

Derenzo and Associates, Inc.

Environmental Consultants

October 14, 2011

Mr. Jeffery F. Koerner, Program Administrator
STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Office of Permitting and Compliance
Division of Air Resource Management
2600 Blair Stone Road, MS#5505
Tallahassee, Florida 32399-2400

Subject: Air Construction Permit Modification Application
Seminole Energy, LLC at the Osceola Road Solid Waste Management Facility
Site ID 1170084

Dear Mr. Koerner:

Project NO. 1170084-009-AC-PSD-FL-376B

Enclosed please find an Air Construction Permit Modification application for Seminole Energy, LLC at the Osceola Road Solid Waste Management Facility (Site ID No. 1170084).

Seminole Energy is proposing changes to the permitted carbon monoxide (CO) emission rates in permit No. 1170084-008-AC / PSD-FL-376A. No additional equipment is being proposed for the Seminole Energy facility beyond that which is already permitted. This application requests modifications to the Air Construction Permit for Seminole Energy only (not concurrent processing of a Title V permit modification). The modifications proposed in this Air Construction Permit application will be addressed in the Title V Permit renewal application that will be submitted by Seminole County (the landfill owner) near the end of 2011 or beginning of 2012.

Attached to this correspondence are original signed application forms and a check in the amount of \$7,500 for the permit review.

Please contact us at (517) 324-1880 or rharvey@derenzo.com if you have any questions or require additional information.

Sincerely,

DERENZO AND ASSOCIATES, INC.



Robert L. Harvey, P.E.
Engineering Services Manager

Attachments
Enclosures (4 bound copies; 1 unbound copy of application documents)



Department of Environmental Protection

RECEIVED

OCT 18 2011

Division of Air Resource Management APPLICATION FOR AIR PERMIT - LONG FORM

DIVISION OF AIR RESOURCE MANAGEMENT

I. APPLICATION INFORMATION

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

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

Air Operation Permit – Use this form to apply for:

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

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: Seminole Energy LLC	
2. Site Name: Osceola Road Waste Management Facility	
3. Facility Identification Number: 1170084	
4. Facility Location Street Address or Other Locator: 1930 East Osceola Road City: Geneva County: Seminole Zip Code: 32732	
5. Relocatable Facility? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6. Existing Title V Permitted Facility? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Application Contact

1. Application Contact Name: Robert L. Harvey	
2. Application Contact Mailing Address Organization/Firm: Derenzo and Associates, Inc. Street Address: 4970 Northwind Dr., Ste 120 City: E. Lansing State: MI Zip Code: 48823	
3. Application Contact Telephone Numbers Telephone: (517) 324 - 1880 ext. Fax: (517) 324 - 5409	
4. Application Contact E-mail Address: RHarvey@derenzo.com	

Application Processing Information (DEP Use)

1. Date of Receipt of Application: 10-18-11	3. PSD Number (if applicable):
2. Project Number(s): 1170084-009-AC-	4. Siting Number (if applicable):

PSD-FL - 376B

APPLICATION INFORMATION

Purpose of Application

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

Air Construction Permit

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

Air Operation Permit

- Initial Title V air operation permit.
- Title V air operation permit revision.
- Title V air operation permit renewal.
- Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is required.
- Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is not required.

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

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

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

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

Application Comment

This permit application requests modification of the carbon monoxide (CO) emission limit, and other minor permit modifications, for the landfill gas fueled engine generator sets that are owned and operated by Seminole Energy, LLC. The Seminole Energy electricity generation facility is part of the Osceola Road Waste Management Facility stationary source.

A Title V Air Operation Permit renewal application for the entire stationary source is being prepared for submittal in early 2012. The requested permit modifications for the engine generators will be incorporated into the renewal application. Therefore, this application is for modification of the Air Construction Permit (1170084-008-AC and PSD-FL-376A) only.

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Processing Fee
EU-002 through EU-007	Landfill gas fueled IC engine generator sets (6 identical units).	AC1A	\$7,500

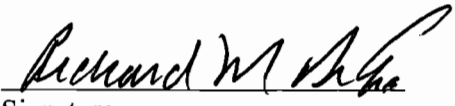
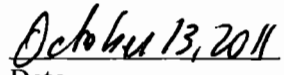
Application Processing Fee

Check one: Attached - Amount: \$ 7,500 _____ Not Applicable

APPLICATION INFORMATION

Owner/Authorized Representative Statement

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

1. Owner/Authorized Representative Name : Richard M. DiGia
2. Owner/Authorized Representative Mailing Address Organization/Firm: Seminole Energy, LLC c/o Landfill Energy Systems Street Address: 46280 Dylan Dr, Ste 200 City: Novi State: MI Zip Code: 48377
3. Owner/Authorized Representative Telephone Numbers Telephone: (248) 380 - 3920 ext. Fax: (248) 380 - 2038
4. Owner/Authorized Representative E-mail Address: Richard.Digia@landfillenergy.com
5. Owner/Authorized Representative Statement: <i>I, the undersigned, am the owner or authorized representative of the corporation, partnership, or other legal entity submitting this air permit application. To the best of my knowledge, the statements made in this application are true, accurate and complete, and any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department.</i>  Signature  Date

APPLICATION INFORMATION

Application Responsible Official Certification

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

1. Application Responsible Official Name:
2. Application Responsible Official Qualification (Check one or more of the following options, as applicable): <input type="checkbox"/> 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. <input type="checkbox"/> For a partnership or sole proprietorship, a general partner or the proprietor, respectively. <input type="checkbox"/> For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official. <input type="checkbox"/> The designated representative at an Acid Rain source or CAIR source.
3. Application Responsible Official Mailing Address Organization/Firm: Street Address: City: State: Zip Code:
4. Application Responsible Official Telephone Numbers... Telephone: () - ext. Fax: () -
5. Application Responsible Official E-mail Address:

APPLICATION INFORMATION

6. Application Responsible Official Certification:

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

Signature

Date

APPLICATION INFORMATION

Professional Engineer Certification

1. Professional Engineer Name: Robert L. Harvey Registration Number: 68151
2. Professional Engineer Mailing Address Organization/Firm: Derenzo and Associates, Inc. Street Address: 4970 Northwind Dr., Ste 120 City: E. Lansing State: MI Zip Code: 48823
3. Professional Engineer Telephone Numbers... Telephone: (517) 324 - 1880 ext. Fax: (517) 324 - 5409
4. Professional Engineer E-mail Address: RHarvey@derenzo.com
5. Professional Engineer Statement: <i>I, the undersigned, hereby certify, except as particularly noted herein*, that:</i> <i>(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</i> <i>(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.</i> <i>(3) If the purpose of this application is to obtain a Title V air operation permit (check here <input type="checkbox"/>, 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.</i> <i>(4) If the purpose of this application is to obtain an air construction permit (check here <input checked="" type="checkbox"/>, 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 <input type="checkbox"/>, 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.</i> <i>(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 <input type="checkbox"/>, 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.</i> Signature <u>R. L. Harvey</u> Date <u>10/12/11</u> (seal)

* 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) 492.240 North (km) 3,184.510		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) 28/47/22.70 Longitude (DD/MM/SS) 81/05/23.10	
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 : This construction permit modification application is for the Seminole Energy electricity generation facility that is located on leased land at the Seminole County Osceola Road Waste Management Facility.			

Facility Contact

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

Facility Primary Responsible Official

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

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

FACILITY INFORMATION

Facility Regulatory Classifications

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

1. <input type="checkbox"/> Small Business Stationary Source	<input type="checkbox"/> Unknown
2. <input type="checkbox"/> Synthetic Non-Title V Source	
3. <input checked="" type="checkbox"/> Title V Source	
4. <input checked="" type="checkbox"/> Major Source of Air Pollutants, Other than Hazardous Air Pollutants (HAPs)	
5. <input type="checkbox"/> Synthetic Minor Source of Air Pollutants, Other than HAPs	
6. <input type="checkbox"/> Major Source of Hazardous Air Pollutants (HAPs)	
7. <input checked="" type="checkbox"/> Synthetic Minor Source of HAPs	
8. <input checked="" type="checkbox"/> One or More Emissions Units Subject to NSPS (40 CFR Part 60)	
9. <input type="checkbox"/> One or More Emissions Units Subject to Emission Guidelines (40 CFR Part 60)	
10. <input checked="" type="checkbox"/> One or More Emissions Units Subject to NESHAP (40 CFR Part 61 or Part 63)	
11. <input type="checkbox"/> Title V Source Solely by EPA Designation (40 CFR 70.3(a)(5))	
12. Facility Regulatory Classifications Comment:	
<p>The Seminole Energy facility is part of the Seminole County Osceola Road Waste Management Facility stationary source and is included in the Title V permit issued to the stationary source. The potential to emit carbon monoxide (CO) for the Seminole Energy electricity generation facility exceeds the PSD major source threshold.</p> <p>New spark-ignited reciprocating internal combustion engines (RICE) are subject to the NSPS in 40 CFR Part 60 Subpart JJJJ.</p> <p>New and existing RICE are subject the NESHAP in 40 CFR Part 63 Subpart ZZZZ.</p>	

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

FACILITY INFORMATION

B. EMISSIONS CAPS

Facility-Wide or Multi-Unit Emissions Caps

1. Pollutant Subject to Emissions Cap	2. Facility-Wide Cap [Y or N]? (all units)	3. Emissions Unit ID's Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap
VOC		EU002-EU007		35.9	ESCPSD
H106		EU002-EU007		9.96	ESCMACT

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

The emission caps in this table are for the Seminole Energy engines, emission units EU-002 through EU-007. The Air Construction Permit issued to Seminole Energy specifies allowable:

- VOC emissions of 5.99 tons/yr per engine
- HCl emissions of 1.66 tons/yr per engine

FACILITY INFORMATION

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) <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix D</u> <input type="checkbox"/> 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) <input checked="" type="checkbox"/> Attached, Document ID: <u>Figure 4.1</u> <input type="checkbox"/> 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) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Previously Submitted, Date: <u>1/17/2007</u>

Additional Requirements for Air Construction Permit Applications

1.	Area Map Showing Facility Location: <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix D</u> <input type="checkbox"/> Not Applicable (existing permitted facility)
2.	Description of Proposed Construction, Modification, or Plantwide Applicability Limit (PAL): <input checked="" type="checkbox"/> Attached, Document ID: <u>Section 5.0</u>
3.	Rule Applicability Analysis: <input checked="" type="checkbox"/> Attached, Document ID: <u>Sections 6.0 and 7.0</u>
4.	List of Exempt Emissions Units: <input checked="" type="checkbox"/> Attached, Document ID: <u>Section 6.0</u> <input type="checkbox"/> Not Applicable (no exempt units at facility)
5.	Fugitive Emissions Identification: <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
6.	Air Quality Analysis (Rule 62-212.400(7), F.A.C.): <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix I</u> <input type="checkbox"/> Not Applicable
7.	Source Impact Analysis (Rule 62-212.400(5), F.A.C.): <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix I</u> <input type="checkbox"/> Not Applicable
8.	Air Quality Impact since 1977 (Rule 62-212.400(4)(e), F.A.C.): <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix I</u> <input type="checkbox"/> Not Applicable
9.	Additional Impact Analyses (Rules 62-212.400(8) and 62-212.500(4)(e), F.A.C.): <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix I</u> <input type="checkbox"/> Not Applicable
10.	Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable

FACILITY INFORMATION

C. FACILITY ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for FESOP Applications

- | |
|---|
| 1. List of Exempt Emissions Units:
<input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> 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) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> 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) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable (revision application with no change in applicable requirements)
3. Compliance Report and Plan: (Required for all initial/revision/renewal applications) <input type="checkbox"/> 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) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Equipment/Activities Onsite but Not Required to be Individually Listed <input type="checkbox"/> Not Applicable
5. Verification of Risk Management Plan Submission to EPA: (If applicable, required for initial/renewal applications only) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable
6. Requested Changes to Current Title V Air Operation Permit: <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable

FACILITY INFORMATION

C. FACILITY ADDITIONAL INFORMATION (CONTINUED)

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

<p>1. Acid Rain Program Forms:</p> <p>Acid Rain Part Application (DEP Form No. 62-210.900(1)(a)):</p> <p><input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____</p> <p><input type="checkbox"/> Not Applicable (not an Acid Rain source)</p> <p>Phase II NO_x Averaging Plan (DEP Form No. 62-210.900(1)(a)1.):</p> <p><input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____</p> <p><input type="checkbox"/> Not Applicable</p> <p>New Unit Exemption (DEP Form No. 62-210.900(1)(a)2.):</p> <p><input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____</p> <p><input type="checkbox"/> Not Applicable</p>
<p>2. CAIR Part (DEP Form No. 62-210.900(1)(b)):</p> <p><input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____</p> <p><input type="checkbox"/> Not Applicable (not a CAIR source)</p>

Additional Requirements Comment

EMISSIONS UNIT INFORMATION

Section [1] of [1]

III. EMISSIONS UNIT INFORMATION

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

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

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

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

EMISSIONS UNIT INFORMATION

Section [1] of [1]

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

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

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

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

Emissions Unit Description and Status

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

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

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

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

2. Description of Emissions Unit Addressed in this Section:
Six (6) identical CAT® G3520C internal combustion engines attached to individual electricity generators

3. Emissions Unit Identification Number: EU002 through EU007

4. Emissions Unit Status Code: A and C	5. Commence Construction Date: 2006	6. Initial Startup Date: 2007	7. Emissions Unit Major Group SIC Code: 49
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8. Federal Program Applicability: (Check all that apply)

Acid Rain Unit

CAIR Unit

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

10. Generator Nameplate Rating: 1.6 MW (per generator set)

11. Emissions Unit Comment: Each engine is equipped with an individual emissions stack.

EMISSIONS UNIT INFORMATION

Section [] of []

Emissions Unit Control Equipment/Method: Control ___ of ___

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

Emissions Unit Control Equipment/Method: Control ___ of ___

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

Emissions Unit Control Equipment/Method: Control ___ of ___

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

Emissions Unit Control Equipment/Method: Control ___ of ___

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

EMISSIONS UNIT INFORMATION

Section [1] of [1]

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: 580 cubic feet / min treated landfill gas
2. Maximum Production Rate: 1.6 MW per generator
3. Maximum Heat Input Rate: 17.1 million Btu/hr (HHV basis)
4. Maximum Incineration Rate: pounds/hr tons/day
5. Requested Maximum Operating Schedule: 24 hours/day 52 weeks/year 7 days/week 24 hours/year
6. Operating Capacity/Schedule Comment: Units operate continuously.

EMISSIONS UNIT INFORMATION

Section [1] of [1]

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: Seminole Energy Plant		2. Emission Point Type Code: 1	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: Six identical internal combustion engines (EU002 through EU007), each equipped with an individual vertical exhaust stack.			
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: One stack per emission unit (EU002, EU003, EU004, EU005, EU006, and EU007)			
5. Discharge Type Code: V	6. Stack Height: 20 feet	7. Exit Diameter: 1.5 feet	
8. Exit Temperature: 900 °F	9. Actual Volumetric Flow Rate: 13,700 acfm	10. Water Vapor: 11 %	
11. Maximum Dry Standard Flow Rate: 4,700 dscfm		12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates... Zone: 17 East (km): 491.240 North (km): 3184.510		14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) 28 / 47 / 22.70 Longitude (DD/MM/SS) 81 / 05 / 23.10	
15. Emission Point Comment:			

EMISSIONS UNIT INFORMATION

Section [1] of [1]

D. SEGMENT (PROCESS/FUEL) INFORMATION**Segment Description and Rate:** Segment 1 of 1

1. Segment Description (Process/Fuel Type): Treated landfill gas containing approximately 50% methane by volume. Heating value is approximately 460 Btu/scf based on LHV.		
2. Source Classification Code (SCC): 20100802		3. SCC Units: Million cubic feet (MMcf)
4. Maximum Hourly Rate: 0.0348	5. Maximum Annual Rate: 304.8	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: 0.02 (by wt)	8. Maximum % Ash: 0	9. Million Btu per SCC Unit: 460 (LHV)
10. Segment Comment: Data provided is per engine, 580 cu. feet/min = 0.0348 MMcf/hr.		

Segment Description and Rate: Segment __ of __

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

EMISSIONS UNIT INFORMATION

Section [] of []

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

Segment Description and Rate: Segment __ of __

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

Segment Description and Rate: Segment __ of __

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

EMISSIONS UNIT INFORMATION

Section [1] of [1]

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, FUGITIVE, AND ACTUAL EMISSIONS**

(Optional for unregulated emissions units.)

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

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: Carbon monoxide (CO)		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 17.23 lb/hour 75.5 tons/year		4. Synthetically Limited? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year			
6. Emission Factor: 3.5 g/bhp-hr Reference: BACT		7. Emissions Method Code: 5	
8.a. Baseline Actual Emissions (if required): tons/year		8.b. Baseline 24-month Period: From: To:	
9.a. Projected Actual Emissions (if required): tons/year		9.b. Projected Monitoring Period: <input type="checkbox"/> 5 years <input type="checkbox"/> 10 years	
10. Calculation of Emissions: $(3.5 \text{ g/bhp-hr}) \times (2233 \text{ hp}) / (453.6 \text{ g/lb}) = 17.23 \text{ lb/hr CO}$ $(17.23 \text{ lb/hr}) \times (8760 \text{ hr/yr}) / (2000 \text{ lb/ton}) = 75.5 \text{ tpy}$			
11. Potential, Fugitive, and Actual Emissions Comment: Data presented is for one IC engine. Calculations are identical for all six engines. All other permitted emissions remain unchanged.			

**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -
ALLOWABLE EMISSIONS**

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

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: RULE (BACT)	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 3.5 g/bhp-hr	4. Equivalent Allowable Emissions: 17.23 lb/hour 75.5 tons/year
5. Method of Compliance: Periodic stack tests (one engine per year)	
6. Allowable Emissions Comment (Description of Operating Method): Data presented is for one engine. Calculations are identical for all six engines. Emissions determined by BACT analysis pursuant to 62.212-400(4)(b) F.A.C.	

Allowable Emissions Allowable Emissions of

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

Allowable Emissions Allowable Emissions of

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

EMISSIONS UNIT INFORMATION

Section [1] of [1]

G. VISIBLE EMISSIONS INFORMATION

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

Visible Emissions Limitation: Visible Emissions Limitation __ of __

1. Visible Emissions Subtype: RULE	2. Basis for Allowable Opacity: <input checked="" type="checkbox"/> Rule <input type="checkbox"/> Other
3. Allowable Opacity: Normal Conditions: 10 % Exceptional Conditions: 10 % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: Treatment of the gas and maintaining the engines in proper working order ensures compliance with the VE emission standards.	
5. Visible Emissions Comment:	

Visible Emissions Limitation: Visible Emissions Limitation __ of __

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: <input type="checkbox"/> Rule <input type="checkbox"/> Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

EMISSIONS UNIT INFORMATION

Section [] of []

H. CONTINUOUS MONITOR INFORMATION**Complete Subsection H if this emissions unit is or would be subject to continuous monitoring.****Continuous Monitoring System:** Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	<input type="checkbox"/> Rule <input type="checkbox"/> Other
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	<input type="checkbox"/> Rule <input type="checkbox"/> Other
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

EMISSIONS UNIT INFORMATION

Section [1] of [1]

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) <input checked="" type="checkbox"/> Attached, Document ID: <u>Figure 4.1</u> <input type="checkbox"/> 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) <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix E</u> <input type="checkbox"/> 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) <input checked="" type="checkbox"/> Attached, Document ID: <u>Section 8.0</u> <input type="checkbox"/> 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) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____ <input checked="" type="checkbox"/> 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) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Previously Submitted, Date <u>1/17/2007</u> <input type="checkbox"/> Not Applicable
6. Compliance Demonstration Reports/Records: <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix E</u> Test Date(s)/Pollutant(s) Tested: <u>CO, NO_x and VOC (tested in 2008, 2009, 2010 and 2011).</u> <input type="checkbox"/> Previously Submitted, Date: _____ Test Date(s)/Pollutant(s) Tested: _____ <input type="checkbox"/> To be Submitted, Date (if known): _____ Test Date(s)/Pollutant(s) Tested: _____ <input type="checkbox"/> 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: <input checked="" type="checkbox"/> Attached, Document ID: <u>Application document</u> <input type="checkbox"/> Not Applicable

EMISSIONS UNIT INFORMATION

Section [1] of [1]

I. EMISSIONS UNIT ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(10) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)): <input checked="" type="checkbox"/> Attached, Document ID: <u>Section 8.0</u> <input type="checkbox"/> Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rules 62-212.400(4)(d) and 62-212.500(4)(f), F.A.C.): <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix I</u> <input type="checkbox"/> Not Applicable
3. Description of Stack Sampling Facilities: (Required for proposed new stack sampling facilities only) <input checked="" type="checkbox"/> Attached, Document ID: <u>Section 6.0</u> <input type="checkbox"/> Not Applicable

Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements: <input type="checkbox"/> Attached, Document ID: _____
2. Compliance Assurance Monitoring: <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable
3. Alternative Methods of Operation: <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable
4. Alternative Modes of Operation (Emissions Trading): <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable

Additional Requirements Comment

--

ORIGINAL

Derenzo and Associates, Inc.

Environmental Consultants

APPLICATION FOR AIR PERMIT

Title: Air Construction Permit Application for Modifications to Landfill Gas-Fueled Reciprocating Internal Combustion Engine Electricity Generation Engines

Date: October 10, 2011

Applicant	
Owner Location	Seminole Energy, LLC Seminole County Osceola Road Solid Waste Management Facility 1930 East Osceola Road, Geneva
Mailing Address	46280 Dylan Drive, Suite 200 Novi, Michigan 48337

Facility Identification	
Facility ID / Permit No.	1170084-008-AC (PSD-FL-376A)

Environmental Consultant	
Company Mailing Address	Derenzo and Associates, Inc. 4970 Northwind Drive, Suite 120 East Lansing, Michigan 48823
Phone	(517) 324-1880
Project No.	0804009

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OCT 18 2011

**DIVISION OF AIR
RESOURCE MANAGEMENT**

APPLICATION FOR AIR PERMIT

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AIR CONSTRUCTION PERMIT APPLICATION
FOR
MODIFICATIONS TO LANDFILL GAS-FUELED
RECIPROCATING INTERNAL COMBUSTION ENGINE
ELECTRICITY GENERATION OPERATIONS
AT THE
SEMINOLE COUNTY OSCEOLA ROAD
SOLID WASTE MANAGEMENT FACILITY

1.0 INTRODUCTION

Seminole Energy, LLC (Seminole Energy) has prepared this air permit application to request modifications to the allowable air pollutant emission rates for its electricity generation facility that is fueled with landfill gas (LFG) generated by the Seminole County, Osceola Road Solid Waste Management Facility (Osceola SWM Facility). This application proposes changes to the permitted carbon monoxide (CO) emission rates based on experience obtained through the operation of these engines. No additional equipment is being proposed for the Seminole Energy facility beyond that which is already permitted. The existing LFG fueled electricity generation facility:

1. Was constructed following the issuance of Air Construction Permit 1170084-005-AC (PSD-FL-376) and has been incorporated into Title V Air Operations Permit No. 1170084-007-AV for the Osceola SWM Facility stationary source;
2. Uses LFG (exclusively) to fuel its reciprocating internal combustion (IC) engine – generator operations (i.e., LFG that is generated at the Osceola SWM Facility as a result of the degradation of solid wastes placed in the facility);
3. Consists of four (4) constructed and operational Caterpillar, Inc. (CAT®) Model G3520C lean-burn IC engine-generator sets (and ancillary equipment that support the electricity generation processes) identified as emission units EU-002, EU-003, EU-004, EU-005. The Air Construction Permit issued to Seminole Energy allows for the phased installation of two additional CAT® G3520C LFG-fueled IC engine generator sets (EU006 and EU-007) within specified time periods following construction of the initial facility.
4. Has the potential to generate 6.4 megawatts (MW) of electricity under base load operating conditions; and
5. Interconnects to the local electric distribution network through a nearby power line.

The electricity generated by the Seminole Energy is sold under the provisions of a Power Purchase Agreement with Florida Power and Light, Inc.

Seminole Energy requests that Air Construction Permit No. 1170084-008-AC be modified to incorporate appropriate CO emission rate limitations that can be maintained and achieved over all fuel quality and engine wear / maintenance operating conditions for the existing CAT[®] Model G3520C IC engine - generator sets.

Existing facilities located in the State of Florida that operate equipment with significant increases in regulated air pollutant emissions are required to submit permit application documents to the Florida Department of Environmental Protection, Division of Air Resource Management (FDEP-DARM) for its review and approval through the issuance of a new or modified Air Construction Permit in accordance with the regulatory provisions of *62-4.210 Construction Permits*, Florida Administrative Code (F.A.C.), and *62-210.300 Permits Required*, F.A.C.

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

Derenzo and Associates, Inc. has been retained by Seminole Energy to prepare permit application documents for the proposed allowable CO emission rate modifications for its LFG-fueled electricity generation facility.

Mr. Richard DiGia, President and Chief Executive Officer of Landfill Energy Systems (parent company of Seminole Energy) and Secondary Responsible Official for the stationary source authorized the preparation of the permit application documents.

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

Appendix B provides a copy of Air Construction Permit 1170084-005-AC and 1170084-008-AC (PSD-FL-376A).

2.0 LANDFILL FACILITY

The Osceola SWM Facility is owned by Seminole County and operated by the Seminole County Solid Waste Management Department. The facility is located at 1930 East Osceola Road in Geneva, Seminole County.

2.1 Gas Collection / Control System

LFG produced from the decomposition of disposed waste materials at both active and capped cells is being collected by an active gas recovery system at the Osceola WMF. A blower station connected to the gas recovery system moves the collected LFG to a central location.

The preferred use for the recovered gas is treatment and use as fuel in the Seminole Energy facility. Excess LFG is directed to open utility flare(s) operated by the landfill where methane, non-methane organic compounds (NMOC) and hazardous air pollutants (HAPs) contained in the gas are destroyed (oxidized).

The Osceola SWM Facility operates two (2) open flares with LFG flow capacities of 2,145 standard cubic feet per minute (scfm) and 3,000 scfm. The flaring systems have a maximum combined LFG flaring capacity of 5,145 scfm (7.41 MMscf/day) of LFG.

2.2 Predicted Landfill Gas Generation Rates

The Osceola SWM Facility has calculated LFG generation and collection rates based on the amount of waste in place, estimated future waste placement, and default factors for methane generation constant and methane generation potential.

These calculations indicate that the landfill has the potential to generate up to 6,000 cubic feet per minute (cfm) of LFG at its current permitted waste placement capacity. This results in the potential to collect 4,500 cfm LFG based on a conservative collection efficiency of 75%.

Appendix C provides printouts from the Landfill Gas Emissions Model (LandGEM).

2.3 MSW Landfill NSPS

The Osceola SWM Facility is subject to the regulatory requirements of federal New Source Performance Standards for Municipal Solid Waste (MSW) Landfills (MSW Landfill NSPS, 40 CFR Part 60 Subpart WWW). The provisions of the MSW Landfill NSPS require that an adequate number of wells and sufficiently sized equipment be installed and operated to control the LFG generated at the facility. The Osceola SWM Facility collects the LFG using a wellfield and either combusts the gas in the open flare(s) or transfers it to Seminole Energy where it is treated and used as fuel to power the IC engine electricity generation facility.

2.4 Permitting

The Title V Air Operations Permit issued to the Osceola SWM Facility stationary source (1170084-007-AV) has an expiration date of August 30, 2012. Therefore, a renewal application must be submitted to the FDEP-DARM by February 28, 2012. To avoid overlapping review periods for a Title V Permit modification and renewal, this application only requests modifications to the Air Construction Permit for Seminole Energy (not concurrent processing of a Title V permit modification). The modifications proposed in this Air Construction Permit application will be addressed in the Title V Permit renewal application submitted by Seminole County near the end of 2011 or beginning of 2012.

3.0 ELECTRICITY GENERATION FACILITY DESCRIPTION

3.1 General Process Description

The constructed and operated existing electricity generation facility consists of:

- 1 LFG treatment equipment (gas dewatering, filtration and compression processes and equipment);
- 2 Four (4) identical LFG (treated gas) fueled CAT[®] Model G3520C IC engines connected to individual electricity generators. Each IC engine has a power generation rating of 2,233 brake horsepower (bhp) and is connected to an electricity generator that has an electricity generation rating of 1,600 kW.
- 3 Ancillary equipment that supports the electricity generation operations.
 - a. Each of the permitted and operated IC engines is equipped with a stand-alone fan-cooled radiator.
 - b. Engine radiator coolant is stored onsite in drum quantities.
 - c. Engine lube oil (new and used) is stored in separate above ground holding tanks installed on the premises of Seminole Energy. The installed new lube oil storage tank has a capacity of 2,000 gallons. The installed used oil storage tank has a capacity of 1,000 gallons.

The existing four (4) CAT[®] G3520C gas IC engine generator sets have a total electricity generation capacity of 6,400 kW (6.4 MW). Operation of the permitted six (6) CAT[®] G3520C gas IC engine generator sets would result in a total electricity generation capacity of 9,600 kW (9.6 MW).

