Derenzo and Associates, Inc.
Environmental Consultants

November 19, 2007

Ms. Trina Vielhauer, Bureau Chief
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

Subject: Brevard Energy, LLC, File No. 0090069-004-AC
PSD Air Construction Permit Application for Significant Modification to landfill gas fueled electricity generation facility

Dear Ms. Vielhauer:

Derenzo and Associates, Inc. (Derenzo and Associates), on behalf of Brevard Energy, LLC, is submitting to the Florida Department of Environmental Protection, Division of Air Resource Management four (4) copies of an Air Construction Permit application for significant modifications to the permitted landfill gas (LFG) fueled internal combustion (IC) engine electricity generation facility at the Brevard County Central Disposal Facility in Brevard County Florida (Air Construction Permit 0090069-004-AC, PSD-FL-378).

A check payable to the Florida Department of Environmental Protection for $7,500 is attached to this cover letter with an original set of signed permit application forms. This fee is required 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 copies of the completed Department of Environmental Protection Division of Air Resources Management Application for Air Permit - Long Form (original signed documents are attached to this cover letter).

Sincerely,

DERENZO AND ASSOCIATES, INC.

Robert L. Harvey
Engineering Services Manager

enclosures

c: Scott Salisbury, Brevard Energy, w/enclosure

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Environmental Consultants

AIR CONSTRUCTION PERMIT APPLICATION FOR SIGNIFICANT MODIFICATIONS TO PERMIT NO. PSD-FL-378 ISSUED BREVARD ENERGY, LLC AT THE BREVARD COUNTY SOLID WASTE MANAGEMENT CENTRAL DISPOSAL FACILITY

Brevard Energy, LLC
29261 Wall Street
Wixom, Michigan 48393

November 2, 2007

DAI Project No. 0705011

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SOLID WASTE MANAGEMENT CENTRAL DISPOSAL FACILITY

1.0 INTRODUCTION

Brevard Energy, LLC (Brevard Energy) has been issued Air Construction Permit 0090069-004-AC, PSD-FL-378 (Permit PSD-FL-378) for the construction and operation of an electricity generation facility, which will result in the beneficial use of landfill gas (LFG) that is generated by the Brevard County Solid Waste Management Central Disposal Facility (Central Disposal Facility).

Conditions of Permit PSD-FL-378, which was issued on March 6, 2007, require that Brevard Energy sample and analyze the LFG (fuel) generated at the Central Disposal Facility for its sulfur content and report the analytical results as a sulfur dioxide (SO_2) emission factor in terms of pound per million standard cubic feet of landfill gas (i.e., the quantity of gas that is consumed as fuel). The results of these analyses, which are required to be completed at least 180 days prior to commercial startup of the engine generator sets and semi-annually, indicate that calculated SO_2 emission factors (based on the results of the site-specific LFG sample analyses) exceed the existing permit limit for SO_2 of 27.5 lb/MMscf [Section III – Emission Unit(s) Specific Conditions, B. Emission and Performance Requirements 6.].

Therefore, Brevard Energy requests that conditions of Permit PSD-FL-378 be modified to increase the SO_2 emission factor and emission rate that is allowed for the permitted facility. The magnitude of the SO_2 emission rate increase that is proposed for the permitted facility exceeds the Prevention of Significant Deterioration (PSD) significant emission rate threshold for SO_2 of 40 tons per year (TpY) as defined by Florida Administrative Code (F.A.C.) Chapter 62-212 *Stationary Sources-Preconstruction Review* (i.e., the proposed SO_2 emission factor results in a potential annual SO_2 emission rate increase that exceeds 40 TpY; the proposed permit revisions result in a major modification for a major carbon monoxide PSD source).

This technical support document contains data and information required by the regulatory agency to support the issuance of an Air Construction Permit for modifications to Permit PSD-FL-378 in accordance with the application submittal provisions of F.A.C. *62-210.900 Forms and Instructions*, *62-212.300 General Preconstruction Review Requirements*, and *62-212.400 Prevention of Significant Deterioration*.

In addition, Brevard Energy is requesting modifications to the compliance demonstration requirements specified in the permit for determination of PM_{10} emissions.

Derenzo and Associates, Inc. (Derenzo and Associates) was retained by Brevard Energy to prepare Air Construction Permit Application documents for modifications to Permit PSD-FL-378.

Mr. Michael Laframboise, Vice President of Operations for Landfill Energy Systems (parent company of Brevard Energy), authorized the preparation of the Air Construction Permit Application documents.

Appendix A provides a complete *Department of Environmental Protection Division of Air Resource Management Application for Air Permit – Long Form* for modifications to Permit PSD-FL-378.

Appendix B provides Permit PSD-FL-378 issued the Brevard Energy LFG fueled IC engine electricity generation facility.

2.0 PROPOSED PERMIT MODIFICATIONS FOR SULFUR DIOXIDE

Brevard Energy requests that Permit PSD-FL-378 be modified to:

1. Increase the existing limit of SO_2 from each engine/generator from 27.5 lb/MMscf to 75.65 lb/MMscf (which is equivalent to a LFG sulfur content of 455 ppmv H_2S) and specify that the limit is based on a 12-month operating period (see section 3.4 Proposed SO_2 Emission Factor of this document).

2. Indicate that compliance with the 75.65 lb/MMscf limit is based on the average (rolling average of consecutive measurements) of at least two (2) LFG samples collected and analyzed for sulfur bearing compounds each calendar year.

3. Incorporate a short-term limit of SO_2 from each engine/generator of 91.44 lb/MMscf (which is equivalent to a LFG sulfur content of 550 ppmv H_2S), which is compliant with the 3-hour and 24-hour SO_2 PSD and NAAQS ambient air quality standards (see section 7.0 Air Quality Impact Analyses of this document).

3.1.2 Heating Value Requirement

A fuel having a minimum LHV of approximately 420 Btu/scf (467 Btu/scf HHV) 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 Central Disposal Facility is expected to range from 450 to 550 Btu/scf over the operating life of the permitted electricity generation facility (the corresponding HHV of the gas is expected to range from 500 to 612 Btu/scf).

3.2 CAT® G3520C Gas IC Engine

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

Appendix D provides technical data (Caterpillar, Inc. equipment operating specifications) for the CAT® Model G3520C gas engine.

The permitted six (6) identical lean-burn CAT® Model G3520C gas IC engines will power electricity generators.

The CAT® G3520C gas IC engine has a power generation rating of 2,233 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 14.11 million Btu per hour (MMBtu/hr), which is derived from the 235,181 Btu/min specification and equivalent to a HHV fuel operating requirement of 15.69 MMBtu/hr. However, the footnote presented in this data sheet indicates that the LHV rate specification has a tolerance (i.e., actual operating condition values may vary from those specified by the manufacturer).

Data obtained from actual CAT® G3520C gas IC engine base load operations indicate that the heat input rate value:

1. Specified in the Caterpillar Gas Engine Technical Data is low (i.e., lower than the heat input rate measured during actual engine operations).

2. For the engine is approximately 14.64 MMBtu/hr (16.27 MMBtu/hr HHV).

At the HHV input rate of 16.27 MMBtu/hr and minimum fuel heating value requirement of 467 BTU/scf HHV, the permitted CAT® G3520C gas IC engines will each have a

maximum fuel use rate of approximately 581 scfm and 34,860 standard cubic feet per hour (scfh).

3.3 Permitted SO_2 Emission Factor

Comprehensive sulfur content analyses for the LFG generated by the Central Disposal Facility were not available for use (at the time permit application documents were initially prepared for the project) in determining a site-specific SO_2 emission factor for the Brevard Energy LFG fueled electricity generation facility. 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) and supplied by Derenzo and Associates (i.e, results of hydrogen sulfide tests performed on LFG samples collected from numerous landfills) were used to estimate the total potential sulfur content of the LFG to be used as IC engine fuel.

The data from this analysis (review of published information and historical test results from other landfills) resulted in a LFG total sulfur content calculation of 164.2 ppmv as hydrogen sulfide (H_2S), which is equivalent to a SO_X (as SO_2) emission rate of 27.5 lb/MMscf of fuel based on the complete oxidation of the fuel-bound sulfur compounds during the combustion process.

Permit PSD-FL-378 specifies that *The emission rate of SO_2 from each engine/generator set exhaust shall not exceed 27.5 lb/MMscf.*

3.4 Proposed SO_2 Emission Factor

Section III – Emission Unit(s) Specific Conditions, C. Test Methods and Procedures 3. of Permit PSD-FL-378 specifies that *The permittee shall comply with the following requirements to monitor the sulfur ... content of the landfill gas:*

At least 180 days prior to commercial startup of the engines, the permittee shall sample and analyze the landfill gas for sulfur ... content. The gas sample collected for the analyses shall be a composite sample and collected under normal operating conditions ... Results shall be reported as SO_2 ... emission factors in terms of lb/MMscf of landfill gas.

Therefore, Brevard Energy obtained samples of the LFG generated by the Central Disposal Facility in February, April and October 2007. The SO_2 emission factors developed from the analysis of these LFG samples are:

1) 62.57 lb/MMscf of LFG (376.3 ppm as H_2S) for the February 2007 measurements (which is based on actual measurements of H_2S, dimethyl sulfide and methyl mercaptan).

2) 44.53 lb/MMscf of LFG (267.9 ppm as H_2S) for the April 2007 measurements (which is based on actual measurements of H_2S and methyl mercaptan).

3) 75.65 lb/MMscf of LFG (455.0 ppm as H_2S) for the October 2007 measurements (which is based on actual measurements of H_2S, dimethyl sulfide and methyl mercaptan).

Numerous sulfur-bearing compounds (those listed in AP-42 and others listed in modified ASTM D5504) were considered in the analyses performed on the collected LFG samples. However, none of these sulfur-bearing compounds (except H_2S, dimethyl sulfide, and methyl mercaptan) were detected at concentrations that exceed the detection limit of the analytical method (MDL). Therefore, the contributions of all non-detected sulfur bearing compounds were not considered in the calculated SO_2 emission factors. The SO_2 emission factors for the analyzed samples were calculated based on the:

- Measured concentration for any detected compounds; and

- Default concentration value for any sulfur-bearing compounds published by USEPA in AP-42 Section 2.4, Municipal Solid Waste Landfills that were not detected above the MDL (i.e., the emission factor calculation did not include all the sulfur-bearing compounds listed in the analytical report, only common sulfur-bearing LFG constituents that are listed in AP-42).

Based on the LFG sulfur content analyses that are presented in this document, Brevard Energy requests that conditions of Permit PSD-FL-378 be modified to increase the allowed SO_2 emission factor for the LFG fueled IC engine operations to 75.65 lb/MMscf of LFG (i.e., the highest of the three LFG sulfur content analyses).

The elevated LFG sulfur (H_2S) contents appears to be from the disposal of construction and demolition debris that was placed in the Central Disposal Facility from cleanup activities associated with hurricane damage. Sulfate reducing bacteria present in the landfill produce H_2S from metabolizing calcium sulfate, the main component of gypsum wallboard.

Table 2 presents a summary of analytical results for the collected LFG samples and calculated SO_2 emission factors.

Appendix C provides the laboratory analytical reports and calculations for the LFG sulfur sampling performed in February, April and October 2007.

4.0 SO_2 EMISSION RATES

Appendix E provides SO_2 emission rate calculations for the CAT® G3520C gas IC engine operations.

4.1 Permitted SO_2 Emission Rates

Table 3 presents permitted SO_2 emission rates for the CAT® G3520C gas IC engine operations.

The operation of six (6) CAT® G3520C gas IC engines under base load conditions (100% design capacity, 2,233 bhp), with a maximum fuel use rate of 3,486 scfm and SO_2 emission factor of 27.5 lb/MMscf of LFG results in a facility mass emission rate of 23.5 TpY of SO_2.

4.2 Proposed SO_2 Emission Rates

Table 4 presents proposed SO_2 emission rates for the CAT® G3520C gas IC engine operations.

The operation of six (6) CAT® G3520C gas IC engines under base load conditions (100% design capacity, 2,233 bhp), with a maximum fuel use rate of 3,486 scfm and SO_2 emission factor of 75.65 lb/MMscf of LFG results in a facility mass emission rate of 69.3 TpY of SO_2.

4.3 SO_2 Emission Rate Increase

The permitted Brevard Energy LFG fueled IC engine electricity generation facility is a major source of carbon monoxide (CO) under State and federal PSD permitting programs.

FAC *62-212.400, Prevention of Significant Deterioration* (PSD), provides procedures that are required to be used to calculate air pollutant emission increases for new (and modified) equipment and processes at an existing major source.

Existing flaring systems have been the primary means of controlling the LFG that is generated by the Central Disposal Facility. When the permitted electricity generation facility is made operational:

1. LFG generated at the landfill will primarily be controlled through its treatment and use as fuel to power the IC engine generator-sets (as opposed to flaring, which wastes the energy value of the LFG); and

2. The LFG fueled IC engine operations (new emission units) will affect the volume of gas fired in the flaring operations (existing emission units).

Therefore, the increase in SO_2 emissions at the stationary source may be determined based on the provisions of FAC 62-212.400(2)(a)(3), *Hybrid Test for Multiple Types of Emission Units* (i.e., Baseline Actual to Projected Actual Applicability Test for Modifications at Existing Emission Units and Baseline Actual to Potential Applicability Test for Construction of New Emission Units).

A significant emission increase of a PSD pollutant (SO_2) occurs if the sum of the emissions for all emission units is equal to or exceeds the significant emission rate for that pollutant (i.e., 40 TpY for SO_2).

4.3.1 Baseline Actual Emissions

Since the gas generated by the Central Disposal Facility contains sulfur bearing compounds, similar amounts of SO_2 emissions will be created during the combustion of LFG in any control device (i.e., the IC engines and flares will theoretically produce the same amount of SO_2 per volume of LFG combusted).

Baseline Actual Emissions have been determined based on the:

1. Average SO_2 emission factor calculated from the results of the site specific LFG sample sulfur bearing compound analyses (as presented in Section 3.4 Proposed SO_2 Emission Factor of this document, which is 60.92 lb/MMscf of LFG, based on an average sulfur content of 366.4 ppmv as H_2S); and

2. Flaring system operating records for the most recent two-year operating period (July 2005 through June 2007), which were provided by the Central Disposal Facility and result in an averaged LFG flaring system control rate of 2,183 scfm.

Baseline Actual Emissions (SO_2) for the existing flaring operations have been calculated to be 34.9 TpY.

Baseline Actual Emissions for the permitted LFG fueled IC engines are zero (i.e., the equipment and processes did not operate).

Appendix F provides operating records for the Central Disposal Facility LFG flaring system.

4.3.2 Projected Actual and Potential Emissions

Projected Actual and Potential Emissions (SO_2) that will be produced at the Central Disposal Facility are dependent on the:

1. Amount of LFG that will be generated by the landfill, collected with the LFG extraction system and controlled with the flaring system or IC engines; and

2. Concentrations of sulfur bearing compounds that are present in the LFG (i.e., measured actuals and maximum potentials).

The Central Disposal Facility LFG control system consists of two flares that have a combined total control capacity of 4,720 scfm total. This control capacity has been determined (by the Central Disposal Facility) to be adequate for the life of the landfill based on its permitted design capacity (i.e., the Central Disposal Facility permitted capacity is not expected to generate more than 4,720 scfm of collectable LFG).

The FDEP-DARM issued the Central Disposal Facility a revision to its Title V Operating Permit in 2004 that allowed for the installation and operation of a third LFG flare, which was installed to provide redundancy for the existing LFG control systems. While the third flare provides additional LFG control capacity, the potential LFG control requirement for the landfill remains at 4,720 scfm of collectable LFG.

Projected Actual Emissions have been determined based on:

1. The average SO_2 emission factor calculated from the results of the site specific LFG sample sulfur bearing compound analyses (as presented in Section 3.4 Proposed SO_2 Emission Factor of this document, which is 60.92 lb/MMscf of LFG, based on a sulfur content of 366.4 ppmv as H_2S);

2. An expected fuel consumption rate of 3,253 scfm for the LFG fueled IC engines, which is based on the anticipated LFG LHV of 450 Btu/scf (an increase in LFG heating value above the minimum required value of 420 Btu/scf proportionally decreases the amount of LFG required to operate the engines); and

3. An expected LFG control rate of 1,467scfm for the Central Disposal Facility flaring system, which is based on the difference between 4,720 and 3,253 scfm (i.e., the balance of the potential amount of LFG generated by the Central Disposal Facility).

Therefore, Projected Actual Emissions (SO_2) for the

1. LFG fueled IC engines have been calculated to be 52.1 TpY.

2. Central Disposal Facility flaring systems have been calculated to be 23.5 TpY.

Potential Emissions have been determined based on:

1. The maximum SO_2 emission factor calculated from the results of the site specific LFG sample sulfur bearing compound analyses (as presented in Section 3.4 Proposed SO_2 Emission Factor of this document, which is 75.65 lb/MMscf of LFG, based on a sulfur content of 455.0 ppmv as H_2S);

2. A maximum potential fuel consumption rate of 3,486 scfm for the LFG fueled IC engines, which is based on the minimum LFG LHV of 420 Btu/scf; and

3. An expected LFG control rate of 1,234 scfm for the Central Disposal Facility flaring system, which is based on the difference between 4,720 and 3,486 scfm (i.e., the balance of the potential amount of LFG generated by the Central Disposal Facility).

Therefore, Potential Emissions (SO_2) for the:

1. LFG fueled IC engines have been calculated to be 69.3 TpY.

2. Central Disposal Facility flaring system have been calculated to be 24.5 TpY.

4.3.3 Significant Emission Increase Analyses

Table 5 presents Baseline Actual, Projected Actual and Potential Emissions (SO_2) for the Central Disposal Facility emission units.

The difference between the Central Disposal Facility Baseline Actual and:

1. Project Actual SO_2 emissions is 40.6 TpY.

2. Potential SO_2 emissions is 58.9 TpY.

Therefore, the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine operations is significant (i.e., the specified emission increases exceed the PSD permitting program 40 TpY SO_2 significance threshold).

5.0 APPLICABLE RULES AND REGULATIONS

5.1 State of Florida

The following text presents Florida Administrative Code (F.A.C.), Chapter 62 regulatory requirements that are applicable to the proposed increase in allowed SO_2 emissions.

5.1.1 Air Pollution Permit Application Procedure

F.A.C. *62-4.050 Procedure to Obtain Permits and Other Authorizations; Applications.*, 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 completed Application for Air Permit – Long Form documents for the specified modifications to Permit PSD-FL-378.

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

(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 specified modifications to Permit PSD-FL-378.

(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.

Landfill Energy Systems check no. 19753 for $7,500 (made payable to the Florida Department of Environmental Protection) has been attached to the original set of permit application forms.

5.1.2 NAAQS Attainment / Nonattainment / Maintenance Areas

F.A.C. *62-204.340 Designation of Attainment, Nonattainment, and Maintenance Areas*, identifies areas that are designated as nonattainment or maintenance for criteria air pollutants. No areas in the State of Florida are designated nonattainment or maintenance

for sulfur dioxide (i.e., Brevard County is in attainment with SO_2 ambient air quality standards).

5.1.3 Prevention of Significant Deterioration Area Designations

62-204.360 Designation of Prevention of Significant Deterioration Area., F.A.C, specifies that all of the State of Florida is designated as a PSD area for sulfur dioxide. In addition:

(a) ... All areas of the state are classified as Class II except ...
(b) ... The following areas of the state are designated as Class I ...
1. Everglades National Park.
2. Chassahowitzka Wilderness Area.
3. St. Marks National Wilderness Area.
4. Bradwell Bay National Wilderness Area.

(5) Federally designated Class I areas outside of Florida but within 100 kilometers of the state are as follows:.
(a) Okefenokee National Wilderness Area.
(b) Wolf Island National Wilderness Area.

5.1.4 Adopted Federal Regulations

62-204.800 Federal Regulations Adopted by Reference., F.A.C., lists the following federal regulations that are applicable to the operation of the permitted LFG fueled IC engine electricity generation facility:

(3) ... Approval and Promulgation of Implementation Plans ...
*(b) ...Subpart K, Florida ...*Delegation of Authority to issue federal PSD permits.

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

Section 5.2 Federal Regulations of this document provides information that indicates the proposed modifications to the permitted LFG fueled IC engine electricity generation facility are compliant with 40 CFR 72, Subpart A - I requirements (i.e., the proposed increase in allowable SO_2 emissions will not affect Federal Acid Rain Program compliance).

5.1.5 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 4.3.3 Significant Emission Increase Analyses of this document presents information that indicates the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine operations is significant (i.e., the specified emission increases exceed the PSD permitting program 40 TpY SO_2 significance threshold). Therefore, results of a public comment period are required to be considered in the permit approval process.

5.1.6 Prevention of Significant Deterioration

62-212.400 Prevention of Significant Deterioration (PSD)., F.A.C, specifies that:
(2) Applicability ...
(f) Pollutants Subject to PSD Preconstruction.
1. ... for a proposed new facility or modification subject to the preconstruction review requirements of this rule ... the preconstruction review requirement shall apply to all pollutants regulated under the Act for which the sum of potential emissions ... of the facility or modification would be greater than the significant emission rates listed in Table 212.400-2, Regulated Air Pollutants – Significant Emission Rates ...which specifies that 40 TpY of sulfur dioxide is a significant emission rate.

Section 4.3.3 Significant Emission Increase Analyses of this document presents information that indicates the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine operations is significant (i.e., the specified emission increases exceed the PSD permitting program 40 TpY SO_2 significance threshold).

(4) General Provisions.
(a) Facilities or Modifications Affecting Class I Areas.
1. Additional Notification Requirements.
a. The Department shall comply with ... additional notification requirements for a proposed new facility or modification that would be located within 100 kilometers of, or whose emissions may affect, any Federal Class I area ... (Federal Land Manager Participation)

Section 8.1 (Visibility Degradation) of this document presents information that indicates that no Class I areas are located within 100 kilometers of the site of the permitted LFG fueled IC engine electricity generation facility.

(5) Preconstruction Review Requirements.
(a) General. ...
(c) Best Available Control Technology
The proposed facility or modification shall apply Best Available Control Technology (BACT) for each pollutant subject to preconstruction review requirements ...

Section 4.3.3 Significant Emission Increase Analyses of this document presents information that indicates the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine operations is significant (i.e., the specified emission increases exceed the PSD permitting program 40 TpY SO_2 significance threshold). Therefore, the requested permit modifications require that BACT be applied to the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine - generator sets.

Section 6.0 BACT Emission Control Analyses of this document provides BACT analyses for the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine - generator sets.

(d) Ambient Impact Analyses.
The owner or operator of the proposed facility or modification shall demonstrate to the Department that the increase in federally enforceable allowable emissions from the proposed facility or modification ... will not cause or contribute to a violation of any ambient air quality standard or maximum allowable increase.

62-204.240 Ambient Air Quality Standards., F.A.C., and *62-204.260 Prevention of Significant Deterioration Increments.*, F.A.C., present applicable limits for the Ambient Air Impact Analyses.

Section 7.0 Air Quality Impact Analyses and Appendix G of this document provide results of ambient air impact analyses for the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine - generator sets.

(e) Additional Impact Analyses.

1. The owner or operator of the proposed facility or modification shall provide the Department with analyses of:

a. The impairment to visibility and soils, and vegetation ...

b The air quality impact projected for the area as a result of general commercial, residential, industrial and other growth associated with the facility or modification; and.

c. The impairment to visibility of ... any Federal Class I area within 100 kilometers of the facility ...

(f) Preconstruction Air Quality Monitoring and Analysis.

The owner or operator of the proposed facility or modification shall provide the Department with an analysis of ambient air quality in the area that the facility or modification would affect for each pollutant subject to NSR requirements ...

Section 8.0 Additional Impact Analyses of this document provides additional impact analyses (impairment to soils, vegetation; and air quality impact projected for the area) for the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine - generator sets.

Cocoa, Florida is located over 100 kilometers from the:

1. Everglades National Park.
2. Chassahowitzka Wilderness Area.
3. St. Marks National Wilderness Area.
4. Bradwell Bay National Wilderness Area.
5. Okefenokee National Wilderness Area.
6. Wolf Island National Wilderness Area.

Therefore, Federal Class I visibility impact analyses are not required to be performed for the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine - generator sets.

(h) Permit Application Information Required ...

1. A description of the nature, location, design capacity and typical operating schedule of the facility or modification, including specifications and drawings showing its design and plant layout;

2. A detailed schedule for construction of the facility or modification;

3. A detailed description of the system of continuous emission reduction proposed by the facility or modification as BACT, emission estimates and any other information as necessary to determine BACT would be applied ...

4. Information relating to the air quality impacts of the facility or modification ...

5. Information relating to the air quality impacts of, and the nature and extent of, all general commercial, residential, industrial and other growth ...in the area the facility or modification would affect.

6. A good-engineering-practice stack height ... analysis ...

Sections 1.0 (Introduction) to 8.0 (Additional Impact Analyses) of this document provide the Permit Application Information Required for the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine - generator sets.

(6) Best Available Control Technology (BACT)..

(a) BACT Determination ...

Section 6.0 (BACT Emission Control Analyses) of this document provides a BACT analysis for the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine - generator sets.

5.2 Federal Regulations

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. New unit exemption provisions of §72.7 specify that utility units:

1. Having a total nameplate capacity of 25 MW or less;

2. Not burning coal or coal-derived fuel; and

3. Burning gaseous fuel with an annual average sulfur content of 0.05% by weight or less,

However, units fired with landfill gas are specifically exempt from the Acid Rain Program, except for its notification and recordkeeping requirements (§§72.2 through 72.7 and §§72.10 through 72.13).

Since the permitted IC engines are fueled exclusively with LFG (i.e., natural gas is not used as a supplement fuel) the proposed increase in allowed SO_2 emissions for the LFG fueled IC engine generator sets is not subject to the Federal Acid Rain Program.

6.0 BACT EMISSION CONTROL ANALYSES

The following text provides analyses of process design, operating practices and best available emission control devices (applicable Best Available Control Technology, BACT) that were considered in determining the appropriate pollution control strategies for the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine - generator sets.

6.1 General Information

Oxides of sulfur (SO_X) have the potential to be emitted from the operation of the permitted IC engines since sulfur-bearing compounds are present in the LFG that is used as fuel. SO_X emissions are a function of gas composition (sulfur content) as opposed to combustion technology (i.e., any form of gas combustion, flaring or IC engine operation, will result in an equivalent emission rate of SO_X per unit of fuel burned).

The gas treatment system designed for the permitted IC engine operations will filter and dewater recovered LFG to produce a viable fuel. As a result of the high solubility of H_2S in water, it is suspected that the gas treatment system for the permitted IC engine operations will remove a portion of the H_2S delivered to the equipment. Since no data exist on the H_2S removal efficiency of the gas treatment system, analyses (emission and control) that are presented in this permit application have been performed based on a conservative expectation that all of the sulfur in the LFG generated by the Central Disposal Facility has the potential to be released as SO_2 by control system combustion processes.

6.2 USEPA RACT/BACT/LAER Clearinghouse

Data in the USEPA Office of Air Quality Planning and Standards RACT / BACT / LAER Clearinghouse (RBLC) were reviewed to identify SO_2 BACT determinations that have been recorded for LFG fueled electricity generation processes.

Appendix H provides USEPA RBLC data (and supporting information) that have been recorded for LFG fueled electricity generation processes (Process codes 17.140 and 17.150). The specified data search, which reviewed information available through October 25, 2007, identified 11 associated determinations.

The specified USEPA RBLC records present information and SO_2 emissions in a variety of measurement units (e.g., pounds per hour per engine, pounds per cubic foot of gas burned, tons per year, etc.). Therefore, the USEPA RBLC SO_2 emission rates were converted to pounds per million Btu heat input (lb/MMBtu) based on the engine heat input value specified in the record or estimated heat input value calculated from data presented in the

records (e.g., engine horsepower). The converted USEPA RBLC records correlate to LFG fueled electricity generation processes with SO_2 emission rates that range from 0.01 lb/MMBtu to 0.14 lb/MMBtu.

None of the USEPA RBLC records indicate that sulfur removal (or any other means of control) was used to achieve the range of specified emission rate. Only three (3) of the USEPA RBLC records provide information on LFG H_2S contents.

The maximum SO_2 emission rate in the specified USEPA RBLC data (i.e., 0.14 lb/MMBtu for MM Hackensack Energy, L.L.C.) correlates to a fuel (LFG) with a sulfur content of approximately 400 ppmv as H_2S (which was estimated based on a nominal LFG heating value of 500 Btu/scf).

6.3 Technically Feasible Emission Control System Evaluation

The most effective means of reducing SO_X emissions from gas-fired combustion equipment is to remove the amount of sulfur that is present in the fuel. Post combustion controls (exhaust stack add-on emission control systems) are typically not used to reduce SO_2 emissions from gaseous fuel combustion devices. Low-cost chemical additives, which cannot be applied to the treatment of LFG, have been developed to treat sludge and reduce the sulfur content of digester gas to fuel IC engines.

Commercially-available systems have been used to remove sulfur from LFG combustion processes that use gaseous fuels which contain high concentrations of sulfur. These technologies are similar to that used in the natural gas industry to sweeten sour natural gas and:

1. Control SO_X emissions by the adsorption or reaction of sulfur-bearing compounds in the fuel to be burned; and

2. Typically consist of adsorber vessels that are packed with sulfur-scavenging material or reactive chemicals that converts the gaseous sulfur compounds to an inert material.

These systems are either regenerative (the reactive component is regenerated in another part of the system) or non-regenerative (the spent reactant is periodically replaced with new reactant).

Therefore, four (4) commercially available sulfur removal systems were reviewed and selected for evaluation based on:

1. Independent research that was performed to identify equipment and processes that had been successfully implemented; and

2. Information compiled by the FDEP-DARM in its review of a permit application for the Okeechobee Landfill gas to energy project (i.e., documents obtained from the FDEQ-DARM that were associated with Air Construction PSD Permit Application No. 1270-2).

The specified evaluations consisted of analyses to quantify the annualized control system capital and operating costs and determine the control system SO_2 reduction costs (i.e., dollars per ton of SO_2 reduced on an annual basis). The control system capital and operating costs were evaluated based on the continuous treatment of a LFG fuel that is supplied at a rate of 3,486 scfm and contains a maximum H_2S concentration of 455 ppmv with the use of:

- Information provided by equipment vendors.

- Air pollution control equipment cost estimation methods that are presented in the USEPA Office of Air Quality Planning and Standards (OAQPS) *Control Cost Manual, 5th Edition*.

- Representative utility (electricity) and maintenance costs.

- Estimated costs that are associated with spent media (reactant) removal, disposal and replacement.

Table 6 presents results of operating and capital recovery costs analyses performed for LFG SO_2 emission control systems.

6.3.1 SulfaTreat® Sulfur Scavenging Process

SulfaTreat® is a sulfur scavenging process that has been successfully used in sour natural gas and LFG applications. The system uses two vertical vessels in series (a lead vessel, which is also referred to as the primary; and a lag vessel, which is also referred to as the polisher) that are packed with SulfaTreat® media, an inert granular substrate coated with iron oxide. Hydrogen sulfide in the inlet gas reacts with the iron oxide to form iron pyrite, a chemically-stable solid material. Once the SulfaTreat® media in the lead vessel becomes saturated, it is moved to the lag position by redirecting the gas flow through the system. The saturated vessel is then scheduled for media replacement. The system is designed to allow media change-out while the system remains on-line (i.e., there is no disruption of gas delivery to the combustion process). The spent media is removed from the vessel using a

vacuum truck equipped with a high-pressure water pump and collected in a container (dumpster) for disposal in a landfill. Once the spent media is replaced, the vessel is returned to service as the lag vessel in the series.

MI SWACO (Chesterfield, Missouri), an authorized SulfaTreat® distributor, has provided information that indicates a treatment system designed for the Brevard Energy LFG fueled electricity generation facility requires six (6) sets of vessels in lead/lag configuration (12 vessels total). Each vessel would have a diameter of 10 feet and be filled with 14.8 feet of SulfaTreat® media (72,000 pounds per vessel). Initial capital costs, which include equipment installation and media, are estimated at $988,220.

Primary vessel saturation would occur after approximately 240 days of service based on a system inlet H_2S concentration of 455 ppmv. The equipment vendor provided an original estimate that was based on a fuel stream that contains 500 ppmv of H_2S; therefore, the specified media service life has been recalculated for a fuel stream that contains 455 ppmv of H_2S. Once the primary vessels become saturated, they would be scheduled for media replacement. The equipment vendor has provided information that indicates that:

1. The activities associated with the media replacement cost $2,600 vessel (i.e., labor, equipment contracting for vacuum truck with high-pressure water pump and media disposal); and

2. Replacement of the SulfaTreat® media costs $36,720 per vessel (which includes shipping charges) based on current product pricing details.

Incremental additional utility costs for the implementation and operation of the SulfaTreat® system have been estimated and considered in the evaluation based on the increased load that would be placed on the gas mover (blower) to compensate for the pressure drop across the packed vessels placed in series (which is estimated at 2 psig).

Nominal costs for taxes, insurance, labor and maintenance have also been estimated and considered in the evaluation.

Results of analyses performed for the installation and operation of the SulfaTreat® system indicate that operating and capital recovery costs (based on a 15-year equipment service life) exceed $539,000 per year, or $8,191 per ton of SO_2 reduced.

Appendix I-1 provides equipment vendor information and emission reduction control cost calculations for the installation and operation of a SulfaTreat® system.

6.3.2 Gas Technology Products Desulfurization Processes

Gas Technology Products, a division of Merichem Chemicals & Refinery Services, L.L.C., has developed a number of desulfurization technologies to remove sulfur from sour gas streams. Based on the LFG flowrate and sulfur content specifications required for the Brevard Energy LFG fueled electricity generation facility, Gas Technology Products (Schaumburg, Illinois) has:

1. Determined that its LO-CAT® product line can be implemented (as an applicable technology); and

2. Provided estimated capital and operating costs for an appropriately sized LO-CAT® II process.

Budgetary costs were also provided by Gas Technology Products for its Sulfur-Rite® process, which is a non-regenerative iron oxide-based system that is sold in packaged units. The capital and operating costs provided for the Sulfur-Rite® process exceed those for the LO-CAT® II system. Therefore, a further evaluation of the Sulfur-Rite® process was not performed.

The LO-CAT® II system has been:

1. Successfully used in large volume LFG applications, most notably at the Broward County (Florida) Landfill, to treat a gas stream that contains up to 5,000 ppmv H_2S at a flowrate of 15 MMscf/dy (which is equivalent to 10,400 scfm).

2. Evaluated by the FDEP-DARM and determined by the regulatory agency to be technically and economically feasible for the treatment of a LFG stream that contains up to 5,800 ppmv H_2S at a flowrate of 15,000 scfm, which will be used to fuel gas turbine engines at the Okeechobee Landfill in Okeechobee County, Florida.

The LO-CAT® II process is a wet scrubbing, liquid reduction-oxidation (redox) system that converts H_2S to elemental sulfur using an environmentally safe, chelated iron catalyst solution. The system consists of an adsorber vessel that converts H_2S to elemental sulfur and an oxidizer vessel that regenerates the catalyst. Gas Technology Products has provided information that indicates the estimated cost of the LO-CAT® equipment package is $1,090,000. Initial capital costs, which include equipment installation and chemicals, are estimated at $1,579,000.

The catalyst is continuously regenerated by the oxidation reaction and the system is designed to run continuously with no disruption in gas delivery to the combustion process.

Gas Technology Products estimates that the cost for the operation of the system is $170 per ton of sulfur removed (which includes caustic chemical addition, replacement of chelated iron that is lost in the sulfur removal process, and replacement of degraded chelating agents).

Based on the design criteria specified for the Brevard Energy LFG fueled electricity generation facility (3,486 scfm LFG at an inlet H_2S concentration of 455 ppmv) 32.9 tons of sulfur will be removed annually, which results in a chemical replacement cost of approximately $5,600. The equipment vendor provided an original estimate that was based on a fuel stream that contains 500 ppmv of H_2S; therefore, the specified chemical replacement costs were recalculated for a fuel stream that contains 455 ppmv of H_2S.

The LO-CAT® II process produces a waste stream in the form of a 65% (by weight) sulfur filter cake. The removal of 32.9 TpY of sulfur results in approximately 50 TpY of process waste (filter cake) that must be handled. The equipment vendor claims that this material is inert and, in some cases, may be mixed with fertilizers and ground-applied. The property leased from the Central Disposal facility by Brevard Energy for its LFG fueled electricity generation facility is relatively small and not sufficiently sized for the ground-application of filter cake. Brevard Energy has no ownership relationship with the Central Disposal Facility and has made no contractual arrangements for waste disposal or composting at the landfill. Therefore, any waste material generated by the specified LFG treatment system would require appropriate disposal in a landfill at an estimated cost of $40 per ton.

Incremental additional utility costs for the operation of the LO-CAT® II system have been estimated and considered in the evaluation based on an electrical operating requirement of 17 kW and the increased load that would be placed on the gas mover (blower) to compensate for the pressure drop across the packed vessels placed in series (which is estimated at 2 psig).

Nominal costs for taxes, insurance, labor and maintenance have also been estimated and considered in the evaluation.

Results of analyses performed for the installation and operation of the LO-CAT® II system indicate that operating and capital recovery costs (based on a 15 year equipment service life) exceed $292,000 per year, or $4,451 per ton of SO_2 reduced.

Appendix I-2 provides equipment vendor information and emission reduction control cost calculations for the installation and operation of the LO-CAT® II and Sulfur-Rite® systems.

6.3.3 H2SPLUS SYSTEM

Mtarri/Varani, LLC (Golden, Colorado) has developed a chemobiofilter (the H2SPLUS system) that uses vessels packed with an iron sponge media to remove H_2S. The iron sponge consists of an organic media (wood chips) impregnated with iron oxide that is seeded with bacteria and kept moist using sprinkler heads mounted inside the vessel. A sump collects the drained fluids that are recycled to the top of the vessel by a pump. Landfill gas is passed downward through the iron sponge and the H_2S reacts to form iron pyrite. The bacteria oxidize the pyrite to form iron oxide and elemental sulfur. While a portion of the iron oxide is regenerated by this process, the iron sponge media eventually becomes spent and is replaced with new media. The spent media is dried and disposed of in a landfill.

Mtarri/Varani has provided information that indicates a treatment system designed for the Brevard Energy LFG fueled electricity generation facility should consist of four (4) fiberglass vessels. Each vessel would have a diameter of 12 feet and be filled with 7 feet of iron sponge media. Initial capital costs for the system are estimated at $254,400, which include four (4) vessels with 3,150 cubic feet of iron sponge media, some vessel interconnect and distribution piping, fresh air blower, a concrete sump and four (4) water recirculation pumps. Oxygen is required for the biological reaction (oxidation of the pyrites to iron oxide and sulfur). Since LFG contains minimal oxygen, the system would be equipped with a blower that introduces fresh air into the fuel gas stream. Consequently, explosion-proof sample pumps and gas oxygen monitors have been added to the system as safety options. Costs have been estimated for:

- Foundation, piping and freight (which were not included in the Mtarri/Varani proposal); and

- Direct and indirect installation costs based on default factors presented in the USEPA OAQPS Control Cost Manual.

Therefore, the total installation cost (total capital investment) for the H2SPLUS system is estimated to be $470,640.

