a heating value of 0.0 Btu/ft^3 The USEPA Air Pollution Cost Control Manual, Section 3.2, Chapter 1 – Flares, states that:

> *Some flares are provided with auxiliary fuel ... when a lean flare gas stream falls below the flammability range or heating value necessary to sustain a stable flame. The amount of fuel required, F, is calculated based on maintaining the vent gas stream net heating value at the minimum of 300 Btu/scf required by rules defined in the Federal Register...*

To calculate the amount of auxiliary fuel that would need to be added to the waste gas (IC engine exhaust gas) to increase its heating value to 300 Btu/scf, the USEPA Air Pollution Cost Control Manual provides the following equation (Equation 1.3):

$$F = Q * ((300 - B_v) / (B_f - 300))$$

Where: F = Auxiliary fuel flowrate requirement (scfm)
Q = Waste (IC engine exhaust) gas flowrate (scfm)
B_v = Waste (IC engine exhaust) gas heat content (Btu/scf)
B_f = Auxiliary fuel heat content (Btu/scf)

For this analysis, the IC engine exhaust flowrate is 21,276 scfm and the heat content of that gas is effectively 0 Btu/scf. Since the facility will be located at a landfill and LFG is readily available to the project location, the use of LFG as the auxiliary fuel is the most logical choice. The Central County Solid Waste Disposal Complex (landfill) currently recovers (extracts) LFG that has a heating value of approximately 457 Btu/scf. Therefore, the use of this fuel (in a flare) results in an auxiliary fuel use requirement of 40,654 scfm (1,115 MMBtu/hr).

40,654 scfm = 21,276 scfm * ((300 – 0 Btu/scf) / (457 Btu/scf – 300))

However, the landfill is projected to generate quantities of LFG that are substantially less than those required to operate a flare to control CO emission from the proposed project.

The use of any other auxiliary fuel (such as natural gas) to provide the necessary heat input is infeasible due to the amount needed (i.e., a similar calculation results in a natural gas use requirement of 8,990 scfm).

8,990 scfm = 21,276 scfm * ((300 – 0 Btu/scf) / (1010 Btu/scf – 300))

The combustion of 8,990 scfm of natural gas would result, based on the flare emission factors presented in USEPA AP-42 Table 2.4-4, in the generation of:

- 108.7 tons per year (TpY) of CO emissions
- 92.1 TpY of NO_x emissions
- 35.4 TpY of $PM_{2.5}$ emissions

108.7 TpY CO = 8,990 scfm CH_4 * 60 min/hr * 8760 hr/yr / 10^6 * 46 lb CO/10^6 dscf CH_4 / 2000 lb/ton

92.1 TpY NO_x = 8,990 scfm CH_4 * 60 min/hr * 8760 hr/yr / 10^6 * 39 lb NO_x/10^6 dscf CH_4 / 2000 lb/ton

35.4 TpY $PM_{2.5}$ = 8,990 scfm CH_4 * 60 min/hr * 8760 hr/yr / 10^6 * 15 lb $PM_{2.5}$/10^6 dscf CH_4 / 2000 lb/ton

The use of a non-renewable fuel to operate a flare to control emissions from the combustion of a renewable fuel defeats the purpose of the proposed project, which is to generate electricity from a readily available renewable fuel source. In addition, the combustion of a non-renewable fuel to operate this flare would result in the generation of significant amounts of CO, NO_X and PM10/PM2.5 (which would be greater than the NO_X and PM10/PM2.5 emissions estimated for the proposed project) that further defeats the purpose of the project.

The amount of auxiliary fuel required to control CO emissions produced by the proposed IC engine operations with thermal oxidation in a flare and the potential air pollutant emissions created by the combustion of the non-renewable auxiliary fuel makes this control option unreasonable; and therefore, not applicable. In order for a control option to be technically feasible, it has to be both available and applicable to the proposed project. Flares are commercially available; however, they are not applicable to the control of CO emissions produced by LFG fueled IC engines.

Thermal Oxidation – Recuperative Oxidizer

The use of recuperative thermal oxidation to control CO emissions requires the IC engine exhaust gas to have an oxygen content of at least 16.5% and a temperature of 1425 °F (recuperative oxidizer operating temperature).

The exhaust gas of the proposed IC engines has an O_2 by volume content of 8.8% (from the Caterpillar, Inc. G3520C technical data sheet). To increase the oxygen content of the IC engine exhaust gas from a value of 8.8% to 16.5% by volume, approximately 37,233 scfm of excess combustion air is required to be added. This excess combustion air requirement was determined as presented in the following text:

((21,276 scfm * 8.8% O_2 + x scfm * 20.9% O_2) / (21,276 scfm + x scfm)) = 16.5% O_2

Rearranging the terms within this equation results in the following mathematical expression:

0.044 * x scfm = 1638

Solving for x results in a value of 37,233 scfm of excess combustion air (20.9% O_2 content). This amount of air is required to be added to the IC engine exhaust gas in order to increase its O_2 content to 16.5% by volume.

The amount of auxiliary fuel required to heat 21,276 scfm of engine exhaust gas from 900 °F to 1425°F and 37,233 scfm of combustion air from ambient temperature (70 °F) to 1425°F was calculated using the following equation:

Heat Required (MMBtu/hr) = $Q (T_{ox} - T_{in}) C_p$ (60 min/hr) $(1-E_f)$ (1+L) / (10^6 Btu/MMBtu)

Where: Q = waste gas flowrate (scfm)
T_{ox} = recuperative oxidizer operating temperature (1425 °F)
T_{in} = waste gas inlet temperature (°F)
C_p = heat capacity of air (0.02 Btu/scf °F)
E_f = heat recovery efficiency
L = general insulation heat loss (2 %)

Recuperative thermal oxidizer heat exchangers have a typical heat recovery efficiency rating of 65%. However, over time as combustion by-product impurities foul the inner walls of the device, its heat recovery efficiency is expected to decrease to a minimum value of 50%. Therefore, a nominal heat recovery efficiency of 60% was used in the calculation as a best-case scenario.

The thermal oxidation of 21,276 scfm of engine exhaust gas results in an auxiliary fuel heat input requirement of 30.2 MMBtu/hr.

Since the proposed project will be located at a landfill, LFG is readily available to the project location and its use as the auxiliary fuel is the most logical choice. The gas generated by the landfill has an existing heating value of approximately 457 Btu/scf, which results in an auxiliary fuel (LFG) requirement of at least 1,101 scfm for the operation of a recuperative thermal oxidation CO emission control device.

1,101 scfm LFG = 30,200,000 Btu/hr / (457 Btu/scf) / (60 min/hr)

The proposed project is estimated to consume approximately 2,200 scfm of LFG to produce 6,400 kW of electricity. Therefore, 50 % of the available LFG for the project would be consumed as auxiliary fuel for use to operate a recuperative thermal oxidizer. The diversion of 1,101 scfm of LFG auxiliary fuel from the proposed project is equivalent to 200% of the fuel requirement for one CAT® Model G3520C IC engine generator, which has an expected fuel requirement of approximately 550 scfm (i.e., the amount of LFG fuel required to control IC engine CO emissions by thermal oxidation in a recuperative thermal oxidizer is equivalent to the fuel requirement to operate two CAT® Model G3520C IC engine generators). In addition, the combustion of 1,101 scfm of LFG in a recuperative thermal oxidizer would result in the creation of increased amounts of air pollutant emissions without any benefit of electricity production. Therefore, the operation of the proposed project with a recuperative thermal oxidizer is not technically feasible.

In order to use another auxiliary fuel (such as natural gas) to provide the heat input necessary for the operation of a recuperative thermal oxidizer, 498 scfm of fuel would be required.

498 scfm CH_4 = 30,200,000 Btu/hr / (1010 Btu/scf) / (60 min/hr)

The use of a non-renewable fuel to operate a recuperative thermal oxidizer that would control emissions from the combustion of a renewable fuel defeats the purpose of the proposed project, which is to generate electricity from a readily available renewable fuel source. In order for a control option to be technically feasible, it has to be both available and applicable to the proposed project. Recuperative thermal oxidizers are commercially available; however, they are not applicable to the control of CO emissions produced by LFG fueled IC engines.

Thermal Oxidation – Regenerative Oxidizer

The analysis for the use of a regenerative thermal oxidizer (RTO) to control CO emissions from LFG fueled IC engine operations is similar to that of a recuperative thermal oxidizer except that RTOs typically have a greater operating temperature (1600 ^{o}F) and heat recovery efficiency. The ceramic material within RTOs is also susceptible to plugging from the combustion of impurities within LFG, which over time will reduce the thermal efficiency of the heat exchanger.

The RTO heat exchanger (direct contact ceramic media bed) has a maximum heat recovery efficiency of 95%. However, based on our knowledge, a RTO has never been used to control CO emissions produced from the combustion of LFG fuel and it is unknown how quickly the heat exchange media beds of the device would become fouled. For this analysis, an average heat recovery efficiency of 80% was used, which is most likely a best-case scenario.

The amount of auxiliary fuel that is required to heat 21,276 scfm of IC engine exhaust gas from 900 °F to 1600 °F and 37,233 scfm of combustion air from ambient temperature (70 °F) to 1600 °F was calculated to be 17.6 MMBtu/hr (based on the heat capacity equation presented for the recuperative thermal oxidizer control analysis). This energy requirement results in a minimum LFG auxiliary fuel requirement of 642 scfm (based on a LFG heating value of 457 Btu/scf).

The proposed project is estimated to consume approximately 2,200 scfm of LFG to produce 6,400 kW of electricity. Therefore, at least 29 % of the available LFG for the proposed project would be consumed as auxiliary fuel for use to operate a RTO. The diversion of 642 scfm of LFG auxiliary fuel from the proposed project is equivalent to 117% of the fuel requirement for one CAT® Model G3520C IC engine generator, which has an expected fuel requirement of approximately 550 scfm (i.e., the amount of LFG fuel required to control IC engine CO emissions by thermal oxidation in a RTO is equivalent to the fuel requirement to operate one CAT® Model G3520C IC engine generators). In addition, the combustion of 642 scfm of LFG in a RTO would result in the creation of increased amounts of air pollutant emissions without any benefit of electricity production. Therefore, the operation of the proposed project with a RTO is not technically feasible. In addition, it is doubtful that a RTO is a feasible technology to control LFG combustion emissions due to the fouling of the direct contact ceramic media beds within the heat exchanger.

In order to use another auxiliary fuel (such as natural gas) to provide the heat input necessary for the operation of a RTO, 290 scfm of fuel would be required.

290 scfm CH_4 = 17,600,000 Btu/hr / (1010 Btu/scf) / (60 min/hr)

The use of a non-renewable fuel to operate a RTO that would control emissions from the combustion of a renewable fuel defeats the purpose of the proposed project, which is to generate electricity from a readily available renewable fuel source. In order for a control option to be technically feasible it has to be both available and applicable to the proposed project. Regenerative thermal oxidizers are commercially available; however, they are not applicable to the control of CO emissions produced by LFG fueled IC engines.

Oxidation Catalysts

The proposed project IC engines will combust pressurized, treated LFG as a fuel. The proposed treatment system will dewater, filter and compress LFG received from the landfill.

This LFG treatment system will meet the treated gas criteria of 40 CFR Part 60 Subpart WWW (MSW Landfill NSPS) but it is not currently subject to the requirements of these rules. The use of treated gas (as fuel) ensures that moisture and particulate matter are removed from the fuel to support good combustion. However, dewatering and filtration of the LFG has a limited effect on the removal of siloxanes (cyclic organic silicon monomers) that are contained as impurities in the received LFG.

Siloxanes are used in the manufacture of personal hygiene, health care and industrial silicone products and are a significant impurity within LFG that makes it different than pipeline-quality natural gas. When siloxanes are exposed to elevated temperatures, they form combustion byproducts (namely silicon dioxide, SiO_2) that poison catalyst-based post combustion control systems. Therefore, vendors and suppliers are not willing to guarantee the performance of add-on control equipment when it is used in applications to reduce emissions from LFG combustion projects.

In the 40 CFR Part 60 Subpart JJJJ and 40 CFR Part 60 Subpart ZZZZ regulations (the reciprocating engine NSPS and NESHAP) that were promulgated by USEPA, the regulatory agency recognizes the affect that siloxane combustion has on add-on control devices. The preambles of these rules state that:

> *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.*

For a post fuel combustion emission control system to operate on a sustained basis, siloxanes must be removed from the LFG prior to its use to avoid fouling these catalyst-based systems, otherwise the control system is rendered ineffective in a relatively short amount of time. Adsorption-based siloxane removal systems can be used to reduce the content of siloxanes in LFG. However, these systems (like most control systems) only reduce the siloxane content to a certain level or have a specified control efficiency that is less than 100%. Parker Hannifin Corp./Domnick-Hunter, one of the leading manufacturers of siloxane removal systems, guarantees that its LFG treatment system will reduce siloxane concentrations at its outlet to a concentration of approximately 5 mg/m^3.

Vendors of catalyst-based control systems will not guarantee the performance of their units unless all (or virtually all) of the silicon-based compounds have been removed from the fuel stream (i.e., engine exhaust gas).

Appendix K-2 provides a list of catalyst poisons that has been developed by Miratech (a catalyst manufacturer) and a warranty statement from Clean Air Systems (a company that manufactures and installs catalyst emission control systems for IC engines).

The Miratech document specifies that organic silicon compounds (i.e., siloxanes) are 'harmful' to catalyst systems and must be reduced to levels below 0.5 mg/kg, which is equivalent to approximately 0.6 milligrams per cubic meter (mg/m^3). The Clean Air Systems warranty statement specifies that *Using fuels with ... contaminates such as siloxanes ... will void the warranty coverage.*

Therefore, while oxidation catalyst systems exist for the control of CO emissions, their use on IC engines that are fueled with LFG is very limited (i.e., primarily on a trial basis) and has not been truly verified as achieved in practice. There are no LFG treatment technologies that are available and capable of removing catalyst contaminants to levels that are below those specified by catalyst manufacturers. Therefore, the use of oxidation catalysts to control CO emissions from LFG fueled IC engines is not technically feasible.

Ranking of Technically Feasible CO Control Options

The third step in performing the BACT analyses is to rank the remaining technically feasible control technologies by their effectiveness. None of the add-on CO emission control devices that were identified, investigated and presented in this air construction permit application have been installed and successfully operated on LFG fueled IC engines for relatively long periods of time.

The applicability analyses that are presented in the preceding information provide physical, chemical and engineering data that indicate the identified emission control technologies do not result in technically feasible operating conditions for the proposed project. Therefore, the only remaining feasible control technology for the proposed project is the good design, maintenance and operating practices required to achieve the CO emissions guaranteed by the IC engine manufacturer (or those demonstrated to be achieved in practice).

Evaluation of Feasible CO Control Technologies

The fourth step in performing BACT analyses is an evaluation of the feasible control technologies beginning with the most efficient with respect to economic, energy and environmental impacts.

All of the IC engine CO emission add-on control devices that were evaluated in the BACT analysis were determined to be technically infeasible. Therefore, the remaining available control technology is the application of good equipment design and operating practices to achieve the CO emissions guaranteed by the IC engine manufacturer (or those demonstrated to be achieved in practice).

The use of a non-renewable fuel (natural gas) to control emissions from a source combusting a renewable fuel has been determined to be unreasonable; and therefore, is the basis of technical infeasibility.

Selection as CO BACT

The final step in performing the CO emission analyses is the selection of BACT as the most effective control technology not eliminated in Steps 1 – 4.

USEPA RBLC Database

The USEPA RBLC database contains 23 emission and control technology determinations for LFG fueled IC engine operations (as of February 21, 2013, see Appendix K-1) and indicates that BACT for CO emissions from LFG fueled IC engines:

1. Range from 2.5 to 5.0 g/bhp-hr of CO; and

2. Are applicable to the operation of lean burn engines with air to fuel ratio control or simply specified as 'clean burn engine' (i.e., no add-on emission controls).

The two most recent LFG fueled IC engine air permits that are presented in the USEPA RBLC database were issued on:

1. July 12, 2012 for modifications to an initial CO control technology determination made for the operation of LFG fueled G3520C IC engines at the Moretown Landfill Gas to Energy Facility. Permit Number AOP-11-012 added a not-to-exceed IC engine CO emission limit of 3.5 g/bhp-hr that is a significantly increase from the previous limit of 2.75 g/bhp-hr.

2. May 8, 2012 for the CO PSD BACT determination made for the operation of LFG fueled G3520C IC engines at the NANR Venice Park Landfill. Permit Number 123-11 contains a not-to-exceed IC engine CO emission limit of 3.3 g/bhp-hr.

The most recent PSD air construction permit approved by the Florida Department of Environmental Protection (FDEP) Division of Air Resource Management (DARM) for the operation of LFG fueled IC engine generators was issued to Waste Management for its Medley Landfill facility. This information was confirmed in February 21, 2013 communications with Mr. Syed Arif, Program Administrator of the FDEP-DARM. This electricity generation facility uses the same Caterpillar, Inc. G3520C gas IC engines as that being proposed for the Sarasota Energy project. Permit No. PSD-FL-414 issued on August 25, 2011 contains a CO BACT limit of 3.5 g/bhp-hr for the IC engine operations. Appendix K-3 provided the FDEP technical review for the Medley Landfill facility permit approval.

The USEPA RBLC database references a CO emission control technology determination made for the Cinnamon Bay electricity generation facility that is significantly lower than those issued more recently for identical equipment (i.e., LFG fueled G3520C IC engines). Discussions with representatives of the facility in early 2013 indicated that:

- The electricity generation plant was constructed with a LFG treatment system (carbon adsorption) and add-on oxidation catalyst CO emission controls.

- Frequent repairs and maintenance are required to be performed on the installed equipment as a result of carbon media replacements and catalyst fouling issues.

- The costs associated with the frequent and unexpected LFG treatment and CO emission control equipment repairs/maintenance were making the project economically infeasible to continue.

- Activities were being planned to submit an air permit application to the NJDEP to request approval to remove the LFG treatment and CO emission controls from operation.

BAAQMD BACT

The Bay Area Air Quality Management District (BAAQMD) released a paper dated February 26, 2009 titled *Revisiting BACT for Lean Burn Landfill Gas Fired Internal Combustion Engines*. The BAAQMD collected data from 62 individual source tests and numerous daily CO readings from a handheld monitoring device. Based on its review, the BAAQMD made a BACT determination for LFG fueled reciprocating IC engines (RICE) with a horsepower output greater than 250 horsepower. The determination, dated March 5, 2009, categorizes engines as either Low NO_x or Low CO bias engines based on the inverse relationship between the two pollutants. The BAAQMD BACT determination specifies that BACT for a low:

- NO_X bias engine is 0.5 g/bhp-hr NO_X with a CO NTE value of 3.9 g/bhp-hr; and

- CO bias engine is 0.6 g/bhp-hr NO_X with a CO NTE value of 3.6 g/bhp-hr.

The BAAQMD CO BACT determination was published as a not-to-exceed (NTE) value since BAAQMD recognized that CO emissions tend to increase with increased engine operating hours and between major engine overhauls.

The BAAQMD has performed subsequent BACT analyses in 2011 for CO emissions from LFG fueled IC engines that are presented in a *Preliminary Engineering Evaluation for BAAQMD Permit Application #22636*. This evaluation specifies that:

- *The catalysts ... have demonstrated some success at reducing ... CO emissions*; and

- *Based on the District's review of the performance of these experimental emission control systems for landfill gas fired engines, the District has determined that it is technologically feasible to use add-on catalytic controls on the exhaust from IC engines burning treated landfill gas to control ... CO emissions. ... The specific*

> *emission limits that are possible for these add-on controls are still under review ... In consideration of these findings the project should at least consider the possibility of using landfill gas treatment and add-on catalysts as a potential emission control method for ... CO emissions from the proposed engines.*

Therefore, while the BAAQMD indicates that catalysts are "technically feasible", the actual CO emission reduction is undefined (described as "some success") and decreases with respect to equipment service life. Based on the results of the economic analyses that were performed for the project, BAAQMD determined that add-on CO emission controls were not cost effective. However, it is unclear how the economic feasibility calculation (cost per ton of reduced pollutant) was performed when the actual emission reduction cannot be determined.

Based on this information, it is the applicant's opinion that the use of catalytic emission controls is still in the experimental / evaluation phase and not technically feasible for long-term operation. Therefore, CO BACT for this project was determined to be a not-to-exceed limit of 3.6 g/bhp-hr, which is consistent with the value established by the regulatory agency in 2009 for low CO bias engines.

Proposed Project CO BACT

The degree to which add-on CO emission controls have been successfully placed in operation and determined to be technologically feasible appears to be uncertain (i.e., while catalysts can be placed in operation there are still many unknowns on their useful life, which appears to be limited in many cases, and the degradation of removal effectiveness with increased numbers of operating hours).

Based on the information that is presented in this air construction permit application, CO BACT for the proposed LFG fueled G3520C IC engines is proper equipment design, maintenance and operational practices to achieve a not-to-exceed emission rate of 3.5 g/bhp-hr as determined to be achieved in practice.

NITROGEN OXIDES BACT

Identification of NO_X Control Technologies

The first step in performing the BACT analyses is the identification of all available control technologies for the PSD pollutant (nitrogen oxides, NO_X) subject to review.

Based on recent experiences with PSD BACT analyses required for the approval of air permits by other state air pollution control agencies for landfill gas (LFG) fueled IC engines, which are identical to those specified for the proposed project, the following control technologies were selected for evaluation.

Selective Catalytic Reduction

Selective Catalytic Reduction (SCR) systems are primarily used to reduce emissions of nitrogen oxide (NO) in IC engine exhausts. The operation of a SCR system is based on the chemical reaction (reduction) of NO to form nitrogen, CO_2 and water in the presence of excess O_2, ammonia (usually in the form of urea), heat and a catalyst.

$$4NO + 2(NH_2)_2CO + O_2 + \text{heat} \rightarrow_{cat} 4N_2 + 2CO_2 + 4H_2O$$

The IC engine exhaust gas, which contains NO, excess O_2 and heat from the combustion of fuel, is injected with ammonia. This exhaust gas stream is then directed through a catalyst matrix. In general, the catalyst is composed of a base metal oxide, zeolite or precious metal. Selective Catalytic Reduction systems can achieve NO reduction efficiencies in excess of 90%. However, they are highly susceptible to poisoning (i.e., encapsulation and deactivation of the catalyst by adverse combustion by-products created by impurities within the gas being controlled), plugging and have the potential to emit ammonia to the ambient air if it is not injected at proper stoichiometric ratios (known as ammonia slip).

Regenerative Selective Catalytic Reduction

Regenerative Selective Catalytic Reduction (RSCR) systems are primarily used to reduce NO_X emissions in low temperature exhaust gas streams. The operation of a RSCR system is based on the same chemical reaction that occurs in a SCR unit (i.e., the reduction of NO to form nitrogen, CO_2 and water in the presence of excess O_2, ammonia, heat and a catalyst.

Nitrogen oxides reduction in the catalyst bed requires the presence of temperatures in the range of 500 °F to 900 °F. The RSCR system is designed to control appropriate emissions in low temperature exhaust gas streams, which can require that additional heat be added to the gas stream to achieve the minimum required temperature necessary for the NO_X reduction. Typically, the amount of heat that is required to operate the system is large, so the use of a regenerative heat recovery device (with maximum heat recovery efficiencies of 95%) can

reduce the amount of additional heat (i.e., auxiliary fuel) that needs to be supplied to the system.

The SCR portion of the RSCR system operates in the same manner as a standalone SCR system, which is described in previously presented information and is also subject to potential fouling and ammonia slip.

Non-Selective Catalytic Reduction

Non-Selective Catalytic Reduction (NSCR) systems are primarily used to reduce emissions of NO_X in exhaust gas streams that have low O_2 concentrations. The operation of a NSCR system is based on the chemical reaction (reduction) of NO and NO_2 to form nitrogen, CO_2 and water in the presence of excess methane (i.e., an O_2 depleted atmosphere), heat and a catalyst through the following two chemical reactions:

$$CH_4 + 4NO_2 + \text{heat} \rightarrow_{cat} CO_2 + 2H_2O + 4NO$$

$$CH_4 + 4NO + \text{heat} \rightarrow_{cat} 2N_2 + CO_2 + 2H_2O$$

The second reaction will only occur in the absence of O_2. The NO_X reduction in the catalyst bed requires the presence of temperatures in the range of 500 °F to 1350 °F. An NSCR system is designed to control appropriate emissions in exhaust gas streams that have low O_2 concentrations and requires the addition of a reducing fuel (typically methane, CH_4) upstream of the system. NSCR systems reduce both NO_2 and NO whereas the SCR unit only reduces NO.

The exhaust gas produced by the operation of the proposed project IC engines, which contains NO, excess O_2 and heat from combustion, would be injected with a reducing fuel (usually CH_4). The IC engine exhaust primarily contains NO; NO_2 formation usually occurs after the exhaust gas has exited the stack and had sufficient time to equilibrate with O_2 in the ambient air. Prior to the injection of the reducing fuel into the reducing catalyst, combustion needs to occur with an auxiliary fuel in order to lower the O_2 content of the exhaust gas stream, which is necessary for the NO reduction to occur. The exhaust gas stream would then be directed through a catalyst matrix. In general, the catalyst is composed of a precious metal (platinum, palladium or rhodium). NSCR systems can achieve NO_X reduction efficiencies in excess of 95%, and similar to SCR/RSCR systems are highly susceptible to poisoning; and they require the combustion of an auxiliary fuel to reduce the O_2 content of the exhaust gas stream and an auxiliary source of CH_4 to create the chemical reduction.

Selective Noncatalytic Reduction

Selective Noncatalytic Reduction (SNCR) systems are primarily used to reduce emissions of NO_X in exhaust gas streams without the use of a catalyst. The operation of a SNCR system is

based on the reduction of NO_X to form nitrogen, CO_2 and water in the presence of excess O_2, ammonia and heat.

$$4NO + 2(NH_2)_2CO + O_2 + heat \rightarrow 4N_2 + 2CO_2 + 4H_2O$$

The NO_X reduction is very dependent on two factors: gas temperature and its residence time within the device. The NO_X reduction requires the presence of temperatures in the range of 1600 °F to 2100 °F. At temperatures below 1600°F, the NO_X reduction reaction has a low conversion rate and at temperatures greater than 2100 °F, ammonia begins to oxidize, which lowers the amount of NO_X reduction. An exhaust gas residence time of 0.5 seconds is generally required for the process to be efficient; shorter residence times decrease the control efficiency. In generally, SNCR systems are operated at the upper end of the temperature limit to reduce reaction time and increase NO_X reduction. SNCR systems reduce both NO_2 and NO whereas SCR systems only reduce NO.