The existing LFG fueled IC engines are housed in a single building constructed in an area (at the landfill facility on leased land) near the LFG collection system header and existing flaring stations (i.e., open utility flares that are owned and operated by the landfill). A gas transmission line (fuel supply pipe) is connected to the header of the existing LFG collection system and a dedicated gas blower/compressor is used to draw LFG from the existing LFG collection system to the electricity generation facility treatment system.

A single meter (flow totalizer) is operated at the existing electricity generation facility to measure the total amount of treated LFG (fuel) that is supplied to power the installed IC engines (i.e., individual engine fuel use meters have not been installed).

Appendix D provides a general location map for the Osceola SWM Facility and a site plan for the electricity generation facility.

3.2 Air Permitting Information

The original construction permit issued to Seminole Energy on January 17, 2007 (1170084-005-AC and PSD-FL-376) allows for the initial construction of four (4) engines and the phased construction of the two (2) additional engines, for a total of six (6) identical CAT® G3520C IC engine generators. This permit was reissued in January 2009 (1170084-008-AC and PSD-FL-376A) to clarify applicability of 40 CFR 63 Subpart ZZZZ requirements.

Seminole Energy has installed and operates four (4) CAT® G3520C IC engine generators identified as emission units EU002, EU003, EU004, and EU005. The installation of the fifth and sixth engine-generator sets is dependent on actual LFG collection rates (these engines will be installed once it is verified that an adequate amount of LFG can be collected to support engine operations). Based on the LFG collection curve presented in Appendix C and anticipated improvements in LFG collection efficiency, Emission unit EU006 is anticipated to be installed within the next five (5) years and emission unit EU007 is anticipated to be installed within five (5) years after EU006.

The existing Seminole Energy operations have been incorporated into Title V Permit 1170084-007-AV that is issued to the Osceola SWM Facility stationary source.

4.0 ELECTRICITY GENERATION FACILITY OPERATIONS

IC engine operation and emissions are dependent on the properties of the treated LFG that is used as fuel and the length of time that the engines are in service. Properties of the supplied LFG are variable and have an impact upon the emissions from the source. This section describes operations of the Seminole Energy existing electricity generation facility.

4.1 Landfill Gas Properties and Treatment

4.1.1 Physical Properties

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

The properties of the treated LFG used to fuel its existing electricity generation operations are monitored on a regular basis by Seminole Energy. Data maintained by Seminole Energy indicate that the methane content in the treated LFG fuel generally ranges from 47 to 50% by volume. The corresponding heat content ranges from 475 British thermal units per standard cubic foot (Btu/scf) to 505 Btu/scf on a higher heating value (HHV) basis, which is equivalent to 425 to 455 Btu/scf on a lower heating value (LHV) basis.

Beginning with the startup of the Seminole Energy facility in 2007, the LFG recovered from the Osceola SWM Facility is sampled twice per year to determine the sulfur and chlorinated compound content as required by conditions of the issued Air Construction and Title V Air Operation Permits.

Table 4.1 presents a summary of physical properties for the treated LFG used as fuel in the Seminole Energy electricity generation facility.

4.1.2 Treatment

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

1. Initial two-stage inlet gas dewatering/filter vessels (the bottom chambers are used for moisture knock-out and the top chambers are equipped with coalescing filter media to remove gas particles having diameters of 0.3-microns and larger).
2. A gas compressor/blower.

3. Air-to-gas coolers, which reduce the temperature of the LFG after compression to approximately 10°F above ambient temperature.
4. Final two-stage gas dewatering/filter vessels (the bottom chambers are used for moisture knock out and the top chambers are equipped with coalescing filter media to remove gas particles having diameters of 0.3-microns and larger).

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

Figure 4.1 provides a process flow diagram for the existing LFG treatment system.

Appendix E provides analytical results for the treated LFG sulfur and chlorinated compound content sampling.

4.2 CAT[®] G3520C IC Engine Specifications

Each CAT[®] G3520C lean-burn gas-fueled IC engine in operation at Seminole Energy:

1. Has a power generation rating of 2,233 bhp.
2. Has been designed to fire low-pressure, lean fuel mixtures and produce low combustion by-product emissions;
3. Is equipped with an air-to-fuel ratio controller that monitors engine performance parameters and automatically adjusts the air-to-fuel ratio and ignition timing to maintain efficient fuel combustion, which minimizes air pollutant emissions; and
4. Is fueled exclusively with treated LFG received from the Osceola SWM Facility (natural gas is not, and will not be, used to fuel the IC engine operations).

Appendix F provides the Gas Engine Technical Data sheet for the CAT[®] G3520C engine.

4.3 IC Engine Heat Input Rate

The manufacturer's technical data specifies that the CAT[®] G3520C gas IC engine heat input at baseload operations is 242,216 Btu/min LHV, which is equivalent to 14.5 million Btu per hour (MMBtu/hr) LHV. This specification has been revised upward by the manufacturer since Seminole Energy requested a permit for its existing operations. The footnote presented in the CAT[®] data sheet indicates that the LHV rate specification has a tolerance of 2.5% (i.e., actual normal operating condition values may vary from those specified by the manufacturer by 2.5%).

Therefore, the upper range of the heat input value based on the manufacturer's specification is 14.9 MMBtu/hr LHV (which is equivalent to 16.5 MMBtu/hr on an HHV basis).

$$14.5 \text{ MMBtu/hr LHV} \times 1.025 = 14.9 \text{ MMBtu/hr LHV}$$
$$14.9 \text{ MMBtu/hr LHV} \times (1010/910) = 16.5 \text{ MMBtu/hr HHV}$$

Data obtained by Landfill Energy Systems (the parent company of Seminole Energy) and other engine operators from LFG (treated gas) fueled CAT® G3520C IC engines indicate that the actual heat input rate of the equipment is consistently near the upper range of the heat input value specified in the CAT® technical data sheet or greater. Heat input rates as high as 17.5 MMBtu/hr HHV have been reported by engine operators.

Appendix G provides engine-generator operating data for Seminole Energy for 2010.

Due to the availability of collected LFG, the Seminole Energy IC engine-generators operated at approximately 80-90% of maximum capacity during 2010. The calculated average operating capacity for calendar year 2010 is 83% based on the data presented in Appendix G. The average heat input rate for calendar year 2010 is 14.2 MMBtu/hr HHV. This results in an estimated maximum heat input rate of 17.1 MMBtu/hr HHV at maximum (100%) capacity, which is consistent with data collected at other facilities that operate LFG (treated gas) fueled CAT® G3520C IC engines. This is equivalent to a heat input of 15.4 MMBtu/hr LHV and is approximately 6% greater than the manufacturer's specification of 14.53 MMBtu/hr LHV.

$$14.2 \text{ MMBtu/hr HHV} / (83\%) = 17.1 \text{ MMBtu/hr HHV}$$
$$17.1 \text{ MMBtu/hr HHV} \times (910/1010) = 15.4 \text{ MMBtu/hr LHV}$$

4.4 IC Engine Fuel Use Rate

The fuel delivery system for the CAT® G3520C IC engine controls the flowrate of the inlet fuel (treated LFG) stream to achieve the required heat input rate that is necessary to maintain operations at the desired engine (or generator) output. Therefore, the maximum gas consumption rate for the CAT® G3520C IC engine is dependent on the heat content of the treated LFG fuel.

At the maximum IC engine heat input rate specified in the previous section (17.1 MMBtu/hr HHV or 15.4 MMBtu/hr LHV) and the:

1. Minimum fuel heating value of 430 Btu/scf LHV recorded by Seminole Energy, the CAT® G3520C gas IC engines will each have a maximum fuel use rate of approximately 600 scfm or 36,000 standard cubic feet per hour (scfh).

2. Average fuel heating value of 445 Btu/scf LHV recorded by Seminole Energy, the CAT[®] G3520C gas IC engines each have an average fuel use rate, at maximum engine output, that is approximately 580 scfm and 34,800 scfh.

4.5 Engine Exhaust Gas Flowrate

Emissions produced by the combustion of treated LFG fuel in the CAT[®] G3520C IC engines are released into the ambient air through individual stacks connected to the engine exhaust manifolds. Noise mufflers are installed on each engine exhaust stack.

The engine exhaust stacks and noise mufflers are located on the roof of the building that houses the electricity generation engines.

4.5.1 Manufacturer Information

Over the operating cycle of the engine, more fuel is required to operate the CAT[®] G3520C gas IC engine than is specified in the technical data published by the equipment manufacturer (as presented in the previous section). This results in higher engine exhaust gas flowrates due to the use of increased fuel and the associated increase in required combustion air. Therefore, the actual (observed) exhaust flowrate of the engine is greater than the value of 12,476 actual cubic foot per minute (acfm) that is presented in the published technical data (which was also revised upward by Caterpillar since Seminole Energy requested a permit for its existing operations). The value published in the Caterpillar technical data sheet correlates to a standardized dry exhaust gas flowrate of 4,330 dry standard cubic feet per minute (dscfm).

Calculations performed by Derenzo and Associates (which are based on the specified higher fuel use rates) indicate that the CAT[®] G3520C gas IC engine exhaust flowrate is approximately 13,700 acfm at an exhaust gas oxygen content of 7.8% (not the 12,476 acfm value presented in the technical data published by the equipment manufacturer). The calculated 13,700 acfm value is equivalent to a standardized dry gas flowrate value of approximately 4,700 dscfm (based on exhaust gases with 11% moisture content).

4.5.2 Compliance Test Flowrate Measurements

Compliance testing has been performed on the four CAT[®] G3520C IC engines in operation at the Seminole Energy facility. The average measured exhaust gas flowrate (using USEPA Methods 1 through 4) for the Seminole Energy CAT[®] G3520C IC engines when operated at maximum capacity is 4,683 dscfm.

Table 4.2 presents a summary of the Seminole Energy LFG fueled CAT[®] G3520C IC engine exhaust gas flowrate and emission compliance test measurements.

Appendix E provides excerpts from the compliance test reports for the Seminole Energy IC engines.

In addition, compliance tests have been performed at several facilities owned by Landfill Energy Systems (parent company of Seminole Energy). The average exhaust gas flowrate for CAT® G3520C engines operated at:

- Ocean Energy Corp. in New Jersey is 4,734 dscfm.
- Brevard Energy, LLC in Cocoa, Florida is 4,474 dscfm.
- Trail Ridge Energy, LLC in Baldwin, Florida is 4,607 dscfm.

4.5.3 Appropriate Engine Exhaust Gas Flowrate

The assembled measurements provide a sufficient amount of data to establish an appropriate exhaust flowrate for the LFG fueled CAT® G3520C IC engine of 4,700 dscfm or approximately 13,700 acfm. This value is:

- Approximately 10% greater than the value published by the equipment manufacturer (12,476 acfm or 22,318 lb/hr), which is estimated to be equivalent to 4,330 dscfm.
- Consistent with theoretical calculations performed by Derenzo and Associates presented in Section 4.5.1 of this document based on the observed, increased fuel use data.

Table 4.3 presents a summary of equipment design, performance and operating specifications for the CAT® G3520C gas IC engines and electricity generators.

Table 4.1 Properties of the treated LFG used as fuel in the Seminole Energy electricity generation facility

Property	Lower Range	Upper Range
Methane content (% vol)	47	50
Heat value (Btu/scf, HHV) ¹	480	510
Heat value (Btu/scf, LHV) ²	430	460
Sulfur compounds (ppmv) ³	87	119
Chlorinated compounds (ppmv) ⁴	4.5	5.0

Notes

1. Based on the higher heating value of methane, 1010 Btu/scf.
2. Based on the lower heating value of methane, 910 Btu/scf.
3. As H₂S, based on semi-annual sampling results in 2010 and 2011.
4. As HCl, based on semi-annual sampling results in 2010 and 2011.

Table 4.2 Summary of Seminole Energy CAT® G3520C exhaust gas flowrate and emission compliance test measurements

Engine No./ Emission Unit ID	Flowrate (dscfm)	CO Emissions		NOx Emissions		VOC Emissions		PM ₁₀ Emissions	
		(g/bhp-hr)	(lb/hr)	(g/bhp-hr)	(lb/hr)	(g/bhp-hr)	(lb/hr)	(g/bhp-hr)	(lb/hr)
Engine 1 / 002	4,521	2.66	13.14	0.40	1.95	0.00	0.00	0.22	1.05
Engine 2 / 003	4,581	2.61	12.50	0.39	1.85	n/a	n/a	0.22	1.03
Engine 3 / 004	4,666	2.52	12.52	0.37	1.85	n/a	n/a	0.13	0.63
Engine 4 / 005	4,964	2.61	12.78	0.28	1.37	0.26	1.29	0.12	0.57
Average	4,683	2.60	12.74	0.36	1.76	0.13	0.65	0.17	0.82

n/a Not available. These tests were not performed.

Table 4.3 Design and operating specifications for the LFG fueled IC engine generator sets

Specification per unit	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, mfg. data ¹ (LHV MMBtu/hr)	14.53	-
Heat input rate, actual data (LHV MMBtu/hr)	15.4	92.4
Heat input rate, actual data (HHV MMBtu/hr)	17.1	102.6
Maximum fuel consumption ² (scfm)	600	3,600
Average fuel consumption ³ (scfm)	580	3,480
Exhaust gas temperature (°F)	900	-
Average exhaust flowrate (acfm)	13,700	-
Average exhaust flowrate ⁴ (dscfm)	4,700	-
Average exhaust oxygen content (% dry)	8.5	-
Average exhaust exit velocity (fps)	129	-
Exhaust stack diameter (inches)	18	-
Exhaust stack release height (feet)	20	-
Building height (feet)	15	-

Notes

1. See Appendix F Technical Data Sheet (242,216 Btu/min LHV).
2. Based on lower range of fuel LHV (430 Btu/scf) and maximum engine LHV input rate of 15.4 MMBtu/hr.
3. Based on average of fuel LHV (445 Btu/scf) and maximum engine LHV input rate of 15.4 MMBtu/hr.
4. Corrected to dry standards conditions (70°F).

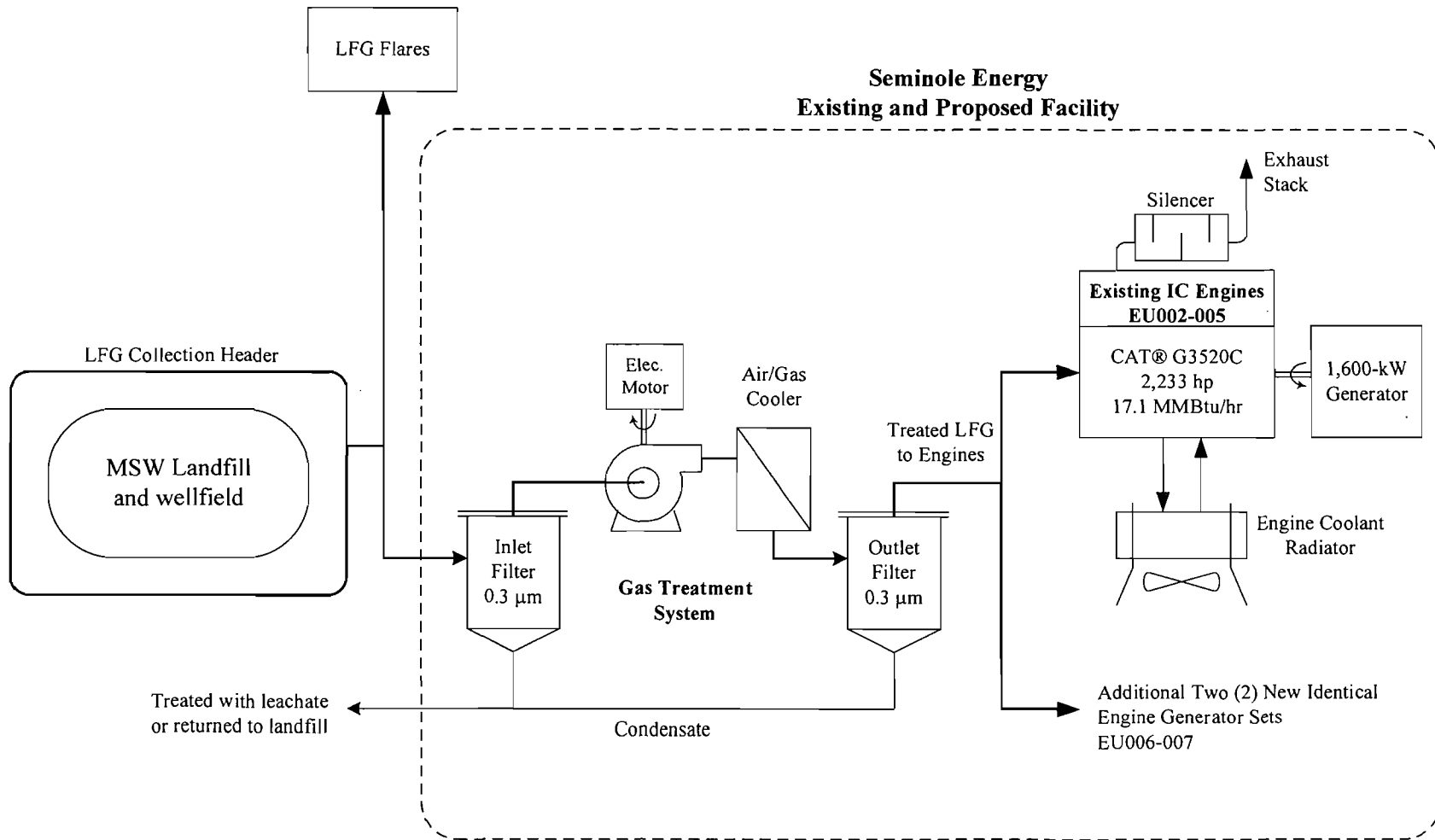


Figure 4.1 Seminole Energy Process Flow Diagram

5.0 AIR POLLUTANT EMISSIONS

The existing IC engine electricity generation facility is a pollution control project where emission reductions are provided for the LFG generated by the Osceola SWM Facility through its beneficial treatment and use as a fuel by Seminole Energy.

Seminole Energy is requesting modifications to the permitted CO emission rates that can be achieved throughout the maintenance cycle of the engine and account for variations in LFG fuel properties. The observed increases in heat input rate and engine exhaust flow have resulted in measured emission rates that exceed permitted limits (2.75 grams per brake horsepower hour, g/bhp-hr) for LFG fueled CAT® G3520C IC engine - generator sets operated at another facility operated by the parent company Landfill Energy Systems.

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

5.1 Engine CO Emissions

5.1.1 Manufacturer Specifications

The Gas Engine Technical Data Sheet (Appendix F) specifies CO:

- Nominal emissions of 2.5 g/bhp-hr upon startup of the engine; and
- Not-to-exceed (NTE) emissions of 4.13 g/bhp-hr.

Calculations indicate that at the 4.13 g/bhp-hr NTE limit and 4,330 dscfm exhaust flow rate value derived from specifications in the Caterpillar Gas Engine Technical Data Sheet, the maximum (or guaranteed) CO concentration in the LFG fueled CAT® G3520C IC engine exhaust would be approximately 1,075 ppmvd (parts per million by volume, dry basis). At an exhaust gas oxygen content of 8% oxygen, this is equivalent to 490 ppmvd at 15% oxygen.

5.1.2 Compliance Test Results

CO compliance testing has been performed for each of the four (4) LFG fueled CAT® G3520C IC engines that are operated at Seminole Energy. A summary of the test results are presented in Table 4.2. The measured exhaust gas CO concentrations range from 612 to 670 ppmvd, which is equivalent to 271 to 302 ppmvd CO at 15% O₂. Based on the measured exhaust gas flowrates, the calculated CO mass emission rates are between 2.52 g/bhp-hr to 2.66 g/bhp-hr.

These results are similar to compliance test results from other facilities owned by Landfill Energy Systems (parent company of Seminole Energy). Measured CO emission rates range from as low as 2.23 g/bhp-hr to as high as 2.85 g/bhp-hr.

5.1.3 Maximum CO Emission Rate

Based on data collected at similar facilities operating LFG-fueled CAT® G3520C engines, it is estimated that the exhaust gas CO concentration will not exceed 360 ppmvd at 15% O₂. Using a minimum exhaust gas oxygen content of 7.6% and the maximum engine exhaust gas flowrate from the Seminole Energy compliance test results presented in Table 4.2 results in a calculated CO emission rate of 17.23 lb/hr. This is equivalent to a CO emission rate of 3.5 g/bhp-hr. This value is greater than the current permitted value (2.75 g/bhp-hr) but less than the NTE emission rate guaranteed by the manufacturer (4.13 g/bhp-hr).

5.2 Proposed CO Emission Rates

The quantity of air pollutants that are emitted by the CAT® G3520C gas IC engine is dependent on fuel quality, fuel properties, and accumulated engine operating hours. The highest measured CO emission rate during the annual compliance tests for Seminole Energy is 97% of the permit limit (2.66 g/bhp-hr compared to the 2.75 g/bhp-hr limit). However, the measured exhaust gas CO concentrations and mass emission rates are well below values guaranteed by the manufacturer.

Based on compliance test measurements, experience obtained by Landfill Energy Systems from the operation of numerous similar LFG fueled IC engines and results of emission control analyses presented in Section 8.0 (Best Available Control Technology) of this document, the CAT® G3520C gas IC engine has the a maximum CO emission rate of 3.5 g/bhp-hr for CO.

The CO emission rate tends to increase with increased operating hours throughout the engine maintenance cycle. The engine manufacturer acknowledged this by specifying a nominal CO emission rate (which is defined in the Gas Engine Technical Data Sheet as “representative of a new engine during the first 100 hours of engine operation”) and a not-to-exceed value. By increasing the permitted CO emission rate from 2.75 to 3.5 g/bhp-hr, the engines will be able to maintain compliance with the allowable CO emission rate over all fuel quality and engine wear / maintenance operating conditions.

The operation of six (6) CAT® G3520C gas IC engine at the specified pollutant emission rates under maximum operating conditions (100% design capacity, 2,233 bhp) will result in maximum potential emissions of:

- 17.23 pounds per hour (lb/hr) and 75.5 TpY of CO per engine; and
- 103.5 lb/hr and 453.3 TpY of CO for the combined operation of all six (6) engines.

Table 5.1 presents existing permitted and proposed allowable air pollutant emission rates for the Seminole Energy facility.

Table 5.1 Existing permitted and proposed allowable air pollutant emission rates for the Seminole Energy IC engines

Air Pollutant	Current Permitted Value			Proposed Allowable Value		
	(g/bhp-hr)	(lb/hr)	(TpY)	(g/bhp-hr)	(lb/hr)	(TpY)
Nitrogen Oxides (NO _x)	0.60	2.95	12.94	n/c	n/c	n/c
Carbon Monoxide (CO)	2.75	13.54	59.30	3.5	17.23	75.5
Particulate Matter (PM ₁₀)	0.24	1.18	5.17	n/c	n/c	n/c
Volatile Organic Cmpds (VOC)	0.28	1.37	5.99	n/c	n/c	n/c
Hydrogen Chloride (HCl)	10.9 [†]	--	1.66	n/c	--	n/c
Sulfur Dioxide (SO ₂)	27.5 [†]	--	--	n/c	--	--

Notes

† These permit limits are lb/MMcf based an analysis of incoming treated LFG fuel.

n/c No change

6.0 FLORIDA RULES AND REGULATIONS

The following text presents Florida Administrative Code (F.A.C.), Chapter 62 regulatory requirements and associated compliance information that are applicable to the permitting and operation of the LFG fueled IC engine electricity generation facility operated by Seminole Energy.

6.1 Air Pollution Permit Application Procedure

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

- (1) Any person desiring to obtain a permit ... shall apply on forms prescribed by the Department and shall submit ... additional information as the Department ... may require.*
- (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 completed Application for Air Permit – Long Form documents for the proposed permit modification for the existing Seminole Energy LFG fueled IC engine electricity generation facility. The forms are certified by the Responsible Official for the stationary source and a State of Florida professional engineer.

- (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.*

The source is currently a major PSD source. The proposed change is not physical in nature and does not change the operation of the process. However, the proposed air pollutant emission limit modification will require PSD review since it is an increase in a pollutant that previously underwent PSD preconstruction review. The fee for updating the emission factor is \$7,500 for PSD significant sources.

6.2 Facility

62-204.200 Definitions., F.A.C., specifies that:

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

While the Seminole Energy electricity generation facility is located on leased land at the Osceola SWM Facility, the electricity generation equipment and processes is owned and operated by Seminole Energy and not under the supervisory control of the Seminole County Solid Waste Management Department, which owns and operates the landfill.

However, Seminole Energy is fueled exclusively with LFG generated by the Osceola SWM Facility (i.e., no natural gas capabilities). Since all of the fuel used by Seminole Energy is and will be supplied by the Osceola WMF, the landfill has an implied control over the electricity generation operations of the facility (i.e., Seminole Energy would not have the capability to generate electricity without the existence of the landfill). Therefore, Seminole Energy is part of the Osceola SWM Facility stationary source and its emission units have been incorporated into the landfill Title V Operating Permit.

6.3 NAAQS Attainment / Nonattainment / Maintenance Areas

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

(1) *Designation of Areas Meeting Ambient Air Quality Standards (Attainment Areas).*

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

62-204.340(2)(d), F.A.C., does not list any carbon monoxide nonattainment areas.

6.4 Prevention of Significant Deterioration Area Designations

62-204.360 *Designation of Prevention of Significant Deterioration Area.*, F.A.C., specifies that:

(4) *All areas of the state shall be classified as Class I, Class II, or Class III.*

(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.*

Seminole Energy (Osceola SWM Facility) located in Geneva, Florida is approximately 150 kilometers from the nearest portion of the Chassahowitzka National Wildlife Refuge Wilderness Area. The Ambient Air Impact Analysis presented in Appendix I addresses impacts within the nearest Class I area.

6.5 Adopted Federal Regulations

62-204.800 *Federal Regulations Adopted by Reference.*, F.A.C., lists the following federal regulations that are potentially applicable to the reciprocating internal combustion engine generator sets:

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

- (8) ... *Standards of Performance for New Stationary Sources* ...
 - (b) ... 72. 40 CFR 60, *Subpart WWW, Municipal Solid Waste Landfills* ...

- (11) ... *National Emission Standards for Hazardous Air Pollutants* ...

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

The applicability of these rules is addressed in Section 7.0, *Applicable Federal Regulations*, of this document.

6.7 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* ...

Based on the potential (permitted) emissions, the facility is a major stationary source of CO emissions. Therefore, the source is required to assist the Florida DEP in the public

notification process and the results of a public comment period are required to be considered in the permit approval process.

6.8 Stack Height Policy

62-4.550 *Stack Height Policy.*, F.A.C, specifies that:

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

The LFG fueled IC engines are housed in a single building with a roof height of 15 feet; the overall release height of the IC engine exhaust is designed 20 feet. The exhaust stacks do not exceed the good engineering practice (GEP) stack height.

6.9 Forms and Instructions

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

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

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

Appendix A provides completed Application for Air Permit – Long Form documents for the proposed Seminole Energy permit modification.

6.10 Prevention of Significant Deterioration

62-212.400 *Prevention of Significant Deterioration (PSD).*, F.A.C, specifies PSD preconstruction review requirements for new and modified sources of air pollutants.

The source is currently a major PSD source (CO emissions exceed 250 TpY). The proposed change is not physical in nature and does not change the operation of the process. However, the proposed air pollutant emission limit modification will require PSD review since it is an increase in a pollutant that previously underwent PSD preconstruction review.

- (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)

Seminole Energy located in Geneva, Florida is approximately 150 kilometers from the nearest portion of the Chassahowitzka National Wildlife Refuge Wilderness Area. The Ambient Air Impact Analysis presented in Appendix I addresses impacts within the nearest Class I area.

(b) Technology Review.

The proposed facility or modification shall comply with all applicable emission limitations contained in Part VI of this chapter and 40 CFR Parts 60 (New Source Performance Standards) and 61 (National Emission Standards for Hazardous Air Pollutants).

Section 7.0 (Applicable Federal Rules) and 8.0 (Best Available Control Technology) of this document provides information that indicates the LFG fueled IC engine electricity generation facility will continue to comply with applicable emission limitations.

(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 8.0 (Best Available Control Technology) of this document provides information that indicates the LFG fueled IC engine electricity generation facility proposed emission limit modifications comply with BACT for CO emissions (all other permitted emission limit will remain unchanged).

(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.

An Ambient Air Impact Analysis is provided in Appendix I. The analysis presents information and calculated ambient air pollutant concentrations to demonstrate compliance with 62-204.240 *Ambient Air Quality Standards.*, F.A.C., and 62-204.260 *Prevention of Significant Deterioration Increments.*, F.A.C.

6.11 General Pollutant Emission Limiting Standards

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

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

The proposed permit modification is for adjustment of the allowable CO emission rates only. No new equipment or sources of odor emissions are being installed. Therefore, the current permit has already incorporated appropriate conditions to mitigate objectionable odors.

- (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).*

The proposed permit modification is for adjustment of the allowable CO emission rates only. No new equipment or sources of particulate matter emissions are being installed or modified.

- (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...*

The proposed permit modification is for adjustment of the CO emission factor. Therefore, the current permit has already incorporated appropriate conditions to mitigate sources of fugitive particulate matter emissions.