Iron sponge saturation would occur after approximately 207 days of service based on an inlet H_2S concentration of 455 ppmv. The equipment vendor estimated 186 days for a fuel stream containing 500 ppmv H_2S; therefore, the media life of the system was recalculated for 455 ppmv H_2S. Prior to its removal, the spent media must be water soaked for 24 hours. The system is not designed for continuous operation during media replacement; therefore, the LFG fueled electricity generation process are required to be shutdown during the media soak and replacement period (estimated to be 36 hours per vessel). Lost

revenues were calculated for the media change-out period and included in the analyses as an operating cost expense for the pollution control system based on:

1. Electricity generation capacity (9.6 MW); and

2. Terms of the power purchase agreement, which according to Brevard Energy, values the electricity at $74 per MW-h for the power purchase price and tax credit.

Replacement iron sponge media (which includes estimated shipping/freight) will cost $31,950 per change-out for the four (4) vessels based on current product pricing. The equipment vendor did not provide a cost for the activities that are required to support the replacement media change-out costs. Therefore, an estimate cost of $2,600 per vessel was used for labor, equipment contracting (crane and vacuum truck with high-pressure water lances) and media disposal (this is the value that was provided by the SulfaTreat® vendor).

The H2SPLUS system requires the continuous operation of a fresh air blower, four sump pumps and monitoring/control systems. An annual electricity consumption rate of 20 kW was used to calculate the power requirement for this equipment

Incremental additional utility costs for the implementation of the H2SPLUS system have been estimated and considered in the evaluation based on an electrical operating requirement and the increased load that would be placed on the gas mover (blower) to compensate for the pressure drop across the packed vessels (which is estimated at 0.5 to 1 psig).

Nominal costs for taxes, insurance, labor and maintenance have also been estimated and considered in the evaluation.

The information provided by Mtarri/Varani indicates that the system operator is required to add (on a weekly basis) minor amounts of bacterial nutrients and that excess water from the vessel sprinkler system is required to be pumped to drain. The cost of these activities and the additional loading on the landfill's leachate treatment system are unknown and were not included in the operating cost analysis.

Results of analyses performed for the installation and operation of the H2SPLUS system indicate that operating and capital recovery costs (based on a 15 year equipment service life) exceed $268,000 per year, or $4,000 per ton of SO_2 reduced.

Mtarri/Varani offered a reference for its system used in a LFG fuel application at the Cape May Landfill in New Jersey. A representative of the Cape May Landfill (Mr. Manny Solheim) was contacted and indicated that the H2SPLUS iron sponge system is used to

treat LFG from the Cape May Landfill that contains 1800 ppmv H_2S, which is used to fuel a single Waukesha IC engine and is designed for a maximum flowrate of 150 scfm of LFG.

Appendix I-3 provides equipment vendor information and emission reduction control cost calculations for the installation and operation of the H2SPLUS system.

6.4 LFG Fueled IC Engine SO_2 Emission BACT

The USEPA RBLC database did not contain any records that specified sulfur emission controls were determined to economically feasible for the control of SO_2 emissions from LFG fueled electricity generation processes. Based on the limited amount of data that is contained in the USEPA RBLC for the control of SO_2 emissions from LFG fueled electricity generation processes, LFG fueled IC engines have been issued permits by regulatory agencies that allow the use of fuels with up to 400 ppmv H_2S without requirements for additional controls.

A limited number of facilities operate with systems that remove sulfur from recovered LFG prior to its use as fuel to power IC engine generator sets. Results of the control analyses that are presented in this document indicate that (for the systems evaluated) annual operating and capital costs are equal to or greater than $4,000 per ton of SO_2 reduced. Total treatment costs (per ton of SO_2 reduced) are inversely proportional to the amount of sulfur required to be removed from the gas. Therefore, the specified systems are typically used to treat recovered LFG that contains significantly more amounts of sulfur than that contained in the LFG recovered from the Central Disposal Facility. Results for samples collected from the Central Disposal Facility (which are presented in Section 2.4 of this document and Table 2) indicate that its maximum LFG sulfur contain is 455 ppmv H_2S (total sulfur bearing compounds as H_2S). Information obtained from equipment vendors and the FDEP-DARM, indicate that the:

1. LO-CAT® II system is being used at Florida landfills for the control of LFG that contains 5,000-5,800 ppmv H_2S; and

2. H2SPLUS system is being used at New Jersey landfills for the control of LFG that contains 1,800 ppmv H_2S.

While the analyses presented in this document indicate that the H2SPLUS system has the most cost effective LFG sulfur removal system, the equipment design is relatively new and the equipment vendor only has details on its successful implementation at a facility that treats a small volumetric flowrate (150 scfm) of LFG (which is significantly less than the maximum 3,486 scfm LFG flowrate specified for Brevard Energy).

The quotations provided by MI SWACO (SulfaTreat®) and Gas Technology Products (LO-CAT® II and Sulfur-Rite®) are for systems designed for continuous operation that have no gas delivery interruptions, which are associated with system regeneration or media change-out activities. The H2SPLUS system proposed by Mtarri/Varani requires that the sulfur removal media (iron sponge) be taken off-line and it be soaked with water for a period of 24 hours prior to replacement. Based on the information provided by Mtarri/Varani, it appears that the company (compared to the other equipment vendors) does not have a lot of experience with large revenue producing LFG to energy projects or sour natural gas sweetening projects. Additional research is required in order to determine whether the H2SPLUS system can be reliably upgraded (scaled up) to meet the design and operating specification of the Brevard Energy LFG fueled IC engines.

The FDEP-DARM has provided information that indicates an emission control system that can be implemented and operated at a cost less than $4,000 per ton of SO_2 emission reduced is generally considered to be economically feasible. Therefore, the economic analyses that are presented in this document indicate that the use of LFG fuel with sulfur concentrations that are equal to or less than 455 ppmv H_2S to produce electricity satisfies BACT for SO_2 emissions.

7.0 AIR QUALITY IMPACT ANALYSES

Analyses submitted in support of the issuance of Permit PSD-FL-378 indicate that emissions from the combined operation of the LFG control flares and LFG fueled electricity generation facility result in maximum ambient air quality impact concentrations that are below the Class II significant impact level for all pollutants and averaging times.

Revised air quality impact analyses have been performed for the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine - generator sets. These analyses indicate that off-site ambient air SO_2 impacts exceed significance levels with the combustion of LFG that contains greater than approximately 400 ppmv H_2S. Therefore, multi-source ambient air SO_2 impact analyses were performed to evaluate the cumulative impacts produced by background sources (major sources located within 75 km of the SO_2 significant impact area) and the Central Disposal Facility equipment and processes based on the combustion of LFG that contains up to:

1. 550 ppm H_2S (91.44 lb SO_2/MMscf) on a short-term basis that was used to demonstrate compliance with 3-hr and 24-hr SO_2 ambient air standards; and

2. 455 ppm H_2S (75.65 lb SO_2/MMscf) on an annual average that was used to demonstrate compliance with the annual SO_2 ambient air standard.

Table 7 presents the results of the revised SO_2 emission air quality impact analyses.

Appendix G provides details on the revised SO_2 emission air quality impact analyses.

8.0 ADDITIONAL AIR IMPACT ANALYSES

Federal and State of Florida PSD regulations require (in addition to appropriate air pollutant emission BACT and air quality impact demonstrations) that new major sources address air quality issues that pertain to visibility degradation, and vegetation, soil and growth impacts.

8.1 Visibility Degradation

Significant emission increases at major sources that have the potential to impair visibility in any Federal Class I area are required to perform analyses to demonstrate the acceptability of the proposed 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 Brevard Energy LFG fueled electricity generation facility (which is located in Geneva, Florida) is the Chassahowitzka Wilderness Area, which is located over 160 kilometers (100 miles) west of Cocoa.

The Everglades National Park (Florida), (Florida), St. Marks National Wilderness Area (Florida), Bradwell Bay National Wilderness Area (Florida), Okefenokee Wilderness Area (Georgia) and Wolf Island National Wilderness Area (South Carolina) are all Class I areas that are located over 100 kilometers from the Central Disposal Facility and Brevard Energy.

Based on the general experience of USEPA and state regulatory agencies with visibility analyses performed for similar emission sources and the distance from the Central Disposal Facility and Brevard Energy to the Chassahowitzka Wilderness Area, it is expected that the plume from the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine - generator sets will not have an adverse impact on visibility in the Chassahowitzka Wilderness Area. The Class I area visibility criteria established by USEPA and specified in *62-204.260 Prevention of Significant Deterioration.*, F.A.C., are expected to be maintained under general and worst-case emission and transport scenarios.

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 the revised air quality analyses (Table 7 and Appendix G) indicate that the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine - generator sets will produce predicted impacts that are below the associated secondary NAAQS.

A time dependent amount of methane-rich gas is generated at the Central Disposal Facility, which is required to be controlled through its combustion. Both flaring and IC engines create LFG combustion by-product air pollutant emissions (SO_2). 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 increase in allowed SO_2 emissions proposed for the LFG fueled IC engine - generator sets.

8.3 Growth Impacts

The permitted electricity generating facility will employ up to two people. This work force will be obtained from existing residences in the general Cocoa, Florida area.

The location of the permitted electricity generation facility (Brevard Energy) is the result of the generation of LFG at the Central Disposal Facility. Therefore, the availability of existing alternative fuel resources had no influence in the selection of the proposed facility site. The operation of the permitted electricity generation with the proposed SO_2 emission modifications will not produce commercial growth in the Cocoa, Florida area at levels greater than normal rates, which are dependent on general economical conditions. The permitted facility will interconnect to the Florida Power & Light distribution network through a nearby power line. This power will be use to satisfy electricity demands within the general area. Therefore, insignificant amounts of air pollutant emissions will occur

from residential and commercial construction and growth, and other activities associated with the operation of the permitted electricity generation with the proposed SO_2 emission modifications.

Based on the location of the Central Disposal Facility (i.e., a relatively rural area), emission configuration of the permitted electricity generation facility and magnitude of associated SO_2 air quality impacts, a significant portion of the applicable PSD increments are available to the Cocoa, Florida area. Therefore, sufficient air resources are expected to be available to support future growth in the Cocoa, Florida area relative to PSD increment consuming pollutants.

8.4 Alternative Sites Analysis

Based on the location of the fuel source for the permitted electricity generation facility (i.e., the LFG fuel for the IC engine operations is generated by the Central Disposal Facility), 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 2,200 scfm of unused LFG is currently being generated by the Central Disposal Facility and controlled (combusted) in the existing open flares, which wastes the energy value of the methane-rich gas.

The size of the permitted electricity generation facility is governed by the amount of fuel that can be recovered from the Central Disposal Facility. The number and size of the permitted IC engine - generator sets (power generation mechanism) has been selected based on its ability to best utilize the LFG fuel generated by the Central Disposal Facility (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 permitted project result in electricity generation inefficiencies (i.e., inefficiencies in the utilization of available LFG as a fuel).

The permitted facility will produce 9.6 MW of electricity and will interconnect to the Florida Power & Light 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 regulated air pollutant emissions will occur at the permitted 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.

The promulgation of the American Jobs Creation Act of 2004 (Act) also encouraged the development of electricity generation projects that utilize LFG fuel. Section 710 of the Act designates landfill gas-to-energy facilities that are placed in operation prior to January 1, 2006 as 'qualifying facilities' relative to tax credits that are reserved for electricity produced from renewable energy sources. The date of operation to satisfy the 'qualifying facilities' criteria has been extended to December 31, 2007.

9.0 PM_{10} COMPLIANCE DEMONSTRATION REQUIREMENTS

Conditions of Permit PSD-FL-378 require that PM_{10} emission measurements for the engine generator exhausts be performed in accordance with USEPA Reference Method 201 (Section III, Condition C.2.f). The size of the Method 201 cyclone sampling apparatus relative to the engine generator exhaust stack diameter (maximum 18 inches), elevated exhaust gas temperatures (in excess of 900°F) and high exhaust gas moisture content (approximately 13%) may make the application of Method 201 undesirable for these landfill gas-fueled engines.

USEPA Reference Method 5, *Determination of Particulate Matter Emissions from Stationary Sources*, and Method 202, *Determination of Condensable Particulate Matter Emissions from Stationary Sources* has been used in the U.S. as an alternative to USEPA Method 201. All of the particulate matter (filterable and condensable) measured using this methodology (combined Method 5/202 sample train) is conservatively reported as PM_{10}.

USEPA has developed a draft test method, which uses dry impingers, that is purported to reduce the measured condensable particulate matter bias caused by sulfur compounds in the exhaust gas stream. Based on information posted on the USEPA Technology Transfer Network (TTN) Emissions Measurement Center (EMC) website, the agency is evaluating test data from the use of this method and is considering posting these procedures on its website as a test method that may be used with case-by-case approval.

Therefore, Brevard Energy is requesting that Section III, Condition C.2.f be modified to allow the option to use alternate test methods for determination of PM_{10} emissions with approval from the Emissions Monitoring Section.

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Table 1. Design and operating specifications for the permitted LFG fueled CAT® G3520C IC Engine Generator Set IC engine - generator sets

Operating Parameter	CAT® G3520C IC Engine Generator Set	
Number of identical units	1	6
Power generation (bhp)	2,233	13,398
Electricity generation (kW)	1,600	9,600
Heat input rate (LHV MMBtu/hr)[1]	14.64	87.84
Heat input rate (HHV MMBtu/hr)[1]	16.27	97.62
Fuel consumption[2] (scfm)	581	3,486
Exhaust gas temperature (°F)	900	-
Average exhaust flowrate (acfm)	12,050	-
Average exhaust flowrate[3] (dscfm)	4,150	-
Average exhaust oxygen content (% dry)	8.5	-
Average exhaust exist velocity (fps)	110	-
Exhaust stack diameter (inches)	18	-
Exhaust stack release height (feet)	20	-
Building height (feet)	15	-

Notes

1. Information previously presented in application for Permit No. PSD-FL-378.
2. Maximum volumetric fuel consumption rate based on minimum fuel heat value of 420 Btu/scf LHV.
3. Corrected to dry standards conditions (70°F).

Table 2. Results of Central Disposal Facility LFG sulfur content analyses and SO_2 emission factor calculations

Analyte	Molecular Formula	USEPA AP-42 Default Concentration (ppmv)	Measured Concentration Feb. 2007 (ppmv)	April 2007 (ppmv)	Oct. 2007 (ppmv)
Hydrogen sulfide	H_2S	35.50	360.0	250.0	440.0
Carbon disulfide	CS_2	0.58	ND	ND	ND
Carbonyl sulfide	CSO	0.49	ND	ND	ND
Dimethyl sulfide	C_2H_6S	7.82	4.20	ND	4.40
Ethyl mercaptan	C_2H_6S	2.28	ND	ND	ND
Methyl mercaptan	CH_4S	2.49	8.20	6.10	6.70
Total sulfur[1]	as H_2S		376.3	267.9	455.0
SO_2 Emission Factor (lb/MMscf)[2]			62.57	44.53	75.65

Notes

ND Not detected above analytical detection limits.

1. Total sulfur content based on measured and USEPA default values (default value was used in place of ND).
2. Emission factor per million cubic feet of landfill gas combusted. Assumes complete conversion of fuel bound sulfur to SO_2.

Table 3. Permitted SO_2 emission rates for the CAT® G3520C gas IC engine operations

Air Pollutant	Emission Factor	One CAT® G3520C Gas IC Engine (lb/hr)	One CAT® G3520C Gas IC Engine (TpY)	Six CAT® G3520C Gas IC Engines (TpY)
SO_2	27.5 lb/MMscf[1]	0.96[A]	4.20[A]	25.3[A]

Notes
1. Specified in Permit PSD-FL-378.
A. Not specified in permit, based on maximum fuel consumption rate of 581 scfm per engine; 8,760 hours per year. Emission rate calculations are provided in Appendix E

Table 4. Proposed SO_2 emission rates for the CAT® G3520C gas IC engine operations

Air Pollutant	Emission Factor	One CAT® G3520C Gas IC Engine (lb/hr)	One CAT® G3520C Gas IC Engine (TpY)	Six CAT® G3520C Gas IC Engines (TpY)
SO_2	75.65 lb/MMscf[1]	2.64[A]	11.55[A]	69.3[A]

Notes
1. Sulfur dioxide emission factor based on LFG sulfur content of 455 ppmv as H_2S.
A. Based on maximum fuel consumption rate of 581 scfm per engine; 8,760 hours per year. Emission rate calculations are provided in Appendix E

Table 5. Baseline Actual, Projected Actual and Potential SO_2 emissions for the Central Disposal Facility emission units

Process	LFG/Fuel Flowrate (scfm)	LFG SO_2 Emission Factor (lb/MMscf)	SO_2 Emission Rate (TpY)	SO_2 Emission Increase From Baseline (TpY)
Baseline Actual Emissions				
LFG Flares	2,183 [A]	60.92 [B]	34.9	
IC Engines	0	0	0	
Total Source	2,183	60.92	34.9	--
Projected Actual Emissions				
LFG Flares	1,467	60.92	23.5	
IC Engines	3,253	60.92	52.1	
Total Source	4,720 [C]	60.92	75.6	40.6
Potential Emissions				
LFG Flares	1,234	75.65 [D]	24.5	
IC Engines	3,486	75.65	69.3	
Total Source	4,720 [C]	75.65	93.8	58.9

Notes

A. Actual average flowrate based on facility records for most recent 24-month period (see Appendix F).
B. Average emission factor from February, April and October 2007 LFG sampling events. Used as representative for historical operations.
C. Projected maximum LFG generation rate for lifetime of Central Disposal Facility based on permitted capacity and existing facility design.
D. Sulfur dioxide emission factor based on proposed maximum LFG sulfur content of 455 ppmv as H_2S.

Table 6. Results of operating and capital recovery costs analyses performed for LFG SO_2 emission control systems

Technology / System	Total Capital Investment	Annual Operating Costs	Total Annualized Costs	SO_2 Reduced[1] (TpY)	Annualized SO_2 Reduction Cost[2] ($/ton)
SULFA-TREAT®	$988,220	$430,633	$539,134	65.8	$8,191
LO-CAT®II	$1,579,000	$119,629	$292,994	65.8	$4,451
Sulfur-Rite®	NA	NA	NA	NA	NA
H2SPLUS	$470,640	$216,749	$268,423	65.8	$4,078

Notes

NA The Sulfur-Rite® system is distributed by Gas Technology Products, the same company that distributes the LO-CAT®II system. Capital and operating costs for the Sulfur-Rite® system were higher than those for the LO-CAT®II system, therefore, further analyses for the Sulfur-Rite® system were not performed.

1. Based on an average H_2S removal efficiency of 95%.
2. Calculations and vendor information provided in Appendix I.

Table 7. Results of the revised SO_2 emission air quality impact analyses

SO_2 Averaging Period	Combined Impact Flares and IC Engines ($\mu g/m^3$)	Class II Significant Impact ($\mu g/m^3$)	Maximum Multisource Impact[1] ($\mu g/m^3$)	Allowable PSD Class II Increment ($\mu g/m^3$)	Cumulative Ambient Air Concentration[2] ($\mu g/m^3$)	Ambient Air Quality Standard[3] ($\mu g/m^3$)
3-hr	25.2	25.0	289	512	326	1300
24-hr	10.1	5.0	77.7	91	93.6	260
Annual	0.80	1.0	NA	NA	NA	NA

Notes

NA Annual average SO_2 impacts are less than the Class II Significant Impact Concentration. No further analysis is required.

1. Includes the Brevard Energy facility, existing LFG combustion sources at the Brevard County Landfill and appropriate PSD increment-consuming sources identified by the Florida DEP.
2. Maximum cumulative ambient air concentration produced by the Brevard County Landfill sources, appropriate background sources and measured background pollutant concentrations.
3. Florida Ambient Air Quality Standards specified in Rule 62-204.240(a)(b)(c).

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 a proposed project:

- subject to prevention of significant deterioration (PSD) review, nonattainment area (NAA) new source review, or maximum achievable control technology (MACT) review; or
- where the applicant proposes to assume a restriction on the potential emissions of one or more pollutants to escape a federal program requirement such as PSD review, NAA new source review, Title V, or MACT; or
- at an existing federally enforceable state air operation permit (FESOP) or Title V permitted facility.

Air Operation Permit – Use this form to apply for:

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

Air Construction Permit & Revised/Renewal Title V Air Operation Permit (Concurrent Processing Option) – Use this form to apply for both an air construction permit and a revised or renewal Title V air operation permit incorporating the proposed project.

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: Brevard Energy, LLC	
2. Site Name: Brevard Energy	
3. Facility Identification Number: 0090069-004-AC, PSD-FL-378	
4. Facility Location... Street Address or Other Locator: 2250 Adamson Road City: Cocoa County: Brevard Zip Code: 32926	
5. Relocatable Facility? ☐ Yes ☒ No	6. Existing Title V Permitted Facility? ☐ Yes ☒ No (landfill – yes)

Application Contact

1. Application Contact Name: David Derenzo
2. Application Contact Mailing Address Organization/Firm: Derenzo and Associates, Inc. Street Address: 39395 Schoolcraft Road City: Livonia State: MI Zip Code: 48150
3. Application Contact Telephone Numbers... Telephone: (734) 464 - 3880 ext. Fax: (734) 464 - 4368
4. Application Contact Email Address: dderenzo@derenzo.com

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	11-21-07
2. Project Number(s):	009 0069 - 004 - AC
3. PSD Number (if applicable):	PSD-FL-378A
4. Siting Number (if applicable):	

APPLICATION INFORMATION

Purpose of Application

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

Air Construction Permit

[X] Air construction permit.

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

Brevard Energy, LLC has been issued a PSD Air Construction Permit for the operation of a landfill gas fired electricity generation facility. Analysis of the landfill gas (fuel) generated at the Central Disposal Facility for its sulfur content indicate the calculated sulfur dioxide (SO_2) emission factors exceed the existing permit limit for SO_2 of 27.5 lb/MMscf.

Therefore, Brevard Energy requests that conditions of Permit PSD-FL-378 be modified to increase the SO_2 emission factor and emission rate that is allowed for the permitted facility. The magnitude of the SO_2 emission rate increase that is proposed for the permitted facility exceeds the Prevention of Significant Deterioration (PSD) significant emission rate threshold for SO_2 of 40 tons per year (TpY).

In addition, Brevard Energy is requesting modifications to the compliance demonstration requirements specified in the permit for determination of PM_{10} emissions.

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Proc. Fee
EU No. 004- 009	Six (6) identical landfill gas fueled IC engines and electricity generators (Caterpillar Model G3520C)	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 :
   David R. Derenzo

2. Owner/Authorized Representative Mailing Address:
   Organization/Firm: Derenzo and Associates, Inc.
   Street Address: 39395 Schoolcraft Road
   City: Livonia State: Michigan Zip Code: 48150

3. Owner/Authorized Representative Telephone Numbers...
   Telephone: (734) 464 – 3880 ext. Fax: (734) 464 – 4368

4. Owner/Authorized Representative Email Address: dderenzo@derenzo.com

5. Owner/Authorized Representative Statement:

   I, the undersigned, am the owner or authorized representative of the facility 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 requirements identified in this application to which the facility 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.

   Signature

   November 7, 2007
   Date

APPLICATION INFORMATION

Application Responsible Official Certification

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

1. Application Responsible Official Name:
   Scott Salisbury (Managing Member)

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.

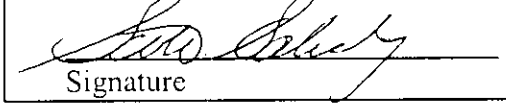
3. Application Responsible Official Mailing Address...
   Organization/Firm: Brevard Energy, L.L.C.
   Street Address: 29261 Wall Street
   City: Wixom State: MI Zip Code: 48393

4. Application Responsible Official Telephone Numbers...
   Telephone: (248) 380 - 3920 ext. Fax: (248) 380 – 2038

5. Application Responsible Official Email Address: Scott.Salisbury@landfillenergy.com

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

November 8, 2007
Date

APPLICATION INFORMATION

Professional Engineer Certification

1. Professional Engineer Name: Jeffery L. Pope, P.E.
   Registration Number: 53815
2. Professional Engineer Mailing Address.
   Organization/Firm: Burns & McDonnell
   Street Address: 1431 Opus Place, Suite 400
   City: Downers Grove State: IL Zip Code: 60515-1164
3. Professional Engineer Telephone Numbers.
   Telephone: (630) 724-3328 ext. Fax: (630) 724 - 3201
4. Professional Engineer Email 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

11/16/07
Date

(seal)

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

* Attach any exception to certification statement.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates... Zone 17 East (km) 516.749 North (km) 3140.571		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) 28/23/35.63 Longitude (DD/MM/SS) 80/49/43.80	
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 : Electricity generation facility is located on leased land at the Central Disposal Facility (east of landfill).			

Facility Contact

1. Facility Contact Name: Michael Laframboise
2. Facility Contact Mailing Address... Organization/Firm: Landfill Energy Systems Street Address: 29261 Wall Street City: Wixom State: MI Zip Code: 48393
3. Facility Contact Telephone Numbers: Telephone: (248) 380-3920 ext. Fax: (284) 380-2038
4. Facility Contact Email 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: Scott Salisbury
2. Facility Primary Responsible Official Mailing Address... Organization/Firm: Brevard Energy, LLC Street Address: 29261 Wall Street City: Wixom State: MI Zip Code: 48393
3. Facility Primary Responsible Official Telephone Numbers... Telephone: (248) 380 – 3920 ext. Fax: (248) 380 – 2038
4. Facility Primary Responsible Official Email Address: Scott.Salisbury@landfillenergy.com

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 permitted Brevard Energy LFG fueled IC engine electricity generation facility is a major source of carbon monoxide (CO) under State and federal PSD permitting programs.	

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
PM10	B	N
SO2	B	N
HAPS	B	N
H106	SM	Y

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 No.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
H106	Y			10	ESCMACT

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

The 36 ton per year (TpY) gas engine total VOC emission is based on a voluntary limitation that is 90% of the 40 TpY significant emission threshold. The CAT® G3520C 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. Therefore, flexibility in establishing an allowable limit is required to ensure ongoing compliance over all engine fuel quality and mechanical operating conditions.

Brevard Energy experience (based on emission testing performed by Landfill Energy Systems on similar LFG fueled engines) indicates that the AP-42 default LFG constituent concentrations overestimate the potential HCl content of the gas generated at the Central Disposal Facility. Therefore, Brevard Energy will restrict the allowed HCl emissions from the proposed engine operations to less than 10 TpY through appropriate permit limits.

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 D [ ] 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: Page 12a [ ] Previously Submitted, Date: _____

Additional Requirements for Air Construction Permit Applications

1. Area Map Showing Facility Location:
   [X] Attached, Document ID: Appendix D [ ] Not Applicable (existing permitted facility)
2. Description of Proposed Construction or Modification:
   [X] Attached, Document ID: Technical Document, Section 2
3. Rule Applicability Analysis:
   [X] Attached, Document ID: Technical Document, Sections 5 - 7
4. List of Exempt Emissions Units (Rule 62-210.300(3)(a) or (b)1., F.A.C.):
   [X] Attached, Document ID: Page 12a [ ] Not Applicable (no exempt units at facility)
5. Fugitive Emissions Identification (Rule 62-212.400(2), F.A.C.):
   [ ] Attached, Document ID: _____ [X] Not Applicable
6. Preconstruction Air Quality Monitoring and Analysis (Rule 62-212.400(5)(f), F.A.C.):
   [X] Attached, Document ID: Appendix G [ ] Not Applicable
7. Ambient Impact Analysis (Rule 62-212.400(5)(d), F.A.C.):
   [X] Attached, Document ID: Appendix G [ ] Not Applicable
8. Air Quality Impact since 1977 (Rule 62-212.400(5)(h)5., F.A.C.):
   [X] Attached, Document ID: Appendix G [ ] Not Applicable
9. Additional Impact Analyses (Rules 62-212.400(5)(e)1. and 62-212.500(4)(e), F.A.C.):
   [X] Attached, Document ID: Technical Document, Section 8 [ ] Not Applicable
10. Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.):
    [ ] Attached, Document ID: _____ [X] Not Applicable

FACILITY INFORMATION

Additional Requirements for FESOP Applications

1. List of Exempt Emissions Units (Rule 62-210.300(3)(a) or (b)1., F.A.C.):
   ☐ 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 On site 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

Additional Requirements Comment

An Air Operation Permit (modification of the Central Disposal Facility Title V Permit) will be pursued as a separate permitting activity (as recommended by Mr. Jeff Koerner of the FDEP-DARM).

C. FACILITY ADDITIONAL INFORMATION

ATTACHMENT (12a)

Precautions to Prevent Emissions of Unconfined Particulate Matter

(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.

Brevard 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.

Exempt Emission Units

The IC engine lube oil (new and used) storage tanks are permit exempt emission units based on the type and quantities of stored material (and its very low vapor pressures).

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:

Six (6) CAT G3520C IC engine electricity generator sets (each with its own exhaust stack)

3. Emissions Unit Identification Number: EU 004 though 009

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C			49	☐ Yes ☒ No

9. Package Unit:
Manufacturer: Caterpillar, Inc. Model Number: G3520C

10. Generator Nameplate Rating: 1.6 MW (each engine generator set, 9.6 MW total capacity)

11. Emissions Unit Comment:

EU004 : ICE1 – stack1 (1.6 MW)
EU005 : ICE2 – stack2 (1.6 MW)
EU006 : ICE3 – stack3 (1.6 MW)
EU007 : ICE4 – stack4 (1.6 MW)
EU008 : ICE5 – stack5 (1.6 MW)
EU009 : ICE6 – stack6 (1.6 MW)

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description:

Add-on air pollutant emission controls will not be installed on the proposed electricity generation facility IC engines.

The CAT® G3520C gas IC engine 2.75 g/bhp-hr CO emission rate is based on the results of Best Available Control Technology (BACT) analyses (presented with the initial construction permit application in June 2006).

The CAT® G3520C gas IC engine 0.60 g/bhp-hr NO_X emission rate is based on the results of BACT analyses (presented with the initial construction permit application in June 2006).

The CAT® G3520C gas IC engine 0.24 g/bhp-hr PM10 emission rate is based on the results of BACT analyses (presented with the initial construction permit application in June 2006).

2. Control Device or Method Code(s):

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: 209,160 scf/hr (LFG fuel)	
2. Maximum Production Rate: 9.6 MW	
3. Maximum Heat Input Rate: 87.84 million Btu/hr (LHV)	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: hours/day 24 weeks/year 52	 days/week 7 hours/year 8,760

6. Operating Capacity/Schedule Comment:

14.64 MMBtu (LHV)/hr/engine maximum heat input
1.6 MW/hr/engine maximum electricity generation
34,860 scf/hr/engine maximum LFG fuel use

Base load (100% design capacity) engine –generator operations. The proposed facility will not produce electricity under partial load engine – generator operating conditions.

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 – ICE6	2. Emission Point Type Code: 1	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: Six (6) identical IC engine generators, each engine has an exhaust stack (6 exhaust stacks, 1 for each engine).		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: EU004 = ICE1 stack 1 EU007 = ICE4 stack 4 EU005 = ICE2 stack 2 EU008 = ICE5 stack 5 EU006 = ICE3 stack 3 EU009 = ICE6 stack 6		
5. Discharge Type Code: V	6. Stack Height: feet 20	7. Exit Diameter: feet 1.5
8. Exit Temperature: °F 900	9. Actual Volumetric Flow Rate: acfm 12,050	10. Water Vapor: %
11. Maximum Dry Standard Flow Rate: dscfm 4,150	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates... Zone: 17 East (km): 516.749 North (km): 3140.571	14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) 28/23/35.63 Longitude (DD/MM/SS) 80/49/43.80	
15. Emission Point Comment: Stack1-ICE1 Stack2-ICE2 Stack3-ICE3 Stack4-ICE4 Stack5-ICE5 Stack6-ICE6		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): Landfill gas used exclusively to fuel 6 IC engines Air pollutant emissions (g/bhp-hr) are related to engine base load horsepower (2233 hp/hr) or maximum fuel use pound per million cubic feet of gas consumed (lb/MMscf).		
2. Source Classification Code (SCC): 20100802	3. SCC Units: MMcf of gas	
4. Maximum Hourly Rate: 0.2092	5. Maximum Annual Rate: 1,832	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: 0.051	8. Maximum % Ash: 0	9. Million Btu per SCC Unit: 420 (LHV)
10. Segment Comment: Hourly and annual maximum fuel use rates for the operation of 6 IC engines based on fuel heating value of 420 Btu/scf (LHV). Sulfur content based on LFG containing 455 ppmv as H_2S.		

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
PM10			EL
SO2			EL
HAPS			EL
H106			EL

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete 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 permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: CO	2. Total Percent Efficiency of Control:
3. Potential Emissions: 81.24 lb/hour 355.8 tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 2.75 g/bhp-hr Reference: BACT	7. Emissions Method Code: 5

8. Calculation of Emissions:

(2.75 g/bhp-hr) (2233 bhp/ICE) / (453.6 g/lb) = 13.54 lb/hr per ICE

(13.54 lb/hr/ICE) (6 ICE) = 81.24 lb/hr for facility

(81.24 lb/hr) (8760 hr/yr) / (2000 lb/ton) = 355.8 tons/yr for facility

9. Pollutant Potential/Estimated Fugitive Emissions Comment:

13.54 lb/hour/engine, 59.3 tons/year/engine

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete 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 permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: NOX	2. Total Percent Efficiency of Control:
3. Potential Emissions: 17.72 lb/hour 77.6 tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 0.60 g/bhp-hr Reference: BACT	7. Emissions Method Code: 5

8. Calculation of Emissions:

(0.60 g/bhp-hr) (2233 bhp/ICE) / (453.6 g/lb) = 2.95 lb/hr per ICE

(2.95 lb/hr/ICE) (6 ICE) = 17.72 lb/hr for facility

(17.72 lb/hr) (8760 hr/yr) / (2000 lb/ton) = 77.62 tons/yr for facility

9. Pollutant Potential/Estimated Fugitive Emissions Comment:

2.95 lb/hour/engine, 12.9 tons/year/engine

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete 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 permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: VOC	2. Total Percent Efficiency of Control:
3. Potential Emissions: 8.22 lb/hour 36.0 tons/year	4. Synthetically Limited? [X] Yes [ ] No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference: 90% of 40 ton/year significance threshold	7. Emissions Method Code: 0

8. Calculation of Emissions:

(0.278 g/bhp-hr) (2233 bhp/ICE) / (453.6 g/lb) = 1.37 lb/hr per ICE

(1.37 lb/hr/ICE) (6 ICE) = 8.22 lb/hr for facility

(8.21 lb/hr) (8760 hr/yr) / (2000 lb/ton) = 36.0 tons/yr for facility

9. Pollutant Potential/Estimated Fugitive Emissions Comment:

1.37 lb/hour/engine, 6.0 tons/year/engine

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete 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 permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: PM10	2. Total Percent Efficiency of Control:
3. Potential Emissions: 7.08 lb/hour 31.0 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. Calculation of Emissions:

(0.24 g/bhp-hr) (2233 bhp/ICE) / (453.6 g/lb) = 1.18 lb/hr per ICE

(1.18 lb/hr/ICE) (6 ICE) = 7.08 lb/hr for facility

(7.08 lb/hr) (8760 hr/yr) / (2000 lb/ton) = 31.0 tons/yr for facility

9. Pollutant Potential/Estimated Fugitive Emissions Comment:

1.18 lb/hour/engine, 5.17 tons/year/engine

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete 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 permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: SO2	2. Total Percent Efficiency of Control:
3. Potential Emissions: 15.65 lb/hour 68.7 tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 75.65 lb/MMscf fuel burned (based on 455 ppm as H_2S)	7. Emissions Method Code: 2

8. Calculation of Emissions:

(455 scf H_2S/MMscf) (scf SO_2/scf H_2S) (64.06 lb SO_2/mol) / (385 scf/mol) = 75.65 lb/MMscf

(75.65 lb/MMcf) (581 cf/min) (60 min/hr) / (1 x 10^6) = 2.64 lb/hr per ICE

(2.64 lb/hr/ICE) (6 ICE) = 15.82 lb/hr for facility

(15.82 lb/hr) (8760 hr/yr) / (2000 lb/ton) = 69.3 tons/yr for facility

9. Pollutant Potential/Estimated Fugitive Emissions Comment:

2.64 lb/hour/engine, 11.55 tons/year/engine

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete 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 permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: HAPS	2. Total Percent Efficiency of Control:
3. Potential Emissions: 2.89 lb/hour 12.60 tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 13.8 lb/MMcf (AP-42 calculation)	7. Emissions Method Code: 3
8. Calculation of Emissions: (13.8 lb/MMcf) (581 cf/min) (60 min/hr) / (1 x 10^6) = 0.48 lb/hr per ICE (0.48 lb/hr/ICE) (6 ICE) = 2.89 lb/hr for facility (2.89 lb/hr) (8760 hr/yr) / (2000 lb/ton) = 12.6 tons/yr for facility	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: 0.48 lb/hour/engine, 2.11 tons/year/engine	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete 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 permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: H106	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour <10.0 tons/year	4. Synthetically Limited? [X] Yes [ ] No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 10.9 lb/MMscf (permitted limit)	7. Emissions Method Code: 2
8. Calculation of Emissions: (10.9 lb/MMcf) (581 cf/min) (60 min/hr) / (1 x 10^6) = 0.38 lb/hr per ICE (0.38 lb/hr/ICE) (6 ICE) = 2.28 lb/hr for facility (2.28 lb/hr) (8760 hr/yr) / (2000 lb/ton) = 10.0 tons/yr for facility	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: <1.66 tons/yr/engine, total <10.0 tons/year/facility	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete 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: CO 2.75 g/bhp-hr	4. Equivalent Allowable Emissions: 81.24 lb/hour 355.8 tons/year
5. Method of Compliance: Engine exhaust stack emissions testing (one engine annually)	
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: NOX 0.60 g/bhp-hr	4. Equivalent Allowable Emissions: 17.72 lb/hour 77.6 tons/year
5. Method of Compliance: Engine exhaust stack emissions testing (one engine annually)	
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: VOC 35.5 ppmvd as hexane 3% O2	4. Equivalent Allowable Emissions: 8.22 lb/hour 36.0 tons/year
5. Method of Compliance: Engine exhaust stack emissions testing (once every five years)	
6. Allowable Emissions Comment (Description of Operating Method): Rule 62-212.400	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete 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: 7.08 lb/hour 31.0 tons/year
5. Method of Compliance: Engine exhaust stack emissions testing (one engine annually)	
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: SO2 75.65 lb/MMscf	4. Equivalent Allowable Emissions: 15.82 lb/hour 69.3 tons/year
5. Method of Compliance: Engine fuel sulfur content analysis (semi-annually)	
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: ESCMACT	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: HAPS 27.3 lb/MMscf	4. Equivalent Allowable Emissions: lb/hour <25.0 tons/year
5. Method of Compliance: Engine fuel HAPs content analysis (gas sample semi-annually)	
6. Allowable Emissions Comment (Description of Operating Method): Rule 62-204.800	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete 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: ESCMACT	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: H106 <10.9 lb/MMscf	4. Equivalent Allowable Emissions: lb/hour <10.0 tons/year
5. Method of Compliance: Engine exhaust stack emissions testing (one engine annually)	
6. Allowable Emissions Comment (Description of Operating Method): Rule 62-204.800	

G. VISIBLE EMISSIONS INFORMATION

Complete 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: Engine exhaust stack emissions testing (one engine annually)	
5. Visible Emissions Comment: Rule 62-296.320 Experience obtained by manufacturers and operators of LFG fueled IC engines indicates that visible emissions from LFG fueled IC engines will be insignificant (emissions are not expected to be visible during normal engine operations).	