The exhaust gas produced by the operation of the proposed project IC engines, which contains NO, excess O_2 and heat from combustion (which are not sufficient for noncatalytic reduction) would be injected with ammonia. The exhaust gas stream would then be heated to a temperature sufficient to support NO_X reduction. SNCR systems can achieve NO_X reduction efficiencies in the range of 30 % - 75% depending on the process operating temperature and residence time. SNCR systems are also subject to ammonia slip if the urea is not injected at the proper stoichiometric ratio.

Air/Fuel Ratio Controllers (Good Design and Operating Practices)

The air-to-fuel ratio is the mass (or molar) ratio of air to fuel in a combustion process. In a LFG fueled IC engine, the combustion of LFG (methane) occurs through the following reaction:

$$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O + heat + minor\ amount\ of\ impurities$$

If the proper amount of O_2 is added to the fuel, the specified reaction is said to be a stoichiometric mixture. If excess amounts of O_2 are added, the air –to-fuel mixture is said to be lean. If excess amounts of fuel are added, the air-to-fuel mixture is said to be rich. The operation of an IC engine at the proper stoichiometric mixture would in theory combust all of the fuel. However, in practice an appropriate amount of excess O_2 (slightly lean air-to-fuel mixture) is required to combust all of the fuel. The operation of an IC engine with a slightly lean air-to-fuel mixture produces high combustion chamber temperatures and pressures that cause the nitrogen in the combustion air to be converted to NO.

$$N_2 + O_2 + heat + pressure \rightarrow 2NO$$

Proper equipment design and operation practices can limit the amount of NO emissions that is generated by the IC engine. The operation of the IC engine at a rich air-to-fuel mixture lowers the combustion chamber temperature because not all of the fuel is combusted (incomplete combustion). However, this condition greatly increases emissions of other criteria pollutants (mainly CO and uncombusted hydrocarbons) and hazardous air pollutants (HAP). The operation of the IC engine at an "ultra" lean mixture (i.e., much more O_2 than is needed for a near stoichiometric mixture) also reduces cylinder chamber temperatures and in effect reduces NO_X formation while maintaining low criteria pollutant and HAP emissions.

Elimination of Technically Infeasible NO_X Control Options

The second step in performing the BACT analyses is to eliminate all technically infeasible control technologies.

All of the NO_X emission control options identified in the preceding information are commercially available, though not specifically designed for operation on LFG fueled IC engines.

Selective Catalytic Reduction (SCR, RSCR and NSCR)

SCR, RSCR and NSCR systems all operate using similar parameters (i.e., the reduction of NO_X using a high temperature catalyst) and achieve virtually the same NO_X reduction efficiency. Therefore, only SCR systems will be evaluated as an emission control option for the specified three (3) catalytic technologies since the technical feasibility analysis of each is essentially the same. The use of RSCR systems would not be appropriate for the control of NO_X emissions from a LFG fueled IC engine because its exhaust gas is already at a sufficient temperature for catalytic reduction and would not require additional heat input. The use of NSCR systems on the proposed project would require the combustion of approximately 936 scfm of methane (1,864 scfm LFG) to reduce the O_2 content of the IC engine exhaust gas to the level required for NO_X reduction. The use of 1,864 scfm of LFG for the operation of a NSCR emission control device is equivalent to 85% of the total amount of LFG that will be used to fuel the four (4) IC engine generators and would make the proposed Sarasota Energy project irrelevant.

The proposed project IC engines will combust pressurized, treated LFG as a fuel. The proposed treatment system will dewater, filter and compress LFG received from the landfill. This LFG treatment system will meet the treated gas criteria of the MSW Landfill NSPS but it is not currently subject to the requirements of these rules. The use of treated gas (as fuel) ensures that moisture and particulate matter are removed from the fuel to support good combustion. However, dewatering and filtration of the LFG has a limited effect on the removal of siloxanes that are contained as impurities in the received LFG.

A discuss ion siloxanes was previously provided in the materials presented for the CO BACT analysis.

In the 40 CFR Part 60 Subpart JJJJ and 40 CFR Part 60 Subpart ZZZZ regulations (the reciprocating engine NSPS and NESHAP) that were promulgated by USEPA, the regulatory agency recognizes the effect that siloxane combustion has on add-on control devices. The preambles of these rules state that:

> *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.*

For a post fuel combustion emission control system to operate on a sustained basis, siloxanes must be removed from the LFG prior to its use to avoid fouling catalyst-based systems, otherwise the control system is rendered ineffective in a relatively short amount of time. Adsorption-based siloxane removal systems can be used to reduce the content of siloxanes in LFG. However, these systems (like most control systems) only reduce the siloxane content to a certain level or have a specified control efficiency that is less than 100%. Parker Hannifin Corp./Domnick-Hunter, one of the leading manufacturers of siloxane removal systems, guarantees that its LFG treatment system will reduce siloxane concentrations at its outlet to a concentration of approximately 5 mg/m^3.

Vendors of catalyst-based control systems will not guarantee the performance of their units unless all (or virtually all) of the silicon-based compounds have been removed from the fuel stream (i.e., engine exhaust gas).

Appendix K-2 provides a list of catalyst poisons that has been developed by Miratech (a catalyst manufacturer) and a warranty statement from Clean Air Systems (a company that manufactures and installs catalyst emission control systems for IC engines).

The Miratech document specifies that organic silicon compounds (i.e., siloxanes) are 'harmful' to catalyst systems and must be reduced to levels below 0.5 mg/kg, which is equivalent to approximately 0.6 milligrams per cubic meter (mg/m^3). The Clean Air Systems warranty statement specifies that *Using fuels with ... contaminates such as siloxanes ... will void the warranty coverage.*

Therefore, while NO_X reduction catalyst systems exist for the control of NO_X emissions, their use on IC engines that are fueled with LFG is very limited and has not been verified as achieved in practice. There are no LFG treatment technologies that are available and capable of removing catalyst contaminants to levels that are below those specified by catalyst manufacturers. Therefore, the use of SCR systems to control NO_X emissions from LFG fueled IC engines is not technically feasible.

Selective Noncatalytic Reduction (SNCR)

SNCR systems are required to operate with elevated exhaust gas temperatures. Therefore, for this technology to be used for the control NO_X emissions from the proposed project IC engines, their exhaust gas temperature must be raised to 2100 °F (the optimum temperature) from 900 °F, which requires the additional of more heat. This auxiliary heat input was calculated using the following equation:

Heat Required (MMBtu/hr) = Q ($T_{SNCR} - T_{in}$) C_p (60 min/hr) / (10^6 Btu/MMBtu)

Where: Q = Waste gas (IC engine exhaust) flowrate (scfm)
T_{SNCR} = SNCR operating temperature (°F)
T_{in} = IC engine exhaust gas inlet temperature (°F)
C_p = heat capacity of air (0.02 Btu/scf °F)

Therefore, 30.6 MMBtu/hr of additional heat is required to raise the IC engine exhaust gas temperature to 2100 °F, which is equivalent to using 1116 scfm of LFG based on the current heating value of 457 Btu/scf for the LFG being recovered from the landfill.

The proposed project is estimated to consume approximately 2,200 scfm of LFG to produce 6,400 kW of electricity. Therefore, 50% of the available LFG for the project would be consumed as auxiliary fuel for use to operate a SNCR system. The diversion of 1116 scfm of LFG auxiliary fuel from the proposed project is equivalent to approximately 200% of the fuel requirement for one CAT® Model G3520C IC engine generator, which has an expected fuel requirement of approximately 550 scfm (i.e., the amount of LFG fuel required to control IC engine NO_X emissions with a SNCR system is equivalent to the fuel requirement to operate two CAT® Model G3520C IC engine generators). In addition, the combustion of 1161 scfm of LFG in a SNCR system would result in the creation of increased amounts of air pollutant emissions without any benefit of electricity production. Therefore, the operation of the proposed project with a SNCR system is not technically feasible.

In order to use another auxiliary fuel (such as natural gas) to provide the heat input necessary for the operation of a SNCR system, 504 scfm of fuel would be required.

504 scfm CH_4 = 30,600,000 Btu/hr / (1010 Btu/scf) / (60 min/hr)

The use of a non-renewable fuel to operate a SNCR system that would control emissions from the combustion of a renewable fuel defeats the purpose of the proposed project, which is to generate electricity from a readily available renewable fuel source. In order for a control option to be technically feasible it has to be both available and applicable to the proposed project. SNCR systems are commercially available; however, they are not applicable to the control of NO_X emissions produced by LFG fueled IC engines.

Ranking of Technically Feasible NO_X Control Options

The third step in performing the BACT analyses is to rank the remaining technically feasible control technologies by their effectiveness.

None of the add-on NO_X emission control devices that are identified, investigated and presented in this air construction permit application have been installed and successfully operated on LFG fueled IC engines for relatively long periods of time. Nitrogen oxides emission controls have been installed on LFG fueled IC engine generators at a facility in California and are in the process of being evaluated. The California regulatory agency has not made a final determination on whether the emission controls are considered achieved in practice. It is important to note that power purchase prices in California are two to three times more than the average fees obtained in Florida. Therefore, should a future determination be issued that specifies controls are potentially technically feasible; it will not address the economic feasibility of the technology in other parts of the country.

The applicability analyses that are presented in the preceding information provide physical, chemical and engineering data that indicate the identified emission control technologies do not result in technically feasible operating conditions for the proposed project.

Therefore, the only remaining feasible control technology for the proposed project is good design, maintenance and operating practices and use of air-to-fuel ratio controllers to achieve NO_X emission rates guaranteed by the IC engine manufacturer.

Evaluation of Most Effective NO_X Controls

The fourth step in performing BACT analyses is an evaluation of the feasible control technologies beginning with the most efficient with respect to economic, energy and environmental impacts.

All of the IC engine NO_X emission add-on control devices that were evaluated in the BACT analysis were determined to be technically infeasible. Therefore, the remaining available control technology is the application of good equipment design and operating practices and use of air-to-fuel controllers to achieve the NO_X emissions guaranteed by the IC engine manufacturer.

The use of a non-renewable fuel (natural gas) to control emissions from a source combusting a renewable fuel has been determined to be unreasonable; and therefore, is the basis of technical infeasibility.

Selection of NO_X BACT

The final step in performing the NO_X emission control analyses is the selection of BACT as

the most effective control technology not eliminated in Steps 1 – 4.

USEPA RBLC Database

The USEPA RBLC database contains 23 emission and control technology determinations for LFG fueled IC engine operations (as of February 21, 2013, see Appendix K-1) and indicates that BACT for NO_X emissions from LFG fueled IC engines:

1. Range from 0.5 to 0.6 g/bhp-hr of CO; and

2. Are applicable to the operation of lean burn engines with air to fuel ratio control or simply specified as 'clean burn engine' (i.e., no add-on emission controls).

The two most recent LFG fueled IC engine air permits that are presented in the USEPA RBLC database were issued on:

1. May 8, 2012 for the NO_X PSD BACT determination made for the operation of LFG fueled G3520C IC engines at the NANR Venice Park Landfill. Permit Number 123-11 contains a not-to-exceed IC engine NO_X emission limit of 0.6 g/bhp-hr.

2. September 11, 2011 for the NO_X PSD BACT determination made for the operation of LFG fueled G3520C IC engines at the Loraine County LFG Power Station. Permit Number P0107089 contains a not-to-exceed IC engine NO_X emission limit of 2.46 lb/hr (0.5 g/bhp-hr).

The most recent PSD air permit approved by FDEP-DARM for the operation of LFG fueled IC engine generators was issued to Waste Management for its Medley Landfill facility. This information was confirmed in February 21, 2013 communications with Mr. Syed Arif, FDEP-DARM Program Administrator. This electricity generation facility uses the same Caterpillar, Inc. G3520C gas IC engines as that being proposed for the Sarasota Energy project. Permit No. PSD-FL-414 issued on August 25, 2011 contains a NO_X BACT limit of 0.6 g/bhp-hr for the IC engine operations. Appendix K-3 provided the FDEP technical review for the Medley Landfill facility permit approval.

Proposed Project NO_X BACT

The CAT® G3520C IC engine has been designed to operate as an "ultra" lean burn unit (i.e., the combustion of low heating value fuels in the presence of additional excess oxygen) to achieve the required power generation and produce relatively low concentrations of air pollutant emissions. This IC engine is equipped with an electronic air/fuel ratio controller that constantly and automatically adjusts the air to fuel ratio in the combustion chamber to achieve optimal fuel firing conditions and minimize NO_X emissions.

Based on the information that is presented in this air construction permit application, NO_X BACT for the proposed project LFG fueled G3520C IC engines is proper engine design, maintenance and operation and use of air-to-fuel ratio controllers to achieve a not-to-exceed emission rate of 0.6 g/bhp-hr as determined to be achieved in practice.

PARTICULATE MATTER BACT ANALYSIS

Identification of Particulate Matter Control Technologies

Particulate matter (filterable and condensable) is generated and emitted from IC engine operations primarily through:

- The combustion of lubricating oil in the combustion cylinder;
- Incomplete combustion of the LFG fuel; and
- The oxidation of siloxanes contained in the LFG fuel to form silicon dioxide in the engine exhaust.

The FDEP-DARM PSD air permitting program addresses the regulation of particulates with diameters equal to and less than 10 microns (PM_{10}) and 2.5 microns ($PM_{2.5}$).

Derenzo and Associates has performed numerous particulate matter emissions tests (for both the filterable and condensable fractions) on the exhausts of LFG fueled G3520C IC engines using USEPA Test Methods 5 and 202. These test results generally indicate that approximately 15% of the particulate matter exhausted from the IC engine is filterable and 85% is condensable.

The first step in performing BACT analyses is the identification of all available control technologies for the PSD pollutant ($PM_{10}/PM_{2.5}$) subject to review.

Based on recent experiences with PSD BACT analyses required for the approval of air permits by other state air pollution control agencies for LFG fueled IC engines, which are identical to those specified for the proposed project, the following control technologies were selected for evaluation.

Fabric Filters

Fabric filters, which are commonly referred to as a baghouse, use fabric filter media to remove particulate matter (filterable) from the exhaust gas of appropriate air pollutant emission sources. This particulate removal process is referred to as sieving. The type of filter media selected for use determines the removal efficiency of the device and the size of particulate matter that is effectively controlled. Baghouses can achieve filterable particulate matter removal efficiencies of up to 99.9%.

The application of baghouse emission control technology to the exhaust of an IC engine would require the system be designed to withstand temperatures of approximately 900 ^{o}F. A majority of the particulate emitted from a gas combustion device is in the form of $PM_{2.5}$.

Therefore, membrane-type filter media with very small openings (mesh) would be utilized to control filterable PM2.5 emissions. During the operation of the baghouse, the:

- IC engine exhaust gas would be directed through the specified filter media (bags) to remove the filterable particulate matter of the exhaust stream; and

- Bags would be cleaned to remove accumulated particulate matter at preset intervals.

Gas Refrigeration and Condensate Recovery

Condensation, refrigeration, and cryogenic systems remove process exhaust vapors (condensable particulate matter) by making them condense on cold surfaces. These cold conditions can be created by passing cold water through an indirect heat exchanger, by spraying cold liquid into an open chamber with the gas stream, by using a freon-based refrigerant to create very cold coils, or by injecting cryogenic gases such as liquid nitrogen into the gas stream. Condensation and refrigeration systems are usually used on high concentration, low gas flow rate sources. Based on the amount of condensable particulate that is present in the exhaust of LFG fueled IC engines (approximately 85% of the total PM2.5 emission rate), cooling of the exhaust gas stream and collection of the resulting condensate is a potential PM10/PM2.5 emission control option.

Wet Scrubber

Wet scrubbing devices remove particulate matter from a gas stream through a process called impaction. A scrubbing liquid (typically water with an anticorrosion agent) is sprayed into the exhaust gas stream. Contact between the atomized scrubbing liquid and the suspended particulate matter removes the particulate matter from the gas stream. The resulting mist cloud is passed through a mist eliminator (demister pads) to remove the water droplets from the scrubbed gas stream prior to its release into the ambient air. The collected particulate matter is then removed from the water with a settling pond or mechanical separator and the water is recycled back to the scrubbing device. A wet scrubber has a typical removal efficiency of up to 90% for particulate matter with diameters greater than 10 microns. For particulate matter with diameters less than 10 microns, the removal efficiency is significantly lower.

Electrostatic Precipitator (including Wet Electrostatic Precipitator)

An electrostatic precipitator removes filterable particulate matter from a gas stream through the use of electric fields. The incoming exhaust gas is ionized, which negatively charges the filterable particulate matter and causes it to be attracted to and collected on electrodes. At preset intervals, the electrodes are rapped to mechanically dislodge the particulate matter, which is appropriately collected and disposed.

The removal efficiency of an electrostatic precipitator is directly related to the surface area of the electrodes; the larger the surface area the greater the efficiency. The key factor in determining the removal efficiency of an electrostatic precipitator is the resistivity of the particles being collected. Resistivity is a measure of a particles resistance to an electric current and measured in ohm-cm. Particles in the range of 100-1000 ohm-cm are effectively removed by an electrostatic precipitator. Particles above or below that specified resistivity range are not effectively removed by an electrostatic precipitator. The resistivity of a particle dramatically decreases as exhaust temperatures exceed 400 ^{o}F or as the moisture content of the gas increases. The removal efficiency is also negatively affected by re-entrainment of particulate matter when it is rapped off the electrodes. If the exhaust gas flow through the unit is too high, particulate matter can return to the exhaust gas stream after it has been dislodged from the electrodes. Ideally, the exhaust gas velocity should be less than 0.6 ft/sec to prevent particle re-entrainment. The electrodes are also susceptible to coating by combustion byproduct impurities. Filterable particulate matter removal efficiencies of up to 98 % are achievable for particulate matter in the range of 0-5 microns.

A wet electrostatic precipitator operates using the same principal as a dry electrostatic precipitator. However, it uses water to remove the filterable particulate matter from the electrodes instead of rapping. The use of water instead of rapping eliminates the potential for re-entrainment of the filterable particulate matter and further reduces fine particulate emissions (which are more prone to re-entrainment).

Mechanical Separators

Mechanical separators include cyclonic separators and inertial separators. Mechanical separators use centrifugal forces to separate filterable particulate matter from a gas stream. The exhaust gas enters a cylindrical chamber on a tangential path and is forced along the outside wall of the chamber at a high velocity causing the filterable particulate matter to impact collectors on the outer wall of the unit and fall into a hopper for collection.

The mechanical separator removal efficiency is directly related to the exhaust gas velocity and particle size. The higher the exhaust gas flowrate the greater the centrifugal force and resulting removal efficiency. Mechanical separators work best on larger sized particles (i.e., those greater than 10 microns in diameter) and can have removal efficiencies in excess of 90%. As particle size drops, so does the removal efficiency. Typical filterable particulate matter removal efficiency for particles with diameters less than 2.5 microns is in the range of 50 % - 70 %.

Good Design and Operating Practices

Proper IC engine design and operation practices can limit the amount of PM10/PM2.5 that is generated by the equipment. Some of the particulate matter (condensable fraction) that is emitted from an IC engine is attributed to the combustion of lubricating oil in the combustion

cylinder. A small amount of engine lubricating oil remains in the combustion cylinder as the piston rings and seals experience wear, which is the result of normal IC engine use. Caterpillar has issued a maintenance schedule for inspection and replacement of the piston rings and seals. Adherence to this schedule maintains the piston rings and seals within manufacturer's tolerances and minimizes condensable particulate matter emissions from the IC engine. In addition, proper maintenance and operation of the IC engine results in maximum fuel combustion efficiency and minimizes particulate matter emissions as a result of inefficient fuel combustion.

LFG contains moisture and other impurities that can contribute to the formation of particulate matter or be emitted as particulate matter from the IC engine when they are combusted. The pretreatment of the LFG using dewatering, filtering and compression devices removes a majority of the moisture and other particulate impurities prior to combustion and reduces particulate matter emissions. However, dewatering and filtration of the LFG has limited effect on siloxanes contained in the utilized LFG fuel.

Elimination of Technically Infeasible Particulate Matter Control Options

The second step in performing BACT analyses is to eliminate all technically infeasible control technologies.

All of the particulate matter (PM10/PM2.5) emissions control options identified in the preceding information are commercially available, though not specifically designed for LFG fueled IC engines. No information was located in this BACT analysis that indicates any of the indentified add-on PM10/PM2.5 emission control devices have been installed and successfully operated on LFG fueled IC engines.

Fabric Filters

Fabric filters are designed to remove filterable particulate matter from the exhaust gas stream. Based on emissions data obtained from the operation of identical equipment, the proposed project IC engines are expected to emit approximately 3.1 TpY of filterable PM10/PM2.5 (i.e., the fabric filter would only control about 15% of the total annual PM10/PM2.5 emission rate of 20.8 TpY).

Typically, fabric filters are not used to control emissions from gas fueled IC engine because the use of filtration media increases the back pressure on the equipment, which has an adverse affect on its performance (i.e., less power is available for electricity generation). Fabric filters are also highly susceptible to plugging from specific types of impurities. LFG combustion byproducts, namely silicon dioxide that occurs from siloxane combustion, would quickly plug the filter media and render the device inoperable. Therefore, siloxane removal to reduce silicon-based particulate emissions would have to be added to the gas treatment system. However, the installation and operation of a siloxane treatment system in conjunction with a

fabric filter would have limited effect on the overall particulate matter emission rate. The combined system would only result in a maximum of 3.1 TpY of PM10/PM2.5 reductions.

Siloxane removal systems are typically used with LFG fueled turbine engines or to address IC engine maintenance issues at landfills that have high LFG siloxane contents.

There are no known fabric filter control systems installed and operated for the purpose of reducing filterable PM10/PM2.5 emissions from LFG fueled IC engine operations.

The use of fabric filter control systems for the purpose of reducing filterable PM10/PM2.5 emissions from LFG fueled IC engine operations is not technically feasible or achieved in practice.

Gas Refrigeration and Condensation Recovery

The exhaust gas of the IC engine would need to be cooled to 65 °F - 85 °F in order to be able to remove the condensable fraction of PM10/PM2.5 emissions produced by the equipment. In this temperature range, the majority of the inorganic and organic particulate matter will condense out of the exhaust gas stream. The temperature of the LFG fueled G3520C IC engine is approximately 900 °F. The amount of energy required to be removed from the IC engine exhaust in order to cool it from 900 °F to 85 °F has been calculated with the following equation:

Heat Required (MMBtu/hr) = $Q (T_{out} - T_{in}) C_p$ (60 min/hr) / (10^6 Btu/MMBtu)

Where: Q = IC engine exhaust gas flowrate (scfm)
T_{out} = Reduced IC engine exhaust gas temperature (85 °F)
T_{in} = IC engine exhaust gas temperature (900 °F)
C_p = heat capacity of air (0.02 Btu/scf °F)

The amount of energy (heat) removal required to cool 21,276 scfm of IC engine exhaust gas from 900 °F to 85 °F is 20.8 MMBtu/hr.

In addition, cooling the IC engine exhaust gas, which contains approximately 12 % moisture, from 900 °F to 85 °F (and assuming saturated air at 85 °F can hold 4% moisture) would result in the generation of approximately 573 gallons of condensation (water) per hour (5.0 million gallons of water annually).

573 gal H_2O/ hr = 21,276 scfm * (0.12 - 0.04) / (385 scfm/lb-mol H_2O)*(18 lb H_2O/lb-mol)/
(8.34 lb/gal H_2O) * 60 min/hr

The calculated energy removal requirement (20.8 MMBtu/hr) does not include the latent heat of condensation (the energy removal required to change vaporized water to liquid water) for

573 gallons of water per hour (gal H_2O/ hr), which will increase the required amount of energy removal.

A refrigeration system sized to handle this amount of cooling would have a power requirement that exceeds 5,800 kW (based on a simple conversion of heat load, MMBtu/hr, to kW assuming 100 % efficiency, which is a best-case and unrealistic scenario). The proposed project will generate a maximum of 6,400 kW. Therefore, nearly all of the energy produced by the project would be required to operate an emission control refrigeration system, which would make the project relatively useless. In addition, Sarasota Energy would need to install additional equipment (i.e., evaporation pond or piping to local wastewater treatment facility) to handle the amount of water that would be collected from the IC engine exhaust gas. Therefore, the use of exhaust gas refrigeration and condensation recovery to control condensable PM10/PM2.5 emissions from the proposed LFG fueled IC engine operations is not technically feasible or achieved in practice.

Wet Scrubbers

Wet scrubbers remove filterable particulate matter by impaction of the particulates with water mist that is injected into the exhaust gas stream. Injection of water into an IC engine exhaust gas stream (which has a temperature of approximately 900 °F) would instantly vaporize the water. Therefore, the IC engine exhaust gas would need to be cooled to an appropriate temperature so that the injected water would remain in liquid form. This activity has been previously presented to be infeasible.

Typically, wet scrubbers are used to remove particulate matter that has diameters greater than 10 microns as their removal efficiency decreases as particle size decreases below 10 microns. Wet scrubbers are not usually used to control PM10/PM2.5 emissions and would not be an effective option to control the estimated 3.1 TpY of filterable PM10/PM2.5 emissions that will be produced by the proposed IC engines. In addition, based on the lower control efficiency for the removal of PM10/PM2.5 particulates, much less than 3.1 TpY of PM10/PM2.5 will be controlled. Therefore, the use of a wet scrubber to control filterable PM10/PM2.5 emissions from the proposed LFG fueled IC engine operations is unreasonable; and therefore, not technically feasible or achieved in practice.

Electrostatic Precipitators

Typically, electrostatic precipitators are not used to control PM10/PM2.5 emissions produced by IC engine operations because their exhaust gas temperature and moisture contents are too high, which reduces the resistivity of the filterable particulate matter and lowers the removal efficiency of the electrostatic precipitator. At a minimum, significant gas cooling and condensate recovery would be required for the efficient operation of an electrostatic precipitator. This activity has been previously presented to be infeasible.

Electrostatic precipitators used in conjunction with LFG fueled IC engines would be highly susceptible to electrode coating from specific types of impurities. LFG combustion byproducts, namely silicon dioxide that occurs from siloxane combustion, would quickly coat the electrodes and render the unit inoperable. Therefore, siloxane removal to reduce silicon-based particulate emissions would have to be added to the gas treatment system. However, the installation and operation of a siloxane treatment system in conjunction with a electrostatic precipitator would have limited effect on the overall particulate matter emission rate. The combined system would only result in a maximum of 3.1 TpY of PM10/PM2.5 reductions.

Siloxane removal systems are typically used with LFG fueled turbine engines or to address IC engine maintenance issues at landfills that have high LFG siloxane contents.

There are no known electrostatic precipitator control systems installed and operated for the purpose of reducing filterable PM10/PM2.5 emissions from LFG fueled IC engine operations.