7.0 APPLICABLE FEDERAL REGULATIONS

7.1 New Source Performance Standards

7.1.1 Municipal Solid Waste Landfill NSPS

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

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

(A) An open flare ...

(B) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen ...

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

The collection and treatment of LFG for subsequent sale and use as a fuel satisfies the MSW Landfill NSPS NMOC control requirements. Seminole Energy has received a correspondence from USEPA Region IV (Appendix J) that approves the use of LFG treatment equipment, which processes the collected gas for subsequent sale or reuse, as an appropriate LFG emissions control method. The MSW Landfill NSPS requirements are not applicable to the IC engine operations at the existing electricity generation facility since the combustion equipment uses treated gas as fuel. The USEPA determination issued for Seminole Energy, dated October 19, 2006 specifies that USEPA ... *has stated in the Federal Register Proposed Rule Amendments dated May 23, 2002, (67 FR 36476-36481) that compression, de-watering, and filtering the LFG down to at least 10 microns is considered treatment for the purposes of 60.752 (b) (2) (iii) (C).* Therefore, equipment that achieves these specifications is compliant with the emission standards of the MSW Landfill NSPS.

7.1.2 Spark Ignition IC Engine NSPS

40 CFR Part 60 Subpart JJJJ Standards of Performance for Stationary Spark Ignition Internal Combustion Engines specifies that *Owners and operators who purchase stationary landfill ... SI engines that are manufactured after July 1, 2007, that are greater than or equal to 500 HP must limit their exhaust emissions of NO_x to 3.0 g/HP-hr, emissions of CO to 5.0 g/HP-hr, and emissions of VOC to 1.0 g/HP-hr ...*

The existing four (4) CAT[®] G3520 IC engines have manufacturing dates that are prior to July 1, 2007 and are not subject to the spark ignition IC engine NSPS. Information relative to engine manufacturing dates has previously been provided to the Florida DEP.

Any new engines installed at Seminole Energy will presumably post July 1, 2007 manufacture dates. Therefore, the company will:

1. Demonstrate compliance with the specified limits through appropriate performance tests required by the rule; and
2. Provide the regulatory agency with an appropriate commencement of construction and operations notifications that are required by the rule.

7.2 National Emission Standard for Hazardous Air Pollutants

The combustion of LFG has the potential to emit:

1. HAPs from the incomplete combustion of these compounds, which are present in the LFG.
2. Inorganic HAP compounds (primarily HCl) from the combustion of chlorinated compounds, which are present in LFG.

Major is defined under federal regulation [in national emission standards for hazardous air pollutants for source categories] as a facility that has the potential to emit in excess of 25 TpY of any combination of HAP compounds or 10 TpY of any single HAP. Area sources are defined as sources that are not major sources of HAPs.

7.2.1 Reciprocating Internal Combustion Engine NESHAP

The reciprocating IC engine National Emission Standard for Hazardous Air Pollutants (RICE NESHAP, 40 CFR Part 63 Subpart ZZZZ, revised October 50, 2010) applies to major sources and area sources of HAPs that operate RICE rated above 100 hp that are not operated as a stationary test cell or stand, or a non road vehicle (40 CFR 63.6585).

The RICE at Seminole Energy have power ratings that exceed 100 bhp (2233 bhp). Based on the amount of LFG generation and combustion predicted for the Osceola SWM Facility stationary source, the source is considered an area source with respect to HAPs. The site will continue to monitor gas composition and fuel usage rates. If the LFG composition changes significantly such that site may be a classified as potential major source of HAPs, appropriate notifications will be made.

Whether engines are new or existing are dependent on the facility's status as a major or area source:

- 40 CFR 63.6590(a)(1)(i) defines existing engines at a major source of HAPs as RICE that are constructed before December 19, 2002.
- 40 CFR 63.6590 (a) (1) (iii) defines existing engines at area sources of HAPs as RICE that are constructed before June 12, 2006.
- Otherwise, IC engines are considered "new" for the purposes of Subpart ZZZZ.

40 CFR Part 63.6603(a) requires that existing RICE at an area source are required to perform maintenance and inspection requirements pursuant to Table 2d of 40 CFR 63 Subpart ZZZZ with a compliance date of October 19, 2013. The existing four (4) CAT[®] G3520 IC engines have a construction commencement date (which is defined in the NSPS as the date the engine is ordered by the owner/operator) prior to June 12, 2006. Information relative to engine manufacturing / order dates has previously been provided to the Florida DEP. Therefore, the existing engines are subject to the maintenance (oil and spark plug changes) and inspection requirements in 40 CFR 63 Subpart ZZZZ Table 2d as of the compliance date.

40 CFR 63.6590 (c) requires new spark-ignition RICE at an area source of HAP emissions to meet the requirements of 40 CFR Part 60 Subpart JJJJ. Any new engines installed at Seminole Energy will be subject to the standards for new engines and the requirements of 40 CFR Part 60 Subpart JJJJ.

7.2.2 Municipal Solid Waste Landfill NESHAP

The Osceola SWM Facility is subject to the MSW Landfill NSPS. Therefore, provisions (i.e., development and implement a start-up, shutdown and malfunction plan, submittal of periodic deviation reports and compliance with recordkeeping, notification and reporting requirements) of the MSW Landfill NESHAP (40 CFR Part 63 Subpart AAAA) are applicable to processes that use LFG generated by the facility. However, Section 7.1.1 of this document provides information that indicates the IC engine generators are fueled with treated LFG and compliance with the control requirements of the MSW Landfill NSPS is achieved by routing the collected gas to a treatment system that processes the gas for subsequent sale or reuse.

Therefore, the MSW Landfill NESHAP requirements are applicable to the landfill facility and gas collection system up to, and including, the gas treatment system. The LFG-fueled IC engine generator sets are not specifically subject to MSW Landfill NESHAP. For Seminole Energy, a start-up, shutdown and malfunction (SSM) plan is only required for the LFG treatment equipment and processes. This information has previously been submitted to the Florida DEP.

7.3 Federal Acid Rain Program

The federal Acid Rain Program (40 CFR Part 72) has been promulgated pursuant to requirements of Title IV of the 1990 Clean Air Act Amendments.

Pursuant to 40 CFR §72.6(a), Applicability, *Each of the following units shall be an affected unit, and any source that includes such a unit shall be an affected source, subject to the requirements of the Acid Rain Program . . . A utility unit . . .*

According to the definitions in 40 CFR §72.2:

- “Unit” means a fossil fuel-fired combustion device.
- “Fossil fuel” means natural gas, petroleum, coal, or any form of solid, liquid, or gaseous fuel derived from such material.
- “Natural gas” means a naturally occurring fluid mixture of hydrocarbons (e.g., methane, ethane, or propane) produced in geological formations beneath the Earth's surface that maintains a gaseous state at standard atmospheric temperature and pressure under ordinary conditions . . . Natural gas does not include the following gaseous fuels: landfill gas, digester gas, refinery gas, sour gas, blast furnace gas, coal-derived gas, producer gas, coke oven gas, or any gaseous fuel produced in a process which might result in highly variable sulfur content or heating value.

Based on this information, the federal Acid Rain Program is not applicable to Seminole Energy since the engine-generator sets are:

1. Fueled exclusively with LFG, which is exempt from the definitions of natural gas and fossil fuel.
2. Not an affected unit under the regulation, which is defined as a fossil fuel-fired combustion device.

8.0 BEST AVAILABLE CONTROL TECHNOLOGY

The following text provides analyses of process design, operating practices and best available emission control technologies (BACT) that were considered in determining CO emission limits for the proposed permitted emission rate adjustments.

8.1 Identification of Control Technologies

The following list of control technologies are used to control emissions of CO (and NO_x) from IC engines and are not fuel specific:

8.1.1 Oxidation Catalysts

Oxidation catalysts are primarily used to reduce emissions of CO in the exhaust of an IC engine. An oxidation catalyst reacts (oxidizes) CO to form carbon dioxide (CO₂) in the presence of excess oxygen, heat and a catalyst.

The exhaust gas from the IC engine, which contains CO, excess O₂ and heat from combustion, is directed through a catalyst matrix. Generally the catalyst is composed of a precious metal (i.e., platinum or palladium). Oxidation catalysts can achieve CO reduction efficiencies in excess of 90%. However, they are susceptible to poisoning (i.e., encapsulation and deactivation of the catalyst by impurities in the combustion by-products).

8.1.2 Engine Design and Combustion Controls

The CAT® G3520C IC engine is designed to efficiently fire low pressure gaseous fuels to extract the maximum amount of energy from the fuel. Air/fuel blending and ignition timing in the CAT® G3520C engine is controlled by the Caterpillar engine control module (ECM). The inlet gas methane content (i.e., heat value) is monitored and the fuel is blended with an appropriate amount of combustion air (air-fuel ratio) based on internal mapping within the ECM that is setup and calibrated by the manufacturer (Caterpillar). The engine is equipped with numerous sensors that monitor critical operation parameters. The engine operating data are received by the ECM, which adjusts operating variables to maximize fuel combustion efficiency and engine output based on the fuel quality measurements and the process monitoring feedback control loop. The excess air supplied to the combustion chamber is precisely controlled to reduce cylinder temperature, which limits thermal NO_x formation, while minimizing incomplete combustion and CO formation.

8.2 Technical Feasibility

The existing (and future) Seminole Energy IC engines combust pressurized, treated LFG as a fuel. The treatment system dewateres, filters and compresses the collected LFG from the Osceola SWM Facility and satisfies the control system criteria of the MSW landfill NSPS. Therefore, the

LFG collected from the Osceola SWM Facility is treated for subsequent sale and use as a fuel as specified in the MSW Landfill NSPS NMOC air emission standards. The use of treated gas (as fuel) ensures that moisture and particulate matter are removed from the fuel to support good combustion. However, dewatering and filtration of the LFG has limited effect on siloxanes (cyclic organic silicon monomers) contained in the recovered LFG.

Siloxanes are used in the manufacture of personal hygiene, health care and industrial silicone products and are a significant impurity in LFG that makes it different than pipeline-quality natural gas. When siloxanes are combusted they form combustion byproducts (namely silicon dioxide, SiO₂) that poison catalyst-based post combustion control systems. Therefore, vendors and suppliers are not willing to guarantee the performance of add-on control equipment when it is used in applications to reduce emissions from LFG combustion projects.

In the federal register for 40 CFR Part 60 Subpart JJJJ and 40 CFR Part 63 Subpart ZZZZ (the reciprocating engine NSPS and NESHAP), the USEPA recognized the effect that siloxane combustion has on add-on control devices and specifies in the preamble that:

Both landfill and digester gases contain a family of silicon-based gases collectively called siloxanes. Combustion of siloxanes forms compounds that have been known to foul fuel systems, combustion chambers, and post-combustion catalysts.

Information published by Caterpillar, Inc. (document G3600-G3300 Low Energy Fuels that has been developed to present manufacturer experience with operating spark-ignited engines on medium and low energy fuels) has not been revised since October 2006 and still specifies (as of September 2011) that:

Several attempts have been made to control exhaust emissions of reciprocating engines operating on LFG or digester gas with an exhaust gas catalyst. LFG contains contaminants such as chlorine, fluorine, and silicon that have proven to be detrimental to exhaust catalysts ... In addition, many users select lubricating oils that have high ash content. The ash tends to coat the catalyst, making the catalyst ineffective in a short period of time. For these reasons, we do not recommend the use of catalysts in conjunction with landfill or digester applications.

For a post-combustion emission control system to operate on a sustained basis, siloxanes must be removed from the LFG prior to combustion to avoid fouling catalyst-based systems, otherwise the control system is rendered ineffective in a short amount of time. Adsorption-based siloxane removal systems can be used to reduce the LFG siloxane content. However, these systems (like most control systems) reduce the siloxane content to a certain level or have a specified control efficiency of less than 100%. Parker Hannifin Corp./Domnick-Hunter, one of the leading manufacturers of siloxane removal systems, specifies that its equipment achieves an "average" outlet siloxane concentration of between 1 to 10 milligrams per cubic meter (mg/m³).

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

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

The Miratech document specifies that organic silicon compounds (i.e., siloxanes) are 'harmful' to catalyst systems and must be reduced to below 0.5 mg/kg, which is equivalent to approximately 0.6 mg/m³. The Clean Air Systems warranty statement specifies that *Using fuels with ... contaminates such as siloxanes ... will void the warranty coverage.*

Add-on emission controls have been proposed for one facility in New Jersey (Cinnamon Bay Edgeboro Disposal) and have been installed on one facility in California (Ameresco Ox Mountain). The Cinnamon Bay facility has not been constructed and a final determination has not been made for the Ameresco Ox Mountain facility in regards to whether the controls can be considered achieved in practice (the performance of the emission control system is still under evaluation). In both cases, the use of add-on control was based on the applicant's desire to avoid PSD new source review and/or nonattainment area new source review (and the requirement to obtain emission reduction credits) and was not specified by the regulatory agency as PSD BACT.

Therefore, while CO emission control systems exist for IC engine exhausts, their use with LFG-fueled IC engine applications has been on a very limited trial basis and has not been verified as achieved in practice. At this time, there are no available LFG treatment technologies capable of removing catalyst contaminants to levels that are below those specified by catalyst manufacturers. The use of oxidation catalysts to control CO in the exhaust of LFG fueled IC engines is not currently technically feasible.

8.3 BACT Determination

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

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

The BAAQMD BACT determination specifies that BACT for a:

- Low NO_x bias engine is 0.5 g/bhp-hr NO_x with a CO NTE value of 3.9 g/bhp-hr; and
- Low CO bias engine is 0.6 g/bhp-hr NO_x with a CO NTE value of 3.6 g/bhp-hr.

The FDEP recently issued air permits for the operation of LFG-fueled IC engine generator sets at the:

- Medley Landfill owned by Waste Management Inc. of Florida (identified as Permit No. PSD-FL-414 issued on August 25, 2011).
- Brevard County Solid Waste Management Central Disposal Facility (Permit No. PSD-FL-378C issued to Brevard Energy, LLC on August 29, 2011).
- Trail Ridge Landfill (Permit No. PSD-FL-374C issued to Trail Ridge Energy, LLC on September 28, 2011).

All three permit applications underwent a PSD BACT review for CO and NO_x emissions. The FDEP determined that appropriate CO BACT was the operation of a lean burn engine with good operating and maintenance practices to achieve CO emission rates based on information provided by the engine manufacturer.

Information presented in the USEPA RBLC (RACT, BACT, LAER Clearinghouse) emission and control technology determination database (through August 26, 2011) indicate that good combustion practices have been specified as BACT for LFG-fueled IC engines. To date, add-on emission controls have not been required as BACT for LFG fueled IC engines. The USEPA RBLC database contains approximately 13 emission and control technology determinations for LFG fueled IC engine operations (as of August 26, 2011) and indicates that BACT for CO emissions from LFG fueled IC engines:

1. Range from 2.5 to 3.5 g CO/bhp-hr;
2. Are applicable to the operation of lean burn engines with air to fuel ratio control or simply specified as 'clean burn engine' (i.e., no add-on emission controls).

Therefore, BACT for the LFG-fueled IC engines is proper engine design, maintenance and operation to achieve the emission rates guaranteed by the manufacturer.

Appendix L provides excerpts from the BAAQMD BACT determination, FDEP technical review document and USEPA RBLC query report.

Based on the information presented in this section, CO BACT for the LFG-fueled IC engines is the operation of the CAT[®] G3520C combustion controls and LFG treatment system to result in a CO emission rate of 3.5 g/bhp-hr, which is:

1. Approximately 15% less than the manufacturer's NTE guarantee of 4.13 g/bhp-hr;
2. Less than the BAAQMD BACT determination for a low-CO bias engine.

9.0 GREENHOUSE GASES

The gas recovered from the Osceola SWM Facility is primarily composed of methane (CH₄) and carbon dioxide (CO₂), both of which are considered to be greenhouse gases (GHG). During the combustion process, the LFG methane is mixed with air (oxygen) and oxidized to form CO₂. This process releases energy (heat) that is converted to mechanical energy within the IC engine and eventually to electricity in the attached generator. The global warming potential (GWP) for CO₂ is 1.0; the GWP for methane is 21. Therefore, the collection and combustion of LFG methane reduces GHG emissions based on the reduction in GWP as methane is converted to CO₂.

9.1 Benefits of LFG-Fueled Electricity Generation

The conversion of LFG methane to CO₂ is nearly identical irrespective of combustion device. Therefore, the requirement to collect and control LFG destroys (oxidizes) methane and results in nearly identical CO₂ emissions regardless of whether a flare or IC engine-generator combustion device is used.

The treatment and use of collected LFG that would otherwise be flared to fuel electricity generating projects has benefits relative to reducing GHG emissions. When fully constructed and operational, the Seminole Energy facility will have the potential to generate and export up to 9.6 MW of electricity to the local utility. This will presumably replace 9.6 MW of electricity generation in the greater Seminole County area that would be produced using non-renewable or fossil fuels. USEPA's eGRID database (Emissions and Generation Resource Integrated Database) provides information on the types of fuels used and associated emissions for utility electricity generation on a regional basis. An on-line eGRID query using USEPA's Power Profiler website indicates that electricity production within the Florida Reliability Coordinating Council region (FRCC, which includes zip code 32773 for the Osceola SWM Facility area) creates an average of 1,220 pounds of CO₂ per megawatt-hour (MWh) of electricity production. Based on this regional average, the generation and export of 9.6 MW of electricity (230 MWh per day) using a renewable fuel (LFG) has the potential to reduce 140 tons per day (51,300 tons/yr) of CO₂ emissions generated at a fossil-fueled utility.

9.2 GHG Permitting Actions

Beginning July 1, 2011, new facilities that emit at least 100,000 tons/yr of total GHG on a carbon dioxide equivalent basis (CO₂e) and modifications at existing facilities that increase GHG emissions by at least 75,000 tons/yr CO₂e are subject to PSD permitting requirements under USEPA's GHG Tailoring Rule. Additionally, the Tailor Rule specifies that new and existing sources that emit at least 100,000 tons/yr of CO₂e are considered major sources relative to 40 CFR Part 70 (Title V) permitting.

However, USPEA subsequently deferred PSD and Title V permit applicability for biogenic CO₂ emission sources. In the Federal Register dated July 20, 2011, USEPA indicated that ... *This action defers for a period of three (3) years the application of Prevention of Significant Deterioration (PSD) and Title V permitting requirements to biogenic carbon dioxide (CO₂) emissions from bioenergy and other biogenic stationary sources.*

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

The July 20, 2011 Federal Register specifies that electric utilities burning biomass fuels (NAICS codes beginning 221) and solid waste landfills (NAICS 562213) as examples of sources affected by the biogenic CO₂ permitting deferral. Therefore, the requested permit modifications for the LFG-fueled Seminole Energy electricity generating facility are not subject to PSD review for GHG emissions.

10.0 SUMMARY OF PROPOSED PERMIT MODIFICATIONS

Seminole Energy is requesting that the permitted (allowable) CO emission rates specified in Condition B.2 of the Air Construction Permit (1170084-008-AC / PSD-FL-376A) for each of the LFG fueled IC engine generators (EU002, EU003, EU004, EU005, EU006, and EU007) be increased from:

- 2.75 g/bhp-hr to 3.5 g/bhp-hr;
- 13.54 lb/hr to 17.23 lb/hr; and
- 59.3 TpY to 75.5 TpY.

Permit 1170084-008-AC was issued to remove applicability of the reciprocating internal combustion engine (RICE) NESHAP (40 CFR Part 63 Subpart ZZZZ) relative to the existing LFG-fueled engine generators. Since that time the RICE NESHAP has been revised so that it is applicable to existing LFG-fueled engines at major and area sources. Therefore, the modified construction permit should specify applicable requirements for 40 CFR Part 63 Subpart ZZZZ for the Seminole Energy engine-generators as presented in Section 7.2.1 of this document.

In addition to the proposed CO permit limit modifications, Seminole Energy requests that annual particulate matter testing be removed from the permit (Condition C.2(f) of the Air Construction Permit). Consistent with other permits recently issued by the FDEP-DARM for LFG-fueled IC engines, compliance with the particulate matter (PM₁₀) emission limits will be achieved through the operation of the LFG treatment system and maintenance practices specified in 40 CFR Part 63 Subpart ZZZZ (the RICE NESHAP).

Document Prepared By:



Robert L. Harvey, P.E.
Engineering Services Manager

Reviewed By:



Andy Rusnak
Environmental Engineer

APPENDIX A

FDEP-DARM APPLICATION FOR AIR PERMIT



Department of Environmental Protection

Division of Air Resource Management APPLICATION FOR AIR PERMIT - LONG FORM

RECEIVED

OCT 18 2011

DIVISION OF AIR RESOURCE MANAGEMENT

I. APPLICATION INFORMATION

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

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

Air Operation Permit – Use this form to apply for:

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

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: Seminole Energy LLC	
2. Site Name: Osceola Road Waste Management Facility	
3. Facility Identification Number: 1170084	
4. Facility Location Street Address or Other Locator: 1930 East Osceola Road City: Geneva County: Seminole Zip Code: 32732	
5. Relocatable Facility? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6. Existing Title V Permitted Facility? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Application Contact

1. Application Contact Name: Robert L. Harvey	
2. Application Contact Mailing Address Organization/Firm: Derenzo and Associates, Inc. Street Address: 4970 Northwind Dr., Ste 120 City: E. Lansing State: MI Zip Code: 48823	
3. Application Contact Telephone Numbers Telephone: (517) 324 - 1880 ext. Fax: (517) 324 - 5409	
4. Application Contact E-mail Address: RHarvey@derenzo.com	

Application Processing Information (DEP Use)

1. Date of Receipt of Application: 10-18-11	3. PSD Number (if applicable):
2. Project Number(s): 1170084-001-AC -	4. Siting Number (if applicable):

PSD-PL-376B

APPLICATION INFORMATION

Purpose of Application

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

Air Construction Permit

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

Air Operation Permit

- Initial Title V air operation permit.
- Title V air operation permit revision.
- Title V air operation permit renewal.
- Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is required.
- Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is not required.

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

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

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

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

Application Comment

This permit application requests modification of the carbon monoxide (CO) emission limit, and other minor permit modifications, for the landfill gas fueled engine generator sets that are owned and operated by Seminole Energy, LLC. The Seminole Energy electricity generation facility is part of the Osceola Road Waste Management Facility stationary source.

A Title V Air Operation Permit renewal application for the entire stationary source is being prepared for submittal in early 2012. The requested permit modifications for the engine generators will be incorporated into the renewal application. Therefore, this application is for modification of the Air Construction Permit (1170084-008-AC and PSD-FL-376A) only.

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Processing Fee
EU-002 through EU-007	Landfill gas fueled IC engine generator sets (6 identical units).	AC1A	\$7,500

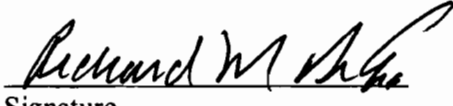
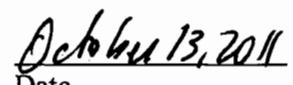
Application Processing Fee

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

APPLICATION INFORMATION

Owner/Authorized Representative Statement

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

1. Owner/Authorized Representative Name : Richard M. DiGia
2. Owner/Authorized Representative Mailing Address Organization/Firm: Seminole Energy, LLC c/o Landfill Energy Systems Street Address: 46280 Dylan Dr, Ste 200 City: Novi State: MI Zip Code: 48377
3. Owner/Authorized Representative Telephone Numbers Telephone: (248) 380 - 3920 ext. Fax: (248) 380 - 2038
4. Owner/Authorized Representative E-mail Address: Richard.Digia@landfillenergy.com
5. Owner/Authorized Representative Statement: <i>I, the undersigned, am the owner or authorized representative of the corporation, partnership, or other legal entity submitting this air permit application. To the best of my knowledge, the statements made in this application are true, accurate and complete, and any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department.</i>  Signature  Date

APPLICATION INFORMATION

Application Responsible Official Certification

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

1. Application Responsible Official Name:
2. Application Responsible Official Qualification (Check one or more of the following options, as applicable): <input type="checkbox"/> 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. <input type="checkbox"/> For a partnership or sole proprietorship, a general partner or the proprietor, respectively. <input type="checkbox"/> For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official. <input type="checkbox"/> The designated representative at an Acid Rain source or CAIR source.
3. Application Responsible Official Mailing Address Organization/Firm: Street Address: City: State: Zip Code:
4. Application Responsible Official Telephone Numbers... Telephone: () - ext. Fax: () -
5. Application Responsible Official E-mail Address:

APPLICATION INFORMATION

6. Application Responsible Official Certification:

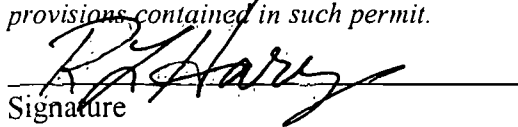
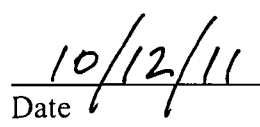
I, the undersigned, am a responsible official of the Title V source addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge,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

Signature

Date

APPLICATION INFORMATION

Professional Engineer Certification

1. Professional Engineer Name: Robert L. Harvey Registration Number: 68151
2. Professional Engineer Mailing Address Organization/Firm: Derenzo and Associates, Inc. Street Address: 4970 Northwind Dr., Ste 120 City: E. Lansing State: MI Zip Code: 48823
3. Professional Engineer Telephone Numbers... Telephone: (517) 324 - 1880 ext. Fax: (517) 324 - 5409
4. Professional Engineer E-mail Address: RHarvey@derenzo.com
5. Professional Engineer Statement: <i>I, the undersigned, hereby certify, except as particularly noted herein*, that:</i> <i>(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</i> <i>(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.</i> <i>(3) If the purpose of this application is to obtain a Title V air operation permit (check here <input type="checkbox"/> , 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.</i> <i>(4) If the purpose of this application is to obtain an air construction permit (check here <input checked="" type="checkbox"/> , 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 <input type="checkbox"/> , 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.</i> <i>(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.</i>  Signature  Date (seal)

* 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) 492.240 North (km) 3,184.510		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) 28/47/22.70 Longitude (DD/MM/SS) 81/05/23.10	
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 : This construction permit modification application is for the Seminole Energy electricity generation facility that is located on leased land at the Seminole County Osceola Road Waste Management Facility.			