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 C [ ] 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: Section 3 [ ] Previously Submitted, Date _____

4. Procedures for Startup and Shutdown (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   [ ] Attached, Document ID: _____ [ ] Previously Submitted, Date _____
   [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)
   [ ] Attached, Document ID: [X] Previously Submitted, Date June 2006
   [ ] 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

   Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.

7. Other Information Required by Rule or Statute
   [X] Attached, Document ID: Sections 1 - 8 [ ] Not Applicable

EMISSIONS UNIT INFORMATION
Section [1] of [1]

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) [X] Attached, Document ID: Section 6.0 [ ] Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) [X] Attached, Document ID: Appendix G [ ] Not Applicable
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) [ ] Attached, Document ID: [X] Not Applicable (submitted with initial construction permit application)

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

5. Acid Rain Part Application
   - ☐ Certificate of Representation (EPA Form No. 7610-1)
     - ☐ Copy Attached, Document ID:_
   - ☐ Acid Rain Part (Form No. 62-210.900(1)(a))
     - ☐ Attached, Document ID:_____
     - ☐ Previously Submitted, Date:_____
   - ☐ Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
     - ☐ Attached, Document ID:_____
     - ☐ Previously Submitted, Date:_____
   - ☐ New Unit Exemption (Form No. 62-210.900(1)(a)2.)
     - ☐ Attached, Document ID:_____
     - ☐ Previously Submitted, Date:_____
   - ☐ Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
     - ☐ Attached, Document ID:_____
     - ☐ Previously Submitted, Date:_____
   - ☐ Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
     - ☐ Attached, Document ID:_____
     - ☐ Previously Submitted, Date:_____
   - ☐ Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
     - ☐ Attached, Document ID:_____
     - ☐ Previously Submitted, Date:_____
   - ☐ Not Applicable

APPENDIX B

COPY OF PERMIT NO. PSD-FL-378
ISSUED TO BREVARD ENERGY

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF FINAL PERMIT

In the Matter of an
Application for Permit

Mr. Scott Salisbury, Managing Member
Brevard Energy, LLC
29261 Wall Street
Wixom, Michigan 48393

DEP File No. 0090069-004-AC
PSD-FL-378

Enclosed is the FINAL Permit Number PSD-FL-378 for the installation of six (6) lean burn Caterpillar Model G3520C landfill gas fueled internal combustion engines at the Brevard County Solid Waste Management Central Disposal Facility in Cocoa, Brevard County. This permit is issued pursuant to Chapter 403, Florida Statutes (F.S.) and Rule 62-212.400, Florida Administrative Code (F.A.C.) for the Prevention of Significant Deterioration (PSD) of Air Quality.

Any party to this order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, F.S., by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Legal Office; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 (thirty) days from the date this Order is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

Trina L. Vielhauer, Chief
Bureau of Air Regulation

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF FINAL PERMIT (including the FINAL permit) and all copies were sent electronically (with Received Receipt) before the close of business on _____ to the person(s) listed:

Scott Salisbury, Trail Ridge Energy, LLC (scott.salisbury@landfillenergy.com)
Euripides Rodriguez, Director, SWMD (dgregory@seminolecountyfl.gov)
Gregg Worley, EPA (worley.gregg@epa.gov)
Dee Morse, NPS (dee_morse@nps.gov)
Len Kozlov, DEP-CD (leonard.kozlov@dep.state.fl.us)
Jeff Pope, P.E., Clayton Group Services, Inc. (jeff.pope@us.bureauveritas.com)
David Derenzo, Derenzo & Associates, Inc. (dderenzo@derenzo.com)

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

_____ _____
(Clerk) (Date)

FINAL DETERMINATION

Brevard Energy, LLC

Permit No. 0090069-004-AC; PSD-FL-378

Brevard County Solid Waste Management Central Disposal Facility

An Intent to Issue air construction permit to Brevard Energy, LLC for the installation of six landfill gas-fired engines at Brevard County Solid Waste Management Central Disposal Facility, Brevard County, was distributed on January 19, 2007. The Notice of Intent was published in the Florida Today on January 25, 2007. Copies of the draft construction permit were available for public inspection at the Department offices in Orlando and Tallahassee.

No comments were received from the applicant, public, EPA Region IV or the National Park Service.

The final action of the Department is to issue the permit as proposed.

Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Charlie Crist
Governor

PERMITTEE:

Brevard Energy, LLC
29261 Wall Street
Wixom, Michigan 48393

File No.	0090069-004-AC
Permit No.	PSD-FL-378
SIC No.	4953
Project:	Brevard County Solid Waste Management Central Disposal Facility Modification – Landfill Gas Engines
Expires:	October 1, 2008

Secondary Responsible Official (Energy Section):

Mr. Scott Salisbury, Managing Member

Primary Responsible Official (Brevard County Solid Waste Management Central Disposal Facility):

Mr. Euripides Rodriguez, Director
Solid Waste Management Department – Brevard County

PROJECT AND LOCATION:

This permit covers the installation and operation of six (6) Caterpillar, Model G3520C, 2,233 brake-horsepower landfill gas-fired engines for the generation of up to a total of 9.6 megawatts (nominal rating) of electricity. The project is located at the Brevard County Solid Waste Management Central Disposal Facility at 2250 Adamson Road, Cocoa, Brevard County. UTM coordinates are Zone 17; 516.75 km E; 3140.57 km N.

STATEMENT OF BASIS:

This construction permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and the Florida Administrative Code (F.A.C.) Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297. The above named permittee is authorized to modify the facility in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department of Environmental Protection (Department).

ATTACHMENTS MADE A PART OF THIS PERMIT:

Appendix BD	BACT Determination
Appendix GC	Construction Permit General Conditions

Joseph Kahn, Director
Division of Air Resource Management

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF FINAL PERMIT

In the Matter of an
Application for Permit

Mr. Scott Salisbury, Managing Member
Brevard Energy, LLC
29261 Wall Street
Wixom, Michigan 48393

DEP File No. 0090069-004-AC
PSD-FL-378

Enclosed is the FINAL Permit Number PSD-FL-378 for the installation of six (6) lean burn Caterpillar Model G3520C landfill gas fueled internal combustion engines at the Brevard County Solid Waste Management Central Disposal Facility in Cocoa, Brevard County. This permit is issued pursuant to Chapter 403, Florida Statutes (F.S.) and Rule 62-212.400, Florida Administrative Code (F.A.C.) for the Prevention of Significant Deterioration (PSD) of Air Quality.

Any party to this order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, F.S., by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Legal Office; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 (thirty) days from the date this Order is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

FOR Trina L. Vielhauer, Chief
Bureau of Air Regulation

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF FINAL PERMIT (including the FINAL permit) and all copies were sent electronically (with Received Receipt) before the close of business on 3/6/07 to the person(s) listed:

Scott Salisbury, Trail Ridge Energy, LLC (scott.salisbury@landfillenergy.com)
Euripides Rodriguez, Director, SWMD (dgregory@seminolecountyfl.gov)
Gregg Worley, EPA (worley.gregg@epa.gov)
Dee Morse, NPS (dee_morse@nps.gov)
Len Kozlov, DEP-CD (leonard.kozlov@dep.state.fl.us)
Jeff Pope, P.E., Clayton Group Services, Inc. (jeff.pope@us.bureauveritas.com)
David Derenzo, Derenzo & Associates, Inc. (dderenzo@derenzo.com)

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

(Clerk) 3/6/07 (Date)

PERMITTEE:

Brevard Energy, LLC
29261 Wall Street
Wixom, Michigan 48393

File No.	0090069-004-AC
Permit No.	PSD-FL-378
SIC No.	4953
Project:	Brevard County Solid Waste Management Central Disposal Facility Modification – Landfill Gas Engines
Expires:	October 1, 2008

Secondary Responsible Official (Energy Section):

Mr. Scott Salisbury, Managing Member

Primary Responsible Official (Brevard County Solid Waste Management Central Disposal Facility):

Mr. Euripides Rodriguez, Director
Solid Waste Management Department – Brevard County

PROJECT AND LOCATION:

This permit covers the installation and operation of six (6) Caterpillar, Model G3520C, 2,233 brake-horsepower landfill gas-fired engines for the generation of up to a total of 9.6 megawatts (nominal rating) of electricity. The project is located at the Brevard County Solid Waste Management Central Disposal Facility at 2250 Adamson Road, Cocoa, Brevard County. UTM coordinates are Zone 17; 516.75 km E; 3140.57 km N.

STATEMENT OF BASIS:

This construction permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and the Florida Administrative Code (F.A.C.) Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297. The above named permittee is authorized to modify the facility in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department of Environmental Protection (Department).

ATTACHMENTS MADE A PART OF THIS PERMIT:

Appendix BD	BACT Determination
Appendix GC	Construction Permit General Conditions

Joseph Kahn, Director
Division of Air Resource Management

SECTION I – FACILITY INFORMATION

FACILITY DESCRIPTION

Brevard County Solid Waste Management Central Disposal Facility (Central Disposal Facility) operates a municipal solid waste (MSW) landfill in Cocoa, Brevard County which is allocated for Class I MSW. Methane-rich landfill gas produced from the decomposition of disposed waste materials is being collected by a gas recovery system. The collected gas is currently being diverted to the flaring system for control. Brevard Energy, LLC plans to construct and operate an electrical generation plant at the Central Disposal Facility. In order to reduce the amount of landfill gas (LFG) wasted by flaring, all available LFG from the landfill will be supplied to Brevard Energy, LLC for use as fuel to power the proposed internal combustion (IC) engine electrical generation plant. As a result of these changes, significant emission increases will occur for carbon monoxide (CO), particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}) and nitrogen oxides (NOx).

REGULATORY CLASSIFICATION

The Central Disposal Facility is classified as a Major or Title V Source of air pollution because emissions of at least one regulated air pollutant, such as particulate matter (PM/PM_{10}), sulfur dioxide (SO_2), NOx, CO, or volatile organic compounds (VOC) exceed 100 tons per year (TPY). The landfill facility is also classified as a Title V source since the design capacity of the landfill is greater than 2.5 million cubic meters and megagrams.

The facility is subject to the following Code of Federal Regulations (CFR):

- 40 CFR 60, Subpart A, General Provisions;
- Subpart WWW, Standards of Performance for Municipal Solid Waste Landfills;
- 40 CFR 63, Subpart A, General Provisions;
- 40 CFR 63, Subpart AAAA, National Emission Standards for Hazardous Air Pollutants (NESHAP) for Municipal Solid Waste Landfills; and
- 40 CFR 63, Subpart ZZZZ, NESHAP for Stationary Reciprocating Internal Combustion Engines.

The proposed landfill gas-fueled IC engine electrical generation plant will be subject to Prevention of Significant Deterioration (PSD) review with respect to Rule 62-210.200(164)(a)2, F.A.C. due to its potential CO emissions being greater than 250 TPY. Best Available Control Technology (BACT) determinations are required for each pollutant emitted in excess of the Significant Emission Rates listed in Rule 62-210.200(242), F.A.C. For this project, the permit specifies BACT emissions standards for CO, NOx and PM_{10} emissions.

RELEVANT DOCUMENTS:

The documents listed below are specifically related to this permitting action and form the basis of the permit. They are on file with the Department:

- Application received 06-05-2006
- Department letters dated 07-03-2006 and 07-31-2006
- Applicant's letters received 07-26-2006 and 08-15-2006
- Modeling information received 11-06-2006
- Technical Evaluation and Preliminary Determination dated 01-16-2007
- Best Available Control Technology determination (issued concurrently with permit)

SECTION II – EMISSION UNIT(S) ADMINISTRATIVE REQUIREMENTS

1. Regulating Agencies: All documents related to applications for permits to operate, reports, tests, minor modifications and notifications shall be submitted to the Department's Central District Office, 3319 Maguire Boulevard, Suite 232, Orlando, Florida 32803-3767. All applications for permits to construct or modify emissions unit(s) subject to the PSD or Nonattainment (NA) review requirements should be submitted to the Florida Department of Environmental Protection (FDEP), Bureau of Air Regulation (BAR), 2600 Blair Stone Road, MS 5505, Tallahassee, Florida 32399-2400 (phone number 850/488-0114).
2. General Conditions: The owner and operator are subject to and shall operate under the attached General Permit Conditions G.1 through G.15 listed in Appendix GC of this permit. General Permit Conditions are binding and enforceable pursuant to Chapter 403 of the Florida Statutes. [Rule 62-4.160, F.A.C.]
3. Terminology: The terms used in this permit have specific meanings as defined in the corresponding chapters of the F.A.C.
4. Applicable Regulations, Forms and Application Procedures: Unless otherwise indicated in this permit, the construction and operation of the subject emissions unit shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of Chapter 403, F.S. and F.A.C. Chapters 62-4, 62-204, 62-210, 62-212, 62-213, 62-296, 62-297 and CFR Title 40, Parts 60 and 63, adopted by reference in the F.A.C. regulations. The permittee shall use the applicable forms listed in Rule 62-210.900, F.A.C. and follow the application procedures in Chapter 62-4, F.A.C. Issuance of this permit does not relieve the facility owner or operator from compliance with any applicable federal, state, or local permitting or regulations. [Rules 62-204.800, 62-210.300 and 62-210.900, F.A.C.]
5. Expiration: The permittee may, for good cause, request that this construction permit be extended. Such a request shall be submitted to the BAR prior to 60 days before the expiration of the permit. However, the permittee shall promptly notify the Department's Central District Office of any delays in completion of the project which would affect the startup day by more than 90 days. [Rule 62-4.090, F.A.C]
6. Application for Title V Permit: This permit authorizes construction of the permitted emissions units and initial operation to determine compliance with Department rules. A Title V operation permit is required for regular operation of the permitted emissions unit. The permittee shall apply for a Title V operation permit at least 90 days prior to expiration, but no later than 180 days after commencing operation. To apply for a Title V operation permit, the applicant shall submit the appropriate application form, compliance test results, and such additional information as the Department may by law require. The application shall be submitted to the appropriate Permitting Authority with copies to the Compliance Authority. [Rules 62-4.030, 62-4.050, 62-4.220, and Chapter 62-213.420, F.A.C.]
7. Source Obligation: Authorization to construct shall expire if construction is not commenced within 18 months after receipt of the permit, if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time. This provision does not apply to the time period between constructions of the approved phases of a phased construction project except that each phase must commence construction within 18 months of the commencement date established by the Department in the permit. [Rule 62-212.400(12)(a), F.A.C.].
8. BACT Determination: For phased construction projects, the determination of best available control technology shall be reviewed and modified as appropriate at the latest reasonable time which occurs no later than 18 months prior to commencement of construction of each independent phase of the project. At such time, the owner or operator of the applicable stationary source may be required to demonstrate the adequacy of any previous determination of best available control technology for the source. [40 CFR 52.21(j)(4)]
9. Annual Reports: Pursuant to Rule 62-210.370(2), F.A.C., Annual Operation Reports, the permittee is required to submit annual reports on the actual operating rates and emissions from this facility. Annual operating reports using DEP Form 62-210.900(4) shall be sent to the DEP's Central District office by March

SECTION II – EMISSION UNIT(S) ADMINISTRATIVE REQUIREMENTS

1st of each year.

10. Stack Testing Facilities: Stack sampling facilities shall be installed in accordance with Rule 62-297.310(6), F.A.C.

11. New or Additional Conditions: For good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time. [Rule 62-4.080, F.A.C.]

SECTION III – EMISSION UNIT(S) SPECIFIC CONDITIONS

SUBSECTION A. SPECIFIC CONDITIONS

The Specific Conditions listed in this section apply to the following emission units:

EMISSION UNIT NO.	EMISSION UNIT DESCRIPTION
004 - 009	Six Caterpillar Model G3520C landfill gas-fueled internal combustion engines and electrical generators. Each engine has a power generation rating of 2,233 brake horsepower at 100 percent load. The generator has a power output rating of 1,600 kilowatt. The engines will be fueled exclusively with LFG generated by and received from the Central Disposal Facility. The landfill gas will go through a gas treatment system prior to combustion in the engines.

A. FUEL SPECIFICATIONS AND WORK PRACTICES

1. This permit authorizes the installation and operation of six (6) Caterpillar, Model G3520C, 2,233 brake-horsepower landfill gas-fired engines for the generation of up to a total of 9.6 megawatts (nominal rating) of electricity. The maximum power generation rating of each engine shall be 2,233 brake horsepower (bhp). Authorization to construct shall expire if construction is not commenced within 18 months after receipt of the permit, if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time. **[Rule 62-212.400, F.A.C.]**

   {Permitting Note: The power generation rating of 2,233 bhp is based on a minimum fuel heating value requirement of 467 British thermal units per standard cubic foot (BTU//scf) and landfill gas usage of 580 standard cubic feet per minute (scfm) per engine.}

2. This permit authorizes the installation of a LFG Treatment System including gas compression (via blowers), liquids removal (via knock-out and chilling), and particulate removal (via 1 micron primary and polishing filters). The gas treatment system shall not be equipped with atmospheric vents. **[Rule 62-212.400, F.A.C., 40 CFR 60.752 and Appendix J of the application]**

3. Emissions Units Nos. 004-009 are subject to 40 CFR 60 Subpart WWW and certain sections of 40 CFR 63 Subparts AAAA and ZZZZ adopted by the Department at Rule 62-204.800(8)(b) and 62-204.800(11)(b), F.A.C. **[Rules 62-204.800 and 62-210.300, F.A.C.]**

4. Unless otherwise indicated, the modification/construction and operation of the Caterpillar internal combustion engines shall be in accordance with the capacities and specifications stated in the application. **[Rule 62-210.300, F.A.C.]**

5. No person shall cause, suffer, allow, or permit the discharge of air pollutants which cause or contribute to an objectionable odor. **[Rule 62-296.320, F.A.C.]**

6. No person shall circumvent any air pollution control device, or allow the emission of air pollutants without the applicable air pollution control device operating properly. **[Rule 62-210.650, F.A.C.]**

7. Fuel fired in the engines is limited to LFG. The use of any other fuel will require an amendment to this permit. **[Rule 62-212.400, F.A.C.]**

8. The permittee shall operate each engine at the air-to-fuel ratio that the tested engine demonstrated compliance during the performance test required by Specific Condition C.2 or the most recent performance test if a subsequent performance test is conducted. **[Rule 62-212.400, F.A.C.]**

9. The permittee shall operate each engine within 0.5% of the Oxygen (O_2) content in the exhaust gas at the air-to-fuel ratio that the tested engine demonstrated compliance during the performance test required by Specific

SECTION III – EMISSION UNIT(S) SPECIFIC CONDITIONS

Condition C.2 or the most recent performance test if a subsequent performance test is conducted. **[Rule 62-212.400, F.A.C. and Appendix F of the application]**

10. The permittee shall install and maintain an automatic fail-safe block valve on each engine. The fail-safe block valve must stop the flow of LFG in the event of an engine failure. **[Rule 62-4.070, F.A.C.]**
11. Excess LFG not used as fuel in an engine must be flared in accordance with the requirements of 40 CFR 60 Subpart WWW. **[Rule 62-4.070, F.A.C.]**
12. Each engine/generator set may operate up to 8,760 hours per year. **[Rule 62-210.200(232), F.A.C.]**
13. The emissions units shall be subject to the following:
    a. Excess emissions resulting from startup, shutdown or malfunction of any source shall be permitted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized but in no case exceed two hours in any 24 hour period unless specifically authorized by the Department for longer duration. **[Rule 62-210.700, F.A.C.]**

    b. Excess emissions which are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure which may reasonably be prevented during startup, shutdown, or malfunction shall be prohibited. **[Rule 62-210.700, F.A.C.]**

    c. In case of excess emissions resulting from malfunctions, each source shall notify the Department in accordance with Rule 62-4.130, F.A.C. A full written report on the malfunctions shall be submitted in a quarterly report, if requested by the Department. **[Rule 62-210.700, F.A.C.]**

B. EMISSION AND PERFORMANCE REQUIREMENTS

1. ***Nitrogen oxides (NOx)***: The emission rate of NOx from each engine/generator set exhaust shall not exceed 0.60 gram per brake horsepower hour (g/bhp-hr) and a maximum of 2.95 pounds per hour (lb/hr) and 12.94 TPY. **[Rule 62-212.400(12), F.A.C.]**
2. ***Carbon Monoxide (CO)***: The emission rate of CO from each engine/generator set exhaust shall not exceed 2.75 g/bhp-hr and a maximum of 13.54 lb/hr and 59.30 TPY. **[Rule 62-212.400(12), F.A.C.]**
3. ***Particulate Matter less than 10 microns (PM_{10})***: The emission rate of PM_{10} from each engine/generator set exhaust shall not exceed 0.24 g/bhp-hr and a maximum of 1.18 lb/hr and 5.17 TPY. **[Rule 62-212.400(12), F.A.C.]**
4. ***Volatile Organic Compound (VOC)***: The emission rate of total VOC from each engine/generator set exhaust shall not exceed 0.28 g/bhp-hr and a maximum of 1.37 lb/hr and 5.99 TPY. **[Rule 62-212.400(12), F.A.C.]**

   {Permitting Note: Project avoids PSD review for VOC based on emission limits.}
5. ***Hydrogen Chloride (HCl)***: The emission rate of HCl from each engine/generator set shall not exceed 10.9 lb/MMscf and 1.66 TPY. **[Rule 62-210.200(184), F.A.C.]**

   {Permitting Note: Facility remains a minor source of HAP's emissions based on permit limits.}
6. ***Sulfur Dioxide (SO_2)***: The emission rate of SO_2 from each engine/generator set shall not exceed 27.5 pound per million standard cubic feet (lb/MMscf). **[Rule 62-212.400(12), F.A.C.]**

   {Permitting Note: Project avoids PSD review based on permit limits.}

SECTION III – EMISSION UNIT(S) SPECIFIC CONDITIONS

7. Visible emissions from each engine/generator set exhaust shall not exceed 10% opacity. **[Rule 62-212.400, F.A.C.]**

C. TEST METHODS AND PROCEDURES

1. Sampling Facilities

   The permittee shall design the internal combustion engine stack to accommodate adequate testing and sampling locations in order to determine compliance with the applicable emission limits specified by this permit. **[Rule 62-297.310(6), F.A.C.]**

2. Performance Test Methods

   Initial (I), Annual (A) and permit renewal (R) compliance tests shall be performed in accordance with the following reference methods as described in 40 CFR 60, Appendix A and 40 CFR 51 Appendix M, adopted by reference in Chapter 62-204.800, F.A.C. Initial, annual and renewal compliance tests shall be conducted on only one of the six engines. A different engine shall be tested each year such that all engines are tested during the six-year cycle.

   (a) EPA Method 7 or 7E – Determination of NOx Emissions from Stationary Sources (I,A);

   (b) EPA Method 9 – Visual Determination of the Opacity of Emissions from Stationary Sources (I,A);

   (c) EPA Method 10 – Determination of CO Emissions from Stationary Sources (I,A);

   (d) EPA Method 18, 25, 25A or 25C – Measurement of Gaseous Organic Compounds Emissions (I,R);

   (e) EPA Method 26 or 26A – Determination of Hydrogen Chloride (HCl) Emissions from Stationary Sources (I,A);

   (f) EPA Method 201 – Determinations of PM_{10} Emissions (I,A)

   EPA Methods 1 through 4 shall be used as necessary to support other test methods. No other test methods may be used for compliance testing unless prior DEP approval is received, in writing, from the Department. **[Rule 62-297.310(7), F.A.C.]**

3. The permittee shall comply with the following requirements to monitor the sulfur and chlorine content of the landfill gas:

   a. At least 180 days prior to commercial startup of the engines, the permittee shall sample and analyze the landfill gas for sulfur and chlorine content. The gas sample collected for the analyses shall be a composite sample and collected under normal operating conditions (i.e., with valves open for all operating cells). The gas sample collection and analyses for sulfur and chlorine content shall be done semi-annually. Based on the sampling results and Rule 62-297.310(7)(b), F.A.C., the Department may request additional gas sampling and analyses. Results shall be reported as SO_2 and HCl emission factors in terms of lb/MMscf of landfill gas.

   b. During each required compliance test conducted for HCl, the permittee shall sample and analyze the landfill gas for the chlorine content. Results for the compliance test shall be reported in terms of HCl emissions in lb/hr and the sample analysis result shall be reported as HCl emission factor in terms of lb/MMscf of landfill gas.

c. Analysis of the chlorine content shall be used to track changes in the landfill gas. Based on the analysis, the Compliance Authority may require additional stack testing for HCl emissions to determine compliance with the emissions standard.

d. Compliance with the fuel sulfur specification shall be determined based on each analysis for the sulfur content of the landfill gas.

[Rules 62-210.200(184), 62-210.200(232) and 62-212.400(12), F.A.C.]

4. Within 60 days of achieving the permitted capacity, but no later than 180 days after initial startup, and annually, the subject emissions units as described in Specific Condition C.2 shall be tested for compliance with the applicable emission limits. For the duration of all tests the emission units shall be operating at permitted capacity. Permitted capacity is defined as 90-100 percent of the maximum operating rate allowed by the permit. If it is impracticable to test at permitted capacity, then the emission unit may be tested at less than permitted capacity (i.e., 90% of the maximum operating rate allowed by the permit); in this case, subsequent emission unit operation is limited to 110 percent of the test load until a new test is conducted. Once the emission unit is so limited, then operation at higher capacities is allowed for no more than 15 consecutive days for the purposes of additional compliance testing to regain the permitted capacity in the permit. **[Rule 62-297.310, F.A.C.]**

D. RECORDKEEPING, REPORTING AND MONITORING REQUIREMENTS

1. Total landfill gas flow to the engines shall be continuously measured and recorded. **[Rule 62-210.200 (232), F.A.C.]**
2. Gross electrical power generation (kw-hrs) shall be continuously measured and recorded for each engine individually and for the six engines combined. **[Rule 62-210.200(232), F.A.C.]**
3. Each engine/generator set shall be equipped with a non-resetable elapsed time meter to indicate, in cumulative hours, the elapsed engine operating time. **[Rule 62-210.200(232), F.A.C.]**
4. The permittee shall maintain the following records on a monthly basis:

   a. The hours of operation of each engine/generator set, including any start-up, shutdown or malfunction in the operations of the engine/generator set.

   b. The total landfill gas flow to each engine.

   c. Gross electrical power generation in kw-hr for each engine and the six engines combined.

   [Rule 62-210.200(232), F.A.C.]

5. The permittee shall submit the results and the corresponding data of the site-specific HCl emission factor and the SO_2 emission factor within 45 days of gas sampling to BAR. The results shall also be submitted to the Central District Office. **[Rules 62-210.200(232) and 62-210.200(264), F.A.C.]**

G.1 The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes (F.S.). The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

G.2 This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings or exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

G.3 As provided in Subsections 403.087(6) and 403.722(5), F.S., the issuance of this permit does not convey and vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

G.4 This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

G.5 This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of F.S. and Department rules, unless specifically authorized by an order from the Department.

G.6 The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

G.7 The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

a) Have access to and copy and records that must be kept under the conditions of the permit;
b) Inspect the facility, equipment, practices, or operations regulated or required under this permit, and,
c) Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

G.8 If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

a) A description of and cause of non-compliance; and
b) The period of non-compliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance. The permittee shall be responsible for any and all damages, which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

G.9 In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the F.S. or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, F.S. Such evidence

shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

G.10 The permittee agrees to comply with changes in Department rules and F.S. after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by F.S. or Department rules.

G.11 This permit is transferable only upon Department approval in accordance with Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

G.12 This permit or a copy thereof shall be kept at the work site of the permitted activity.

G.13 This permit also constitutes:

a) Determination of Best Available Control Technology (X)
b) Determination of Prevention of Significant Deterioration (X);
c) Compliance with New Source Performance Standards (X). Subpart WWW requirements and
d) Compliance with National Emission Standards for Hazardous Air Pollutants (X). Subpart AAAA and ZZZZ requirements

G.14 The permittee shall comply with the following:

a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application or this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

c) Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;
2. The person responsible for performing the sampling or measurements;
3. The dates analyses were performed;
4. The person responsible for performing the analyses;
5. The analytical techniques or methods used; and
6. The results of such analyses.

G.15 When requested by the Department, the permittee shall within a reasonable time furnish any information required by law, which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

Brevard Energy, LLC
Brevard County Solid Waste Management Central Disposal Facility
PSD-FL-378/0090069-004-AC
Cocoa, Brevard County

Brevard Energy, LLC has applied to modify Brevard County Solid Waste Management Central Disposal Facility (Central Disposal Facility) by installing six (6) lean-burn internal combustion (IC) Caterpillar (CAT) Model G3520C engines and electrical generators. The electrical generation plant will also consist of landfill gas (LFG) treatment equipment (gas dewatering, filtration and compression equipment and processes) and ancillary equipment that supports the electrical generation operations (e.g., engine oil storage tanks and LFG temperature and moisture conditioning equipment).

The six lean-burn IC engines will be connected to individual electrical generators. Each gas IC engine will be connected to a 1,600 kilowatt electrical generator. The plant will have the potential to generate 9.6 megawatts of electricity under base load operating conditions and will be interconnected to the Florida Power & Light distribution network through a nearby power line.

The LFG-fueled IC engines will be housed in a single building constructed near the existing LFG collection system header and control system flare. A gas transmission line will be connected to the header of the existing LFG collection system and a dedicated gas blower/compressor will be used to draw methane-rich gas (fuel) from the existing LFG collection system to the proposed electrical generation plant.

The Central Disposal Facility is a major source of air pollution or a Title V source based on Rule 62-210.200(184), Florida Administrative Code (F.A.C.). Additionally, based on this modification, potential emissions of carbon monoxide (CO) will be greater than 250 tons per year (TPY) making the facility a Major Stationary Source for Prevention of Significant Deterioration (PSD) review with respect to Rule 62-210.200(185)(a)2., F.A.C. The increases in emissions of CO, nitrogen oxide (NOx) and particulate matter less than or equal to 10 microns (PM_{10}) will exceed the significant emission rates listed in Rule 62-210.200(264), F.A.C. A Best Available Control Technology (BACT) determination is part of the review required for CO, NOx and PM_{10} by Rule 62-210.200(39), F.A.C.

Descriptions of the process, project, BACT determination, air quality effects, and rule applicability are given in the Technical Evaluation and Preliminary Determination, accompanying the Department's Intent to Issue.

The Department specifies the following as BACT for each engine:

POLLUTANT	EMISSION LIMIT	CONTROL TECHNOLOGY
CO	2.75 g/bhp-hr and 13.54 lb/hr and 59.30 TPY	Combustor design and good combustion practices
NOx	0.60 g/bhp-hr and 2.95 lb/hr and 12.94 TPY	Combustor design and good combustion practices
PM_{10}	0.24 g/bhp-hr and 1.18 lb/hr and 5.17 TPY	Pretreatment of landfill gas and proper engine maintenance

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

Compliance with the emission limits shall be in accordance with the following EPA Reference Methods as contained in 40 CFR 60, Appendix A or as otherwise approved by the Department:

EMISSION UNIT	POLLUTANT	EPA REFERENCE METHOD
Six (6) Caterpillar Model G 3520C LFG-fueled Internal Combustion Engines	PM_{10}	201
	NOx	7 or 7E
	CO	10
	VE	9

APPENDIX C

LANDFILL GAS SAMPLING RESULTS

Golder Associates Inc.

3730 Chamblee Tucker Road
Atlanta, GA USA 30341
Telephone (770) 496-1893
Fax (770) 934-9476

Golder Associates

September 5, 2005 043-3881.002

S2L, Inc.
8029 Ridge Valley
Woodstock, GA 30189-7047

Attn: Mr. Omar Smith, P.E., Regional Manager

RE: INITIAL FLARE PERFORMANCE TEST
BREVARD COUNTY CENTRAL DISPOSAL FACILITY
BREVARD COUNTY, FLORIDA
AIR PERMIT NUMBER 0090069-003-AV

Dear Mr. Smith:

In order to optimize the Brevard County Central Disposal Facility (CDF) Landfill Gas Collection and Control System (GCCS) a third candlestick flare has been installed at the site.

To maintain compliance with the GCCS, a performance test of this open flare was required. Presented herein are the results of the Flare Performance Test completed on July 22, 2005.

REGULATORY REQUIREMENTS

To maintain compliance with the CDF GCCS design plan and as required by 40 CFR Part 60 Subpart WWW, Standards of Performance for Municipal Solid Waste Landfills, the performance test of the Site's open flare was completed on July 22, 2005. The test was conducted in conformance with the Standards for Air Emissions from Municipal Solid Waste Landfills, 40 CFR §60.752(b)(2)(iii)(A).

The flare at the Site was constructed and is operated in accordance with 40 CFR §60.18, General Control Device Requirements. Such requirements, as applied to the CDF flare and to the July 22, 2005 performance testing are addressed in subsequent sections of this report. The following items briefly summarize the application of each pertinent Subpart WWW rule to the CDF landfill gas flare.

Subpart WWW §60.18(c)(1). Visible Emissions
The CDF flare is designed and operated with no visible emissions as determined by methods specified in §60.18(f) except for periods not to exceed a total of five minutes during any two consecutive hours.

Subpart WWW §60.18(c)(2). Flame Presence and Response to Flameout
The flare is operated with a flame present at all times. The presence of the flare pilot flame is monitored by thermocouple or equivalent means. If the sensor does not register that a flame is present, the flare is automatically shut down. All pilot flame outages are recorded and the flare is shut down until such time as the pilot flame operation is restored.

Sample ID	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Nitrogen (%)
Flare #1	48	37	1.3	6.9
Flare #1 (DUP)	48	37	1.3	6.8
Flare #2	49	37	1.1	6.2
Flare #3	34	26	7.2	25

Methane concentrations ranging from 34 percent to 49 percent were measured at the flare. To determine the net heating value of the gas, Golder used use an average methane concentration of 43.7 percent.

A published value was utilized for the net heat of combustion of methane. According to Chemistry: The Central Science 2nd Edition, by Theodore L. Brown and H. Eugene LeMay, Jr., it has been found experimentally that 802 kJ of heat is produced when 1 mole of methane is burned in a constant pressure system.

It follows that:

$$(802\frac{kJ}{mole})*(\frac{1000J}{1kJ}) = 802{,}000\frac{J}{mole}$$

Since, 1 cal = 4.184 J:

$$(802{,}000\frac{J}{mole})*(\frac{1cal}{4.184J}) = 191{,}682\frac{cal}{mole} = 191.682\frac{kcal}{mole}$$

$$(191.682\frac{kcal}{mole})*(\frac{mole}{16.04g}) = 11.950\frac{kcal}{g}$$

$$H_t = 1.74*10^{-7}(\frac{1}{ppm})(\frac{mole}{scm})(\frac{MJ}{kcal})(437{,}000ppm)(11.950\frac{kcal}{g})(16.04\frac{g}{mole})$$

H_t = 14.57 MJ/scm

The minimum allowable net heating value of the gas being combusted at the non-assisted flare at the CDF Landfill is 7.45 MJ/scm. The actual net heating value of the sample collected at the CDF Landfill is 14.57 MJ/scm as determined using methods and procedures specified in paragraph (f) of 40 CFR Section 60.18.

EXIT VELOCITY OF THE COMBUSTED GAS

The exit velocity was calculated per 40 CFR§60.18(f)(4) using Method 2D, Measurement of Gas Volumetric Flow Rates in Small Pipes and Ducts, to determine the volumetric flow rate through the flare stack. Method 2D applies to measurements made before the emission control device; i.e., in the horizontal piping wherein an appropriate flow rate meter is installed between the blower outlet and the flare flame arrestor.

The flow rate of LFG through this horizontal pipe was determined using a flow meter that has been calibrated for the type of gas being measured (density, moisture content, etc.). Absolute temperature and absolute pressure were measured and used to calculate volumetric flow and standard conditions.

The flow meter permits measurement of the stack flow rate to within five percent of its true value and has a capacity range sufficient to accommodate the minimum and maximum flow rates of the current blower and flare assembly.

Per 40 CFR §60.18(f)(3), the net heating value of the gas conveyed to the flare and monitored by the thermal dispersion flow meter was calculated using the concentration of the principal combustible component (methane being the far greatest percentage) as calculated by Method 3C, Determination of Carbon Dioxide, Methane, Nitrogen, and Oxygen from Stationary Sources.

Although the regulations indicate that Method 18, Measurement of Gaseous Organic Compound Emissions by Gas Chromatography, is required, in a letter dated July 11, 2005 (Attachment B), the United States Environmental Protection Agency (EPA) granted the CDF facility permission to use Method 3C as an alternative to Method 18 to determine the compliance of the utility flare combusting landfill gas. The EPA stated that the alternative method is acceptable because the major components of landfill gas are known to be methane and carbon dioxide. The concentrations of organic compounds other than methane are minimal and their contributions to the heating value or molecular weight calculation can be considered negligible.

The EPA went on further to state that the requirement in §60.18(a)(3) to test for hydrogen with ASTM D1946 was waived in this case due to the low levels of hydrogen in landfill gas. Oxygen and nitrogen can be present in landfill gas in substantial quantities, and the Method 3C analysis must include these for the molecular weight determination. Method 3C was also granted for use in place of Method 3A to determine the landfill gas molecular weight for calculating flare gas exit velocity under §60.18(c)(4).

Using the approach outlined in 40 CFE§60.18(f)(4), the exit velocity of the flare was determined by dividing the volumetric flow rate, 1801 scfm, by the free cross-sectional area of the flare tip, 113.1 in^2 (0.785 ft^2).

$$\frac{1801 ft^3}{\min} * \frac{1}{113.1 in^2} * \frac{144 in^2}{1 ft^2} = 2293.0 ft/\min$$

$$\frac{2293.0 ft}{\min} * \frac{1 \min}{60 \sec} = 38.22 ft/\sec$$

The calculated exit velocity for the CDF flare is 38.22 ft/sec, which complies with the 40 CFR §60.18(f)(4)(i) design velocity of less than 60 feet per second.

Furthermore, according to 40 CFR Section 60.18(f)(5) the maximum permitted velocity, Vmax, shall be determined by the following equation:

$$\log_{10}(V_{max}) = (H_t + 28.8)/31.7$$

$$V_{max} = 24.10 \text{ m/sec} = 79.07 \text{ ft/sec}$$

The exit velocity of the CDF flare was 11.64 m/sec or 38.22 feet/sec, which is less than both V_{max} as specified in 40 CFR Section 60.18(f)(4) and 122m/sec (400 ft/sec) as specified in 40 CFR Section 60.18(c)(4)(iii).

SUMMARY

The flare performance test was completed on July 22, 2005, after observing the maximum anticipated flow rate at which the blower/flare assembly in its current GCCS configuration is operated.

We appreciate the opportunity to provide our continuing services to S2L, Inc. at the Central Disposal Facility in Brevard County, Florida. If you have any questions or require additional information, please do not hesitate to call.

Very truly yours,

GOLDER ASSOCIATES INC.