Therefore, the use of electrostatic precipitators to control filterable PM10/PM2.5 emissions from the proposed LFG fueled IC engine operations is not technically feasible or achieved in practice

Mechanical Separators

Mechanical separators are designed and used to remove particulate matter that has diameters greater than 10 microns as their removal efficiency decreases as particle size decreases below 10 microns. Mechanical separators are not usually used to control PM10/PM2.5 emissions and would not be an effective option to control the estimated 3.1 TpY of filterable PM10/PM2.5 emissions that will be produced by the proposed IC engines. In addition, based on the lower control efficiency for the removal of PM10/PM2.5 particulates, much less than 3.1 TpY of PM10/PM2.5 will be controlled. Therefore, the use of mechanical separators to control filterable PM10/PM2.5 emissions from the proposed LFG fueled IC engine operations is not technically feasible or achieved in practice.

Ranking of Technically Feasible PM10/PM2.5 Control Options

The third step in performing BACT analyses is to rank the remaining technically feasible control technologies by their effectiveness.

A combination of equipment and systems would have to be used to address the control of both filterable and condensable particulates emissions in order to significantly reduce the amount of PM10/PM2.5 that is emitted from the proposed project IC engines generators,. For example, the use of siloxane pretreatment with a fabric filter to control filterable particulate matter and exhaust gas refrigeration to remove condensable particulate matter. Based on the elevated temperature of the IC engine exhaust gas and its high moisture content of

approximately 12 % moisture by volume), exhaust gas treatment to control PM10/PM2.5 emissions would require almost as much energy input as the proposed project would produce.

None of the add-on PM10/PM2.5 emission control devices that are identified, investigated and presented in this air construction permit application have been installed and successfully operated on LFG fueled IC engines. The applicability analyses that are presented in the preceding information provide physical, chemical and engineering data that indicate the identified emission control technologies do not result in technically feasible operating conditions for the proposed project.

Therefore, the only remaining feasible control technology for the proposed project is good design, maintenance and operating practices to achieve the proposed IC engine PM10/PM2.5 emission rates (as determined to be achieved in practice).

Evaluation of Most Effective PM10/PM2.5 Controls

The fourth step in performing BACT analyses is an evaluation of the feasible control technologies, beginning with the most efficient, with respect to economic, energy and environmental impacts.

None of the add-on PM10/PM2.5 emission control devices that are identified investigated and presented in this air permit application result in technically feasible operating conditions for the proposed project. The only remaining feasible control technology for the proposed project is good design, maintenance and operating practices to achieve the proposed IC engine PM10/PM2.5 emission rates.

The use of a wet scrubber to control PM10/PM2.5 emissions requires the implementation of gas refrigeration technology in order to prevent the scrubbing liquid from vaporizing in the high temperature exhaust. No mechanical process is 100% efficient; therefore, an energy balance around the cooling of a gas stream that was heated by combustion back to the precombustion temperature will require more energy than can be produced by the combustion process. The use of an emission control device that will use more energy than the process can produce is unreasonable; and therefore, the basis of technical infeasibility.

Selection of PM10/PM2.5 BACT

The final step in performing the PM10/PM2.5 emission control analyses is the selection of BACT as the most effective control technology not eliminated in Steps 1 – 4.

USEPA RBLC Database

The USEPA RBLC database contains 23 emission and control technology determinations for LFG fueled IC engine operations (as of February 21, 2013, see Appendix K-1) and indicates

that BACT for PM10/PM2.5 emissions from LFG fueled IC engines:

1. Range from 0.10 to 0.26 g/bhp-hr; and

2. Are applicable to the operation of lean burn engines with air to fuel ratio control or simply specified as 'clean burn engine' (i.e., no add-on emission controls).

The two most recent LFG fueled IC engine air permits that are presented in the USEPA RBLC database were issued on:

1. May 8, 2012 for the PM2.5 PSD BACT determination made for the operation of LFG fueled G3520C IC engines at the NANR Venice Park Landfill. Permit Number 123-11 contains a not-to-exceed IC engine PM2.5 emission limit of 0.20 g/bhp-hr.

2. September 11, 2011 for the PM10 PSD BACT determination made for the operation of LFG fueled G3520C IC engines at the Loraine County LFG Power Station. Permit Number P0107089 contains a not-to-exceed IC engine PM10 emission limit of 0.49 lb/hr (0.1 g/bhp-hr).

The most recent PSD air permit approved by FDEP-DARM for the operation of LFG fueled IC engine generators was issued to Waste Management for its Medley Landfill facility. This information was confirmed in February 21, 2013 communications with Mr. Syed Arif, FDEP-DARM Program Administrator. This electricity generation facility uses the same Caterpillar, Inc. G3520C gas IC engines as that being proposed for the Sarasota Energy project. Permit No. PSD-FL-414 issued on August 25, 2011 contains a PM10 BACT limit of 0.24 g/bhp-hr for the IC engine operations. Appendix K-3 provided the FDEP-DARM technical review for the Medley Landfill facility permit approval.

Proposed Project PM10/PM2.5 BACT

Based on the information that is presented in this air construction permit application PM10/PM2.5 BACT for the proposed project LFG fueled G3520C IC engines is proper IC engine design, maintenance and operation practices to achieve a not-to-exceed emission rate of 0.24 g/bhp-hr as determined to be achieved in practice.

While the most recent PM10/PM2.5 IC engine emission control technology determinations that are presented in the USEPA RBLC Database for identical equipment are lower than the 0.24 g/bhp-hr value, the following information, which is presented in Appendix K-3, correctly describes the need for a higher 0.24 g/bhp-hr limit:

Florida's most recent BACT determination for a similar landfill gas engine was 0.24 g/bhp-hr based on fuel pretreatment and good combustion practices. Although initial stack tests for particulate matter emissions from new landfill gas engines have been very low (< 0.1 g/bhp-

hour), subsequent tests on the same equipment tend to show higher emission levels with increasing engine operating hours. Based on operating experience, Caterpillar, Inc. confirms an increase in particulate matter resulted from normal wear and tear on piston rings and seals. Therefore, the Department establishes ... work practice standards as the preliminary BACT determination for particulate matter from the engines ... These *... work practices should achieve a particulate matter (PM/PM10) emission rate of less than 0.24 g/bhp-hour.*

APPENDIX K-1

USEPA RACT, BACT, LAER CLEARINGHOUSE SEARCH RESULTS

Derenzo and Associates, Inc.

Summary of USEPA RBLC Query for LFG fueled IC engines with similar power ratings to those proposed for operation at Sarasota Energy (as of 6/12/13)

Facility Information	Identification	Process		Engine Size			CO			NO_x			$PM/PM_{10}/PM_{2.5}$		
Name		Code	State	(MMBtu/hr)	(kW)	(hp)	(g/bhp-hr)	(lb/hr)	Basis	(g/bhp-hr)	(lb/hr)	Basis	(g/bhp-hr)	(lb/hr)	Basis
Permits Listed in USEPA RBLC															
Moretown LFG to Energy Facility	VT-0038	17.140	VT	-	1,600	2,233	3.5	17.3	Not-to-Exceed	-	-	-	-	-	-
NANR Venice Park	MI-0396	17.140	MI	-	1,600	2,233	3.3	-	BACT-PSD	0.6	-	BACT-PSD	0.20	-	BACT-PSD
Loraine County LFG Power Station	OH-0348	17.140	OH	-	1,600	2,233	(2.75)	13.53	BACT-PSD	(0.5)	2.46	BACT-PSD	-	0.49	BACT-PSD
City of Santa Maria	CA-1186	17.140	CA	-	1,426	1,966	-	308 ppmvd 15% O2	Case by Case	-	38 ppmvd 15% O2	Case by Case	-	-	-
Waste Management, Medley Landfill	FL-0326	17.140	FL	-	1,600	2,233	3.50	17.2	BACT-PSD	-	-	-	0.24	1.20	BACT-PSD
Carbon Limestone LFG Power Station	OH-0347	17.140	OH	-	1,600	2,233	5.00	27.06	BACT-PSD	3.0	5.9	N/A	0.10	0.98	N/A
Sumpter Energy Associates, Carleton Farms	MI-0397	17.140	MI	-	1,600	2,233	3.30	-	BACT-PSD	0.6	-	BACT-PSD	0.23	-	BACT-PSD
Cinnamon Bay / Edgeboro Disposal[1]	NJ-0078	17.140	NJ	-	1,600	2,233	(0.40)	1.95	Case by Case	0.5	2.46	LAER	-	-	-
Green Gas Pioneer Crossing Energy	PA-0279	17.140	PA	-	1,600	2,233	3.0	14.8	BACT-PSD	0.5	2.5	BACT-PSD	0.17	-	BACT-PSD
Moretown LFG to Energy Facility	VT-0029	17.140	VT	-	1,600	2,233	2.75	13.5	Case by Case	-	-	-	-	-	-
Pine Tree Landfill	ME-0036	17.140	ME	10.8	-	-	2.75	8.9	BACT-PSD	-	1.94	BACT-PSD	-	0.49	BACT-PSD
University of New Hampshire	NH-0014	17.140	NH	-	1,600	-	2.75	(13.5)	BACT-PSD	0.5	(2.46)	LAER	0.10	(0.49)	BACT-PSD
Brevard Energy, L.L.C.	FL-0291	17.140	FL	-	1,600	2,233	3.50	(17.2)	BACT-PSD	0.6	2.95	BACT-PSD	0.24	1.18	BACT-PSD
Seminole Energy, L.L.C.	FL-0290	17.140	FL	-	1,600	2,233	2.75	13.54	BACT-PSD	0.6	2.95	BACT-PSD	0.24	1.18	BACT-PSD
Monmouth County Reclamation Center	NJ-0069	17.140	NJ	9.81	1,000	1,468	2.53	(8.2)	Case by Case	0.53	(1.72)	LAER	(0.18)	0.58	Case by Case
Manchester Renewable Power, L.L.C.	NJ-0068	17.140	NJ	16.38	1,600	2,233	2.75	13.54	BACT-PSD	0.5	2.46	LAER	0.20	0.98	BACT-PSD
Burlington County Resource Recovery Complex	NJ-0067	17.140	NJ	12.5	1,500	-	2.50	11.95	Case by Case	0.6	2.66	LAER	-	0.75	Case by Case
Trail Ridge Energy, L.L.C	FL-289	17.140	FL	-	1,600	2,233	3.50	(17.2)	BACT-PSD	0.6	2.95	BACT-PSD	0.24	1.18	BACT-PSD
Ridgewood Rhode Island Generation, L.L.C	RI-0022	17.140	RI	-	1,600	2,229	2.75	13.51	BACT-PSD	0.5	2.46	LAER	0.10	0.49	BACT-PSD
New England Waste Services of Vermont, Inc.	VT-0019	17.140	VT	-	1,600	2,221	2.75	13.5	Case by Case	0.5	2.45	Case by Case	-	-	-
Bio Energy of Texas, L.L.C.	TX-0495	17.140	TX	-	1,600	2,172	2.80	13.41	BACT-PSD	0.6	2.87	BACT-PSD	(0.15)	0.71	BACT-PSD
Other PSD-BACT Determinations[2]															
Waste Management, Pine Tree Acres	233-09	-	MI	-	1,600	2,233	3.30	16.3	BACT-PSD	0.6	3.00	BACT-PSD	0.24	1.20	BACT-PSD
Sumpter Energy Associates, Pine Tree Acres	103-09	-	MI	-	1,600	2,233	3.30	16.3	BACT-PSD	0.6	3.00	BACT-PSD	-	-	-

(Parantheses indicate calculated value based on information presented in USEPA RBLC Database)

Notes

1. CO emission factor in USEPA RBLC database was chosen to avoid PSD regulations and has not been proven to be technically feasible.
2. These permits did not appear in the USEPA RBLC database, identification listed is the air permit number.

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COMPREHENSIVE REPORT
Report Date:02/21/2013

Facility Information

RBLC ID:	VT-0038 (final)	**Date Determination Last Updated:**	10/17/2012
Corporate/Company Name:	PPL RENEWABLE ENERGY, LLC	**Permit Number:**	AOP-11-012
Facility Name:	MORETOWN LANDFILL GAS TO ENERGY FACILITY	**Permit Date:**	07/12/2012 (actual)
Facility Contact:	STEVEN GABRIELLE 610-774-7095 SAGABRIELLE@PPL.WEB.COM	**FRS Number:**	110040547263
Facility Description:	Landfill gas to energy: use of reciprocating internal combustion engines	**SIC Code:**	4953
Permit Type:	C: Modify process at existing facility	**NAICS Code:**	221210
Permit URL:			
EPA Region:	1	**COUNTRY:**	USA
Facility County:	WASHINGTON		
Facility State:	VT		
Facility ZIP Code:	05676		
Permit Issued By:	VERMONT AIR POLLUTION CONTROL DIVISION (Agency Name) MR. DOUG ELLIOTT(Agency Contact) (802) 241-3845 doug.elliott@state.vt.us		
Permit Notes:	This permit modifies the previous BACT determination from permit AOP-08-015. Due to the buildup of siloxane in the engines, the CO emission rate is higher than expected. The new permit requires periodic cleaning of the engines and allows for higher CO emission rates.		

Affected Boundaries:

Boundary Type:	Class 1 Area State:	Boundary:	Distance:
CLASS1	NH	Great Gulf	100km - 50km
CLASS1	VT	Lye Brook	100km - 50km
CLASS1	NH	Presidential Range-Dry River	100km - 50km
INTL BORDER		US/Canada Border	< 100 km

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	33.7000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: Landfill gas to energy engines

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: landfill gas

Throughput: 1600.00 kW (each engine)

Process Notes: There are currently two 1600 kW engines: Caterpillar G3520C LE.

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: EPA/OAR Mthd 10

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 3.5000 G/BHP-H HOURLY AVERAGE

Emission Limit 2: 17.3000 LB/H HOURLY AVERAGE

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: OTHER CASE-BY-CASE

Other Applicable Requirements:

Control Method: (P) Engine design and periodic cleaning/rebuilding of engine to manage the build-up of siloxane in the engine.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: The limit of 3.5 g/bhp-hr is to be met at all times, this Facility also has lower engine emission limits to demonstrate the lower CO emissions after the cleaning and/or rebuild of the engines

Process/Pollutant Information

PROCESS NAME: Landfill gas to energy engines - after annual maintenance

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: landfill gas

Throughput: 1600.00 kw (each)

Process Notes: There are two 1600 kW engines: Caterpillar G3520C LE. This 'process' is for the performance of the engines after annual maintenance to remove siloxane deposits in the engine. This level of maintenance will reduce the CO emissions, but does not return the engine to a 'like new' level of performance.

POLLUTANT NAME:	Carbon Monoxide
CAS Number:	630-08-0
Test Method:	EPA/OAR Mthd 10
Pollutant Group(s):	(InOrganic Compounds)
Emission Limit 1:	3.1000 G/BHP-H HOURLY AVERAGE
Emission Limit 2:	15.3000 LB/H HOURLY AVERAGE
Standard Emission:	
Did factors, other then air pollution technology considerations influence the BACT decisions:	U
Case-by-Case Basis:	OTHER CASE-BY-CASE
Other Applicable Requirements:	
Control Method:	(P) Engine design and annual maintenance for removal of siloxane build up in the engine.
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verificd:	Unknown
Pollutant/Compliance Notes:	This emission limit must be demonstrated annually; after engine siloxane deposits have been removed.

Process/Pollutant Information

PROCESS NAME:	Landfill gas to energy engines - new and 6-yr rebuild
Process Type:	17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel:	landfill gas
Throughput:	1600.00 kw (each)
Process Notes:	There are two 1600 kW engines: Caterpillar G3520C LE. This 'process' has the CO emission limits for new engines and for the engines after they have rebuilt to like-new condition with essentially all of the siloxane deposits having been removed from the inside of the engine

POLLUTANT NAME:	Carbon Monoxide
CAS Number:	630-08-0
Test Method:	EPA/OAR Mthd 10
Pollutant Group(s):	(InOrganic Compounds)
Emission Limit 1:	2.7500 G/BHP-H HOURLY AVERAGE
Emission Limit 2:	13.5000 G/BHP-H HOURLY AVERAGE
Standard Emission:	
Did factors, other then air pollution technology considerations influence the BACT decisions:	U
Case-by-Case Basis:	OTHER CASE-BY-CASE
Other Applicable Requirements:	
Control Method:	(P) engine design for new and/or rebuilt engine.
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	This emission rate of 2.75 g/bhp-hr was the original limit for this facility. After a few years of operation it was established that this limit was not achievable at all times due to the build up of siloxane in the engine.

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Facility Information

RBLC ID:	MI-0396 (draft)	**Date Determination Last Updated:**	10/05/2012
Corporate/Company Name:	NORTH AMERICAN NATURAL RESOURCES	**Permit Number:**	123-11
Facility Name:	VENICE PARK LANDFILL	**Permit Date:**	05/08/2012 (actual)
Facility Contact:	ROBERT EVANS 517-347-4048 ROBERTEVANS@NANR.NET	**FRS Number:**	26-155-00144
Facility Description:	Landfill gas to electricity	**SIC Code:**	4911
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	221119
Permit URL:			

EPA Region:	5	**COUNTRY:**	USA
Facility County:	SHIAWASSEE		
Facility State:	MI		
Facility ZIP Code:	48449-9622		
Permit Issued By:	MICHIGAN DEPT OF ENVIRONMENTAL QUALITY (Agency Name) MS. CINDY SMITH(Agency Contact) (517)241-7461 SMITHC17@MICHIGAN.GOV		
Permit Notes:	Contact Permit Engineer Jennifer Bixby at 517-335-6978 with questions regarding this permit.		

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	201.9000 (Tons/Year)
Nitrogen Oxides (NOx)	64.7000 (Tons/Year)
Particulate Matter (PM)	12.5000 (Tons/Year)
Sulfur Oxides (SOx)	32.8000 (Tons/Year)
Volatile Organic Compounds (VOC)	35.6000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: (1) Caterpillar 3516 Generator Engine ("Engine 7")

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: Landfill gas

Throughput: 800.00 KW

Process Notes: 800KW (1148 HP)

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))

Emission Limit 1: 2.0000 G/B-HP-H NA

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NESHAP , SIP , OPERATING PERMIT

Control Method: (N) Must use an electronic Air Fuel Ratio Controller (AFRC). This is a "low emissions" engine tuned for low NOx which is a trade-off with higher CO emissions. The emission limit is the manufacturer's specification for NOx when tuned for low NOx.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: AFRC is a design consideration that did not require a cost analysis.

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 3.1000 G/B-HP-H NA

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: SIP , NESHAP , OPERATING PERMIT

Control Method: (N) The engine is a "low emissions" engine tuned for low NOx which is a trade-off for higher CO emissions. The CO emission limit is the manufacturer's specification for CO when tuned for low NOx.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, total < 2.5 μ (TPM2.5)

CAS Number: PM

Test Method: Unspecified

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 0.2000 G/B-HP-H NA
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NESHAP , SIP , OPERATING PERMIT
Control Method: (P) Proper operation and maintenance
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

Process/Pollutant Information

PROCESS NAME: (1) Caterpillar 3512 Generator Engine ("Engine 8")
Process Type: 17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel: Landfill gas
Throughput: 615.00 KW
Process Notes: 615 KW (861 HP)

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 2.0000 G/B-HP-H NA
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NESHAP , SIP , OPERATING PERMIT
Control Method: (N) Electronic Air Fuel Ratio Controller (AFRC). This is a "low emissions" engine tuned for low NOx which is a trade-off with higher CO emissions. The NOx emission limit is the manufacturer's specification for when the engine is tuned for low NOx.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: AFRC is a design consideration that did not require a cost analysis.

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 3.0300 G/B-HP-H NA
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NESHAP , SIP , OPERATING PERMIT
Control Method: (N) This is a low emissions engine tuned for low NOx which is a trade off for higher CO emissions. The CO emission limit is the manufacturer's specification for CO when tuned for low NOx.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, total < 2.5 μ (TPM2.5)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 0.2000 G/B-HP-H NA
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NESHAP , SIP , OPERATING PERMIT
Control Method: (P) Proper operation and maintenance
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

Process/Pollutant Information

PROCESS NAME: (2) Landfill Gas Generator Engine ("Engines 9&10")
Process Type: 17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel: Landfill gas
Throughput: 1600.00 KW
Process Notes: 1600 KW (2233 HP) EACH

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.6000 G/B-HP-H EACH ENGINE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP , OPERATING PERMIT , NSPS , NESHAP
Control Method: (N) Electronic Air Fuel Ratio Controller. This engine is a "low emissions" engine tuned for low NOx which is a tradeoff for higher CO emissions. The NOx emission limit is the manufacturer's specification when tuned for low NOx.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: AFRC is a design consideration that did not require a cost analysis.

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 3.3000 G/B-HP-H EACH ENGINE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NESHAP , NSPS , SIP , OPERATING PERMIT
Control Method: (N) This is a "low emissions" engine tuned for low NOx which is a trade off for higher CO emissions. The CO emission limit is the manufacturer's specification for CO when tuned for low NOx.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, total < 2.5 μ (TPM2.5)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 0.2000 G/B-HP-H EACH ENGINE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP , SIP , OPERATING PERMIT
Control Method: (P) Proper operation and maintenance
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

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Facility Information

RBLC ID: OH-0348 (final)
Date Determination Last Updated: 10/16/2012
Corporate/Company Name: LORAINE COUNTY LFG POWER STATION
Permit Number: P0107089
Facility Name: LORAINE COUNTY LFG POWER STATION
Permit Date: 09/14/2011 (actual)
Facility Contact: MIKE DAE 281-398-8417 MIKE.DAE@ENERGYDI.COM
FRS Number: Not Available
Facility Description: Landfill Gas Power Station
SIC Code: 4911
Permit Type: B: Add new process to existing facility
NAICS Code: 221119
Permit URL:
EPA Region: 5
COUNTRY: USA
Facility County: LORAINE
Facility State: OH
Facility ZIP Code: 43502
Permit Issued By: OHIO ENVIRONMENTAL PROTECTION AGENCY (Agency Name)
MS. CHERYL SUTTMAN(Agency Contact) (614)644-3617 mailto:cheryl.suttman@epa.ohio.gov
Permit Notes: Installation of ten 2233 HP internal combustion engines to burn landfill gas and produce electricity and a thermal oxidizer burning 200 scfm

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	597.8600 (Tons/Year)
Nitrogen Oxides (NOx)	109.9000 (Tons/Year)
Particulate Matter (PM)	21.9400 (Tons/Year)
Sulfur Oxides (SOx)	12.7000 (Tons/Year)
Volatile Organic Compounds (VOC)	36.2500 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: Reciprocationg Internal Combustion Engines (10)
Process Type: 17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel: Landfill Gas
Throughput: 2233.00 HP
Process Notes: 10 Caterpillar RICE burning landfill gas, 2233 HP each.

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: EPA/OAR Mthd 10
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 13.5300 LB/H FROM EACH ENGINE
Emission Limit 2: 59.2600 T/YR FROM EACH ENGINE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , OPERATING PERMIT
Control Method: (P) Lean burn technology and meeting the requirements of Part 60 Subpart JJJJ

Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: Additional limit: 2.75 G/BHP-H; standard is 5.0 G/HP-H

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: EPA/OAR Mthd 7
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 2.4600 LB/H FROM EACH ENGINE
Emission Limit 2: 10.7800 T/YR FROM EACH ENGINE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , OPERATING PERMIT
Control Method: (P) Lean burn technology and meeting the requirements of Part 60 Subpart JJJJ
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: Additional NOx limit: 0.50 G/BHP-H; standard is 2.0 g/HP-H Method 7 or Method 7E

POLLUTANT NAME: Particulate matter, filterable < 10 μ (FPM10)
CAS Number: PM
Test Method: Other
Other Test Method: Method 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.4900 LB/H FROM EACH ENGINE
Emission Limit 2: 2.1500 T/YR FROM EACH ENGINE
Standard Emission: 0.1000 G/BHP-H
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: Method 5 if required.

POLLUTANT NAME: Sulfur Dioxide (SO2)
CAS Number: 7446-09-5
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 0.2800 LB/H FROM EACH ENGINE
Emission Limit 2: 1.2300 T/YR FROM EACH ENGINE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC)
CAS Number: VOC
Test Method: EPA/OAR Mthd 25

Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 28.7200 LB/H FROM EACH ENGINE
Emission Limit 2: 125.7900 T/YR FROM EACH ENGINE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: OPERATING PERMIT , NSPS
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: This limit is for organic compounds. Additional organic compound limit: 5 84 G/BHP-H VOC limits: 0.82 LB/H; 3.59 T/YR; and 1 G/HP-H Method 25 or 25A.

POLLUTANT NAME: Hydrochloric Acid
CAS Number: 7647-01-0
Test Method: EPA/OAR Mthd 26
Pollutant Group(s): (Acid Gasses/Mist , Hazardous Air Pollutants (HAP) , InOrganic Compounds , Particulate Matter (PM))
Emission Limit 1: 0.3600 LB/H FROM EACH ENGINE
Emission Limit 2: 1.5800 T/YR FROM EACH ENGINE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: If requireed Method 26

POLLUTANT NAME: Visible Emissions (VE)
CAS Number: VE
Test Method: EPA/OAR Mthd 9
Pollutant Group(s):
Emission Limit 1: 10.0000 % OPACITY AS A 6 MINUTE AV
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: If required Method 9

Process/Pollutant Information

PROCESS NAME: Thermal Oxidizer
Process Type: 19.900 (Other Misc. Combustion)
Primary Fuel: landfill gas
Throughput: 6.00 MMBTU/H
Process Notes: Used to clean the siloxane filters. Must maintain temperature at or above 1400 degrees F Requires temperature monitoring device and a device that records flow to the control device and must secure bypass lines.

