Addenda
to
Prevention of Significant Deterioration (PSD) Air Construction (AC) Permit Application 1270-2

Document No. 1270-3
Facility No. 0930104
Okeechobee Landfill
(Formerly Berman Road Landfill)
Okeechobee, Florida

Prepared for:

Okeechobee Landfill, Inc.
10800 N.E. 128th Avenue
Okeechobee, FL 34972
(863) 357-0111

Prepared by:

Shaw®

Shaw Environmental and Infrastructure, Inc.
88C Elm Street
Hopkinton, MA 01748

Submitted to:

Florida Department of Environmental Protection
Air Resource Management
2600 Blair Stone Road MS 5500
Tallahassee, Florida 32399-2400

October 28, 2008

TABLE OF CONTENTS
PSD/AC Permit Application No. 1270-3
Okeechobee Landfill, Facility No. 0930104

1.0

Section I
Application for Air Permit (Long Form)

Section I

Application for Prevention of Significant Deterioration (PSD) Air Construction (AC) Permit (Long Form)

Revision 01

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Department of
Environmental Protection
Division of Air Resource Management

SUBMITTED APPLICATION REPORT
APPLICATION FOR AIR PERMIT - LONG FORM

--- Form Effective 03/16/08 ---

Application Number: 1270- 3

Application Name: OKEECHOBEE AC & AV MODIFICATION FOR FLARES: PSD

Date Submitted: 30 October 2008

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/renewal Title V air operation permit.

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: OKEECHOBEE LANDFILL, INC.
2. Site Name: OKEECHOBEE LANDFILL
3. Facility Identification Number: 0930104
4. Facility Location...

   Street Address or Other Locator: 3.5 miles north of St. Rd. 70 on NE 128th Avenue

   10800 N.E. 128TH AVENUE

   City: OKEECHOBEE County: OKEECHOBEE Zip Code: 34972

5. Relocatable Facility? ☐ Yes ☑ No
6. Existing Title V Permitted Facility ☑ Yes ☐ No

Application Contact

1.	Application Contact Name: SETH NUNES	Application Contact Job Title: SITE ENGINEER
2.	Application Contact Mailing Address... Organization/Firm: OKEECHOBEE LANDFILL, INC. Street Address: 10800 N.E. 128TH AVENUE City: OKEECHOBEE State: FL Zip Code: 34972	
3.	Application Contact Telephone Numbers... Telephone: (863) 357-0824 ext. Fax: (863) 357-0772	
4.	Application Contact Email Address: SNUNES1@wm.com	

Purpose of Application

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

Air Construction Permit

- [x] 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

Application purpose: To continue construction of EU-001 a MSW landfill, its gas collection and control devices. This is an Application Addendum to Document No. 1270-2, PSD/Air Construction Permit Application.

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type
1	MSW Landfill with an active gas collection & control devices	AC1A
3	3000SCFM ENC FLARE-application redesignates a control device	ACM1
4	3000 SCFM OPEN FLARE-application redesignates a control dev.	ACM1
5	3000SCFM ENC FLARE-application redesignates a control device	ACM1

Note: The fee calculation information associated with this application may be accessed from the Main Menu of ESPAP.

Owner/Authorized Representative Statement

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

1.	Owner/Authorized Representative Name: JOHN VAN GESSEL	Owner/Authorized Representative Job Title: Vice President AND Assistant Secretary
2.	Owner/Authorized Representative Mailing Address... Organization/Firm: WASTE MANAGEMENT, INC. OF FLORIDA Street Address: 2859 WEST PACES FERRY ROAD SUITE 1600 City: ATLANTA State: GA Zip Code: 30339	
3.	Owner/Authorized Representative Telephone Numbers... Telephone: (770) 805-3350 ext. Fax: (770) 805-8485	
4.	Owner/Authorized Representative Email Address: jvangessel@wm.com	
5.	Owner/Authorized Representative Statement: By entering my PIN below, I certify that I 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.	

Professional Engineer Certification

1. Professional Engineer Name: KRISTIN ALZHEIMER Registration Number: 43456	Professional Engineer Job Title: Engineering Manager
2. Professional Engineer Mailing Address... Organization/Firm: SHAW ENVIRONMENTAL INC. Street Address: 3 EXECUTIVE CAMPUS City: CHERRY HILL State: NJ Zip Code: 08003	
3. Professional Engineer Telephone Numbers... Telephone: (856) 482-3103 ext.	Fax: (609) 689-7720
4. Professional Engineer Email Address: Kristin.alzheimer@shawgrp.com	

5. Professional Engineer Statement:

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

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

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

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

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

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

* Explain any exception to the certification statement.
Professional Engineer Exception Statement:

II. FACILITY INFORMATION
A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates... Zone 17 East (km) 530.28 North (km) 3023.96		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) 27° 20` 24" N Longitude (DD/MM/SS) 80° 41` 27" W	
3. Governmental Facility Code: (0) NOT OWNED OR OPERATED BY A FEDERAL, STATE, OR LOCAL GOVERNMENT	4. Facility Status Code: Active	5. Facility Major Group SIC Code: (49) ELECTRIC, GAS AND SANITARY SERVICES	6. Facility SIC(s): Primary: 4953 Secondary: 4911
7. Facility Comment:			

Facility Contact

1.	Facility Contact Name: SETH NUNES	Facility Contact Job Title: Site Engineer
2.	Facility Contact Mailing Address... Organization/Firm: OKEECHOBEE LANDFILL, INC. Street Address: 10800 NE 128TH AVENUE City: OKEECHOBEE State: FL Zip Code: 34972	
3.	Facility Contact Telephone Numbers... Telephone: (863) 357-0824 ext. Fax: (863) 357-0772	
4.	Facility Contact Email Address: snunes1@wm.com	