Facility Contact

1. Facility Contact Name: Michael Laframboise
2. Facility Contact Mailing Address Organization/Firm: Seminole Energy c/o Landfill Energy Systems Street Address: 46280 Dylan Dr, Suite 200 <div style="display: flex; justify-content: space-between; margin-top: 5px;"> City: Novi State: MI Zip Code: 48377 </div>
3. Facility Contact Telephone Numbers: Telephone: (248) 380 - 3920 ext. Fax: (248) 380 - 2038
4. Facility Contact E-mail Address: Michael.laframboise@landfillenergy.com

Facility Primary Responsible Official

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

1. Facility Primary Responsible Official Name:
2. Facility Primary Responsible Official Mailing Address Organization/Firm: Street Address: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> City: State: Zip Code: </div>
3. Facility Primary Responsible Official Telephone Numbers... Telephone: () - ext. Fax: () -
4. Facility Primary Responsible Official E-mail Address:

FACILITY INFORMATION

Facility Regulatory Classifications

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

1.	<input type="checkbox"/> Small Business Stationary Source	<input type="checkbox"/> Unknown
2.	<input type="checkbox"/> Synthetic Non-Title V Source	
3.	<input checked="" type="checkbox"/> Title V Source	
4.	<input checked="" type="checkbox"/> Major Source of Air Pollutants, Other than Hazardous Air Pollutants (HAPs)	
5.	<input type="checkbox"/> Synthetic Minor Source of Air Pollutants, Other than HAPs	
6.	<input type="checkbox"/> Major Source of Hazardous Air Pollutants (HAPs)	
7.	<input checked="" type="checkbox"/> Synthetic Minor Source of HAPs	
8.	<input checked="" type="checkbox"/> One or More Emissions Units Subject to NSPS (40 CFR Part 60)	
9.	<input type="checkbox"/> One or More Emissions Units Subject to Emission Guidelines (40 CFR Part 60)	
10.	<input checked="" type="checkbox"/> One or More Emissions Units Subject to NESHAP (40 CFR Part 61 or Part 63)	
11.	<input type="checkbox"/> Title V Source Solely by EPA Designation (40 CFR 70.3(a)(5))	
12.	<p>Facility Regulatory Classifications Comment:</p> <p>The Seminole Energy facility is part of the Seminole County Osceola Road Waste Management Facility stationary source and is included in the Title V permit issued to the stationary source. The potential to emit carbon monoxide (CO) for the Seminole Energy electricity generation facility exceeds the PSD major source threshold.</p> <p>New spark-ignited reciprocating internal combustion engines (RICE) are subject to the NSPS in 40 CFR Part 60 Subpart JJJJ.</p> <p>New and existing RICE are subject the NESHAP in 40 CFR Part 63 Subpart ZZZZ.</p>	

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

FACILITY INFORMATION

B. EMISSIONS CAPS

Facility-Wide or Multi-Unit Emissions Caps

1. Pollutant Subject to Emissions Cap	2. Facility-Wide Cap [Y or N]? (all units)	3. Emissions Unit ID's Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap
VOC		EU002-EU007		35.9	ESCPD
H106		EU002-EU007		9.96	ESCMACT

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

The emission caps in this table are for the Seminole Energy engines, emission units EU-002 through EU-007. The Air Construction Permit issued to Seminole Energy specifies allowable:

- VOC emissions of 5.99 tons/yr per engine
- HCl emissions of 1.66 tons/yr per engine

FACILITY INFORMATION

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) <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix D</u> <input type="checkbox"/> 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) <input checked="" type="checkbox"/> Attached, Document ID: <u>Figure 4.1</u> <input type="checkbox"/> 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) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Previously Submitted, Date: <u>1/17/2007</u>

Additional Requirements for Air Construction Permit Applications

1.	Area Map Showing Facility Location: <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix D</u> <input type="checkbox"/> Not Applicable (existing permitted facility)
2.	Description of Proposed Construction, Modification, or Plantwide Applicability Limit (PAL): <input checked="" type="checkbox"/> Attached, Document ID: <u>Section 5.0</u>
3.	Rule Applicability Analysis: <input checked="" type="checkbox"/> Attached, Document ID: <u>Sections 6.0 and 7.0</u>
4.	List of Exempt Emissions Units: <input checked="" type="checkbox"/> Attached, Document ID: <u>Section 6.0</u> <input type="checkbox"/> Not Applicable (no exempt units at facility)
5.	Fugitive Emissions Identification: <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
6.	Air Quality Analysis (Rule 62-212.400(7), F.A.C.): <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix I</u> <input type="checkbox"/> Not Applicable
7.	Source Impact Analysis (Rule 62-212.400(5), F.A.C.): <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix I</u> <input type="checkbox"/> Not Applicable
8.	Air Quality Impact since 1977 (Rule 62-212.400(4)(e), F.A.C.): <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix I</u> <input type="checkbox"/> Not Applicable
9.	Additional Impact Analyses (Rules 62-212.400(8) and 62-212.500(4)(e), F.A.C.): <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix I</u> <input type="checkbox"/> Not Applicable
10.	Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable

FACILITY INFORMATION

C. FACILITY ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for FESOP Applications

- | |
|---|
| 1. List of Exempt Emissions Units:
<input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> 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)
<input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> 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)
<input type="checkbox"/> Attached, Document ID: _____
<input type="checkbox"/> Not Applicable (revision application with no change in applicable requirements) |
|---|

- | |
|--|
| 3. Compliance Report and Plan: (Required for all initial/revision/renewal applications)
<input type="checkbox"/> 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)
<input type="checkbox"/> Attached, Document ID: _____
<input type="checkbox"/> Equipment/Activities Onsite but Not Required to be Individually Listed
<input type="checkbox"/> Not Applicable |
|--|

- | |
|---|
| 5. Verification of Risk Management Plan Submission to EPA: (If applicable, required for initial/renewal applications only)
<input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable |
|---|

- | |
|--|
| 6. Requested Changes to Current Title V Air Operation Permit:
<input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable |
|--|

FACILITY INFORMATION

C. FACILITY ADDITIONAL INFORMATION (CONTINUED)

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

1. Acid Rain Program Forms:

Acid Rain Part Application (DEP Form No. 62-210.900(1)(a)):

Attached, Document ID: _____ Previously Submitted, Date: _____

Not Applicable (not an Acid Rain source)

Phase II NO_x Averaging Plan (DEP Form No. 62-210.900(1)(a)1.):

Attached, Document ID: _____ Previously Submitted, Date: _____

Not Applicable

New Unit Exemption (DEP Form No. 62-210.900(1)(a)2.):

Attached, Document ID: _____ Previously Submitted, Date: _____

Not Applicable

2. CAIR Part (DEP Form No. 62-210.900(1)(b)):

Attached, Document ID: _____ Previously Submitted, Date: _____

Not Applicable (not a CAIR source)

Additional Requirements Comment

EMISSIONS UNIT INFORMATION

Section [1] of [1]

III. EMISSIONS UNIT INFORMATION

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

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

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

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

EMISSIONS UNIT INFORMATION

Section [1] of [1]

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

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

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

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

Emissions Unit Description and Status

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

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

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

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

2. Description of Emissions Unit Addressed in this Section:
Six (6) identical CAT® G3520C internal combustion engines attached to individual electricity generators

3. Emissions Unit Identification Number: EU002 through EU007

4. Emissions Unit Status Code: A and C	5. Commence Construction Date: 2006	6. Initial Startup Date: 2007	7. Emissions Unit Major Group SIC Code: 49
---	-------------------------------------	-------------------------------	--

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

Acid Rain Unit

CAIR Unit

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

10. Generator Nameplate Rating: 1.6 MW (per generator set)

11. Emissions Unit Comment: Each engine is equipped with an individual emissions stack.

EMISSIONS UNIT INFORMATION

Section [] of []

Emissions Unit Control Equipment/Method: Control ___ of ___

1. Control Equipment/Method Description:
--

2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control ___ of ___

1. Control Equipment/Method Description:
--

2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control ___ of ___

1. Control Equipment/Method Description:
--

2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control ___ of ___

1. Control Equipment/Method Description:
--

2. Control Device or Method Code:

EMISSIONS UNIT INFORMATION

Section [1] of [1]

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: 580 cubic feet / min treated landfill gas
2. Maximum Production Rate: 1.6 MW per generator
3. Maximum Heat Input Rate: 17.1 million Btu/hr (HHV basis)
4. Maximum Incineration Rate: pounds/hr tons/day
5. Requested Maximum Operating Schedule: 24 hours/day 7 days/week 52 weeks/year 24 hours/year
6. Operating Capacity/Schedule Comment: Units operate continuously.

EMISSIONS UNIT INFORMATION

Section [1] of [1]

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: Seminole Energy Plant		2. Emission Point Type Code: 1	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: Six identical internal combustion engines (EU002 through EU007), each equipped with an individual vertical exhaust stack.			
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: One stack per emission unit (EU002, EU003, EU004, EU005, EU006, and EU007)			
5. Discharge Type Code: V	6. Stack Height: 20 feet	7. Exit Diameter: 1.5 feet	
8. Exit Temperature: 900 °F	9. Actual Volumetric Flow Rate: 13,700 acfm	10. Water Vapor: 11 %	
11. Maximum Dry Standard Flow Rate: 4,700 dscfm		12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates... Zone: 17 East (km): 491.240 North (km): 3184.510		14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) 28 / 47 / 22.70 Longitude (DD/MM/SS) 81 / 05 / 23.10	
15. Emission Point Comment:			

EMISSIONS UNIT INFORMATION

Section [1] of [1]

D. SEGMENT (PROCESS/FUEL) INFORMATION**Segment Description and Rate:** Segment 1 of 1

1. Segment Description (Process/Fuel Type): Treated landfill gas containing approximately 50% methane by volume. Heating value is approximately 460 Btu/scf based on LHV.		
2. Source Classification Code (SCC): 20100802		3. SCC Units: Million cubic feet (MMcf)
4. Maximum Hourly Rate: 0.0348	5. Maximum Annual Rate: 304.8	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: 0.02 (by wt)	8. Maximum % Ash: 0	9. Million Btu per SCC Unit: 460 (LHV)
10. Segment Comment: Data provided is per engine, 580 cu. feet/min = 0.0348 MMcf/hr.		

Segment Description and Rate: Segment __ of __

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

EMISSIONS UNIT INFORMATION

Section [] of []

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

Segment Description and Rate: Segment _ of _

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

Segment Description and Rate: Segment _ of _

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

EMISSIONS UNIT INFORMATION

Section [1] of [1]

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, FUGITIVE, AND ACTUAL EMISSIONS**
(Optional for unregulated emissions units.)

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

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted: Carbon monoxide (CO)		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 17.23 lb/hour 75.5 tons/year		4. Synthetically Limited? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year			
6. Emission Factor: 3.5 g/bhp-hr Reference: BACT		7. Emissions Method Code: 5	
8.a. Baseline Actual Emissions (if required): tons/year		8.b. Baseline 24-month Period: From: To:	
9.a. Projected Actual Emissions (if required): tons/year		9.b. Projected Monitoring Period: <input type="checkbox"/> 5 years <input type="checkbox"/> 10 years	
10. Calculation of Emissions: $(3.5 \text{ g/bhp-hr}) \times (2233 \text{ hp}) / (453.6 \text{ g/lb}) = 17.23 \text{ lb/hr CO}$ $(17.23 \text{ lb/hr}) \times (8760 \text{ hr/yr}) / (2000 \text{ lb/ton}) = 75.5 \text{ tpy}$			
11. Potential, Fugitive, and Actual Emissions Comment: Data presented is for one IC engine. Calculations are identical for all six engines. All other permitted emissions remain unchanged.			

**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -
 ALLOWABLE EMISSIONS**

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

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: RULE (BACT)	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: 3.5 g/bhp-hr	4. Equivalent Allowable Emissions: 17.23 lb/hour 75.5 tons/year
5. Method of Compliance: Periodic stack tests (one engine per year)	
6. Allowable Emissions Comment (Description of Operating Method): Data presented is for one engine. Calculations are identical for all six engines. Emissions determined by BACT analysis pursuant to 62.212-400(4)(b) F.A.C.	

Allowable Emissions Allowable Emissions of

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

Allowable Emissions Allowable Emissions of

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

EMISSIONS UNIT INFORMATION

Section [1] of [1]

G. VISIBLE EMISSIONS INFORMATION

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

Visible Emissions Limitation: Visible Emissions Limitation __ of __

1. Visible Emissions Subtype: RULE	2. Basis for Allowable Opacity: <input checked="" type="checkbox"/> Rule <input type="checkbox"/> Other
3. Allowable Opacity: Normal Conditions: 10 % Exceptional Conditions: 10 % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: Treatment of the gas and maintaining the engines in proper working order ensures compliance with the VE emission standards.	
5. Visible Emissions Comment:	

Visible Emissions Limitation: Visible Emissions Limitation __ of __

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: <input type="checkbox"/> Rule <input type="checkbox"/> Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

EMISSIONS UNIT INFORMATION

Section [] of []

H. CONTINUOUS MONITOR INFORMATION**Complete Subsection H if this emissions unit is or would be subject to continuous monitoring.****Continuous Monitoring System:** Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	<input type="checkbox"/> Rule <input type="checkbox"/> Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	<input type="checkbox"/> Rule <input type="checkbox"/> Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

EMISSIONS UNIT INFORMATION

Section [1] of [1]

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) <input checked="" type="checkbox"/> Attached, Document ID: <u>Figure 4.1</u> <input type="checkbox"/> 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) <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix E</u> <input type="checkbox"/> 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) <input checked="" type="checkbox"/> Attached, Document ID: <u>Section 8.0</u> <input type="checkbox"/> 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) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____ <input checked="" type="checkbox"/> 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) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Previously Submitted, Date <u>1/17/2007</u> <input type="checkbox"/> Not Applicable
6. Compliance Demonstration Reports/Records: <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix E</u> Test Date(s)/Pollutant(s) Tested: <u>CO, NOx and VOC (tested in 2008, 2009, 2010 and 2011).</u> <input type="checkbox"/> Previously Submitted, Date: _____ Test Date(s)/Pollutant(s) Tested: _____ <input type="checkbox"/> To be Submitted, Date (if known): _____ Test Date(s)/Pollutant(s) Tested: _____ <input type="checkbox"/> 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: <input checked="" type="checkbox"/> Attached, Document ID: <u>Application document</u> <input type="checkbox"/> Not Applicable

EMISSIONS UNIT INFORMATION

Section [1] of [1]

I. EMISSIONS UNIT ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(10) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)): <input checked="" type="checkbox"/> Attached, Document ID: <u>Section 8.0</u> <input type="checkbox"/> Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rules 62-212.400(4)(d) and 62-212.500(4)(f), F.A.C.): <input checked="" type="checkbox"/> Attached, Document ID: <u>Appendix I</u> <input type="checkbox"/> Not Applicable
3. Description of Stack Sampling Facilities: (Required for proposed new stack sampling facilities only) <input checked="" type="checkbox"/> Attached, Document ID: <u>Section 6.0</u> <input type="checkbox"/> Not Applicable

Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements: <input type="checkbox"/> Attached, Document ID: _____
2. Compliance Assurance Monitoring: <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable
3. Alternative Methods of Operation: <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable
4. Alternative Modes of Operation (Emissions Trading): <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable

Additional Requirements Comment

APPENDIX B

AIR CONSTRUCTION PERMIT 1170084-005-AC AND 1170084-008-AC

PERMITTEE:

Seminole Energy, LLC
29261 Wall Street
Wixom, Michigan 48393

File No.	1170084-005-AC
Permit No.	PSD-FL-376
SIC No.	4953
Project:	Osceola Road Solid Waste Management Facility Modification – Landfill Gas Engines
Expires:	October 1, 2008

Secondary Responsible Official (Energy Section):

Mr. Scott Salisbury, Managing Member

*Primary Responsible Official (Osceola Road Solid Waste
Management Facility):*

Mr. David Gregory, Solid Waste Manager
Environmental Services Department, Solid Waste Division
– Seminole 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 Osceola Road Solid Waste Management Facility at 1930 E. Osceola Road, Geneva, Seminole County. UTM coordinates are Zone 17; 492.00 km E; 3184.50 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

Osceola Road Solid Waste Management Facility operates a municipal solid waste (MSW) landfill near Geneva, Seminole 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. Seminole Energy, LLC plans to construct and operate an electricity generation plant at the Osceola Road Solid Waste Management Facility. In order to reduce the amount of landfill gas (LFG) wasted by flaring, all available LFG from the landfill will be supplied to Seminole Energy for use as fuel to power the proposed internal combustion (IC) engine electricity 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 (PM₁₀) and nitrogen oxides (NO_x).

REGULATORY CLASSIFICATION

The Osceola Road Solid Waste Management 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/PM₁₀), sulfur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (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 regulations:

- 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 electricity 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, NO_x and PM₁₀ 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 04-18-2006
- Department letters dated 05-16-2006, 07-13-2006 and e-mail dated 10-13-2006
- Applicant's letters received 05-23-2006, 06-12-2006, 08-11-2006, 08-31-2006 and e-mail dated 11-08-2006
- Technical Evaluation and Preliminary Determination dated 11-16-2006
- 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 Prevention of Significant Deterioration or Nonattainment (NA) review requirements should be submitted to the Bureau of Air Regulation (BAR), Florida Department of Environmental Protection (FDEP), 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 Florida Administrative Code.
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 Florida Administrative Code Chapters 62-4, 62-204, 62-210, 62-212, 62-213, 62-296, 62-297 and the Code of Federal Regulations Title 40, Parts 60 and 63, adopted by reference in the Florida Administrative Code (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 Bureau of Air Regulation 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)]

SECTION II – EMISSION UNIT(S) ADMINISTRATIVE REQUIREMENTS

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 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
002 - 005	Four Caterpillar Model G3520C landfill gas-fueled internal combustion engines and electricity 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 landfill gas (LFG) generated by and received from the Osceola Road Solid Waste Management Facility. The landfill gas will go through a gas treatment system prior to combustion in the engines.

PHASE I:

A. FUEL SPECIFICATIONS AND WORK PRACTICES

1. This permit authorizes the installation and operation of four (4) Caterpillar, Model G3520C, 2,233 brake-horsepower landfill gas-fired engines for the generation of up to a total of 6.4 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. 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, F.A.C.]**
{Permitting Note: The power generation rating of 2,233 bhp is based on a minimum fuel heating value requirement of 467 BTU/scf and landfill gas usage of 580 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. 002-005 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.]**

SECTION III – EMISSION UNIT(S) SPECIFIC CONDITIONS

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 O₂ content in the exhaust gas 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. 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 (NO_x):** The emission rate of NO_x 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 tons per year (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 (PM₁₀):** The emission rate of PM₁₀ 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 Compounds (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.]

SECTION III – EMISSION UNIT(S) SPECIFIC CONDITIONS

{Permitting Note: Facility remains a minor source of HAP emissions based on permit limits.}

6. **Sulfur Dioxide (SO₂):** The emission rate of SO₂ from each engine/generator set shall not exceed 27.5 lb/MMscf. [Rule 62-212.400(12), F.A.C.]

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

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 NO_x 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 HCl Emissions from Stationary Sources (I,A);
- (f) EPA Method 201 – Determinations of PM₁₀ 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 SO₂ and HCl emission factors in terms of lb/MMscf of landfill gas.

SECTION III – EMISSION UNIT(S) SPECIFIC CONDITIONS

- 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 four engines combined. **[Rule 62-210.200(232), F.A.C.]**
- 3. Each engine/generator set shall be equipped with a non-resettable 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 SO₂ emission factor within 45 days of gas sampling to the Bureau of Air Regulation. The results shall also be submitted to the Central District Office. **[Rules 62-210.200(232) and 62-210.200(264), F.A.C.]**

SECTION III – EMISSION UNIT(S) SPECIFIC CONDITIONS

SUBSECTION B. PHASED CONSTRUCTION

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

EMISSION UNIT NO.	EMISSION UNIT DESCRIPTION
006 - 007	Two Caterpillar Model G3520C landfill gas-fueled internal combustion engines and electricity 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 landfill gas (LFG) generated by and received from the Osceola Road Solid Waste Management Facility. The landfill gas will go through a gas treatment system prior to combustion in the engines.

1. If construction of a new phase is to commence 18 months or more after completion of the latest phase, the permittee shall submit an application and obtain a modified PSD permit prior to commencing construction on the new phase. The application shall include an updated best available control technology analysis for CO, NO_x and PM₁₀. [Rules 62-4.070(3) and 62-212.400(12)(a), F.A.C.]

PHASE II:

2. This permit authorizes the installation of Emission Unit No. 006 within five (5) years after the commencement of the initial electricity generation operations. Emission Unit No. 006 shall be a Caterpillar Model G3520C, 2,233 brake-horsepower landfill gas-fired engine for the generation of up to 1.6 megawatts (nominal rating) of electricity. At a minimum, all the requirements of Section III Subsection A that applies to Emissions Unit 002-005 shall apply to Emission Unit 006. [Rule 62-212.400, F.A.C., and 40 CFR 52.21(j)(4)]

PHASE III:

3. This permit authorizes the installation of Emission Unit 007 within ten (10) years after the commencement of the initial electricity generation operations. Emission Unit No. 007 shall be a Caterpillar Model G3520C, 2,233 brake-horsepower landfill gas-fired engine for the generation of up to 1.6 megawatts (nominal rating) of electricity. At a minimum, all the requirements of Section III Subsection A that applies to Emissions Unit 002-005 shall apply to Emission Unit 007. [Rule 62-212.400, F.A.C., and 40 CFR 52.21(j)(4)]

January 23, 2009

Sent by Electronic Mail – Received Receipt Requested

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

Re: Final Air Construction (AC) Permit Revision Project No. 1170084-008-AC/PSD-FL-376A
Revision of Permit Project No. 1170084-005-AC/PSD-FL-376
Seminole Energy, LLC – Six Reciprocating Internal Combustion Engine-Generator Sets
Determination of Non-Applicability of 40 CFR 63, Subpart ~~ZZZZ~~

Dear Mr. Salisbury:

The Department received your request on November 5, 2008, for a revision of air construction (AC) permit, No. 1170084-005-AC/PSD-FL-376, which authorized the construction of six lean-burn spark-ignition reciprocating internal combustion engine (RICE)-generator sets at the existing Osceola Road Solid Waste Management Facility located at 1930 Osceola Road in Geneva, Seminole County, Florida. The AC permit was issued on January 17, 2007.

Based on your request, the Department concurs with you that the six RICE are not subject to the provisions of Title 40 of the Code of Federal Regulations Part 63 (40 CFR 63), Subpart ~~ZZZZ~~. Therefore and as explained in the technical evaluation and preliminary determination, the Department is agreeable to revise AC permit No. 1170084-005-AC/PSD-FL-376 as follows. Please note that double underlined words are additions and strikethrough words are deletions.

I. Section I. Facility Information.

Regulatory Classification. Paragraph 2. 5th Bullet.

The facility is subject to the following regulations:

- ~~40 CFR 63, NESHAP for Stationary Reciprocating Internal Combustion Engines.~~

II. Section III. Emissions Unit(s) Specific Conditions.

A. Subsection A. Specific Condition A.3. Fuel Specifications and Work Practices.

Emissions Units Nos. 002-005 are subject to 40 CFR 60 Subpart WWW and certain sections of 40 CFR 63 Subparts AAAA and ~~ZZZZ~~ adopted by the Department at Rules 62-204.800(8)(b) and 62-204.800(11)(b), F.A.C., respectively.

III. Appendix GC.

Condition 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

A copy of this letter and attachments shall be filed with the referenced permit and shall become part of the permit. This permitting decision is issued pursuant to Chapter 403, Florida Statutes (F.S.).

Any party to this permitting decision (order) has the right to seek judicial review of it under section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, 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 must be filed within thirty days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida.

Joseph Kahn, Director
Division of Air Resource Management

Date

APPENDIX C

LANDFILL GAS GENERATION AND COLLECTION CURVES

LANDFILL GAS PRODUCTION DATA SHEET

DATE OF ENTRY: 3/13/2006
 WET PROJECT NUMBER: 206502
 SITE: Seminole County SWMF
 WASTE PROFILE: MSW - See Refuse Information Sheet

Description:	Values:	Units:	
SITE CLOSURE DATE:	2055	(year)	See Refuse Information Sheet
GAS GENERATION RATE:	0.128	(cubic feet/lbm-year)	AP-42 Value
LANDFILL GAS PRODUCTION:	3.2	(cubic feet/lbm)	AP-42 Value
REFUSE DENSITY:	Varies	(lbm/cubic yard)	See Refuse Information Sheet
RECOVERABLE GAS:	75	(percent)	AP-42 Value
METHANE CONCENTRATION:	55	(percent)	AP-42 Value
SITE DESIGN CAPACITY:	30,625,452	(tons)	See Refuse Information Sheet

YEAR	ANNUAL REFUSE (tons)	MAXIMUM GAS PRODUCED (cubic feet/min)	RECOVERABLE GAS PRODUCED (cubic feet/min)
1970	82,102	0	0
1971	82,102	40	30
1972	82,102	80	60
1973	82,102	118	89
1974	82,102	155	116
1975	82,102	190	143
1976	82,102	224	168
1977	82,102	257	192
1978	82,102	288	216
1979	82,102	317	238
1980	82,102	346	259
1981	82,102	373	280
1982	82,102	399	299
1983	82,102	424	318
1984	82,102	448	336
1985	82,102	471	354
1986	82,102	493	370
1987	82,102	515	386
1988	82,102	535	401
1989	82,102	554	416
1990	312,319	573	430
1991	288,769	703	527
1992	260,905	820	615
1993	236,104	919	690
1994	256,659	1002	751
1995	263,151	1090	817
1996	248,958	1178	883
1997	259,571	1256	942
1998	259,202	1335	1001
1999	268,168	1411	1058
2000	266,755	1488	1116
2001	266,611	1562	1171
2002	299,682	1632	1224
2003	300,943	1715	1287
2004	530,441	1797	1348
2005	475,201	1987	1490
2006	333,700	2146	1610
2007	340,500	2229	1672
2008	347,300	2309	1732
2009	354,100	2389	1792

LANDFILL GAS PRODUCTION DATA SHEET

DATE OF ENTRY: 3/13/2006
 WET PROJECT NUMBER: 206502
 SITE: Seminole County SWMF
 WASTE PROFILE: MSW - See Refuse Information Sheet

Description:	Values:	Units:	
SITE CLOSURE DATE:	2055	(year)	See Refuse Information Sheet
GAS GENERATION RATE:	0.128	(cubic feet/lbm-year)	AP-42 Value
LANDFILL GAS PRODUCTION:	3.2	(cubic feet/lbm)	AP-42 Value
REFUSE DENSITY:	Varies	(lbm/cubic yard)	See Refuse Information Sheet
RECOVERABLE GAS:	75	(percent)	AP-42 Value
METHANE CONCENTRATION:	55	(percent)	AP-42 Value
SITE DESIGN CAPACITY:	30,625,452	(tons)	See Refuse Information Sheet

YEAR	ANNUAL REFUSE (tons)	MAXIMUM GAS PRODUCED (cubic feet/min)	RECOVERABLE GAS PRODUCED (cubic feet/min)
2010	360,800	2469	1852
2011	367,500	2549	1912
2012	374,100	2630	1972
2013	380,800	2710	2032
2014	387,400	2790	2093
2015	394,000	2870	2153
2016	400,700	2951	2213
2017	407,300	3031	2273
2018	413,900	3111	2334
2019	420,500	3192	2394
2020	427,000	3272	2454
2021	433,500	3352	2514
2022	439,900	3433	2575
2023	446,200	3513	2635
2024	452,400	3593	2695
2025	458,500	3673	2755
2026	464,500	3752	2814
2027	470,300	3832	2874
2028	476,100	3911	2933
2029	481,800	3989	2992
2030	487,400	4068	3051
2031	493,300	4145	3109
2032	499,200	4223	3167
2033	505,200	4300	3225
2034	511,200	4377	3283
2035	517,400	4454	3341
2036	523,600	4531	3398
2037	529,900	4608	3456
2038	536,200	4685	3514
2039	542,700	4762	3571
2040	549,200	4839	3629
2041	555,800	4916	3687
2042	562,400	4993	3745
2043	569,200	5070	3803
2044	576,000	5148	3861
2045	582,900	5225	3919
2046	589,900	5303	3978
2047	597,000	5382	4036
2048	604,200	5460	4095
2049	611,400	5539	4155
2050	618,700	5619	4214

LANDFILL GAS PRODUCTION DATA SHEET

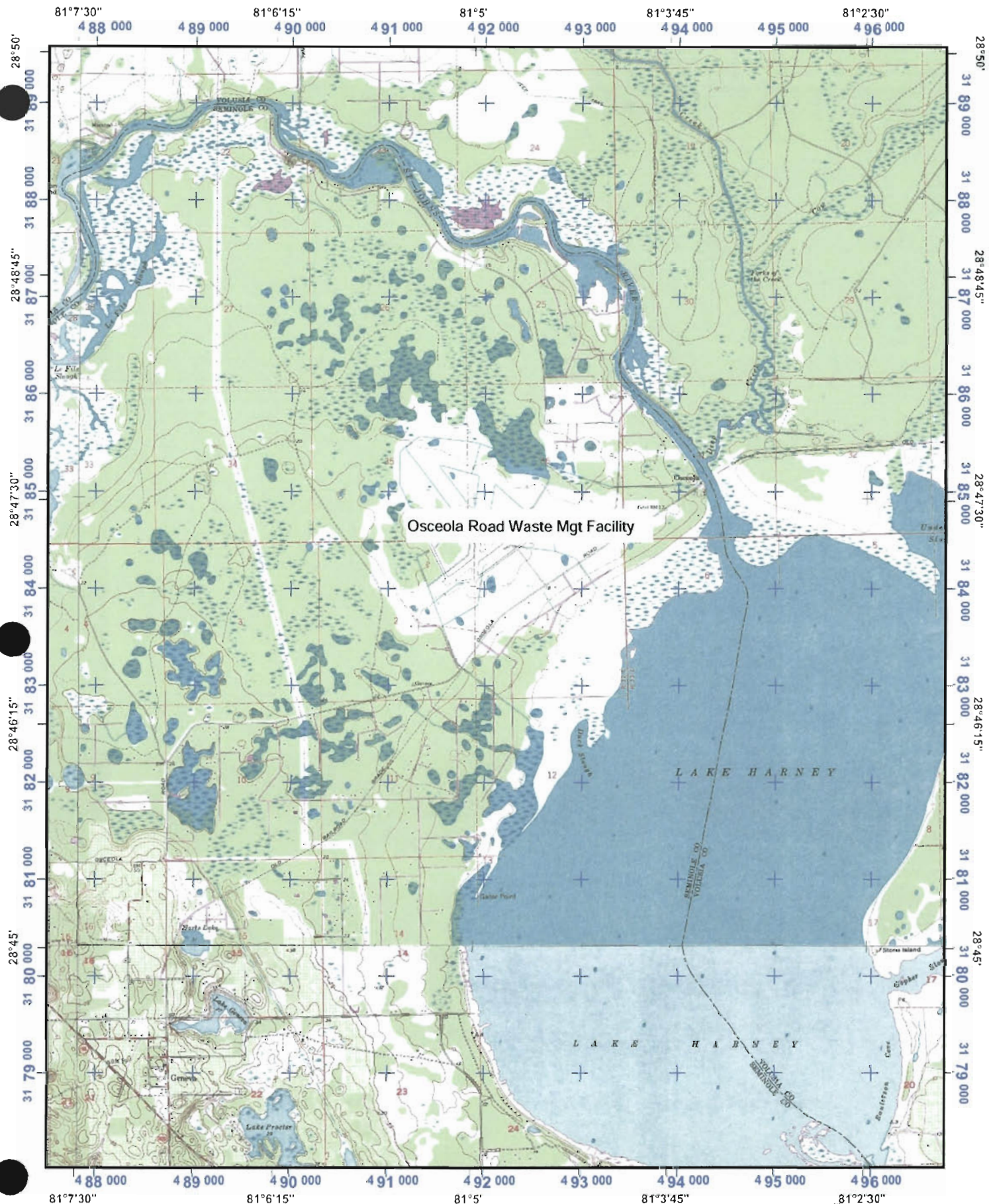
DATE OF ENTRY: 3/13/2006
 WET PROJECT NUMBER: 206502
 SITE: Seminole County SWMF
 WASTE PROFILE: MSW - See Refuse Information Sheet