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.4800 LB/H
Emission Limit 2: 2.1000 T/YR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: Additional limit: 0.08 lb/MMBtu

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 1.2000 LB/H
Emission Limit 2: 5.2600 T/YR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: Additional Limit: 0.2 lb/MMBtu

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.1000 LB/H
Emission Limit 2: 0.4400 T/YR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC)
CAS Number: VOC
Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 0.0800 LB/H
Emission Limit 2: 0.3500 T/YR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Dioxide (SO2)
CAS Number: 7446-09-5
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 0.0900 LB/H
Emission Limit 2: 0.4000 T/YR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Hydrochloric Acid
CAS Number: 7647-01-0
Test Method: Unspecified
Pollutant Group(s): (Acid Gasses/Mist , Hazardous Air Pollutants (HAP) , InOrganic Compounds , Particulate Matter (PM))
Emission Limit 1: 0.1100 LB/H
Emission Limit 2: 0.4800 T/YR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Visible Emissions (VE)
CAS Number: VE
Test Method: EPA/OAR Mthd 9
Pollutant Group(s):
Emission Limit 1: 10.0000 % OPACITY AS A 6 MINUTE AV
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: If required Method 9

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Facility Information

RBLC ID:	CA-1186 (final)	**Date Determination Last Updated:**	09/06/2012
Corporate/Company Name:	CITY OF SANTA MARIA LANDFILL	**Permit Number:**	ATC 13281
Facility Name:	CITY OF SANTA MARIA LANDFILL	**Permit Date:**	08/26/2011 (actual)
Facility Contact:		**FRS Number:**	110012694110
Facility Description:	Landfill	**SIC Code:**	4953
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	562212
Permit URL:			
EPA Region:	9	**COUNTRY:**	USA
Facility County:	SANTA BARBARA		
Facility State:	CA		
Facility ZIP Code:	93454		
Permit Issued By:	SANTA BARBARA COUNTY APCD, CA (Agency Name) MR. BEN ELLENBERGER(Agency Contact) (805) 961-8879 EllenbergerC@SBCAPCD.ORG		
Other Agency Contact Info:	805-961-8800 cbe@sbcapcd.org		
Permit Notes:			

Process/Pollutant Information

PROCESS NAME: Internal Combustion Engine
Process Type: 17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel: Landfill Gas
Throughput: 1966.00 BHP
Process Notes: Generate 1.426 MW electricity

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 38.0000 PPMVD@15% O2 6 MIMUTES
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements: N/A
Control Method: (P) Lean-burn engine with air fuel ratio controller
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 308.0000 PPMVD@15% O2 6 MIMUTES
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements: N/A
Control Method: (P) Lean-burn engine with air fuel ratio controller
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME:	Volatile Organic Compounds (VOC)
CAS Number:	VOC
Test Method:	Unspecified
Pollutant Group(s):	(Volatile Organic Compounds (VOC))
Emission Limit 1:	86.0000 PPMVD@15% O2 6 MIMUTES
Emission Limit 2:	
Standard Emission:	
Did factors, other then air pollution technology considerations influence the BACT decisions:	U
Case-by-Case Basis:	OTHER CASE-BY-CASE
Other Applicable Requirements:	N/A
Control Method:	(P) Lean-burn engine with air-fuel ratio controller
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	

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Facility Information

RBLC ID:	FL-0326 (final)	**Date Determination Last Updated:**	12/12/2011
Corporate/Company Name:	WASTE MANAGEMENT, INC.	**Permit Number:**	0250615-012-AC (PSD-FL-414)
Facility Name:	MEDLEY LANDFILL	**Permit Date:**	08/25/2011 (actual)
Facility Contact:	JAMES KISIEL 713/823-7068 JKISIEL@WM.COM	**FRS Number:**	110041179266
Facility Description:	The Medley Landfill is an open Class I Landfill with a design capacity greater than 2.5 million megagrams by mass or 2.5 million cubic meters by volume. This landfill commenced construction prior to 1980 as a lime rock quarry that was backfilled with fill and municipal solid waste (MSW) placed above the groundwater table. The landfill started receiving waste prior to 1980 and was 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. In 2003, the saddle fill was constructed with a geosynthetic liner to provide an additional 2 million cubic yards. Yearly waste acceptance is approximately 700,000 tons. The nonmethane organic compounds (NMOC) emissions are calculated to be greater than 50 megagrams per year. This landfill does not contain a bioreactor and is an active asbestos waste disposal site. Landfill gas emissions are collected and controlled through an extraction well-field system with open and closed flares.	**SIC Code:**	4911
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	221119
Permit URL:			
EPA Region:	4	**COUNTRY:**	USA
Facility County:	MIAMI-DADE		
Facility State:	FL		
Facility ZIP Code:	33178		
Permit Issued By:	FLORIDA DEPT. OF ENVIRONMENTAL PROTECTION (Agency Name) MR. JEFF KOERNER(Agency Contact) (850)921-9000 Jeff.Koerner@dep.state.fl.us		
Permit Notes:	The facility currently operates two flares – one 3,000 standard cubic feet per minute (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 first flare (EU 001) was installed in 1990. A second flare (EU 005) was installed in October of 2003 and started operation November 5, 2003. Neither the enclosed flare nor the open flare is equipped with a bypass in which landfill gas can bypass the control device in a un-combusted manner.		

Affected Boundaries:

Boundary Type:	Class I Area State:	Boundary:	Distance:
CLASSI	FL	Everglades NP	< 100 km

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	455.0000 (Tons/Year)
Nitrogen Oxides (NOx)	78.0000 (Tons/Year)
Particulate Matter (PM)	31.0000 (Tons/Year)
Sulfur Oxides (SOx)	39.0000 (Tons/Year)
Volatile Organic Compounds (VOC)	37.0000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: Landfill Gas-to-Energy

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: Landfill gas

Throughput: 4000.00 scfm

Process Notes: Each engine uses approximately 588 scfm of landfill gas, giving a total of 3,528 scfm of landfill gas for all six lean-burn, spark-ignited reciprocating internal combustion engine/generator sets (Caterpillar Model G3520C). A maximum engine rating of 2,233 bhp, a nominal electrical generator rating of 1.6 MW; and a heat input rate of approximately 17.6 MMBtu/hour.

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0
Test Method: EPA/OAR Mthd 10
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 3.5000 G/BHP-H
Emission Limit 2: 17.2000 LB/H EACH ENGINE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (P) Lean-burn engine with air-to-fuel controller
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC)

CAS Number: VOC
Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 1.0000 G/BHP-H
Emission Limit 2: 0.8000 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements: NSPS
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Hydrochloric Acid

CAS Number: 7647-01-0
Test Method: Unspecified
Pollutant Group(s): (Acid Gasses/Mist , Hazardous Air Pollutants (HAP) , InOrganic Compounds , Particulate Matter (PM))
Emission Limit 1: 9.9000 T/YR PER 12 CONSECUTIVE MONTHS
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements:
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: Based on landfill gas analysis & consumption. Annually, a sample of landfill gas during each stack test shall be analyzed for HCl emission factors in terms of lb/MMscf. Emissions of HCl calculated from the monthly fuel consumption and analytical results for chlorine contents of the landfill gas.

POLLUTANT NAME: Particulate matter, total < 2.5 μ (TPM2.5)

CAS Number:	PM
Test Method:	Other
Other Test Method:	Method 9
Pollutant Group(s):	(Particulate Matter (PM))
Emission Limit 1:	10.0000 % OPACITY
Emission Limit 2:	SEE NOTES
Standard Emission:	
Did factors, other then air pollution technology considerations influence the BACT decisions:	U
Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Control Method:	(P) Pretreatment of landfill gas and good combustion practices
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	Based on these work practice standards, the maximum emissions of PM/PM10/PM2.5 from each engine/generator are estimated to be 0.24 g/bhp-hour, 1.2 lb/hour and 5.2 tons/year/engine. Visible Emisions 10% opacity

POLLUTANT NAME:	Sulfur Dioxide (SO2)
CAS Number:	7446-09-5
Test Method:	Unspecified
Pollutant Group(s):	(InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1:	4.9000 LB/H PER ENGINE (MONITORING ONLY)
Emission Limit 2:	
Standard Emission:	4.9000 LB/H PER ENGINE (MONITORING ONLY)
Did factors, other then air pollution technology considerations influence the BACT decisions:	U
Case-by-Case Basis:	OTHER CASE-BY-CASE
Other Applicable Requirements:	
Control Method:	(N)
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	Semiannually, a sample of landfill gas during each stack test shall be analyzed for SO2 emission factors in terms of lb/MMscf. Emissions of SO2 calculated from the monthly fuel consumption as well as the analytical results for the sulfur contents of the landfill gas representative of the given month of operation.

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Facility Information

RBLC ID:	OH-0347 (final)	**Date Determination Last Updated:**	10/16/2012
Corporate/Company Name:	ENERGY DEVELOPMENTS INC.	**Permit Number:**	P0107078
Facility Name:	CARBON LIMESTONE LANDFILL GAS POWER STATION	**Permit Date:**	07/05/2011 (actual)
Facility Contact:	MIKE DAE 281-398-8417 MIKE.DAE@ENERGYDI.COM	**FRS Number:**	110040580092
Facility Description:	Landfill Gas Power Station	**SIC Code:**	4911
Permit Type:	U: Unspecified	**NAICS Code:**	221119
Permit URL:			
EPA Region:	5	**COUNTRY:**	USA
Facility County:	MAHONING		
Facility State:	OH		
Facility ZIP Code:	44436		
Permit Issued By:	OHIO ENVIRONMENTAL PROTECTION AGENCY (Agency Name) MS. CHERYL SUTTMAN(Agency Contact) (614)644-3617 mailto:cheryl.suttman@epa.ohio.gov		
Permit Notes:	Adding two more engines		
Facility-wide Emissions:	**Pollutant Name:** Carbon Monoxide	**Facility-wide Emissions Increase:** 118.5200 (Tons/Year)	

Nitrogen Oxides (NOx)	25.8400 (Tons/Year)
Particulate Matter (PM)	4.3000 (Tons/Year)
Sulfur Oxides (SOx)	2.4600 (Tons/Year)
Volatile Organic Compounds (VOC)	7.1800 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: 2 caterpillar engines 2233 HP

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: Landfill gas

Throughput: 2233.00 HP

Process Notes: Two 2233 HP caterpillar engines burning landfill gas

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)

CAS Number: PM
Test Method: Other
Other Test Method: Method 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.9800 LB/H FROM BOTH ENGINES TOGETHER
Emission Limit 2: 4.3000 T/YR FROM BOTH ENGINES TOGETHER
Standard Emission: 0.1000 G/BHP-H
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: If required Method 5. 0.062 lb PM/MMBtu of actual heat input

POLLUTANT NAME: Sulfur Dioxide (SO2)

CAS Number: 7446-09-5
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 0.5600 LB/H FROM BOTH ENGINES TOGETHER
Emission Limit 2: 2.4600 T/YR FROM BOTH ENGINES TOGETHER
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC)

CAS Number: VOC
Test Method: EPA/OAR Mthd 25
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 1.6400 LB/H FROM BOTH ENGINES TOGETHER
Emission Limit 2: 7.1800 T/YR FROM BOTH ENGINES TOGETHER
Standard Emission: 1.0000 G/HP-H
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown
Pollutant/Compliance Notes: Method 25 or 25A

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: EPA/OAR Mthd 7
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 5.9000 LB/H FROM BOTH ENGINES TOGETHER
Emission Limit 2: 25.8400 T/YR FROM BOTH ENGINES TOGETHER
Standard Emission: 3.0000 G/HP-H
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: OPERATING PERMIT
Control Method: (P) Lean burn technology
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: Method 7 or 7E

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: EPA/OAR Mthd 10
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 27.0600 LB/H FROM BOTH ENGINES TOGETHER
Emission Limit 2: 118.5200 T/YR FROM BOTH ENGINES TOGETHER
Standard Emission: 5.0000 G/HP-H
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Control Method: (P) Lean burn technology
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Hydrochloric Acid
CAS Number: 7647-01-0
Test Method: Unspecified
Pollutant Group(s): (Acid Gasses/Mist , Hazardous Air Pollutants (HAP) , InOrganic Compounds , Particulate Matter (PM))
Emission Limit 1: 0.3000 LB/H FROM BOTH ENGINES TOGETHER
Emission Limit 2: 1.3200 T/YR FROM BOTH ENGINES TOGETHER
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Visible Emissions (VE)
CAS Number: VE
Test Method: EPA/OAR Mthd 9
Pollutant Group(s):
Emission Limit 1: 10.0000 % OPACITY AS A 6-MINUTE AV
Emission Limit 2:
Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: If required Method 9

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Facility Information

RBLC ID:	MI-0397 (draft)	**Date Determination Last Updated:**	10/17/2012
Corporate/Company Name:	SUMPTER ENERGY ASSOCIATES	**Permit Number:**	293-09A
Facility Name:	CARLETON FARMS LANDFILL	**Permit Date:**	06/29/2011 (actual)
Facility Contact:	RICHARD DIGIA 248-380-3920	**FRS Number:**	26-16304020
Facility Description:	Landfill gas to energy plant	**SIC Code:**	
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	562212
Permit URL:			
EPA Region:	5	**COUNTRY:**	USA
Facility County:	WAYNE		
Facility State:	MI		
Facility ZIP Code:	48164-9610		
Permit Issued By:	MICHIGAN DEPT OF ENVIRONMENTAL QUALITY (Agency Name) MS. CINDY SMITH(Agency Contact) (517)241-7461 SMITHC17@MICHIGAN.GOV		
Other Agency Contact Info:	Please contact permit engineer Jeremy Hoeh at 517-241-2194 with questions related to the permit. Thank you.		
Permit Notes:			

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	221.8500 (Tons/Year)
Nitrogen Oxides (NOx)	65.6000 (Tons/Year)
Particulate Matter (PM)	22.3400 (Tons/Year)
Sulfur Oxides (SOx)	50.3000 (Tons/Year)
Volatile Organic Compounds (VOC)	10.3000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: Landfill gas fired generator engines-2
Process Type: 17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel: Landfill gas
Throughput: 260880.00 MMBTU/yr
Process Notes: 260,880 MMBTU/yr COMBINED for both engines. Each engine greater than 500 HP.

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 3.3000 G/B-HP-H EACH ENGINE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (P) Good combustion practices with an air/fuel ratio controller
Est. % Efficiency:
Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.6000 G/B-HP-H EACH ENGINE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (N) Good combustion practices with an air/fuel ratio controller.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, total < 10 μ (TPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.2300 G/B-HP-H EACH ENGINE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N) Good combustion practices of gas treated according to NSPS WWW.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Dioxide (SO2)
CAS Number: 7446-09-5
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 1.2500 LB/H EACH ENGINE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N) Good combustion practices of gas treated according to NSPS WWW.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

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Facility Information

RBLC ID:	NJ-0078 (final)	**Date Determination Last Updated:**	01/24/2012
Corporate/Company Name:	CINNAMON BAY/EDGEBORO DISPOSAL	**Permit Number:**	17901-BOP100001
Facility Name:	CINNAMON BAY/EDGEBORO DISPOSAL	**Permit Date:**	05/03/2011 (actual)
Facility Contact:	SYSNULL	**FRS Number:**	110000802640
Facility Description:		**SIC Code:**	4911
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	221119
Permit URL:			
EPA Region:	2	**COUNTRY:**	USA
Facility County:	MIDDLESEX		
Facility State:	NJ		
Facility ZIP Code:	08816		
Permit Issued By:	NEW JERSEY DEPT OF ENV PROTECTION, DIVISION OF AIR QUALITY (Agency Name) ALIYA KHAN(Agency Contact) (609) 292-2169 ALIYA.KHAN@DEP.STATE.NJ.US		
Other Agency Contact Info:	Supervisor: DAVID OWEN; DAVID.OWEN@DEP.STATE.NJ.US Engineer: Chris.schwalje@DEP.STATE.NJ.US		
Permit Notes:			

Affected Boundaries:

Boundary Type:	Class 1 Area State:	Boundary:	Distance:
CLASS1	NJ	Brigantine	100km - 50km

Process/Pollutant Information

PROCESS NAME: INTERNAL COMBUSTION ENGINES

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: LANDFILL GAS

Throughput: 848820.00 MMBTU/YR

Process Notes: THIS PROJECT ALLOWS THE FACILITY TO: 1) INSTALL SIX NEW CATERPILLAR G3520C LANDFILL-GAS FIRED INTERNAL COMBUSTION ENGINES, 1600 KW EACH, CONTROLLED BY OXIDATION CATALYSTS, TO GENERATE ELECTRICITY. THE SIX ENGINES ARE PERMITTED TO USE LANDFILL GAS EQUAL TO 848, 820 MMBTU/YR, BASED ON AN HOURLY MAXIMUM OF 96.9 MMBTU/HR AND 8760 HOURS/YR. 2) INSTALL TWO ENCLOSED FLARES AND A LANDFILL GAS PRETREATMENT SYSTEM FOR THE CLOSED EDGEBORO LANDFILL.

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102
Test Method: EPA/OAR Mthd 7E
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.5000 GRAMS/BHP-H AVERAGE OF THREE 1-HR TESTS
Emission Limit 2: 2.4600 LB/H EACH OF THREE TEST RUNS
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: LAER
Other Applicable Requirements: NSPS , NESHAP , OPERATING PERMIT
Control Method: (N) THESE ARE ULTRA LEAN BURN ENGINES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0
Test Method: EPA/OAR Mthd 10
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 1.9500 LB/H EACH OF THREE ONE-HR STACK TEST RUNS
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements: NSPS , OPERATING PERMIT
Control Method: (A) OXIDATION CATALYST

Est. % Efficiency:	90.000
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	

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Facility Information

RBLC ID:	PA-0279 (draft)	**Date Determination Last Updated:**	02/20/2013
Corporate/Company Name:	GREEN GAS PIONEER CROSSING ENERGY LLC	**Permit Number:**	06-05105B
Facility Name:	GREEN GAS PIONEER CROSSING ENERGY LLC/EXETER	**Permit Date:**	12/13/2010 (actual)
Facility Contact:	DUNCAN COX 561-322-8011	**FRS Number:**	35-2247063-1
Facility Description:	This facility is a landfill gas to energy facility located at Pioneer Crossing Landfill. Addition of two units where each unit is a 2233 Hp Reciprocating Internal Combustion Engine using landfill gas as the fuel and powering a 1600 KW electric generator.	**SIC Code:**	
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	221119
Permit URL:			
EPA Region:	3	**COUNTRY:**	USA
Facility County:	BERKS		
Facility State:	PA		
Facility ZIP Code:			
Permit Issued By:	PENNSYLVANIA DEP, BUREAU OF AIR QUALITY (Agency Name) MR. REGI SAM(Agency Contact) (717)772-3375 rsam@pa.gov		
Permit Notes:			

Process/Pollutant Information

PROCESS NAME:	RIC ENGINES (2)
Process Type:	17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel:	Treated Landfil Gas
Throughput:	66876.00 CF/HR
Process Notes:	

POLLUTANT NAME:	Nitrogen Oxides (NOx)
CAS Number:	10102
Test Method:	Unspecified
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1:	0.5000 G/BHP-HR AT FULL LOAD (ONE HR AVERAGE)
Emission Limit 2:	2.5000 LB/HR AT ANY LOAD (ONE HR AVERAGE)
Standard Emission:	
Did factors, other then air pollution technology considerations influence the BACT decisions:	U
Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	OTHER
Control Method:	(P) Each engine shall be constructed with low NOx technology in the form of lean burn combustion with automatic air/fuel ratio control.
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	The permittee shall not utilize the landfill gas if the total chlorine as HCl in the landfill gas are found to be greater than 50 ppmv after the treatment.

POLLUTANT NAME:	Carbon Monoxide

CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 3.0000 G/BHP-HR AT FULL LOAD (ONE HOUR AVERAGE)
Emission Limit 2: 14.8000 LB/HR AT ANY LOAD (ONE HOUR AVERAGE)
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC)
CAS Number: VOC
Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 0.3200 G/BHP-HR AT FULL LOAD (ONE HOUR AVERAGE)
Emission Limit 2: 1.5500 LB/BHP-HR AT ANY LOAD (ONE HOUR AVERAGE)
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 10 μ (FPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.1700 G/BHP-HR AT FULL LOAD (ONE HOUR AVERAGE)
Emission Limit 2: 17.0000 LB/MMCF OF METHANE AT ANY LOAD (ONE HOUR AVERAGE)
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

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Facility Information

RBLC ID: CA-1184 (final)
Corporate/Company Name: CHP CLEAN ENERGY L, LLC
Facility Name: CHP CLEAN ENERGY L, LLC
Date Determination Last Updated: 09/06/2012
Permit Number: 000453
Permit Date: 03/08/2010 (actual)

Facility Contact:		**FRS Number:**	Not Available
Facility Description:		**SIC Code:**	4953
Permit Type:	U: Unspecified	**NAICS Code:**	562212
Permit URL:			
EPA Region:	9	**COUNTRY:**	USA
Facility County:	SAN DIEGO		
Facility State:	CA		
Facility ZIP Code:	92057		
Permit Issued By:	SAN DIEGO COUNTY APCD, CA (Agency Name) MR. GARY SMITH(Agency Contact) (858)650-4599 gary.smith@sdcounty.ca.gov		
Other Agency Contact Info:	Camqui Nguyen (858) 586-2747 camqui.nguyen@sdapcd.org		
Permit Notes:			

Process/Pollutant Information

PROCESS NAME: ICE: Landfill or Digested Gas Fired

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: Digester gas

Throughput: 0

Process Notes: Manufacturer: Guascor Type: Model: SFGLD 560 Equipment Description: Prime engine Capacity / Diinentions 789 bhp Fuel Type Digester Gas Multiple Fuel Types Digester gas and natural gas Operating Schedule (hours/day)/(days/week)/(weeks/year)e Continuous (24/7/52) Function of Equipment Producing electricity

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.5000 G/BHP-H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements: OTHER
Control Method: (P) Lean burn low emission
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC)

CAS Number: VOC
Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 0.8000 G/BHP-H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements: OTHER
Control Method: (P) Lean burn low emission
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

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Facility Information

RBLC ID:	FL-0331 (final)	**Date Determination Last Updated:**	10/11/2012
Corporate/Company Name:	INDUSTRIAL POWER GENERATING COMPANY, LLC (INGENCO)	**Permit Number:**	0250623-007-AC/PSD-FL-408
Facility Name:	MIAMI-DADE WM SOUTH DADE LANDFILL INGENCO	**Permit Date:**	06/09/2009 (actual)
Facility Contact:	ROBERT GREENE RGREENE@INGENCO.COM	**FRS Number:**	110007244035
Facility Description:	The permit approved construction of 24 Detroit Diesel Series 60 dual-fuel engines or equivalent coupled to electrical generators. The electrical generation plant will consist of: LFG treatment equipment (landfill gas dewatering, filtration and compression equipment and processes); 24 internal combustion engine / electrical generator sets, which will produce a total of 8 megawatts (MW, nominal) of electricity under base load operating conditions and will be interconnected to the Florida Power and Light distribution network through a nearby power line; ancillary equipment to support the electric generation plant (e.g., fuel tanks, lube oil tanks, a small boiler and small cooling towers).	**SIC Code:**	4953
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	221119
Permit URL:			
EPA Region:	4	**COUNTRY:**	USA
Facility County:	MIAMI-DADE		
Facility State:	FL		
Facility ZIP Code:	33176		
Permit Issued By:	FLORIDA DEPT. OF ENVIRONMENTAL PROTECTION (Agency Name) MR. JEFF KOERNER(Agency Contact) (850)921-9000 Jeff.Koerner@dep.state.fl.us		
Other Agency Contact Info:	Syed Arif syed.arif@dep.state.fl.us 850-717-9039		
Permit Notes:	The engines will be arranged in four groups of six engines. The engines will be located near the existing LFG collection and control system and connect from the existing line to a blower/compressor, which will draw methane-rich LFG from the gas collection system for delivery to the new electrical generation plant. The exhaust from each group of six engines will be ducted together to a single stack. Therefore, there will be a total of four stacks in the electric generation plant. Unregulated ancillary equipment that supports the electric generation plant consists of: -Diesel fuel tanks (preliminary design of two 12,000 gallon tanks) to provide diesel oil storage for the engines. -One lube oil tank (approximately 1,000 gallons). -One used lube oil tank (approximately 1,000 gallons) and moisture conditioning equipment. -If necessary, a package boiler (approximately 0.2 million British thermal units per hour (MMBtu/hr)) for providing heat to the building and a fuel oil tank (approximately 275 gallons) for the boiler will be installed. -Evaporative cooling towers.		

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	13.8000 (Tons/Year)
Nitrogen Oxides (NOx)	10.6000 (Tons/Year)
Particulate Matter (PM)	29.0000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: 24 Detroit Diesel Series 60 dual fuel RICE

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: landfill gas

Throughput: 0

Process Notes: These emissions units are 24 Detroit Diesel Series 60 dual-fuel fired compression ignition reciprocating internal combustion engines. Each engine is a 6-cylinder engine with a total displacement of 12.7 liters Each engine has a maximum rating of 550 brake horsepower (bhp) and is coupled to a 350 kW generator (nominal rating) for the generation of up to a total of 8 MW of electricity. Each engine will fire landfill gas with diesel and/or biodiesel. The LFG will be processed by a gas treatment system prior to combustion in the engines. The engines will be arranged in four groups of six engines: groups A, B, C and D. The exhaust from each group of six engines will be ducted together to a single stack, for a total of four stacks.

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: EPA/OAR Mthd 10

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 3.0000 G/BHP-H

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS

Control Method:	(P) Lean-burn engine with air-to-fuel ratio control
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	0.86 lb/MMBtu and 3.15 lb/hour. (3.00 grams/bhp-hour) Best maintenance practices. Change oil and filter every 1,440 hours of operation or annually, whichever comes first; During periods of startup minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply; and maintain recordkeeping requirements found in 40 CFR 63.6655, continuous compliance in 40 CFR 63.6605 and 40 CFR 63.6640 and monitoring, installation, collection, operation and maintenance requirements in 40 CFR 63.6625(e), (h), and (j). In accordance with 40 CFR 63.6625(b), the owner or operator shall during periods of startup minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, after which time the non-startup emission limitations apply.

POLLUTANT NAME:	Nitrogen Oxides (NOx)
CAS Number:	10102
Test Method:	EPA/OAR Mthd 7E
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1:	2.3400 G/BHP-H
Emission Limit 2:	
Standard Emission:	
Did factors, other then air pollution technology considerations influence the BACT decisions:	U
Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Control Method:	(P) Lean-burn engine with air-to-fuel ratio control
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	0.65 lb/MMBtu and 2.42 lb/hour (2.34 grams/bhp-hour) Best maintenance practices. Change oil and filter every 1,440 hours of operation or annually, whichever comes first; During periods of startup minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply; and maintain recordkeeping requirements found in 40 CFR 63.6655, continuous compliance in 40 CFR 63.6605 and 40 CFR 63.6640 and monitoring, installation, collection, operation and maintenance requirements in 40 CFR 63.6625(e), (h), and (j). In accordance with 40 CFR 63.6625(b), the owner or operator shall during periods of startup minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, after which time the non-startup emission limitations apply.

POLLUTANT NAME:	Particulate matter, filterable < 10 μ (FPM10)
CAS Number:	PM
Test Method:	Other
Other Test Method:	Method 19
Pollutant Group(s):	(Particulate Matter (PM))
Emission Limit 1:	0.2600 G/BHP-H
Emission Limit 2:	
Standard Emission:	
Did factors, other then air pollution technology considerations influence the BACT decisions:	U
Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Control Method:	(B) Treatment of LFG fuel with 10-micron filter
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	0.075 lb/MMBtu and 0.28 lb/hour (0.26 grams/bhp-hour) Best maintenance practices. Change oil and filter every 1,440 hours of operation or annually, whichever comes first; During periods of startup minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply; and maintain recordkeeping requirements found in 40 CFR 63.6655, continuous compliance in 40 CFR 63.6605 and 40 CFR 63.6640 and monitoring, installation, collection, operation and maintenance requirements in 40 CFR 63.6625(e), (h), and (j). In accordance with 40 CFR 63.6625(b), the owner or operator shall during periods of startup minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, after which time the non-startup emission limitations apply.