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

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

List of Pollutants Emitted by Facility

1. Pollutants Emitted	2. Pollutant Classification	Emissions Cap [Y or N]?
SO2	(A) ACTUAL OR POTENTIAL EMISSIONS ARE ABOVE THE APPLICABLE MAJOR SOURCE THRESHOLDS.	N
PM10	(A) ACTUAL OR POTENTIAL EMISSIONS ARE ABOVE THE APPLICABLE MAJOR SOURCE THRESHOLDS.	N
PM	(A) ACTUAL OR POTENTIAL EMISSIONS ARE ABOVE THE APPLICABLE MAJOR SOURCE THRESHOLDS.	N
HAPS	(A) ACTUAL OR POTENTIAL EMISSIONS ARE ABOVE THE APPLICABLE MAJOR SOURCE THRESHOLDS.	N
CO	(A) ACTUAL OR POTENTIAL EMISSIONS ARE ABOVE THE APPLICABLE MAJOR SOURCE THRESHOLDS.	N
NOX	(A) ACTUAL OR POTENTIAL EMISSIONS ARE ABOVE THE APPLICABLE MAJOR SOURCE THRESHOLDS.	N
NMOC	(B) ACTUAL AND POTENTIAL EMISSIONS BELOW ALL APPLICABLE MAJOR SOURCE THRESHOLDS	N
H2S	(C) CLASS IS UNKNOWN	N
VOC	(C) CLASS IS UNKNOWN	N

B. Emissions Caps

Facility-Wide or Multi-Unit Emissions Caps

1. Pollutant Subject to Emissions Cap	2. Facility Wide Cap [Y or N]? (all units)	3. Emissions Unit ID No.s Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap
NOX	No	No EUs included in the cap			OTHER
VOC	No	No EUs included in the cap			OTHER
NMOC	No	No EUs included in the cap			OTHER

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

NOX: State, not federal, threshold for major facility (Title V). Greater than 100 TPY. F.A.C. 62.213-420(3)(c)
VOC: MSW Landfill NSPS - 40 CFR 60, Subpart WWW
NMOC: MSW Landfill NSPS - 40 CFR 60, Subpart WWW

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)
   ☐ Applicable ☑ Previously Submitted, Date: 26-MAR-03 ☐ Attachment
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)
   ☐ Applicable ☑ Previously Submitted, Date: 27-FEB-07 ☑ Attachment
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)
   ☐ Applicable ☑ Previously Submitted, Date: 27-FEB-07 ☐ Attachment

Additional Requirements for Air Construction Permit Applications

1. Area Map Showing Facility Location: (Not applicable for existing permitted facility)
   ☐ Applicable ☐ Attachment
2. Description of Proposed Construction, Modification, or Plantwide Applicability Limit (PAL):
   ☑ Applicable ☑ Attachment
3. Rule Applicability Analysis:
   ☑ Applicable ☑ Attachment
4. List of Exempt Emissions Units:
   ☐ Applicable ☐ Attachment
5. Fugitive Emissions Identification:
   ☐ Applicable ☐ Attachment
6. Air Quality Analysis (Rule 62-212.400(7), F.A.C.):
   ☑ Applicable ☑ Attachment
7. Source Impact Analysis (Rule 62-212.400(5), F.A.C.):
   ☑ Applicable ☑ Attachment
8. Air Quality Impact since 1977 (Rule 62-212.400(4)(e), F.A.C.):
   ☑ Applicable ☑ Attachment
9. Additional Impact Analyses (Rules 62-212.400(8) and 62-212.500(4)(e), F.A.C.):
   ☑ Applicable ☑ Attachment
10. Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.):
    ☐ Applicable ☐ Attachment

Additional Requirements for FESOP Applications

1. List of Exempt Emissions Units:
   ☐ Applicable ☐ Attachment

Additional Requirements for Title V Air Operation Permit Applications

1. List of Insignificant Activities: (Required for initial/renewal applications, but not for revision applications)
   ☐ Applicable ☐ Attachment
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):
   ☐ Applicable ☐ Attachment
3. Compliance Report and Plan: (Required for all initial/revision/renewal applications):
   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.
   ☐ Applicable ☐ Attachment
4. List of Equipment/Activities Regulated under Title VI (If applicable, required for initial/renewal applications only):
   ☐ Applicable ☐ Equipment/Activities On site but Not Required to be Individually Listed ☐ Attachment
5. Verification of Risk Management Plan Submission to EPA (If applicable, required for initial/renewal applications only):
   ☐ Applicable ☐ Attachment
6. Requested Changes to Current Title V Air Operation Permit:
   ☐ Applicable ☐ Attachment

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)):
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment
   Phase II NOX Averaging Plan (DEP Form No. 62-210.900(1)(a)1.):
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment
   New Unit Exemption (DEP Form No. 62-210.900(1)(a)2.):
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment
2. CAIR Part (DEP Form No. 62-210.900(1)(b)):
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment
3. Hg Budget Part (DEP Form No. 62-210.900(1)(c)):
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment

Other Information Regarding this Facility:

1. Other Facility Information:
   ☑ Included ☑ Attachment

Additional Requirements Comment

Attached in four (4) electronic files are Application Document No. 1270-3, the Addenda to the PSD/AC Permit Application 1270-2. [This document includes any applicable attachments.]

Facility Attachments

Supplemental Item	Electronic File Name	Attachment Description	Electronic Document	Date Uploaded
Description of Proposed Construction,Modificatio or Plantwide Applicability Limit (PAL)	Refer to Support Documents under Facility.pdf	Please refer to the Subsections 2.0 and 3.0, Section II of this Addenda Application (1270-3), which revises the Subsection 3.0, Section II of the Permit Application 1270-2.	Yes	10/29/2008
Rule Applicability Analysis	Refer to Support Documents under Facility.pdf	Previously submitted under Application 1270-2.	Yes	10/29/2008
Air Quality Analysis	Refer to Support Documents under Facility.pdf	Please refer to the Addenda to the Air Quality Impact Assessment in Section III of this Addenda Application (1270-3), which revises the February 2008 Air Impact Analysis and Setion III, subsection 4.2 AQIA of the Permit Application 1270-2.	Yes	10/29/2008
Source Impact Analysis	Refer to Support Documents under Facility.pdf	Please refer to the Addenda to the Air Quality Impact Assessment in Section III of this Addenda Application (1270-3), which revises the February 2008 Air Impact Analysis and AQIA of the Permit Application 1270-2.	Yes	10/29/2008
Air Quality Impact since 1977	Refer to Support Documents under Facility.pdf	Please refer to the Addenda to the Air Quality Impact Assessment in Section III of this Addenda Application (1270-3), which revises the February 2008 Air Impact Analysis and Section 5.2 of the Permit Application 1270-2.	Yes	10/29/2008
Additional Impact Analyses	Refer to Support Documents under Facility.pdf	Please refer to the Addenda to the Air Quality Impact Assessment in Section III of this Addenda Application (1270-3), which revises the February 2008 Air Impact Analysis and the May 2008 Class I Air Impact Analysis	Yes	10/29/2008
Process Flow Diagram	Refer to Support	Please refer to Figure 2B	Yes	10/29/2008