Dana B. Mehlman
Staff Geotechnical Engineer

Kevin S. Brown, P.E
Senior Project Manager and Associate

DBM/KSB/ksb

X:\Clients\S2L\043-3881.002 - Flare Performance\200_Draft\Reports\Flare Perf Test.doc

Field Collection Data
Brevard County Flare Performance Test
22-Jul-05

Time	Flow Rate Reading (scfm)	Static Pressure mm Hg	Static Pressure in Hg	Temperature °F	Temperature °C
10:00	1791			1255	679.4
10:15	1792			1263	683.9
10:30	1799			1257	680.6
10:35	1806			1265	685.0
10:45	1796			1260	682.2
11:00	1803			1262	683.3
11:10	1818			1261	682.8
11:15	1799			1264	684.4
11:25	1806			1253	678.3
11:45	1798			1260	682.2
12:00	1807			1258	681.1
AVE	**1801**	**#DIV/0!**		**1260**	**682**

ATTACHMENT A
LABORATORY RESULTS

@ AIR TOXICS LTD.
AN ENVIRONMENTAL ANALYTICAL LABORATORY

Air Toxics Ltd. Introduces the Electronic Report

Thank you for choosing Air Toxics Ltd. To better serve our customers, we are providing your report by e-mail. This document is provided in Portable Document Format which can be viewed with Acrobat Reader by Adobe.

This electronic report includes the following:

- Work order Summary;
- Laboratory Narrative;
- Results; and
- Chain of Custody (copy).

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630

(916) 985-1000 .FAX (916) 985-1020
Hours 8:00 A.M to 6:00 P.M. Pacific

@ AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0507518

Work Order Summary

CLIENT:	Ms. Dana Mehlman Golder Associates, Inc. 3730 Chamblee Tucker Road Atlanta, GA 30341	**BILL TO:**	Ms. Dana Mehlman Golder Associates, Inc. 3730 Chamblee Tucker Road Atlanta, GA 30341
PHONE:	770-496-1893	**P.O. #**	
FAX:	770-934-9476	**PROJECT #**	
DATE RECEIVED:	07/25/2005	**CONTACT:**	DeDe Dodge
DATE COMPLETED:	08/05/2005		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.
01A	Flare #1	Modified Method 3C	8.0 "Hg
01AA	Flare #1 Duplicate	Modified Method 3C	8.0 "Hg
02A	Flare #2	Modified Method 3C	7.0 "Hg
03A	Flare #3	Modified Method 3C	6.0 "Hg
04A	Lab Blank	Modified Method 3C	NA
05A	LCS	Modified Method 3C	NA

CERTIFIED BY: Linda L. Truman DATE: 08/05/05

Laboratory Director

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified Method 3C
Golder Associates, Inc.
Workorder# 0507518

Three 1 Liter Silonite Canister samples were received on July 25, 2005. The laboratory performed analysis via Modified EPA Method 3C for Oxygen, Nitrogen, Carbon Dioxide and Methane using GC/TCD. The method involves direct injection of 1.0 mL of gas sample. The analytical system consists of a multidimensional gas chromatograph equipped with a variety of gas switching valves and columns. See the data sheet for the reporting limits.

Requirement	*Method 3C*	*ATL Modifications*
Daily Calibration Check	Single point standard concentration within 20 % of the sample concentration	A Continuing Calibration standard, %D ± 15 %
Sample Analysis	Analyze samples in duplicate, the peak area for two consecutive runs agree within 5 % of their average, analyze samples until consistent area obtained	Report duplicate analysis at a frequency of 10 % of the samples with %RPD </= 30 % for hits > 5 X's the RL.
Reporting Limit/Unit	10 ppmv	0.1 % (1000 ppmv)
Final Result Correction	Correct for temperature & moisture	No corrections

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

AIR TOXICS LTD.

Summary of Detected Compounds
MODIFIED EPA METHOD 3C GC/TCD

Client Sample ID: Flare #1

Lab ID#: 0507518-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.28	1.3
Nitrogen	0.28	6.9
Methane	0.28	48
Carbon Dioxide	0.28	37

Client Sample ID: Flare #1 Duplicate

Lab ID#: 0507518-01AA

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.28	1.3
Nitrogen	0.28	6.8
Methane	0.28	48
Carbon Dioxide	0.28	37

Client Sample ID: Flare #2

Lab ID#: 0507518-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.26	1.1
Nitrogen	0.26	6.2
Methane	0.26	49
Carbon Dioxide	0.26	37

Client Sample ID: Flare #3

Lab ID#: 0507518-03A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	7.2
Nitrogen	0.25	25
Methane	0.25	34
Carbon Dioxide	0.25	26

AIR TOXICS LTD.

Client Sample ID: Flare #1

Lab ID#: 0507518-01A

MODIFIED EPA METHOD 3C GC/TCD

[redacted]	[redacted]	Date of Collection:	7/2/05
Dil. Factor:	2.76	Date of Analysis:	7/9/05 07:10 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.28	1.3
Nitrogen	0.28	6.9
Methane	0.28	48
Carbon Dioxide	0.28	37

Container Type: 1 Liter Silonite Canister

AIR TOXICS LTD.

Client Sample ID: Flare #1 Duplicate

Lab ID#: 0507518-01AA

MODIFIED EPA METHOD 3C GC/TCD

File Name:	n072956	Date of Collection:	7/22/05
Dil. Factor:	2.75	Date of Analysis:	7/29/05 07:22 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.28	1.3
Nitrogen	0.28	6.8
Methane	0.28	48
Carbon Dioxide	0.28	37

Container Type: 1 Liter Silonite Canister

AIR TOXICS LTD.

Client Sample ID: Flare #2

Lab ID#: 0507518-02A

MODIFIED EPA METHOD 3C GC/TCD

[redacted]

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.26	1.1
Nitrogen	0.26	6.2
Methane	0.26	49
Carbon Dioxide	0.26	37

Container Type: 1 Liter Silonite Canister

AIR TOXICS LTD.

Client Sample ID: Flare #3

Lab ID#: 0507518-03A

MODIFIED EPA METHOD 3C GC/TCD

[redacted]

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	7.2
Nitrogen	0.25	25
Methane	0.25	34
Carbon Dioxide	0.25	26

Container Type: 1 Liter Silonite Canister

AIR TOXICS LTD.

Client Sample ID: Lab Blank

Lab ID#: 0507518-04A

MODIFIED EPA METHOD 3C GC/TCD

[redacted]

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.10	Not Detected
Nitrogen	0.10	Not Detected
Methane	0.10	Not Detected
Carbon Dioxide	0.10	Not Detected

Container Type: NA - Not Applicable

AIR TOXICS LTD.

Client Sample ID: LCS

Lab ID#: 0507518-05A

MODIFIED EPA METHOD 3C GC/TCD

Compound	%Recovery
Oxygen	109
Nitrogen	97
Methane	99
Carbon Dioxide	105

Container Type: NA - Not Applicable

ATTACHMENT B
EPA LETTER

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

JUL 2005

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Dana B. Mehlman
Golder Associates, Inc.
3730 Chamblee Tucker Road
Atlanta, Georgia 30341

Dear Ms. Mehlman:

In your June 28, 2005 letter, you asked permission to use Method 3C as an alternative to Method 18 and ASTM D1946 to determine the compliance of a flare combusting landfill gas at the Brevard County Central Disposal Facility with 40 CFR Part 60, Subpart WWW, Standards of Performance for Municipal Solid Waste Landfills. Subpart WWW requires open flares to comply with the general flare provisions under § 60.18. This request has been approved several times before for use at facilities similar to yours. Specifically, you desire to use Method 3C in place of Methods 18 and ASTM D1946 to determine landfill gas components for calculating net heating value under § 60.18 (c)(3).

Your requested alternative method is acceptable because the major components of landfill gas are known to be methane and carbon dioxide. The concentrations of organic compounds other than methane are minimal and their contributions to the heating value or molecular weight calculation are normally negligible. Therefore, Method 3C is more appropriate for this application than Method 18. The requirement in § 60.18(a)(3) to test for hydrogen with ASTM D1946 is waived in this case due to the low levels of hydrogen in landfill gas. Oxygen and nitrogen, on the other hand, can be present in landfill gas in substantial quantities. The analysis must include these if Method 3C is used in place of Method 3A to determine the landfill gas molecular weight for calculating flare gas exit velocity under § 60.18(c)(4).

We therefore grant you permission to use Method 3C to determine flare gas heating value, molecular weight, and moisture content under Subpart WWW. A minimum of three 30-minute Method 3C samples must be taken and analyzed for compliance determination. This is a site-specific method approval and applies only to the testing of the utility flare at the Brevard County Central Disposal Facility in Cocoa, Florida.

If you have questions or would like to discuss the matter further, please call Foston Curtis at (919) 541-1063, or you may e-mail him at curtis.foston@epa.gov.

Sincerely,

Conniesue B. Oldham

Conniesue B. Oldham, Ph.D., Group Leader
Air Measurements and Quality Group

Table C-1. Maximum Sulfur Dioxide Emission Factor for February 2007 Sampling Result

LFG Influent Sulfur Compound	EPA AP-42 Concentrations[A] (ppmv)	Analytical Result[B] (ppmv)	Molecular Formula	No. Sulfur Atoms	Max. Sulfur Content as H_2S (ppmv)	Resulting SO_2 Emission Rate (lb./MMcf)
Hydrogen sulfide	35.50	360.0	H_2S	1	360.0 [C]	59.85 [D]
Carbon disulfide	0.58	ND	CS_2	2	1.2	0.19
Carbonyl sulfide	0.49	ND	CSO	1	0.5	0.08
Dimethyl sulfide	7.82	4.20	C_2H_6S	1	4.2	0.70
Ethyl mercaptan	2.28	ND	C_2H_6S	1	2.3	0.38
Methyl mercaptan	2.49	8.20	CH_4S	1	8.2	1.36
Total		**372.4**			**376.3**	**62.57** [E]

Notes

A. 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. Used in place of ND result.

B. Measured concentration

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

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

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

= 59.85 lb SO_2/MMcf LFG

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

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

= 62.57 lb SO_2/MMcf LFG

Air Toxics LTD.
AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0703006C

Work Order Summary

CLIENT:	Mr. David Derenzo Derenzo & Associates 39395 Schoolcraft Road Livonia, MI 48150	**BILL TO:**	Mr. David Derenzo Derenzo & Associates 39395 Schoolcraft Road Livonia, MI 48150
PHONE:	734-464-3880	**P.O. #**	962
FAX:	734-464-4368	**PROJECT #**	0207040 Brevard Energy
DATE RECEIVED:	03/01/2007	**CONTACT:**	Brandon Dunmore
DATE COMPLETED:	03/13/2007		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.
01A	BVD 1	ASTM D-5504	
01AA	BVD 1 Duplicate	ASTM D-5504	
02A(on hold)	BVD 2	ASTM D-5504	
03A	Lab Blank	ASTM D-5504	NA
04A	LCS	ASTM D-5504	NA

CERTIFIED BY: Linda D. Frumarx DATE: 03/13/07

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004
NY NELAP - 11291, UT NELAP - 9166389892
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/06, Expiration date: 06/30/07
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
ASTM D-5504
Derenzo & Associates
Workorder# 0703006C

Two Bag samples were received on March 01, 2007. The laboratory performed the analysis of sulfur compounds via ASTM D-5504 using GC/SCD. The method involves direct injection of the air sample into the GC via a fixed 1.0 mL sampling loop. See the data sheets for the reporting limits for each compound.

Receiving Notes

The Chain of Custody was not relinquished properly. The discrepancy was noted in the Sample Receipt Confirmation email/fax.

Sample BVD 2 was placed on hold per the client's request.

Sulfur samples were received past the recommended hold time of 24 hours. The discrepancy was noted in the Sample Receipt Confirmation email/fax and the analysis proceeded.

Analytical Notes

Ethyl Methyl Sulfide and n-Butyl Mercaptan coelute with 3-Methyl Thiophene.

An end check was analyzed to verify the stability of the analytical system after sample analysis. The results for this end check were <70% of the known spiked concentration for Dimethyl Sulfide, n-Propyl Mercaptan, and 2,5-Dimethyl Thiophene. Diethyl Sulfide and Tetrahydrothiophene were <50% of the known spiked concentration. This indicates a potential low bias for sample results analyzed on 03/01/2007.

The first analysis of sample BVD 1 exceeded the instrument calibration level. A second analysis was performed using further dilution. Both analyses are reported. Data for the first analysis is reported qualified as a duplicate sample.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

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

Client Sample ID: BVD 1

Lab ID#: 0703006C-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	2400	320000
Methyl Mercaptan	2400	7200
Dimethyl Sulfide	2400	3400

Client Sample ID: BVD 1 Duplicate

Lab ID#: 0703006C-01AA

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	1600	360000 E
Methyl Mercaptan	1600	8200
Dimethyl Sulfide	1600	4200

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: BVD 1

Lab ID#: 0703006C-01A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name: b030111 Date of Collection: 2/28/07
Dil. Factor: 600 Date of Analysis: 3/1/07 02:54 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	2400	320000
Carbonyl Sulfide	2400	Not Detected
Methyl Mercaptan	2400	7200
Ethyl Mercaptan	2400	Not Detected
Dimethyl Sulfide	2400	3400
Carbon Disulfide	2400	Not Detected
Isopropyl Mercaptan	2400	Not Detected
tert-Butyl Mercaptan	2400	Not Detected
n-Propyl Mercaptan	2400	Not Detected
Thiophene	2400	Not Detected
Isobutyl Mercaptan	2400	Not Detected
3-Methyl Thiophene/n-Butyl Mercaptan/Ethyl Methyl Sulfide	2400	Not Detected
Diethyl Sulfide	2400	Not Detected
Dimethyl Disulfide	2400	Not Detected
Tetrahydrothiophene	2400	Not Detected
2-Ethylthiophene	2400	Not Detected
2,5-Dimethylthiophene	2400	Not Detected
Diethyl Disulfide	2400	Not Detected

Container Type: Bag

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: BVD 1 Duplicate

Lab ID#: 0703006C-01AA

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	b030110	Date of Collection:	2/28/07
Dil. Factor:	400	Date of Analysis:	3/1/07 02:22 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	1600	360000 E
Carbonyl Sulfide	1600	Not Detected
Methyl Mercaptan	1600	8200
Ethyl Mercaptan	1600	Not Detected
Dimethyl Sulfide	1600	4200
Carbon Disulfide	1600	Not Detected
Isopropyl Mercaptan	1600	Not Detected
tert-Butyl Mercaptan	1600	Not Detected
n-Propyl Mercaptan	1600	Not Detected
Thiophene	1600	Not Detected
Isobutyl Mercaptan	1600	Not Detected
3-Methyl Thiophene/n-Butyl Mercaptan/Ethyl Methyl Sulfide	1600	Not Detected
Diethyl Sulfide	1600	Not Detected
Dimethyl Disulfide	1600	Not Detected
Tetrahydrothiophene	1600	Not Detected
2-Ethylthiophene	1600	Not Detected
2,5-Dimethylthiophene	1600	Not Detected
Diethyl Disulfide	1600	Not Detected

E = Exceeds instrument calibration range.

Container Type: Bag

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: Lab Blank

Lab ID#: 0703006C-03A

SULFUR GASES BY ASTM D-5504 GC/SCD

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	4.0	Not Detected
Isopropyl Mercaptan	4.0	Not Detected
tert-Butyl Mercaptan	4.0	Not Detected
n-Propyl Mercaptan	4.0	Not Detected
Thiophene	4.0	Not Detected
Isobutyl Mercaptan	4.0	Not Detected
Diethyl Sulfide	4.0	Not Detected
3-Methyl Thiophene/n-Butyl Mercaptan/Ethyl Methyl Sulfide	4.0	Not Detected
Dimethyl Disulfide	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

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: LCS

Lab ID#: 0703006C-04A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	b030102	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis:	3/1/07 08:26 AM

Compound	%Recovery
Hydrogen Sulfide	107
Carbonyl Sulfide	105
Methyl Mercaptan	80
Ethyl Mercaptan	114
Dimethyl Sulfide	95
Carbon Disulfide	117
Isopropyl Mercaptan	104
tert-Butyl Mercaptan	122
n-Propyl Mercaptan	76
Thiophene	95
Isobutyl Mercaptan	111
Diethyl Sulfide	83
3-Methyl Thiophene/n-Butyl Mercaptan/Ethyl Methyl Sulfide	96
Dimethyl Disulfide	99
Tetrahydrothiophene	85
2-Ethylthiophene	87
2,5-Dimethylthiophene	84
Diethyl Disulfide	87

Container Type: NA - Not Applicable

Table C-2. Maximum Sulfur Dioxide Emission Factor for April 2007 Sampling Result

LFG Influent Sulfur Compound	EPA AP-42 Concentrations[A] (ppmv)	Analytical Result[B] (ppmv)	Molecular Formula	No. Sulfur Atoms	Max. Sulfur Content as H_2S (ppmv)	Resulting SO_2 Emission Rate (lb./MMcf)
Hydrogen sulfide	35.50	250.0	H_2S	1	250.0 [C]	41.57 [D]
Carbon disulfide	0.58	ND	CS_2	2	1.2	0.19
Carbonyl sulfide	0.49	ND	CSO	1	0.5	0.08
Dimethyl sulfide	7.82	ND	C_2H_6S	1	7.8	1.30
Ethyl mercaptan	2.28	ND	C_2H_6S	1	2.3	0.38
Methyl mercaptan	2.49	6.10	CH_4S	1	6.1	1.01
Total		**256.1**			**267.9**	**44.53** [E]

Notes

A. 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. Used in place of ND result.

B. Measured concentration

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

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

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

= 41.57 lb SO_2/MMcf LFG

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

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

= 44.53 lb SO_2/MMcf LFG

Air Toxics LTD.
AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0704243B

Work Order Summary

CLIENT:	Mr. David Derenzo Derenzo & Associates 39395 Schoolcraft Road Livonia, MI 48150	**BILL TO:**	Ms. Donna Povich Derenzo & Associates 39395 Schoolcraft Road Livonia, MI 48150
PHONE:	734-464-3880	**P.O. #**	974
FAX:	734-464-4368	**PROJECT #**	0702040B Brevard Energy
DATE RECEIVED:	04/12/2007	**CONTACT:**	Brandon Dunmore
DATE COMPLETED:	04/17/2007		

FRACTION #	NAME	TEST
01A	BVD1	ASTM D-5504
01AA	BVD1 Duplicate	ASTM D-5504
02A(on hold)	BVD2	ASTM D-5504
03A	Lab Blank	ASTM D-5504
04A	LCS	ASTM D-5504

CERTIFIED BY: Linda D. Frumarx DATE: 04/17/07

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004
NY NELAP - 11291, UT NELAP - 9166389892
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/06, Expiration date: 06/30/07
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
ASTM D-5504
Derenzo & Associates
Workorder# 0704243B

Two Bag samples were received on April 12, 2007. The laboratory performed the analysis of sulfur compounds via ASTM D-5504 using GC/SCD. The method involves direct injection of the air sample into the GC via a fixed 1.0 mL sampling loop. See the data sheets for the reporting limits for each compound.

Receiving Notes

Sample BVD2 was placed on hold per the client's request.

The Chain of Custody was not relinquished properly. The discrepancy was noted in the Sample Receipt Confirmation email/fax.

Sample identifications for samples BVD1 and BVD2 were not provided on the sample tags. The discrepancy was noted in the Sample Receipt Confirmation email/fax and the information on the Chain of Custody was used to process and report the samples.

Analytical Notes

Ethyl Methyl Sulfide and n-Butyl Mercaptan coelute with 3-Methyl Thiophene. The corresponding peak is reported as 3-Methyl Thiophene.

The Reporting Limit of Hydrogen Sulfide was raised to 10 ppbv.

The Reporting Limit of Diethyl Sulfide was raised to 10 ppbv.

The Reporting Limit of Tetrahydrothiophene was raised to 30 ppbv.

Samples BVD1 and BVD1 Duplicate were received with insufficient time remaining to analyze within the method specified 24 hour hold time.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates

as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

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

Client Sample ID: BVD1

Lab ID#: 0704243B-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	10000	250000
Methyl Mercaptan	4000	6100

Client Sample ID: BVD1 Duplicate

Lab ID#: 0704243B-01AA

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	10000	300000
Methyl Mercaptan	4000	7200

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: BVD1

Lab ID#: 0704243B-01A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	b041210	**Date of Collection:**	4/11/07
Dil. Factor:	1000	**Date of Analysis:**	4/12/07 10:30 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	10000	250000
Carbonyl Sulfide	4000	Not Detected
Methyl Mercaptan	4000	6100
Ethyl Mercaptan	4000	Not Detected
Dimethyl Sulfide	4000	Not Detected
Carbon Disulfide	4000	Not Detected
Isopropyl Mercaptan	4000	Not Detected
tert-Butyl Mercaptan	4000	Not Detected
n-Propyl Mercaptan	4000	Not Detected
Thiophene	4000	Not Detected
Isobutyl Mercaptan	4000	Not Detected
3-Methyl Thiophene/n-Butyl Mercaptan/Ethyl Methyl Sulfide	4000	Not Detected
Diethyl Sulfide	10000	Not Detected
Dimethyl Disulfide	4000	Not Detected
Tetrahydrothiophene	30000	Not Detected
2-Ethylthiophene	4000	Not Detected
2,5-Dimethylthiophene	4000	Not Detected
Diethyl Disulfide	4000	Not Detected

Container Type: Bag

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: BVD1 Duplicate

Lab ID#: 0704243B-01AA

SULFUR GASES BY ASTM D-5504 GC/SCD

[redacted]

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	10000	300000
Carbonyl Sulfide	4000	Not Detected
Methyl Mercaptan	4000	7200
Ethyl Mercaptan	4000	Not Detected
Dimethyl Sulfide	4000	Not Detected
Carbon Disulfide	4000	Not Detected
Isopropyl Mercaptan	4000	Not Detected
tert-Butyl Mercaptan	4000	Not Detected
n-Propyl Mercaptan	4000	Not Detected
Thiophene	4000	Not Detected
Isobutyl Mercaptan	4000	Not Detected
3-Methyl Thiophene/n-Butyl Mercaptan/Ethyl Methyl Sulfide	4000	Not Detected
Diethyl Sulfide	10000	Not Detected
Dimethyl Disulfide	4000	Not Detected
Tetrahydrothiophene	30000	Not Detected
2-Ethylthiophene	4000	Not Detected
2,5-Dimethylthiophene	4000	Not Detected
Diethyl Disulfide	4000	Not Detected

Container Type: Bag

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: Lab Blank

Lab ID#: 0704243B-03A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	b041203	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	4/11/07 10:06 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	10	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	4.0	Not Detected
Isopropyl Mercaptan	4.0	Not Detected
tert-Butyl Mercaptan	4.0	Not Detected
n-Propyl Mercaptan	4.0	Not Detected
Thiophene	4.0	Not Detected
Isobutyl Mercaptan	4.0	Not Detected
3-Methyl Thiophene/n-Butyl Mercaptan/Ethyl Methyl Sulfide	4.0	Not Detected
Diethyl Sulfide	10	Not Detected
Dimethyl Disulfide	4.0	Not Detected
Tetrahydrothiophene	30	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

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: LCS

Lab ID#: 0704243B-04A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	b041202	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	4/11/07 08:59 PM

Compound	%Recovery
Hydrogen Sulfide	118
Carbonyl Sulfide	89
Methyl Mercaptan	100
Ethyl Mercaptan	113
Dimethyl Sulfide	114
Carbon Disulfide	105
Isopropyl Mercaptan	123
tert-Butyl Mercaptan	111
n-Propyl Mercaptan	112
Thiophene	115
Isobutyl Mercaptan	106
3-Methyl Thiophene/n-Butyl Mercaptan/Ethyl Methyl Sulfide	121
Diethyl Sulfide	123
Dimethyl Disulfide	120
Tetrahydrothiophene	124
2-Ethylthiophene	122
2,5-Dimethylthiophene	133 Q
Diethyl Disulfide	126

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Table C-3. Maximum Sulfur Dioxide Emission Factor for October 2007 Sampling Result

LFG Influent Sulfur Compound	EPA AP-42 Concentrations[A] (ppmv)	Analytical Result[B] (ppmv)	Molecular Formula	No. Sulfur Atoms	Max. Sulfur Content as H_2S (ppmv)	Resulting SO_2 Emission Rate (lb./MMcf)
Hydrogen sulfide	35.50	440.0	H_2S	1	440.0 [C]	73.15 [D]
Carbon disulfide	0.58	ND	CS_2	2	1.2	0.19
Carbonyl sulfide	0.49	ND	CSO	1	0.5	0.08
Dimethyl sulfide	7.82	4.40	C_2H_6S	1	4.4	0.73
Ethyl mercaptan	2.28	ND	C_2H_6S	1	2.3	0.38
Methyl mercaptan	2.49	6.70	CH_4S	1	6.7	1.11
Total		**451.1**			**455.0**	**75.65** [E]

Notes

A. 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. Used in place of ND result.

B. Measured concentration

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

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

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

= 73.15 lb SO_2/MMcf LFG

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

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

= 75.65 lb SO_2/MMcf LFG

Air Toxics LTD.
AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0710145B

Work Order Summary

CLIENT:	Mr. David Derenzo Derenzo & Associates 39395 Schoolcraft Road Livonia, MI 48150	**BILL TO:**	Ms. Donna Povich Derenzo & Associates 39395 Schoolcraft Road Livonia, MI 48150
PHONE:	734-464-3880	**P.O. #**	1002
FAX:	734-464-4368	**PROJECT #**	0706006 Brevard Energy
DATE RECEIVED:	10/05/2007	**CONTACT:**	Brandon Dunmore
DATE COMPLETED:	10/10/2007		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.
01A	BVD1	ASTM D-5504	Tedlar Bag
02A(on hold)	BVD2	ASTM D-5504	Tedlar Bag
03A	Lab Blank	ASTM D-5504	NA
04A	LCS	ASTM D-5504	NA

CERTIFIED BY: Linda A. Truman DATE: 10/10/07

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004
NY NELAP - 11291, UT NELAP - 9166389892
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/07, Expiration date: 06/30/08
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
ASTM D-5504
Derenzo & Associates
Workorder# 0710145B

Two 1 Liter Tedlar Bag samples were received on October 05, 2007. The laboratory performed the analysis of sulfur compounds via ASTM D-5504 using GC/SCD. The method involves direct injection of the air sample into the GC via a fixed 1.0 mL sampling loop. See the data sheets for the reporting limits for each compound.

Receiving Notes

The Chain of Custody (COC) was not relinquished properly. A signature and date were not provided by the field sampler.

Sample BLD2 was placed on hold per the client's request.

Analytical Notes

Ethyl Methyl Sulfide and n-Butyl Mercaptan coelute with 3-Methyl Thiophene.

Sample BVD1 was received with insufficient time remaining to analyze within the method specified 24 hour hold time.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

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

Client Sample ID: BVD1

Lab ID#: 0710145B-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	2000	440000
Methyl Mercaptan	2000	6700
Dimethyl Sulfide	2000	4400

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: BVD1

Lab ID#: 0710145B-01A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	I100505	**Date of Collection:**	10/4/07
Dil. Factor:	500	**Date of Analysis:**	10/5/07 10:07 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	2000	440000
Carbonyl Sulfide	2000	Not Detected
Methyl Mercaptan	2000	6700
Ethyl Mercaptan	2000	Not Detected
Dimethyl Sulfide	2000	4400
Carbon Disulfide	2000	Not Detected
Isopropyl Mercaptan	2000	Not Detected
tert-Butyl Mercaptan	2000	Not Detected
n-Propyl Mercaptan	2000	Not Detected
Thiophene	2000	Not Detected
Isobutyl Mercaptan	2000	Not Detected
3-Methyl Thiophene/n-Butyl Mercaptan/Ethyl Methyl Sulfide	2000	Not Detected
Diethyl Sulfide	2000	Not Detected
Dimethyl Disulfide	2000	Not Detected
Tetrahydrothiophene	2000	Not Detected
2-Ethylthiophene	2000	Not Detected
2,5-Dimethylthiophene	2000	Not Detected
Diethyl Disulfide	2000	Not Detected

Container Type: 1 Liter Tedlar Bag

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: Lab Blank

Lab ID#: 0710145B-03A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	I100503	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	10/5/07 09:08 AM

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	4.0	Not Detected
Isopropyl Mercaptan	4.0	Not Detected
tert-Butyl Mercaptan	4.0	Not Detected
n-Propyl Mercaptan	4.0	Not Detected
Thiophene	4.0	Not Detected
Isobutyl Mercaptan	4.0	Not Detected
3-Methyl Thiophene/n-Butyl Mercaptan/Ethyl Methyl Sulfide	4.0	Not Detected
Diethyl Sulfide	4.0	Not Detected
Dimethyl Disulfide	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

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: LCS

Lab ID#: 0710145B-04A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	I100502	**Date of Collection:**	NA
Dil. Factor:	1.00	**Date of Analysis:**	10/5/07 08:31 AM

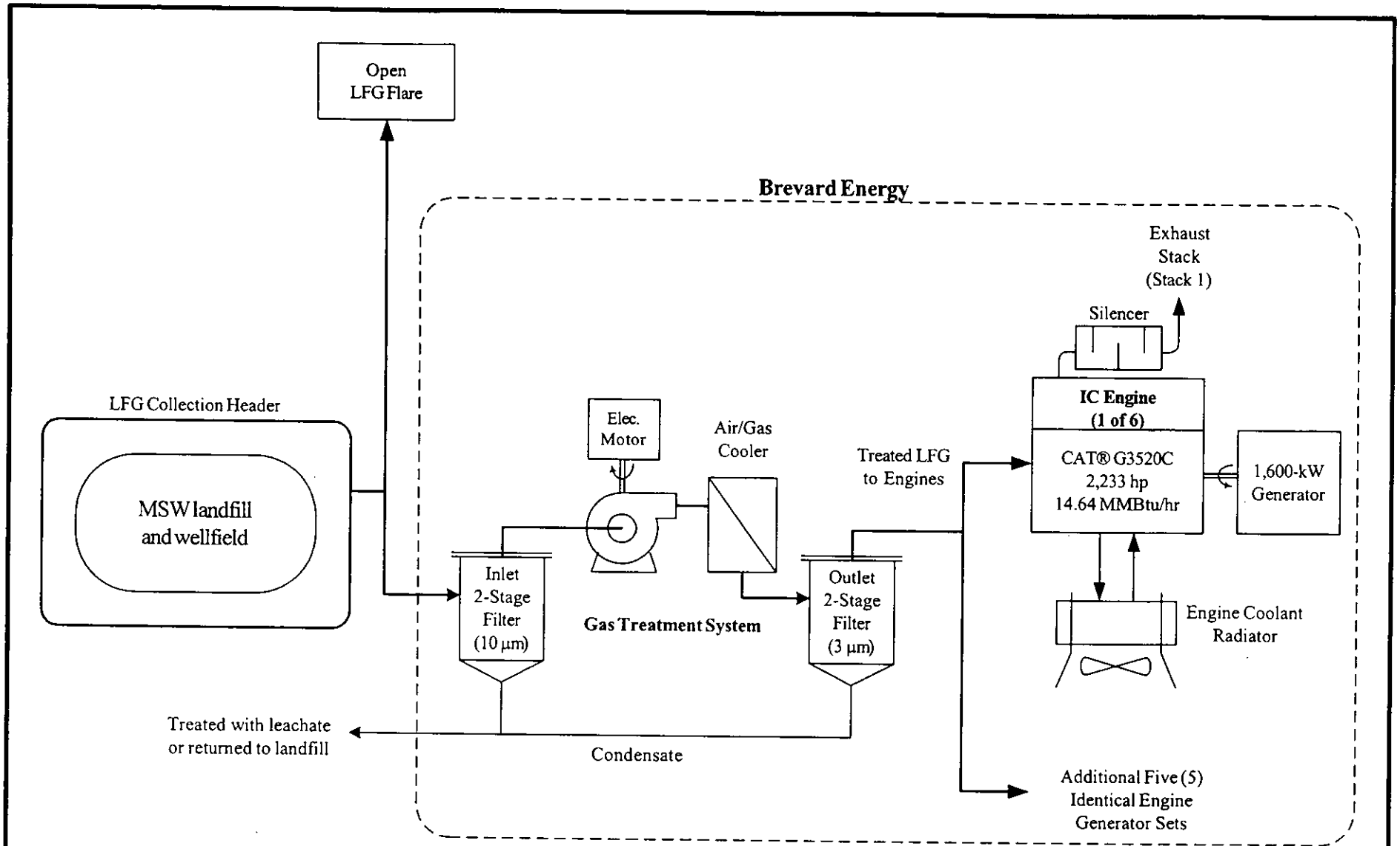
Compound	%Recovery
Hydrogen Sulfide	110
Carbonyl Sulfide	93
Methyl Mercaptan	102
Ethyl Mercaptan	104
Dimethyl Sulfide	97
Carbon Disulfide	102
Isopropyl Mercaptan	105
tert-Butyl Mercaptan	103
n-Propyl Mercaptan	105
Thiophene	104
Isobutyl Mercaptan	97
3-Methyl Thiophene/n-Butyl Mercaptan/Ethyl Methyl Sulfide	110
Diethyl Sulfide	108
Dimethyl Disulfide	120
Tetrahydrothiophene	128
2-Ethylthiophene	124
2,5-Dimethylthiophene	132 Q
Diethyl Disulfide	130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

APPENDIX D

FACILITY PLOT PLAN, PROCESS FLOW AND ENGINEERING SPECIFICATIONS FOR THE CAT® MODEL 3520C GAS IC ENGINE



05/17/06	**Brevard Energy, L.L.C.** **LFG Electricity Generation Facility**		
	Scale None	Sheet 1 of 1	Derenzo and Associates Project No. 0603003

G3520C

GAS ENGINE TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED:	1200	FUEL:	LOW ENERGY (1 43 CH4:CO2 RATIO)
COMPRESSION RATIO:	11.3:1	FUEL SYSTEM:	CAT LOW PRESSURE WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 1 MAX. INLET (°F):	218		
AFTERCOOLER - STAGE 2 MAX. INLET (°F):	130	FUEL PRESS. RANGE (PSIG):	1.5 - 5.0
JACKET WATER - MAX. OUTLET (°F):	230	MIN. METHANE NUMBER:	135
COOLING SYSTEM:	JW+1AC, OC+2AC	RATED ALTITUDE (FT):	1378
IGNITION SYSTEM:	ADEM3	AT AIR TO TURBO. TEMP. (°F):	77
EXHAUST MANIFOLD:	DRY	NOx EMISSION LEVEL:	0.5 g/bhp-hr
COMBUSTION:	LOW EMISSION	FUEL LHV (BTU/SCF):	456
		APPLICATION:	GENSET

RATING AND EFFICIENCY		NOTES	LOAD	100%	75%	50%
ENGINE POWER	(WITHOUT FAN)	(1)	BHP	2233	1675	1116
GENERATOR POWER	(WITHOUT FAN)	(2)	EKW	1600	1200	800
ENGINE EFFICIENCY	(ISO 3046/1)	(3)	%	**41.3**	**39.7**	**37.2**
ENGINE EFFICIENCY	(NOMINAL)	(3)	%	40.3	38.7	36.3
THERMAL EFFICIENCY	(NOMINAL)	(4)	%	39.9	40.0	39.6
TOTAL EFFICIENCY	(NOMINAL)	(5)	%	80.2	78.7	75.9

ENGINE DATA						
FUEL CONSUMPTION	(ISO 3046/1)	(6)	**BTU/bhp-hr**	**6170**	**6411**	**6843**
FUEL CONSUMPTION	(NOMINAL)	(6)	BTU/bhp-hr	6320	6568	7010
AIR FLOW (77 °F, 14.7 psi)		(7)	SCFM	4360	3309	2294
AIR FLOW		(7)	lb/hr	19331	14670	10171
COMPRESSOR OUT PRESSURE			in. HG (abs)	100.2	75.2	52.7
COMPRESSOR OUT TEMPERATURE			°F	361	289	208
AFTERCOOLER AIR OUT TEMPERATURE			°F	141	138	137
INLET MAN. PRESSURE		(8)	in. HG (abs)	91.6	69.6	48.3
INLET MAN. TEMPERATURE	(MEASURED IN PLENUM)	(9)	°F	141	138	137
TIMING		(10)	°BTDC	28	28	28
EXHAUST STACK TEMPERATURE		(11)	°F	896	942	964
EXHAUST GAS FLOW (@ stack temp.)		(12)	CFM	12045	9469	6682
EXHAUST MASS FLOW		(12)	lb/hr	21569	16415	11412

EMISSIONS DATA					
NOx (as NO2)	(13)	g/bhp-hr	0.5	0.5	0.5
NTE CO	(14)	g/bhp-hr	4.2	4.28	4.37
NOMINAL CO	(15)	g/bhp-hr	2.5	2.5	2.5
THC (molecular weight of 15.84)	(14)	g/bhp-hr	5.34	6.04	7.31
NMHC (molecular weight of 15.84)	(14)	g/bhp-hr	0.81	0.91	1.1
EXHAUST O2	(16)	% DRY	8.5	8.3	8.1
LAMBDA	(16)		1.70	1.65	1.61

HEAT BALANCE DATA					
LHV INPUT	(17)	BTU/min	235181	183288	130422
HEAT REJECTION TO JACKET	(18)	BTU/min	25082	22244	18780
HEAT REJECTION TO ATMOSPHERE	(19)	BTU/min	7210	6034	4857
HEAT REJECTION TO LUBE OIL	(20)	BTU/min	9888	9338	8840
HEAT REJECTION TO EXHAUST (LHV to 77°F)	(21)	BTU/min	73582	60917	44770
HEAT REJECTION TO EXHAUST (LHV to 350°F)	(21)	BTU/min	55468	46004	33318
HEAT REJECTION TO A/C - STAGE 1	(22)	BTU/min	13345	5012	-474
HEAT REJECTION TO A/C - STAGE 2	(23)	BTU/min	9410	6751	4326

CONDITIONS AND DEFINITIONS

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

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

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

FOR NOTES INFORMATION CONSULT PAGE THREE.