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Facility Information

RBLC ID:	VT-0029 (final)	**Date Determination Last Updated:**	07/22/2010
Corporate/Company Name:	PPL RENEWABLE ENERGY, LLC	**Permit Number:**	AOP-08-015
Facility Name:	MORETOWN LANDFILL GAS TO ENERGY FACILITY	**Permit Date:**	09/15/2008 (actual)
Facility Contact:	STEVEN GABRIELLE 610-774-7095 SAGABRIELLE@PPLWEB.COM	**FRS Number:**	UNKNOWN
Facility Description:	Landfill gas to energy: use of reciprocating internal combustion engines	**SIC Code:**	4953
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	221210
Permit URL:			
EPA Region:	I	**COUNTRY:**	USA
Facility County:	WASHINGTON		
Facility State:	VT		
Facility ZIP Code:	05676		
Permit Issued By:	VERMONT AIR POLLUTION CONTROL DIVISION (Agency Name) MR. DOUG ELLIOTT(Agency Contact) (802) 241-3845 doug.elliott@state.vt.us		
Permit Notes:			

Affected Boundaries:

Boundary Type:	Class I Area State:	Boundary:	Distance:
CLASS1	NH	Great Gulf	100km - 50km
CLASS1	VT	Lye Brook	100km - 50km
CLASS1	NH	Presidential Range-Dry River	100km - 50km
INTL BORDER		US/Canada Border	< 100 km
INTL BORDER		US/Canada Border	< 100 km

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	118.3000 (Tons/Year)
Nitrogen Oxides (NOx)	21.5000 (Tons/Year)
Particulate Matter (PM)	8.3000 (Tons/Year)
Sulfur Oxides (SOx)	22.2000 (Tons/Year)
Volatile Organic Compounds (VOC)	8.5000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: Landfill gas to energy engines

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: landfill gas

Throughput: 1600.00 KW EACH

Process Notes: There are two 1600 kW engines: Caterpillar G3520C LE

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: EPA/OAR Mthd 10

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 2.7500 G/B-HP-H

Emission Limit 2: 13.5000 LB/H LIMIT FOR EACH ENGINE

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: OTHER CASE-BY-CASE

Other Applicable Requirements:

Control Method: (P) engine design

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

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Facility Information

RBLC ID:	ME-0036 (final)	**Date Determination Last Updated:**	09/08/2008
Corporate/Company Name:	NEW ENGLAND WASTE SERVICES OF ME, INC.	**Permit Number:**	A-850-77-3-A
Facility Name:	PINE TREE LANDFILL	**Permit Date:**	10/15/2007 (actual)
Facility Contact:	TOM GILBERT 2073944371 TOM.GILBERT@CASELLA.COM	**FRS Number:**	110032749177
Facility Description:	MUNICIPAL SOLID WASTE LANDFILL	**SIC Code:**	8744
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	562212
Permit URL:			
EPA Region:	1	**COUNTRY:**	USA
Facility County:	PENOBSCOT		
Facility State:	ME		
Facility ZIP Code:	04444		
Permit Issued By:	MAINE DEPARTMENT OF ENV PROTECTION (Agency Name) MR. MARC CONE(Agency Contact) (207)287-2437 Marc.A.Cone@maine.gov		
Permit Notes:			

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	100.8000 (Tons/Year)
Nitrogen Oxides (NOx)	23.8000 (Tons/Year)
Particulate Matter (PM)	5.6000 (Tons/Year)
Sulfur Oxides (SOx)	-169.6000 (Tons/Year)
Volatile Organic Compounds (VOC)	39.9000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: LANDFILL GAS FIRED ENGINES

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: LANDFILL GAS

Throughput: 10.80 MMBTU/H

Process Notes: FACILITY PERMITTED THE ADDITION OF THREE(3) 10.8 MMBTU/HR HEAT INPUT (EACH) LANDFILL GAS-FIRED ENGINES. EMISSION LIMITS ARE FOR EACH INDIVIDUAL ENGINE.

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 2.7500 G/B-HP-H
Emission Limit 2: 8.9000 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N)
Est. % Efficieney:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 1.9400 LB/H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:

Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate Matter (PM)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0500 LB/MMBTU
Emission Limit 2: 0.4900 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

Process/Pollutant Information

PROCESS NAME: SOLID WASTE LANDFILL
Process Type: 29.900 (Other Waste Processing & Disposal Processes)
Primary Fuel:
Throughput:
Process Notes: SO2 EMISSIONS FROM THE LANDFILL ENGINES AND FLARE ARE CONTROLLED BY CONTROLLING THE TRS CONCENTRATIONS IN THE LANDFILL GAS PRIOR TO FIRING

POLLUTANT NAME: Sulfur Dioxide (SO2)
CAS Number: 7446-09-5
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 5.7100 LB/H 12-MONTH ROLLING AVERAGE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Control Method: (A) WET SCRUBBER WITH BIOREACTORS
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: ALL EMISSION UNITS (ENGINES AND FLARE) ARE SUBJECT TO A COMBINED EMISSION LIMIT OF 5.71 LB/HR OF SO2. COMPLIANCE IS DEMONSTRATED BY MEETING A LIMIT OF 200 PPM OF TRS IN THE LANDFILL GAS PRIOR TO COMBUSTION. THE FACILITY USES A WET SCRUBBER WHICH REMOVES TRS FROM THE LANDFILL GAS. MULTIPLE BIOREACTORS THEN CONVERT THE DISOLVED SULFUR COMPOUNDS TO ELEMENTAL SULFUR WHICH IS REMOVED AND DISPOSED OF ALLOWING THE SCRUBBING MEDIA TO BE REUSED. THE FACILITY IS PERMITTED TO USE ANY ADDITIONAL PRE-APPROVED CONTROLS AS NECESSARY TO MEET THE LB/HR SO2 LIMIT. OCCASIONALLY AN ADSORBER IS USED TO SUPPLEMENT THE SCRUBBING SYSTEM OR FOR PERIODS OF MAINTENANCE.

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Facility Information

RBLC ID:	NH-0014 (final)	**Date Determination Last Updated:**	01/18/2012
Corporate/Company Name:	UNIVERSITY OF NEW HAMSHIRE	**Permit Number:**	TP-B-0531
Facility Name:	UNIVERSITY OF NEW HAMPSHIRE	**Permit Date:**	07/25/2007 (actual)
Facility Contact:	JIM DOMBROSK 6038622345 JIM.DOMBROSK@UNH.EDU	**FRS Number:**	065187122
Facility Description:	CAMPUS COGENERATION (STEAM/ELECTRICITY) PLANT	**SIC Code:**	4911
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	611310
Permit URL:	HTTP://WWW2.DES.STATE.NH.US/ONESTOPPUB/AIR/330170000909-0236TYPEPERMIT.PDF		
EPA Region:	1	**COUNTRY:**	USA
Facility County:	STRAFFORD		
Facility State:	NH		
Facility ZIP Code:	03824		
Permit Issued By:	NEW HAMPSHIRE DEPT OF ENV SERV, AIR RES (Agency Name) MR. TODD MOORE(Agency Contact) (603)271-6798 Todd.Moore@des.nh.gov		
Other Agency Contact Info:	GARY.MILBURY@DES.NH.GOV		
Permit Notes:	FACILITY WENT ONLINE IN MID 2009. COMPLIANCE STACK TESTING WAS COMPLETED DURING MID TO LATE 2009. PSD/NSR PERMIT MAY BE DOWNLOADED AT: HTTP://WWW2.DES.STATE.NH.US/ONESTOPPUB/AIR/330170000909-0236TYPEPERMIT.PDF		

Affected Boundaries:

Boundary Type:	Class 1 Area State:	Boundary:	Distance:
CLASS1	NH	Presidential Range-Dry River	< 100 km

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	176.2300 (Tons/Year)
Nitrogen Oxides (NOx)	42.6100 (Tons/Year)
Particulate Matter (PM)	23.1400 (Tons/Year)
Sulfur Oxides (SOx)	24.5200 (Tons/Year)
Volatile Organic Compounds (VOC)	48.2400 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: LANDFILL GAS ENGINES

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: LANDFILL GAS

Throughput: 14.30 MMBTU/H

Process Notes: TWO 1,600 KW INTERAL COMBUSTION ENGINES FIRING ON LANDFILL GAS (LFG). THE LFG WILL BE SENT THROUGH A MOISTURE SEPARATOR, WHICH WILL HAVE AN INTERNAL MESH PAD FILTER TO COLLECT WATER DROPLETS AND SOME PARTICULATE. THE ENGINES WILL BE EQUIPPED WITH COALESCING FILTERS THAT CALL FOR 99% REMOVAL OF ALL WATER DROPLETS AND PARTICULATES OVER 1 MICRON.

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))

Emission Limit 1: 0.5000 G/B-HP-H 1-HOUR AVG. PERIOD (STACK TEST)

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: LAER

Other Applicable Requirements:

Control Method: (N) COMBUSTION CONTROLS (LEAN BURN DESIGN, AIR/FUEL RATIO CONTROLLER, INTERCOOLER, GOOD COMBUSTION PRACTICES)

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: No

Pollutant/Compliance Notes: DUE TO CONTAMINANTS PRESENT IN LANDFILL GAS, CATALYST BASED CONTROLS SUCH AS SCR WERE DISMISSED AS POTENTIALLY APPLICABLE CONTROL TECHNOLOGIES

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 2.7500 G/B-HP-H 3-HOUR AVERAGE (STACK TEST)

Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N) GOOD COMBUSTION PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes: DUE TO CONTAMINANTS PRESENT IN THE LANDFILL GAS, CATALYST BASED CO CONTROLS WERE DISMISSED AS POTENTIALLY APPLICABLE CONTROL TECHNOLOGIES.

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.1000 G/B-HP-H 3-HOUR AVG (STACK TEST)
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Control Method: (N) FILTERING OF INLET AIR
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

Process/Pollutant Information

PROCESS NAME: LANDFILL GAS/ NAT GAS COMBUSTION TURBINE
Process Type: 16.120 (Landfill/Digester/Bio-Gas)
Primary Fuel: LANDFILL GAS
Throughput: 43.60 MMBTU/H
Process Notes: SOLAR TURBINES - MODEL: MERCURY 50

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 10.0000 PPM @ 15% O2 3 HOUR AVG (STACK TEST)
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N) GOOD COMBUSTION PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0420 G/B-HP-H 3-HOUR AVG (STACK TEST)
Emission Limit 2:

Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Control Method: (N) GOOD COMBUSTION PRACTICES AND FILTERING OF LFG THROUGH CARBON FILTER
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verificd: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 5.0000 PPM @ 15% O2 3 HOUR AVG
Emission Limit 2: 25.0000 PPM @ 15% O2 HOURLY (NOX RACT LIMIT - STACK TEST)
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: LAER
Other Applicable Requirements: SIP
Control Method: (N) DRY LOW NOX (ULTRA LEAN PREMIX) COMBUSTION TECHNOLOGY GOOD COMBUSTION PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes:

Process/Pollutant Information

PROCESS NAME: UTILITY FLARE
Process Type: 19.320 (Digester and Landfill Gas Flares)
Primary Fuel: LANDFILL GAS
Throughput: 125.40 MMBTU/H
Process Notes: A SECOND LFG FLARE RATED AT 105.06 MMBTU/HR IS ALSO PERMITTED. BACT/LAER LIMITS ARE THE SAME FOR BOTH FLARES.

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.0680 LB/MMBTU 3-HOUR AVG
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: LAER
Other Applicable Requirements: NSPS
Control Method: (N) GOOD COMBUSTION PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: FLARES WILL BE USED AT GREATLY VARYING PERCENTAGES OF DESIGN CAPACITY (BACKUP AND SUPPLEMENTAL OPERATING MODES). BASED ON THIS, APPLICANT PROPOSED THAT OPEN FLARES WOULD HAVE GREATEST FLEXIBILITY IN OPERATING EFFICENTLY AT VARIOUS LOADS.

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1:	0.3700 LB/MMBTU 3-HOUR AVG
Emission Limit 2:	
Standard Emission:	
Did factors, other then air pollution technology considerations influence the BACT decisions:	N
Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Control Method:	(N) GOOD COMBUSTION PRACTICES
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	FLARES WILL BE USED AT GREATLY VARYING PERCENTAGES OF DESIGN CAPACITY (BACKUP AND SUPPLEMENTAL OPERATING MODES). BASED ON THIS, APPLICANT PROPOSED THAT OPEN FLARES WOULD HAVE GREATEST FLEXIBILITY IN OPERATING EFFICENTLY AT VARIOUS LOADS.

POLLUTANT NAME:	Particulate matter, filterable < 10 µ (FPM10)
CAS Number:	PM
Test Method:	Unspecified
Pollutant Group(s):	(Particulate Matter (PM))
Emission Limit 1:	0.0420 LB/MMBTU 3-HOUR AVG
Emission Limit 2:	
Standard Emission:	
Did factors, other then air pollution technology considerations influence the BACT decisions:	U
Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Control Method:	(N)
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	

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Facility Information

RBLC ID:	FL-0291 (final)	**Date Determination Last Updated:**	10/28/2010
Corporate/Company Name:	BREVARD ENERGY, LLC	**Permit Number:**	00900069-004-AC/PSD-FL-378
Facility Name:	BREVARD COUNTY SOLID WASTE MGMT CENTRAL DISPOSAL FACILITY	**Permit Date:**	03/06/2007 (actual)
Facility Contact:	EURIPIDES RODRIGUEZ 3216332042 EURIPIDES.RODRIGUEZ@BREVARDCOUNTY.US	**FRS Number:**	110015731387
Facility Description:	BREVARD COUNTY SOLID WASTE MANAGMENT CENTRAL DISPOSAL FACILITY IS A MUNICIPAL SOLID WASTE LANDFILL. BREVARD ENERGY WILL INSTALL SIX INTERNAL COMBUSTION LANDFILL GAS FUELED ENGINES WHICH WILL GENERATE 9.6 MW OF ELECTRICITY	**SIC Code:**	495
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	562212
Permit URL:			
EPA Region:	4	**COUNTRY:**	USA
Facility County:	BREVARD		
Facility State:	FL		
Facility ZIP Code:	32926		
Permit Issued By:	FLORIDA DEPT. OF ENVIRONMENTAL PROTECTION (Agency Name) MR. JEFF KOERNER(Agency Contact) (850)921-9000 Jeff.Koerner@dep.state.fl.us		
Other Agency Contact Info:	SYED ARIF, P.E. PROJECT ENGINEER PHONE 850-921-9528 SYED.ARIF@DEP STATE.FL.US		

Permit Notes:

Affected Boundaries:	Boundary Type:	Class 1 Area State:	Boundary:	Distance:
	CLASS1	FL	Chassahowitzka	100km - 50km

Facility-wide Emissions:	Pollutant Name:	Facility-wide Emissions Increase:
	Carbon Monoxide	59.0000 (Tons/Year)
	Nitrogen Oxides (NOx)	13.0000 (Tons/Year)
	Particulate Matter (PM)	5.0000 (Tons/Year)
	Sulfur Oxides (SOx)	25.0000 (Tons/Year)
	Volatile Organic Compounds (VOC)	6.0000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: SIX 1.6 MW INTERNAL COMBUSTION ENGINES

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: LANDFILL

Throughput: 1.60 MW

Process Notes:

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 2.7500 G/B-HP-H
Emission Limit 2: 13.5400 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (N) GOOD COMBUSTION
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.6000 G/B-HP-H
Emission Limit 2: 2.9500 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (N) GOOD COMBUSTION
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 10 μ (FPM10)

CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.2400 G/B-HP-H
Emission Limit 2: 1.1800 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP

Control Method:	(N)
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	

POLLUTANT NAME:	Sulfur Dioxide (SO2)
CAS Number:	7446-09-5
Test Method:	Other
Other Test Method:	EPA Method 6, 6C or 19
Pollutant Group(s):	(InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1:	2.6400 LB/H
Emission Limit 2:	
Standard Emission:	

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Control Method:	(P)
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	THE EMISSION RATE OF SO2 FROM EACH ENGINE/GENERATOR SET SHALL NOT EXCEED 2.64 LB/H AND 11.55 T/YR (T/YR). THE TOTAL SO2 EMISSIONS FROM THE SIX ENGINES SHALL NOT EXCEED 69.3 T/YR. COMPLIANCE: EPA REFERENCE METHOD 6, 6C OR 19 - DETERMINATIONS OF SO2 EMISSIONS (I, A). THE CONCENTRATION OF H2S IN THE TREATED LANDFILL GAS USED AS FUEL IN THE ENGINES SHALL NOT EXCEED 455 PPMV ON A WEEKLY ROLLING AVERAGE, CALCULATED ON A CALENDAR DAY BASIS, NOR SHALL IT EXCEED 550 PPMV ON A 24-HOUR ROLLING AVERAGE BASIS, CALCULATED ON AN HOURLY BASIS. THE CONCENTRATION OF H2S SHALL BE MEASURED BY THE CONTINUOUS MONITORING SYSTEM.

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Facility Information

RBLC ID:	FL-0290 (final)	**Date Determination Last Updated:**	06/05/2008
Corporate/Company Name:	SEMINOLE ENERGY, LLC	**Permit Number:**	1170084-005-AC/PSD-FL-376
Facility Name:	OSCEOLA ROAD SOLID WASTE MANAGEMENT FACILITY	**Permit Date:**	01/17/2007 (actual)
Facility Contact:	MR. DAVID GREGORY 4076652022 DGREGORY@SEMINOLECOUNTYFL.ORG	**FRS Number:**	UNKNOWN
Facility Description:	OSCEOLA ROAD SOLID WASTE MANAGEMENT FACILITY IS A MUNICIPAL SOLID WASTE FACILITY. SEMINOLE ENERGY WILL INSTALL SIX INTERNAL COMBUSTION LANDFILL FUELED ENGINES WHICH WILL GENERATE 9.6 MW OF ELECTRICITY	**SIC Code:**	4953
Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	562212
Permit URL:			
EPA Region:	4	**COUNTRY:**	USA
Facility County:			
Facility State:	FL		
Facility ZIP Code:	32732		
Permit Issued By:	FLORIDA DEPT. OF ENVIRONMENTAL PROTECTION (Agency Name) MR. JEFF KOERNER(Agency Contact) (850)921-9000. Jeff.Koerner@dep.state.fl.us		
Other Agency Contact Info:	SYED ARIF, P.E. PROJECT ENGINEER PHONE 850-921-9528 SYED.ARIF@DEP.STATE.FL.US		
Permit Notes:			

Affected Boundaries:	Boundary Type:	Class 1 Area State:	Boundary:	Distance:
	CLASS1	FL	Chassahowitzka	100km - 50km

Facility-wide Emissions:	Pollutant Name:	Facility-wide Emissions Increase:
	Carbon Monoxide	59.0000 (Tons/Year)
	Nitrogen Oxides (NOx)	13.0000 (Tons/Year)
	Particulate Matter (PM)	5.0000 (Tons/Year)
	Sulfur Oxides (SOx)	25.0000 (Tons/Year)
	Volatile Organic Compounds (VOC)	6.0000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: INTERNAL COMBUSTION ENGINES
Process Type: 17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel: LANDFILL
Throughput: 1.60 MW
Process Notes:

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 2.7500 G/B-HP-H
Emission Limit 2: 13.5400 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (N) GOOD COMBUSTION
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.6000 G/B-HP-H
Emission Limit 2: 2.9500 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (N) GOOD COMBUSTION
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.2400 G/B-HP-H
Emission Limit 2: 1.1800 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (N)
Est. % Efficiency:

Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

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Facility Information

RBLC ID:	NJ-0069 (final)	**Date Determination Last Updated:**	08/04/2008
Corporate/Company Name:	MONMOUTH COUNTY RECLAMATION CENTER	**Permit Number:**	BOP 050003
Facility Name:	MONMOUTH COUNTY RECLAMATION CENTER	**Permit Date:**	12/12/2006 (actual)
Facility Contact:	WM. CHRISTOPHER MURRAY 7329228686	**FRS Number:**	110001528446
Facility Description:		**SIC Code:**	4953
Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	322110
Permit URL:			
EPA Region:	2	**COUNTRY:**	USA
Facility County:	MONMOUTH		
Facility State:	NJ		
Facility ZIP Code:	07753		
Permit Issued By:	NEW JERSEY DEPT OF ENV PROTECTION, DIVISION OF AIR QUALITY (Agency Name) ALIYA KHAN(Agency Contact) (609) 292-2169 ALIYA.KHAN@DEP.STATE.NJ US		
Permit Notes:	FACILITY ID : 21351		

Process/Pollutant Information

PROCESS NAME: LANDFILL GAS ENGINE
Process Type: 17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel: LANDFILL GAS
Throughput: 183263744.00 SCF/YR
Process Notes: IC ENGINE: LEAN BURN ENGINE ,JENBACHER, MODEL JGS 320 GS-L.L, 9.81 MMBTU/H, 1468 BHP, 1000 KW

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.5300 G/B-HP-H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: LAER
Other Applicable Requirements: OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 2.5300 G/B-HP-H
Emission Limit 2:
Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: CO LIMIT REPRESENTS STATE OF THE ART CASE BY CASE PERFORMANCE LEVEL.

POLLUTANT NAME: Total Suspended Particulates
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.5800 LB/H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 10 μ (FPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.5800 LB/H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OPERATING PERMIT , OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Dioxide (SO2)
CAS Number: 7446-09-5
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 0.4700 LB/H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OPERATING PERMIT , OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes: SO2(LB/H) WAS BASED ON A MAXIMUM TOTAL CONCENTRATION OF SULFUR IN LANDFILL GAS OF 150 PPM(AS VOLUME) EXPRESSED AS H2S.

POLLUTANT NAME:	Hydrogen Sulfide
CAS Number:	7783-06-4
Test Method:	Unspecified
Pollutant Group(s):	(InOrganic Compounds)
Emission Limit 1:	0.0400 LB/H
Emission Limit 2:	
Standard Emission:	
Did factors, other then air pollution technology considerations influence the BACT decisions:	Unknown
Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	OPERATING PERMIT , OTHER
Control Method:	(N)
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	No
Pollutant/Compliance Notes:	H2S(LB/H) WAS BASED ON 150 PPM H2S IN LANDFILL GAS.

POLLUTANT NAME:	Volatile Organic Compounds (VOC)
CAS Number:	VOC
Test Method:	Unspecified
Pollutant Group(s):	(Volatile Organic Compounds (VOC))
Emission Limit 1:	0.3300 G/B-HP-H
Emission Limit 2:	
Standard Emission:	
Did factors, other then air pollution technology considerations influence the BACT decisions:	U
Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	OPERATING PERMIT , OTHER
Control Method:	(N)
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	

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Facility Information

RBLC ID:	NJ-0068 (final)	**Date Determination Last Updated:**	07/24/2008
Corporate/Company Name:	MANCHESTER RENEWABLE POWER CORPORATION (LES)	**Permit Number:**	BOP 060001
Facility Name:	MANCHESTER RENEWABLE POWER CORPORATION	**Permit Date:**	10/06/2006 (actual)
Facility Contact:	SCOTT SALISBURY 2483803920	**FRS Number:**	1100071487 8
Facility Description:		**SIC Code:**	3999
Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	221122
Permit URL:			
EPA Region:	2	**COUNTRY:**	USA
Facility County:	OCEAN		
Facility State:	NJ		
Facility ZIP Code:	08733		
Permit Issued By:	NEW JERSEY DEPT OF ENV PROTECTION, DIVISION OF AIR QUALITY (Agency Name) ALIYA KHAN(Agency Contact) (609) 292-2169 ALIYA.KHAN@DEP.STATE.NJ.US		
Other Agency Contact Info:	YOGESH DOSHI 609-633-7249		
Permit Notes:	FACILITY ID: 78901 THIS APPLICATION IS FOR A PSD PERMIT AND SIGNIFICANT MODIFICATION TO STATE TITLE V OPERATING PERMIT.THE PROPOSED PROJECT IS AN ELECTRIC GENERATING PROJECT		

Process/Pollutant Information

PROCESS NAME: LANDFILL GAS FUELED RECIPROCATING ENGINES(6)

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: LANDFILL GAS

Throughput:

Process Notes: THE FACILITY PROPOSES TO INSTALL 6 (SIX) NEW IDENTICAL LEAN BURN CATERPILLAR LANDFILL GAS FUELED ENGINES. EACH ENGINE IS RATED AT 16.38 MMBTU/HR , 2233BHP & 1600 KW. FUEL TYPE IS LIMITED TO TREATED LANDFILL GAS.THE LANDFILL GAS IS TREATED BY CONDITIONING WITH DEWATERING, COMPRESSION AND FILTRATION).

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.5000 G/B-HP-H
Emission Limit 2: 2.4600 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: LAER
Other Applicable Requirements: OTHER , NSPS , OPERATING PERMIT
Control Method: (P) AIR TO FUEL RATIO CONTROL TECHNOLOGIES TO MINIMIZE THE AMOUNT OF NOX EMISSIONS.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NOX EMISSIONS LIMIT OF 0.5 G/B-HP-HR/ENGINE REPRESENTS LAER.

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 2.7500 G/B-HP-H
Emission Limit 2: 13.5400 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT , OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 10 μ (FPM10)

CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.2000 G/B-HP-H
Emission Limit 2: 0.9800 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT
Control Method: (P)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC)
CAS Number: VOC
Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 0.1600 G/B-HP-H
Emission Limit 2: 0.7700 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OPERATING PERMIT
Control Method: (P)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Dioxide (SO2)
CAS Number: 7446-09-5
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 1.1300 LB/H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Total Suspended Particulates
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.9800 LB/H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OPERATING PERMIT
Control Method: (P)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Hydrochloric Acid
CAS Number: 7647-01-0
Test Method: Unspecified
Pollutant Group(s): (Acid Gasses/Mist , Hazardous Air Pollutants (HAP) , InOrganic Compounds , Particulate Matter (PM))
Emission Limit 1: 0.1300 LB/H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OPERATING PERMIT

Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 2.5 μ (FPM2.5)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.9800 LB/H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OPERATING PERMIT
Control Method: (P)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

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Facility Information

RBLC ID:	NJ-0067 (final)	**Date Determination Last Updated:**	04/16/2007
Corporate/Company Name:	BURLINGTON COUNTY RESOURCE RECOVERY	**Permit Number:**	BOP 050001
Facility Name:	BURLINGTON COUNTY RESOURCE RECOVERY COMPLEX	**Permit Date:**	08/03/2006 (actual)
Facility Contact:	MARY PAT ROBBIE 8566423850	**FRS Number:**	UNKNOWN
Facility Description:		**SIC Code:**	4953
Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	
Permit URL:			
EPA Region:	2	**COUNTRY:**	USA
Facility County:	BURLINGTON		
Facility State:	NJ		
Facility ZIP Code:	08060		
Permit Issued By:	NEW JERSEY DEPT OF ENV PROTECTION, DIVISION OF AIR QUALITY (Agency Name) ALIYA KHAN(Agency Contact) (609) 292-2169 ALIYA.KHAN@DEP.STATE.NJ.US		
Other Agency Contact Info:	DOUG BRUCKMAN PHONE:609-633-8244		
Permit Notes:	THIS PERMIT ACTION IS A SIGNIFICANT MODIFICATION TO THE FACILITY INITIAL OPERATING PERMIT.		