(s)	Documents under Facility.pdf	EU-001 Process Flow Diagram in Section II of this Addenda to Permit Application 1270-2. (The facility process flow diagram is the same as EU-001.)		
Other Facility Information	10-29-08 Section I _ II PSD_AC Application 1270-3.pdf	Section I and II Application Document No. 1270-3, the Addenda to the PSD/AC Permit Application 1270-2.	Yes	10/29/2008
	10-29-08 Class I AQA Section III PSD_AC Application 1270-3.pdf	Section III Class I Air Quality Impact Analysis, Application Document No. 1270-3, the Addenda to the PSD/AC Permit Application 1270-2	Yes	10/29/2008
	10-29-08 Section II Appendices PSD_AC Application 1270-3.pdf	Section II Appedices for Application Document No. 1270-3, the Addenda to the PSD/AC Permit Application 1270-2.	Yes	10/29/2008
	10-29-08 AQIA Section III PSD_AC Application 1270-3.pdf	Section III Air Quality Impact Analysis, Application Document No. 1270-3, the Addenda to the PSD/AC Permit Application 1270-2	Yes	10/29/2008

III. EMISSIONS UNIT INFORMATION
A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. (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:
   MSW Landfill with an active gas collection & control devices

3. Emissions Unit Identification Number: 1

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:
A		01-JAN-81	49

8. Federal Program Applicability: (Check all that apply)
   - ☐ Acid Rain Unit
   - ☐ CAIR Unit
   - ☐ Hg Budget Unit

9. Package Unit Manufacturer: NOT RELEVENT - MSW LANDFILL CONSTRUCTION Model Number: NA

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:
    Proposed primary operating scenario includes LFG turbines and flares as the control devices and flares as the alternative control device operating scenario.

Emissions Unit Control Equipment

Code	Equipment	Description
0	NO CONTROL EQUIPMENT	Fugitive emission from the landfill
23	FLARING	Up to 12 LFG open (Utility) flares installed to control NMOC and HAPs as LFG production increases.
13	GAS SCRUBBER, GENERAL	LFG desulfurization system
99	MISCELLANEOUS CONTROL DEVICES	LFG Turbines: 1 Titan Solar Turbine and 15 Centaur 40 Solar Turbines installed to control NMOC and HAPs as LFG production increases.

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1.	Maximum Process or Throughput Rate: 32400 SCFM
2.	Maximum Production Rate:
3.	Maximum Heat Input Rate: million Btu/hr
4.	Maximum Incineration Rate: pounds/hr tons/day
5.	Requested Maximum Operating Schedule: 24 hours/day 7 days/week 52 weeks/year 8760 hours/year
6.	Operating Capacity/Schedule Comment: The EU facility`s operating hours are not consistent with LFG generation which is always occuring.

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: 4 - Proposed Centaur Turbine (Representative stack)	2. Emission Point Type Code: 3 - A configuration of multiple emissions points serving a single emissions unit

3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:
- Control Device 12: Utility Flare (proposed)
- Control Device 20: LFG Turbine (proposed)
- Control Device 21: LFG Turbine (proposed)
- Control Device 25: LFG Turbine (proposed)
- Control Device 28: LFG Turbine (proposed)
- Control Device 30: LFG Turbine (proposed)
- Control Device 2: Existing Enclosed LFG Flare (permit redesignates this EU as a control device)
- Control Device 4: Utility Flare (existing odor control)
- Control Device 6: Utility Flare (proposed)
- Control Device 17: LFG Turbine (proposed)
- Control Device 16: LFG Turbine (proposed)
- Control Device 15: Utility Flare (proposed)
- Control Device 14: Utility Flare (proposed)
- Control Device 13: Utility Flare (proposed)
- Control Device 10: Utility Flare (proposed)
- Control Device 9: Utility Flare (proposed)
- Control Device 8: Utility Flare (proposed)
- Control Device 7: Utility Flare (proposed)
- Control Device 31: LFG Turbine (proposed)
- Control Device 19: LFG Turbine (proposed)
- Control Device 27: LFG Turbine (proposed)
- Control Device 24: LFG Turbine (proposed)
- Control Device 23: LFG Turbine (proposed)
- Control Device 18: LFG Turbine (proposed)
- Control Device 11: Utility Flare (proposed)
- Control Device 5: Utility Flare (proposed)
- Control Device 3: Existing Utility Flare (permit redesignates this EU as a control device)
- Control Device 1: Existing Enclosed LFG Flare (permit redesignates this EU as a control device)
- Control Device 29: LFG Turbine (proposed)
- Control Device 26: LFG Turbine (proposed)
- Control Device 22: LFG Turbine (proposed)

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

5. Discharge Type Code: (V) A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL/NEARLY VERTICAL DIRECTION	6. Stack Height: 35 feet	7. Exit Diameter: 4 feet

8. Exit Temperature: 837° F	9. Actual Volumetric Flow Rate: 82503 acfm	10. Water Vapor: 8 %

11. Maximum Dry Standard Flow Rate: 1379 dscfm	12. Nonstack Emission Point Height: feet
13. Emission Point UTM Coordinates... Zone: 17 East (km): 530.433 North (km): 3023.71	14. Emission Point Latitude/Longitude... Latitude: Longitude:

15. Emission Point Comment: The Centaur 40 Turbine is the representative stack. Stack information for the multiple points is summarized in Appendix G