FUEL USAGE GUIDE

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

ALTITUDE DERATION FACTORS

AIR TO TURBO (°F)	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	0.96	0.92	0.89	0.86	0.82	0.79	0.76	0.73	0.71	0.68	0.65	0.63	0.60
120	0.97	0.94	0.90	0.87	0.84	0.81	0.78	0.75	0.72	0.69	0.66	0.64	0.61
110	0.99	0.96	0.92	0.89	0.85	0.82	0.79	0.76	0.73	0.70	0.67	0.65	0.62
100	1.00	0.97	0.94	0.90	0.87	0.84	0.80	0.77	0.74	0.71	0.69	0.66	0.63
90	1.00	0.99	0.95	0.92	0.88	0.85	0.82	0.79	0.76	0.73	0.70	0.67	0.64
80	1.00	1.00	0.97	0.94	0.90	0.87	0.83	0.80	0.77	0.74	0.71	0.68	0.66
70	1.00	1.00	0.99	0.95	0.92	0.88	0.85	0.82	0.79	0.75	0.72	0.70	0.67
60	1.00	1.00	1.00	0.97	0.94	0.90	0.87	0.83	0.80	0.77	0.74	0.71	0.68
50	1.00	1.00	1.00	0.99	0.95	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

AIR TO TURBO (°F)	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	1.34	1.39	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41
120	1.27	1.32	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
110	1.20	1.25	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27
100	1.14	1.18	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
90	1.07	1.11	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
80	1.00	1.04	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

ALTITUDE (FEET ABOVE SEA LEVEL)

FREE FIELD MECHANICAL & EXHAUST NOISE

100% Load Data			dB(A)	(dB)							
Free Field Mechanical	DISTANCE FROM THE ENGINE (FEET)	3.2	108.5	51.5	78.7	88.2	92.9	99.9	97.3	93.2	99.2
		22.9	91.6	34.6	59.0	68.1	74.0	83.0	79.4	75.1	85.2
		49.2	85.0	28.0	55.2	64.7	69.4	76.4	73.8	69.7	75.7
Free Field Exhaust	DISTANCE FROM THE ENGINE (FEET)	4.9	106.1	67.5	86.5	96.0	88.5	88.7	90.1	95.6	92.7
		22.9	92.7	54.1	73.1	82.6	75.1	75.3	76.7	82.2	79.3
		49.2	86.1	47.5	66.5	76.0	68.5	68.7	70.1	75.6	72.7
			Overal SPL	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 khz
				Octave Band Center Frequency (OBCF)							

FUEL USAGE GUIDE:

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

ALTITUDE DERATION FACTORS:

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

INLET AND EXHAUST RESTRICTION CORRECTIONS FOR ALTITUDE CAPABILITY:

To determine the appropriate altitude derate factor to be applied to this engine for inlet or exhaust restrictions differenng from the standard conditions listed on page 1, a correction to the site altitude can be made to adjust for this difference. Add 039 feet to the site altitude for each additional inch of H2O of exhaust stack pressure greater than spec sheet conditions. Add 070 feet to the site altitude for each additional inch of H2O of inlet restriction greater than spec sheet conditions. If site inlet restriction or exhaust stack pressure are less than spec sheet conditions, the same trends apply to lower the site altitude.

ACTUAL ENGINE RATING:

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

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

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

AFTERCOOLER HEAT REJECTION FACTORS:

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

SOUND DATA:

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

NOTES

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

2 FACTOR OF 0.8 [GENERATOR POWER = ENGINE POWER x GENERATOR EFFICIENCY].

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

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

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

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

7 UNDRIED AIR. FLOW TOLERANCE IS ± 5 %

8 INLET MANIFOLD PRESSURE TOLERANCE IS ± 5 %

9 INLET MANIFOLD TEMPERATURE TOLERANCE IS ± 9°F.

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

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

12 WET EXHAUST. FLOW TOLERANCE IS ± 6 %

13 NOX TOLERANCES ARE ± 18 % OF SPECIFIED VALUE.

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

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

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

17 LHV RATE TOLERANCE IS ± 2.5%.

18 (ACHRF-1). TOLERANCE IS ± 10 % OF FULL LOAD DATA.

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

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

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

22 TOLERANCE IS ± 5 % OF FULL LOAD DATA.

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

APPENDIX E

EMISSION RATE CALCULATIONS

Table E-1. Proposed Criteria Air Pollutant (and total HAP) Emission Rates for LFG-Fueled Internal Combustion Engines

1-CAT® G3520C IC Engine Specifications			6 -CAT® G3520C IC Engines	
Engine output	2233	hp	-	
Min. LFG LHV	420.0	Btu/scf	-	
Heat input rate (LHV)	14.64	MMBtu/hr	87.84	MMBtu/hr
Heat input rate (HHV)	16.27	MMBtu/hr		
Fuel consumption	34,857	scf/hr	209143	scf/hr
	581.0	scfm	3485.7	scfm
	0.837	MMscf/day	5.02	MMscf/day

		Pollutant Emission Factors			Pollutant Emission Rates Per Engine		Facility Emission Rate
Regulated Pollutant		(g/bhp-hr)	(lb/MMscf)	(lb/MMBtu)	(lb/hr)	(TpY)	(TpY)
Nitrogen Oxides	NO_X	0.60	--	--	2.95	12.94	77.62
Carbon Monoxide	CO	2.75	--	--	13.54	59.30	355.77
Sulfur Dioxide	SO2	--	75.65	0.180	2.64	11.55	69.30
VOC	VOC	0.28	--	--	1.37	5.99	35.97
Particulate Matter	PM10	0.24	--	--	1.18	5.17	31.05
Hazardous Air Pollutants	HAPs	--	13.8	0.033	0.48	2.11	12.65
Hydrogen Chloride	HCl	--	12.0	0.028	0.42	1.82	10.95

Notes

Table E-1 and Appendix C provide lb/MMscf emission data for SO_2

Table E-2. Average Sulfur Dioxide Emission Factor for LFG Combustion

LFG Influent Sulfur Compound	Utilized Concentrations (ppmv)	Molecular Formula	No. Sulfur Atoms	Sulfur Content as H_2S (ppmv)	Resulting SO_2 Emission Rate (lb./MMcf)
Hydrogen sulfide	455.0 [A]	H_2S	1	455.0	75.65 [B]

A. Proposed maximum landfill gas sulfur content as H_2S.

B. Calculation of SO_2 emission factor from sulfur content, as H_2S:
(455.0 scf H_2S/MMcf LFG) (1 scf SO_2/scf H_2S) (64.06 lb.SO_2/mol) / (385.3 ft^3/mol)
= 75.65 lb SO_2/MMcf LFG

Table E-3. Maximum Sulfur Dioxide Emission Factor for LFG Combustion (Used for short-term averaging periods in dispersion model)

LFG Influent Sulfur Compound	Utilized Concentrations (ppmv)	Molecular Formula	No. Sulfur Atoms	Sulfur Content as H_2S (ppmv)	Resulting SO_2 Emission Rate (lb./MMcf)
Hydrogen sulfide	550.0 [A]	H_2S	1	550.0	91.44 [B]

A. Proposed maximum landfill gas sulfur content as H_2S.

B. Calculation of SO_2 emission factor from sulfur content, as H_2S:
(550.0 scf H_2S/MMcf LFG) (1 scf SO_2/scf H_2S) (64.06 lb.SO_2/mol) / (385.3 ft^3/mol)
= 91.44 lb SO_2/MMcf LFG

Table E-4. Summary of sulfur sampling data

Sample Date	Emission Factor (lb/MMcf)	Sulfur Content (ppm H_2S)
February 2007	62.57	376.3
April 2007	44.53	267.9
October 2007	75.65	455.0
Average	*60.92*	*366.4*

Table E-5. Emission Increase Determination

	Flow (scfm)	SO_2 Factor (lb/MMscf)	Emissions (TpY)	Increase (TpY)
Baseline				
Flare	2183	60.92	34.9	
Engine Plant	0	60.92	0.0	
Total	2183	60.92	34.9	NA
Projected (avg sulfur)				
Flare	1467	60.92	23.5	
Engine Plant	3253	60.92	52.1	
Total	4720	60.92	75.6	40.6
Potential (455 ppm H_2S)				
Flare	1234	75.65	24.5	
Engine Plant	3486	75.65	69.3	
Total	4720	75.65	93.8	58.9

APPENDIX F

HISTORICAL OPERATING FLARE DATA

Brevard County
Central Disposal Facility Flares

Weekly flow readings

2005	SCFM
Jan-05	2,113
Jan-05	2,158
Jan-05	2,237
Jan-05	2,252
Feb-07	2,134
Feb-07	2,112
Feb-07	2,131
Feb-07	2,133
Feb-07	2,128
Mar-05	2,098
Mar-05	2,252
Mar-05	2,220
Mar-05	2,196
Apr-05	2,180
Apr-05	2,224
Apr-05	2,184
Apr-05	2,161
May-05	2,078
May-05	2,158
May-05	2,206
May-05	2,225
May-05	2,231
Jun-05	2,223
Jun-05	2,231
Jun-05	2,283
Jun-05	2,238
Jul-05	2,476
Jul-05	2,168
Jul-05	2,322
Jul-05	2,369
Aug-05	2,393
Aug-05	2,419
Aug-05	2,312
Aug-05	2,234
Aug-05	2,379
Sep-05	2,356
Sep-05	2,362
Sep-05	2,366
Sep-05	2,362
Oct-05	2,412
Oct-05	2,442
Oct-05	2,493
Oct-05	2,332
Nov-05	2,139
Nov-05	2,112
Nov-05	2,090
Nov-05	1,868
Dec-05	1,864
Dec-05	2,195
Dec-05	2,077
Dec-05	2,016

2006			SCFM
12/29/2005	-	1/5/2006	1,997
1/5/2006	-	1/12/2006	1,999
1/12/2006	-	1/19/2006	1,856
1/19/2006	-	1/26/2006	1,779
1/26/2006	-	2/6/2006	1,952
2/6/2006	-	2/13/2006	2,124
2/13/2006	-	2/20/2006	2,153
2/20/2006	-	2/28/2006	2,153
2/28/2006	-	3/7/2006	2,103
3/7/2006	-	3/14/2006	2,058
3/14/2006	-	3/21/2006	2,076
3/21/2006	-	3/28/2006	2,051
3/28/2006	-	4/4/2006	2,031
4/4/2006	-	4/11/2006	1,975
4/11/2006	-	4/18/2006	1,932
4/18/2006	-	4/25/2006	1,959
4/25/2006	-	5/2/2006	1,994
5/2/2006	-	5/9/2006	2,201
5/9/2006	-	5/16/2006	1,993
5/16/2006	-	5/23/2006	1,728
5/23/2006	-	5/30/2006	3,058
5/30/2006	-	6/6/2006	2,900
6/6/2006	-	6/13/2006	2,301
6/13/2006	-	6/20/2006	1,772
6/20/2006	-	6/27/2006	2,039
6/27/2006	-	7/5/2006	1,846
7/5/2006	-	7/11/2006	1,335
7/11/2006	-	7/18/2006	1,513
7/18/2006	-	7/25/2006	1,872
7/25/2006	-	8/1/2006	2,125
8/1/2006	-	8/8/2006	1,918
8/8/2006	-	8/15/2006	1,910
8/15/2006	-	8/22/2006	1,879
8/22/2006	-	8/31/2006	2,111
8/31/2006	-	9/6/2006	2,389
9/6/2006	-	9/13/2006	3,471
9/13/2006	-	9/22/2006	2,369
9/22/2006	-	9/22/2006	2,148
9/22/2006	-	10/5/2006	2,185
10/5/2006	-	10/13/2006	1,369
10/13/2006	-	10/19/2006	2,344
10/19/2006	-	10/26/2006	2,254
10/26/2006	-	11/3/2006	2,209
11/3/2006	-	11/9/2006	2,213
11/9/2006	-	11/16/2006	2,180
11/16/2006	-	11/22/2006	1,839
11/22/2006	-	11/29/2006	2,482
11/29/2006	-	12/6/2006	2,443
12/6/2006	-	12/13/2006	2,294
12/13/2006	-	12/22/2006	2,258
12/22/2006	-	12/27/2006	2,246
12/27/2006	-	1/3/2007	2,244

2007			SCFM
01/03/07	-	01/10/07	2,241
01/10/07	-	01/17/07	2,205
01/17/07	-	01/24/07	1,926
01/24/07	-	01/31/07	2,303
01/31/07	-	02/07/07	2,389
02/07/07	-	02/14/07	2,460
02/14/07	-	02/23/07	2,277
02/23/07	-	03/01/07	2,180
03/01/07	-	03/09/07	2,370
03/09/07	-	03/15/07	2,321
03/15/07	-	03/21/07	2,358
03/21/07	-	03/28/07	2,367
03/28/07	-	04/04/07	2,383
04/04/07	-	04/13/07	2,349
04/13/07	-	04/18/07	2,274
04/18/07	-	04/25/07	2,286
04/25/07	-	05/02/07	2,297
05/02/07	-	05/09/07	2,278
05/09/07	-	05/16/07	2,159
05/16/07	-	05/23/07	2,087
05/23/07	-	05/30/07	2,303
05/30/07	-	06/06/07	2,146
06/06/07	-	06/13/07	2,138
06/13/07	-	06/21/07	2,194
06/21/07	-	06/27/07	2,198
06/27/07	-	07/05/07	2,180
07/05/07	-	07/12/07	2,107
07/12/07	-	07/19/07	2,046
07/19/07	-	07/26/07	2,068

Average for July 2005 through June 2007: 2,183 scfm

APPENDIX G

AIR QUALITY MODELING PROTOCOL
AND
AMBIENT AIR IMPACT RESULTS
FOR
BREVARD ENERGY, L.L.C.

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AIR QUALITY MODELING PROTOCOL
AND
AMBIENT AIR IMPACT RESULTS
FOR
BREVARD ENERGY, L.L.C.
PERMIT NO. PSD-FL-378

1.0 INTRODUCTION TO AIR QUALITY IMPACT ANALYSES

Brevard Energy, LLC (Brevard Energy) has been issued Air Construction Permit 0090069-004-AC, PSD-FL-378 (Permit PSD-FL-378) for the construction and operation of an electricity generation facility, which will result in the beneficial use of landfill gas (LFG) that is generated by the Brevard County Solid Waste Management Central Disposal Facility (Central Disposal Facility).

Brevard Energy is requesting that conditions of Permit PSD-FL-378 be modified to increase the SO_2 emission factor and rate that is allowed for the permitted facility. The magnitude of the SO_2 emission factor and rate increase that is proposed for the permitted facility exceeds the Prevention of Significant Deterioration (PSD) significant SO_2 emission rate threshold of 40 tons per year (TpY) as defined by Florida Administrative Code (F.A.C.) Chapter 62-212 *Stationary Sources-Preconstruction Review* (i.e., the proposed 75.65 lb/MMscf emission factor results in a potential annual SO_2 emission rate of 93.8 TpY; and the permitted facility is a major PSD source for carbon monoxide).

1.1 Class II Area Impacts

The Brevard Energy LFG-fueled electricity generation facility is a permitted major source of CO emissions relative to federal Prevention of Significant Deterioration (PSD) regulations. Therefore, air quality impact analyses are required for all regulated criteria pollutants (CO, NO_X, SO_2, PM_{10}, except ozone) that have the potential to be emitted by the facility in order to demonstrate that these emissions will not cause or significantly contribute to a violation of National Ambient Air Quality Standards (NAAQS). Analysis for CO, NO_X and PM_{10} includes the same protocol and results that were presented in the document "*Appendix I: Air Quality Modeling Protocol and Ambient Air Impact Results for Brevard Energy, L.L.C.*" dated November 2006.

The calculated ambient air impact results are compared to Class II Area PSD increment concentrations to demonstrate that the proposed project emissions are acceptable relative to federal PSD program requirements.

This protocol presents technical information and procedures that were used for performing air pollutant dispersion modeling analyses to predict maximum ambient air impacts that are produced by the electricity generation facility, existing flare emissions and appropriate background sources.

Section 3.0 of this protocol presents technical information and procedures that were used to perform the Class II Area impact analyses.

1.2 Class I Areas

The Brevard Landfill in Cocoa, Florida is located 175 kilometers from the nearest national wilderness areas. Based on the minimum distance to Class I designated areas (175 km) and the results of visibility and Class I impact analyses performed for similar facilities (refer to application PSD-FL-374 for Trail Ridge Energy) Brevard Energy expects that the facility will not have significant pollutant or visibility impacts within any Class I areas.

Table G-1.1 presents the distances from the Brevard Energy facility to the closest three (3) Class I Areas.

Table G-1.1 National Wilderness Areas and their approximate distances from the Brevard Energy Facility

State	Wilderness Area	Representative UTM coordinates (km) East	North	Distance (km)
FL	Brevard Energy Facility	3,140	517	-
FL	Chassahowitzka Wilderness Area	3,174	344	175
GA	Okefenokee National Wilderness Area	3,385	383	278
FL	Everglades National Park	2,860	551	282

2.0 SITE CHARACTERISTICS AND FACILITY INFORMATION

Brevard Landfill owns approximately 4.40 square kilometers (km^2) of land to the west of US Highway 95, on the western edge of Cocoa about 5 miles from the east coast. The property owned by Brevard County has dimensions of 8,809 feet running north/south and 5,380 feet running east/west. The Central Disposal Facility (portion of the property currently used for waste disposal) occupies an estimated one-fourth of the Brevard County property. The Central Disposal Facility is located in the center of the north half of the property. The electricity generation facility will be located south of the landfill; approximately in the center of the county owned property.

The LFG fueled internal combustion (IC) engines will be housed in a single building (with dimensions of 62.7 feet by 108.7 feet) constructed in a leased area (within the landfill property) near the existing LFG collection system header. A gas transmission line (fuel supply pipe) will be connected to the header of the existing LFG collection system and a dedicated gas blower/compressor will be used to draw methane-rich gas (fuel) from the existing LFG collection system to the gas treatment system and electricity generation facility.

A single meter (flow totalizer) will be installed and operated at the Brevard Energy electricity generation facility to measure the total amount of LFG fuel that is supplied to power the six (6) IC engines (i.e., individual engine fuel use meters will not be installed).

Brevard Landfill owns and operates three (3) utility flares to control landfill gas emissions. Predicted LFG flowrates for the utility flares are presented in Section 2.3.2 of this protocol.

2.1 Land Use

The population density of the area within a radius of 1 km from the source was determined using a county population density map from the 2000 U.S. Census Bureau. The density map indicates that the area surrounding the facility has a population density between 0 and 296 persons per square mile. Because the area surrounding the Brevard Energy facility has a population density significantly less than 1000 persons per square mile (and no significant development has occurred since the 2000 census), the general classification of the land use can be considered rural. The Census Bureau lists urban areas as having at least 1000 persons per square mile. The facility location is not in an industrial area that would significantly impact the population density analysis (in heavy industrial areas the non-resident population may be much larger than those indicated by standard population density plots).

2.2 Topography

The topography of the land that surrounds the Brevard Landfill is relatively flat. The base elevation of the electricity generation facility is approximately 6.4 meters (21 ft.) above sea level

and the minimum stack heights of the IC engine exhaust stacks is 20 feet (as measured from local grade), which results in an exhaust stack release elevation of 41 feet above sea level. Based on a review of topography plots of the surrounding area there is no terrain within 3 km that has elevations greater than 41 feet above sea level.

Appendix G-1 provides a site plan of the electricity generation facility and surrounding topography.

2.3 Exhaust Stack Parameters

2.3.1 IC Engines

The Brevard Energy electricity generation facility will use IC engines that are fueled with treated LFG and designed to operate at base load (100% capacity) conditions. Each of the IC engines is expected to exhaust effluent gas at a rate of 12,050 actual cubic feet per minute (acfm) at 900°F through an 18-inch diameter stack. These engines will operate continuously with the exception of planned maintenance shutdowns or automatic engine shutdowns (instantaneous, automatic engine shutdowns if monitored operating parameters are outside of preset ranges). The amount of time required for an engine start-up is minimal. Since the engines are operated at base load conditions and the durations of engine shutdown and startup times are minimal, no air quality impact concentrations analyses were performed for these specific events (i.e., the engines will not be operated for any appreciable amount of time at loads other than 100%).

Each of the six IC engine exhaust stacks were entered into the computer dispersion model as individual point sources.

2.3.2 Open Utility Flares

The Central Disposal Facility LFG control system consists of two flares that have a combined total control capacity of 4,720 scfm. This control capacity has been determined (by the Central Disposal Facility) to be adequate for the life of the landfill based on its permitted design capacity (i.e., the Central Disposal Facility permitted capacity is not expected to generate more than 4,720 scfm of collectable LFG).

The FDEP-DARM issued the Central Disposal Facility a revision to its Title V Operating Permit in 2004 that allowed for the installation and operation of a third LFG flare, which was installed to provide redundancy for the existing LFG control systems. While the third flare provides additional LFG control, the potential LFG control requirement for the landfill remains at 4,720 scfm of collectable LFG. The electricity generation facility has the capacity to receive 3,486 scfm. At the minimum landfill gas generation rate (4,770 scfm) 1,234 scfm is required to be controlled in Flares 1 and 2.

Flares 1 and 2 have actual release heights of 8.53 m; an equivalent release height and diameter were calculated for the flares based on the actual release height and design heat release using the following equations from the TSCREEN users manual:

$H_{equiv} = H_{actual} + 0.00128(Q_c^{0.478})$; and
$D_{equiv} = 1.754*10^{-4} * sqrt(Q_c)$

Where: H_{equiv} = Equivalent stack height
H_{actual} = Actual stack height (8.53 m for Flares 1 & 2)
D_{equiv} = Equivalent stack diameter (m); and
Q_c = Flared gas heat release ($44.424*10^6$ Btu/hr for Flares 1 & 2)

The equations above account for the flared gas plume rise based on an effective buoyancy flux parameter. Using a gas heat release rate equivalent to the combustion of 1,234 scfm of gas for Flares 1 and 2 at 550 Btu/scf results in an equivalent flare height of 14.32 m and an equivalent diameter of 1.169 m.

The flares were entered into the computer dispersion model as one point source (Flares 1 and 2 have identical release parameters and emissions) using the calculated equivalent height, diameter and default value for temperature (1000 degrees Celsius) and velocity (20 meters per second).

Table G-2.1 presents exhaust stack parameters for the six (6) identical IC engines (BICE 01 through 06) and the utility flare that were used in the air quality impact analyses.

Appendix G-2 provides a plot plan of the electricity generation facility building, IC engine exhaust stacks and flare on a UTM coordinate system.

2.4 GEP Stack Height Analysis and Influencing Structures

The IC engines will be installed within a 62.7 ft. (width) by 108.7 ft. (length) building that has a roof height of 15 ft. The individual exhaust stacks will be located on the roof of the building. The stacks will extend above the roof at least 5 feet (i.e., overall engine exhaust release height of 20 ft. as measured from grade of the land that surrounds the building) and exhaust vertically. The electricity generation facility has a maximum projected crosswind width of 125.5 feet (i.e., the diagonal of the rectangular building).

In general, air pollutant dispersion models consider the influence of building structures on exhaust stack plumes (i.e., downwash conditions) when the exhaust stack has a height that is less than its Good Engineering Practice (GEP) stack height. The GEP stack height for the engine exhaust stacks is 37.5 ft. (11.43 meters) determined with the following equation:

$H_{GEP} = H_b + 1.5L$

where: H_{GEP} = formula GEP stack height (ft.)
H_b = height of adjacent building (15 ft.)
L = lesser of height or maximum projected width of adjacent building (15 ft)

Other nearby structures have the potential to influence the plume rise of the engine exhaust stacks if the distance between the stacks and the nearby structure is less than five times the L dimension (lesser of the building height or maximum projected width) of the structure. There are no other nearby structures located within the 5L radius.

There are no other structures located near the electricity generation facility that have the potential to increase the calculated GEP stack height (i.e., the dimensions of the facility control the GEP stack height determination). The release height of the identical engine exhaust stacks is less than the GEP stack height (based on the dimensions of the structure in which the engines will be installed); therefore, emissions from the electricity generation facility exhaust stacks have the potential to be influenced by aerodynamic downwash created by the building that houses the equipment. The influence of stack downwash on emission impacts was included in the dispersion modeling analyses.

The UTM coordinate locations and heights of the influencing structure (i.e., the building that houses the engines) and engine exhaust stacks were input to the USEPA Building Profile Input Program, Plume Rise Enhancement version (BPIP-PRIME). This computer program calculates projected building widths and heights for the influencing structure as a function of wind direction for use in the building downwash algorithms of the dispersion model that is used for the significant impact analysis (which is described in the following section of this document).

Appendix G-3 provides a compact disc that contains the BPIP input files (.PIP and .GPW files) and output building parameter files (.TAB, .SUM and .SO files) that were used in the modeling analysis.

Table G-2.1 Exhaust stack parameters for the LFG combustion devices; open utility flares and Brevard Energy facility

Source ID	Location (UTM) East (m)	Location (UTM) North (m)	Base Elev. (m)	Stack Height (m)	Stack Height (ft)	Stack Diameter (m)	Stack Diameter (ft)	Temp. (K)	Exit Velocity (m/s)
BICE01	516,755	3,140,579	6.40	6.09	20.0	0.457	1.5	755	34.64
BICE02	516,760	3,140,579	6.40	6.09	20.0	0.457	1.5	755	34.64
BICE03	516,765	3,140,579	6.40	6.09	20.0	0.457	1.5	755	34.64
BICE04	516,770	3,140,579	6.40	6.09	20.0	0.457	1.5	755	34.64
BICE05	516,775	3,140,579	6.40	6.09	20.0	0.457	1.5	755	34.64
BICE06	516,780	3,140,579	6.40	6.09	20.0	0.457	1.5	755	34.64
FLARE1/2†	516,760	3,140,709	6.40	14.09	46.21	1.120	3.67	1273	20.00

† Data presented for height and diameter are equivalent values calculated for open flares, using equations from the TSCREEN users manual. Exit temperature and velocity are default values for open flares.

3.0 CLASS II AREA SIGNIFICANT IMPACT ANALYSIS

3.1 Purpose

A new source that has potential criteria air pollutant emissions in excess of PSD major source thresholds is required to perform analyses to determine whether its regulated air pollutant emissions will significantly impact the ambient air in designated Class II areas. In NAAQS attainment areas, a demonstration that indicates the maximum predicted ambient air pollutant impacts (concentrations) caused by the emissions of a proposed source are less than the applicable PSD significant impact levels is equivalent to a demonstration of compliance with Federal and State ambient air standards.

Table G-3.1 presents PSD significant impact levels established for Class II areas.

Air pollutant emissions from major sources that result in predicted ambient air impacts that exceed the significant impact levels are required to perform additional modeling to consider the cumulative impact caused by background emission sources and regional air pollutant background concentrations to demonstrate compliance with PSD increment consumption requirements and applicable federal ambient air quality standards (NAAQS).

For the purposes of the Class II modeling demonstration the criteria pollutant emissions from the operation of the IC engines at 100% capacity, and the utility flares operating at a capacity of 1,234 scfm were considered in order to provide the most conservative (i.e., maximum) estimate of ambient air impacts.

3.2 Criteria Pollutant Emission Rates

Table G-3.2 presents criteria pollutant emission rates for the electricity generation facility that were used in the modeling analysis. The maximum SO_2 and NO_2 impacts produced by the electricity generation facility were based on the total conversion of SO_X compounds to SO_2, and 75% conversion of NO_X compounds to NO_2.

Table G-3.3 presents criteria pollutant emission rates for the flare that were used in the modeling analysis. The emission rates are based on the LFG throughput specified in the previous section and pollutant emission factors provided by Brevard Landfill representatives.

3.3 Refined Modeling

Screening modeling is often performed for an initial determination of maximum impacts and the radius of significant impact. However, the screening model (e.g., SCREEN3) only calculates impacts associated with a single representative emission source. Due to the differences between the IC engine and flare exhaust parameters, no screening modeling was performed for this project (the analysis was performed using a refined model).

3.3.1 Model Selection

The AERMOD (American Meteorological Society/Environmental Protection Agency Regulatory Model) air pollutant dispersion model (version No. 04300) was used to calculate ground-level pollutant concentrations resulting from the electricity generation facility and flare air pollutant emission rates and exhaust configuration. AERMOD is the most recent Gaussian steady-state plume dispersion model released by USEPA for use in assessing ambient air impacts associated with air pollutant releases and was adopted by the USEPA as the preferred general purpose dispersion model (Federal Register Notice November 9, 2005). The USEPA *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W) specifies that impacts calculated with most steady-state Gaussian plume models are applicable at distances up to 50 km from the origin of the emission source.

The use of the AERMOD model was determined appropriate because it:

- Can be used to model combined impact concentrations for multiple emission sources.
- Uses the plume rise enhancement (PRIME) building downwash algorithm, which has been shown to be superior to the downwash algorithm in previously released Gaussian steady-state plume dispersion models.

The following sections present input data and processing options that were used for the AERMOD air pollutant dispersion modeling. The AERMOD input files were prepared by entering appropriate data (applicable to the specific emission process) and model operating parameters into a Windows-based graphical user interface (GUI) developed by BEE-Line Software (BEEST for Windows, current version 9.63).

3.3.2 Model Options

The AERMOD dispersion model was executed with regulatory default options, which include the use of stack-tip downwash and incorporate the effects of elevated terrain (if applicable). In regulatory default mode, no calculations are performed for deposition or plume depletion.

Based on information presented in Section 2.1 of this protocol, the land use for the area surrounding the electricity generation facility is predominantly classified as rural (as opposed to urban). Therefore, no options for urban dispersion were used to calculate air quality impact concentrations produced by the modeled emission sources.

3.3.3 Meteorological Data

Meteorological data (hourly surface measurements and upper-air soundings) for the five-year period 1999 through 2003 with site characteristics (surface roughness, albedo and Bowen Ratio)

were provided by the Florida DEP for this project. The station numbers identified on the meteorological data files indicate that the surface and upper air data were acquired from the Orlando and Tampa Bay areas. The data were preprocessed by the Florida DEP using the AERMET meteorological preprocessor program to produce two types of data files for each meteorological year that are used by AERMOD; surface scalar parameters (*filename*.sss) and vertical profiles (*filename*.pfc). A profile base elevation of 28.7 meters (94.2 feet) was used with the meteorological data for the execution of AERMOD.

The AERMET data files used for this project are provided on the compact disc in Appendix G-3.

3.3.4 Receptor Network

Ground-level pollutant impact concentrations are required to be calculated for all nearby areas that are considered to be ambient air (i.e., areas in which public access is not precluded or restricted by the stationary source). Preliminary modeling results (using AERMOD) indicate that ambient air impacts for the criteria pollutants exceed PSD Class II significance levels exterior to the Brevard Landfill facility property fenceline. Based on modeling performed for similar sources, the receptor network (locations at which air pollutant impact concentrations are calculated) used in the AERMOD modeling analyses was developed by creating a grid of receptors on a Cartesian coordinate system having a spacing of 100 meters to determine off-site impacts up to 2.1 km from the Brevard Energy facility to ensure that all maximum impacts were within the boundary of the receptor grid. Receptors were placed at the Brevard Landfill facility boundary (fenceline) and extended 2.1 km in all directions from the facility.

No flagpole receptors were identified in the area surrounding the facility location.

Figure G-3.1 presents a depiction of the receptor network that was used to perform the refined modeling analysis.

3.3.5 Terrain Data

As presented in Section 2.2 of this protocol and the site plan in Appendix G-1, complex terrain was not considered as part of the refined modeling analysis, as there are no offsite receptors at elevations that exceed the stack height. The terrain in the region surrounding the Brevard Landfill property is at elevations lower than the stack release elevation for the IC engines and flare; therefore, the terrain was classified as simple.

USGS 30-meter (7.5 minute) ASCII Digital Elevation Models (DEM) files were obtained for the geographical area surrounding the facility. The DEM data were based on the North American Datum of 1927 (NAD27). USEPA's AERMAP computer program was used to extract data from the DEM files and calculate source base elevations and receptor elevations using the default algorithm (inverse distance squared of the nearest four terrain nodes).

The DEM data files and AERMAP output files that were used in the model are provided on the compact disc in Appendix G-3.

3.3.6 Pollutant Impact Averaging Times

Maximum ambient air pollutant impact concentrations produced by the emission sources were determined for the specified five-year meteorological period. These results were compared to the PSD significant impact levels, and if applicable, to establish the radius of significant impact (i.e., the geographic areas that surround the emission facility that are determined to have maximum impacts that are greater than the significance values). The highest calculated impact for each pollutant and averaging period for the five-year meteorological data set was used for the significant impact area (SIA) determination.

The impact concentration(s) calculated for:

- SO_2 were based on maximum 3-hr, 24-hr and annual average impacts.
- PM_{10} were based on maximum 24-hr and annual impacts.
- CO were based on the maximum 1-hr and 8-hr average impacts.
- NO_2 was based on the maximum annual average impact.

Highest 2nd high impacts for short-term pollutant averaging periods that are used for PSD and NAAQS demonstrations were not considered for the SIA determinations.

3.4 Refined Modeling SIA Results

Appendix G-4 provides AERMOD output summary files.

Results from the SIA modeling analysis indicate that emissions from the combined operation of the utility flare and electricity generation facility result in maximum impact concentrations that exceed the Class II significant impact levels for SO_2 24-hr and 3-hr time periods. The impacts do not exceed the significant impact level for SO_2 annual, CO, NO_X and PM_{10}.

Table G-3.4 presents the Brevard Energy facility and utility flare emission rates used in the modeling demonstration, the predicted individual impacts from the flares and electricity generation facility and combined impacts for all on-site LFG combustion sources.

The maximum radius of impact for SO_2 is 1.8 km. Therefore, the receptor grid (which considers receptors out to a distance of 2.1 km from the facility) adequately encompasses the significant impact area. The calculated significant impact area is used to determine the number of sources that need to be included in the multisource modeling analysis (described in Section 4.0 of this protocol).

Table G-3.1 Significant Impact Levels for Class II Areas ($\mu g/m^3$)

Pollutant	Annual	24-Hr	8-Hr	3-Hr	1-Hr
Nitrogen Dioxide (NO_2)	1.0	--	--	--	--
Carbon Monoxide (CO)	--	--	500	--	2000
Sulfur Dioxide (SO_2)	1.0	5.0	--	25.0	--
Particulates (PM_{10}/TSP)	1.0	5.0	--	--	--

Table G-3.2 Criteria pollutant emission rates for the Brevard Energy facility used in the air quality analysis

Pollutant	LFG-Fired ICE Emission Factors		Single ICE[5] Emissions (lb/hr)	Facility Emission Rate for Six (6) ICE (lb/hr)	(TpY)	(g/s)
Nitrogen Dioxide (NO_x)[1]	0.60	g/bhp-hr	2.95	17.72	77.6	1.67
Carbon Monoxide (CO)	2.75	g/bhp-hr	13.54	81.23	355.8	10.24
Sulfur Dioxide (SO_2)[2]	75.7	lb/MMcf	2.64	15.82	69.30	1.99
Sulfur Dioxide (SO_2)[3]	91.4	lb/MMcf	3.19	19.12	-	2.41
Particulates[4]	0.24	g/bhp-hr	1.18	7.09	31.05	0.89

1. Emission factor of 0.60 g/bhp-hr is for total oxides of nitrogen (NO_x), USEPA guidance specifies that 75% of NO_x can be considered NO_2, which is reflected only in the (g/s) emission rate.
2. Sulfur Dioxide annual emission rates based on LFG sulfur content of 455 ppmv as H_2S.
3. Maximum short-term (3-hr and 24-hr) SO_2 emission rate based on a LFG content of 550 ppmv as H_2S.
4. Particulate emission rate for TSP, PM_{10} and $PM_{2.5}$.
5. Based on operation of a single engine at base load (100% capacity) conditions; engine output of 2,233 hp and maximum theoretical fuel consumption of 34,860 scfh LFG.

Table G-3.3 Criteria pollutant emission rates for the Brevard Landfill utility flare used in the air quality analysis

Pollutant	LFG Utility Flare Emission Factors		Flare 1/2 Emission Rate[2] (lb/hr)	(g/s)
Nitrogen Dioxide (NO_x) [1, 3]	0.06	lb/MMBtu	2.45	0.231
Carbon Monoxide (CO) [3]	0.20	lb/MMBtu	8.15	1.03
Sulfur Dioxide (SO_2) [4]	75.7	lb/MMscf LFG	5.60	0.706
Sulfur Dioxide (SO_2) [5]	91.4	lb/MMscf LFG	6.77	0.853
Particulates [6]	17.0	lb/MMdscf CH_4	1.26	0.159

1. USEPA guidance specifies that 75% of NO_x can be considered NO_2, which is reflected in the (g/s) emission rate.
2. Based on continuous operation at 1,234 scfm LFG and heat value of 550 Btu/scfm (44.424 MMBtu/hr).
3. Manufacturer guaranteed emission rate.
4. Sulfur Dioxide annual emission rates based on LFG sulfur content of 455 ppmv as H_2S.
5. Maximum short-term (3-hr and 24-hr) SO_2 emission rate based on a LFG content of 550 ppmv as H_2S.
6. Default PM emission rate AP-42 section 2.4-5.

Table G-3.4 Ambient air impact results compared to PSD Class II Significant Impact Levels

Pollutant	Averaging Time	Flare Emission Rate (g/s)	Energy Facility Emission Rate (g/s)	Maximum Predicted Flare Impact ($\mu g/m^3$)	Maximum Predicted Energy Facility Impact ($\mu g/m^3$)	Combined Energy and Flare Impact ($\mu g/m^3$)	Class II Significant Impact Levels ($\mu g/m^3$)
NO_2	Annual	0.827	1.67	0.03	0.57	0.62	1.0
CO	8-hr	2.757	10.24	5.07	82.5	84.0	500
	1-hr	2.757	10.24	8.02	143	143	2000
SO_2	Annual	0.706	1.993	-	0.79	0.80	1.0
	24-hr	0.853	2.410	-	10.1	10.1	5.0
	3-hr	0.853	2.410	-	25.2	25.2	25.0
PM_{10}	Annual	0.426	0.892	0.23	0.30	0.34	1.0
	24-hr	0.426	0.892	0.43	4.12	4.61	5.0

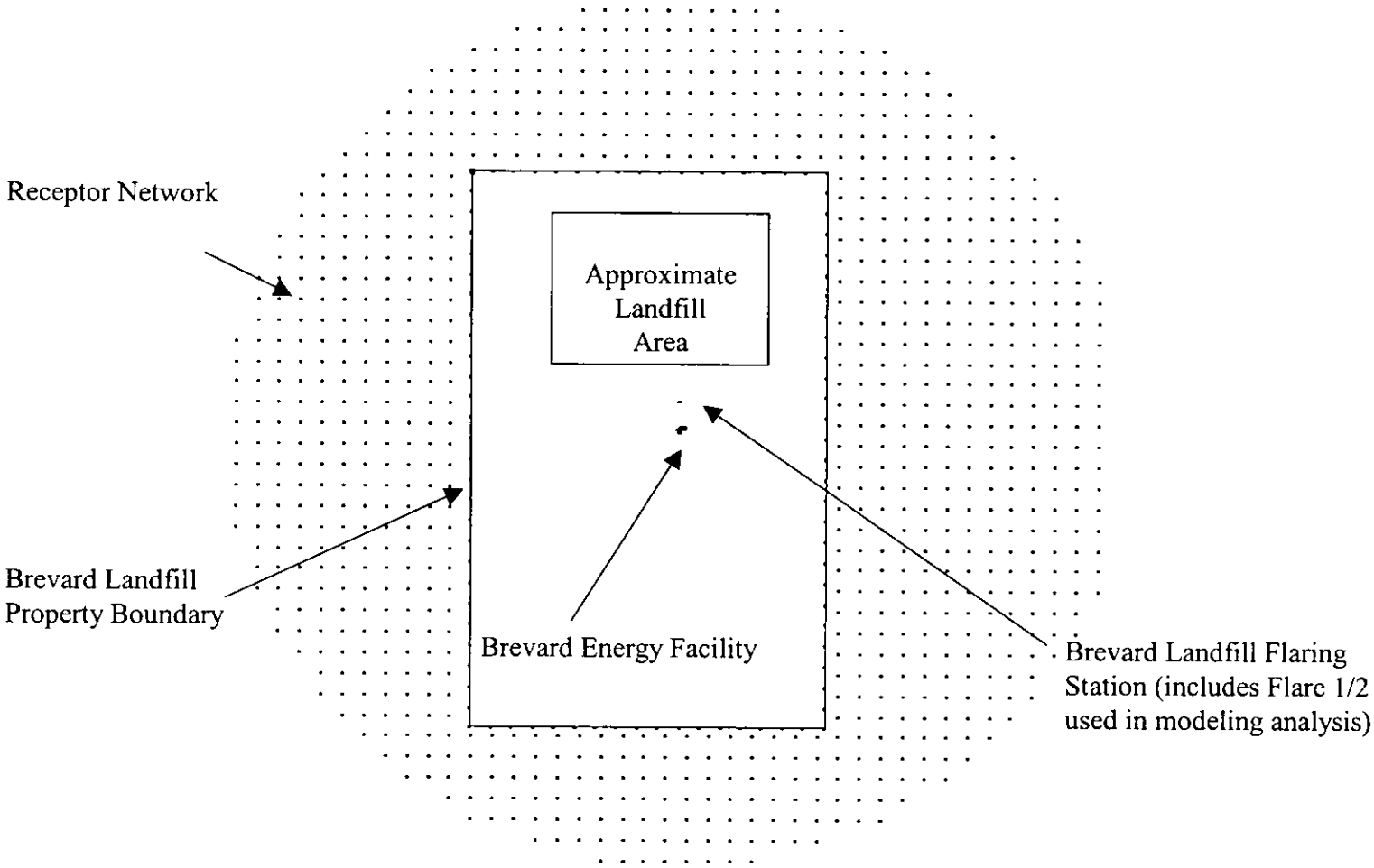


Figure G-3.1 Receptor network used in refined modeling analysis

4.0 BACKGROUND DATA AND MULTISOURCE MODELING

Revised air quality impact analyses were performed for the increase in allowed SO_2 emissions proposed for the LFG fueled IC engine - generator sets. These analyses indicate that off-site ambient air SO_2 impacts exceed significance levels when the Brevard Landfill combustion sources are fueled with LFG that contains greater than approximately 400 ppmv H_2S. Therefore, multi-source ambient air SO_2 impact analyses were performed to evaluate the cumulative impacts produced by background sources (major sources located within 75 km of the SO_2 significant impact area) and the Central Disposal Facility equipment and processes based on the combustion of LFG that contains up to:

1. 550 ppm H_2S (91.44 lb SO_2/MMscf) on a short-term basis that was used to demonstrate compliance with 3-hr and 24-hr SO_2 ambient air standards; and

2. 455 ppm H_2S (75.65 lb SO_2/MMscf) on an annual average that was used to demonstrate compliance with the annual SO_2 ambient air standard.