Process/Pollutant Information

PROCESS NAME: LANDFILL GAS FIRED INTERNAL COMBUSTION ENGINES (5)
Process Type: 17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel: LANDFILL GAS
Throughput: 12.50 MMBTU/H
Process Notes: THERE ARE FIVE NEW (5) JENBACHER LANDFILL GAS FIRED INTERNAL COMBUSTION ENGINES. EACH ENGINE IS RATED AT 12.5 MMBTU/HR AND 1500 KW.THEY ARE USED FOR PRODUCING ELECTRICITY.

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102

Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.6000 G/B-HP-H
Emission Limit 2: 2.6600 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: LAER
Other Applicable Requirements:
Control Method: (N) GOOD COMBUSTION.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NOX EMISSION LIMIT IS PER ENGINE.

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 2.5000 G/B-HP-H
Emission Limit 2: 11.9500 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OPERATING PERMIT , OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: CO EMISSION LIMIT IS PER ENGINE. 2.5 G/BHP-HR OF CO REPRESENTS: ENGINES -STATE OF THE ART CASE BY CASE.

POLLUTANT NAME: Volatile Organic Compounds (VOC)
CAS Number: VOC
Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 1.7700 LB/H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OPERATING PERMIT , OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: VOC EMISSION LIMIT IS PER ENGINE.

POLLUTANT NAME: Sulfur Dioxide (SO2)
CAS Number: 7446-09-5
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 1.5200 LB/H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OPERATING PERMIT , OTHER
Control Method: (N)
Est. % Efficiency:

Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: SO2 EMISSION LIMIT IS PER ENGINE.

POLLUTANT NAME: Particulate matter, filterable < 10 μ (FPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.7500 LB/H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OTHER , OPERATING PERMIT
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: PM-10 EMISSION LIMIT IS PER ENGINE.

POLLUTANT NAME: Total Suspended Particulates
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.7500 LB/H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OPERATING PERMIT , OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: TSP EMISSION LIMIT IS PER ENGINE.

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Facility Information

RBLC ID:	FL-0289 (final)	**Date Determination Last Updated:**	07/31/2008
Corporate/Company Name:	TRAIL RIDGE ENERGY, LLC	**Permit Number:**	0310358-004-AC/PSD-FL-374
Facility Name:	TRAIL RIDGE LANDFILL, INC	**Permit Date:**	02/24/2006 (actual)
Facility Contact:	MR. L. CHRIS PEARSON 9043878922 CHRISP.SW1.CH4@COJ.NET	**FRS Number:**	110002376919
Facility Description:	TRAIL RIDGE LANDFILL IS A MUNICIPAL SOLID WASTE FACILITY. TRAIL RIDGE ENERGY WILL INSTALL SIX INTERNAL COMBUSTION LANDFILL GAS FUELED ENGINES WHICH WILL GENERATE 9.6 MW OF ELECTRICITY	**SIC Code:**	4953
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	562212
Permit URL:			
EPA Region:	4	**COUNTRY:**	USA
Facility County:	DUVAL		
Facility State:	FL		

Facility ZIP Code: 32234

Permit Issued By: FLORIDA DEPT. OF ENVIRONMENTAL PROTECTION (Agency Name)
MR. JEFF KOERNER(Agency Contact) (850)921-9000 Jeff.Koerner@dep.state.fl.us

Other Agency Contact Info: SYED ARIF, P.E.
PROJECT ENGINEER
PHONE 850-921-9528
SYED.ARIF@DEP.STATE.FL.US

Permit Notes:

Affected Boundaries:

Boundary Type:	Class 1 Area State:	Boundary:	Distance:
CLASS1	GA	Okefenokee	< 100 km

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	59.0000 (Tons/Year)
Nitrogen Oxides (NOx)	13.0000 (Tons/Year)
Particulate Matter (PM)	5.0000 (Tons/Year)
Sulfur Oxides (SOx)	25.0000 (Tons/Year)
Volatile Organic Compounds (VOC)	6.0000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: INTERNAL COMBUSTION ENGINES

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: LANDFILL GAS

Throughput: 1.60 MW

Process Notes:

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 2.7500 G/B-HP-H
Emission Limit 2: 13.5400 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (N) GOOD COMBUSTION
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.6000 G/B-HP-H
Emission Limit 2: 2.9500 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N) GOOD COMBUSTION
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)

CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 0.2400 G/B-HP-H
Emission Limit 2: 1.1800 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

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Facility Information

RBLC ID: RI-0022 (final)
Date Determination Last Updated: 05/05/2008
Corporate/Company Name: RIDGEWOOD POWER MANAGEMENT LLC
Permit Number: RI-PSD-7
Facility Name: RIDGEWOOD RHODE ISLAND GENERATION LLC
Permit Date: 01/05/2005 (actual)
Facility Contact: JOHN BAHRS 2014479000 JBAHRS@RIDGEWOODPOWER.COM
FRS Number: 110000820078
Facility Description: LANDFILL GAS-FIRED POWER GENERATION
SIC Code: 4911
Permit Type: B: Add new process to existing facility
NAICS Code: 221119
Permit URL:
EPA Region: 1
COUNTRY: USA
Facility County: PROVIDENCE
Facility State: RI
Facility ZIP Code: 02919
Permit Issued By: Rhode Island Department of Environmental Management; Air Resources (Agency Name)
MS RUTH GOLD(Agency Contact) (401)222-2808X7110 ruth.gold@dem.ri.gov
Permit Notes:
Affected Boundaries:

Boundary Type:	Class 1 Area State:	Boundary:	Distance:
CLASS I	VT	Lye Brook	100km - 50km

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	258.3000 (Tons/Year)
Nitrogen Oxides (NOx)	43.0000 (Tons/Year)
Particulate Matter (PM)	8.6000 (Tons/Year)
Sulfur Oxides (SOx)	11.0000 (Tons/Year)
Volatile Organic Compounds (VOC)	13.4000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: 4-CATERPILLAR 3520C LEAN BURN ENGINE-GENERATOR SETS
Process Type: 17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel: LANDFILL GAS
Throughput: 2229.00 HP
Process Notes: LEAN BURN, SPARK IGNITED, AIR/FUEL RATIO CONTROLLERS, INTERCOOLERS

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.5000 G/B-HP-H 1-HOUR AVERAGE
Emission Limit 2: 2.4600 LB/H 1-HOUR AVERAGE
Standard Emission: 0.0500 G/B-HP-H
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: LAER
Other Applicable Requirements:

Control Method: (P) LEAN BURN, AIR/FUEL RATIO CONTROLLERS, INTERCOOLERS
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Yes
Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 2.7500 G/B-HP-H 1-HOUR AVERAGE
Emission Limit 2: 13.5100 LB/H 1-HOUR AVERAGE
Standard Emission: 2.7000 G/B-HP-H
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) GOOD COMBUSTION PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Yes
Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC)
CAS Number: VOC
Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 20.0000 PPMVD@3%O2 1-HOUR AVERAGE
Emission Limit 2: 0.7600 LB/H 1-HOUR AVERAGE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) GOOD COMBUSTION PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Yes
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 10 μ (FPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.1000 G/B-HP-H 1-HOUR AVERAGE
Emission Limit 2: 0.4900 LB/H 1-HOUR AVERAGE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) GOOD COMBUSTION PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Yes
Pollutant/Compliance Notes:

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Facility Information

RBLC ID:	VT-0019 (final)	**Date Determination Last Updated:**	12/21/2005
Corporate/Company Name:	NEW ENGLAND WASTE SERVICES, INC.	**Permit Number:**	AOP-03-044
Facility Name:	NEW ENGLAND WASTE SERVICES OF VERMONT, INC.	**Permit Date:**	12/16/2004 (actual)
Facility Contact:	JOHN GAY 8022237221	**FRS Number:**	110021144279
Facility Description:	THE FACILITY IS A MUNICIPAL SOLID WASTE LANDFILL THAT OPERATES A LANDFILL GAS TO ENERGY (LFGTE) SYSTEM. THE LFGTE SYSTEM WILL CONSIST OF UP TO 4 INTERNAL COMBUSTION ENGINES: CATERPILLAR G3520C LE, EACH RATED TO BURN 507 SCFM OF GAS AND PRODUCE 1600KW. EXCESS GAS IS BURNED TWO BACKUP FLARES: JOHN ZINK MODEL ZEF1235 EACH RATED AT 2500 SCFM.	**SIC Code:**	4953
Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	562212
Permit URL:			
EPA Region:	1	**COUNTRY:**	USA
Facility County:	ORLEANS		
Facility State:	VT		
Facility ZIP Code:	05825		
Permit Issued By:	VERMONT AIR POLLUTION CONTROL DIVISION (Agency Name) MR. DOUG ELLIOTT(Agency Contact) (802) 241-3845 doug.elliott@state.vt.us		
Permit Notes:			

Affected Boundaries:

Boundary Type:	Class I Area State:	Boundary:	Distance:
CLASS I	NH	Great Gulf	< 100 km
CLASS I	VT	Lye Brook	100km - 50km
CLASS I	NH	Presidential Range-Dry River	100km - 50km
INTL BORDER		US/Canada Border	< 100 km

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	325.0000 (Tons/Year)
Nitrogen Oxides (NOx)	59.0000 (Tons/Year)
Particulate Matter (PM)	8.6000 (Tons/Year)
Sulfur Oxides (SOx)	7.8000 (Tons/Year)
Volatile Organic Compounds (VOC)	17.0000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: LANDFILL GAS FLARE

Process Type: 11.320 (Landfill/Digester/Bio-Gas)

Primary Fuel: LANDFILL GAS

Throughput: 5000.00 SCFM

Process Notes: THERE ARE TWO JOHN ZINK FLARES: MODEL ZEF1235. THEY ARE USED AS A BACKUP COMBUSTION DEVICE IF THE ENGINES ARE NOT AVAILABLE OR WHEN THERE IS EXCESS LANDFILL GAS UNUSED BY THE ENGINEES.

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 0.3700 LB/MMBTU 1 HOUR

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: Other Case-by-Case

Other Applicable Requirements:

Control Method: (P) LOW EMISSION DESIGN

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: No

Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Dioxide (NO2)

CAS Number: 10102-44-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx))
Emission Limit 1: 0.0680 LB/MMBTU 1 HOUR
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Control Method: (P) LOW EMISSION DESIGN
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes:

Process/Pollutant Information

PROCESS NAME: STATIONARY INTERNAL COMBUSTION ENGINE
Process Type: 17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel: LANDFILL GAS
Throughput: 2028.00 SCFM
Process Notes: THE PROCESS IS PERMITTED FOR FOUR INTERNAL COMBUSTION ENGINES EACH DRIVING AN ELECTRICAL GENERATOR. EACH SET IS THE SAME: CATERPILLAR G3520C LE RATED AT 2,221 HP / 1600 KW, BURNING 507 SCFM OF LANDFILL GAS.

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 2.7500 G/B-HP-H 1 HOUR
Emission Limit 2: 13.5000 LB/H 1 HOUR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OTHER
Control Method: (P) LOW EMISSION ENGINE DESIGN
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Dioxide (NO2)
CAS Number: 10102-44-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx))
Emission Limit 1: 0.5000 G/B-HP-H 1 HOUR
Emission Limit 2: 2.4500 LB/H 1 HOUR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements: OTHER
Control Method: (P) LOW EMISSION ENGINE DESIGN
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes:

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Facility Information

RBLC ID:	TX-0441 (final)	**Date Determination Last Updated:**	10/13/2011
Corporate/Company Name:	BIO ENERGY (TEXAS) LLC	**Permit Number:**	P1034
Facility Name:	COVEL GARDENS WASTE MANAGEMENT	**Permit Date:**	07/23/2004 (actual)
Facility Contact:	MR. LESLIE COOK 713.300.3310	**FRS Number:**	110021081862
Facility Description:	NEW LANDFILL GAS (LPG) FUELED POWER GENERATION FACILITY	**SIC Code:**	4911
Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	221119
Permit URL:			
EPA Region:	6	**COUNTRY:**	USA
Facility County:	BEXAR		
Facility State:	TX		
Facility ZIP Code:			
Permit Issued By:	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) (Agency Name) MR. JOHNNY VERMILLION(Agency Contact) (512) 239-1292 John.Vermillion@tceq.texas.gov		
Other Agency Contact Info:	Ms. Kate Stinchcomb 512-239-1583 Katherine.Stinchcomb@tceq.texas.gov		
Permit Notes:	56641		

Process/Pollutant Information

PROCESS NAME: Landfill gas-fired engines

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: landfill gas

Throughput: 12.52 MW

Process Notes: Bio Energy (Texas) LLC proposes to construct a landfill gas (LFG) fueled power generation facility. This project will entail the installation of 8 Caterpillar, Model G3520C, 2,172 brake-horsepower (bHP) landfill gas-fired engines for the generation of up 12.52 megawatts of electricity. A LFG Treatment System will also be installed. The LFG Treatment System includes gas compression (via blowers), liquid removal (via knock-out and chilling), and particulate removal (via particulate filters).

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102
Test Method: EPA/OAR Mthd 7E
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.6000 G/HP-H PORTABLE ANALYZER, ONCE PER QUARTER
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) lean burn
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 2.8000 G/HP-H PORTABLE ANALYZER, ONCE PER QUARTER
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:

Control Method: (P) lean burn
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, total < 10 μ (TPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.7100 LB/H 1-HR
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (B) condensate knockout drum plus 10 and 1 micron filters for landfill gas prior to combustion. good combustion practices
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC)
CAS Number: VOC
Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 0.1600 G/HP-H 3-HR, INTITIAL STACK TEST
Emission Limit 2: 20.0000 PPMVD @3% OXYGEN AS HEXANE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (P) good combustion
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Dioxide (SO2)
CAS Number: 7446-09-5
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 3.2900 LB/H 1-HR
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) limit sulfur in landfill gas to 600 ppmv. Sample gas once per quarter to confirm.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: SO2 is controlled by sulfur content of the gas being fired. That limit (600 ppmv sulfur in fuel) should be considered the BACT determination

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Facility Information

RBLC ID:	TX-0495 (final)	**Date Determination Last Updated:**	10/02/2007
Corporate/Company Name:	BIO ENEERGY TEXAS LLC	**Permit Number:**	56641/PSD-TX 1034
Facility Name:	NEW LANDFILL GAS (LFG) FUELED POWER GENERATION FACILITY	**Permit Date:**	07/23/2004 (actual)
Facility Contact:	MR. JOHN LOVE	**FRS Number:**	110022572768
Facility Description:	BIO ENERGY (TEXAS) LLC PROPOSES TO CONSTRUCT A LANDFILL GAS (LFG) FUELED POWER GENERATION FACILITY. THIS PROJECT WILL ENTAIL THE INSTALLATION OF 8 CATERPILLAR, MODEL G3520C, 2,172 BRAKE-HORSEPOWER (BHP) LANDFILL GAS-FIRED ENGINES FOR THE GENERATION OF UP 12.52 MEGAWATTS OF ELECTRICITY. A LFG TREATMENT SYSTEM WILL ALSO BE INSTALLED. THE LFG TREATMENT SYSTEM INCLUDES GAS COMPRESSION (VIA BLOWERS), LIQUID REMOVAL (VIA KNOCK-OUT AND CHILLING), AND PARTICULATE REMOVAL (VIA PARTICULATE FILTERS). THE ENGINES WILL BE THE ONLY AIR POLLUTANT EMITTING EQUIPMENT REQUIRED FOR THE COVEL GARDENS LFG POWER STATION. WASTE MANAGEMENT, INC. PREVIOUSLY COLLECTED AND ROUTED THE LANDFILL GAS FROM THE COVEL GARDENS LANDFILL TO A FLARE. WASTE MANAGEMENT WILL MAINTAIN RESPONSIBILITY FOR THE GAS COLLECTION CONTROL SYSTEM INCLUDING THE EXISTING FLARE. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) REVIEW FOR NOX, CO, AND PM10 IS REQUIRED SINCE THE ESTIMATED POTENTIAL EMISSIONS OF THESE POLLUTANTS ARE GREATER THAN THE PSD SIGNIFICANCE THRESHOLDS.	**SIC Code:**	369
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	221112
Permit URL:			
EPA Region:	6	**COUNTRY:**	USA
Facility County:	BEXAR		
Facility State:	TX		
Facility ZIP Code:			
Permit Issued By:	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) (Agency Name) MR. JOHNNY VERMILLION(Agency Contact) (512) 239-1292 John.Vermillion@tceq.texas.gov		
Other Agency Contact Info:	PERMIT ENGINEER: ERICA PARSONS		
Permit Notes:			

Process/Pollutant Information

PROCESS NAME:	CATERPILLAR, MODEL G3520C ENGINES 2172 BHP (8)
Process Type:	17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel:	LANDFILL GAS
Throughput:	
Process Notes:	THE PROPOSED COVEL GARDENS LANDFILL GAS (LFG) POWER STATION WILL UTILIZE LFG FROM THE NEIGHBORING WASTE MANAGEMENT, INC. COVEL GARDENS LANDFILL TO PRODUCE ELECTRICITY. WASTE MANAGEMENT WILL SELL THE LFG TO ENERGY DEVELOPMENTS INC. (EDI), (THE FUTURE OPERATOR OF THE COVEL GARDENS POWER STATION) AFTER THE GAS IS EXTRACTED AND COMPRESSED. THE GAS WILL BE ROUTED TO THE LFG TREATMENT SYSTEM WHERE IT IS COMPRESSED (VIA BLOWERS), THE LIQUID IS REMOVED (VIA KNOCK-OUT AND CHILLING), AND THE PARTICULATE IS REMOVED (VIA FILTER). ONCE THROUGH THE LFG TREATMENT SYSTEM, THE GAS WILL BE ROUTED TO EIGHT POWER GENERATION UNITS WHICH EACH CONTAIN A CATERPILLAR MODEL G3520C INTERNAL COMBUSTION ENGINE, AN ELECTRICAL GENERATOR AND AUXILIARY SYSTEMS. THE ENGINES ARE LEAN-BURN, FOUR STROKE, TURBOCHARGED, AFTERCOOLED UNITS EACH RATED AT 2,172 BHP. EACH ENGINE IS COUPLED TO A GENERATOR AND WILL PRODUCE APPROXIMATELY 1,565 KW, FOR A TOTAL FACILITY OUTPUT POTENTIAL OF 12.52 MW. EMISSIONS FROM EACH UNIT WILL BE RELEASED THROUGH EXHAUST STACKS, EPNS E1, E2, E3, E4, E5, E6, E7, AND E8. EMISSIONS ARE PER ENGINE

POLLUTANT NAME:	Nitrogen Oxides (NOx)
CAS Number:	10102
Test Method:	Unspecified
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1:	2.8700 LB/H
Emission Limit 2:	12.5800 T/YR
Standard Emission:	
Did factors, other then air pollution technology considerations influence the BACT decisions:	U
Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Control Method:	(B) THE COMPANY WILL USE LEAN-BURN TECHNOLOGY TO CONTROL NOX EMISSIONS TO A

LEVEL OF 0.6 G/B-HP-H PER ENGINE. FLUE GAS TREATMENT CONTROLS SUCH AS NON-SELECTIVE CATALYTIC REDUCTION (NSCR) AND SELECTIVE CATALYTIC REDUCTION (SCR) A

Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 13.4100 LB/H
Emission Limit 2: 58.7300 T/YR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) PROPER OPERATION AND MAINTENANCE WILL CONTROL CO TO A LEVEL OF 2.80 G/BHP-HR PER ENGINE. FLUE GAS CONTROLS WERE REJECTED FOR THE REASONS DISCUSSED PREVIOUSLY.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verificd: Unknown
Pollutant/Compliancc Notes:

POLLUTANT NAME: Sulfur Dioxide (SO2)

CAS Number: 7446-09-5
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 0.2600 LB/H
Emission Limit 2: 1.1400 T/YR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC)

CAS Number: VOC
Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 0.7600 LB/H
Emission Limit 2: 3.3400 T/YR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (P) NSPS WWW LIMITS VOC EMISSIONS TO 20 PPMVD AS HEXANE AT 3% OXYGEN.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 10 μ (FPM10)

CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.7100 LB/H
Emission Limit 2: 3.1200 T/YR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) GAS PRETREATMENT AND PROPER OPERATION AND MAINTENANCE OF THE ENGINES WILL CONTROL PM10 TO A LEVEL OF 0.71 LB/HR PER ENGINE. GAS PRETREATMENT CONSISTS OF A CONDENSATE KNOCKOUT TANK, FOLLOWED BY A BLOWER, A 10 MICRON FILTER, A
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

Process/Pollutant Information

PROCESS NAME: FUGITIVES (4)
Process Type: 50.007 (Petroleum Refining Equipment Leaks/Fugitive Emissions)
Primary Fuel:
Throughput:
Process Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC)
CAS Number: VOC
Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 0.0400 LB/H
Emission Limit 2: 0.1800 T/YR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

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Facility Information

RBLC ID:	SC-0130 (draft)	**Date Determination Last Updated:**	11/13/2012
Corporate/Company Name:	SC PUBLIC SERVICE AUTHORY (SANTEE COOPER)	**Permit Number:**	1540-0031-CA
Facility Name:	LEE COUNTY LANDFILL GAS TO ENERGY	**Permit Date:**	01/13/2004 (actual)
Facility Contact:	JAY HUDSON 8437618000X5183 JHUDSON@SANTEECOOPER.COM	**FRS Number:**	110014433014
Facility Description:	MUNICIPAL SOLID WASTE LANDFILL GAS TO ENERGY FACILITY	**SIC Code:**	4911
Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	221119
Permit URL:			
EPA Region:	4	**COUNTRY:**	USA
Facility County:	LEE		
Facility State:	SC		

Facility ZIP Code: 29010

Permit Issued By: SOUTH CAROLINA DEPT OF HEALTH & ENV CTRL, BUREAU OF AIR QUALITY (Agency Name)
MR. DENNIS CAMIT(Agency Contact) (803)898-4284 camitdr@dhec.sc.gov

Other Agency Contact Info: CHRISTOPHER HARDEE
(803) 898-4123

Permit Notes:

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	352.1200 (Tons/Year)
Nitrogen Oxides (NOx)	59.5600 (Tons/Year)
Particulate Matter (PM)	21.0200 (Tons/Year)
Sulfur Oxides (SOx)	3.9400 (Tons/Year)
Volatile Organic Compounds (VOC)	43.8000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: FOUR 2,677 HP RECIPROCATING INTERNAL COMBUSTION ENGINES

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: LANDFILL GAS

Throughput: 482.00 SCFM

Process Notes: FOUR JENBACHER JGS 616 GS-B.L. 1,895 KW RECIPROCATING INTERNAL COMBUSTION ENGINES

POLLUTANT NAME: Volatile Organic Compounds (VOC)

CAS Number: VOC
Test Method: None selected in SAE
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 0.4300 G/BHP-H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) GOOD COMBUSTION PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 10 μ (FPM10)

CAS Number: PM
Test Method: None selected in SAE
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.2000 G/BHP-H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (B) GOOD COMBUSTION PRACTICES, GAS PRETREATMENT SYSTEM
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102
Test Method: None selected in SAE
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.5700 G/BHP-H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) LEAN BURN COMBUSTION
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: None selected in SAE
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 3.4000 G/BHP-H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) GOOD COMBUSTION PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

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Facility Information

RBLC ID: MI-0371 (final)
Date Determination Last Updated: 08/16/2005
Corporate/Company Name: SUMPTER ENERGY ASSOCIATES
Permit Number: 62-01A
Facility Name: CARLTON FARMS LANDFILL
Permit Date: 12/23/2003 (actual)
Facility Contact: SCOTT SALISBURY 2483803920
FRS Number: NOT AVAILABLE
Facility Description: LANDFILL GAS TO ELECTRICITY GENERATION FACILITY
SIC Code: 4953
Permit Type: B: Add new process to existing facility
NAICS Code: 562212
Permit URL:
EPA Region: 5
COUNTRY: USA
Facility County: WAYNE
Facility State: MI
Facility ZIP Code: 48164
Permit Issued By: MICHIGAN DEPT OF ENVIRONMENTAL QUALITY (Agency Name)
MS. CINDY SMITH(Agency Contact) (517)241-7461 SMITHC17@MICHIGAN.GOV
Other Agency Contact Info: JEFF RATHBUN, PERMIT ENGINEER
PO BOX 30260
LANSING, MI 48909
(517) 241-8072
Permit Notes:
Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	191.3000 (Tons/Year)
Nitrogen Oxides (NOx)	118.8000 (Tons/Year)
Particulate Matter (PM)	4.5100 (Tons/Year)
Sulfur Oxides (SOx)	4.6600 (Tons/Year)
Volatile Organic Compounds (VOC)	13.1400 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: SIX INTERNAL COMBUSTION ENGINES

Process Type: 17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel: TREATED LANDFILL GAS
Throughput: 8.60 MMBTU/H
Process Notes: THE ADDITIONAL ENGINES WILL INCREASE CAPACITY AT THE FACILITY BY 4.9 MW FROM THE SIX ENGINES.

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 4.5200 LB/H 3-HOUR AVERAGE
Emission Limit 2:
Standard Emission: NOT AVAILABLE
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: N/A
Control Method: (N) GOOD COMBUSTION PRACTICE
Est. % Efficiency:
Cost Effectiveness: 8575 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Yes
Pollutant/Compliance Notes: EMISSION LIMIT IS LB/HR PER ENGINE.

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 7.2800 LB/H 3-HOUR AVERAGE
Emission Limit 2:
Standard Emission: NOT AVAILABLE
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: N/A
Control Method: (N) GOOD COMBUSTION PRACTICE
Est. % Efficiency:
Cost Effectiveness: 8037 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Yes
Pollutant/Compliance Notes: EMISSION LIMIT IS LB/HR PER ENGINE.