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 5

1. Segment Description (Process/Fuel Type): Figure 2B: Segment 1 -Landfill Operations		
2. Source Classification Code (SCC): 50100402	3. SCC Units: Acre-Years Landfill Existing	
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:		
Is this a valid segment? No		

Segment Description and Rate: Segment 2 of 5

1. Segment Description (Process/Fuel Type): Figure 2B, segment 2: LFG Generation - Gas collection		
2. Source Classification Code (SCC): 50100406	3. SCC Units: Million Cubic Feet Waste Gas Processed	
4. Maximum Hourly Rate: 1.944	5. Maximum Annual Rate: 17030	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: .6	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: LFG generation is estimated based on waste deposition rate		
Is this a valid segment? Yes		

Segment Description and Rate: Segment 3 of 5

1. Segment Description (Process/Fuel Type): Figure 2B, segment 5: LFG Flaring		
2. Source Classification Code (SCC): 50100410	3. SCC Units: Million Cubic Feet Waste Gas Burned	
4. Maximum Hourly Rate: 1.944	5. Maximum Annual Rate: 17030	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: .04	8. Maximum % Ash:	9. Million Btu per SCC Unit: 972
10. Segment Comment: Sulfur content for the destructive control devices is Post-BACT (LFG desulfurization) with exemption for processing unit maintenance and malfunction.		
Is this a valid segment? No		

Segment Description and Rate: Segment 4 of 5

1. Segment Description (Process/Fuel Type): Figure 2B, segment 4: Waste Gas Recovery: Turbines		
2. Source Classification Code (SCC): 50100420	3. SCC Units: Million Cubic Feet Waste Gas Burned	
4. Maximum Hourly Rate: 1.944	5. Maximum Annual Rate: 17030	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: .04	8. Maximum % Ash:	9. Million Btu per SCC Unit: 972
10. Segment Comment: Sulfur content for the destructive control devices is Post-BACT (LFG desulfurization)		
Is this a valid segment? No		

Segment Description and Rate: Segment 5 of 5

1. Segment Description (Process/Fuel Type): Figure 2B, Segment 3: LFG desulferization		
2. Source Classification Code (SCC): 50100422	3. SCC Units: Million Cubic Feet Waste Gas Processed	
4. Maximum Hourly Rate: 1.944	5. Maximum Annual Rate: 17030	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: .04	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: BACT for estimated H2S in collected LFG.		
Is this a valid segment? Yes		

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	Valid?
CO	NO CONTROL EQUIPMENT		NS	Yes
H2S	GAS SCRUBBER, GENERAL	MISCELLANEOUS CONTROL DEVICES	NS	Yes
HAPS	MISCELLANEOUS CONTROL DEVICES	FLARING	WP	Yes
NMOC	MISCELLANEOUS CONTROL DEVICES	FLARING	EL	Yes
NOX	NO CONTROL EQUIPMENT		NS	Yes
PM10	NO CONTROL EQUIPMENT		NS	Yes
SO2	GAS SCRUBBER, GENERAL		WP	Yes
VOC	FLARING	MISCELLANEOUS CONTROL DEVICES	NS	Yes

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: CO - Carbon Monoxide	2. Total Percent Efficiency of Control:
3. Potential Emissions: 1152 lb/hour 5043 tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 196 LB/HR Reference: AP-42 13.5-1	7. Emissions Method Code: (5) CALCULATED USING EMISSION FACTOR OTHER THAN AP-42/FIRE SYSTEM.
8.a. Baseline Actual Emissions (if required): 131 tons/year	8.b. Baseline 24-month Period: From: 01-FEB-05 To: 01-FEB-07
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: See Appendix B Support Calculations. The emission rate for this pollutant is based on 16 turbines and 2 LFG flares = 32,400 scfm. EF from manufacturer is based on worse case: Titan turbine @50% load	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: This pollutant is a product of the destructive control devices for NMOC and HAPs: turbines and flaring	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: H2S - Hydrogen Sulfide	2. Total Percent Efficiency of Control: 0
3. Potential Emissions: .1 lb/hour .3 tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: .4 PPMVD Reference:	7. Emissions Method Code: (2) CALCULATED BY USE OF MATERIAL BALANCE AND KNOWLEDGE OF THE PROCESS.
8.a. Baseline Actual Emissions (if required): .7 tons/year	8.b. Baseline 24-month Period: From: 01-FEB-05 To: 01-FEB-07
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: See Appendix B Support Calculations. The emission rate for this pollutant is based on 98% control efficieny through 11 LFG flares and 16 turbines or a combination of flares and turbines based on 32,400 scfm.	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