The predicted annual ambient air impact for the Brevard Landfill combustion sources does not exceed the PSD significant concentration. However, since the proposed annual SO_2 emission rate exceeds the PSD significant emission increase threshold (40 tons per year), annual average SO_2 impacts were included in the PSD and NAAQS modeling demonstration.

4.1 Background Sources

Major PSD sources with air pollutant emissions that produce ambient air quality impact concentrations that exceed the Class II significant concentrations are required to perform a multi-source air quality impact modeling demonstration (i.e., PSD increment consumption analysis and NAAQS compliance demonstration). A multisource modeling demonstration is required for all pollutants with a maximum impact that exceeds the PSD significant impact concentration and must consider all major sources that:

1. Are located within the significant impact area (sources located at a distance from the facility that is less than the radius of significant impact); and

2. Have the potential to significantly impact the SIA of the facility (generally considers major sources within 50 to 75 km from the SIA).

An inventory of background emission sources required to be considered in the multisource PSD increment and NAAQS modeling analysis (major sources located within 75 km of the significant impact area) was provided by the Florida DEP. The inventory provided by the department specified the emission units that consume PSD increment (those emission units that were installed subsequent to the applicable PSD baseline date).

Appendix G-5 provides the inventory of permitted air pollutant emission rates and exhaust stack parameters for the background sources provided by the Florida DEP for consideration in the multisource PSD increment and NAAQS modeling analysis.

Many of the sources in the original background sources inventory were screened out (i.e., excluded from the refined modeling demonstration) using the '20D' criteria. This method, recommended by the Florida DEP, excludes from the modeling analysis any source that has emissions (in TPY) less than 20 times the distance (in km) between the background source and the SIA.

4.2 Background Air Quality (Monitoring Data)

For the NAAQS demonstration, representative background pollutant concentrations were added to the predicted air pollutant impacts determined by the multisource modeling analysis. Available air monitoring data were retrieved from the USEPA AIRS website. The three most recent years of complete data from the nearest monitoring station were reviewed (2003-2005) to establish representative background air pollutant concentrations.

Table G-4.1 presents representative maximum background concentrations for each criteria pollutant that were used in the NAAQS demonstration.

4.3 Criteria Pollutant Emission Rates and Averaging Periods

The predicted emission impact concentrations for the refined multisource air quality analysis were determined using the operating parameters and emission rates for the six individual engine exhaust stacks, the utility flares and appropriate background sources.

The results for the SIA (presented in Section 3.0) are based on the highest calculated impact for each averaging period for any of the five years modeled. For the PSD increment and NAAQS refined modeling analyses, the combined ambient air impact of the facility and appropriate background sources was based on the:

- Highest second-high (i.e., highest of the second highest concentration predicted for any of the five meteorological years used) SO_2 impact for the PSD and NAAQS 3-hr, and 24-hr averaging periods.

- Highest SO_2 impact for the PSD and NAAQS annual averaging period.

4.4 PSD and NAAQS Results

Table G-4.2 presents results of the PSD increment consumption analysis.

Table G-4.3 presents results of the state and federal ambient air quality standards analysis.

The highest SO_2 3-hour ambient air impact produced by the modeled emission sources is 289 $\mu g/m^3$, which is less than the allowable PSD increment of 512 $\mu g/m^3$. This calculated impact results in a cumulative ambient air concentration, including the reported background of 326 $\mu g/m^3$, less than the NAAQS of 1300 $\mu g/m^3$. The highest SO_2 24-hour ambient air impact produced by the modeled emission sources is 78 $\mu g/m^3$, which is less than the allowable PSD increment of 91 $\mu g/m^3$. This calculated impact results in a cumulative ambient air concentration, including the reported background of 94 $\mu g/m^3$, less than the Florida ambient air quality standard of 260 $\mu g/m^3$. The highest SO_2 annual average ambient air impact produced by the modeled emission sources is 11 $\mu g/m^3$, which is less than the allowable PSD increment of 20 $\mu g/m^3$. This calculated impact results in a cumulative ambient air concentration, including reported background of 14 $\mu g/m^3$, which is less than the Florida ambient air quality standard of 60 $\mu g/m^3$. These calculated impacts result in cumulative ambient air concentrations, including background pollutant measurements that are less than the respective NAAQS and Florida ambient air quality standards (i.e., there are no calculated impacts beyond the Landfill facility property that exceed the standards).

Appendix G-6 provides AERMOD output summary files and graphical plots for the PSD increment and NAAQS refined modeling analyses.

Table G-4.1 Monitoring data that were used to establish background air quality for the NAAQS demonstration

Pollutant	Averaging Time	Concentration[1, 2] (ppm)	($\mu g/m^3$)	Monitoring Site	County[3]	Year(s)
SO_2	3-hour	0.014	37.3	Morris Blvd. Winter Park	Orange	2004
SO_2	24-hour	0.006	15.9	Morris Blvd. Winter Park	Orange	2004
SO_2	Annual	0.001	2.66	Morris Blvd. Winter Park	Orange	2003

1. For SO_2 the monitoring data provided in the USEPA AIRS database are presented in ppm and were converted to $\mu g/m^3$ using an ideal gas relationship (0.02405 m^3/g-mol) and the molecular weight for SO_2 (64).

2. Maximum concentrations reported for the 3 most recent years of data (2003, 2004 and 2005).

3. The Orange County monitoring station is the closest measurement station that records background SO2 concentrations.

Table G-4.2 Results of PSD increment consumption analysis

Pollutant	Averaging Period	Met. Year	Maximum Impact PSD Increment Consuming Sources[1] ($\mu g/m^3$)	Allowable PSD Class II Increment ($\mu g/m^3$)
SO_2	3-hr (2^{nd} high)	1999	289	512
SO_2	24-hr (2^{nd} high)	1999	77.7	91
SO_2	Annual	2001	10.9	20

1. Includes the Brevard Energy facility, existing LFG combustion sources at the Brevard County Landfill and appropriate PSD increment-consuming sources identified by the Florida DEP.

Table G-4.3 Results of Florida and Federal ambient air quality standards analysis

Pollutant	Averaging Period	Met. Year	Maximum Multisource Impact[1] ($\mu g/m^3$)	Representative Background Concentration[2] ($\mu g/m^3$)	Max Combined Ambient Air Concentration ($\mu g/m^3$)	Florida Standards[3] ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
SO_2	3-hr (2^{nd} high)	1999	289	37.3	326	1300	1300
SO_2	24-hr (2^{nd} high)	2000	77.7	15.9	93.6	260	365
SO_2	Annual	2001	10.9	2.66	13.6	60	80

1. Includes the Brevard Energy facility, existing LFG combustion sources at the Brevard County Landfill and appropriate PSD increment-consuming sources from Table G-4.2

2. Background monitoring data provided in the USEPA AIRS database and presented in Table I-4.1.

3. Florida Ambient Air Quality Standards provided in Rule 62-204.240(a)(b)(c).

5.0 SPECIAL MODELING CONSIDERATIONS

5.1 Particle Deposition

Based on the design and operation of the IC engines and the treatment (dewatering, compression and filtration) of LFG received from the landfill prior to its use as a fuel and combustion, the amount of particulates emitted from the combustion process are expected to be relatively small. Therefore, compliance with the particulate matter ambient air quality standards can be achieved without considering particle deposition (i.e., the removal of particulates from the exhaust plume over the distance of maximum ground-level impacts due to deposition are expected to be minimal).

5.2 Fugitive Emissions

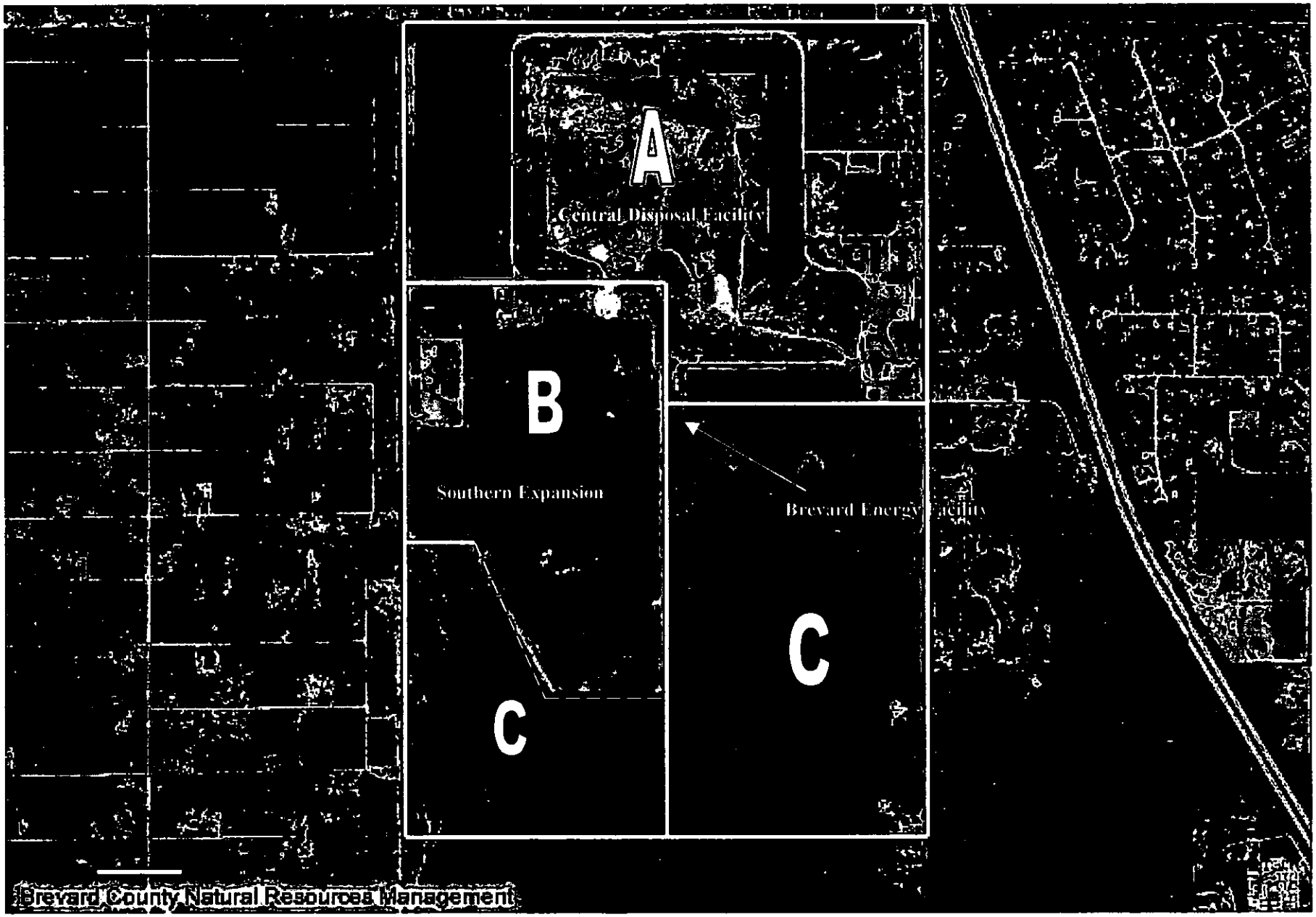
The Brevard Energy electricity generation facility will utilize LFG that is supplied by the Brevard Landfill gas collection and control system. The Brevard Energy electricity generation facility will not be a source of fugitive emissions.

5.3 Start-Up / Shutdown / Low Load Scenarios

The electricity generation facility will use LFG-fueled IC engines that are designed to operate as base load (100% capacity) conditions. These engines will operate continuously with the exception for planned maintenance shutdowns or automatic engine shutdowns (instantaneous, automatic engine shutdowns if monitored operating parameters are outside of preset ranges). The amount of time required for an engine start-up is minimal. Since the engines are operated at base load conditions and the durations of engine shutdown and startup times are minimal, no air quality impact concentrations analyses will be performed for these specific events.

APPENDIX G-1

LANDFILL AND BREVARD ENERGY SITE PLANS
AND
TOPOGRAPHICAL PLOT



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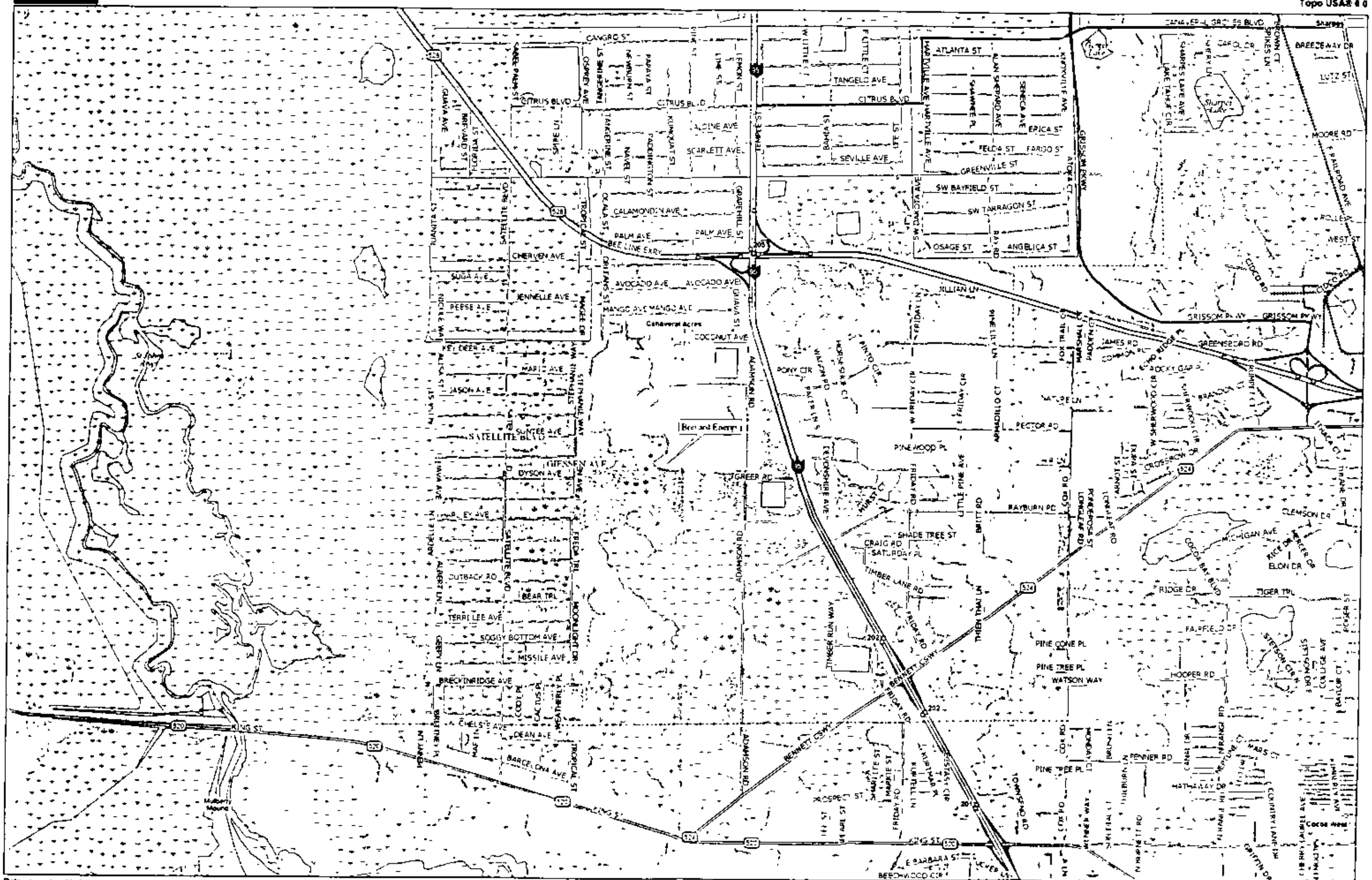

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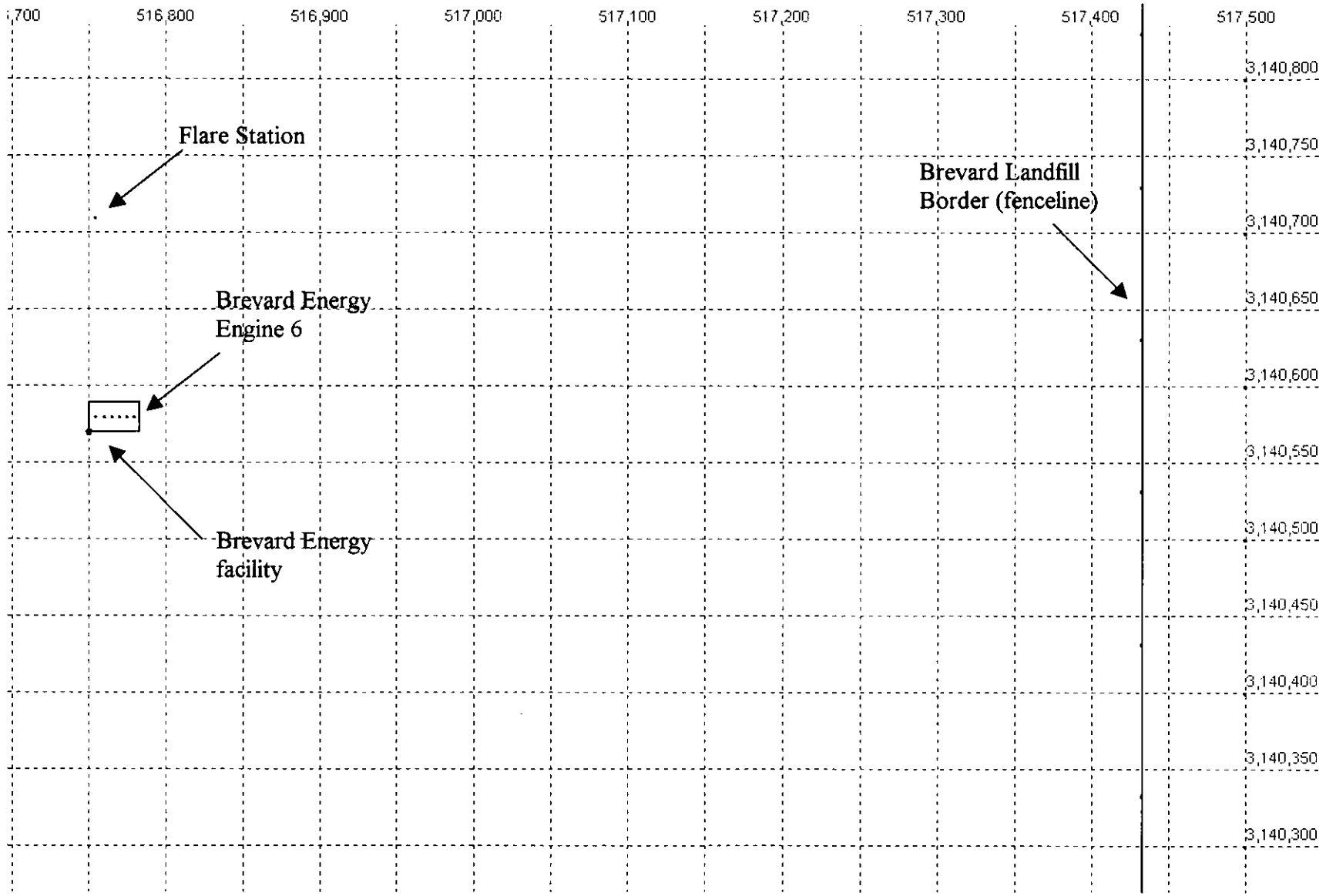
Scale 1 : 34,375

1" = 2,864.6 ft Data Zoom 12-5

APPENDIX G-2

COORDINATES FOR FACILITY AND STACKS

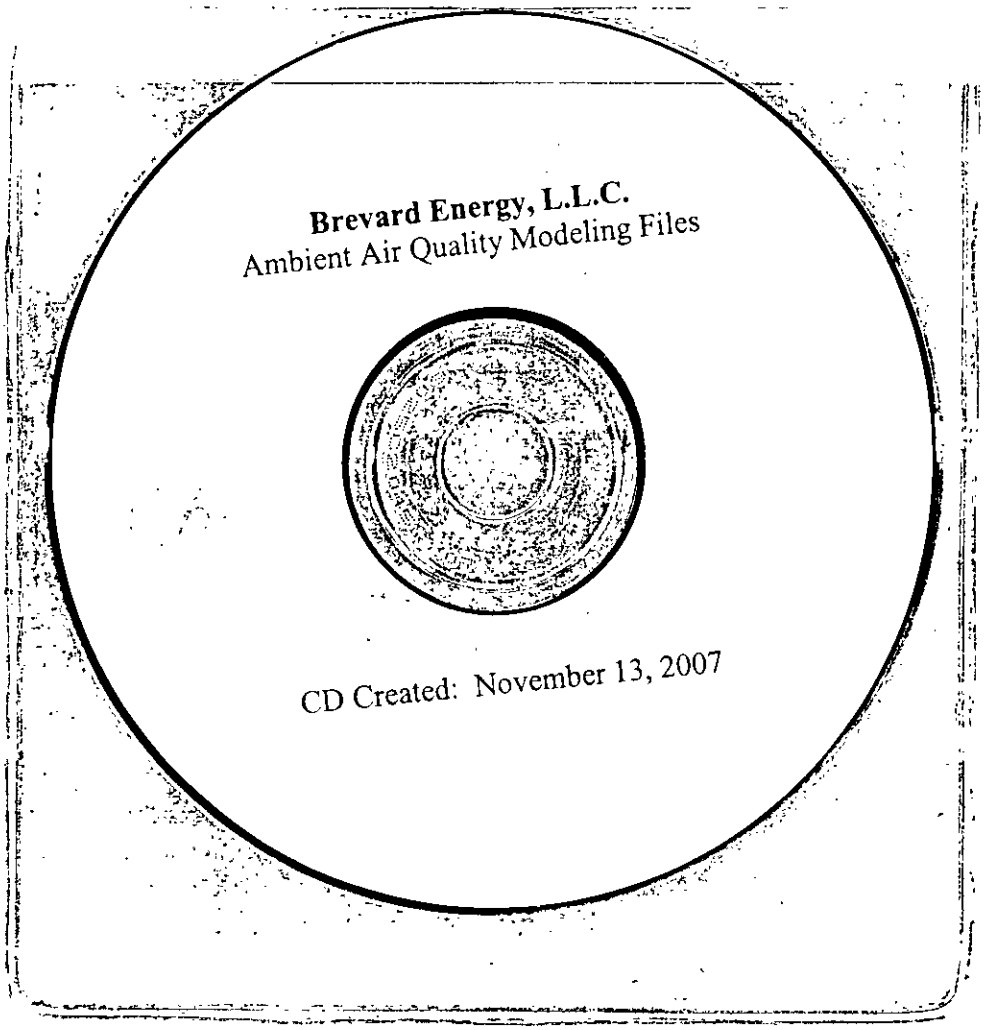
Derenzo and Associates, Inc.



Brevard Energy Facility and Stacks

APPENDIX G-3

MODELING INPUT FILES



APPENDIX G-4

RESULTS OF CLASS II SIGNIFICANT IMPACT ANALYSIS

Appendix G-4

AERMOD Modeling Results (SO_2 3-hour 2nd high PSD Increment Consumption Analysis)

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elev	Met File
AERMOD	Brevard03 99_SO2short.USF	SO2	3-HR	ALL	2ND	288.7	518700	3139900	7.32	MCOTPA99.SFC
AERMOD	Brevard03 02_SO2short.USF	SO2	3-HR	ALL	2ND	222.4	517400	3138600	6.30	MCOTPA02.SFC
AERMOD	Brevard03 00_SO2short.USF	SO2	3-HR	ALL	2ND	198.9	518700	3139800	7.32	MCOTPA00.SFC
AERMOD	Brevard03 01_SO2short.USF	SO2	3-HR	ALL	2ND	192.1	518700	3139800	7.32	MCOTPA01.SFC
AERMOD	Brevard03 03_SO2short.USF	SO2	3-HR	ALL	2ND	170.7	518600	3141500	7.32	MCOTPA03.SFC
AERMOD	Brevard03 99_SO2short.USF	SO2	3-HR	BNRG	2ND	22.41	517433	3140730	6.71	MCOTPA99.SFC
AERMOD	Brevard03 03_SO2short.USF	SO2	3-HR	BNRG	2ND	20.76	517433	3140432	6.71	MCOTPA03.SFC
AERMOD	Brevard03 00_SO2short.USF	SO2	3-HR	BNRG	2ND	20.69	517433	3140531	6.71	MCOTPA00.SFC
AERMOD	Brevard03 01_SO2short.USF	SO2	3-HR	BNRG	2ND	19.54	517433	3140730	6.71	MCOTPA01.SFC
AERMOD	Brevard03 02_SO2short.USF	SO2	3-HR	BNRG	2ND	17.96	517433	3140531	6.71	MCOTPA02.SFC
AERMOD	Brevard03 99_SO2short.USF	SO2	3-HR	MULTI	2ND	288.7	518700	3139900	7.32	MCOTPA99.SFC
AERMOD	Brevard03 02_SO2short.USF	SO2	3-HR	MULTI	2ND	222.4	517400	3138600	6.30	MCOTPA02.SFC
AERMOD	Brevard03 00_SO2short.USF	SO2	3-HR	MULTI	2ND	198.9	518700	3139800	7.32	MCOTPA00.SFC
AERMOD	Brevard03 01_SO2short.USF	SO2	3-HR	MULTI	2ND	192.1	518700	3139800	7.32	MCOTPA01.SFC
AERMOD	Brevard03 03_SO2short.USF	SO2	3-HR	MULTI	2ND	170.6	518600	3141500	7.32	MCOTPA03.SFC

Appendix G-4

AERMOD Modeling Results (SO_2 24-hour 2nd high PSD Increment Consumption Analysis)

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elev	Met File
AERMOD	Brevard03 99_SO2short.USF	SO2	24-HR	ALL	2ND	77.65	517800	3142300	7.01	MCOTPA99.SFC
AERMOD	Brevard03 03_SO2short.USF	SO2	24-HR	ALL	2ND	71.67	517500	3142500	6.4	MCOTPA03.SFC
AERMOD	Brevard03 01_SO2short.USF	SO2	24-HR	ALL	2ND	71.00	518700	3139800	7.32	MCOTPA01.SFC
AERMOD	Brevard03 00_SO2short.USF	SO2	24-HR	ALL	2ND	65.73	518700	3141200	7.32	MCOTPA00.SFC
AERMOD	Brevard03 02_SO2short.USF	SO2	24-HR	ALL	2ND	53.74	518700	3140500	7.32	MCOTPA02.SFC
AERMOD	Brevard03 03_SO2short.USF	SO2	24-HR	BNRG	2ND	8.78	517433	3140531	6.71	MCOTPA03.SFC
AERMOD	Brevard03 00_SO2short.USF	SO2	24-HR	BNRG	2ND	8.20	517433	3140631	6.71	MCOTPA00.SFC
AERMOD	Brevard03 99_SO2short.USF	SO2	24-HR	BNRG	2ND	7.22	517433	3140730	6.71	MCOTPA99.SFC
AERMOD	Brevard03 01_SO2short.USF	SO2	24-HR	BNRG	2ND	7.20	517433	3140432	6.71	MCOTPA01.SFC
AERMOD	Brevard03 02_SO2short.USF	SO2	24-HR	BNRG	2ND	6.06	517433	3140233	6.71	MCOTPA02.SFC
AERMOD	Brevard03 99_SO2short.USF	SO2	24-HR	MULTI	2ND	77.63	517800	3142300	7.01	MCOTPA99.SFC
AERMOD	Brevard03 03_SO2short.USF	SO2	24-HR	MULTI	2ND	71.65	517500	3142500	6.4	MCOTPA03.SFC
AERMOD	Brevard03 01_SO2short.USF	SO2	24-HR	MULTI	2ND	70.98	518700	3139800	7.32	MCOTPA01.SFC
AERMOD	Brevard03 00_SO2short.USF	SO2	24-HR	MULTI	2ND	65.67	518700	3141200	7.32	MCOTPA00.SFC
AERMOD	Brevard03 02_SO2short.USF	SO2	24-HR	MULTI	2ND	53.48	518600	3140100	7.32	MCOTPA02.SFC

Appendix G-4

AERMOD Modeling Results (SO_2 Annual PSD Increment Consumption Analysis)

Model	File	Pol	Average	Group	Rank	Conc.	East(X)	North(Y)	Elev	Met File
AERMOD	Brevard03 01_SO2annual.USF	SO2	ANNUAL	ALL	1ST	10.93	517200	3142600	6.40	MCOTPA01.SFC
AERMOD	Brevard03 00_SO2annual.USF	SO2	ANNUAL	ALL	1ST	10.64	517900	3142300	7.01	MCOTPA00.SFC
AERMOD	Brevard03 02_SO2annual.USF	SO2	ANNUAL	ALL	1ST	10.17	517100	3142600	6.23	MCOTPA02.SFC
AERMOD	Brevard03 99_SO2annual.USF	SO2	ANNUAL	ALL	1ST	10.07	517500	3142500	6.40	MCOTPA99.SFC
AERMOD	Brevard03 03_SO2annual.USF	SO2	ANNUAL	ALL	1ST	9.58	517900	3142300	7.01	MCOTPA03.SFC
AERMOD	Brevard03 02_SO2annual.USF	SO2	ANNUAL	BNRG	1ST	0.80	515793	3140332	5.79	MCOTPA02.SFC
AERMOD	Brevard03 99_SO2annual.USF	SO2	ANNUAL	BNRG	1ST	0.76	517433	3140531	6.71	MCOTPA99.SFC
AERMOD	Brevard03 00_SO2annual.USF	SO2	ANNUAL	BNRG	1ST	0.75	517433	3140531	6.71	MCOTPA00.SFC
AERMOD	Brevard03 03_SO2annual.USF	SO2	ANNUAL	BNRG	1ST	0.72	515793	3140531	6.10	MCOTPA03.SFC
AERMOD	Brevard03 01_SO2annual.USF	SO2	ANNUAL	BNRG	1ST	0.72	515793	3140332	5.79	MCOTPA01.SFC
AERMOD	Brevard03 01_SO2annual.USF	SO2	ANNUAL	MULTI	1ST	10.73	517200	3142600	6.40	MCOTPA01.SFC
AERMOD	Brevard03 00_SO2annual.USF	SO2	ANNUAL	MULTI	1ST	10.45	517900	3142300	7.01	MCOTPA00.SFC
AERMOD	Brevard03 02_SO2annual.USF	SO2	ANNUAL	MULTI	1ST	9.99	517200	3142600	6.40	MCOTPA02.SFC
AERMOD	Brevard03 99_SO2annual.USF	SO2	ANNUAL	MULTI	1ST	9.89	517500	3142500	6.40	MCOTPA99.SFC
AERMOD	Brevard03 03_SO2annual.USF	SO2	ANNUAL	MULTI	1ST	9.40	517900	3142300	7.01	MCOTPA03.SFC

APPENDIX H

USEPA RBLC DATA

Derenzo and Associates, Inc.

Summary of USEPA RBLC Query (October 25, 2007)

Facility Information		Engine Size			SO_X / SO_2		
Name	State	(MMBtu/hr)	(kW)	(hp)	(lb/hr)	(lb/MMBtu)	Additional SOx Notes
Burlington County Resource Rec.	NJ	12.5	1500		1.52	(0.12)	
MM Hackensack Energy	NJ	9.96	950	1340	1.39	0.14	lb/MMBtu emission rate converts to approx. 400 ppm H2S
Reliant Energy, Harris	TX		1664	2343	1.27		13.2 grains H2S per 100 dscf (11.9 gr total sulfur per 100 dscf)
Reliant Energy, Galveston	TX			2343	1.27		13.2 grains H2S per 100 dscf (11.9 gr total sulfur per 100 dscf)
Manchester Renewable Power-OEC Expansion	NJ	16.38	1600	2233	1.13	(0.07)	Based on 180 ppm as H2S LFG
Monmouth County Reclamation	NJ	9.81	1000	1468	0.47	(0.05)	Record specifies 150 ppm H2S in landfill gas
Bio-Energy, EDI Covel Gardens	TX		1565	2172	0.26		
Bio-Energy, EDI Carbon	OH	14.0	1400	1877	0.23	(0.02)	
Bio-Energy, EDI Loraine[1]	OH	14.0		1830	0.20	(0.01)	
MM San Bernardino Energy	CA	14.7		1850	0.10	(0.01)	Compliance method not specified
Reliant Energy, Montgomery	TX		1664	2343	(0.28)		13.2 grains H2S per 100 dscf (11.9 gr total sulfur per 100 dscf)
Industrial Power Generating Corp	VA		350	550		0.202	N/A SO2 limit is for diesel fuel

(Parantheses indicate calculated value based on information presented in USEPA RBLC Database)

Notes

1. Data presented in the USEPA RBLC is for one 1830 hp engine, not a 5500 hp engine.

COMPREHENSIVE REPORT
Report Date: 10/25/2007

Facility Information

RBLC ID:	NJ-0069 (final)	**Date Determination Last Updated:**	05/17/2007
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:**	322110
EPA Region:	2	**COUNTRY:**	USA
Facility County:	MONMOUTH		
Facility State:	NJ		
Facility ZIP Code:	07753		
Permit Issued By:	NEW JERSEY DEPT OF ENV PROTECTION (Agency Name) VIORICA PETRIMAN (Agency Contact) (609) 292-1638 VIORICA.PETRIMAN@DEP.STATE.NJ.US		
Other Permitting Information:	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

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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide **CAS Number:** 630-08-0

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: N/A

Case-by-Case Basis: Other Case-by-Case

Other Applicable Requirements: OTHER

Control Method: (N)

Est. % Efficiency:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes: CO LIMIT REPRESENTS STATE OF THE ART CASE BY CASE PERFORMANCE LEVEL.

POLLUTANT NAME: Volatile Organic Compounds (VOC) **CAS Number:** 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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Total Suspended Particulates **CAS Number:** 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: N/A

Case-by-Case Basis: Other Case-by-Case

Other Applicable Requirements: OPERATING PERMIT

Control Method: (N)

Est. % Efficiency:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate Matter < 10 µ (PM10) **CAS Number:** 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: N/A

Case-by-Case Basis: Other Case-by-Case

Other Applicable Requirements: OPERATING PERMIT, OTHER

Control Method: (N)

Est. % Efficiency:

Compliance Verified: N

Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Dioxide (SO2) **CAS Number:** 7446-09-5

Emission Limit 1: 0.4700 LB/H

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N/A

Case-by-Case Basis: Other Case-by-Case

Other Applicable Requirements: OPERATING PERMIT, OTHER

Control Method: (N)

Est. % Efficiency:

Compliance Verified: N

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

Emission Limit 1: 0.0400 LB/H

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N/A

Case-by-Case Basis:	Other Case-by-Case
Other Applicable Requirements:	OPERATING PERMIT, OTHER
Control Method:	(N)
Est. % Efficiency:	
Compliance Verified:	N
Pollutant/Compliance Notes:	H2S(LB/H) WAS BASED ON 150 PPM H2S IN LANDFILL GAS.

Facility Information

RBLC ID:	NJ-0068 (draft)	**Date Determination Last Updated:**	04/18/2007
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:**	11000714878
Facility Description:		**SIC Code:**	3999
Permit Type:	A: New/Greenfield Facility	**NAICS:**	
EPA Region:	2	**COUNTRY:**	USA
Facility County:	OCEAN		
Facility State:	NJ		
Facility ZIP Code:	08733		
Permit Issued By:	NEW JERSEY DEPT OF ENV PROTECTION (Agency Name) VIORICA PETRIMAN (Agency Contact) (609) 292-1638 VIORICA.PETRIMAN@DEP.STATE.NJ.US		
Other Agency Contact Info:	YOGESH DOSHI 609-633-7249		
Other Permitting Information:	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

Emission Limit 1:	0.5000 G/BHP-HR
Emission Limit 2:	2.4600 LB/HR
Standard Emission:	

Did factors, other then air pollution technology considerations influence the BACT decisions: N/A

Case-by-Case Basis:	LAER
Other Applicable Requirements:	NSPS, OPERATING PERMIT, OTHER
Control Method:	(P) AIR TO FUEL RATIO CONTROL TECHNOLOGIES TO MINIMIZE THE AMOUNT OF NOX EMISSIONS.
Est. % Efficiency:	
Compliance Verified:	UNKNOWN
Pollutant/Compliance Notes:	NOX EMISSIONS LIMIT OF 0.5 G/BHP-HR/ENGINE REPRESENTS LAER.