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Facility Information

RBLC ID:	VA-0288 (final)	**Date Determination Last Updated:**	06/21/2004
Corporate/Company Name:	IDUSTRIAL POWER GENERATING CORP	**Permit Number:**	61423
Facility Name:	INGENCO	**Permit Date:**	12/17/2003 (actual)
Facility Contact:	ROBERT GREENE (804)521-3557	**FRS Number:**	110008189129
Facility Description:	THIS SOURCE IS A STATE MAJOR, ELECTRIC POWER PLANT	**SIC Code:**	4931
Permit Type:	D: Both B (Add new process to existing facility) &C (Modify process at existing facility)	**NAICS Code:**	221112
Permit URL:			
EPA Region:	3	**COUNTRY:**	USA
Facility County:	CHESAPEAKE		
Facility State:	VA		
Facility ZIP Code:	23230		
Permit Issued By:	VIRGINIA DEPT. OF ENVIRONMENTAL QUALITY; DIVISION OF AIR QUALITY (Agency Name) MR. YOGESH DOSHI(Agency Contact) (804)698-4017 Yogesh.doshi@deq.virginia.gov		

Other Agency Contact Info: MARGARET KEY
7705 TIMBERLAKE ROAD
LYNCHBURG, VA 24502
804-582-5120

Permit Notes: SOURCE HAS REQUESTED A MODIFICATION TO THE EXISTING PERMIT FOR AN INCREASE IN YEARLY EMISSION LIMITS; THERE IS NO CHANGE TO THE EXISTING EQUIPMENT. Original permit (dated 10/16/01) is to construct and operate a dual fuel electric power plant, located at the Virginia Beach Landfill II. In case of a landfill gas treatment system malfunction, untreated landfill gas is diverted to a flare.

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	240.0000 (Tons/Year)
Nitrogen Oxides (NOx)	240.0000 (Tons/Year)
Particulate Matter (PM)	17.6000 (Tons/Year)
Volatile Organic Compounds (VOC)	35.2000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: IC ENGINES, DUAL FUEL, (36)

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: LANDFILL GAS

Throughput: 550.00 HP

Process Notes: 36 Detroit diesel engines, arranged in 6 groups of 6 engines each. Each engine drives a 350 kW generator. Treated landfill gas input ratio is limited to < 50%, treated landfill gas input to total fuel heat input for each period of continuous dual fuel operations. Compliance with lb/mmBtu limits for PM, PM10, VOC, CO and NOx, determined by stack testing.

POLLUTANT NAME: Particulate matter, filterable < 10 μ (FPM10)

CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.1100 LB/MMBTU
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Control Method: (P) PROPER ENGINE MAINTENANCE PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: State regulation is basis

POLLUTANT NAME: Sulfur Dioxide (SO2)

CAS Number: 7446-09-5
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 0.2020 LB/MMBTU
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Control Method: (P) DISTILLATE OIL FUEL SULFUR LIMITS: FOR NO. 1 OR 2 OIL: 0.2% MAX SULFUR; FOR NO. 4 OIL: 0.5% MAX SULFUR.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: State regulation is basis

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 2.1000 LB/MMBTU

Emission Limit 2:
Standard Emission: 5.0500 G/B-HP-H calculated, assumes 48% efficiency
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Control Method: (P) AIR-TO-FUEL RATIO CONTROL, TURBOCHARGING, CHARGE- AIR COOLING SYSTEMS, SUPPLEMENTARY INLET CHARGE- AIR WATER-TO-AIR COOLING AND OVERSIZED INLET CHARGE AND EXHAUST DUCTS.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: State regulation is basis

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 3.2000 LB/MMBTU
Emission Limit 2:
Standard Emission: 7.7000 G/B-HP-H calculated, assumes 48% efficiency
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Control Method: (P) FUEL LIMIT: TREATED LANDFILL GAS HEAT INPUT RATIO < 50%
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: State regulation is basis

POLLUTANT NAME: Volatile Organic Compounds (VOC)
CAS Number: VOC
Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 0.2200 LB/MMBTU
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: Other Case-by-Case
Other Applicable Requirements:
Control Method: (P) PROPER ENGINE MAINTENANCE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: state reg is basis

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Facility Information

RBLC ID:	OH-0260 (final)	**Date Determination Last Updated:**	08/28/2006
Corporate/Company Name:	BIO-ENERGY, L.L.C.	**Permit Number:**	02-16880
Facility Name:	CARBON LIMESTONE LFG	**Permit Date:**	04/10/2003 (actual)
Facility Contact:	LESLIE M. COOK 7133003310	**FRS Number:**	110017419293
Facility Description:	16 LANDFILL GAS-FIRED (LFG) IC ENGINES, AT EXISTING LANDFILL, FOR POWER GENERATION.	**SIC Code:**	4911

Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	221112
Permit URL:			
EPA Region:	5	**COUNTRY:**	USA
Facility County:	MAHONING		
Facility State:	OH		
Facility ZIP Code:	77063		
Permit Issued By:	OHIO ENVIRONMENTAL PROTECTION AGENCY (Agency Name) MS. CHERYL SUTTMAN(Agency Contact) (614)644-3617 mailto:cheryl.suttman@epa.ohio.gov		
Other Agency Contact Info:	CHERYL E. SUTTMAN 122 S. FRONT ST COLUMBUS, OH 43215 614-644-3617		
Permit Notes:	THIS PTI IS A MODIFICATION TO PTI#02-14296 ISSUED 4/5/01. TESTING SHOWED THE ORIGINAL LIMITS FOR NOX AND HCL WERE TOO LOW, AND THE FACILITY WAS OUT OF COMPLIANCE. THIS ADJUSTMENT INCLUDED AN INCREASE OF 170 TONS OF NOX AND 6 TONS OF HCL. PM10, NOX, CO AND OC WERE PSD IN THE INITIAL PERMIT. THE FORMALDEHYDE LIMIT WAS REMOVED IN THIS MODIFICATION AND THE ROLLING 12-MO LIMITS WERE CHANGED TO TPY LIMITS. THE TOTAL FACILITY PM LIMIT IS 61 TONS/YR.		

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	580.3000 (Tons/Year)
Nitrogen Oxides (NOx)	343.4000 (Tons/Year)
Particulate Matter (PM)	61.0000 (Tons/Year)
Sulfur Oxides (SOx)	16.0000 (Tons/Year)
Volatile Organic Compounds (VOC)	47.7000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: IC ENGINES (16)

Process Type: 17.140 (Landfill/Digester/Bio-Gas)

Primary Fuel: LANDFILL GAS

Throughput: 14.00 MMBTU/H

Process Notes: SIXTEEN 14 MMBTU/H (1400 KW, 1877 HP) INTERNAL COMBUSTION ENGINES BURNING LANDFILL GAS FOR ELECTRICAL POWER. STACK TESTING WAS CONDUCTED ON ONE OF THE 16 SIMILAR UNITS, FOR NOX, CO, PM, HCL AND OCS. IT WAS FOUND THAT NOX, CO, AND HCL DID NOT MEET THE LIMITS IN THE ORIGINAL PERMIT; IT WAS MODIFIED TO INCREASE THESE LIMITS, AND RE-ISSUED ON 4/10/03. THE WAS AN INCREASE OF 170 TONS OF NOX, 79 TONS CO, AND 6 TONS OF HCL. LANDFILL GAS SHALL BE DIVERTED TO AN EXISTING LANDFILL COMBUSTOR, WHEN NOT BURNED IN THE INTERNAL COMBUSTION ENGINES. THE ALLOWABLE GAS FLOW RATE TO THE INTERNAL COMBUSTION ENGINES SHALL BE EXTABLISHED DURING THE MOST RECENT COMPLIANCE TEST; CURRENTLY THIS IS 415 SCFM.

POLLUTANT NAME:	Nitrogen Oxides (NOx)
CAS Number:	10102
Test Method:	Unspecified
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1:	4.9000 LB/H
Emission Limit 2:	0.3600 LB/MMBTU
Standard Emission:	0.6000 G/B-HP-H
Did factors, other then air pollution technology considerations influence the BACT decisions:	U
Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Control Method:	(P) LEAN BURN TECHNOLOGY
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	LIMITS ARE FOR EACH ENGINE. ANNUAL LIMIT: 21.5 T/YR. THESE LIMITS WERE CHANGED IN THE PERMIT MODIFICATION FOLLOWING THE INITIAL STACK TEST. THE ORIGINAL LIMIT COULD NOT BE MET, WAS: 2.48 LB/H AND 10.87 TPY

POLLUTANT NAME:	Carbon Monoxide
CAS Number:	630-08-0
Test Method:	Unspecified
Pollutant Group(s):	(InOrganic Compounds)
Emission Limit 1:	9.4000 LB/H
Emission Limit 2:	0.6700 LB/MMBTU
Standard Emission:	2.0000 G/B-HP-H
Did factors, other then air pollution technology considerations influence the BACT decisions:	U
Case-by-Case Basis:	BACT-PSD

Other Applicable Requirements:
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: LIMITS ARE FOR EACH ENGINE. ANNUAL LIMIT: 41.2 T/YR.

POLLUTANT NAME: Volatile Organic Compounds (VOC)
CAS Number: VOC
Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 0.7000 LB/H
Emission Limit 2: 3.0000 T/YR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: LIMITS ARE FOR EACH ENGINE.

POLLUTANT NAME: Particulate matter, filterable < 10 μ (FPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.4000 LB/H
Emission Limit 2: 1.7000 T/YR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: LIMITS ARE FOR EACH ENGINE.

POLLUTANT NAME: Sulfur Dioxide (SO2)
CAS Number: 7446-09-5
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 0.2300 LB/H
Emission Limit 2: 1.0000 T/YR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: SIP
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: LIMITS ARE FOR EACH ENGINE.

POLLUTANT NAME: Hydrochloric Acid
CAS Number: 7647-01-0

Test Method: Unspecified
Pollutant Group(s): (Acid Gasses/Mist , Hazardous Air Pollutants (HAP) , InOrganic Compounds , Particulate Matter (PM))
Emission Limit 1: 0.1300 LB/H
Emission Limit 2: 0.6000 T/YR
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: SIP
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: LIMITS ARE FOR EACH ENGINE.

POLLUTANT NAME: Formaldehyde
CAS Number: 50-00-0
Test Method: Unspecified
Pollutant Group(s): (Hazardous Air Pollutants (HAP) , Organic Compounds (all) , Volatile Organic Compounds (VOC))
Emission Limit 1: LIMITATION REMOVED SEE NOTE
Emission Limit 2: LIMITATION REMOVED IN MODIFICATION
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: N/A
Other Applicable Requirements: N/A
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: LIMIT WAS FOR EACH ENGINE. TESTING PROVED THE LIMIT UNNECESSARY AND THIS LIMIT WAS REMOVED FROM THE PERMIT MODIFICATION.

POLLUTANT NAME: Visible Emissions (VE)
CAS Number: VE
Test Method: Unspecified
Pollutant Group(s):
Emission Limit 1: 10.0000 % OPACITY 6 minute average
Emission Limit 2:
Standard Emission: 10.0000 % OPACITY 6 minute average
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Yes
Pollutant/Compliance Notes: Limit is for each engine.

POLLUTANT NAME: Volatile Organic Compounds (VOC)
CAS Number: VOC
Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 20.0000 PPM @ 3% O2 NONMETHANE ORGANIC CARBON, AS HEXANE
Emission Limit 2: 98.0000 % REDUCTION NONMETHANE ORGANIC CARBON
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N)
Est. % Efficiency: 98.000

APPENDIX K-2

CATALYST MANUFACTURER DATA

Limits of poisonous substances for SCR catalysts

MIRATECH CORPORATION

Element	Symbol	Max concentration in fuel			Effect	
		Liquid bio-fuels[05]	Liquid fossil fuels	Gaseous fuels	SCR	Oxi/ Filter
		[mg/kg] (elementary)				
Aluminium	Al	0.5	0.5	0.5	02	02
Antimony	Sb	0.5	0.5	0.5	02	02
Arsenic	As	1	0.2	0.2	04	02
Lead	Pb	0.5	0.5	0.5	03	04
Boron	B	0.5	0.5	0.5	02	02
Bromine	Br	1	1	1	02	02
Cadmium	Cd	1	05	0.5	02	04
Calcium	Ca	12	5	5	02	02
Chlorine	Cl	1	5	5	03	02
Chromium	Cr	0.5	0.5	0.5	02	02
Iron	Fe	15	0.5	0.5	03	02
Fluorine	F	1	0.5	0.5	03	02
Iodine	J	1	1	1	03	02
Potassium	K	5	1	1	04	02
Cobalt	Co	0.5	0.5	0.5	02	02
Copper	Cu	0.5	0.5	0.5	02	02
Lithium	Li	0.5	0.5	0.5	02	02
Magnesium	Mg	12	5	5	02	02
Manganese	Mn	0.5	0.5	0.5	02	02
Molybdenum	Mo	0.5	0.5	0.5	02	02
Sodium	Na	8	5	5	03	02
Nickel	Ni	0.5	0.5	0.5	03	02
Phosphorous	P	16	5	5	04	02
Mercury	Hg	0.5	0.5	0.5	04	04
Sulfur	S	20	15'000 [06]	20	01	03
Selenium	Se	0.5	0.5	0.5	02	02
Silicon organic	Si	0.5	0.5	0.5	03	03
Silicon inorganic	Si	15	15	15	02	02
Tin	Sn	0.5	0.5	0.5	02	03
Vanadium	V	1	15'000 [07]	1	01	04
Zinc	Zn	0.5	0.5	0.5	03	03

01 Positive effect
02 Lightly harmful
03 harmful
04 strongly harmful
05 -► Limitations
06 -► Limitations
07 -► Limitations

The limits of catalyst poisons in the exhaust gas can be calculated as follows ($\lambda \cong 2$):

$$\frac{\text{Limit in fuel [mg/kg]}}{30} = \text{Limit in exhaust gas [mg/kg]}$$

In the exhaust gas there are also the poisons that originate in the lube oil. According to our experience the common, approved lube oils do not harm our catalyst. Exceptions see "Guidelines to catalyst lifetime"

The reactant that is used for the SCR reaction has to be free of catalyst poisons, see also C.00214 "Reactant specifications"

Limitations:

05 Phosphorous

Fuel	Phosphorous-content	Limitations
Bio fuel	P ≤ 16 mg/kg	• SCR volume needs to be adapted (-► layout rules for SCR catalyst)

06 Sulphur

Fuel	Sulphur content	Limitations
Light fuel oil (Diesel)	S ≤ 0,1%	• No Limitations
Marine fuel oil MDO	S > 0,1%	• No precious metal oxidation catalyst (Pt, Pd)
Heavy fuel oil HFO	S ≥ 0,5%	• No Oxidation catalysts • Dust blowers for all catalyst layers
Heavy fuel oil HFO	S ≥1,5%	• Special case, requires detailed analysis

07 Vanadium

Fuel	Vanadium content	Limitations
all	V > 1 mg/kg	• No Oxidation catalysts

General Warranty

CleanAIR Systems warrants the emissions control system to be free from defects in design, materials and workmanship for a period of 12 months or 8000 hours of operation, whichever comes first from the date of commissioning provided there has been no abuse, neglect, or improper maintenance of the emission control system, engine, vehicle or equipment, as specified in all owner's and operation manuals. Some examples of misuse, abuse, neglect and improper maintenance are: continuing to run the engine when alarms are indicated, improper installation or maintenance of emissions control system, operating in an application different from the intended application, not maintaining the engine or allowing the engine to operate in an improper state of combustion. Tampering, disabling, or unauthorized modification of the emissions control system or the CleanAIR Systems control or monitoring system will void the warranty coverage.

The sole remedy for breach of the foregoing warranty shall be repair, replacement of any defective product, as determined by CleanAIR Systems, based on its sole evaluation and in its sole discretion. In no event shall CleanAIR Systems be liable for special, indirect or consequential damages including but not limited to lost profits, non-compliance penalties, down time related costs or damages to the premises. In no event shall the aggregate liabilities of CleanAIR Systems arising out of or relating to the transactions herein exceed the price for the goods or services in respect of which such claim is made.

Repairs or modifications made to the emissions control system without the written consent of CleanAIR Systems will not be the responsibility of CleanAIR Systems and may void the warranty.

THESE WARRANTIES ARE EXCLUSIVE AND ARE IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY LAW OR CUSTOM, INCLUDING BUT NOT BY WAY OF LIMITATION, THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Performance Warranty

CleanAIR Systems warrants the emissions control system to perform as stated in the attached quotation for a period of 30 days or 720 hours of operation, whichever comes first from the date of commissioning provided there has been no abuse, neglect, miss fueling, or improper maintenance of the emission control system, engine, vehicle or equipment, as specified in all owner's and operation manuals. Some examples of misuse, abuse, neglect and improper maintenance are: continuing to run the engine when the alarms are indicated, improper installation of emissions control system, operating in an application different from the intended application, not maintaining the engine or allowing the engine to operate in an improper state of combustion. Tampering, disabling, or unauthorized modification of the CleanAIR Systems' control or monitoring system will void the warranty coverage.

Catalyst poisoning due to siloxanes, phosphorus, lead, barium, zinc or other contaminates will void the warranty coverage.

For systems using diesel particulate filters, plugged filters are not cover as a warranty item.

Using fuels with sulfur content higher than 50 ppm by weight or other contaminates such as siloxanes, zinc and lead will void the warranty coverage.

The sole remedy for breach of the foregoing warranty shall be repair, replacement of any defective product, as determined by CleanAIR Systems, based on its sole evaluation and in its sole discretion. In no event shall CleanAIR Systems be liable for special, indirect or consequential damages including but not limited to lost profits, non-compliance penalties, down time related costs or damages to the premises. In no event shall the aggregate liabilities of CleanAIR Systems arising out of or relating to the transactions herein exceed the price for the goods or services in respect of which such claim is made.

Repairs or modifications made to the emissions control system without the written consent of CleanAIR Systems will not be the responsibility of CleanAIR Systems and may void the warranty.

THESE WARRANTIES ARE EXCLUSIVE AND ARE IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY LAW OR CUSTOM, INCLUDING BUT NOT BY WAY OF LIMITATION, THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

APPENDIX K-3

PERMIT NO. PSD-FL-414
FDEP-DARM TECHNICAL REVIEW

Memorandum

Florida Department of Environmental Protection

To: Jeff Koerner, Permitting and Compliance Section

From: Tammy McWade, Permitting and Compliance Section

Date: May 25, 2011

Subject: Draft Air Permit No. 0250615-012-AC
PSD-FL-414
Waste Management, Inc., Medley Landfill
Landfill Gas-to-Energy Project

The Medley Landfill is an existing municipal solid waste landfill. Waste Management, Inc. proposes to construct and operate a landfill gas-to-energy plant at the existing Medley Landfill, which will use landfill gas to fuel six lean-burn reciprocating internal combustion engine/generator sets. The six engines will be capable of generating a nominal 9.6 megawatts (MW) of power to the electrical grid. The two existing flares will be retained and relocated adjacent to the engines as additional combustion devices for the landfill gas. The landfill gas will be routed through a landfill gas treatment system and then to the engines. As necessary, residual landfill gas will be routed to the flares.

The proposed project is subject to preconstruction review pursuant to Rule 62-212.400, Florida Administrative Code (F.A.C.) for the Prevention of Significant Deterioration (PSD) of Air Quality for emissions of CO, NO_X and PM/PM_{10}. The draft permit includes the following determinations of the Best Available Control Technology (BACT): emissions of CO and NOx will be minimized by the lean-burn combustion design combined with good operating and maintenance practices; and emissions of PM/PM_{10} will be controlled by filtration in the landfill gas treatment system prior to combustion.

Day 90 of the permitting time clock is June 13, 2011.

I recommend your approval of the attached draft permit package.

Attachments

JFK/ttm

P.E. CERTIFICATION STATEMENT

PERMITTEE

Waste Management, Inc.
2700 Northwest 48th Street
Pompano Beach, FL 33073

Draft Permit No. 0250615-012-AC
PSD-FL-414
Medley Landfill
Landfill Gas-to-Energy Project
Miami-Dade County, Florida

PROJECT DESCRIPTION

Waste Management, Inc. operates the existing Medley Landfill, which is an existing municipal solid waste landfill located in Miami-Dade County at 9350 Northwest 89th Avenue in Medley, Florida. Waste Management, Inc. proposes to construct and operate a landfill gas-to-energy plant at the existing Medley Landfill, which will use landfill gas to fuel six lean-burn reciprocating internal combustion engine/generator sets. The six engines will be capable of generating a combined nominal 9.6 megawatts (MW) of power to the electrical grid. The two existing flares will be retained and relocated adjacent to the engines as additional combustion devices for the landfill gas. The landfill gas will be routed through a landfill gas treatment system and then to the engines. As necessary, residual landfill gas will be routed to the flares.

In addition to the general preconstruction review requirements of Rule 62-212.300, Florida Administrative Code (F.A.C.), the proposed project is subject to the major stationary source preconstruction review requirements of Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality for emissions of CO, NO_X, PM and PM_{10}. The draft permit includes the following Best Available Control Technology (BACT) determinations: emissions of CO and NOx will be minimized by the lean-burn combustion design combined with good operating and maintenance practices; and emissions of PM and PM_{10} will be controlled by filtration in the landfill gas treatment system prior to combustion. The Department's full review of the project and rationale for issuing the draft permit is provided in the Technical Evaluation and Preliminary Determination.

I HEREBY CERTIFY *that the air pollution control engineering features described in the above-referenced application and subject to the proposed permit conditions provide reasonable assurance of compliance with applicable provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 62-4 and 62-204 through 62-297. However, I have not evaluated and I do not certify any other aspects of the proposal (including, but not limited to, the electrical, civil, mechanical, structural, hydrological, geological and meteorological features).*

DNER

5-25-(

Jeffery F. Koerner, P.E.
Registration Number: 49441

(Date)

Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T. Vinyard Jr.
Secretary

May 25, 2011

Electronically Sent – Received Receipt Requested

Mr. Tim Hawkins, South Florida Market Area Vice President
Waste Management, Inc. of Florida, Medley Landfill
2700 Northwest 48th Street
Pompano Beach, FL 33073

Re: Draft Air Permit No. 0250615-012-AC
PSD-FL-414
Medley Landfill
Landfill Gas-to-Energy Project

Dear Mr. Hawkins:

On August 16, 2010, you submitted an application for an air construction permit subject to the preconstruction review requirements of Rule 62-212.400, Florida Administrative Code, for the Prevention of Significant Deterioration (PSD) of Air Quality. The project requests authorization to construct and operate a landfill gas-to-energy plant at the existing Medley Landfill, which will use landfill gas to fuel six reciprocating internal combustion engine/generator sets. The six engines will be capable of generating a nominal 9.6 megawatts (MW) to the electrical grid. This work will be conducted at the existing Medley Landfill, which is located in Miami-Dade County at 9350 Northwest 89th Avenue in Medley, Florida. Enclosed are the following documents: Written Notice of Intent to Issue Air Permit; Public Notice of Intent to Issue Air Permit; Technical Evaluation and Preliminary Determination; and Draft Permit with Appendices.

The Public Notice of Intent to Issue Air Permit is the actual notice that you must have published in the legal advertisement section of a newspaper of general circulation in the area affected by this project. If you have any questions, please contact the Project Engineer, Tammy McWade, at 850/717-9086 or me at 850/717-9083.

Sincerely,

Jeffery F. Koerner, Program Administrator
Permitting and Compliance Section
Division of Air Resource Management

Enclosures

JFK/ttm

WRITTEN NOTICE OF INTENT TO ISSUE AIR PERMIT

In the Matter of an
Application for Air Permit by:

Waste Management, Inc.
2700 Northwest 48th Street
Pompano Beach, FL 33073

Draft Permit No. 0250615-012-AC
PSD-FL-414
Medley Landfill
Landfill Gas-to-Energy Project
Miami-Dade County, Florida

Authorized Representative:
Mr. Tim Hawkins, South Florida Market Area Vice President

Facility Location: Waste Management, Inc. operates the existing Medley Landfill, which is located in Miami-Dade County at 9350 Northwest 89th Avenue in Medley, Florida.

Project: The Medley Landfill is an existing municipal solid waste landfill. The applicant proposes to construct and operate a landfill gas-to-energy plant at the existing Medley Landfill, which will use landfill gas to fuel six reciprocating internal combustion engine/generator sets. The six engines will be capable of generating a nominal 9.6 megawatts (MW) of power. The two existing flares will be retained and relocated adjacent to the engines as additional combustion devices for the landfill gas. The landfill gas will be routed through a landfill gas treatment system and then to the engines. As necessary, residual landfill gas will be routed to the flares. The project is subject to the preconstruction review requirements of Rule 62-212.400, Florida Administrative Code (F.A.C.) for the Prevention of Significant Deterioration (PSD) of Air Quality for the following pollutants: carbon monoxide (CO), nitrogen oxides (NO_X), total particulate matter (PM) and particulate matter with a mean particle diameter of 10 microns or less (PM_{10}). Details of the project are provided in the application and the enclosed Technical Evaluation and Preliminary Determination.

Permitting Authority: Applications for air construction permits are subject to review in accordance with the provisions of Chapter 403, Florida Statutes (F.S.) and Chapters 62-4, 62-210 and 62-212, F.A.C. The proposed project is not exempt from air permitting requirements and an air permit is required to perform the proposed work. The Florida Department of Environmental Protection's Bureau of Air Regulation is the Permitting Authority responsible for making a permit determination for this project. The Bureau of Air Regulation's physical address is 111 South Magnolia Drive, Suite 4, Tallahassee, Florida and the mailing address is 2600 Blair Stone Road, MS #5505, Tallahassee, Florida 32399-2400. The Bureau of Air Regulation's phone number is 850/717-9000.

Project File: A complete project file is available for public inspection during the normal business hours of 8:00 a.m. to 5:00 p.m., Monday through Friday (except legal holidays), at address indicated above for the Permitting Authority. The complete project file includes the Draft Permit, the Technical Evaluation and Preliminary Determination, the application, and the information submitted by the applicant, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Permitting Authority's project review engineer for additional information at the address and phone number listed above.

Notice of Intent to Issue Air Permit: The Permitting Authority gives notice of its intent to issue an air permit to the applicant for the project described above. The applicant has provided reasonable assurance that operation of the proposed equipment will not adversely impact air quality and that the project will comply with all applicable provisions of Chapters 62-4, 62-204, 62-210, 62-212, 62-296 and 62-297, F.A.C. The Permitting Authority will issue a Final Permit in accordance with the conditions of the proposed Draft Permit unless a timely petition for an administrative hearing is filed under Sections 120.569 and 120.57, F.S. or unless public comment received in accordance with this notice results in a different decision or a significant change of terms or conditions.