08' Charley
Jan '05

Jan
1/1

When we moved -
Gardenpark
Aug '08
Reserve 1123

2001 Reserve 315
Oct '01
Oct '01
Oct '02
'03
'04

'08

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: HAPS - Total Hazardous Air Pollutants	2. Total Percent Efficiency of Control: 98
3. Potential Emissions: 9 lb/hour 40 tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: PPMVD Reference: 2.4-1	7. Emissions Method Code: (3B) CALCULATED USING EMISSION FACTOR FROM AP-42/FIRE SYSTEM OR EPA EMISSIONS CALCULATION TOOLS.
8.a. Baseline Actual Emissions (if required): 5.7 tons/year	8.b. Baseline 24-month Period: From: 01-FEB-05 To: 01-FEB-07
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: See Appendix B Support Calculations. The emission rate for this pollutant is based on 98% control efficieny through 11 LFG flares and 16 turbines or a combination of flares and turbines based on 32,400 scfm.	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: NMOC - Nonmethane Organic Compounds from MSW Landfill	2. Total Percent Efficiency of Control: 98
3. Potential Emissions: 5.3 lb/hour 23 tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 595 PPMVD Reference: AP-42 TABLE 2.4-2	7. Emissions Method Code: (3B) CALCULATED USING EMISSION FACTOR FROM AP-42/FIRE SYSTEM OR EPA EMISSIONS CALCULATION TOOLS.
8.a. Baseline Actual Emissions (if required): 3.4 tons/year	8.b. Baseline 24-month Period: From: 01-FEB-05 To: 01-FEB-07
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: See Appendix B Support Calculations. The emission rate for this pollutant is based on 98% control efficieny through 11 LFG flares and 16 turbines or a combination of flares and turbines based on 32,400 scfm.	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: NOX - Nitrogen Oxides	2. Total Percent Efficiency of Control:
3. Potential Emissions: 175 lb/hour 766 tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 72 PPMVD @ 15% O2 Reference: MANUFACTURER: SOLAR	7. Emissions Method Code: (5) CALCULATED USING EMISSION FACTOR OTHER THAN AP-42/FIRE SYSTEM.
8.a. Baseline Actual Emissions (if required): 38 tons/year	8.b. Baseline 24-month Period: From: 01-FEB-05 To: 01-FEB-07
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: See Appendix B Support Calculations. The emission rate for this pollutant is based maximum potential to emit for 16 turbines and 2 LFG flares. EF is worse case for Titan Turbine.	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: This pollutant is a product of the destructive control devices for NMOC and HAPs: turbines and flaring.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: PM10 - Particulate Matter - PM10	2. Total Percent Efficiency of Control:
3. Potential Emissions: 18 lb/hour 77 tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: .023 LB/MMBTU Reference: 3.1-2B & 2.4-5	7. Emissions Method Code: (3B) CALCULATED USING EMISSION FACTOR FROM AP-42/FIRE SYSTEM OR EPA EMISSIONS CALCULATION TOOLS.
8.a. Baseline Actual Emissions (if required): 9.7 tons/year	8.b. Baseline 24-month Period: From: 01-FEB-05 To: 01-FEB-07
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: See Appendix B Support Calculations. The emission rate for this pollutant is based maximum potential to emit for 16 turbines and 2 LFG flares.	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: This pollutant is a product of the destructive control devices for NMOC and HAPs: turbines and flaring	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: SO2 - Sulfur Dioxide	2. Total Percent Efficiency of Control: 93
3. Potential Emissions: 131 lb/hour 575 tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 400 PPMVD Reference:	7. Emissions Method Code: (2) CALCULATED BY USE OF MATERIAL BALANCE AND KNOWLEDGE OF THE PROCESS.
8.a. Baseline Actual Emissions (if required): 1209 tons/year	8.b. Baseline 24-month Period: From: 01-FEB-05 To: 01-FEB-07
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: See Appendix B Support Calculations. The emission rate for this pollutant is based on 93% control efficieny through 11 LFG flares and 16 turbines or a combination of flares and turbines based on 32,400 scfm.	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: This pollutant is a product of the destructive control devices for NMOC and HAPs: turbines and flaring. Primary Control Device is a pretreatment gas scrubber: desulfurization system	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

__Allowable Emissions__ Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: (AMBIENT) reduce impact on ambient concentrations (Explain in comment field)	2. Future Effective Date of Allowable Emissions: 2009-12-31
3. Allowable Emissions and Units: 400 PARTS PER MILLION DRY GAS VOLUME	4. Equivalent Allowable Emissions: 132 lb/hour 575 tons/year
5. Method of Compliance: Inlet LFG monitoring	
6. Allowable Emissions Comment (Description of Operating Method):	

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: VOC - Volatile Organic Compounds	2. Total Percent Efficiency of Control:
3. Potential Emissions: 2.1 lb/hour 9 tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 232 PPMVD Reference: 2.4-2 NOTE C	7. Emissions Method Code: (3B) CALCULATED USING EMISSION FACTOR FROM AP-42/FIRE SYSTEM OR EPA EMISSIONS CALCULATION TOOLS.
8.a. Baseline Actual Emissions (if required): 1.4 tons/year	8.b. Baseline 24-month Period: From: 01-FEB-05 To: 01-FEB-07
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: See Appendix B Support Calculations. The emission rate for this pollutant is based on 98% control efficieny through 10 LFG flares, 7 turbines and 2 LFG flares, or a combination of flares and turbines based on 32,400 scfm.	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

G. VISIBLE EMISSIONS INFORMATION

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

Visible Emissions Limitation: Visible Emissions Limitation 1 of 2

1. Visible Emissions Subtype: VE00 - VISIBLE EMISSIONS - 0% NORMAL OPACITY	2. Basis for Allowable Opacity: ☑ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: EPA METHOD 22	
5. Visible Emissions Comment: Applicable to Flare control devices. This method does not have a VE opacity limit. It is based on visible emissions only. The exception is 5 minutes in a 2 hour period.	

Visible Emissions Limitation: Visible Emissions Limitation 2 of 2

1. Visible Emissions Subtype: VE20 - VISIBLE EMISSIONS - 20% NORMAL OPACITY	2. Basis for Allowable Opacity: ☑ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: 20% Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: EPA METHOD 9	
5. Visible Emissions Comment: Applicable to turbine control devices	

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor 1 of 3

1. Parameter Code: FO - Flame Outage	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☑ Other	
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment: Enclosed Flares: flame detector used to verify flame presence.	
Status: Active	

Continuous Monitoring System: Continuous Monitor 2 of 3

1. Parameter Code: FO - Flame Outage	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☑ Other	
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment: Utility Flares: Thermocouple at flare tip is used to detect flame presence NOT temperature.	
Status: Active	

Continuous Monitoring System: Continuous Monitor 3 of 3

1. Parameter Code: OTHER - Explain in comment field	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☑ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment: H2S monitoring device will be installed before and after the LFG desulfurization unit	
Status: Inactive	

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)
   ☑ Applicable ☑ Previously Submitted, Date: 27-FEB-07 ☑ Attachment

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)
   ☐ Applicable ☑ Previously Submitted, Date: 27-FEB-07 ☐ Attachment

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)
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment

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)
   ☑ Applicable ☑ Previously Submitted, Date: 27-FEB-07 ☑ Attachment

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)
   ☑ Applicable ☑ Previously Submitted, Date: 27-FEB-07 ☑ Attachment

6. Compliance Demonstration Reports/Records
   ☐ Applicable ☑ Previously Submitted, Date: 31-MAR-08 ☐ Attachment
   ☑ To Be Submitted, Date (if known): 31-MAR-09
   Previously Submitted Test Date(s)/Pollutants Tested:
   October 2007/NMOC
   To be Submitted Test Date(s)/Pollutants Tested:
   August 2008/CO
   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
   ☐ Applicable ☐ Attachment

Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements ☐ Applicable	☐ Attachment
2. Compliance Assurance Monitoring Plan ☐ Applicable	☐ Attachment
3. Alternative Methods of Operation ☐ Applicable	☐ Attachment
4. Alternative Modes of Operation (Emissions Trading) ☐ Applicable	☐ Attachment

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)) ☐ Applicable ☐ Attachment	
2.	Good Engineering Practice Stack Height Analysis (Rule 62-212.400(4)(d), F.A.C., and Rule 62-212.500(4)(f), F.A.C.) ☐ Applicable ☐ Attachment	
3.	Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) ☑ Applicable ☑ Attachment	

Other Information Regarding this Emissions Unit

1.	Other Emissions Unit Information ☐ Applicable ☐ Attachment Note: Provide any other information related to the emissions unit addressed in this Emissions Unit Information Section that is not elsewhere provided in the application, not otherwise required and that you, the applicant, believe may be helpful.

Additional Requirements Comment

Emission Unit Attachments

Supplemental Item	Electronic File Name	Attachment Description	Electronic Document	Date Uploaded
Description of Stack Sampling Facilities	Refer to Support Documents under Facility.pdf	Please refer to the Subsection 3.5, Section II and Appendix G of this Addenda Application (1270-3), which revises the Subsection 3.5, Section II of the Permit Application 1270-2.	Yes	10/29/2008
	Refer to Support Documents under Facility.pdf	Please refer to the Subsection 3.4, Section III of the Permit Application 1270-2.	Yes	10/29/2008
Process Flow Diagram	Refer to Support Documents under Facility.pdf	Please refer to Figure 2B EU-001 Process Flow Diagram in Section II of this Addenda to Permit Application 1270-2.	Yes	10/29/2008
Procedures for Startup and Shutdown	Refer to Support Documents under Facility.pdf	Please refer to the Subsection 3.2.2(B), Section II of this Addenda Application (1270-3), which revises the Subsection 3.0, Section II of the Permit Application 1270-2.	Yes	10/29/2008
Operation and Maintenance Plan	Refer to Support Documents under Facility.pdf	No Revisions to the Permit Application 1270-2.	Yes	10/29/2008

III. EMISSIONS UNIT INFORMATION
A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. (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:
   3000SCFM ENC FLARE-application redesignates a control device

3. Emissions Unit Identification Number: 3

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:
A		01-JUL-02	49

8. Federal Program Applicability: (Check all that apply)
   - ☐ Acid Rain Unit
   - ☐ CAIR Unit
   - ☐ Hg Budget Unit

9. Package Unit Manufacturer: LFG SPECIALITIES, INC. Model Number: EF1045I14

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:
    Designation as a Emission Unit EU003 to be removed and added as a control device for EU-001 MSW Landfill

Emissions Unit Control Equipment

Code	Equipment	Description
23	FLARING	This application seeks to properly designate this EU as a control device for the MSW landfill (EU-001)

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

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

C. EMISSION POINT (STACK/VENT) INFORMATION

(Optional for unregulated emissions units.)

Emission Point Description and Type

No Emission Point information submitted.

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC): 50100410	3. SCC Units: Million Cubic Feet Waste Gas Burned	
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:		
Is this a valid segment? No		

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	Valid?
CO				No
HAPS				No
NMOC				No
NOX				No
PM				No
PM10				No
SO2			NS	No
VOC				No

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: CO - Carbon Monoxide	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions 1 of 1

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

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: HAPS - Total Hazardous Air Pollutants	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: NMOC - Nonmethane Organic Compounds from MSW Landfill	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions 1 of 2

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 2 of 2

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

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: NOX - Nitrogen Oxides	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

<u>Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions</u>

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

1. Pollutant Emitted: PM - Particulate Matter - Total	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: PM10 - Particulate Matter - PM10	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: SO2 - Sulfur Dioxide	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: VOC - Volatile Organic Compounds	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

G. VISIBLE EMISSIONS INFORMATION

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

No Visible Emissions information submitted.

H. CONTINUOUS MONITOR INFORMATION

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

No Continuous Monitoring information submitted.

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)
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment

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)
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment

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)
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment

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)
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment

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)
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment

6. Compliance Demonstration Reports/Records
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment
   ☐ To Be Submitted, Date (if known):

   Previously Submitted Test Date(s)/Pollutants Tested:

   To be Submitted Test Date(s)/Pollutants Tested:

   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
   ☐ Applicable ☐ Attachment

Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements ☐ Applicable	☐ Attachment
2. Compliance Assurance Monitoring Plan ☐ Applicable	☐ Attachment
3. Alternative Methods of Operation ☐ Applicable	☐ Attachment
4. Alternative Modes of Operation (Emissions Trading) ☐ Applicable	☐ Attachment

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)) ☐ Applicable ☐ Attachment	
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(4)(d), F.A.C., and Rule 62-212.500(4)(f), F.A.C.) ☐ Applicable ☐ Attachment	
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) ☐ Applicable ☐ Attachment	

Other Information Regarding this Emissions Unit

1. Other Emissions Unit Information ☐ Applicable ☐ Attachment Note: Provide any other information related to the emissions unit addressed in this Emissions Unit Information Section that is not elsewhere provided in the application, not otherwise required and that you, the applicant, believe may be helpful.

Additional Requirements Comment

III. EMISSIONS UNIT INFORMATION
A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. (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:
   3000 SCFM OPEN FLARE-application redesignates a control dev.

3. Emissions Unit Identification Number: 4

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:
A		01-DEC-98	49

8. Federal Program Applicability: (Check all that apply)
   - ☐ Acid Rain Unit
   - ☐ CAIR Unit
   - ☐ Hg Budget Unit

9. Package Unit Manufacturer: Model Number:

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

Emissions Unit Control Equipment

Code	Equipment	Description
23	FLARING	This application seeks to properly designate this EU as a control device for the MSW landfill (EU-001)

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

No Capacity information submitted.

C. EMISSION POINT (STACK/VENT) INFORMATION

(Optional for unregulated emissions units.)