POLLUTANT NAME: Carbon Monoxide **CAS Number:** 630-08-0

Emission Limit 1: 2.7500 G/BHP-HR

Emission Limit 2: 13.5400 LB/HR

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:

Compliance Verified: NO

Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate Matter < 10 µ (PM10) CAS Number: PM

Emission Limit 1: 0.2000 G/BHP-HR

Emission Limit 2: 0.9800 LB/HR

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:

Compliance Verified: NO

Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC) CAS Number: VOC

Emission Limit 1: 0.1600 G/BHP-HR

Emission Limit 2: 0.7700 LB/HR

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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Dioxide (SO2) CAS Number: 7446-09-5

Emission Limit 1: 1.1300 LB/HR

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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Total Suspended Particulates CAS Number: PM

Emission Limit 1: 0.9800 LB/HR

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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Hydrochloric Acid **CAS Number:** 7647-01-0

Emission Limit 1: 0.1300 LB/HR

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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate Matter < 2.5 μ (PM2.5) **CAS Number:** PM

Emission Limit 1: 0.9800 LB/HR

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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

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:**	
EPA Region:	2	**COUNTRY:**	USA
Facility County:	BURLINGTON		
Facility State:	NJ		
Facility ZIP Code:	08060		

Permit Issued By: NEW JERSEY DEPT OF ENV PROTECTION (Agency Name)
VIORICA PETRIMAN (Agency Contact) (609) 292-1638 VIORICA.PETRIMAN@DEP.STATE.NJ.US

Other Agency Contact Info: DOUG BRUCKMAN
PHONE:609-633-8244

Other Permitting Information: 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

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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes: NOX EMISSION LIMIT IS PER ENGINE.

POLLUTANT NAME: Carbon Monoxide **CAS Number:** 630-08-0

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:

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

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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes: VOC EMISSION LIMIT IS PER ENGINE.

POLLUTANT NAME: Sulfur Dioxide (SO2)	**CAS Number:** 7446-09-5
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:	
Compliance Verified:	UNKNOWN
Pollutant/Compliance Notes:	SO2 EMISSION LIMIT IS PER ENGINE.

POLLUTANT NAME: Particulate Matter < 10 µ (PM10)	**CAS Number:** 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:	OPERATING PERMIT, OTHER
Control Method:	(N)
Est. % Efficiency:	
Compliance Verified:	UNKNOWN
Pollutant/Compliance Notes:	PM-10 EMISSION LIMIT IS PER ENGINE.

POLLUTANT NAME: Total Suspended Particulates	**CAS Number:** 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:	
Compliance Verified:	UNKNOWN
Pollutant/Compliance Notes:	TSP EMISSION LIMIT IS PER ENGINE.

Facility Information

RBLC ID:	TX-0495 (draft)	**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:**	221112
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) JEAN XU SHAW, P.E. (Agency Contact) (512) 239-1823 JXUSHAW@TCEQ.STATE.TX.US		
Other Agency Contact Info:	PERMIT ENGINEER: ERICA PARSONS		
Other Permitting Information:			

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

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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide — CAS Number: 630-08-0

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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Dioxide (SO2) — CAS Number: 7446-09-5

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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC) — CAS Number: 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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate Matter < 10 μ (PM10) — CAS Number: 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:

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

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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

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:**	221112
EPA Region:	3	**COUNTRY:**	USA
Facility County:	CHESAPEAKE		
Facility State:	VA		
Facility ZIP Code:	23230		
Permit Issued By:	VIRGINIA ENVIRONMENTAL QUALITY AIR DIV. (Agency Name) MS. MONICA A. HARVEY (Agency Contact) (804)698-4300 MAHARVEY@DEQ.VIRGINIA.GOV		
Other Agency Contact Info:	MARGARET KEY 7705 TIMBERLAKE ROAD LYNCHBURG, VA 24502 804-582-5120		
Other Permitting Information:	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.		

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 < 10 µ (PM10) **CAS Number:** 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:

Compliance Verified: Unknown

Pollutant/Compliance Notes: State regulation is basis

POLLUTANT NAME: Sulfur Dioxide (SO2) **CAS Number:** 7446-09-5

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:

Compliance Verified: Unknown

Pollutant/Compliance Notes: State regulation is basis

POLLUTANT NAME: Nitrogen Oxides (NOx) **CAS Number:** 10102

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:

Compliance Verified: Unknown

Pollutant/Compliance Notes: State regulation is basis

POLLUTANT NAME: Carbon Monoxide **CAS Number:** 630-08-0

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:	
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	State regulation is basis

POLLUTANT NAME: Volatile Organic Compounds (VOC) **CAS Number:** 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:	
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	state reg is basis

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:**	221112
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 CHERYL.SUTTMAN@EPA.STATE.OH.US		
Other Agency Contact Info:	CHERYL E. SUTTMAN 122 S. FRONT ST. COLUMBUS, OH 43215 614-644-3617		
Other Permitting Information:	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.		

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

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:

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

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:

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

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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes: LIMITS ARE FOR EACH ENGINE.

POLLUTANT NAME: Particulate Matter < 10 μ (PM10) CAS Number: 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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes: LIMITS ARE FOR EACH ENGINE.

POLLUTANT NAME: Sulfur Dioxide (SO2) CAS Number: 7446-09-5

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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes: LIMITS ARE FOR EACH ENGINE.

POLLUTANT NAME: Hydrochloric Acid CAS Number: 7647-01-0

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:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes: LIMITS ARE FOR EACH ENGINE.

POLLUTANT NAME: Formaldehyde CAS Number: 50-00-0

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:

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

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:

Compliance Verified:	Y
Pollutant/Compliance Notes:	Limit is for each engine.

POLLUTANT NAME: Volatile Organic Compounds (VOC) **CAS Number:** 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
Compliance Verified:	UNKNOWN
Pollutant/Compliance Notes:	LIMITS ARE FOR NONMETHANE ORGANIC CARBON. LIMITS ARE FOR EACH ENGINE.

Facility Information

RBLC ID:	CA-1092 (final)	**Date Determination Last Updated:**	01/04/2006
Corporate/Company Name:	MM SAN BERNARDINO ENERGY, LLC	**Permit Number:**	391009
Facility Name:	MM SAN BERNARDINO ENERGY, LLC	**Permit Date:**	05/16/2002 (actual)
Facility Contact:		**FRS Number:**	NEW, NOT FOUND
Facility Description:		**SIC Code:**	4953
Permit Type:	A: New/Greenfield Facility	**NAICS:**	562212
EPA Region:	9	**COUNTRY:**	USA
Facility County:	SAN BERNARDINO		
Facility State:	CA		
Facility ZIP Code:	91761		
Permit Issued By:	SOUTH COAST AQMD, CA (Agency Name) MR. MARTIN KAY (Agency Contact) (909)396-3115 mkay@aqmd.gov		
Other Agency Contact Info:	SOUTH COAST AQMD, MARTIN KAY, (909) 396-3115, MKAY@AQMD.GOV		
Other Permitting Information:	CARB ID: 795.0, OPERATING PERMIT DATE: , STARTUP DATE: NEW CONSTR MODIFICATION: NEW CONSTRUCTION TECH STATUS: BACT DETERMINATION NO SOURCE TEST AVAILABLE		

Process/Pollutant Information

PROCESS NAME:	ICE: LANDFILL OR DIGESTED GAS FIRED
Process Type:	17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel:	LANDFILL GAS
Throughput:	14.70 MMBTU/H 1850 BHP
Process Notes:	EQUIP: , MFR: DUETZ, TYPE: TURBOCHARGED/INTERCOOLED, MODEL: TBG620V16K, FUNC EQUIP: POWER GENERATION, FUEL_TYPE: , SCHEDULE: CONTINUOUS, H/D: 24, D/W: 7, W/Y: 52, NOTES: PPMVD@15%O2: NOX-46, CO-360, HC-79. G/HP-HR: ROG <.02, PM-10 <.05 (BASED ON 34% (HHV) ENGINE EFFICIENCY USED BY THE MANUFACTURE IN HIS CALCULATIONS, THE PPMVD LIMITS CORRESPOND TO THE FOLLOWING G/HP-HR: NOX-0.61, CO-2.9, HC-0.36 (AS METHANE). SOURCE TEST RESULTS:

POLLUTANT NAME: Nitrogen Oxides (NOx) **CAS Number:** 10102

Emission Limit 1:	0.6000 G/B-HP/H

Emission Limit 2:

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: N/A

Control Method: (A) TURBOCHARGED,INTERCOOLED AIR/FUEL CONTROLLER

Est. % Efficiency:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide CAS Number: 630-08-0

Emission Limit 1: 2.5000 G/B-HP/H

Emission Limit 2:

Standard Emission: 2.5000 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: N/A

Control Method: (A) TURBOCHARGED,INTERCOOLED AIR/FUEL CONTROLLER

Est. % Efficiency:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC) CAS Number: VOC

Emission Limit 1: 0.8000 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: BACT-PSD

Other Applicable Requirements: N/A

Control Method: (A) TURBOCHARGED,INTERCOOLED AIR/FUEL CONTROLLER

Est. % Efficiency:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate Matter (PM) CAS Number: PM

Emission Limit 1: 0.2000 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: N/A

Control Method: (A)

Est. % Efficiency:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Oxides (SOx) CAS Number: 7446

Emission Limit 1: 0.1000 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:	N/A
Control Method:	(N)
Est. % Efficiency:	
Compliance Verified:	UNKNOWN
Pollutant/Compliance Notes:	

Facility Information

RBLC ID:	TX-0404 (final)	**Date Determination Last Updated:**	04/13/2005
Corporate/Company Name:	RELIANT ENERGY RENEWABLES SECURITY LP	**Permit Number:**	P791
Facility Name:	RELIANT SECURITY LFGTE	**Permit Date:**	01/31/2002 (actual)
Facility Contact:	GREG NEWMAN 7139458334	**FRS Number:**	110010496917
Facility Description:	ELECTRICITY GENERATION FROM LANDFILL GAS	**SIC Code:**	4911
Permit Type:	A: New/Greenfield Facility	**NAICS:**	221119
EPA Region:	6	**COUNTRY:**	USA
Facility County:	MONTGOMERY		
Facility State:	TX		
Facility ZIP Code:	77210		
Permit Issued By:	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) (Agency Name) JEAN XU SHAW, P.E. (Agency Contact) (512) 239-1823 JXUSHAW@TCEQ.STATE.TX.US		
Other Agency Contact Info:	JOHNNY VERMILLION TX 512-239-1292		
Other Permitting Information:	ADDITIONAL PERMIT NUMBERS: 44276, PSD-TX-971. THE ISSUED PERMIT WAS FOR THE INSTALLATION OF FOUR 1664 KW GENERATORS FIRED BY LANDFILL GAS.		

Process/Pollutant Information

PROCESS NAME:	GENERATOR ENGINE, 4
Process Type:	17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel:	LANDFILL GAS
Throughput:	1664.00 KW
Process Notes:	THROUGHPUT IS FOR EACH. THE ENGINES ARE JENBACHER MODEL JGS 616. LANDFILL GAS LIMITED TO 11.9 GR/100 DSCF H2S AND 13.2 GR/100 DSCF S.

POLLUTANT NAME: Nitrogen Oxides (NOx) **CAS Number:** 10102

Emission Limit 1:	0.6000 G/BHP-H
Emission Limit 2:	3.1000 T/YR EACH
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) GOOD COMBUSTION PRACTICE
Est. % Efficiency:	
Compliance Verified:	UNKNOWN
Pollutant/Compliance Notes:	

POLLUTANT NAME: Carbon Monoxide **CAS Number:** 630-08-0

Emission Limit 1: 3.0000 G/BHP-H

Emission Limit 2: 15.5000 T/YR EACH

Standard Emission: 3.0000 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: (P) GOOD COMBUSTION PRACTICE

Est. % Efficiency:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC) **CAS Number:** VOC

Emission Limit 1: 0.2800 G/BHP-H

Emission Limit 2: 0.8300 T/YR EACH

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) GOOD COMBUSTION PRACTICE

Est. % Efficiency:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate Matter < 10 μ (PM10) **CAS Number:** PM

Emission Limit 1: 0.8400 T/YR EACH

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: (P) GOOD COMBUSTION PRACTICE, LOW SULFUR FUEL

Est. % Efficiency:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Dioxide (SO2) **CAS Number:** 7446-09-5

Emission Limit 1: 1.2400 T/YR EACH

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: (P) GOOD COMBUSTION PRACTICE, LOW SULFUR FUEL

Est. % Efficiency:

Compliance Verified: UNKNOWN

Pollutant/Compliance Notes:

POLLUTANT NAME: Visible Emissions (VE) **CAS Number:** VE

Emission Limit 1:	5.0000 % OPACITY
Emission Limit 2:	
Standard Emission:	5.0000 % OPACITY

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) GOOD COMBUSTION PRACTICE
Est. % Efficiency:	
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	

Facility Information

RBLC ID:	TX-0385 (final)	**Date Determination Last Updated:**	05/05/2005
Corporate/Company Name:	RELIANT ENERGY RENEWABLES COASTAL PLAINS LP	**Permit Number:**	NA031
Facility Name:	RELIANT ENERGY GALVESTON PLANT	**Permit Date:**	01/24/2002 (actual)
Facility Contact:		**FRS Number:**	110002345515
Facility Description:	CO-GENERATION USING LANDFILL GAS AS FUEL	**SIC Code:**	4911
Permit Type:	A: New/Greenfield Facility	**NAICS:**	221112
EPA Region:	6	**COUNTRY:**	USA
Facility County:	GALVESTON		
Facility State:	TX		
Facility ZIP Code:			
Permit Issued By:	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) (Agency Name) JEAN XU SHAW, P.E. (Agency Contact) (512) 239-1823 JXUSHAW@TCEQ.STATE.TX.US		
Other Agency Contact Info:	AARON MOON PO BOX 13087 AUSTIN, TX 78711-3087 512-238-1093		
Other Permitting Information:	CONSTRUCTION PERMIT FOR THE INSTALLATION AND OPERATION OF SEVEN JENBACHER, 2,343 HP, LANDFILL GAS-FIRED IC ENGINES FOR A TOTAL OF 12 MEGAWATTS OF ELECTRICAL POWER. A SUBSEQUENT PERMIT MODIFICATION REDUCED THE NUMBER OF IC ENGINES TO 6. THE REFERENCE DATE AND AND PERMIT NUMBERS FOR THIS MODIFICATION ARE THE SAME AS THE ORIGINAL. NOT ABLE TO FIND FRS NUMBER		

Process/Pollutant Information

PROCESS NAME:	JENBACHER IC ENGINES (7)
Process Type:	17.140 (Landfill/Digester/Bio-Gas)
Primary Fuel:	LANDFILL GAS
Throughput:	12.00 MW (TOTAL)
Process Notes:	SULFUR COMPOUND LIMITED TO: 13.2 GRAINS H2S/100 DSCF 11.9 GRAINS TOTAL S/100 DSCF

POLLUTANT NAME: Carbon Monoxide **CAS Number:** 630-08-0

Emission Limit 1:	15.5000 LB/H EACH ENGINE
Emission Limit 2:	460.9800 T/YR TOTAL FOR ALL
Standard Emission:	3.0000 G/B-HP-H EACH ENGINE

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:	(N)

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx) CAS Number: 10102

Emission Limit 1: 3.1000 LB/H EACH ENGINE

Emission Limit 2: 92.2100 T/YR FOR ALL ENGINES

Standard Emission: 0.6000 G/B-HP-H EACH ENGINE

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: (N)

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate Matter < 10 μ (PM10) CAS Number: PM

Emission Limit 1: 0.4900 LB/H EACH ENGINE

Emission Limit 2: 14.1600 T/YR TOTAL

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: (N)

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Dioxide (SO2) CAS Number: 7446-09-5

Emission Limit 1: 1.2700 LB/H EACH ENGINE

Emission Limit 2: 37.7500 T/YR TOTAL ALL ENGINES

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) FUEL LIMIT ON SULFUR: 13.2 H2S AND 11.9 TOTAL SULFUR PER 100 DSCF

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Hydrochloric Acid CAS Number: 7647-01-0

Emission Limit 1: 0.1400 LB/H EACH

Emission Limit 2: 4.1400 T/YR TOTAL

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: (N)

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC) **CAS Number:** VOC

Emission Limit 1: 0.8300 LB/H EACH

Emission Limit 2: 24.7200 T/YR TOTAL

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: (N)

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

COMPREHENSIVE REPORT
Report Date: 10/25/2007

Facility Information

RBLC ID:	OH-0273 (final)	**Date Determination Last Updated:**	06/23/2003
Corporate/Company Name:	Bio-Energy, L.L.C.	**Permit Number:**	02-17062
Facility Name:	LORAINE COUNTY LANDFILL LFG POWER STATION	**Permit Date:**	04/22/2003 (actual)
Facility Contact:	LESLIE M. COOK 713-300-3310	**FRS Number:**	110009607719
Facility Description:	EIGHT 14.0 MMBTU/HR INTERNAL COMBUSTION ENGINES TO BURN LANDFILL GAS TO PRODUCE ELECTRICITY	**SIC Code:**	4911
Permit Type:	A: New/Greenfield Facility	**NAICS:**	221112
EPA Region:	5	**COUNTRY:**	USA
Facility County:	LORAINE		
Facility State:	OH		
Facility ZIP Code:	77063		
Permit Issued By:	OHIO ENVIRONMENTAL PROTECTION AGENCY (Agency Name) MS. CHERYL SUTTMAN (Agency Contact) (614)644-3617 CHERYL.SUTTMAN@EPA.STATE.OH.US		
Other Agency Contact Info:	CHERYL E. SUTTMAN 122 S. FRONT ST. COLUMBUS, OH 43215 614-644-3617		
Other Permitting Information:	Bio-Energy is installing 8 internal combusiton engines for electrical power, using landfill gas from an existing landfill.		

Process/Pollutant Information

PROCESS NAME: IC ENGINES, LANDFILL GAS, (8)

Process Type: 17.150 (Other Gaseous)

Primary Fuel: LANDFILL GAS

Throughput: 5500.00 HP

Process Notes: Eight 14 mmBtu/hr internal combustion engines burning landfill gas for electrical power. Landfill gas shall be diverted to an open flare 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; this is estimated to be 508 scfm, based on a landfill gas methane content of 49%.

POLLUTANT NAME: Particulate Matter < 10 ï¼ (PM10) **CAS Number:** PM

Emission Limit 1: 0.3700 LB/H

Emission Limit 2: 1.6300 T/YR

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: N/A

Other Applicable Requirements: SIP

Control Method: (N)

Est. % Efficiency:

Compliance Verified: Y

Pollutant/Compliance Notes: Limits are for each of 8 engines.

POLLUTANT NAME: Sulfur Dioxide (SO2) **CAS Number:** 7446-09-5

Emission Limit 1: 0.2000 LB/H

Emission Limit 2: 0.9000 T/YR

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: N/A

Other Applicable Requirements: SIP

Control Method: (N)

Est. % Efficiency:

Compliance Verified: Y

Pollutant/Compliance Notes: Limits are for each of 8 engines.

POLLUTANT NAME: Volatile Organic Compounds (VOC) **CAS Number:** VOC

Emission Limit 1: 0.6800 LB/H

Emission Limit 2: 3.0000 T/YR

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: N/A

Other Applicable Requirements: NSPS

Control Method: (N)

Est. % Efficiency:

Compliance Verified: Y

Pollutant/Compliance Notes: Limits are for each of 8 engines. Non-methane organic compound (NMOC) emissions shall be reduced by 98% weight-percent or the outlet NMOC emissions shall be less than 20 ppmvd, as hexane at 3% oxygen.

POLLUTANT NAME: Hydrochloric Acid **CAS Number:** 7647-01-0

Emission Limit 1: 0.2800 LB/H

Emission Limit 2: 1.2400 T/YR

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: N/A

Other Applicable Requirements: SIP

Control Method: (N)

Est. % Efficiency:

Compliance Verified: Y

Pollutant/Compliance Notes: Limits are for each of 8 engines.

POLLUTANT NAME: Nitrogen Oxides (NOx) **CAS Number:** 10102

Emission Limit 1: 5.8800 LB/H

Emission Limit 2: 0.4200 LB/MMBTU

Standard Emission: 0.5000 G/B-HP-H

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 TECHNOLOGY

Est. % Efficiency:

Compliance Verified: Y

Pollutant/Compliance Notes: Limits are for each of 8 engines. Additional limit per engine: 25.8 tons/yr.

POLLUTANT NAME: Carbon Monoxide **CAS Number:** 630-08-0

Emission Limit 1: 9.7600 LB/H

Emission Limit 2: 0.7000 LB/MMBTU

Standard Emission: 0.8000 G/B-HP-H

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:

Compliance Verified: Y

Pollutant/Compliance Notes: Limits are for each of 8 engines. Additional limit per engine: 42.75 tons/yr.

POLLUTANT NAME: Particulate Matter (PM)	**CAS Number:** PM
Emission Limit 1:	0.8700 LB/H
Emission Limit 2:	3.8000 T/YR
Standard Emission:	
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown	
Case-by-Case Basis:	N/A
Other Applicable Requirements:	SIP
Control Method:	(N)
Est. % Efficiency:	
Compliance Verified:	Y
Pollutant/Compliance Notes:	LIMITS ARE FOR EACH OF 8 ENGINES.

POLLUTANT NAME: Visible Emissions (VE)	**CAS Number:** VE
Emission Limit 1:	10.0000 % OPACITY
Emission Limit 2:	
Standard Emission:	10.0000 % OPACITY
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown	
Case-by-Case Basis:	N/A
Other Applicable Requirements:	SIP
Control Method:	(N)
Est. % Efficiency:	
Compliance Verified:	Y
Pollutant/Compliance Notes:	LIMITS ARE FOR EACH OF 8 ENGINES

Facility Information

RBLC ID:	TX-0349 (final)	**Date Determination Last Updated:**	01/04/2005
Corporate/Company Name:	RELIANT ENERGY RENEWABLES ATASCOCITA LP	**Permit Number:**	PSD-TX-973
Facility Name:	RELIANT ATASCOCITA LFGTE	**Permit Date:**	01/24/2002 (actual)
Facility Contact:	BEN CARMINE	**FRS Number:**	110017419266
Facility Description:	RELIANT ENERGY RENEWABLES ATASCOCITA, L.P. PROPOSES TO CONSTRUCT A LANDFILL- GAS-TO-ENERGY FACILITY (LFGTE). THIS PROJECT WILL ENTAIL THE INSTALLATION OF 7 JENBACHER MODEL JGS 616 GS-LL, 2343 B- HP LANDFILL GAS-FIRED ENGINES. THE PROPOSED LFGTE FACILITY WILL PRODUCE APPROXIMATELY 11.65 MW (1.664 MW EACH) OF ELECTRICITY. THE ENGINES WILL BE THE ONLY AIR POLLUTANT EMITTING EQUIPMENT REQUIRED FOR THE NEW FACILITY. WASTE MANAGEMENT INCORPORATED (WMI) PREVIOUSLY COLLECTED AND ROUTED THE LANDFILL GAS TO A FLARE UNDER THE AUTHORITY OF 30 TAC 106492, REGISTRATION NO 38954. WMI WILL MAINTAIN THIS SEPARATE AUTHORITY TO FLARE ANY GAS THAT IS NOT SOLD TO THE RELIANT ENERGY RENEWABLES LFGTE FACILITY. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) REVIEW FOR CO AND NO2 (AS NOX) AND NONATTAINMENT REVIEW FOR NOX ARE REQUIRED SINCE THE PROJECT INCREASES OF THESE POLLUTANTS ARE SIGNIFICANT UNDER THE CORRESPONDING FEDERAL NSR PROGRAMS. THE COMPANY HAS TWO SIMILAR CONCURRENT PROJECTS IN THE HOUSTON/GALVESTON AREA WHICH ARE ALSO UNDERGOING NON-ATTAINMENT AND PSD REVIEW.	**SIC Code:**	4931
Permit Type:	A: New/Greenfield Facility	**NAICS:**	221119
EPA Region:	6	**COUNTRY:**	USA
Facility County:	HARRIS		
Facility State:	TX		
Facility ZIP Code:	772104455		

Permit Issued By:	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) (Agency Name) JEAN XU SHAW, P.E. (Agency Contact) (512) 239-1823 JXUSHAW@TCEQ.STATE.TX.US
Other Agency Contact Info:	AARON MOON PO BOX 13087 AUSTIN, TX 78711-3087 .512-238-1093
Other Permitting Information:	LANDFILL GAS TO ENERGY FACILITY

Process/Pollutant Information

PROCESS NAME: (7) LANDFILL GAS-FIRED ENGINES, JGS616GS-LL, E1-7

Process Type: 17.150 (Other Gaseous)

Primary Fuel: LANDFILL GAS

Throughput: 12.00 MW, TOTAL

Process Notes: EACH ENGINE IS RATED FOR 2343 B-HP OR 1664 KW.

POLLUTANT NAME: Carbon Monoxide **CAS Number:** 630-08-0

Emission Limit 1: 15.5000 LB/H EACH UNIT

Emission Limit 2: 460.9800 T/YR TOTAL

Standard Emission: 3.0000 G/B-HP-H EACH UNIT

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) NONE INDICATED

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx) **CAS Number:** 10102

Emission Limit 1: 3.1000 LB/H EACH UNIT

Emission Limit 2: 92.2100 T/YR TOTAL

Standard Emission: 0.6000 G/B-HP-H EACH UNIT

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: LAER

Other Applicable Requirements:

Control Method: (N) NONE INDICATED

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes: PSD POLLUTANT WITH LAER APPLIED.

POLLUTANT NAME: Volatile Organic Compounds (VOC) **CAS Number:** VOC

Emission Limit 1: 0.8300 LB/H EACH UNIT

Emission Limit 2: 24.7200 T/YR TOTAL

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: LAER

Other Applicable Requirements:

Control Method: (N) NONE INDICATED

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes: VOC ADDITIONAL EMISSION LIMITS: 0.28 G/B-HP-H EACH UNIT

POLLUTANT NAME: Particulate Matter < 10 Î¼ (PM10) **CAS Number:** PM

Emission Limit 1: 0.7700 LB/H EACH UNIT

Emission Limit 2: 22.8800 T/YR TOTAL

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) LANDFILL GAS PRETREATMENT SYSTEM

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Dioxide (SO2) **CAS Number:** 7446-09-5

Emission Limit 1: 1.2700 LB/H EACH UNIT

Emission Limit 2: 37.7500 T/YR TOTAL

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) LANDFILL GAS CONTAINING NO MORE THAN 13.2 GR H2S AND 11.9 GR S/100 DSCF.

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Hydrochloric Acid **CAS Number:** 7647-01-0

Emission Limit 1: 0.1400 LB/H EACH UNIT

Emission Limit 2: 4.1400 T/YR TOTAL

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: (N) NONE INDICATED

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Visible Emissions (VE) **CAS Number:** VE

Emission Limit 1: 5.0000 % OPACITY 6 MIN AV, EACH UNIT

Emission Limit 2:

Standard Emission: 5.0000 % OPACITY 6 MIN AV, EACH UNIT

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: N/A

Other Applicable Requirements: SIP

Control Method: (N) NONE INDICATED

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

Facility Information

RBLC ID:	NJ-0021 (final)	**Date Determination Last Updated:**	09/06/2002
Corporate/Company Name:	MM HACKENSACK ENERGY, LLC.	**Permit Number:**	LOG# 01-96-2800
Facility Name:	MM HACKENSACK ENERGY, LLC.	**Permit Date:**	04/09/1998 (actual)
Facility Contact:	BEN HEVISER	**FRS Number:**	110012646583
Facility Description:		**SIC Code:**	4931
Permit Type:	A: New/Greenfield Facility	**NAICS:**	221111
EPA Region:	2	**COUNTRY:**	USA
Facility County:	BERGEN		
Facility State:	NJ		
Facility ZIP Code:	07032-		
Permit Issued By:	NEW JERSEY DEPT OF ENV PROTECTION (Agency Name) VIORICA PETRIMAN (Agency Contact) (609) 292-1638 VIORICA.PETRIMAN@DEP.STATE.NJ.US		
Other Agency Contact Info:	SUBHASH SHAH NJ (609) 633-8224		
Other Permitting Information:	ADDITIONAL SIC: 4953 NEW COMPANY TO USE LANDFILL GAS TO GENERATE ELECTRICITY AND ALSO DESTRUCT NMOC IN LANDFILL GAS BY 98% AND COMPLY WITH 40 CFR 60 SUBPART CC. 6.8:1 A-F RATIO LEAN BURN C516 FITN. EACH ENGINE SHALL OPERATE AT LEAST 80% OF MAXIMUM LOAD. STACK TEST REQUIRED WITHIN 180 DAYS OF INITIAL OPERATION. ALL EMISSIONS ARE BACT-PSD EXCEPT NOX AND CO, WHICH ARE LAER AND MUST COMPLY WITH STATE EMISSION OFFSET RULES. NO CONTROLS FOR ANY POLLUTANT WERE DESCRIBED-THE FACILITY IS REQUIRED TO REMOVE 98% OF VOCS THROUGH EFFICIENT COMBUSTION, AND MONITOR THE OXYGEN % AND AIR/FUEL RATIO IN THE ENGINES. PLANT CONTACT INFO: BEN HEVISER; 1221 NICOLETTE MALL; SUITE 700; MINNEAPOLIS, MN 55403-2445. APPLICATION REVISED ON 7/7/1997.		

Process/Pollutant Information

PROCESS NAME: 6 RECIPROCATING ENGINES

Process Type: 17.150 (Other Gaseous)

Primary Fuel: LANDFILL GAS

Throughput: 9.96 MMBTU/H HHV (EACH)

Process Notes: ENGINE MODEL: CATERPILLAR CAT 3516 SITA. THROUGHPUT: 1340 BHP EACH (950 KW).

POLLUTANT NAME: Sulfur Dioxide (SO2) **CAS Number:** 7446-09-5

Emission Limit 1: 1.3900 LB/H

Emission Limit 2: 0.1390 LB/MMBTU

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: (A)

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Hydrochloric Acid **CAS Number:** 7647-01-0

Emission Limit 1: 0.2100 LB/H

Emission Limit 2: 0.0210 LB/MMBTU

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: (A)

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Methyl Chloroform CAS Number: 71-55-6

Emission Limit 1: 1.9300 E-3 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:

Control Method: (A)

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Tetrachloroethylene CAS Number: 127-18-4

Emission Limit 1: 3.8300 E-3 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:

Control Method: (A)

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Acrylonitrile CAS Number: 107-13-1

Emission Limit 1: 6.3000 E-3 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:

Control Method: (A)

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx) CAS Number: 10102

Emission Limit 1: 1.0000 G/BHP-H

Emission Limit 2: 0.2960 LB/MMBTU OF HHV 2.95 LB/H

Standard Emission: 1.0000 G/BHP-H

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: LAER

Other Applicable Requirements:

Control Method: (P) CONTROL OF AIR/FUEL RATIO AND OXYGEN LEVEL

Est. % Efficiency: 0

Compliance Verified: Unknown

Pollutant/Compliance Notes: ADDITIONAL BASIS: STATE EMISSION OFFSET RULE

POLLUTANT NAME: Volatile Organic Compounds (VOC) **CAS Number:** VOC

Emission Limit 1: 0.0740 LB/MMBTU OF HHV

Emission Limit 2: 0.7400 LB/H

Standard Emission: 0

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: N/A

Other Applicable Requirements: NSPS

Control Method: (P) GOOD COMBUSTION PRACTICE

Est. % Efficiency: 98.000

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide **CAS Number:** 630-08-0

Emission Limit 1: 0.6070 LB/MMBTU OF HHV

Emission Limit 2: 6.0500 LB/H

Standard Emission: 0.6070 G/B-HP-H

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: N/A

Other Applicable Requirements: NSPS

Control Method: (P) GOOD COMBUSTION PRACTICE

Est. % Efficiency: 0

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Total Suspended Particulates **CAS Number:** PM

Emission Limit 1: 0.5500 LB/H

Emission Limit 2: 0.0550 LB/MMBTU

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: (A)

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate Matter < 10 Î¼ (PM10) **CAS Number:** PM

Emission Limit 1: 0.5500 LB/H

Emission Limit 2: 0.0550 LB/MMBTU

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: (A)

Est. % Efficiency:

Compliance Verified: Unknown

Pollutant/Compliance Notes:

APPENDIX I

EQUIPMENT VENDOR INFORMATION AND CONTROL COST ANALYSIS

GAS TREATMENT / SULFUR DIOXIDE ABATEMENT COSTS
SULFATREAT® SYSTEM

Design and Emissions Data

LFG flowrate	5.02 MMcf/day 3,486 scfm
Sulfur content (as H_2S)	455 ppmv
Sulfur removed per day (elemental sulfur) at 95% efficiency	180.3 lb/day
Sulfur dioxide emissions abated	360.7 lb/day 65.8 ton/yr
SulfaTreat media per vessel	72,000 lb.
H_2S removal per vessel (1 lb. per 10 lb. media)	7,200 lb.
Vessel lifetime (days to saturation, 6 vessels on-line)	240 days
SulfaTreat replacements per year	1.5

Initial Capital Costs

		Cost/Unit	Units	Total Cost
SulfaTreat Vessels	120-in ID x 18 ft. length	$25,000	12	$300,000
Freight	Estimated			$10,000
Subtotal Purchased equipment costs (PEC)				***$310,000***
Media cost per vessel	72,000 lb per vessel @ $0.48/lb	$34,560	12	$414,720
Piping / foundation	15% of PEC			$46,500
Direct installation costs (DIC)[1]	50% of PEC			$155,000
Indirect installation costs (IIC)[2]	20% of PEC			$62,000
Subtotal Media and Installation Costs				***$678,220***
Total capital investment (TCI)				***$988,220***

Annual interest rate (fraction)	0.07
Control system lifetime (years)	15
Captial recovery factor (per year)[3]	0.1098
Annual Capital Recovery (TCI * Recovery factor)	***$108,501***

GAS TREATMENT / SULFUR DIOXIDE ABATEMENT COSTS
SULFA TREAT SYSTEM (continued)

Annual Operating Costs	Basis	Unit/yr	Cost/Unit	Total Cost
SulfaTreat media replacement	6 vessels, 1.5 changes/year	9.0	$34,560	$311,040
SulfaTreat media freight	$0.03 per pound media	9.0	$2,160	$19,440
Changeout labor & disposal	$2600 per vessel	9.0	$2,600	$23,400
Electricity (kWh)	20 kW added compressor	175,200	$0.07	$12,264
Natural Gas	None required	0	$0	$0
Taxes, insurance, admin.[4]	4% of TCI	1	$39,529	$39,529
Operating labor[5]	Avg. $20 per work day	260	$20	$5,200
Maintenance (labor and materials)[5]	Avg. $40 per work day	260	$40	$10,400
Overhead (supervision and labor)[6]	60% of O&M costs			$9,360
Total Operating Costs (per year)				***$430,633***

Summary of Emission Reduction Costs

Capital Costs (Annual Cost Recovery)	$108,501
Operating Costs	$430,633
Total Annual Costs	***$539,134***
Landfill Gas Treated per year (MMscf)	1,832
Annual Sulfur Control Costs ($/MMscf)	***$294.27***
Sulfur Dioxide Reduced per year (tons at 95% removal)	65.8
SO_2 Reduction Cost ($/ton, annual basis)	***$8,191***

GAS TREATMENT / SULFUR DIOXIDE ABATEMENT COSTS
SULFA TREAT SYSTEM (continued)

References from EPA AIR POLLUTION CONTROL COST MANUAL, Sixth Edition, January 2002, Section 5.2 for Gas Adsorbers.

1. Section 5.2, Table 1.3 indicates that Direct Installation Costs (DIC) including piping are equivalent of up to 85% of the Purchased Equipment Cost.
2. Section 5.2, Table 1.3 indicates that Indirect Installation Costs (IIC) are equivalent of up to 35% of the Purchased Equipment Cost.
3. Capital Recovery Factor presented in Section 5.2, Table 1.4.
4. Section 5.2, Table 1.4 indicates that Administrative charges, Property tax and Insurance are equivalent to 4% of the Total Capital Investment.
5. Estimated based on information presented in Section 5.2, Table 1.4.
6. Section 5.2, Table 1.4 indicates that Overhead is equivalent to 60% of Labor and Materials.

Rob Harvey

From: Robert Izatt [rizatt@centurytel.net]
Sent: Tuesday, August 28, 2007 8:46 AM
To: rharvey@derenzo.com
Subject: Landfill gas

Mr. Harvey,

Thank you for the opportunity to quote SulfaTreat for your landfill application. Please find the EPS attached below.

The vessel configuration would dictate utilizing twelve vessels total. The size would be 120" ID x 18' seam to seam. The vessels are numerous due to the high flow and low pressure. Approximate new price would be -$300,000 for all twelve vessels. Used may be an option, and I will look for similar type and let you know. Installation costs will very based upon location.

The system is configured with six sets of lead lag vessels, meaning you would change out six lead vessels every 218 days. At this point, the lag vessels would become lead vessels.

The SulfaTreat material cost is $.48 per pound FOB St. Louis, IL. Freight to Florida would be about $.03 per pound additional. The cost for change out labor and disposal of SulfaTreat would be approximately $2600 per vessel. With all costs included you would see a total cost to change each vessel of approximately $39,320. SulfaTreat is comprised of inert iron compounds and can be disposed of in any class 2 without problems.

Please let me know if you have any further questions.

Thank you,
Rob Izatt
Sales Executive
SulfaTreat a business unit of MI-L.L.C.