Description:	Values:	Units:	
SITE CLOSURE DATE:	2055	(year)	See Refuse Information Sheet
GAS GENERATION RATE:	0.128	(cubic feet/lbm-year)	AP-42 Value
LANDFILL GAS PRODUCTION:	3.2	(cubic feet/lbm)	AP-42 Value
REFUSE DENSITY:	Varies	(lbm/cubic yard)	See Refuse Information Sheet
RECOVERABLE GAS:	75	(percent)	AP-42 Value
METHANE CONCENTRATION:	55	(percent)	AP-42 Value
SITE DESIGN CAPACITY:	30,625,452	(tons)	See Refuse Information Sheet

YEAR	ANNUAL REFUSE (tons)	MAXIMUM GAS PRODUCED (cubic feet/min)	RECOVERABLE GAS PRODUCED (cubic feet/min)
2051	626,200	5699	4274
2052	633,700	5779	4334
2053	641,300	5860	4395
2054	649,000	5941	4456
2055	244,165	6022	4517
2056	0	5904	4428
2057	0	5663	4247
2058	0	5427	4070
2059	0	5200	3900
2060	0	4983	3737

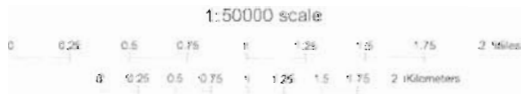
APPENDIX D

AREA LOCATION AND SITE DRAWINGS



Osceola Road Waste Mgt Facility

Universal Transverse Mercator (UTM) Projection Zone 17
 North American Datum of 1983
 1000 meter UTM / USNG / MGRS
 Grid Zone Designation: 17R
 100,000-m Squares.MM

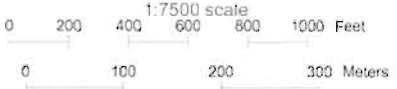


Magnetic declination of 5W at center of map
 on March 17, 2011



**Seminole Energy
Facility Location**

Universal Transverse Mercator (UTM) Projection Zone 17
 North American Datum of 1983
 100 meter UTM / USNG / MGRS
 Grid Zone Designation: 17R
 100,000-m Squares:MM



N 9000
E 6000

E 7000

E 8000

E 9000

E 10000

N 8000

N 8000

N 9000

N 9000

N 10000

N 10000

N 11000

N 11000

N 12000

N 12000

N 13000

N 13000

E 6000

E 7000

E 8000

E 9000

E 10000

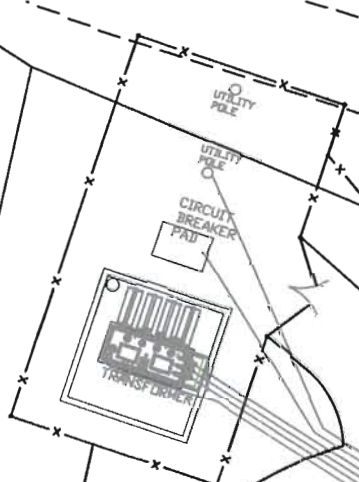
Seminole Energy
Facility



Osceola Road Waste Management Facility Site Plan

SITE
E 83583.3691 CORNER
N 110726.2434 SET 5/8" IRC
STAMPED LB3763

NEW SUBSTATION



FUEL GAS
HEADER

ELECTRICAL
CONDUITS

E 83995.2713
N 109738.6072

BLDG.
CORNER

SEWER HOLDING TANK

BATHROOM

NEW GENERATING
PLANT

18" LFG
STUB-UP
LOCATION

BLDG.
CORNER E 84948.1264
N 109527.3180

SITE
CORNER E 85832.9341
N 109784.9243
SET 5/8" IRC
STAMPED LB3763

× 23.2

× 22.3

BLDG.
CORNER

× 21.2

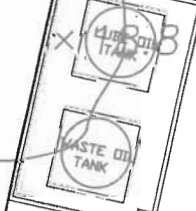
× 32.3

24.4

24.4

× 21.6

BLDG. E 84783.5980
CORNER N 108785.3407



EXISTING LEACHATE
STATION

× 22.8

× 23.1

SITE
CORNER E 85456.2505
N 108086.1867
SET 5/8" IRC

Seminole Energy LFG to Energy
Electricity Generation Facility

APPENDIX E

**LFG SAMPLING AND EMISSION COMPLIANCE
TEST DATA AND REPORTS**

Seminole Energy, LLC (April 28, 2010 Sample)

Sulfur Dioxide Emission Factor for LFG Combustion

LFG Influent Sulfur Compound	Analytical Report		No. Sulfur Atoms	Sulfur Content ^b as H ₂ S (ppmv)	Resulting SO ₂ Emission Rate (lb./MMcf)
	Concentrations ^A (ppmv)	Molecular Formula			
Hydrogen sulfide	96.5	H ₂ S	1	96.5	16.04
Carbonyl sulfide	0.28	CSO	1	0.28	0.05
Methyl mercaptan	8.15	CH ₃ S	1	8.15	1.36
Ethyl mercaptan	0.06	C ₂ H ₆ S	1	0.06	0.01
Dimethyl sulfide	13.5	C ₂ H ₆ S	1	13.5	2.24
Carbon disulfide	0.04	CS ₂	2	0.08	0.01
Isopropyl mercaptan	0.13	C ₃ H ₆ S	1	0.13	0.02
tert-Butyl mercaptan	0.07	C ₄ H ₁₀ S	1	0.07	0.01
n-Propyl mercaptan	<0.05	C ₃ H ₈ S	1	<0.05	<0.01
Ethyl methyl sulfide	<0.05	C ₃ H ₈ S	1	<0.05	<0.01
Thiophene	0.19	C ₄ H ₄ S	1	0.19	0.03
Isobutyl mercaptan	<0.05	C ₄ H ₁₀ S	1	<0.05	<0.01
Diethyl sulfide	<0.05	CH ₃ CH ₂ SCH ₂ CH ₃	1	<0.05	<0.01
n-Butyl mercaptan	<0.05	C ₄ H ₁₀ S	1	<0.05	<0.01
3-Methyl Thiophene	<0.05	C ₅ H ₆ S	1	<0.05	<0.01
Dimethyl disulfide	0.04	CH ₃ SSCH ₃	2	0.08	0.01
Tetrahydrothiophene	<0.05	C ₄ H ₈ O ₂ S	1	<0.05	<0.01
2-Ethylthiophene	<0.05	C ₆ H ₈ S	1	<0.05	<0.01
2,5-Dimethylthiophene	<0.05	C ₆ H ₈ S	1	<0.05	<0.01
Diethyl disulfide	<0.03	CH ₃ SSCH ₃	2	<0.05	<0.01
Total				<119.5	<19.87^C

Notes

A. April 29, 2010 LFG sample laboratory analytical results (see Attachment)

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

C. Calculation of SO₂ emission factor from sulfur content, as H₂S:

$$\begin{aligned} & (119.5 \text{ scf H}_2\text{S/MMcf LFG}) (1 \text{ scf SO}_2\text{/scf H}_2\text{S}) (64.06 \text{ lb. SO}_2\text{/mol}) / (385.3 \text{ ft}^3\text{/mol}) \\ & = 19.9 \text{ lb SO}_2\text{/MMcf LFG} \end{aligned}$$

* Sample calculation: SO₂ generation from hydrogen sulfide (H₂S):

$$\begin{aligned} & (96.5 \text{ scf H}_2\text{S/MMcf LFG}) (1 \text{ scf SO}_2\text{/scf H}_2\text{S}) (64.06 \text{ lb. SO}_2\text{/mol}) / (385.3 \text{ ft}^3\text{/mol}) \\ & = 16.04 \text{ lb SO}_2\text{/MMcf LFG} \end{aligned}$$

Seminole Energy, LLC (April 29, 2010 Sample)

LFG Combustion Hydrogen Chloride Emission Factor

LFG Influent Chlorine Compounds	Analytical Report Concentration ¹ (ppm)	Molecular Formula	No. Chlorine Atoms	HCl Emission Factor (lb./MMcf)
Freon 12 (Dichlorodifluoromethane)	0.520	CCl ₂ F ₂	2	0.098
Freon 114 (Dichlorotetrafluoroethane)	<0.200	C ₂ Cl ₂ F ₄	2	<0.038
Chloromethane	<0.790	CH ₃ Cl	1	<0.074
Vinyl Chloride	<0.200	C ₂ HCl	1	<0.019
Chloroethane	<0.200	C ₂ H ₅ Cl	1	<0.019
Freon 11 (Fluorotrichloromethane)	<0.200	CFCl ₃	3	<0.057
Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	<0.200	C ₂ Cl ₂ F ₃	2	<0.038
3-Chloropropene	<0.790	C ₃ H ₅ Cl	1	<0.074
Methylene Chloride (Dichloromethane)	0.230	CH ₂ Cl ₂	2	0.043
1,2-Dichloroethene (as cis-1,2-Dichloroethene)	0.310	C ₂ H ₂ Cl ₂	2	0.058
1,2-Dichloroethene (as trans-1,2-Dichloroethene)	<0.200	C ₂ H ₂ Cl ₂	2	<0.038
1,1-Dichloroethane	<0.200	C ₂ H ₄ Cl ₂	2	<0.038
1,1-Dichloroethene	<0.200	C ₂ H ₂ Cl ₂	2	<0.038
Chloroform	<0.200	CHCl ₃	3	<0.057
1,1,1-Trichloroethane	<0.200	C ₂ H ₃ Cl ₃	3	<0.057
Carbon Tetrachloride	<0.200	CCl ₄	4	<0.075
1,2-Dichloroethane	<0.200	C ₂ H ₄ Cl ₂	2	<0.038
Trichloroethene	<0.200	C ₂ HCl ₃	3	<0.057
1,2-dichloropropane	<0.200	C ₃ H ₆ Cl ₂	2	<0.038
Bromodichloromethane	<0.200	CBrCl ₂	2	<0.038
1,3-Dichloropropene (as cis-1,3-Dichloropropene)	<0.200	C ₃ H ₄ Cl ₂	2	<0.038
1,3-Dichloropropene (as trans-1,3-Dichloropropene)	<0.200	C ₃ H ₄ Cl ₂	2	<0.038
1,1,2-Trichloroethane	<0.200	C ₂ H ₃ Cl ₃	3	<0.057
Tetrachloroethene (Perchloroethene)	0.360	C ₂ Cl ₄	4	0.136
Dibromochloromethane	<0.200	CHBr ₂ Cl	1	<0.019
Chlorobenzene	<0.200	C ₆ H ₅ Cl	1	<0.019
1,1,2,2-Tetrachloroethane	<0.200	C ₂ H ₂ Cl ₄	4	<0.075
1,3-Dichlorobenzene	<0.200	C ₆ H ₄ Cl ₂	2	<0.038
1,4-Dichlorobenzene	0.500	C ₆ H ₄ Cl ₂	2	0.094
alpha-Chlorotoluene	<0.200	C ₇ H ₇ Cl	1	<0.019
1,2-Dichlorobenzene	<0.200	C ₆ H ₄ Cl ₂	2	<0.038
1,2,4-Trichlorobenzene	<0.790	C ₆ H ₃ Cl ₃	3	<0.223
Hexachlorobutadiene	<0.790	C ₄ Cl ₆	6	<0.447
Total hydrogen chloride emission factor (lb./MMcf)				<2.23

Notes

1. May 19, 2010 LFG sample laboratory analytical results (see Attachment)

* Example calculation for Freon 12 that assumes complete conversion of chloride to HCl

$$(0.52 \text{ ft}^3 \text{ Freon 12/MMcf LFG}) (2 \text{ mol HCl/mol Freon 12}) (36.46 \text{ lb. HCl/mol}) / (387 \text{ ft}^3/\text{mol})$$

$$= 0.10 \text{ lb. HCl/MMcf LFG}$$

Seminole Energy, LLC (November 8, 2010 Sample)

Sulfur Dioxide Emission Factor for LFG Combustion

LFG Influent Sulfur Compound	Analytical Report Concentrations ^A (ppmv)	Molecular Formula	No. Sulfur Atoms	Sulfur Content ^B as H ₂ S (ppmv)	Resulting SO ₂ Emission Rate (lb./MMcf)
Hydrogen sulfide	.69.0	H ₂ S	1	69.0	11.47
Carbonyl sulfide	<1.20	CSO	1	<1.20	<0.20
Methyl mercaptan	8.40	CH ₄ S	1	8.40	1.40
Ethyl mercaptan	<1.20	C ₂ H ₆ S	1	<1.20	<0.20
Dimethyl sulfide	10.0	C ₂ H ₆ S	1	10.0	1.66
Carbon disulfide	<1.50	CS ₂	2	<3.00	<0.50
Isopropyl mercaptan	<1.20	C ₃ H ₆ S	1	<1.20	<0.20
tert-Butyl mercaptan	<1.20	C ₄ H ₁₀ S	1	<1.20	<0.20
n-Propyl mercaptan	<1.20	C ₃ H ₈ S	1	<1.20	<0.20
Ethyl methyl sulfide	<1.20	C ₃ H ₈ S	1	<1.20	<0.20
Thiophene	<1.20	C ₄ H ₄ S	1	<1.20	<0.20
Isobutyl mercaptan	<1.20	C ₄ H ₁₀ S	1	<1.20	<0.20
Diethyl sulfide	<1.20	CH ₃ CH ₂ SCH ₂ CH ₃	1	<1.20	<0.20
n-Butyl mercaptan	<1.20	C ₄ H ₁₀ S	1	<1.20	<0.20
3-Methyl Thiophene	<1.20	C ₅ H ₆ S	1	<1.20	<0.20
Dimethyl disulfide	<1.20	CH ₃ SSCH ₃	2	<2.40	<0.40
Tetrahydrothiophene	<1.20	C ₄ H ₈ O ₂ S	1	<1.20	<0.20
2-Ethylthiophene	<1.20	C ₆ H ₈ S	1	<1.20	<0.20
2,5-Dimethylthiopene	<1.20	C ₆ H ₈ S	1	<1.20	<0.20
Diethyl disulfide	<1.20	CH ₃ SSCH ₃	2	<2.40	<0.40
Total				<112.0	<18.62^C

Notes

- A. November 9, 2010 LFG sample laboratory analytical results (see Attachment)
- B. Determined by multiplying concentration by number of sulfur atoms in the molecule.
- C. Calculation of SO₂ emission factor from sulfur content, as H₂S:

$$(112.0 \text{ scf H}_2\text{S/MMcf LFG}) (1 \text{ scf SO}_2\text{/scf H}_2\text{S}) (64.06 \text{ lb.SO}_2\text{/mol}) / (385.3 \text{ ft}^3\text{/mol})$$

$$= 18.6 \text{ lb SO}_2\text{/MMcf LFG}$$
- * Sample calculation: SO₂ generation from hydrogen sulfide (H₂S):

$$(69.0 \text{ scf H}_2\text{S/MMcf LFG}) (1 \text{ scf SO}_2\text{/scf H}_2\text{S}) (64.06 \text{ lb.SO}_2\text{/mol}) / (385.3 \text{ ft}^3\text{/mol})$$

$$= 11.47 \text{ lb SO}_2\text{/MMcf LFG}$$

Seminole Energy, LLC (November 8, 2010 Sample)

LFG Combustion Hydrogen Chloride Emission Factor

LFG Influent Chlorine Compounds	Analytical Report Concentration ¹ (ppm)	Molecular Formula	No. Chlorine Atoms	HCl Emission Factor (lb./MMcf)
Freon 12 (Dichlorodifluoromethane)	0.460	CCl ₂ F ₂	2	0.087 *
Freon 114 (Dichlorotetrafluoroethane)	<0.025	C ₂ Cl ₂ F ₄	2	<0.005
Chloromethane	<0.100	CH ₃ Cl	1	<0.009
Vinyl Chloride	<0.025	C ₂ HCl	1	<0.002
Chloroethane	<0.025	C ₂ H ₅ Cl	1	<0.002
Freon 11 (Fluorotrichloromethane)	<0.025	CFCl ₃	3	<0.007
Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	<0.025	C ₂ Cl ₂ F ₃	2	<0.005
3-Chloropropene	<0.100	C ₃ H ₅ Cl	1	<0.009
Methylene Chloride (Dichloromethane)	<0.025	CH ₂ Cl ₂	2	<0.005
1,2-Dichloroethene (as cis-1,2-Dichloroethene)	0.320	C ₂ H ₂ Cl ₂	2	0.060
1,2-Dichloroethene (as trans-1,2-Dichloroethene)	<0.025	C ₂ H ₂ Cl ₂	2	<0.005
1,1-Dichloroethane	<0.025	C ₂ H ₄ Cl ₂	2	<0.005
1,1-Dichloroethene	<0.025	C ₂ H ₂ Cl ₂	2	<0.005
Chloroform	<0.025	CHCl ₃	3	<0.007
1,1,1-Trichloroethane	<0.025	C ₂ H ₃ Cl ₃	3	<0.007
Carbon Tetrachloride	<0.025	CCl ₄	4	<0.009
1,2-Dichloroethane	0.250	C ₂ H ₄ Cl ₂	2	0.047
Trichloroethene	<0.025	C ₂ HCl ₃	3	<0.007
1,2-dichloropropane	<0.025	C ₃ H ₆ Cl ₂	2	<0.005
Bromodichloromethane	<0.025	CBrCl ₂	2	<0.005
1,3-Dichloropropene (as cis-1,3-Dichloropropene)	<0.025	C ₃ H ₄ Cl ₂	2	<0.005
1,3-Dichloropropene (as trans-1,3-Dichloropropene)	<0.025	C ₃ H ₄ Cl ₂	2	<0.005
1,1,2-Trichloroethane	<0.025	C ₂ H ₃ Cl ₃	3	<0.007
Tetrachloroethene (Perchloroethene)	0.410	C ₂ Cl ₄	4	0.155
Dibromochloromethane	<0.025	CHBr ₂ Cl	1	<0.002
Chlorobenzene	0.350	C ₆ H ₅ Cl	1	0.033
1,1,2,2-Tetrachloroethane	<0.025	C ₂ H ₂ Cl ₄	4	<0.009
1,3-Dichlorobenzene	<0.025	C ₆ H ₄ Cl ₂	2	<0.005
1,4-Dichlorobenzene	0.460	C ₆ H ₄ Cl ₂	2	0.087
alpha-Chlorotoluene	<0.025	C ₇ H ₇ Cl	1	<0.002
1,2-Dichlorobenzene	<0.025	C ₆ H ₄ Cl ₂	2	<0.005
1,2,4-Trichlorobenzene	<0.100	C ₆ H ₃ Cl ₃	3	<0.028
Hexachlorobutadiene	<0.100	C ₄ Cl ₆	6	<0.057
Total hydrogen chloride emission factor (lb./MMcf)				<0.69

Notes

1. November 9, 2010 LFG sample laboratory analytical results (see Attachment)

* Example calculation for Freon 12 that assumes complete conversion of chloride to HCl

(0.46 ft³ Freon 12/MMcf LFG) (2 mol HCl/mol Freon 12) (36.46 lb. HCl/mol) / (387 ft³/mol)

= 0.087 lb. HCl/MMcf LFG

Sulfur Dioxide Emission Factor for LFG Combustion

LFG Influent Sulfur Compound	Analytical Report Concentrations ^A (ppmv)	Molecular Formula	No. Sulfur Atoms	Sulfur Content ^B as H ₂ S (ppmv)	Resulting SO ₂ Emission Rate (lb./MMcf)
Hydrogen sulfide	74.0	H ₂ S	1	74.0	12.25 *
Carbonyl sulfide	<1.20	CSO	1	<1.20	<0.20
Methyl mercaptan	7.80	CH ₄ S	1	7.80	1.29
Ethyl mercaptan	<1.20	C ₂ H ₆ S	1	<1.20	<0.20
Dimethyl sulfide	10.0	C ₂ H ₆ S	1	10.0	1.66
Carbon disulfide	<1.50	CS ₂	2	<3.00	<0.50
Isopropyl mercaptan	<1.20	C ₃ H ₆ S	1	<1.20	<0.20
tert-Butyl mercaptan	<1.20	C ₄ H ₁₀ S	1	<1.20	<0.20
n-Propyl mercaptan	<1.20	C ₃ H ₈ S	1	<1.20	<0.20
Ethyl methyl sulfide	<1.20	C ₃ H ₈ S	1	<1.20	<0.20
Thiophene	<1.20	C ₄ H ₄ S	1	<1.20	<0.20
Isobutyl mercaptan	<1.20	C ₄ H ₁₀ S	1	<1.20	<0.20
Diethyl sulfide	<1.20	CH ₃ CH ₂ SCH ₂ CH ₃	1	<1.20	<0.20
n-Butyl mercaptan	<1.20	C ₄ H ₁₀ S	1	<1.20	<0.20
3-Methyl Thiophene	<1.20	C ₅ H ₆ S	1	<1.20	<0.20
Dimethyl disulfide	<1.20	CH ₃ SSCH ₃	2	<2.40	<0.40
Tetrahydrothiophene	<1.20	C ₄ H ₈ O ₂ S	1	<1.20	<0.20
2-Ethylthiophene	<1.20	C ₆ H ₈ S	1	<1.20	<0.20
2,5-Dimethylthiophene	<1.20	C ₆ H ₈ S	1	<1.20	<0.20
Diethyl disulfide	<1.20	CH ₃ SSCH ₃	2	<2.40	<0.40
Total				<116.4	<19.27^C

Notes

- A. April 20, 2011 LFG sample laboratory analytical results (see Attachment)
- B. Determined by multiplying concentration by number of sulfur atoms in the molecule.
- C. Calculation of SO₂ emission factor from sulfur content, as H₂S:

$$(116.4 \text{ scf H}_2\text{S/MMcf LFG}) (1 \text{ scf SO}_2/\text{scf H}_2\text{S}) (64.06 \text{ lb. SO}_2/\text{mol}) / (387 \text{ ft}^3/\text{mol})$$

$$= 19.3 \text{ lb SO}_2/\text{MMcf LFG}$$
- * Sample calculation: SO₂ generation from hydrogen sulfide (H₂S):

$$(74.0 \text{ scf H}_2\text{S/MMcf LFG}) (1 \text{ scf SO}_2/\text{scf H}_2\text{S}) (64.06 \text{ lb. SO}_2/\text{mol}) / (387 \text{ ft}^3/\text{mol})$$

$$= 12.30 \text{ lb SO}_2/\text{MMcf LFG}$$

Seminole Energy, LLC (March 10, 2011 Sample)

LFG Combustion Hydrogen Chloride Emission Factor

LFG Influent Chlorine Compounds	Analytical Report Concentration ¹ (ppm)	Molecular Formula	No. Chlorine Atoms	HCl Emission Factor (lb./MMcf)
Freon 12 (Dichlorodifluoromethane)	0.467	CCl ₂ F ₂	2	0.088
Freon 114 (Dichlorotetrafluoroethane)	<0.069	C ₂ Cl ₂ F ₄	2	<0.013
Chloromethane	<0.287	CH ₃ Cl	1	<0.027
Vinyl Chloride	0.087	C ₂ HCl	1	0.008
Chloroethane	<0.287	C ₂ H ₅ Cl	1	<0.027
Freon 11 (Fluorotrichloromethane)	<0.069	CFCl ₃	3	<0.020
Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	<0.069	C ₂ Cl ₂ F ₃	2	<0.013
3-Chloropropene	<0.287	C ₃ H ₅ Cl	1	<0.027
Methylene Chloride (Dichloromethane)	0.177	CH ₂ Cl ₂	2	0.033
1,2-Dichloroethene (as cis-1,2-Dichloroethene)	0.263	C ₂ H ₂ Cl ₂	2	0.050
1,2-Dichloroethene (as trans-1,2-Dichloroethene)	<0.069	C ₂ H ₂ Cl ₂	2	<0.013
1,1-Dichloroethane	<0.069	C ₂ H ₄ Cl ₂	2	<0.013
1,1-Dichloroethene	<0.069	C ₂ H ₂ Cl ₂	2	<0.013
Chloroform	<0.069	CHCl ₃	3	<0.020
1,1,1-Trichloroethane	<0.069	C ₂ H ₃ Cl ₃	3	<0.020
Carbon Tetrachloride	<0.069	CCl ₄	4	<0.026
1,2-Dichloroethane	0.213	C ₂ H ₄ Cl ₂	2	0.040
Trichloroethene	0.140	C ₂ HCl ₃	3	0.040
1,2-dichloropropane	<0.069	C ₃ H ₆ Cl ₂	2	<0.013
Bromodichloromethane	<0.069	CBrCl ₂	2	<0.013
1,3-Dichloropropene (as cis-1,3-Dichloropropene)	<0.069	C ₃ H ₄ Cl ₂	2	<0.013
1,3-Dichloropropene (as trans-1,3-Dichloropropene)	<0.069	C ₃ H ₄ Cl ₂	2	<0.013
1,1,2-Trichloroethane	<0.069	C ₂ H ₃ Cl ₃	3	<0.020
Tetrachloroethene (Perchloroethene)	0.310	C ₂ Cl ₄	4	0.117
Dibromochloromethane	<0.069	CHBr ₂ Cl	1	<0.007
Chlorobenzene	0.102	C ₆ H ₅ Cl	1	0.010
1,1,2,2-Tetrachloroethane	<0.069	C ₂ H ₂ Cl ₄	4	<0.026
1,3-Dichlorobenzene	<0.069	C ₆ H ₄ Cl ₂	2	<0.013
1,4-Dichlorobenzene	0.457	C ₆ H ₄ Cl ₂	2	0.086
alpha-Chlorotoluene	<0.069	C ₇ H ₇ Cl	1	<0.007
1,2-Dichlorobenzene	<0.069	C ₆ H ₄ Cl ₂	2	<0.013
1,2,4-Trichlorobenzene	<0.287	C ₆ H ₃ Cl ₃	3	<0.081
Hexachlorobutadiene	<0.287	C ₄ Cl ₆	6	<0.162
Total hydrogen chloride emission factor (lb./MMcf)				<1.08

Notes

1. March 31, 2011 LFG sample laboratory analytical results. Average of 3 samples (see Attachment).

* Example calculation for Freon 12 that assumes complete conversion of chloride to HCl

(0.467 ft³ Freon 12/MMcf LFG) (2 mol HCl/mol Freon 12) (36.46 lb. HCl/mol) / (387 ft³/mol)

= 0.088 lb. HCl/MMcf LFG

Table 4
 Nitrogen Oxides, Carbon Monoxide, and Volatile Organic Compound
 Concentrations, Emission Rates, and Emission Factors
 from
 Emission Unit No. 4 (IC Engine)
 Seminole Energy, LLC
 at
 Osceola Road Solid Waste Management Facility - Seminole County, Florida

Test Date(s): April 17, 2008
 Derenzo and Associates, Inc. Project No.: 0711014

Test Times (EST)	Engine Output (Kw)	Moisture (bhp)	O ₂ (%)	CO ₂ (%)
U4-C1 10:11 - 11:58	1,588	2,219	12.2	11.2
U4-C2 13:03 - 14:11	1584	2,212	12.0	11.2
U4-C3 15:10 - 16:16	1596	2,229	10.9	11.2
Average	1,589	2,220	11.7	11.2

NOx					
Test ID	Flowrate (dscfm) ¹	NOx Instrumental Concentration (ppmv)	NOx Corrected Concentration (ppmv)	NOx Emission Rate (lb/hr)	NOx Emission Factor (g/bhp*hr)
U4-C1	4,579	42.36	41.78	1.37	0.28
U4-C2	4,598	41.85	42.48	1.40	0.29
U4-C3	4,596	39.54	40.78	1.34	0.27
Average	4,591	41.25	41.68	1.37	0.28
Permit Limits				2.95	0.60

CO					
Test ID	Flowrate (dscfm) ¹	CO Instrumental Concentration (ppmv)	CO Corrected Concentration (ppmv)	CO Emission Rate (lb/hr)	CO Emission Factor (g/bhp*hr)
U4-C1	4,579	649	647	12.93	2.64
U4-C2	4,598	635	626	12.56	2.57
U4-C3	4,596	656	641	12.86	2.62
Average	4,591			12.78	2.61
Permit Limits				13.54	2.75

VOC					
Test ID	Flowrate (scfm) ¹	THC Corrected Concentration (ppmv)	Exhaust Methane Concentration ² (ppmv)	VOC Emission Rate (lb/hr) ³	VOC Emission Factor (g/bhp*hr) ³
U4-C1	5,208	2,495	2,391	1.35	0.28
U4-C2	5,193	2,567	2,441	1.63	0.33
U4-C3	5,159	2,482	2,412	0.90	0.18
Average	5,187			1.29	0.26
Permit Limits				1.37	0.28

Notes:

- 1 = Flowrate calculation based on Type S Pilot measurements (USEPA Methods 1 - 4) pre-test and post-test flowrates
- 2 = Exhaust gas methane concentration (ppmv-wet), as propane
- 3 = Calculated emission rate derived from in-field, methane response factor determination

Definitions:

- (Kw) = Killowatt
- (bhp) = brake horsepower
- (g/bhp*hr) = grams per brake horsepower hour
- (dscfm) = dry standard cubic feet per minute
- (scfm) = standard cubic feet per minute (wet)
- (lb/hr) = pounds per hour
- (ppmv) = parts per million by volume - as propane
- (EST) = Eastern Standard Time
- O₂ = oxygen
- CO₂ = carbon dioxide
- NOx = oxides of nitrogen
- CO = carbon monoxide
- THC = total hydrocarbons
- VOC = volatile organic compounds

NOx, CO, and VOC Emission Rate Calculation Formulas:

$$(\text{ft}^3 \text{ pollutant} / 100 \text{ ft}^3 \text{ gas}) * (\text{lb.mol} / 385 \text{ ft}^3 \text{ pollutant}) * (\text{lb pollutant} / \text{lb.mol pollutant}) * (\text{exhaust flowrate ft}^3 / \text{min}) * (60 \text{ min} / \text{hr}) = \text{Emission Rate (lb/hr)}$$

$$(\text{Emission Rate (lb/hr)}) (453.6 \text{ g/lb}) / (\text{bhp}) = \text{Emission Factor (g/bhp*hr)}$$

Table 4
 Nitrogen Oxides, Carbon Monoxide, and Volatile Organic Compound
 Concentrations, Emission Rates, and Emission Factors
 from the
 Unit #1 Caterpillar Model G3520C Engine
 at
 Seminole Energy, L.L.C.
 Osceola Road Solid Waste Facility - Seminole County, Florida

Test Date(s): March 23, 2009
 Derenzo and Associates, Inc. Project No.: 0901015

Test Times (EST)	Engine Output		Moisture	O ₂	CO ₂
	(Kw)	(bhp)	(%)	(%)	(%)
Test 1 901-1001	1,603	2,239	12.3	7.78	11.8
Test 2 1045-1145	1607	2,245	12.5	7.79	11.8
Test 3 1225-1325	1600	2,235	12.9	7.81	11.8
Average	1,603	2,240	12.6	7.79	11.8

NOx					
Test ID	Flowrate (dscfm) ¹	NOx Instrumental Concentration (ppmv)	NOx Corrected Concentration (ppmv)	NOx Emission Rate (lb/hr)	NOx Emission Factor (g/bhp*hr)
Test 1	4,505	62.72	63.02	2.04	0.41
Test 2	4,511	59.22	59.25	1.92	0.39
Test 3	4,546	58.27	58.29	1.90	0.39
Average	4,521	60.07	60.18	1.95	0.40
Permit Limits				2.95	0.60

CO					
Test ID	Flowrate (dscfm) ¹	CO Instrumental Concentration (ppmv)	CO Corrected Concentration (ppmv)	CO Emission Rate (lb/hr)	CO Emission Factor (g/bhp*hr)
Test 1	4,505	680	670	13.18	2.67
Test 2	4,511	680	668	13.15	2.66
Test 3	4,546	673	660	13.09	2.66
Average	4,521	678	666	13.14	2.66
Permit Limits				13.54	2.75

VOC					
Test ID	Flowrate (scfm) ¹	THC Corrected Concentration (ppmv)	Exhaust Methane Concentration ² (ppmv)	VOC Emission Rate (lb/hr) ³	VOC Emission Factor (g/bhp*hr) ¹
Test 1	5,138	514	640	0.0	0.0
Test 2	5,157	570	630	0.0	0.0
Test 3	5,219	570	646	0.0	0.0
Average	5,171	551	639	0.0	0.0
Permit Limits				1.37	0.28

Notes:

- 1 = Flowrate calculation based on Type S Pitot measurements (USEPA Methods 1 - 4) pre-test flowrates
- 2 = Exhaust gas methane concentration (ppmv-wet), as propane
- 3 = Calculated emission rate derived from in-field, methane subtracted from THC as propane

Definitions:

- | | |
|---|----------------------------------|
| (Kw) = Kilowatt | (EST) = Eastern Standard Time |
| (bhp) = brake horsepower | O ₂ = oxygen |
| (g/bhp*hr) = grams per brake horsepower hour | CO ₂ = carbon dioxide |
| (dscfm) = dry standard cubic feet per minute | NOx = oxides of nitrogen |
| (scfm) = standard cubic feet per minute (wet) | CO = carbon monoxide |
| (lb/hr) = pounds per hour | THC = total hydrocarbons |
| (ppmv) = parts per million by volume - as propane | VOC = volatile organic compounds |

NOx, CO, and VOC Emission Rate Calculation Formulas:

$$(\text{ft}^3 \text{ pollutant} / 100 \text{ ft}^3 \text{ gas}) * (\text{lb. mol} / 385 \text{ ft}^3 \text{ pollutant}) * (\text{lb pollutant} / \text{lb. mol pollutant}) * (\text{exhaust flowrate ft}^3/\text{min}) * (60 \text{ min}/\text{hr}) = \text{Emission Rate (lb/hr)}$$

$$(\text{Emission Rate (lb/hr)}) / (453.6 \text{ g/lb}) / (\text{bhp}) = \text{Emission Factor (g/bhp*hr)}$$

Table 4
 Nitrogen Oxides and Carbon Monoxide,
 Concentrations, Emission Rates, and Emission Factors
 from the
 Unit #2 (EU003) Caterpillar Model G3520C Engine
 at
 Seminole Energy, L.L.C.
 Osceola Road Solid Waste Facility - Seminole County, Florida

Test Date(s): April 29, 2010
 Derenzo and Associates, Inc. Project No.: 1001035

Test Times (EST)	Engine Output (Kw)	(bhp)	Moisture (%)	O ₂ (%)	CO ₂ (%)
Test 1 902-1010	1,553	2,167	12.8	7.82	11.94
Test 2 1047-1150	1557	2,173	12.8	7.86	11.90
Test 3 1245-1349	1540	2,149	12.4	7.90	11.89
Average	1,550	2,163	12.6	7.86	11.91

NO _x					
Test ID	Flowrate (dscfm) ¹	NO _x Instrumental Concentration (ppmv)	NO _x Corrected Concentration (ppmv)	NO _x Emission Rate (lb/hr)	NO _x Emission Factor (g/bhp*hr)
Test 1	4,659	58.48	57.46	1.89	0.40
Test 2	4,569	56.36	56.36	1.82	0.38
Test 3	4,515	55.22	56.18	1.83	0.39
Average	4,581	56.69	56.66	1.85	0.39
Permit Limits				2.95	0.60

CO					
Test ID	Flowrate (dscfm) ¹	CO Instrumental Concentration (ppmv)	CO Corrected Concentration (ppmv)	CO Emission Rate (lb/hr)	CO Emission Factor (g/bhp*hr)
Test 1	4,659	628	637	12.78	2.64
Test 2	4,569	627	629	12.39	2.59
Test 3	4,515	626	622	12.33	2.60
Average	4,581	627	629	12.50	2.61
Permit Limits				13.54	2.75

Notes:

1 = Flowrate calculation based on Type S Pitot measurements (USEPA Methods 1 - 4) pre-test flowrates

Definitions:

- | | |
|---|--------------------------------------|
| (Kw) = Killowatt | (ppmv) = parts per million by volume |
| (bhp) = brake horsepower | (EST) = Eastern Standard Time |
| (g/bhp*hr) = grams per brake horsepower hour | O ₂ = oxygen |
| (dscfm) = dry standard cubic feet per minute | CO ₂ = carbon dioxide |
| (scfm) = standard cubic feet per minute (wet) | NO _x = oxides of nitrogen |
| (lb/hr) = pounds per hour | CO = carbon monoxide |

NO_x and CO Emission Rate Calculation Formulas:

$$(\text{ft}^3 \text{ pollutant} / 100 \text{ ft}^3 \text{ gas}) * (\text{lb.mol} / 385 \text{ ft}^3 \text{ pollutant}) * (\text{lb pollutant} / \text{lb.mol pollutant}) * (\text{exhaust flowrate ft}^3/\text{min}) * (60 \text{ min}/\text{hr}) = \text{Emission Rate (lb/hr)}$$

$$(\text{Emission Rate (lb/hr)}) (453.6 \text{ g/lb}) / (\text{bhp}) = \text{Emission Factor (g/bhp*hr)}$$

Table 4
 Nitrogen Oxides and Carbon Monoxide,
 Concentrations, Emission Rates, and Emission Factors
 from the
 Unit #3 (EU004) Caterpillar Model G3520C Engine
 at
 Seminole Energy, L.L.C.
 Osceola Road Solid Waste Facility - Seminole County, Florida

Test Date(s): March 10, 2011
 Derenzo and Associates, Inc. Project No.: 1101030

Test Times (EST)	Engine Output (Kw)	Engine Output (bhp)	Moisture (%)	O ₂ (%)	CO ₂ (%)
Test 1 902-1010	1,612	2,250	13.5	7.57	12.14
Test 2 1047-1150	1619	2,259	13.1	7.65	12.10
Test 3 1245-1349	1612	2,249	12.8	7.65	12.03
Average	1,614	2,253	13.1	7.62	12.09

NOx					
Test ID	Flowrate (dscfm) ¹	NOx Instrumental Concentration (ppmv)	NOx Corrected Concentration (ppmv)	NOx Emission Rate (lb/hr)	NOx Emission Factor (g/bhp*hr)
Test 1	4,655	56.66	57.57	1.97	0.40
Test 2	4,706	53.90	54.68	1.82	0.37
Test 3	4,637	52.86	53.67	1.76	0.36
Average	4,666	54.47	55.31	1.85	0.37
Permit Limits				2.95	0.60

CO					
Test ID	Flowrate (dscfm) ¹	CO Instrumental Concentration (ppmv)	CO Corrected Concentration (ppmv)	CO Emission Rate (lb/hr)	CO Emission Factor (g/bhp*hr)
Test 1	4,655	613	612	12.74	2.57
Test 2	4,706	611	617	12.53	2.52
Test 3	4,637	612	615	12.30	2.48
Average	4,666	612	615	12.52	2.52
Permit Limits				13.54	2.75

Notes:

1 = Flowrate calculation based on Type S Pitot measurements (USEPA Methods 1 - 4) pre-test flowrates

Definitions:

- | | |
|--|----------------------------------|
| (Kw) = Killowatt | (EST) = Eastern Standard Time |
| (bhp) = brake horsepower | O ₂ = oxygen |
| (g/bhp*hr) = grams per brake horsepower hour | CO ₂ = carbon dioxide |
| (dscfm) = dry standard cubic feet per minute | NOx = oxides of nitrogen |
| (ppmv) = parts per million by volume | CO = carbon monoxide |
| (lb/hr) = pounds per hour | |

NOx and CO Emission Rate Calculation Formulas:

$$(\text{ft}^3 \text{ pollutant}/100 \text{ ft}^3 \text{ gas}) * (\text{lb.mol}/385 \text{ ft}^3 \text{ pollutant}) * (\text{lb pollutant}/\text{lb.mol pollutant}) * (\text{exhaust flowrate ft}^3/\text{min}) * (60 \text{ min}/\text{hr}) = \text{Emission Rate (lb/hr)}$$

$$(\text{Emission Rate (lb/hr)}) (453.6 \text{ g/lb}) / (\text{bhp}) = \text{Emission Factor (g/bhp*hr)}$$

APPENDIX F

CAT[®] MODEL 3520C GAS IC ENGINE AND
GENERATOR SET TECHNICAL DATA

ENGINE SPEED:	1200	FUEL:	LOW ENERGY (1.43 CH ₄ :CO ₂ RATIO)
COMPRESSION RATIO:	11.3:1	FUEL SYSTEM:	CAT LOW PRESSURE
AFTERCOOLER - STAGE 1 MAX. INLET (°F):	218		WITH AIR FUEL RATIO CONTROL
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
SPARK PLUG TYPE:	J-GAP	NO _x EMISSION LEVEL:	0.5 g/bhp-hr
EXHAUST MANIFOLD:	DRY	FUEL LHV (BTU/SCF):	456
COMBUSTION:	LOW EMISSION	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)	%	40.1	38.6	36.1
ENGINE EFFICIENCY	(NOMINAL)	(3)	%	39.1	37.7	35.2
THERMAL EFFICIENCY	(NOMINAL)	(4)	%	41.3	40.6	42.2
TOTAL EFFICIENCY	(NOMINAL)	(5)	%	80.4	78.3	77.4

ENGINE DATA						
FUEL CONSUMPTION	(ISO 3046/1)	(6)	BTU/bhp-hr	6354	6592	7047
FUEL CONSUMPTION	(NOMINAL)	(6)	BTU/bhp-hr	6509	6753	7219
AIR FLOW (77 °F, 14.7 psi)		(7)	SCFM	4512	3415	2286
AIR FLOW		(7)	lb/hr	20006	15141	10366
COMPRESSOR OUT PRESSURE			in. HG (abs)	105.8	80.8	55.5
COMPRESSOR OUT TEMPERATURE			°F	375	306	220
AFTERCOOLER AIR OUT TEMPERATURE			°F	142	138	135
INLET MAN. PRESSURE		(8)	in. HG (abs)	94.4	71.5	48.9
INLET MAN. TEMPERATURE	(MEASURED IN PLENUM)	(9)	°F	142	138	135
TIMING		(10)	°BTDC	27	27	27
EXHAUST STACK TEMPERATURE		(11)	°F	898	943	984
EXHAUST GAS FLOW (@ stack temp.)		(12)	CFM	12476	9780	6770
EXHAUST MASS FLOW		(12)	lb/hr	22318	16940	11418

EMISSIONS DATA						
NO _x (as NO ₂)		(13)	g/bhp-hr	0.5	0.5	0.5
NTE CO		(14)	g/bhp-hr	4.13	4.25	4.4
NOMINAL CO		(15)	g/bhp-hr	2.5	2.5	2.5
THC (molecular weight of 15.84)		(14)	g/bhp-hr	5.84	6.49	7.51
NMHC (molecular weight of 15.84)		(14)	g/bhp-hr	0.88	0.98	1.13
EXHAUST O ₂		(16)	% DRY	9.0	8.8	8.6
LAMBDA		(16)		1.71	1.67	1.57

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

CONDITIONS AND DEFINITIONS

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

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

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

FOR NOTES INFORMATION CONSULT PAGE THREE.

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

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

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

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

ACTUAL ENGINE RATING:

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

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

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

AFTERCOOLER HEAT REJECTION FACTORS:

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

SOUND DATA:

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

NOTES

- 1 ENGINE RATING IS WITH 2 ENGINE DRIVEN WATER PUMPS. TOLERANCE IS $\pm 3\%$ OF FULL LOAD.
- 2 GENERATOR POWER DETERMINED WITH AN ASSUMED GENERATOR EFFICIENCY OF 96.1% AND POWER FACTOR OF 0.8 [GENERATOR POWER = ENGINE POWER x GENERATOR EFFICIENCY].
- 3 ISO 3046/1 ENGINE EFFICIENCY TOLERANCE IS (+)0, (-)5% OF FULL LOAD % EFFICIENCY VALUE. NOMINAL ENGINE EFFICIENCY TOLERANCE IS $\pm 2.5\%$ 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 $\pm 10\%$ OF FULL LOAD DATA.
- 6 ISO 3046/1 FUEL CONSUMPTION TOLERANCE IS (+)5, (-)0% OF FULL LOAD DATA. NOMINAL FUEL CONSUMPTION TOLERANCE IS $\pm 2.5\%$ OF FULL LOAD DATA.
- 7 UNDRYED AIR. FLOW TOLERANCE IS $\pm 5\%$
- 8 INLET MANIFOLD PRESSURE TOLERANCE IS $\pm 5\%$
- 9 INLET MANIFOLD TEMPERATURE TOLERANCE IS $\pm 9^\circ\text{F}$.
- 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 $\pm 6\%$
- 13 NOX TOLERANCES ARE $\pm 18\%$ 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 $\pm 2.5\%$.
- 18 TOTAL JW HEAT (based on treated water) = JACKET HEAT + STAGE 1 A/C HEAT + 0.90 x (STAGE 1 + STAGE 2) x (ACHRF-1). TOLERANCE IS $\pm 10\%$ OF FULL LOAD DATA.
- 19 RADIATION HEAT RATE BASED ON TREATED WATER. TOLERANCE IS $\pm 50\%$ OF FULL LOAD DATA.
- 20 LUBE OIL HEAT RATE BASED ON TREATED WATER. TOLERANCE IS $\pm 20\%$ OF FULL LOAD DATA.
- 21 EXHAUST HEAT RATE BASED ON TREATED WATER. TOLERANCE IS $\pm 10\%$ OF FULL LOAD DATA.
- 22 STAGE 1 A/C HEAT (based on treated water) = STAGE 1 A/C HEAT + 0.90 x (STAGE 1 + STAGE 2) x (ACHRF-1). TOLERANCE IS $\pm 5\%$ 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 $\pm 5\%$ OF FULL LOAD DATA.

APPENDIX G

ENGINE-GENERATOR OPERATING DATA FOR 2010

Seminole Energy

Month	Gross KWH	Hours Unit 1	Hours Unit 2	Hours Unit 3	Hours Unit 4	Lfg Consumed	Lfg HHV MMBtu
January 10	3,738,900	734	728	719	729	75,221,000	36,831
February 10	3,359,700	661	642	644	555	67,366,000	33,776
March 10	3,757,200	732	725	731	702	78,077,100	38,933
April 10	3,534,400	700	680	703	654	75,844,400	36,882
May 10	3,851,400	679	726	700	711	82,991,000	42,053
June 10	3,795,700	690	715	653	713	83,899,500	41,872
July 10	3,954,400	736	731	729	700	90,189,000	43,849
August 10	3,875,400	725	726	724	721	87,140,000	43,147
Sept. 10	3,768,500	707	707	711	701	83,557,000	42,572
Oct. 10	3,645,400	723	740	720	730	84,062,300	40,151
Nov. 10	3,236,228	689	704	696	373	70,324,700	34,329
Dec. 10	3,282,472	705	481	435	672	69,667,278	33,877
Total year	43,799,700	8,481	8,305	8,165	7,961	948,339,278	468,273

*June, July and August designated as ozone/summer season

Operation by Season

	Hours	Percentage
Dec/Jan/Feb	7,705	23%
Mar/Apr/May	8,443	26%
Jun/Jul/Aug	8,563	26%
Sep/Oct/Nov	8,201	25%
Total	32,912	

Seminole Energy

Month	KWH made Unit 1	KWH made Unit 2	KWH made Unit 3	KWH made Unit 4	Gas use Unit 1	Gas use Unit 2	Gas use Unit 3	Gas use Unit 4
January 10	942,500	935,700	923,100	937,600	18,961,671	18,824,866	18,571,373	18,863,091
February 10	906,400	873,800	868,100	711,400	18,174,403	17,520,734	17,406,442	14,264,420
March 10	962,900	937,200	949,800	907,300	20,009,699	19,475,636	19,737,472	18,854,294
April 10	924,200	911,800	889,500	808,900	19,832,332	19,566,241	19,087,708	17,358,119
May 10	929,400	1,004,400	962,100	955,500	20,026,960	21,643,081	20,731,589	20,589,370
June 10	942,300	981,800	893,500	978,100	20,828,437	21,701,538	19,749,770	21,619,754
July 10	1,007,200	1,000,200	994,700	952,300	22,971,465	22,811,814	22,686,374	21,719,347
August 10	968,600	975,400	968,700	962,700	21,779,379	21,932,280	21,781,627	21,646,715
Sept. 10	943,000	945,100	950,100	930,300	20,908,651	20,955,213	21,066,076	20,627,060
Oct. 10	895,000	938,200	899,700	912,500	20,638,547	21,634,731	20,746,928	21,042,094
Nov. 10	925,000	957,832	916,096	437,300	20,100,669	20,814,123	19,907,181	9,502,727
Dec. 10	1,069,700	641,468	564,604	1,006,700	22,703,343	13,614,535	11,983,171	21,366,229
Total year	11,416,200	11,102,900	10,780,000	10,500,600	246,935,556	240,494,792	233,455,711	227,453,220

Annual Calculations:

Total generation	43,799,700 kW-hr
kW generation (avg)	1,331 kW
Generation factor:	83.2%
Gas heat value (avg)	493.8 Btu/cf
Avg Flow per ICE	480.2 scfm
Heat Input per ICE	14.2 MMBtu/hr
LFG Recovery	1,804 scfm
Prediction from curve	1,852 scfm
<i>Flow at max cap. per ICE</i>	<i>577.4 scfm</i>
<i>Heat input at max</i>	<i>17.1 MMBtu/hr</i>

APPENDIX H

REGULATED AIR EMISSION RATE CALCULATIONS

Derenzo and Associates, Inc.

Theoretical Engine Exhaust Calculator

User Inputs (Constants)

17.1	Heat Input Rate (MMBtu/hr, HHV)
48.0	Methane in LFG (% CH ₄)
7.80	Oxygen in engine exhaust gas (% O ₂)
930	Exhaust Temperature (°F)
11.0	Exhaust Stack Moisture (%)

Calculated Fuel Input

282	scfm CH ₄
306	scfm CO ₂ , balance of LFG

Calculated Engine Exhaust

588	scfm CO ₂
564	scfm H ₂ O
409	scfm O ₂
3,685	scfm N ₂

Calculated Combustion Air

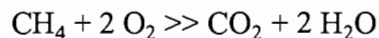
974	scfm O ₂
3,685	scfm N ₂

5,246	Total exhaust gas (scfm)
4,682	Total dry exhaust (dscfm)
13,757	Total actual exhaust (acfm)

This spreadsheet calculates the amount of oxygen (excess air) required to completely oxidize the methane in the LFG and result in the stack gas oxygen content specified by the user.

Assumptions:

1. Landfill gas is composed of methane (CH₄) with the balance being carbon dioxide (CO₂).
2. Combustion air is composed of 20.9% oxygen (O₂) with the balance being nitrogen (N₂).
3. CH₄ is completely converted to CO₂ in the engine.



4. Nitrogen in the combustion air is not consumed in the engine.

Derenzo and Associates, Inc.

**Exhaust CO Concentration Calculations
Internal Combustion Engine (CAT G3520C)**

CAT® G3520C Emission Calculations Based on Manufacturer's Specifications

Engine exhaust rate, dry (Q): 4,330 dscfm
Exhaust oxygen content (dry): 8.0 % O₂
Engine output: 2,233 bhp

Pollutant	Pollutant Molecular Weight	Exhaust Concentration [C] (ppmvd)	Concentration at 15% O ₂ (ppmvd)	Emission Rate [E _R] (lb/hr)	Emission Rate (g/bhp-hr)
CO	28.0	1075	492	20.31	4.13

Calculations:

Concentration at 15% Oxygen = (C, ppmvd) x (20.9% - 15%) / (20.9% - O₂%)

Emission rate (lb/hr) = (C, ppmvd) x (Q, dscfm) x (MW, lb/lb-mol) x (60 min/hr) / (385 scf/lb-mol)

Emission rate (g/bhp-hr) = (ER, lb/hr) x (454 g/lb) / (engine hp)

Derenzo and Associates, Inc.

**Exhaust CO Concentration Calculations
Internal Combustion Engine (CAT G3520C)**

CAT® G3520C Emission Calculations Based on Actual Data

Max. engine exhaust rate, dry (Q): 4,860 dscfm
Exhaust oxygen content (dry): 7.6 % O₂
Engine output: 2,233 bhp

Pollutant	Pollutant Molecular Weight	Max. Exhaust Concentration [C] (ppmvd)	Max. Concentration at 15% O ₂ (ppmvd)	Emission Rate [E _R] (lb/hr)	Emission Rate (g/bhp-hr)
CO	28.0	812	360	17.23	3.50

Calculations:

Concentration at 15% Oxygen = (C, ppmvd) x (20.9% - 15%) / (20.9% - O₂%)

Emission rate (lb/hr) = (C, ppmvd) x (Q, dscfm) x (MW, lb/lb-mol) x (60 min/hr) / (385 scf/lb-mol)

Emission rate (g/bhp-hr) = (ER, lb/hr) x (454 g/lb) / (engine hp)

APPENDIX I
AMBIENT AIR IMPACT ANALYSES

AIR QUALITY MODELING PROTOCOL
TO SUPPORT
CARBON MONOXIDE EMISSION RATE INCREASES
FOR
SEMINOLE ENERGY, L.L.C.
AT THE
OSCEOLA ROAD WASTE MANAGEMENT FACILITY LANDFILL

Seminole Energy, LLC
46280 Dylan Dr, Suite 200
Novi MI 48377

September 30, 2010

DAI Project No. 0804010

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APPENDICES

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AIR QUALITY MODELING PROTOCOL
TO SUPPORT
CARBON MONOXIDE EMISSION RATE INCREASES
FOR
SEMINOLE ENERGY, L.L.C.
AT THE
OSCEOLA ROAD WASTE MANAGEMENT FACILITY LANDFILL

1.0 INTRODUCTION TO AIR QUALITY IMPACT ANALYSES

Seminole Energy, L.L.C. (Seminole Energy) currently operates electricity generation processes that results in the beneficial use, after treatment, of landfill gas (LFG) that is collected from the Osceola Road Waste Management Facility (Landfill) located in Geneva, Seminole County, Florida.

An active gas collection system recovers LFG generated within the landfill. Seminole Energy treats the recovered LFG and uses it as fuel in its landfill gas to energy (LFGTE) facility to produce electricity. Two (2) open utility flares are operated by the Osceola Road Waste Management Facility (Osceola Waste Management Facility) to control excess LFG that the LFGTE cannot use. This air quality modeling protocol has been prepared for regulatory agency review and approval for proposed adjustments to the permitted carbon monoxide (CO) emission rates for the permitted six (6) electricity generation internal combustion engines (IC engines).

The construction permit 1170084-005-AC (PSD-FL-376) allows for a phased construction of the six (6) IC engines and was issued on January 17, 2007. Currently, emission units EU002, EU003, EU004, and EU005 have been constructed and are operating. Emission units EU006 and EU007 will be installed as gas is available to fuel the additional engines.

This protocol presents proposed CO emission rates for the permitted electricity generation equipment and a description of the procedures and data used with United States Environmental Protection Agency (USEPA) approved computer models to predict regional ambient air impacts caused by the proposed emission factor modifications to the permitted Seminole Energy emission units. Results of the ambient air impact analyses are included in this document.

Appendix D provides a site plan of the electricity generation facility building and surrounding topography.

2.0 FACILITY INFORMATION AND SITE CHARACTERISTICS

2.1 Facility Description and Permitting

The Landfill is owned by Seminole County. The municipal solid waste (MSW) landfill, LFG flares, and existing electricity generation facility are specified in Title V Air Operations Permit No. 1170084-007-AV. The permit allows for the installation and operation of six (6) reciprocating IC engine generator sets, which are owned and operated by Seminole Energy.

The Landfill encompasses approximately 32.47 square kilometers (km², or 20.2 square miles) of land to the west of US Highway 95, approximately 40.2 km (25 miles) northeast of Orlando, Florida. The active landfill (portion of the property currently and previously used for waste disposal) occupies approximately 0.97 km² of land located in the west central area of the Seminole County property. The electricity generation facility is located near the western border of the landfill.

The LFG fueled IC engines are 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 LFG collection system header. A gas transmission line (fuel supply pipe) is connected to the header of the LFG collection system and a dedicated gas blower/compressor is used to draw the fuel from the existing LFG collection system to the gas treatment system and electricity generation facility.

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

Seminole County currently owns and operates two (2) utility flares to control landfill gas emissions. The two (2) open utility flares have maximum capacities of 2,145 cubic feet per minute (scfm), and 3,000 scfm of landfill gas (i.e., total LFG control capacity of 5,145 scfm). After the installation of the engine facility the flares have served as back-up control devices and only used when an excess amount of gas exists (e.g., if an engine is taken off-line for maintenance or if the landfill gas production rate exceeds the amount that can be used in the engines). The flares are only used as a backup emission control device (producing electricity from combustion of the LFG in the IC engines is the preferred use for the gas).

2.2 Land Use Classifications

The general land use classification of the land within 3 kilometers (km) surrounding the Landfill location is rural.

Figure 2.1 provides a general location map for the Osceola Waste Management Facility.

2.2.1 Population Density

The population density of the area within a radius of 5.0 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 of approximately 24 persons per square kilometer. Because the area surrounding the proposed Seminole 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 land use of that area 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).

2.2.2 Federal Class I Areas

The Landfill located in Geneva, Florida is located approximately 150 kilometers from the closest portion of the Chassahowitzka National Wildlife Refuge Wilderness Area (Chassahowitzka NWR). The refuge was established in 1941 and encompasses 31,000 acres on the western portion of Florida that includes swampland, estuaries, and saltwater bays.

The results of the PSD Significant Impact Level (SIL) modeling demonstration indicate that the worst-case emissions scenario (the combined operation of all six engine generators at the proposed maximum CO emission rate) results in maximum ambient air CO impacts that are less than the PSD SIL for CO (i.e., insignificant). The distance to the nearest Class I area is over 150 km. Due to the relatively low ambient air CO impacts and distance to the Class I area, a Class I ambient air impact analysis was not performed for the proposed CO emission rate increase.

Other nearby Class I areas include Okefenokee National Wilderness Area (230 km from Seminole Energy), Wolf Island National Wilderness Area (280 km from Seminole Energy), and Everglades National Park (330 km from Seminole Energy).