Emission Point Description and Type

No Emission Point information submitted.

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC): 50100410	3. SCC Units: Million Cubic Feet Waste Gas Burned	
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:		
Is this a valid segment? No		

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	Valid?
CO				No
HAPS				No
NMOC				No
NOX				No
PM10				No
SO2				No
VOC				No

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: CO - Carbon Monoxide	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: HAPS - Total Hazardous Air Pollutants	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code: (7) SOURCE CLOSED; OPERATION CEASED. EMISSIONS ARE ZERO.
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: NMOC - Nonmethane Organic Compounds from MSW Landfill	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: NOX - Nitrogen Oxides	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: PM10 - Particulate Matter - PM10	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: SO2 - Sulfur Dioxide	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: VOC - Volatile Organic Compounds	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

G. VISIBLE EMISSIONS INFORMATION

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

Visible Emissions Limitation: Visible Emissions Limitation 1 of 1

1. Visible Emissions Subtype: VE00 - VISIBLE EMISSIONS - 0% NORMAL OPACITY	2. Basis for Allowable Opacity: ☑ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment: The standard is based on METHOD 22. NO VE except for 5 MINUTES in any 2 CONSECUTIVE Hour period	

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor 1 of 2

1. Parameter Code: FO - Flame Outage	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: LFG SPECIALITIES Model Number: PCF1228I10	Serial Number:
5. Installation Date: 01-SEP-02	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	
Status: Active	

Continuous Monitoring System: Continuous Monitor 2 of 2

1. Parameter Code: FLOW - Volumetric flow rate	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: LFG SPECIALITIES Model Number: EF1150I14	Serial Number: 1698
5. Installation Date: 01-JAN-01	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	
Status: Active	

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)
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment

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)
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment

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)
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment

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)
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment

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)
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment

6. Compliance Demonstration Reports/Records
   ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment
   ☐ To Be Submitted, Date (if known):

   Previously Submitted Test Date(s)/Pollutants Tested:

   To be Submitted Test Date(s)/Pollutants Tested:

   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
   ☐ Applicable ☐ Attachment

Additional Requirements for Title V Air Operation Permit Applications

1.	Identification of Applicable Requirements ☐ Applicable	☐ Attachment
2.	Compliance Assurance Monitoring Plan ☐ Applicable	☐ Attachment
3.	Alternative Methods of Operation ☐ Applicable	☐ Attachment
4.	Alternative Modes of Operation (Emissions Trading) ☐ Applicable	☐ Attachment

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))	
☐ Applicable	☐ Attachment
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(4)(d), F.A.C., and Rule 62-212.500(4)(f), F.A.C.)	
☐ Applicable	☐ Attachment
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only)	
☐ Applicable	☐ Attachment

Other Information Regarding this Emissions Unit

1. Other Emissions Unit Information	
☐ Applicable	☐ Attachment
Note: Provide any other information related to the emissions unit addressed in this Emissions Unit Information Section that is not elsewhere provided in the application, not otherwise required and that you, the applicant, believe may be helpful.	

Additional Requirements Comment

EU-004 is not part of the proposed project for this Title V operation and construction permit application. The changes/updates herein are administrative only.

III. EMISSIONS UNIT INFORMATION
A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. (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:
   3000SCFM ENC FLARE-application redesignates a control device
3. Emissions Unit Identification Number: 5

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:
A		01-APR-05	49

8. Federal Program Applicability: (Check all that apply)
   - ☐ Acid Rain Unit
   - ☐ CAIR Unit
   - ☐ Hg Budget Unit
9. Package Unit Manufacturer: LFG SPECIALTIES, INC. Model Number: EF1045I12
10. Generator Nameplate Rating: MW
11. Emissions Unit Comment:

Emissions Unit Control Equipment

Code	Equipment	Description
23	FLARING	This application seeks to properly designate this EU as a control device for the MSW landfill (EU-001)

B. EMISSIONS UNIT CAPACITY INFORMATION
(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1.	Maximum Process or Throughput Rate: 3000 SCFM LFG		
2.	Maximum Production Rate:		
3.	Maximum Heat Input Rate: 99 million Btu/hr		
4.	Maximum Incineration Rate:	pounds/hr tons/day	
5.	Requested Maximum Operating Schedule:	24 hours/day 52 weeks/year	7 days/week 8760 hours/year
6.	Operating Capacity/Schedule Comment:		

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:	2. Emission Point Type Code: 1 - A single emission point serving a single emissions unit	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: (V) A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL/NEARLY VERTICAL DIRECTION	6. Stack Height: feet	7. Exit Diameter: feet
8. Exit Temperature: 1400° F	9. Actual Volumetric Flow Rate: 196340 acfm	10. Water Vapor: 8 %
11. Maximum Dry Standard Flow Rate: 2760 dscfm	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates... Zone: East (km): 530.705 North (km): 3024.018	14. Emission Point Latitude/Longitude... Latitude: Longitude:	
15. Emission Point Comment:		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): LFG generated by the MSW is flared (MMcf burned)		
2. Source Classification Code (SCC): 50100410	3. SCC Units: Million Cubic Feet Waste Gas Burned	
4. Maximum Hourly Rate: .18	5. Maximum Annual Rate: 225	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: .6	8. Maximum % Ash: .1	9. Million Btu per SCC Unit: 550
10. Segment Comment:		
Is this a valid segment? Yes		

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	Valid?
CO				No
HAPS				No
NMOC				No
NOX				No
PM				No
PM10				No
SO2				No
VOC				No

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: CO - Carbon Monoxide	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions 1 of 1

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

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: HAPS - Total Hazardous Air Pollutants	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: NMOC - Nonmethane Organic Compounds from MSW Landfill	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions 1 of 2

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 2 of 2

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

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: NOX - Nitrogen Oxides	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: PM - Particulate Matter - Total	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: PM10 - Particulate Matter - PM10	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: SO2 - Sulfur Dioxide	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

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

(Optional for unregulated emissions units.)

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

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

1. Pollutant Emitted: VOC - Volatile Organic Compounds	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☑ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Pollutant Potential,Fugitive, and Actual Emissions Comment: Not a valid EU.	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

No Pollutant Allowable Emissions information submitted.