Phone: 1-231-275-2840
Fax: 1-231-275-2839
Cell: 1-231-357-7819

SulfaTreat · A Business Unit of M-I LLC. · 17998 Chesterfield Airport Road · Suite 215 · Chesterfield · Missouri · 63005 · USA
Tel : 636.532.2189 · Toll Free: 800.726.7687 · Fax:636.532.2764 · info@sulfreat.com

DATE : August 28, 2007

SULFATREAT®
ESTIMATED PERFORMANCE SHEET ("EPS")

CUSTOMER INFORMATION:

Company:	DERENZO & ASSOCIATES		
Lease Name:	LANDFILL		
Contact:	Rob Harvey	Lease City:	
Phone:	517-324-1880	Lease State:	FL
Fax:	517-324-5409	Lease Country:	USA

OPERATING CONDITIONS

Gas Flow Rate (MMscf/d):	4.800	Gas Pressure (psig):	2.0
Inlet H2S (ppmv):	500	Gas Temperature (°F):	90
Max. Outlet H2S (ppmv):	25.0	Water Saturated:	Yes
CO2 (Mole %):	20.0	O2 (Mole %):	0.50

REACTOR DIMENSTIONS AND SET UP

Total Number Of Vessels:	12	Inside Diameter(inches):	120.0
System Design*:	Lead/Lag	Bed Height (feet):	14.8
*Vessels are in trains of two		Min. S/S Height (feet):	18.80
		Vessel Loading (lbs/vessel):	72,000

PREDICTED RESULTS

Days to Max. Outlet H2S:	218 **	Product Selection:	ST-410HP
H_2Sulfur Removed (lbs):	45,831	Product Price (USD/lb):	$0.48
H_2Sulfur Removed (lbs/day):	210.2	Product Cost/Vessel (USD)	$34,560
Gas Volume Produced (MMscf):	1,048.241	Cost/MCF (USD)	$0.1978
Gas Velocity (ft/min):	6.59	Cost/lb Sulfur Removed (USD):	$4.52
Total Pressure Drop (psi):	1.96	**All prices are FOB St. Louis**	

NOTES & SPECIAL CONDITIONS:

Contact Email: rharvey@derenzo.com

** Change one of the two vessels and reverse vessel sequence

ASK ABOUT OUR NO FAULT PRODUCT WARRANTY

Any Questions? Call Rob Izatt at 231-275-2840, MI

1.00 77 RMI goalseek

GAS TREATMENT / SULFUR DIOXIDE ABATEMENT COSTS
LO-CAT® II DESULFURIZATION PROCESS

Design and Emissions Data

LFG flowrate	5.02 MMcf/day 3,486 scfm
Sulfur content (as H_2S)	455 ppmv
Sulfur removed per day (elemental sulfur) at 95% efficiency	180.3 lb/day 32.9 ton/yr
Sulfur dioxide emissions abated	360.7 lb/day 65.8 ton/yr

Initial Capital Costs	Cost/Unit	Units	Total Cost
Lo-CAT equipment package	Cost provided by vendor		$1,090,000
Initial chemical charge (included)			$0
Subtotal Purchased equipment costs (PEC)			***$1,090,000***
Site prep / foundation	10% of PEC		$109,000
Installation Cost	Estimate provided by vendor		$380,000
Subtotal Installation Costs			***$489,000***
Total capital investment (TCI)			***$1,579,000***
Annual interest rate (fraction)	0.07		
Control system lifetime (years)	15		
Captial recovery factor (per year)[1]	0.1098		
Annual Capital Recovery (TCI * Recovery factor)			***$173,366***

GAS TREATMENT / SULFUR DIOXIDE ABATEMENT COSTS
LO CAT SULFUR SYSTEM (continued)

Annual Operating Costs	Basis	Unit/yr	Cost/Unit	Total Cost
Chemical Costs (per ton of sulfur)	$170 / ton sulfur removed	32.9	$170	$5,595
Chemical Freight Costs	Estimated	4	$300	$1,200
Spent Media Disposal (tons)[2]	Sulfur in 65% wt cake	50.6	$40	$2,025
Electricity (kWh)	17 kW for LO-CAT	148,920	$0.07	$10,424
Electricity (kWh)	20 kW for added blower	175,200	$0.07	$12,264
Natural Gas	None required	0	$0	$0
Taxes, insurance, admin.[3]	Estimated at 4% of TCI	1	$63,160	$63,160
Operating labor [4]	$20 per work day	260	$20	$5,200
Maintenance (labor and materials)[4]	$40 per work day	260	$40	$10,400
Overhead (supervision and labor)[5]	60% of O&M costs			$9,360
Total Operating Costs (per year)				***$119,629***

Summary of Emission Reduction Costs

Capital Costs (Annual Cost Recovery)	$173,366
Operating Costs	$119,629
Total Annual Costs	***$292,994***
Landfill Gas Treated per year (MMscf)	1,832
Annual Sulfur Control Costs ($/MMscf)	***$159.92***
Sulfur Dioxide Reduced per year (tons at 95% removal)	65.8
SO_2 Reduction Cost ($/ton, annual basis)	***$4,451***

GAS TREATMENT / SULFUR DIOXIDE ABATEMENT COSTS
LO CAT SULFUR SYSTEM (continued)

References from EPA AIR POLLUTION CONTROL COST MANUAL, Sixth Edition, January 2002, Section 5.2 for Gas Adsorbers.

1. Capital Recovery Factor presented in Section 5.2, Table 1.4.
2. Disposal costs estimated at $40 per ton.
3. Section 5.2, Table 1.4 indicates that Administrative charges, Property tax and Insurance are equivalent to 4% of the Total Capital Investment.
4. Estimated based on information presented in Section 5.2, Table 1.4.
5. Section 5.2, Table 1.4 indicates that Overhead is equivalent to 60% of Labor and Materials.

----- Original Message -----
From: John Watson
To: Rebecca Frear
Sent: Wednesday, August 22, 2007 3:56 PM
Subject: RE: H2S removal estimate follow up (GTP 829-07)

Rebecca,

I was waiting on additional information, but I have a partial answer for you and I hope this will be helpful while I wait on the missing info.

For the revised feed definition, you will need to decide between LO-CAT and Sulfur-Rite technologies. LO-CAT is the regenerable system that I proposed for the erroneous operating case that we previously evaluated. It produces elemental sulfur using a regenerable catalyst system and has low operating costs relative to scavenger systems like our Sulfur-Rite process. However, the CAPEX associated with LO-CAT for this smaller size range is generally higher than the CAPEX associated with Sulfur-Rite. So the choice usually comes down to the relative weighting given to CAPEX vs. OPEX.

I have estimated costs for LO-CAT for your latest feed definition. I will provide the Sulfur-Rite estimates later when they become available.

Based on the process conditions you provided:
gas fow rate: 3486 scfm
temp: 90 °F
outlet pressure: 2 psig
H2S in raw gas: 500
required H2S limit in outlet: 50 ppm
use of treated gas: fuel

Sulfur Recovered
212 pounds per day as elemental sulfur in a 65 wt% cake

CAPEX (+/- 50%)

LO-CAT Equipment Package		1,090,000
Installation Costs		380,000
Total Installed Cost	US	$1,470,000

OPEX
Chemical cost: $170 per ton of sulfur removed ($5,900 per year at design rates)
Electrical requirement: 17 kW ($10,200 per year @ $0.07/kWh)
Total Operating Cost: $16,100 per year @ design rates

I assumed you would need this gas at 2 psig but we really didn't discuss that when you provided me the revised basis. If this gas is at very low pressure, you will also need to provide the gas at sufficient pressure to overcome system pressure drop and deliver the gas to the engines at 2 psig. For the 50 ppm outlet spec, the required LO-CAT inlet pressure will be ~ 4 psig. If your system cannot deliver this

type of pressure, we can provide a blower to boost the pressure. Let me know if you would like further information about blowers at this time, or if we need to consider a higher pressure let me know that.

As I said, I will provide and estimate for Sulfur-Rite as soon as it becomes available.

Regards,

John F. Watson
Business Development Manager
Gas Technology Products
a division of Merichem Chemicals & Refinery Services LLC
846 East Algonquin Road, Suite A100
Schaumburg, Illinois 60173
847-285-3858
cell: 224-848-2579
fax: 847-285-3888
jwatson@merichem.com
www.merichem.com

----- Original Message -----
From: John Watson
To: Rebecca Frear
Sent: Wednesday, September 05, 2007 6:41 PM
Subject: RE: H2S removal estimate follow up (GTP 829-07)

Rebecca,

Sorry for the delay. I was looking for some way to bring down the cost of the Sulfur-Rite package, but it seems you are in the range where a Sulfur-Rite unit is very similar in cost to a LO-CAT unit, and the operating costs are much higher./

In any case, on the same basis as we used for LO-CAT, i.e.:
gas fow rate: 3486 scfm
temp: 90 °F
outlet pressure: 2 psig
H2S in raw gas: 500
required H2S limit in outlet: 50 ppm
use of treated gas: fuel

Scavenger usage:
At design rates, you will need to change out a vessel of Sulfur-Rite ~ every 200 days.
Fresh Sulfur-Rite media per vessel changeout is 360,000 pounds (180 2000-pound super sacks)

OPEX:
$312,500 per year of fresh media

CAPEX:

Equipment Package	$1,150,000
Installation Costs	275,000
Total Installed Cost	$1,425,000

We could try to use smaller vessels, but the efficiency on media use would plummet (or in other words, the operating costs would climb).

As with the LO-CAT estimates, I have not included any blower to boost pressure. This equipment sizing for Sulfur-Rite actually has higher pressure drop than the LO-CAT, so we would need more like 10 psig inlet pressure for this system.

I hope this will allow you to complete your evaluation. Please direct all questions or concerns to me through any of the contact routes shown below.

Regards,

John F. Watson
Business Development Manager
Gas Technology Products

a division of Merichem Chemicals & Refinery Services LLC
846 East Algonquin Road, Suite A100
Schaumburg, Illinois 60173
847-285-3858
cell: 224-848-2579
fax: 847-285-3888
jwatson@merichem.com
www.merichem.com

GAS TREATMENT / SULFUR DIOXIDE ABATEMENT COSTS
H2S PLUS SYSTEM

Design and Emissions Data

LFG flowrate	5.02 MMcf/day 3,486 scfm
Sulfur content (as H_2S)	455 ppmv
Sulfur removed per day (elemental sulfur) at 95% efficiency	180.3 lb/day
Sulfur dioxide emissions abated	360.7 lb/day 65.8 ton/yr
Media per vessel	788 cu. ft. 30,000 lb. (estimated)
Vessel lifetime (days to saturation, 4 vessels on-line)	207 days
Media replacements per year	1.8

Initial Capital Costs		Cost/Unit	Units	Total Cost
Vessels	12-ft. dia by 10.5 ft. fiberglass	$56,000	4	$224,000
Media Charge	Included in vessel cost			$0
Explosion-proof sampling pumps	Cost provided by vendor			$11,600
Gas oxygen monitor	Cost provided by vendor			$8,800
Freight	Estimated			$10,000
Subtotal Purchased equipment costs (PEC)				***$254,400***
Site prep / foundation / piping	15% of PEC			$38,160
Direct installation costs (DIC)[1]	50% of PEC			$127,200
Indirect installation costs (IIC)[2]	20% of PEC			$50,880
Installation Costs				***$216,240***
Total capital investment (TCI)				***$470,640***
Annual interest rate (fraction)		0.07		
Control system lifetime (years)		15		
Captial recovery factor (per year)[3]		0.1098		
Annual Capital Recovery (TCI * Recovery factor)				***$51,674***

GAS TREATMENT / SULFUR DIOXIDE ABATEMENT COSTS
H2S PLUS SYSTEM (continued)

Annual Operating Costs	Basis	Unit/yr	Cost/Unit	Total Cost
Media replacement	3150 cu.ft. @ $9/cu.ft.	1.8	$28,350	$50,070
Media freight	$0.03 per pound media	1.8	$3,600	$6,358
Changeout labor & disposal	$2600 per vessel x 4 vessels	1.8	$2,600	$18,368
Electricity (kWh)	10 kW added compressor	87,600	$0.07	$6,132
Electricity (kWh)	20 kW for blower, recirc pumps	175,200	$0.07	$12,264
Natural Gas	None required	0	$0	$0
Taxes, insurance, admin.[4]	Estimated at 4% of TCI	1	$18,826	$18,826
Operating labor[5]	$20 per work day	260	$20	$5,200
Maintenance (labor and materials)[5]	$40 per work day	260	$40	$10,400
Overhead (supervision and labor)[6]	60% of O&M costs			$9,360
Lost Revenues [7]	36 hr/changeout, $74/MW-h	1.8	$45,168	$79,772
Total Operating Costs (per year)				***$216,749***

Summary of Emission Reduction Costs

Capital Costs (Annual Cost Recovery)	$51,674
Operating Costs	$216,749
Total Annual Costs	***$268,423***
Landfill Gas Treated per year (MMscf)	1,832
Annual Sulfur Control Costs ($/MMscf)	***$146.51***
Sulfur Dioxide Reduced per year (tons at 95% removal)	65.8
SO_2 Reduction Cost ($/ton, annual basis)	***$4,078***

GAS TREATMENT / SULFUR DIOXIDE ABATEMENT COSTS
H2S PLUS SYSTEM (continued)

References from EPA AIR POLLUTION CONTROL COST MANUAL, Sixth Edition, January 2002
Section 5.2 for Gas Adsorbers.

1. Section 5.2, Table 1.3 indicates that Direct Installation Costs (DIC) including piping are equivalent of up to 85% of the Purchased Equipment Cost.
2. Section 5.2, Table 1.3 indicates that Indirect Installation Costs (IIC) are equivalent of up to 35% of the Purchased Equipment Cost.
3. Capital Recovery Factor presented in Section 5.2, Table 1.4.
4. Section 5.2, Table 1.4 indicates that Administrative charges, Property tax and Insurance are equivalent to 4% of the Total Capital Investment.
5. Estimated based on information presented in Section 5.2, Table 1.4.
6. Section 5.2, Table 1.4 indicates that Overhead is equivalent to 60% of Labor and Materials.
7. Lost revenues resulting from plant shutdown for media soak and replacement (36 hours) calculated at $74 per MW-h and plant generating capacity of 9.6 MW.

Proposal

for

Landfill Gas H2S removal
Via
H2SPLUS SYSTEM
NOTE: PRICES QUOTED ARE FOR BUDGETARY PURPOSES ONLY

To

ROB HARVEY
DERENZO AND ASSOC.

28 AUGUST, 2007

by

Mtarri/Varani LLC
1511 Washington Ave.
Golden, Colorado 80401
303-277-1625

HYDROGEN SULFIDE REMOVAL

from

LANDFILL GAS

BACKGROUND

ROB HARVEY DERENZO AND ASSOC. has requested a Bid/Proposal from Mtarri/Varani LLC, (MV) to supply a patent pending H2SPLUS system for the removal of H2S (Hydrogen Sulfide) gas from the ROB HARVEY DERENZO AND ASSOC. landfill gas stream located in Florida. The system parameters given by ROB HARVEY DERENZO AND ASSOC. are:

Design Basis:

- Average Biogas production of 3500 cfm
- H_2S Inlet Concentration of 500 ppm HAVING OUTLET CONCENTRATION OF +/- 50 PPM
- Liquid/Gas Interface Temperature Range, 15° C to 25° C
- Inlet Air Relative Humidity calculated at 60%
- Outlet Concentration 50 ppm
- System location to be Florida, thus tanks do not require insulation

PERFORMANCE REQUIREMENTS

1.) The system proposed must remove obnoxious odors and hydrogen sulfide

2.) The system proposed must pass 3500 cfm ave. with a maximum head-loss of 0.5 psi

3.) The **initial treated** gas will have an H2S concentration of <1 ppm (parts per million). As the reactant becomes loaded with sulfur compounds, the H2S concentration in the treated gas will gradually increase. The operator of this system will have ample time to decide when recharge is necessary.

4.) The operational life of the initial reactant (iron sponge and bacteria) IN THE FOUR TANK SYSTEM is anticipated to be 0.5 YEARS +/-10% at which point the treated biogas will contain an estimated >50 ppm H2S. **NOTE: THIS OPERATIONAL LIFE IS PREDICATED UPON APPROXIMATELY 10% OF THE UNTREATED BIOGAS BYPASSING THE H2S SCRUBBER SYSTEM AND THEN REBLENDED TO ACHIEVE ~50 PPM H2S IN THE COMBINED BIOGAS STREAM.**

TREATMENT APPROACH

Mtarri/Varani LLC has applied bio-filtration for odor and H_2S removal in a variety of projects. Projects such as Cape May Landfill, Cargill's Excel facility in Ft. Morgan, Colorado, and Dodge City, Kansas; Simplot Foods in Burley, Idaho; Coors Brewing Co. in Golden, Colorado; and numerous asphalt plants and agricultural digesters have been successfully treated by this technique from Mtarri/Varani LLC.

The project described above is very similar to one completed at the Cape May Landfill facility for Cape May Municipal Utilities Authority in New Jersey.

MV proposes to utilize is **patent-pending chemobiofilter** (the ***H2SPLUS*** system), which is **packed** with Iron Sponge media for the efficient and low cost removal of odor compounds and Hydrogen Sulfide in gaseous streams and then **seeded** with bacteria.

MV has applied these H2SPLUS systems in many gas-treatment/scrubbing applications in landfill gas applications, anaerobic systems, and waste water treatment plants, including high rate bio-reactors, low rate lagoons and medium rate solids digesters. In addition, the technology has been employed in fixed-bed and modular systems for organic and Hydrogen Sulfide (H_2S) gas and other odor removal in air streams. Recently MV has successfully retrofitted two competitor's iron sponge scrubbers and demonstrated an operating life almost 3X longer—thus operating costs are cut considerably.

H2SPLUS SYSTEM DESCRIPTION

Iron Sponge media has been used for many years in the oil and gas industry for the sweetening of sour gas from well operations. MV has utilized similar technology for many years for the scrubbing of digester gases. During the course of this work, our development efforts have shown that the media can be successfully applied as a H2SPLUS system, capable of: 1) high H_2S removal capacity and 2) the removal of other organic compounds in gaseous streams, and 3) a filtration unit to remove boiler-fouling particulates, AND **4) SIMULTANEOUS REMOVAL OF 70+% OF INCOMMING SILOXANES (thus protecting the IC prime mover)**. Our experience has taught us correct design and operating parameters to achieve these treatment goals.

MV's system has demonstrated longer operating life when compared to other H2S removal systems due to its ***unique and proprietary design***. **Unique features of MV's system include: 1) the addition of a small amount of air in the inlet gas stream, to prolong iron sponge life, 2) incorporation of a sump and liquid recycle**

apparatus to recycle iron, bacteria, and nutrients, to also provide a longer media life, and 3) seeding of the unit with bacteria and nutrients, 4) a unique gas distribution/trickling filter arrangement, AND 5) the incorporation the patent pending MVNETS (to facilitate the easy removal of spent iron sponge-which historically has been a major detriment to the use of iron sponge systems at WWTP). These features differentiate MV's system from any other on the market and provide for the lowest operational costs coupled with the easiest method of iron sponge recharge.

MV's system is entirely constructed from fiberglass, PVC, stainless steel, concrete, or aluminum to provide a long system life due to freedom from corrosion.

For the purposes of this project, this design proposed is similar to that used at the Cape May Landfill facility, wherein the flow of landfill gas is collected and passed downward through a bed of moist Iron Sponge media within a single vessel. However for the increased flow rate at the ROB HARVEY DERENZO AND ASSOC. site, a total of 4 insulated fiberglass vessels 12' in diameter and 10.6' tall, with ribbed fiberglass insulated domed roofs CAPABLE OF HAVING AN OPERATING PRESSURE OR VACUUM OF 2PSI, WILL BE REQUIRED. The units are designed for roof removal and for accessibility from the top in order to load and remove spent iron sponge media. The vessel roofs are sealed to the vessel body by means of two gaskets—one located inside of the bolts and one outside of the roof bolts.

Fiberglass piping penetrates the service vessel wall for inlet gas distribution to an internal fiberglass piping distribution network. The piping network is buried in smooth river rock and Iron Sponge is spread on top the rock to a depth of ~7 feet deep IN A SERIES OF THREE LIFTS. After each lift of iron sponge a patent pending MVNET (the nets are designed to lift the spent iron sponge out of the vessel like a semi-consolidated hockey puck) is placed on top of the iron sponge lift and then the subsequent lift of iron sponge is added. A total of four MVNETS and 4 lifts of iron sponge (with each lift being ~1.75 ' thick) completes the filling of the vessel. The iron sponge is then inoculated with the bacterial agents. Chemical and biological agents are conserved by being collected in the system sump and recycled into the media. Air, injected into the inlet gas stream on a continuous basis, facilitates the conversion of the FeS2 (formed by the reaction of H2S and FeOH3) to elemental sulfur which then extends the operating life of the iron sponge bed media. Exhausted or spent iron sponge is placed on tarps and allowed to slowly oxidize while being kept moist for a period of ~3 days. After this period the spent iron sponge can

be recycled to compost (either on site or off site), placed in the landfill, or directly applied to soil as a fertilizer.

MV proposes to supply to ROB HARVEY DERENZO AND ASSOC. :

- **A one-time use Technology License**
- **Complete Design**
- **Process drawings for piping, plan, elevation and layout**
- **PVC Schedule 80 Piping to and from sump and air blower**
- **4 fiberglass vessels, 12 foot diameter by 10'6" foot tall sidewall, Insulated.**
- **4 insulated, domed ribbed gas tight roofs for vessels.**
- **Complete set of all internal piping for each vessel.**
- **Flanged inlet and outlet piping 8 inch diameter**
- **Piping for all drain water and recycle fluids to be PVC Schedule 80**
- **Complete water inlet and drain flanged piping with valves. ALL WATER PIPING TO BE SCHEDULE 80 PVC.**
- **Fuji air blower and flowmeter to introduce air to inlet gas stream.**
- **Temperature probe for each vessel equipped with thermo controller and wired into the control panel so that any excess increase in temperature within any vessel is automatically cooled by addition of water to that appropriate vessel.**
- **One sump system consisting of a 4' X 4' X 6' concrete vessel equipped with internal float switches and 3 submersible pumps to recycle the scrubber drain water, chemicals, and biological agents/nutrients back to the vessels and thus minimize fluid handling and maximize operating life due to reagent recycling. In addition one of the submersible pump lines will be equipped with a hose connection to allow**

pumping and draining of the sump. The sump shall be equipped with an aluminum or fiberglass cover.

- **Stainless Steel Control Panel Nema 3 SS rated for automatic control of blower, sump makeup water and high temperature alarm/automatic feed water system .**
- **4 sets of MV NET's (Patent Pending) (1 set per tank consisting of 4 MVNETS per set) to allow easy removal of the iron sponge from the vessel when the iron sponge is spent and in need of replacement.**
- **Three days of MV's on-site supervision for construction advice, and if necessary a second site visit to assist in startup.**
- **Explosion proof high temperature external switches for water addition and emergency cooling water addition.**
- **Bacterial startup agents and nutrients.**

DESIGN DRAWINGS, SPECIFICATIONS, AND MANUALS

General Process Flow Diagram and Layout Drawings will be supplied. Further detail and drawings for Process Flow, Piping Specifications, and concrete pad sizing will also be supplied. Requirements including recycle condensate sumps, Equipment Lists and Specifications will be supplied upon award. Included also will be two operating manuals, and one assembly manual.

SYSTEM OPERATION

Once installed, system operation is very simple. A system of sprinklers, to maintain moisture in the Iron Sponge Bed, are installed under the tank lid. The buried sump will collect the drained fluids and the submerged sump pump will recycle the liquids to the top of each vessel bed. In case of high water levels in the sump a second pump is provided that takes the excess water and pumps it to a drain. A small air blower will add up to 6 percent V/V air (or less if incoming LFG has contained oxygen) to the inlet gas stream. Operators will add minor amounts of bacterial nutrients on a weekly basis.

ITEMS TO BE PROVIDED BY OTHERS

These are as follows:

- Concrete pad
- System Biogas piping to and from the vessel's inlet and outlet flanges
- Heat tracing and insulation of external piping to and from the bio-filters (if desired)

- Off-loading, setting of all equipment supplied by MV.
- Water piping including a one inch (1") water line to the water inlet valve on H2SPLUS system sump (freeze protected)
- Condensate "P" traps (freeze protected) as per MV design
- Any required permitting
- Site supervision and labor
- Cranes and other construction equipment and tools
- 18 cubic yards of 1-1/2" river stone-**well sorted, well rounded, well washed plus 2 cubic yards of ½ inch river stone well sorted, well rounded, well washed**
- Installation of iron sponge material and vessel roof as per MV direction
- Installation and electrical connections ***NOTE: Motor starters are provided by the MV control panel***
- Installation of fluid recycling watering system as per MV design (using materials supplied by MV)
- Equipment, piping, fittings to and from the bed watering system

ESTIMATED OPERATING COSTS

Operating costs will consist primarily of media replacement. Worst case basis for this cost is complete replacement of 3150 CF of Iron Sponge every 186 +/-10% operating days at an estimated media cost of $9.00/CF FOB Chicago, Il or ~$57,000/yr. **This life assumes that the system is operated according to the directions given in the operation manual.**

Replacement of the iron sponge media will also require a crane or boom truck capable of lifting an estimated 30,000 # per net (approximate weight of spent/wet iron sponge and net) for each of the three nets to lift the MVNETS with the spent iron sponge from the vessel, and a high-vacuum sucker truck equipped with high pressure water lances and possibly some hand tools to remove any spent media not recovered by the net. MV Nets weigh approximately 70# each.

NOTE: MVNETS are reusable. The use of the MVNET has allowed the spent iron sponge to be removed from a similar-sized vessel to the one quoted here in six hours total time-**after a minimum of a 24-hour water soak**.

A truck to haul spent media along with a small crane to replace new media will also be required. Spent iron sponge media can be disposed in licensed landfills, or used in soil compost operations.

Routine operating labor is very low, requiring only occasional maintenance checks of sumps, machinery, and operating temperature.

Electrical costs include only the power for the system blower.

START-UP TRAINING AND SERVICES

MV, LLC will provide:

- Just prior to start-up, MV will be on-site to supervise the loading of media into the bio-filters, and to check out all other system aspects.
- Start-up is expected to last no more than three (3) days, during which MV personnel will review with local engineers, as well as operators and maintenance people, the complete theory and operation of the chemobiofilter system, the Operating and Maintenance Manual, and any required testing and procedures.
- Two complete copies of the System Operation and Maintenance Manual will be provided and will include Theory and Operation, Mechanical Maintenance, Media Evaluation Procedures, Media Replacement Procedures, Disposal Procedures, and General Operating Procedures.

REFERENCE PROJECTS

1. Cape May Landfill, Cape May Courthouse, NJ, 08210, 609 465 9026, Manny Solheim (eng.)

2. Excel Packing (Cargill), Fort Morgan, Colorado **and** in Dodge City, Kansas.
   1505 East Burlington Avenue
   Fort Morgan, Colorado 80201
   970-867-1603
   - Anaerobic Lagoon, Bio-Gas Bio-Filters,

3. Coors Brewing Company, Golden, Colorado
   17735 West 32nd Avenue
   Mail BC 510
   Golden, Colorado 80401
   303-277-2057

- Biogas from a high-rate digester containing 400-2500 ppm H2S at variable flow rates of 90-400 cfm.

4 Lethbridge WWTP, Alberta, Canada, and Greeley, CO
   Retrofit of a VAREC iron sponge unit and retrofit of a MARCAB unit. Side by side comparisons of operating life for Lethbridge demonstrated 3X longer operating life for H2SPlus system as compared to VAREC system.

5. MV OdorFilters (Similar to bioscrubbers but with minor modification) have been emplaced at 6 asphalt plants in various locations in the USA.

6. Various Anaerobic Digester systems designed and built by Varani Technologies, employing Iron Sponge Bio-Filters for the removal of hydrogen sulfide from bio-gas have also been constructed over the past 25 years.

ADDITIONAL MATERIALS and SERVICES PROVIDED BY MV LLC

ENGINEERING

MV will provide engineering assistance via telephone, fax or e-mail associated with the installation and operation of the H2SPLUS systems.

MV SHALL ALSO PROVIDE ENGINEERING ASSISTANCE IN THE INTEGRATION OF OUR SYSTEM WITHIN ROB HARVEY DERENZO AND ASSOC.'S EXISTING INFRASTRUCTURE. THIS ASSISTANCE SHALL BE PROVIDED AT NO COST TO ROB HARVEY DERENZO AND ASSOC.

INSTALLATION ASSISTANCE

MV will provide assistance via telephone, fax or e-mail for the installation to provide the following functions:

a) Coordinate with Engineer to answer questions as they arise
b) Insure equipment and media supply as per contract
c) Review engineering and construction process.

OPERATION AND MAINTENANCE MANUALS

Two (2) copies of H2SPLUS system Operation and Maintenance Manuals will be supplied to the Customer, which describes in detail the operation of the System, and cut sheets for all supplied equipment. Manuals will be thoroughly reviewed with the personnel responsible for the day-to-day operation of the system.

START-UP and TRAINING

In particular, the start-up services that MV will provide include the following:

a) Reviewing the contents of the Operation and Maintenance Manual with designated personnel

b) Providing technical supervision and guidance on procedures of analyses to determine system performance
c) Assisting with testing procedures to the extent practical
d) Providing review summaries for project evaluation purposes
e) Advancing start-up to the point where the system is operating routinely
f) Supervise the packing and start-up of the H2SPLUS systems
g) One site visit is included in this scope of work. The site visit will be with the General Contractor immediately after arrival of the H2SPLUS system at the plant location to assist with hookup and loading of the iron sponge. If required a second site visit will be available at Customer's request.

MATERIALS OF CONSTRUCTION

All Biogas contact surfaces within the MV H2SPLUS systems will be fiberglass, PVC, concrete, or polyethylene or Stainless steel, and will be compatible with the known characteristics of the biogas.

The MV vessels are capable of sustaining a 2 psi load in either vacuum or pressure modes.

NEW JERSEY LANDFILL EXPERIENCE

MV has operating experience in the state of New Jersey for treatment of landfill gas. In addition MV has in place all of the necessary operating permits and licenses required to conduct business in New Jersey.

Cape May personnel measured the inlet and outlet concentrations of siloxanes and found that the MV H2SPlus system was removing 60-90% of the various siloxanes in the landfill gas. Thus this siloxane removal may be beneficial in protection of ROB HARVEY DERENZO AND ASSOC.'s IC engines and no additional costs.

LABOR, MATERIALS AND EQUIPMENT TO BE PROVIDED
By OTHERS

PERMITS

MV will assist Customer with any permit modifications required for the construction, start-up, and operation of the H2SPLUS system process, however, responsibility for permitting and other associated costs lie with the Customer/ General Contractor.

CONCRETE

Customer will be responsible for concrete pads. MV will supply overall pad sizing and Colorado PE stamped calculations and drawings for pad assuming 2000-3000 psf soil.

FIELD PIPING

Customer will be responsible for all field piping and connections carrying biogas to the H2SPLUS systems inlet and outlet flanges (Alternative One). Customer will also be responsible for all water recycling, drain lines and air line material and installation. MV will provide P&ID's, piping specifications, routing directions and other engineering detail AND PIPING TO/FROM SUMP.

FIELD ERECTION MATERIALS

Materials necessary for concrete work such as reinforcing bars, mesh, anchor bolts, coping frames, lighting, and buildings are the responsibility of the Customer. Requirements including water lines, air lines, gas lines, and product lines required are the responsibility of Customer.

UTILITIES

ELECTRICITY - 120 VAC, 60 amps, (or equivalent) for pumps, air blower and controls.

WATER - One inch (1") water lines to the vicinity of the project.

LIGHTING - Perimeter lighting as adequate for this equipment.

OFF-LOADNG - Customer will off-load and set equipment shipped to the job site. Customer will also provide labor and crane for packing the H2SPLUS systems under the direction of MV.

INSULATION - Customer will be responsible for all heat tracing and insulation of outdoor piping and sample cocks. NOTE: THE TANKS AND LIDS ARE INSULATED AND SHOULD NOT REQUIRE ANY FURTHER INSULATION.

INSTALLATION - Customer will be responsible for all installation associated with setting and leveling equipment, as well as for all electrical and piping to make the units operational.

STANDARD SPECIFICATIONS

ENGINEERING SERVICES

Includes design, coordination, and instruction as stated in other sections of this Agreement to form an operational H2SPLUS system.

SHIPMENT

Shipment of machinery and equipment listed in this Agreement can be made within approximately 16-18 weeks from the date of the Contract approval and Purchase Order.

DELIVERY

Unless otherwise specified, the equipment covered by this Agreement is to be furnished F.O.B. Point of Origin, USA. Title to the equipment supplied by MV shall remain with MV until installation is complete, and thereafter shall be transferred to Customer or its representative. MV shall act as agent for transportation and charge Customer on a pass thru basis.

MV shall have the right to file a Material and Mechanic's Lien or liens, until MV is paid in full. ROB HARVEY DERENZO AND ASSOC. and Customer shall keep all machinery, equipment and plant insured against all perils in an amount not less than eighty percent (80%) of the total purchase price with MV specifically named as loss payee for the outstanding receivable. Proof of insurance shall be provided to MV upon request. ROB HARVEY DERENZO AND ASSOC. and Customer bears all risk of loss with respect to the subject machinery and equipment after MV's delivery of equipment to common carriers.

TAXES

Sales taxes have been estimated for this project.

OSHA (IF APPLICABLE)

MV will provide equipment that, to the best of its knowledge, complies with existing requirements of the Williams-Steiger Occupational Safety and Health Act of 1970; however, because of the vague nature of the Act's equipment specifications and the uncertainty surrounding OSHA inspection procedures, MV does not represent, warrant, or guarantee that the equipment being purchased meets all OSHA requirements. MV shall not be responsible to ROB HARVEY DERENZO AND ASSOC. or Customer for any costs, damages, fines, or assessments resulting from failure of the equipment to comply with provisions of OSHA or any other Safety Agency. MV will advise in the operating manuals the specific safety features included in its equipment.

FORCE MAJEURE

MV shall be excused for any delay in performance due to unforeseen causes beyond MV's control, including but not limited to any act or neglect of ROB HARVEY DERENZO AND ASSOC. or Customer or by any other contractor with ROB HARVEY DERENZO AND ASSOC. , or by changes in the work, or by strikes, lockouts or other labor difficulties, or by fire, flood, earthquake, epidemics, quarantine restrictions, riots, insurrections, freight embargo, plant breakdown, unusually severe weather, governmental restrictions, acts of God or the public enemy.

MANUFACTURERS WARRANTIES

All manufacturers' warranties on parts such as pumps, motors, controllers, etc., are provided on a pass-through basis, and are generally one (1) year from date of commissioning.

LIMITATION OF REMEDIES

In no event shall MV be liable for any special, incidental or consequential damages based upon breach of warranty, breach of contract, negligence, strict tort or any other legal theory. Such damages include, but are not limited to, loss of profits, loss of savings or revenue, loss of use of the Bio-Filter unit and/or the system to which it is attached or has been made a part of, costs of any substitute equipment, downtime, the claims of third parties, including customers, and injury to property. Some states do not allow limits on warranties or on remedies for breach in certain transactions. In such states the limits set forth in this paragraph and the last paragraph of this section may not apply.

TIME LIMIT FOR BRINGING SUIT

Any action for breach of warranty must be commenced within thirteen (13) months following installation of the H2SPLUS system unit.

NFPA REQUIREMENTS

The fiberglass tank shall conform to NFPA regulations for outside placement (minimum 10' from any other building, and explosion proof operating controls if located within 3' of vessel).

THERE ARE NO WARRANTIES THAT EXTEND BEYOND THOSE SET FORTH IN THIS WARRANTY SECTION.

PRICING and TERMS OF PAYMENT

THREE TANK SYSTEM SYSTEM ESTIMATED OPERATING LIFE ~220 DAYS

- 4 vessels fiberglass, uninsulated, 12' diameter by 10'6" tall complete with all internal gas distribution piping and external flanges plus valves; and 3150 cf of iron sponge; supplied together with one concrete sump, 4 recycle pumps and lid.
- One air blower and rotameter.
- Appropriate Drawings (AutoCad 2000)
- Start-Up Site Visit/Training
- Engineering/Construction Assistance via telephone, fax, e-mail
- One-time Technology Use License
- Vessel, piping and all appurtenances per this quote
- 4 sets of MV NETS –one set per tank

- Control panel
- Temperature control probes for each vessel
- **NOTE: PRICES DO NOT INCLUDE TAXES, IMPORT FEES, OR TRANSPORTATION**

Total System Costs **$222,960.00**

NOTE: IF SO DESIRED MV WOULD BE PLEASED TO ASSIST IN THE DESIGN AND SUPPLY OF THE HEADER PIPING WHICH WE SUGGEST BE SS.

Optional Items:

1.) ***H2S dilution, measurement and transmitter*** to provide continuous on line measurement of H2S in the cleaned biogas or alternately in the incoming biogas. NOTE DEPENDING ON BIOGAS PRESSURE AND METHOD OF MOVEMENT AN ADDITIONAL SAMPLING PUMP MAY BE REQUIRED FOR EACH MONITORING UNIT AND IS NOT INCLUDED IN PRICE QUOTED. **$12,450EA**

2.) Two (2) ¼ hp explosion proof sample pumps to provide inlet and outlet gas sample feed to the H2S monitors and O2 monitor. **$11,600 Total**

3.) ***Gas Oxygen monitor*** to provide real time analysis of the oxygen content in the cleaned biogas to insure a safety factor of 10 X is maintained below lower explosive limits. If oxygen content increases the monitor shuts down the air addition pump. **$8,800EA**

4.) **Automated servo driven bypass valve** to provide continuous adjustment for amount of untreated biogas bypass to achieve desired blended outlet biogas H2S concentration. Does not include wiring or any control units. **$3,500EA**

Terms:

30% Due upon signed Purchase Agreement Receipt

60% Due upon shipping of Materials purchased

10% Due 30 days after shipment

Note: All MV invoices will be due within 30 days of date of invoice. Failure to pay with the 30 day period shall result in a 1-1/2 % per month interest charge on the unpaid balance.

NOTE: CONTRARY TO OTHER IRON SPONGE SYSTEMS THE MV SYSTEM IS EQUIPPED WITH CONTINUOUS RECHARGE CAPABILITY AND DOES NOT REQUIRE ANY DOWNTIME UNTIL ALL OF THE CONTAINED IRON SPONGE REACHES TOTAL EXHAUSTION.

Estimated Customer Costs For Items Excluded From This Bid (for single vessel configuration):

Concrete: ~20 cubic yards @ $300/finished cubic yard	$ 6,000
River Stone: 18 cubic yards at $20.00 per cubic yard	$ 3,600
Site Electrical: Motor starters, panels (INCLUDED IN CONTROL PANEL SUPPLIED)	
Labor for assembly of MV H2SPLUS system 90 hour @ $50/man hr	$ 4,500
Cranes, front loaders, bobcat rental.	No Data
Shipment of Vessel, sump, blower, and piping	No Data

Note: These costs are estimated and intended to serve as guidelines only.

REMEDIES

Failure to timely pay any installment required herein shall entitle MV at its option, to (1) terminate or suspend any remaining obligations on its part under this Agreement, (2) recover its costs and damages, (3) seek specific performance, (4) file a Mechanic's Lien to secure outstanding payments and any future payments, or (5) any other remedy available under applicable law. MV may pursue any one or more of the foregoing remedies.

ASSUMPTIONS AND CLARIFICATIONS

This proposal, operational capabilities, and costing is based on the following assumptions and clarifications:

1. H2S concentrations may vary widely and may adversely affect operating life.
2. Intermittent feed of the LFG-if it occurs-may slightly decrease the projected operating life as opposed to a steady-state feed rate.
3. Weekly analysis of incoming H2S load and flow rate will be required to verify loading rate and operating life of the system.
4. An extended operating life can be achieved by equipping the incoming biogas with a bypass valve and thus diverting ~10% of the incoming flow and then blending the diverted biogas with the treated gas to achieve the desired H2S concentration of 50 ppm.

MISCELLANEOUS

(a) The internal laws of the State of Colorado shall govern this Agreement.

(b) ROB HARVEY DERENZO AND ASSOC. shall be deemed to have accepted the materials, and equipment as in full compliance with the terms of this Agreement upon its payment in full of the purchase price. Upon receipt of the full purchase price, MV agrees to (i) execute and deliver a final lien waiver and (ii) assign to ROB HARVEY DERENZO AND ASSOC. or its Customer all third party warranties and deliver a bill of sale covering the material, machinery, and equipment quoted above.

(c) ROB HARVEY DERENZO AND ASSOC. and Customer agree that they will provide MV with access that is adequate for MV's site activities.

(d) Delivery time is estimated at ~18 weeks after receipt of order.

ACCEPTANCE

Execution of this Agreement by ROB HARVEY DERENZO AND ASSOC. shall constitute an offer by ROB HARVEY DERENZO AND ASSOC. as Agent for Customer and when MV executes said Agreement it shall constitute an acceptance of ROB HARVEY DERENZO AND ASSOC. 's offer. The transmittal of the unsigned Agreement from MV to ROB HARVEY DERENZO AND ASSOC. shall constitute an invitation to ROB HARVEY DERENZO AND ASSOC. to make an offer on the terms set forth herein. ROB HARVEY DERENZO AND ASSOC. agrees and understands that the terms contained herein are subject to change by MV without notice. If said offer is not accepted by ROB HARVEY DERENZO AND ASSOC. on or before 1 Nov 2007, this pricing may be subject to change.

Mtarri/Varani LLC, (Seller)

By: _____ Date: _____

Paul B. Trost PhD,

ROB HARVEY DERENZO AND ASSOC. (Purchaser, or agent of Purchaser), as agreed for ROB HARVEY DERENZO AND ASSOC. or Other

By: _____ Date: _____