2.3 Topography

The topography of the land that surrounds the Landfill is relatively flat. The base elevation of the proposed Seminole Energy electricity generation facility is approximately 7.59 meters (24.9 ft.) above sea level and the minimum stack heights of the proposed IC engine exhaust stacks is 20 feet (as measured from local grade), which results in an exhaust stack release elevation of 44.9 feet above sea level. Based on review of topography plots of the surrounding area there is no terrain within 3 km that has elevations greater than 44.9 feet above sea level.

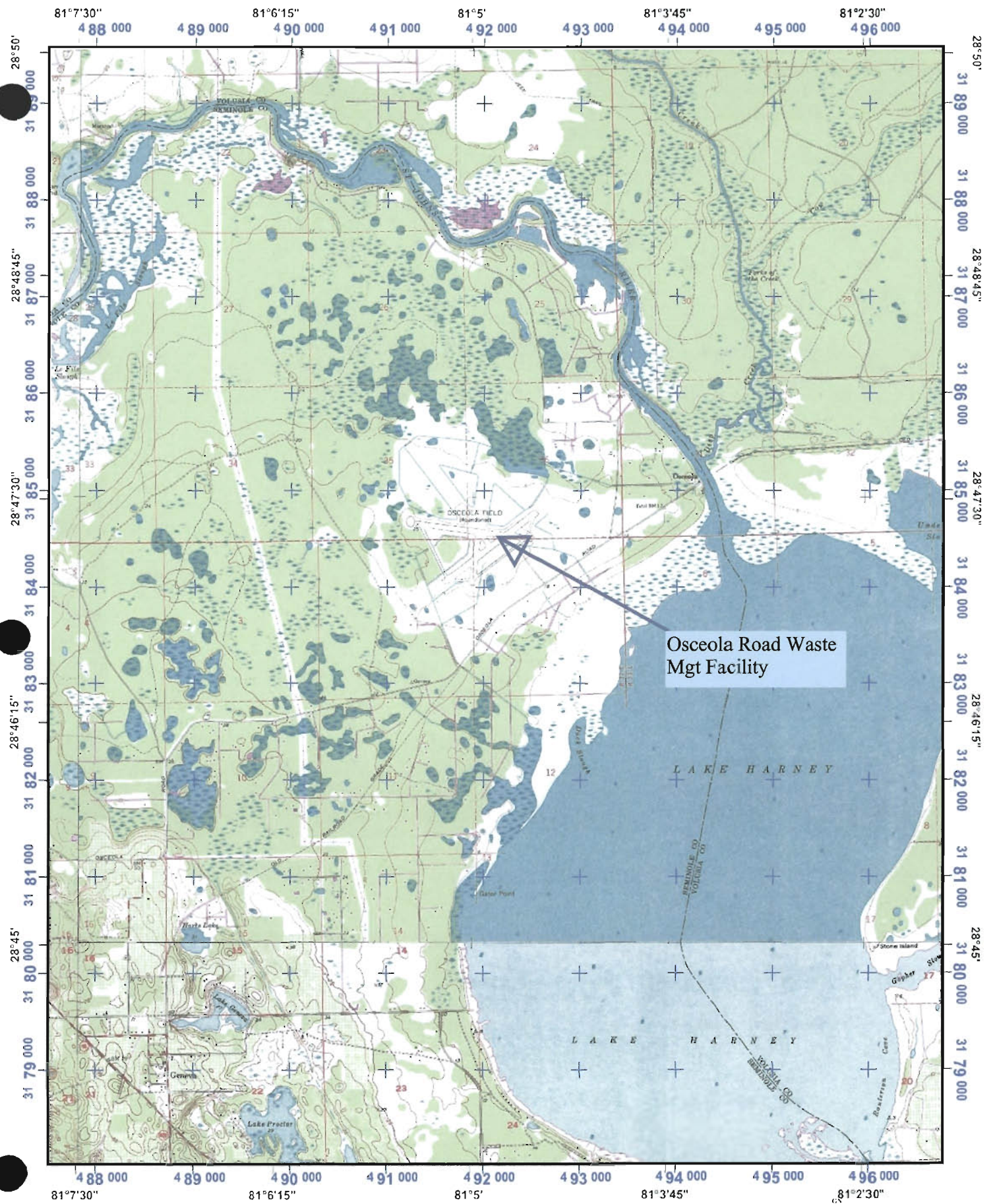


Figure 2.1 General location of the Osceola Waste Management Facility

3.0 EMISSION UNIT SPECIFICATIONS

3.1 Gas Collection and Control

The LFG is collected using a system of wells that are connected to a central header (gas collection system). The collected LFG is primarily directed to the electricity generation facility where it is treated and used as fuel for the IC engine generator sets. Excess LFG (gas which is collected and exceeds the electricity generation facility fuel capacity) or LFG collected during IC engine outages (due to planned engine maintenance or engine shutdowns) is directed to the LFG flaring stations operated by Seminole County for the destruction of methane and air toxics contained in the gas. However, the preferred use for the collected LFG is the transfer to Seminole Energy for treatment and use as a fuel gas.

3.2 Gas Treatment System

Seminole Energy operates a treatment system that filters (removal of particles down to 0.3 microns), dewater and compresses the LFG received from the landfill prior to its combustion as fuel in the IC engine generators. This system is designed to treat the gas to support good combustion, prolong the life of the combustion equipment and reduce material buildup (combustion deposits) on the internal components of the engines.

Components of the gas treatment system are not equipped with atmospheric vents. Therefore, all of the LFG received by the treatment system is directed to the IC engine generators for use as a fuel.

3.3 Landfill Gas Use Rates

A design heat input rate is required to maintain base load operation of the IC engine generators. Therefore, the volumetric fuel use rate is dependent on the fuel quality (BTU value or methane content) of the recovered LFG that is treated and used as fuel. The properties of the treated LFG used to fuel its existing electricity generation operations are monitored on a regular basis by Seminole Energy. Data maintained by Seminole Energy indicate that the methane content in the treated LFG fuel generally ranges from 47 to 50% by volume. The corresponding heat content ranges from 475 British thermal units per standard cubic foot (Btu/scf) to 505 Btu/scf on a higher heating value (HHV) basis, which is equivalent to 425 to 455 Btu/scf on a lower heating value (LHV) basis.

At the maximum IC engine heat input rate specified in the permit application documents (17.1 MMBtu/hr HHV or 15.4 MMBtu/hr LHV) and the:

1. Minimum fuel heating value of 430 Btu/scf LHV recorded by Seminole Energy, the CAT[®] G3520C gas IC engines will each have a maximum fuel use rate of approximately 600 scfm or 36,000 standard cubic feet per hour (scfh).

2. Average LHV for the LFG recovered from the Osceola Waste Management Facility of approximately 445 Btu/scf, the CAT[®] G3520C gas IC engines each have an average fuel use rate, at maximum capacity, that is approximately 580 scfm and 34,800 scfh.

3.4 Electricity Generation Facility Specifications

The LFG-fueled IC engines generator sets are housed in a single building constructed within the leased property area. A gas transmission line (fuel supply pipe) is connected to the header of the existing LFG collection system and a dedicated gas blower/compressor is used to draw LFG from the collection system to the gas treatment system and electricity generation facility.

The IC engines generator sets are designed to fire low-pressure, lean fuel mixtures and produce low combustion by-product emissions. The engines are fueled exclusively with treated LFG generated by the landfill (natural gas is not used to fuel the IC engine operations under any conditions). Engine exhaust gas is released into the ambient air through individual stacks connected to the engine exhaust manifolds. A muffler (for noise control) is installed on each engine exhaust stack. No add-on equipment is used to further reduce specific air pollutants.

3.4.1 Seminole Energy Facility Modification

Seminole Energy is proposing to modify the allowable CO emission rate for the six (6) permitted CAT[®] G3520C IC engines generator sets, which are and will be housed in an existing engine building. Each CAT[®] G3520C IC engine has a power generation rating of 2,233 brake horsepower (bhp).

The CAT[®] G3520C engine is equipped with an air-to-fuel ratio controller that monitors engine performance parameters and automatically adjusts the air-to-fuel ratio and ignition timing to maintain efficient fuel combustion, which minimizes air pollutant emission rates. Each engine is connected to a 1,600 kilowatt (kW) electricity generator, resulting in a total electricity generation rate of 9.6 megawatt (MW) for the six (6) permitted engine generators. The modifications requested will not change the total electricity generation rate of the plant.

3.4.2 Exhaust Gas Specifications

At actual operating conditions, the CAT[®] G3520C engine exhausts combustion effluent gas at a rate of 13,700 actual cubic feet per minute (acfm) at 900°F through an 18-inch diameter stack. These exhaust gas conditions were used in the modeling demonstration for the IC engines generators.

Table 3.1 and 3.2 present general design specifications and exhaust stack parameters for the Seminole Energy CAT[®] G3520C LFG-fueled IC engine generator sets.

Table 3.1 General design specifications and exhaust stack information for the Seminole Energy CAT® G3520C LFG-fueled electricity generation IC engines

Engine Model	No. Units	Engine Rating (bhp)	Generator Output (MW)	Stack Diameter (inch)	Release Height (ft)	Exhaust Temp. (°F)	Exhaust Flowrate (acfm)
CAT® G3520C	6	2,233	1.60	18.0	20	900	13,700
Total Electricity Generation			9.60				

Table 3.2 Exhaust stack parameters used in the computer model for the six (6) Seminole Energy CAT® G3520C LFG-fueled electricity generation engines

Source ID	Location (UTM)		Base Elev. (m)	Stack Height		Stack Diameter		Temp. (°F)	Exit Velocity (m/s)
	East (m)	North (m)		(m)	(ft)	(m)	(ft)		
EU002	491,240	3,184,521	7.59	6.09	20.0	0.457	1.5	900	39.8
EU003	491,235	3,184,521	7.59	6.09	20.0	0.457	1.5	900	39.8
EU004	491,230	3,184,521	7.59	6.09	20.0	0.457	1.5	900	39.8
EU005	491,225	3,184,521	7.59	6.09	20.0	0.457	1.5	900	39.8
EU006	491,220	3,184,521	7.59	6.09	20.0	0.457	1.5	900	39.8
EU007	491,215	3,184,521	7.59	6.09	20.0	0.457	1.5	900	39.8

4.0 CRITERIA POLLUTANT EMISSION RATES

4.1 Electricity Generation Facility CO Emission Rates

The quantity of air pollutants that are emitted by the CAT[®] G3520C gas IC engine is dependent on fuel quality, fuel properties, and accumulated engine operating hours. The highest measured CO emission rate during the annual compliance tests is 97% of the permit limit (2.66 g/bhp-hr compared to the 2.75 g/bhp-hr limit). However, the measured exhaust gas CO concentrations and mass emission rates are well below values guaranteed by the manufacturer.

Based on data provided by the engine manufacturer, compliance test measurements, experience obtained by Landfill Energy Systems from the operation of numerous similar LFG fueled IC engines and results of emission control analyses (presented in the air permit application document), the CAT[®] G3520C gas IC engine has the a maximum CO emission rate of 3.5 g/bhp-hr for CO.

The CO emission rate tends to increase with increased operating hours throughout the engine maintenance cycle. The engine manufacturer acknowledged this by specifying a nominal CO emission rate (which is defined in the Gas Engine Technical Data Sheet as “representative of a new engine during the first 100 hours of engine operation”) and a not-to-exceed value. By increasing the permitted CO emission rate from 2.75 to 3.5 g/bhp-hr, the engines will be able to maintain compliance with the allowable CO emission rate over all fuel quality and engine wear / maintenance operating conditions.

A comprehensive best available control technology (BACT) analysis is included in the permit application documents to support the proposed CO emission rate for the IC engines.

Table 4.1 presents the proposed criteria pollutant emission rates that were used in the modeling analysis for the electricity generation facility.

Table 4.1 Proposed CO emission rates used in the air quality modeling analysis for the six (6) Seminole Energy CAT® G3520C LFG-fueled IC engines

Pollutant	LFG-fueled IC engine emission factors	Modeled emission rate per engine ¹		Emission rate for six (6) IC engines	
		(lb/hr)	(g/s)	(lb/hr)	(ton/yr)
Carbon Monoxide (CO)	3.50 g/bhp-hr	17.23	2.171	103.5	453.3

1. Based on continuous operation at base load (100% capacity); engine output of 2,233 hp.

5.0 MODELING REQUIREMENTS

5.1 PSD Applicability

Seminole Energy is proposing changes to the permitted CO emission rates based on experience obtained through the operation of these engines. No new equipment is being proposed for the Seminole Energy facility beyond that which has already been permitted. Specifically, Seminole Energy is requesting to increase the existing permitted CO emission rate of each of the six (6) permitted engines from 2.75 to 3.50 g/bhp-hr CO. The associated emission increase is equivalent to 453 tons per year (TpY) CO (the total proposed emission rate) since this requested modification occurs within the contemporaneous five (5) year period with the initial construction. Therefore, the modification exceeds the Prevention of Significant Deterioration of Air Quality (PSD) major source threshold of 250 TpY (or 100 TpY for a major modification) relative to 40 CFR §52.21(b) for CO.

Pursuant to 40 CFR §52.21(m), Air Quality Analysis, an application for a permit under the PSD program *shall contain an analysis of ambient air quality in the area that the major stationary source or major modification would affect for each of the following pollutants:*

- (a) *For the source, each pollutant that it would have the potential to emit in a significant amount;*
- (b) *For the modification, each pollutant for which it would result in a significant net emissions increase*

Additionally, the modeling analysis must demonstrate that emissions will not cause or significantly contribute to a violation of National Ambient Air Quality Standards (NAAQS) or State ambient air quality standard (AAQS) for all pollutants that exceed the significant emission increase value.

Based on the provisions specified in 40 CFR §52.21(m), CO emissions for the permitted Seminole Energy facility are subject to PSD air quality analysis requirements. No other modifications to the existing permitted facility are proposed.

A PSD SIL analysis was performed using the procedures described in this protocol to calculate maximum ambient air impacts for the six (6) CAT® Model G3520C IC engines operating at the proposed CO emission rate for comparison to the applicable PSD significant impact concentration (a demonstration that indicates the maximum predicted ambient air pollutant impacts are less than the applicable PSD SIL is equivalent to a demonstration of compliance with federal and State ambient air standards).

5.2 Influencing Structure and GEP Stack Height Analysis

The existing and permitted IC engine generators are and 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 are located on the roof of the building. The stacks extend above the roof at least 5 feet (i.e., overall IC engine exhaust release height of 20 ft. as measured from grade of the land that surrounds the building) and exhaust vertically. The existing 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 release height that is less than its Good Engineering Practice (GEP). According to the USEPA's Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for Stack Height Regulations) GEP means the greater of:

- a. 65 meters, measured from ground level elevation at the base of the stack;
- b. The height calculated by the following equation:

$$H_{GEP} = H_b + 1.5L$$

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

- c. The height demonstrated by a fluid model or field study approved by the EPA... Seminole Energy does not plan to perform a fluid model in order to increase the stack height to mitigate excessive concentrations as provided by this option.

The roof height of the facility is less than the projected building width. Therefore, the calculated GEP stack height using the equation below for this structure is 37.5 feet (11.43 meters).

$$H_{GEP} = 15.0 \text{ ft.} + 1.5 (15.0 \text{ ft.}) = 37.5 \text{ ft.}$$

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 permitted electricity generation facilities control the GEP stack height determination). The release height of the identical engine exhaust stacks is less than the GEP stack height (65 meters and/or based on the dimensions of the structure in which the engines will be installed); therefore, emissions from the permitted IC engine generator exhaust stacks have the potential to be influenced by aerodynamic downwash created by the buildings that house the equipment. The influence of stack downwash on emission impacts was included in the dispersion modeling analyses.

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. No other nearby structures are located within the 5L radius.

The UTM coordinate locations and heights of the influencing structures (i.e., the building that houses the IC engines generators) and exhaust stacks were entered into 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 I-1 provides a compact disc that contains the AERMOD input and output files that were used in the significant impact analysis.

6.0 CLASS II AREA SIGNIFICANT IMPACT ANALYSIS

6.1 Computer Modeling

6.1.1 Model Selection

The AERMOD (American Meteorological Society/Environmental Protection Agency Regulatory Model) air pollutant dispersion model (Version No. 11103) was used to calculate ground-level pollutant concentrations resulting from the proposed and existing LFGTE CO 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 determine cumulative pollutant concentrations at both simple and complex terrain receptors resulting from the operation of multiple sources.

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 / Oris Solutions (BEEST for Windows, current version 9.90a). BEEST for Windows uses the unmodified regulatory AERMOD program.

6.1.2 Model Options

The AERMOD dispersion model was executed with regulatory default options. Stack-tip downwash was considered due to the height of the exhaust stacks relative to the influencing structures. In regulatory default mode, no calculations are performed for deposition or plume depletion.

Based on information presented in Section 2.2 of this protocol, the land use for the area surrounding the Seminole Energy facility is predominantly classified as rural. Therefore, no options for urban dispersion were used to calculate air quality impact concentrations produced by the modeled emission sources.

6.1.3 Meteorological Data

Upper air and surface meteorological data for calendar years 1999 through 2003 were obtained from the Florida DEP for the meteorological station in the Orlando area. The data for the selected period

are complete and quality-assured. Data from 2004 and 2005 would have provided more current data, but hurricanes during those years did not allow for a complete data set for 2004 and 2005. This station was selected based on its proximity to the project site and a completeness check of the recorded data. While this meteorological station is located in a metropolitan area, it is determined to be the most representative of the meteorological conditions for the area surrounding the Seminole Energy facility due to proximity to the project site.

The data were preprocessed using the AERMET meteorological preprocessor program to produce two types of data files for each meteorological year which are used by AERMOD; surface scalar parameters (*filename.sss*) and vertical profiles (*filename.pfc*).

The AERSURFACE program was used to process existing land cover data to determine surface characteristics (surface albedo, Bowen Ratio and surface roughness) within 1 km of the data collection site. These files were processed by Florida DEP for use by the regulated community.

The AERMET data files used for this project are provided on the compact disc in Appendix I-1.

The same meteorological data files (hourly surface measurements and upper-air soundings) used in the initial AERMOD modeling analyses for the Seminole Energy facility were used in this analysis.

6.1.4 Fenceline and 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). The fenceline that surrounds the Osceola Waste Management Facility (which includes the permitted Seminole Energy facility) was used as the ambient air boundary. The same receptor network (locations at which air pollutant impact concentrations were calculated) that was used in the initial AERMOD modeling analyses for the Seminole Energy facility was used in this analysis and was developed as described in the following text.

The receptor network used for the PSD-SIL analysis 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 3 km from the facility (i.e., receptors placed at the Landfill boundary and extended 3 km in all directions from the property boundary fenceline). Receptors were placed on the Landfill fenceline with a spacing of 100 meters to determine impacts at the property boundary.

No flagpole receptors were identified in the area surrounding the facility. Therefore, no flagpole receptors were included in the modeling analysis.

Figure 6.1 presents a depiction of the receptor network with UTM coordinates that was used to perform the SIA modeling analysis.

6.1.5 Terrain Data

USGS 30-meter (7.5 minute) ASCII Digital Elevation Models (DEM) files were created from the SDTS data using the sdts2dem data extraction computer program. The DEM data were based on the North American Datum of 1973 (NAD73). USEPA's AERMAP computer program (Version No. 11103) 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 and developed by the model are provided on the compact disc in Appendix I-1.

6.1.6 Pollutant Impact Averaging Times

For the PSD SIL modeling analysis, maximum (highest high) ambient air pollutant impact concentrations for each averaging period produced by the permitted emission sources for CO were determined for the specified five-year meteorological period. These results were compared to the significant impact levels. The highest calculated CO impact for each averaging period for the five-year meteorological data set was used for the PSD SIL determination.

6.2 PSD Significant Impact Level Modeling Results

PSD SIL modeling results, based on the data and procedures described in this section, are presented in this protocol for regulatory agency review.

These results indicate that emissions from the operation of the six (6) LFG-fueled IC engines generators at the proposed CO emission rate result in maximum predicted impact concentrations that do not exceed the PSD SIL for CO (1-hr and 8-hr) averaging periods.

Table 6.1 presents a summary of maximum predicted impacts produced by the operation of the six (6) LFG-fueled IC engines generators at the requested allowable CO emission rate.

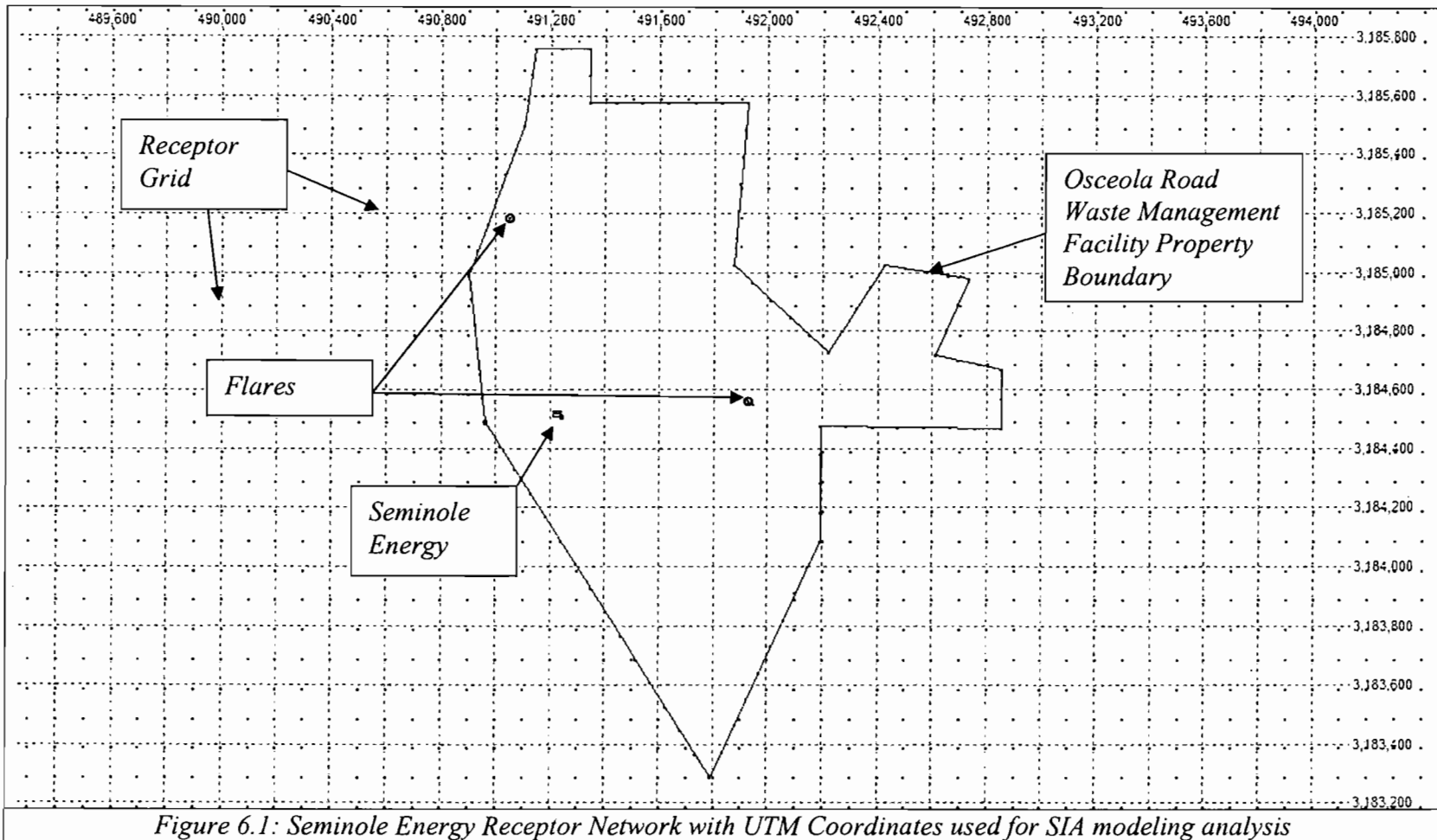
Appendix I-1 provides the AERMOD output summary files.

Table 6.1 CO impact results for the Seminole Energy facility compared to PSD Significant Impact Levels

Pollutant	Avg. Time	Proposed Seminole Energy Impact ¹ ($\mu\text{g}/\text{m}^3$)	PSD Significant Impact Level ($\mu\text{g}/\text{m}^3$)	Radius of Significant Impact (km)
CO	8-hr	419	500	NA
	1-hr	611	2000	NA

Notes

1. The maximum impact over the 5-year meteorological data set was used to establish the significant impact.



7.0 SPECIAL MODELING CONSIDERATIONS

7.1 Particle Deposition

Based on the design and operation of the permitted IC engines and the treatment (dewatering, compression and filtration) of LFG received from the landfill prior to its use as a fuel, the amount of particulates emitted from the combustion process are expected to be relatively small. Increasing the CO emission rate will not have any impact on the compliance with the particulate matter ambient air quality standards that was previously demonstrated.

7.2 Fugitive Emissions

The existing electricity generation equipment will continue to utilize LFG that is supplied by the Osceola Waste Management Facility landfill gas collection and control system. The electricity generation facility will not be a source of any appreciable fugitive emissions.

7.3 Impacts on Vegetation, Soils and Wildlife (including Endangered Species)

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.

The effects that air pollutants have on soils and 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 Seminole Energy facility is located within the boundaries of an existing active landfill. The proposed CO emission rate increase will not disturb vegetation, soils or wildlife habitats that are not already being affected by the existing electricity generation or landfill facilities and no land clearing of forested or heavily vegetated area will be required.

Predicted impacts caused by proposed Seminole Energy CO emission rate increase are well below the secondary NAAQS levels, which are meant to take into account the protection of ecosystems, which includes vegetation and soil.

Based on the information presented above, the proposed Seminole Energy CO emission rate increase is expected to have minimal impact on the surrounding soils and vegetation in the area. Increasing the CO emission rate will not physically disturb areas exterior to the landfill property and off-site ambient air impacts have been compared to levels that have been established for the protection of these systems.

7.4 Growth Impacts

The potential increase of CO emissions from the six (6) LFG fueled CAT[®] G3520C IC engine - generator sets at Seminole Energy will have no effect on commercial growth in the Geneva, Florida area at levels greater than normal rates, which are dependent on general economical conditions.

The facility interconnects with the local utility through an existing nearby power distribution line and power generated by the facility is used to satisfy electricity demands within the general area.

No air pollutant emissions from residential and commercial construction and growth, and other activities will occur as a result of the potential increase of CO emissions from the six (6) LFG fueled CAT[®] G3520C IC engine - generator sets.


7.5 Alternative Sites Analysis

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

Flaring is being utilized to control any unused LFG from the IC engines due to maintenance, downtime, or increase in generation of LFG from the Osceola Waste Management Facility. This flaring of the LFG wastes the energy value of the LFG.

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

The existing facility will continue to produce up to 6.4 MW (permitted to produce 9.6 MW) of electricity and interconnects to the 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 electricity generation facility, decreases in these emissions may occur at an offsite power plant.



Modeling Input/Output Files
Seminole Energy, LLC

Derenzo and Associates, Inc.
October 14, 2011

APPENDIX I-1

COMPACT DISC WITH MODELING FILES

APPENDIX J

MSW LANDFILL NSPS USEPA OSCEOLA ROAD WASTE MANAGEMENT
FACILITY LFG TREATMENT DETERMINATION



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

4APT-ATMB

OCT 19 2006

Joseph Kahn, Acting Director
Division of Air Resource Management
FL Department of Environmental Protection
Mail Station 5500
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Dear Mr. Kahn:

The purpose for this letter is to provide you with a determination regarding emission limit applicability and monitoring requirements for landfill gas that will be combusted in internal combustion engines to produce electricity at the following landfills located in Florida:

Trail Ridge Landfill (Baldwin, Florida)

Brevard County Landfill (Cocoa, Florida)

Seminole County Landfill (Geneva, Florida)

These landfills are subject to 40 CFR Part 60, Subpart WWW (Standards of Performance for Municipal Solid Waste Landfills), and a consultant (Derenzo and Associates, Inc.) representing the owners of all three sites submitted applicability determination requests to the U.S. Environmental Protection Agency (EPA) Region 4 and to your agency. The primary question posed in these requests is whether the landfill gas processing operations at these sites constitute "treatment" as this term is defined under Subpart WWW. Based upon our review of the information provided with the applicability determination request, we concluded that the gas processing conducted at the three landfills in question does constitute treatment under Subpart WWW. Therefore, the gas leaving the treatment systems at these landfills is no longer subject to the control and monitoring requirements in Subpart WWW. Details regarding the gas processing systems at these sites and the basis for our determination are provided in the remainder of this letter.

Derenzo and Associates requested a determination regarding whether the gas processing at the three landfills in Florida constitutes treatment because gas that has been treated is no longer subject to the control requirements in Subpart WWW. Under provisions in 40 CFR §60.752(b)(2)(iii), gas collected from landfills subject to Subpart WWW must be routed to either a flare, a control system that reduces nonmethane organic compound (NMOC) emissions by 98 weight-percent, an enclosed combustor, or a

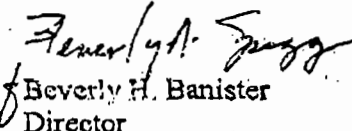
2

treatment system that processes the gas for subsequent sale or use. If an enclosed combustor is used, NMOC emissions must be reduced by either 98 weight-percent or to a concentration of less than 20 parts per million as hexane, corrected to three percent oxygen. Although landfill gas is no longer subject to the control requirements in Subpart WWW after it has been processed for subsequent sale or use, emissions from any atmospheric vents in the treatment system must be sent to a control system (flare, enclosed combustor, etc.) that complies with the removal efficiency standards in the rule.