Public Notice: Pursuant to Section 403.815, F.S. and Rules 62-110.106 and 62-210.350, F.A.C., you (the applicant) are required to publish at your own expense the enclosed Public Notice of Intent to Issue Air Permit

(Public Notice). The Public Notice shall be published one time only as soon as possible in the legal advertisement section of a newspaper of general circulation in the area affected by this project. The newspaper used must meet the requirements of Sections 50.011 and 50.031, F.S. in the county where the activity is to take place. If you are uncertain that a newspaper meets these requirements, please contact the Permitting Authority at the address or phone number listed above. Pursuant to Rule 62-110.106(5) and (9), F.A.C., the applicant shall provide proof of publication to the Permitting Authority at the above address within 7 days of publication. Failure to publish the notice and provide proof of publication may result in the denial of the permit pursuant to Rule 62-110.106(11), F.A.C.

Comments: The Permitting Authority will accept written comments concerning the proposed Draft Permit and requests for a public meeting for a period of 30 days from the date of publication of the Public Notice. Written comments must be received by the Permitting Authority by close of business (5:00 p.m.) on or before the end of this 30-day period. In addition, if a public meeting is requested within the 30-day comment period and conducted by the Permitting Authority, any oral and written comments received during the public meeting will also be considered by the Permitting Authority. If timely received comments result in a significant change to the Draft Permit, the Permitting Authority shall revise the Draft Permit and require, if applicable, another Public Notice. All comments filed will be made available for public inspection.

Petitions: A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative hearing in accordance with Sections 120.569 and 120.57, F.S. The petition must contain the information set forth below and must be filed with (received by) the Department's Agency Clerk in the Office of General Counsel of the Department of Environmental Protection, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000. Petitions filed by the applicant or any of the parties listed below must be filed within 14 days of receipt of this Written Notice of Intent to Issue Air Permit. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3), F.S., must be filed within 14 days of publication of the attached Public Notice or within fourteen 14 days of receipt of this Written Notice of Intent to Issue Air Permit, whichever occurs first. Under Section 120.60(3), F.S., however, any person who asked the Permitting Authority for notice of agency action may file a petition within 14 days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above, at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention (in a proceeding initiated by another party) will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

A petition that disputes the material facts on which the Permitting Authority's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner; the name, address and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of when and how each petitioner received notice of the agency action or proposed decision; (d) A statement of all disputed issues of material fact; (e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action including an explanation of how the alleged facts relate to the specific rules or statutes; and, (g) A statement of the relief sought by the petitioner, stating precisely the action the petitioner wishes the agency to take with respect to the agency's proposed action. A petition that does not dispute the material facts upon which the Permitting Authority's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301, F.A.C.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Permitting Authority's final action may be different from the position taken by it in this Written Notice of Intent to Issue Air Permit. Persons whose substantial interests will be affected by any such final decision of the Permitting Authority on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

Mediation: Mediation is not available in this proceeding.

Executed in Tallahassee, Florida.

Jeffery F. Koerner, Program Administrator
Permitting and Compliance Section
Division of Air Resource Management

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this Written Notice of Intent to Issue Air Permit package (including the Written Notice of Intent to Issue Air Permit, the Public Notice of Intent to Issue Air Permit, the Technical Evaluation and Preliminary Determination and the Draft Permit with Appendices) was sent by electronic mail, or a link to these documents made available electronically on a publicly accessible server, with received receipt requested before the close of business on 5/25/11 to the persons listed below.

Mr. Tim Hawkins, Waste Management, Inc. (thawkins@wm.com)
Mr. James Kisiel, P.E., Waste Management Inc. (jkisiel@wm.com)
Mr. David A. Buff, P.E., Golder Associates, Inc. (dbuff@golder.com)
Mr. Lennon Anderson, SED Office (lennon.anderson@dep.state.fl.us)
Ms. Mallika Muthias, Miami-Dade DERM (muthim@miamidade.gov)
Ms. Kathleen Forney, EPA Region 4 (forney.kathleen@epa.gov)
Ms. Heather Abrams, EPA Region 4 (abrams.heather@epa.gov)
Ms. Ana M. Oquendo, EPA Region 4 (oquendo.ana@epa.gov)
Ms. Vickie Gibson, DEP BAR Reading File (victoria.gibson@dep.state.fl.us)

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to Section 120.52(7), Florida Statutes, with the designated agency clerk, receipt of which is hereby acknowledged.

(Clerk) 5/25/11 (Date)

PUBLIC NOTICE OF INTENT TO ISSUE AIR PERMIT

Florida Department of Environmental Protection
Division of Air Resource Management, Bureau of Air Regulation

Draft Air Permit No. 0250615-012-AC / PSD-FL-414
Waste Management, Inc., Medley landfill
Miami-Dade County, Florida

Applicant: The applicant for this project is Waste Management, Inc. The applicant's authorized representative and mailing address is: Tim Hawkins, South Florida Market Area Vice President, Waste Management, Inc., Medley Landfill, 2700 Northwest 48th Street, Pompano Beach, FL 33073.

Facility Location: Waste Management, Inc. operates the existing Medley Landfill, which is located in Miami-Dade County at 9350 Northwest 89th Avenue in Medley, Florida.

Project: The Medley Landfill is an existing municipal solid waste landfill. The applicant proposes to construct and operate a landfill gas-to-energy plant at the existing Medley Landfill, which will use landfill gas to fuel six lean-burn reciprocating internal combustion engine/generator sets. The six engines will be capable of generating a combined nominal 9.6 megawatts (MW) of power to the electrical grid. The two existing flares will be retained and relocated adjacent to the engines as additional combustion devices for the landfill gas. The landfill gas will be routed through a landfill gas treatment system and then to the engines. As necessary, residual landfill gas will be routed to the flares. The project will result in the following potential emissions increases at the existing landfill: 455 tons/year of carbon monoxide (CO); 78 tons/year of nitrogen oxides (NO_X); 31 tons/year of particulate matter (PM), particulate matter with a mean particle diameter of 10 microns or less (PM_{10}) and particulate matter with a mean particle diameter of 2.5 microns or less ($PM_{2.5}$); 39 tons/year of sulfur dioxide (SO_2); and 37 tons/year of volatile organic compounds (VOC).

The proposed project is subject to preconstruction review pursuant to Rule 62-212.400, Florida Administrative Code (F.A.C.) for the Prevention of Significant Deterioration (PSD) of Air Quality for emissions of CO, NO_X, PM and PM_{10}. In accordance with this rule, the Department is required to make a determination of the Best Available Control Technology (BACT) for CO, NOx, PM and PM_{10} emissions. The draft permit includes the following preliminary BACT determinations: emissions of CO and NOx will be minimized by the lean-burn combustion design combined with good operating and maintenance practices; and emissions of PM/PM_{10} will be controlled by filtration in the landfill gas treatment system prior to combustion.

The Department reviewed the air quality analysis prepared by the applicant. The project has no predicted significant impact for any pollutants in the nearest PSD Class I area (Everglades National Park). Therefore, a multi-source modeling analysis for PSD Class I increment was not required. The Department reviewed a multi-source modeling analysis for PSD Class II increment because the project has predicted significant impacts for nitrogen dioxide (NO_2) and PM_{10} in the Class II area in the vicinity of the project. The following table shows the maximum predicted PSD Class II increments consumed in micrograms per cubic meter ($\mu g/m^3$) by all sources in the area, including this project, for NO_2 and PM_{10}.

Pollutant	Averaging Time	Allowable Increment ($\mu g/m^3$)	Increment Consumed ($\mu g/m^3$)	Percent
NO_2	Annual	25	6	24
PM_{10}	24-hour	30	13	43
	Annual	17	2	12

(Public Notice to be Published in the Newspaper)

PUBLIC NOTICE OF INTENT TO ISSUE AIR PERMIT

Permitting Authority: Applications for air construction permits are subject to review in accordance with the provisions of Chapter 403, Florida Statutes (F.S.) and Chapters 62-4, 62-210 and 62-212, F.A.C. The proposed project is not exempt from air permitting requirements and an air permit is required to perform the proposed work. The Florida Department of Environmental Protection's Bureau of Air Regulation is the Permitting Authority responsible for making a permit determination for this project. The Bureau of Air Regulation's physical address is 111 South Magnolia Drive, Suite 4, Tallahassee, Florida and the mailing address is 2600 Blair Stone Road, MS #5505, Tallahassee, Florida 32399-2400. The Bureau of Air Regulation's phone number is 850/717-9000.

Project File: A complete project file is available for public inspection during the normal business hours of 8:00 a.m. to 5:00 p.m., Monday through Friday (except legal holidays), at address indicated above for the Permitting Authority. The complete project file includes the Draft Permit, the Technical Evaluation and Preliminary Determination, the application, and the information submitted by the applicant, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Permitting Authority's project review engineer for additional information at the address and phone number listed above. In addition, electronic copies of these documents are available on the following web site by entering draft permit number: http://www.dep.state.fl.us/air/emission/apds/default.asp.

Notice of Intent to Issue Air Permit: The Permitting Authority gives notice of its intent to issue an air permit to the applicant for the project described above. The applicant has provided reasonable assurance that operation of the proposed equipment will not adversely impact air quality and that the project will comply with all applicable provisions of Chapters 62-4, 62-204, 62-210, 62-212, 62-296 and 62-297, F.A.C. The Permitting Authority will issue a Final Permit in accordance with the conditions of the proposed Draft Permit unless a timely petition for an administrative hearing is filed under Sections 120.569 and 120.57, F.S. or unless public comment received in accordance with this notice results in a different decision or a significant change of terms or conditions.

Comments: The Permitting Authority will accept written comments concerning the proposed Draft Permit and requests for a public meeting for a period of 30 days from the date of publication of the Public Notice. Written comments must be received by the Permitting Authority by close of business (5:00 p.m.) on or before the end of this 30-day period. In addition, if a public meeting is requested within the 30-day comment period and conducted by the Permitting Authority, any oral and written comments received during the public meeting will also be considered by the Permitting Authority. If timely received comments result in a significant change to the Draft Permit, the Permitting Authority shall revise the Draft Permit and require, if applicable, another Public Notice. All comments filed will be made available for public inspection.

Petitions: A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative hearing in accordance with Sections 120.569 and 120.57, F.S. The petition must contain the information set forth below and must be filed with (received by) the Department's Agency Clerk in the Office of General Counsel of the Department of Environmental Protection, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3), F.S., must be filed within 14 days of publication of this Public Notice or receipt of a written notice, whichever occurs first. Under Section 120.60(3), F.S., however, any person who asked the Permitting Authority for notice of agency action may file a petition within 14 days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above, at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention (in a proceeding initiated by another party) will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

A petition that disputes the material facts on which the Permitting Authority's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner; the name,

address and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of when and how each petitioner received notice of the agency action or proposed decision; (d) A statement of all disputed issues of material fact; (e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action including an explanation of how the alleged facts relate to the specific rules or statutes; and, (g) A statement of the relief sought by the petitioner, stating precisely the action the petitioner wishes the agency to take with respect to the agency's proposed action. A petition that does not dispute the material facts upon which the Permitting Authority's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301, F.A.C.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Permitting Authority's final action may be different from the position taken by it in this Public Notice of Intent to Issue Air Permit. Persons whose substantial interests will be affected by any such final decision of the Permitting Authority on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

Mediation: Mediation is not available in this proceeding.

TECHNICAL EVALUATION

&

PRELIMINARY DETERMINATION

APPLICANT

Waste Management, Inc. of Florida
2700 Northwest 48th Street
Pompano Beach, FL 33073

Medley Landfill
ARMS Facility ID No. 0250615

PROJECT

Draft Permit No. PSD-FL-414
Project No. 0250615-012-AC

Landfill Gas-to-Energy Project

COUNTY

Miami-Dade County, Florida

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resource Management
Bureau of Air Regulation
New Source Review Section
2600 Blair Stone Road, MS#5505
Tallahassee, Florida 32399-2400

May 25, 2011

1. GENERAL INFORMATION

State Regulations

This project is subject to the applicable environmental laws specified in Section 403 of the Florida Statutes (F.S.). The Florida Statutes authorize the Department of Environmental Protection to establish rules and regulations regarding air quality as part of the Florida Administrative Code (F.A.C.). This project is subject to the applicable rules and regulations defined in the following Chapters of the F.A.C.: 62-4 (Permitting Requirements); 62-204 (Ambient Air Quality Requirements, PSD Increments, and Federal Regulations Adopted by Reference); 62-210 (Permits Required, Public Notice, Reports, Stack Height Policy, Circumvention, Excess Emissions, and Forms); 62-212 (Preconstruction Review, PSD Review and BACT, and Non-attainment Area Review and LAER); 62-213 (Title V Air Operation Permits for Major Sources of Air Pollution); 62-296 (Emission Limiting Standards); and 62-297 (Test Methods and Procedures, Continuous Monitoring Specifications, and Alternate Sampling Procedures). PSD applicability and the preconstruction review requirements of Rule 62-212.400, F.A.C. are discussed in Section 2 of this report. Additional details of the other state regulations are provided in Section 3 of this report.

Federal Regulations

The Environmental Protection Agency (EPA) establishes air quality regulations in Title 40 of the Code of Federal Regulations (CFR). Part 60 identifies New Source Performance Standards (NSPS) for a variety of industrial activities. Part 61 specifies National Emissions Standards for Hazardous Air Pollutant (NESHAP) based on specific pollutants. Part 63 specifies NESHAP provisions based on the Maximum Achievable Control Technology (MACT) for given source categories. Federal regulations are adopted in Rule 62-204.800, F.A.C. Additional details of the applicable federal regulations are provided in Section 3 of this report.

Facility Description and Location

The facility is a municipal solid waste landfill with a Standard Industrial Classification Code of SIC No. 4911. The facility is located at 9350 Northwest 89th Avenue in Medley, Florida. The UTM coordinates are Zone 17, 565.04 kilometers (km) East, and 2,860.02 km North. This existing facility is located in Miami-Dade County, an area designated as "attainment/maintenance" for the pollutant ozone, and attainment for all other criteria pollutants in accordance with Rule 62-204.340, F.A.C.

The Medley Landfill is an open Class I Landfill with a design capacity greater than 2.5 million megagrams by mass or 2.5 million cubic meters by volume. This landfill commenced construction prior to 1980 as a lime rock quarry that was backfilled with fill and municipal solid waste (MSW) placed above the groundwater table. The landfill started receiving 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. In 2003, the saddle fill was constructed with a geosynthetic liner to provide an additional 2 million cubic yards. Yearly waste acceptance is approximately 700,000 tons.

The nonmethane organic compounds (NMOC) emissions are calculated to be greater than 50 megagrams per year, based on EPA's uncontrolled emission rate estimates. This landfill does not contain a bioreactor and is an active asbestos waste disposal site. Landfill gas emissions are collected and controlled through an extraction well-field system with open and closed flares.

The facility currently operates two flares – one 3,000 standard cubic feet per minute (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 first flare (EU 001) was installed in 1990. A second flare (EU 005) was installed in October of 2003 and started operation November 5, 2003. Neither the enclosed flare nor the open flare is equipped with a bypass in which landfill gas can bypass the control device in a un-combusted manner.

Primary Regulatory Categories

- The existing facility is not a major source of hazardous air pollutants (HAP).
- The existing facility has no units subject to the acid rain provisions of the Clean Air Act.
- The existing facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C.
- The existing facility is a major stationary source in accordance with Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.
- The landfill is subject to applicable New Source Performance Standards (NSPS) in Title 40, Part 60 of the Code of Federal Regulations.
- The existing facility is subject to applicable National Emissions Standards for Hazardous Air Pollutants (NESHAP) in Title 40, Part 63 of the Code of Federal Regulations.

Project Description

On August 16, 2010, the Department received an application from Waste Management, Inc. of Florida to construct and operate a landfill gas-to-energy facility at the existing Medley Landfill. The applicant proposes to install six Caterpillar (CAT) Model G3520C reciprocating internal combustion engine/electrical generator sets. The six engines will fire landfill gas to generate a total of 9.6 megawatts (MW, nominal) of power (1.6 MW per engines).

The landfill currently generates 4,000 standard cubic feet per minute (scfm) of landfill gas. Each engine uses approximately 588 scfm of landfill gas, giving a total of 3,528 scfm of landfill gas for all six engines. The two existing flares will be retained and relocated adjacent to the engines as backup control devices or to control emissions when more landfill gas is generated than can be handled by the engines. The landfill gas will be transported from the landfill gas collection system to a landfill gas treatment system consisting of: a knock-out vessel to remove water; air-to-gas coolers to remove moisture and control the landfill gas temperature; a filtration system to remove particles larger than 1 micron from the landfill gas; and a gas compressor and blower system. Only treated landfill gas will be delivered to the engines; any excess landfill gas will not be treated, but directly routed to the flares.

The following existing emissions units will be affected by this project.

EU ID	Emission Unit Description
001	Flare #1 – 3,000 scfm open utility (candle type) flare
002	Fugitive non-methane organic compounds (NMOC) and hazardous air pollutant (HAP) emissions from the natural decomposition reactions associated with the landfill, which are not collected by the landfill gas collection system.
005	Flare #3 – 6,000 scfm enclosed flare

The following new emissions units will be added by this project.

EU ID	Emission Unit Description
006	Six Caterpillar (CAT) Model G3520C (CAT 3520) lean-burn internal combustion engines and generator sets

Processing Schedule

08/16/2010 Department received the application for an air pollution construction permit.

09/15/2010 Department requested additional information.

11/22/2010 Department received additional information; however, information relating to the hydrogen sulfide (H_2S) content of the landfill gas and Air Quality Modeling Analysis was not included.

12/15/2010 Department requested additional information.

03/15/2011 Department received additional information; application complete.

2. PSD APPLICABILITY REVIEW

General PSD Applicability

The Department regulates major stationary sources in accordance with Florida's PSD program pursuant to Rule 62-212.400, F.A.C. PSD preconstruction review is required in areas that are currently in attainment with the state and federal Ambient Air Quality Standards (AAQS) or areas designated as "unclassifiable" for these regulated pollutants. As defined in Rule 62-210.200, F.A.C., a facility is considered a "major stationary source" if it emits or has the potential to emit 5 tons per year of lead, 250 tons per year or more of any PSD pollutant, or 100 tons per year or more of any PSD pollutant and the facility belongs to one of the 28 listed PSD major facility categories. PSD pollutants include: carbon monoxide (CO); nitrogen oxides (NO_X); sulfur dioxide (SO_2); particulate matter (PM); particulate matter with a mean particle diameter of 10 microns or less (PM_{10}); volatile organic compounds (VOC); lead (Pb); Fluorides (F); sulfuric acid mist (SAM); hydrogen sulfide (H_2S); total reduced sulfur (TRS), including H_2S; reduced sulfur compounds, including H_2S; municipal waste combustor organics measured as total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans; municipal waste combustor metals measured as particulate matter; municipal waste combustor acid gases measured as SO_2 and hydrogen chloride (HCl); municipal solid waste landfills emissions measured as nonmethane organic compounds (NMOC); and mercury (Hg).

For major stationary sources, PSD applicability is based on emissions thresholds known as the "significant emission rates" as defined in Rule 62-210.200, F.A.C. Emissions of PSD pollutants from the project exceeding these rates are considered "significant" and the Best Available Control Technology (BACT) must be employed to minimize emissions of each PSD pollutant. Although a facility may be "major" for only one PSD pollutant, a project must include BACT controls for any PSD pollutant that exceeds the corresponding significant emission rate. Rule 62-210.200, F.A.C. defines "BACT" as:

> *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; and*
>
> *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.*
>
> *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.*
>
> *Each BACT determination shall include applicable test methods or shall provide for determining compliance with the standard(s) by means which achieve equivalent results.*
>
> *In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR Parts 60, 61, and 63.*

In addition, applicants must provide an Air Quality Analysis that evaluates the predicted air quality impacts

resulting from the project for each PSD pollutant.

PSD Applicability for the Project

The project is located in Miami-Dade County, which is in an area that is currently in attainment with the state and federal AAQS or otherwise designated as unclassifiable. According to Table 3-3 of the application, the applicant provides the following PSD applicability analysis summarizing the proposed project emissions.

Table A. Applicant's Annual Emission Summary and PSD Applicability Analysis

Pollutant	Baseline Actual Emissions (TPY)	Projected Actual Emissions (TPY)	Increased from Project (TPY)	Significant Emissions Rate (TPY)	Subject to PSD?
CO	164.3	619.4	455	100	Yes
NO_X	32.6	110.6	78	40	Yes
PM/PM_{10}	8.51	39.5	31	25/15/10	Yes
SO_2	225.9	264.9	39	40	No
VOC	7.21	44.3	37	40	No

Notes:

a. "TPY" means tons per year.

b. Baseline actual emissions were calculated based on the highest consecutive 2-year average reported in the air operating report for each pollutant during the years 2000 to 2009. Projected actual emissions are based on worst-case engine/flare combination. The increase from the project is the difference between the projected and baseline actual emissions.

c. With regard to particulate matter with a mean particle diameter of 2.5 microns or less ($PM_{2.5}$), the Department adopted by reference the federal ambient air quality standard for $PM_{2.5}$, but has not yet promulgated the implementing regulations for PSD preconstruction review (e.g., define $PM_{2.5}$ as a PSD pollutant with a significant emission rate for PSD applicability). We are in the process of completing a rulemaking action to implement this remaining piece of the $PM_{2.5}$ program.

As shown in the table, the project is subject to PSD preconstruction review for CO, NO_X and PM/PM_{10} in accordance with the provisions of Rule 62-212.400, F.A.C. Therefore, BACT determinations are required for CO, NO_X and PM/PM_{10} emissions. An air quality modeling analysis is required for CO, nitrogen dioxide (NO_2) and PM_{10} emissions.

3. PROJECT DETAILS

Landfill Gas Availability

The Medley Landfill currently generates approximately 4,000 scfm of landfill gas (LFG), which is being controlled by two existing flares: a 6,000 scfm enclosed flare and a 3,000 scfm open flare. Each engine can fire approximately 588 scfm of landfill gas per engine for a total of 3,528 scfm total for six engines. This is approximately 5.08 million standard cubic feet per day (MMscf per day). The current landfill gas generating capacity is adequate to fuel and power all six engines. According to the landfill gas projection recovery model (gas curves), the future estimated landfill production rate is estimated to be 7,317 scfm by the year 2025.

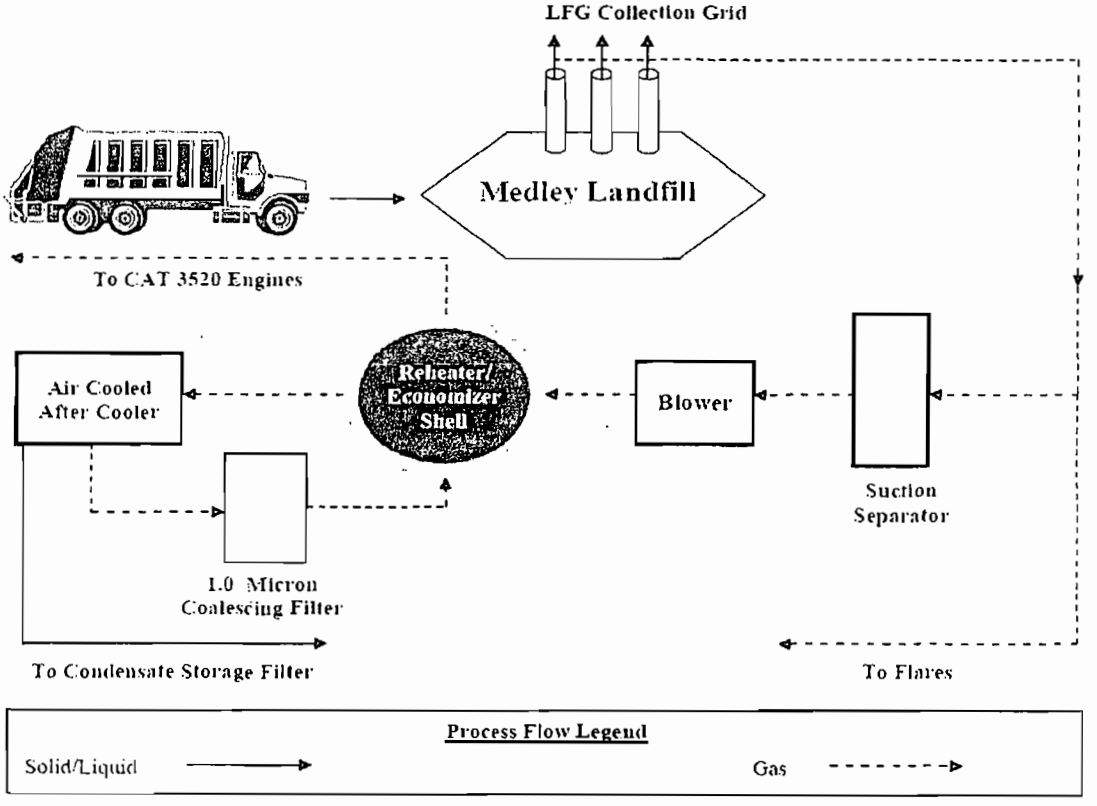
Treatment of Landfill Gas

The equipment and processes used to treat (dewater, filter and compress) the collected landfill gas prior to its combustion as fuel in the proposed engines will consist of the following.

- Landfill gas will pass through the suction separator, which is used for moisture knockout and mechanically filters the gas in the initial portion of the treatment system.

- Landfill gas enters the blowers, which supply the compressor. The heat of compression increases the temperature of the gas.
- Landfill gas in excess of the engines design capacity bypasses the treatment system prior to being routed to the flares for destruction.
- Landfill gas is dewatered by cooling the gas in the after-cooler to condense remaining water vapor in the landfill gas to condensate.
- Landfill gas passes through a coalescing filter to remove particles down to 1 micron. The cooled and filtered gas is then reheated in the re-heater/economizer to vaporize any remaining moisture before being fired in the engines.

Attachment 1: Process Flow Diagram – LFG Treatment System for Medley Landfill



CAT G3520C Engines/Generator Specifications (EU 006 – EU 011)

Each of the six identical CAT Model G3520C engines/generators sets will have the following specifications:

- Each engine is designed to fire low-pressure, lean fuel mixtures (lean-burn) and produce low combustion by-product emissions. Each engine is equipped with an air-to-fuel ratio controller to monitor engine performance parameters and automatically adjust the air-to-fuel ratio and ignition timing to maintain efficient fuel combustion, which also minimizes air pollutant emissions.
- Each engine will be fired exclusively with landfill gas generated by and received from the Medley Landfill.
- Each engine will fire a maximum of approximately 588 scfm of landfill gas.
- Each engine will have power generation rating of 2,233 brake horsepower (bhp).
- Each engine will be connected to an electrical generator rated at 1.6 MW, nominal.