According to the process description that Derenzo and Associates provided with its applicability determination requests, gas collected at the three landfills in question is filtered to remove particles larger than one micron, dewatered, and compressed. According to several previous U.S. Environmental Protection Agency (EPA) determinations, a landfill gas processing operation that includes filtration to ten microns or less, dewatering, and compression constitutes treatment in accordance with provisions in 40 CFR §60.752(b)(2)(iii)(C). Since the gas processing operations at the three landfills in question include all of the steps cited in EPA's previous determinations, they constitute treatment systems for Subpart WWW purposes, and the treated gas leaving these systems will no longer be subject to control or monitoring requirements under the rule.

If you have any questions about the determination provided in this letter, please contact Mr. David McNeal of the EPA Region 4 staff at (404) 562-9102.

Sincerely,


Beverly H. Banister
Director
Air, Pesticides and Toxics
Management Division

cc: Syed Arif
Division of Air Resource Management
FL Department of Environmental Protection
Mail Station 5500
2600 Blair Stone Road
Tallahassee, FL 32399-2400

APPENDIX K

CATALYST VENDOR INFORMATION

General Warranty

CleanAIR Systems warrants the emissions control system to be free from defects in design, materials and workmanship for a period of 12 months or 8000 hours of operation, whichever comes first from the date of commissioning provided there has been no abuse, neglect, or improper maintenance of the emission control system, engine, vehicle or equipment, as specified in all owner's and operation manuals. Some examples of misuse, abuse, neglect and improper maintenance are: continuing to run the engine when alarms are indicated, improper installation or maintenance of emissions control system, operating in an application different from the intended application, not maintaining the engine or allowing the engine to operate in an improper state of combustion. Tampering, disabling, or unauthorized modification of the emissions control system or the CleanAIR Systems control or monitoring system will void the warranty coverage.

The sole remedy for breach of the foregoing warranty shall be repair, replacement of any defective product, as determined by CleanAIR Systems, based on its sole evaluation and in its sole discretion. In no event shall CleanAIR Systems be liable for special, indirect or consequential damages including but not limited to lost profits, non-compliance penalties, down time related costs or damages to the premises. In no event shall the aggregate liabilities of CleanAIR Systems arising out of or relating to the transactions herein exceed the price for the goods or services in respect of which such claim is made.

Repairs or modifications made to the emissions control system without the written consent of CleanAIR Systems will not be the responsibility of CleanAIR Systems and may void the warranty.

THESE WARRANTIES ARE EXCLUSIVE AND ARE IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY LAW OR CUSTOM, INCLUDING BUT NOT BY WAY OF LIMITATION, THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Performance Warranty

CleanAIR Systems warrants the emissions control system to perform as stated in the attached quotation for a period of 30 days or 720 hours of operation, whichever comes first from the date of commissioning provided there has been no abuse, neglect, miss fueling, or improper maintenance of the emission control system, engine, vehicle or equipment, as specified in all owner's and operation manuals. Some examples of misuse, abuse, neglect and improper maintenance are: continuing to run the engine when the alarms are indicated, improper installation of emissions control system, operating in an application different from the intended application, not maintaining the engine or allowing the engine to operate in an improper state of combustion. Tampering, disabling, or unauthorized modification of the CleanAIR Systems' control or monitoring system will void the warranty coverage.

Catalyst poisoning due to siloxanes, phosphorus, lead, barium, zinc or other contaminants will void the warranty coverage.

For systems using diesel particulate filters, plugged filters are not cover as a warranty item.

Using fuels with sulfur content higher than 50 ppm by weight or other contaminants such as siloxanes, zinc and lead will void the warranty coverage.

The sole remedy for breach of the foregoing warranty shall be repair, replacement of any defective product, as determined by CleanAIR Systems, based on its sole evaluation and in its sole discretion. In no event shall CleanAIR Systems be liable for special, indirect or consequential damages including but not limited to lost profits, non-compliance penalties, down time related costs or damages to the premises. In no event shall the aggregate liabilities of CleanAIR Systems arising out of or relating to the transactions herein exceed the price for the goods or services in respect of which such claim is made.

Repairs or modifications made to the emissions control system without the written consent of CleanAIR Systems will not be the responsibility of CleanAIR Systems and may void the warranty.

THESE WARRANTIES ARE EXCLUSIVE AND ARE IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY LAW OR CUSTOM, INCLUDING BUT NOT BY WAY OF LIMITATION, THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Limits of poisonous substances for SCR catalysts



Element	Sym- bol	Max concentration in fuel			Effect	
		Liquid bio-fuels ⁰⁵	Liquid fossil fuels [mg/kg] (elementary)	Gaseous fuels	SCR	Oxi/ Filter
Aluminium	Al	0.5	0.5	0.5	02	02
Antimony	Sb	0.5	0.5	0.5	02	02
Arsenic	As	1	0.2	0.2	04	02
Lead	Pb	0.5	0.5	0.5	03	04
Boron	B	0.5	0.5	0.5	02	02
Bromine	Br	1	1	1	02	02
Cadmium	Cd	1	0.5	0.5	02	04
Calcium	Ca	12	5	5	02	02
Chlorine	Cl	1	5	5	03	02
Chromium	Cr	0.5	0.5	0.5	02	02
Iron	Fe	15	0.5	0.5	03	02
Fluorine	F	1	0.5	0.5	03	02
Iodine	I	1	1	1	03	02
Potassium	K	5	1	1	04	02
Cobalt	Co	0.5	0.5	0.5	02	02
Copper	Cu	0.5	0.5	0.5	02	02
Lithium	Li	0.5	0.5	0.5	02	02
Magnesium	Mg	12	5	5	02	02
Manganese	Mn	0.5	0.5	0.5	02	02
Molybdenum	Mo	0.5	0.5	0.5	02	02
Sodium	Na	8	5	5	03	02
Nickel	Ni	0.5	0.5	0.5	03	02
Phosphorous	P	16	5	5	04	02
Mercury	Hg	0.5	0.5	0.5	04	04
Sulfur	S	20	15'000 ⁰⁶	20	01	03
Selenium	Se	0.5	0.5	0.5	02	02
Silicon organic	Si	0.5	0.5	0.5	03	03
Silicon inor- ganic	Si	15	15	15	02	02
Tin	Sn	0.5	0.5	0.5	02	03
Vanadium	V	1	15'000 ⁰⁷	1	01	04
Zinc	Zn	0.5	0.5	0.5	03	03

- 01 Positive effect
- 02 Lightly harmful
- 03 harmful
- 04 strongly harmful
- 05 ► Limitations
- 06 → Limitations
- 07 → Limitations

The limits of catalyst poisons in the exhaust gas can be calculated as follows ($\lambda \cong 2$):

$$\frac{\text{Limit in fuel [mg/kg]}}{30} = \text{Limit in exhaust gas [mg/kg]}$$

In the exhaust gas there are also the poisons that originate in the lube oil. According to our experience the common, approved lube oils do not harm our catalyst. Exceptions see "Guidelines to catalyst lifetime"

The reactant that is used for the SCR reaction has to be free of catalyst poisons, see also C.00214 "Reactant specifications"

Limitations:

05 Phosphorous

Fuel	Phosphorous- content	Limitations
Bio fuel	P ≤ 16 mg/kg	<ul style="list-style-type: none"> SCR volume needs to be adapted (→ layout rules for SCR catalyst)

06 Sulphur

Fuel	Sulphur con- tent	Limitations
Light fuel oil (Diesel)	S ≤ 0,1%	<ul style="list-style-type: none"> No Limitations
Marine fuel oil MDO	S > 0,1%	<ul style="list-style-type: none"> No precious metal oxidation catalyst (Pt, Pd)
Heavy fuel oil HFO	S ≥ 0,5%	<ul style="list-style-type: none"> No Oxidation catalysts Dust blowers for all catalyst layers
Heavy fuel oil HFO	S ≥ 1,5%	<ul style="list-style-type: none"> Special case, requires detailed analysis

07 Vanadium

Fuel	Vanadium content	Limitations
all	V > 1 mg/kg	<ul style="list-style-type: none"> No Oxidation catalysts

APPENDIX L

**BAAQMD, FLORIDA DEP AND USEPA RBLC
BACT DETERMINATION INFORMATION**

White Paper

Revisiting BACT
for
Lean Burn
Landfill Gas Fired
Internal Combustion Engines

Randy E. Frazier, P.E.
Senior Air Quality Engineer

Carol S. Allen, P.E.
Senior Air Quality Engineer

Toxics Evaluation Section
Engineering Division
Bay Area Air Quality Management District

February 26, 2009

APPENDIX A

BAY AREA AIR QUALITY MANAGEMENT DISTRICT Best Available Control Technology (BACT) Guideline
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Source Category

Source:	IC Engine – Landfill Gas Fired	Revision:	4
		Document #:	96.2.2
Class:	> 250 Hp Output	Date:	2009

Pollutant	BACT 1. Technologically Feasible/ Cost Effective 2. Archived in Practice	TYPICAL TECHNOLOGY
POC	1. n/s 2. 120 ppm @ 3% O ₂ ^b	1. Lean Burn Technology + LFG Trtmt: filtration + refrigeration + carbon adsorption ^h 2. Lean Burn Technology ^a
NO_x [Low-NO _x Engine Bias]	1. n/s 2. 0.5 g/bhp-hr ^{c, g}	1. n/d 2. Lean Burn Technology ^c
CO [Low-NO _x Engine Bias]	1. n/s 2. a) Initial Standard: 2.5 g/bhp-hr ^{b, h} b) Not to Exceed Standard: 3.9 g/bhp-hr ^{c, h} c) CO emissions based overhaul schedule ^{c, e, f}	1. Lean Burn Technology + LFG Trtmt: filtration + refrigeration + carbon adsorption ^h 2. Lean Burn Technology ^{c, h}
NO_x [Low-CO Engine Bias]	1. n/s 2. 0.6 g/bhp-hr ^{d, g, h}	1. n/d 2. Lean Burn Technology ^{d, h}
CO [Low-CO Engine Bias]	1. n/s 2. a) Initial Standard: 2.1 g/bhp-hr ^{c, d, g} b) Not to Exceed Standard: 3.6 g/bhp-hr ^{c, h} c) CO emissions based overhaul schedule ^{c, e, f}	1. Lean Burn Technology + LFG Trtmt: filtration + refrigeration + carbon adsorption ^h 2. Lean Burn Technology ^{c, d, h}
SO₂	1. n/s 2. n/s	1. LFG Treatment with >80% H ₂ S Removal ^a 2. n/d
PM₁₀	1. n/d 2. n/s	1. n/d 2. LFG Filtration ^a

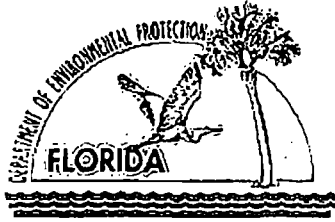
Low-NO_x Engine Bias

Low-CO Engine Bias

NPOC	1. n/a	1. n/a
	2. n/a	2. n/a

References and notes for LFG IC Engine BACT Determination

- a. BAAQMD Published Waste Gas IC Engine BACT Determination, 6-2-1995, Revision 3.
- b. BAAQMD Regulation 8-34-301.4. 120 ppm as methane at 3% O₂ (equivalent to 360 ppm @ 15% O₂. Equivalent to 98% NMOC destruction. Compliance with CO NTE limit may be used as a surrogate for NMOC destruction for the purpose of showing compliance on a monthly basis.
- c. LFGTE Coalition LFG BACT Proposal, 7-3-2007
- d. AN 12649 (Ameresco-Half Moon Bay), AN 14265 (Ameresco-Keller Canyon).
- e. 3.9 g/bhp-hr equivalent CO Limit = 420 ppm CO at 15% O₂. 3.6 g/bhp-hr equivalent CO Limit = 385 ppm CO @ 15% O₂. Ongoing compliance demonstrated by monthly monitoring with handheld analyzer for NO_x and CO. Exceeding 420 ppm CO (or 385 ppm CO, if appropriate) triggers either 1) compliance source test to determine g/bhp-hr NO_x and CO emissions or 2) operator must shutdown engine within 30 days for maintenance. If 80% of NTE limit is exceeded, engine must be shutdown for maintenance within 12 months of date of the CO excursion. NOTE: The ppm CO to g/bhp-hr CO conversions are based on LFG methane content of 50% and engine mechanical efficiency of 30% (gross heat input to shaft horsepower). The owner or operator may request a revised ppm equivalent level based on site specific engine and landfill gas characteristics.
- f. Engine maintenance may be deferred until 26,000 hours or 36 calendar months of operation, whichever comes first, if all standards are met (with CO ≤ 80% of NTE).
- g. Source test required within 60 days of engine startup after top-end or major maintenance event.
- h. White Paper, Revisiting BACT for Lean Burn Landfill Gas Fired Internal Combustion Engines, BAAQMD, 2-26-2009.



**TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION**

APPLICANT

Brevard Energy, LLC
29261 Wall Street
Wixom, Michigan 48393

Brevard County Solid Waste Management Central Disposal
Facility ID No. 0090069

PROJECT

Project No. 0090069-009AC / PSD-FL-378C
Draft Air Construction Permit Modification
Revision for CO/PM₁₀ Limits on the Landfill Gas Engines

COUNTY

Brevard County, Florida

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resource Management
Bureau of Air Regulation
Permitting and Compliance Section
2600 Blair Stone Road, MS#5505
Tallahassee, Florida 32399-2400

June 20, 2011

1. GENERAL PROJECT INFORMATION

Air Pollution Regulations

Projects at stationary sources with the potential to emit air pollution are subject to the applicable environmental laws specified in Section 403 of the Florida Statutes (F.S.). The statutes authorize the Department of Environmental Protection (Department) to establish regulations regarding air quality as part of the Florida Administrative Code (F.A.C.), which includes the following applicable chapters: 62-4 (Permits); 62-204 (Air Pollution Control – General Provisions); 62-210 (Stationary Sources – General Requirements); 62-212 (Stationary Sources – Preconstruction Review, including determinations of Best Available Control Technology (BACT)); 62-213 (Operation Permits for Major Sources of Air Pollution); 62-296 (Stationary Sources - Emission Standards); and 62-297 (Stationary Sources – Emissions Monitoring). Specifically, air construction permits are required pursuant to Rules 62-4, 62-210 and 62-212, F.A.C.

In addition, the U. S. Environmental Protection Agency (EPA) establishes air quality regulations in Title 40 of the Code of Federal Regulations (CFR). Part 60 specifies New Source Performance Standards (NSPS) for numerous industrial categories. Part 61 specifies National Emission Standards for Hazardous Air Pollutants (NESHAP) based on specific pollutants. Part 63 specifies NESHAP based on the Maximum Achievable Control Technology (MACT) for numerous industrial categories. The Department adopts these federal regulations on a quarterly basis in Rule 62-204.800, F.A.C.

Glossary of Common Terms

Because of the technical nature of the project, the permit contains numerous acronyms and abbreviations, which are defined in Appendix A of this permit.

Facility Description and Location

The Brevard County Solid Waste Management Central Disposal Facility (Central Disposal Facility) operates a Class I municipal solid waste (MSW) landfill in Cocoa, Brevard County. The Brevard County Solid Waste Management Central Disposal Facility is located at 2250 Adamson Road, Cocoa, Brevard County. The facility's universal transverse mercator (UTM) system coordinates are Zone 17; 516.75 kilometer (km) East; 3140.57 km North.

Landfill gas (LFG) is a product of the microbial decomposition of waste and is extracted by recovery wells that are located in both active and capped cells of the landfill. Brevard Energy operates an electrical generation plant that consists of six Caterpillar Model G3520C internal combustion engines and electrical generators that are fueled exclusively by LFG. Each engine has an energy output of 2,233 brake horsepower at 100% load and generates 1,600 kilowatt of power. The LFG recovered from the landfill well points is filtered, compressed and dewatered. After pretreatment, LFG is transferred through the collection system by the gas blower/compressor to the LFG engines for combustion. When the engines are off line for maintenance or the wells are providing LFG in excess of the capacity of the engines, residual LFG is diverted to the existing flare system for oxidation.

Facility Regulatory Categories

- The facility is not a major source of hazardous air pollutants (HAP).
- The facility does not operate units subject to the acid rain provisions of the Clean Air Act (CAA).
- The facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C.
- The facility is an existing major stationary source in accordance with Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.
- The facility operates units subject to the following applicable New Source Performance Standards (NSPS) in Title 40, Part 60 of the Code of Federal Regulations (40 CFR 60): Subpart A (General Provisions), and Subpart WWW (MSW Landfills).

TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

- The facility operates units subject to the following applicable National Emissions Standards for Hazardous Air Pollutants (NESHAP) in Title 40, Part 63 of the Code of Federal Regulations (40 CFR 63): Subpart A (General Provisions), Subpart AAAA (MSW Landfills) and Subpart ZZZZ (Reciprocating Internal Combustion Engines).

Project Description

The applicant requests a revision of the BACT emissions limits maximum allowable carbon monoxide (CO) and particulate matter with an aerodynamic diameter of less than 10 micrometers (PM₁₀) emissions rate. Based on experience with operating LFG-to-energy systems, the applicant proposes the following revisions:

- CO emission factor from 2.75 grams per brake horsepower hour (g/bhp-hr) CO to 3.3 g/bhp-hr.
- PM₁₀ emission factor from 0.24 g/bhp-hr to 0.29 g/bhp-hr.

Although the request will revise the original BACT determinations, it is not expected to result in an actual increase in emissions. The applicant requested a concurrent revision of the Title V air operation permit along with a revision to the original PSD air construction permit.

Processing Schedule

- November 15, 2010 Application received.
- December 27, 2010 Additional information requested.
- March 28, 2011 Additional information received.

2. PSD APPLICABILITY

The existing facility is an existing major stationary source. Construction of the LFG-to-energy plant was in accordance with original Permit No. PSD-FL-378. The proposed project requires a review of the original BACT determinations as well as an air quality modeling analysis for CO and PM₁₀ emissions.

3. DEPARTMENT REVIEW

Carbon Monoxide

Emissions data from Caterpillar indicates a not to exceed (NTE) CO emissions limit of 4.13 g/bhp-hr. Annual compliance tests conducted at the facility over the past three years report CO emission ranging between 2.23 and 2.40 g/bhp-hr. While these CO compliance test results are significantly less than the manufacturers NTE limit, variability in the LFG fuel methane content and engine maintenance cycles will have a significant impact on projected emissions in the future.

The original CO BACT determination was based on the engine design and good combustion practices (including maintenance). The Department is unaware of any new control equipment that would be cost effective. The LFG contains siloxanes, which are silica compounds that form glass-like deposits on the pistons, cylinders, valves, intake manifold and exhaust manifolds of the engine. These deposits degrade the performance of the engine and extensive maintenance is required to restore the combustion equipment to proper operation. As the engine performance degrades, it is difficult to maintain the engine tuned for low CO and NO_x emissions.

In support of this concept, the Department found a recent white paper report by the Bay Area Air Quality Management District (BAAQMD) titled, "Revisiting BACT for Lean-Burn Landfill Gas Fired Internal Combustion Engines" from February of 2009. The study discovered that the variability in engine combustion efficiency was not being accounted for since, "... CO deterioration during the year is not typically detected nor limited". Existing BACT emissions limits "achieved in practice" were based on once per year compliance tests. Such tests do not account for variability of emissions due to degraded engine performance resulting from siloxane deposits on combustion surfaces. In addition, existing BACT limits were "... established based on early, limited source test data for digester gas fired engines ..." and as such, are not appropriate for LFG combustion engines.

TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

Wastewater digester gas has higher methane content than LFG meaning that it also has a higher amount of energy per unit volume. The BAAQMD concluded that "... Our discussions with waste gas engine operators leads us to believe that engines generally perform at their best after overhaul events and that combustion performance tends to deteriorate as siloxane deposits form throughout the combustion surfaces." The white paper concluded "... it is apparent that:

1. it is normal for CO emissions to increase as the engines are operated, and
2. establishment of not to exceed limits based on a nominal rate of CO increase would seem to be a reasonable approach for these engines, and
3. additional monitoring is needed to ensure that the engines get needed maintenance in a timely fashion.

Engine maintenance events may not have a significant impact on NOx emissions, but for landfill gas engines, regular maintenance is of paramount importance for minimizing CO emissions." The BAAQMD recommends a NTE emissions limit of 3.6 g/bhp-hr for low-CO biased engines.

The Department also agrees that additional flexibility with CO emissions is necessary to concurrently maintain and tune the engines for low NOx emissions. Therefore, the current CO BACT emission standards for each engine/generator set will be revised as follows:

- From 2.75 to 3.5 g/bhp-hr;
- From 13.54 to 17.2 lb/hour; and
- From 59.3 to 75.3 tons/year.

Particulate Matter

On occasion, the Department relies on the firing of clean fuels as BACT for PM₁₀ emissions (e.g., combustion turbines). Since LFG is not considered a "clean fuel", the original project based the PM₁₀ BACT determination on treating the LFG prior to combustion, which required a pretreatment system including: LFG compression (via blowers), liquids removal (via knock-out and chilling) and particle removal (via 1 micron primary and polishing filters). The Department notes that the new NSPS provisions in 40 CFR 60 for compression ignition engines (Subpart IIII) and for spark ignition engines (Subpart JJJJ) do not regulate particulate matter emissions. As specified in the NSPS Standards of Performance, Emission Guidelines and National Emission Standards for Hazardous Air Pollutants for Municipal Solid Waste Landfills:

"Landfills NSPS for filtration and de-watering, the refined proposed definitions contain specific numerical values that would provide long-term protection of the combustion equipment, which would support good combustion. For particulate matter filtration, a filter system would be required to have an absolute rating no greater than 10 microns. For dewatering, the system would be required to reduce the dew point by at least 20 degrees Fahrenheit."

The BAAQMD posted a June 17, 1999 internal memo titled "BACT Guideline for the Vasco Road Sanitary Landfill's Proposed Gas Turbine (Application #19620, Plant #5095)". This memo references another BACT determination by the South Coast Air Quality Management District (SCAQMD), which states:

"BACT for PM₁₀:"

Only the SCAQMD has established BACT guidelines for landfill gas turbines. The SCAQMD BACT guideline specifies that, for landfill gas-fired turbines, fuel gas pretreatment for particulate removal have been "achieved in practice". Therefore, in the absence of any other BACT determinations, fuel gas pretreatment for particulate removal constitutes BACT for landfill gas-fired turbines."

Previous BACT determinations for particulate matter range from 0.039 to 1.52 g/bhp-hr. Florida's most recent draft BACT determination for a similar landfill gas engine (Waste Management, Inc. of Florida, Medley Landfill,

Summary of USEPA RBLC Query for LFG-fueled IC engines

Facility Information Name	Identification	Process		Engine Size			CO			NO _x		
		Code	State	(MMBtu/hr)	(kW)	(hp)	(g/bhp-hr)	(lb/hr)	Basis	(g/bhp-hr)	(lb/hr)	Basis
Permits Listed in USEPA RBLC												
Moretown LFG to Energy Facility	VT-0029	17.140	VT	-	1,600	2,233	2.75	13.5	Case by Case	-	-	-
Pine Tree Landfill	ME-0036	17.140	ME	10.8	-	-	2.75	8.9	BACT-PSD	-	1.94	BACT-PSD
Cintamon Bay / Edgeboro Disposal ¹	NJ-0078	17.140	NJ	-	1,600	2,233	(0.40)	1.95	Case by Case	0.5	2.46	LAER
University of New Hampshire	NH-0014	17.140	NH	-	1,600	-	2.75	(13.5)	BACT-PSD	0.5	(2.46)	LAER
Brevard Energy, L.L.C.	FL-0291	17.140	FL	-	1,600	2,233	3.50	(17.2)	BACT-PSD	0.6	2.95	BACT-PSD
Seminole Energy, L.L.C.	FL-0290	17.140	FL	-	1,600	2,233	2.75	13.54	BACT-PSD	0.6	2.95	BACT-PSD
Monmouth County Reclamation Center	NJ-0069	17.140	FL	9.81	1,000	1,468	2.53	(8.2)	Case by Case	0.53	(1.72)	LAER
Manchester Renewable Power, L.L.C.	NJ-0068	17.140	NJ	16.38	1,600	2,233	2.75	13.54	BACT-PSD	0.5	2.46	LAER
Burlington County Resource Recovery Complex	NJ-0067	17.140	NJ	12.5	1,500	-	2.50	11.95	Case by Case	0.6	2.66	LAER
Trail Ridge Energy, L.L.C.	FL-289	17.140	FL	-	1,600	2,233	3.50	(17.2)	BACT-PSD	0.6	2.95	BACT-PSD
Ridgewood Rhode Island Generation, L.L.C	RI-0022	17.140	RI	-	1,600	2,229	2.75	13.51	BACT-PSD	0.5	2.46	LAER
New England Waste Services of Vermont, Inc.	VT-0019	17.140	VT	-	1,600	2,221	2.75	13.5	Case by Case	0.5	2.45	Case by Case
Bio Energy of Texas, L.L.C.	TX-0495	17.140	TX	-	1,600	2,172	2.80	13.41	BACT-PSD	0.6	2.87	BACT-PSD
Other PSD-BACT Determinations²												
Waste Management, Pine Tree Acres	233-09	-	MI	-	1,600	2,233	3.30	16.3	BACT-PSD	0.6	3.00	BACT-PSD
Sunpter Energy Associates, Pine Tree Acres	103-09	-	MI	-	1,600	2,233	3.30	16.3	BACT-PSD	0.6	3.00	BACT-PSD
Sunpter Energy Associates, Carleton Farms	293-09A	-	MI	-	1,600	2,233	3.30	16.25	BACT-PSD	0.6	2.95	BACT-PSD
Waste Management, Medley Landfill	0250615-012-AC	-	FL	-	1,600	2,233	3.50	17.2	BACT-PSD	0.6	3.00	BACT-PSD

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

Notes

1. CO emission factor in USEPA RBLC database was chosen to avoid PSD regulations and has not been proven to be technically feasible.
2. These permits did not appear in the USEPA RBLC database, identification listed is the air permit number.

APPENDIX M

USEPA POWER PROFILER QUERY REPORT



How Does the Electricity I Use Compare to the National Average?

The table below contains two charts:

- The first chart compares the fuel mix used to generate electricity in your region of the power grid to the national fuel mix.
- The second chart compares the average air emissions rates in your region of the power grid to the national average emissions rates.



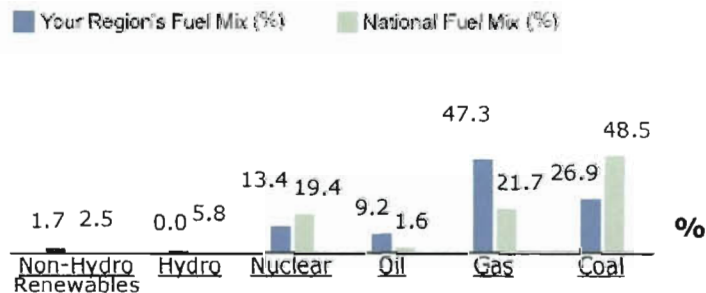
eGRID Subregion: **FRCC All** (which includes the ZIP code: 32773)

FUEL MIX COMPARISON

1

What Is My Fuel Mix?

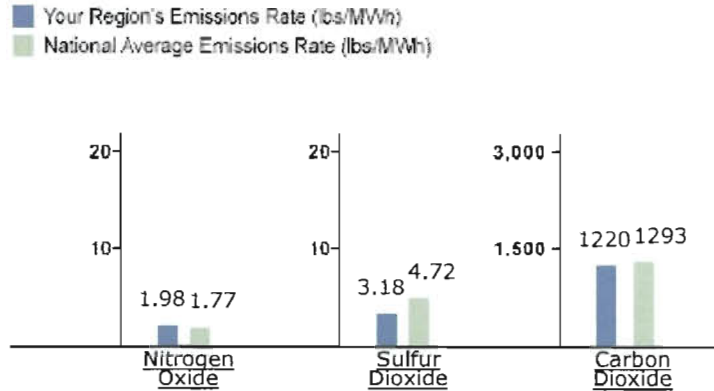
This chart compares fuel mix (%) of sources used to generate electricity in your region to the fuel mix (%) for the entire United States.



EMISSIONS RATE COMPARISON

2 What Are the Emissions in My Area?

This chart compares the average emissions rates (lbs/MWh) in your geographical region to the national average emissions rates (lbs/MWh) for nitrogen oxide, sulfur dioxide, and carbon dioxide.



MAKE A DIFFERENCE

3 What Can I Do to Make a Difference?

Choose one of the buttons on the right to find out what you

My Emissions

Find out about the **actual emissions** attributable to the electricity you use in your home or business.

Be More Energy Efficient

Find out how you can make your home or business more **energy efficient**.