G. VISIBLE EMISSIONS INFORMATION

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

No Visible Emissions information submitted.

H. CONTINUOUS MONITOR INFORMATION

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

No Continuous Monitoring information submitted.

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) ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment
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) ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment
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) ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment
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) ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment
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) ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment
6.	Compliance Demonstration Reports/Records ☐ Applicable ☐ Previously Submitted, Date: ☐ Attachment ☐ To Be Submitted, Date (if known): Previously Submitted Test Date(s)/Pollutants Tested: To be Submitted Test Date(s)/Pollutants Tested: 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 ☐ Applicable ☐ Attachment

Additional Requirements for Title V Air Operation Permit Applications

1.	Identification of Applicable Requirements ☐ Applicable	☐ Attachment
2.	Compliance Assurance Monitoring Plan ☐ Applicable	☐ Attachment
3.	Alternative Methods of Operation ☐ Applicable	☐ Attachment
4.	Alternative Modes of Operation (Emissions Trading) ☐ Applicable	☐ Attachment

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)) ☐ Applicable ☐ Attachment	
2.	Good Engineering Practice Stack Height Analysis (Rule 62-212.400(4)(d), F.A.C., and Rule 62-212.500(4)(f), F.A.C.) ☐ Applicable ☐ Attachment	
3.	Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) ☐ Applicable ☐ Attachment	

Other Information Regarding this Emissions Unit

1.	Other Emissions Unit Information ☐ Applicable ☐ Attachment

2.0

Section II
Addendum to the Prevention of Significant Deterioration (PSD) Air Construction (AC) Permit Application Support Documentation

Addendum
Prevention of Significant Deterioration (PSD) Air Construction (AC) Permit Application Support Documentation

Document No. 1270-3
Facility No. 0930104
Okeechobee Landfill
(Formerly Berman Road Landfill)
Okeechobee, Florida

Prepared for:

Okeechobee Landfill, Inc.
10800 N.E. 128th Avenue
Okeechobee, FL 34972
(863) 357-0111

Prepared by:

Shaw®

Shaw Environmental and Infrastructure, Inc.
88C Elm Street
Hopkinton, MA 01748

Submitted to:

Florida Department of Environmental Protection
Air Resource Management
2600 Blair Stone Road MS 5500
Tallahassee, Florida 32399-2400

October 28, 2008

Table of Contents

Abbreviations, Acronyms, and Initialisms

Amendment	Revised Construction Permit Application, Document No. 1270-3
AP-42	Compilation of Air Pollution Emission Factors (USEPA)
Application	Construction Permit Application 1270-2 for Okeechobee Landfill, Inc.
AQIA	Air Quality Impact Analysis
ascfm	actual standard cubic feet per minute
BACT	Best Available Control Technology
CD	control device
CFR	Code of Federal Regulations
CO	Carbon Monoxide
dscfm	dry standard cubic feet per minute
EU	Emission Unit
F.A.C.	Florida Administrative Code
Facility	Okeechobee Landfill, Inc, landfill facility
FDEP	Florida Department of Environmental Protection
FLM	Federal Land Managers
HAP	Hazardous Air Pollutant
H_2S	Hydrogen Sulfide
lb/hr	pounds per hour
LFG	Landfill gas
LFGTE	Landfill gas to energy
MSW	Municipal Solid Waste
NMOC	Nonmethane Organic Compounds
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides
OLI	Okeechobee Landfill, Inc.
PCP	pollution control project
PCR	Preconstruction Review
PM	particulate matter
PSD	Prevention of Significant Deterioration
PTE	potential to emit
scfm	standard cubic feet per minute
SIL	Significant Impact Level
SO_2	Sulfur Dioxide
TPY	tons per year
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

1.0 INTRODUCTION AND OVERVIEW

The Okeechobee Landfill Facility (the Facility), which is owned and operated by Okeechobee Landfill, Inc. (OLI), is comprised of an existing municipal solid waste (MSW) landfill and supporting operations. The facility has been operational since 1981 and under the existing solid waste permits would continue to construct and operate the landfill until approximately 2058. In February 2007, Air Construction Permit Application No 1270-2 (Application or the Application) was submitted to the Florida Department of Environmental Protection (FDEP) to modify the existing air construction permits and to support the continued construction of the MSW landfill (the Project). This Addendum (No. 1270-3) offers additional information and revises portions of Application 1270-2.

The project is a MSW landfill which is an emission unit for nonmethane organic compounds (NMOCs) and hazardous air pollutants (HAPs), landfill gas (LFG) constituents. The typical control device (CD) for NMOCs and HAPs in LFG is flaring. Other destructive control devices that are sometimes used for LFG combustion are turbines, engines, enclosed combustors, and boilers. The proposed modification to the landfill includes increasing flaring capacity, adding sulfur removal equipment, and constructing a landfill-gas-to-energy (LFGTE) plant. This Addendum revises the individual capacity of control devices identified for the Project in the Application No. 1270-2.

The Addendum is comprised of the following sections:

- Section I – Air Construction Permit Application (Long Form)
- Section II - Prevention of Significant Deterioration (PSD) Air Construction (AC) Permit Application Support Documentation (the Report)
  - Section 1.0 – Introduction and Overview
  - Section 2.0 - Facility History and Operations Overview
  - Section 3.0 - Description of the Construction Project
  - Section 4.0 - Rule Applicability Analysis
  - Section 5.0 - Preconstruction Review
  - Section 6.0 – Precautions to Prevent Emission of Unconfined Particulate Matter
- Section III – Addenda to Air Quality Impact Analysis (AQIA) for Proposed Modification Construction

This Addendum No. 1270-3 is based on the final Application 1270-2 Revisions for this submittal reflect the three changes listed below.

1. The primary air pollution control devices will be one (1) Titan Solar Turbine and 15 (15) Centaur 40 Solar Turbines instead of the Mars Solar Turbines preceded by a desulfurization system
2. The alternative operating scenarios are based on providing100 percent backup with landfill gas flares
3. The emissions calculations and air quality impact analysis reflect those used in the procedures and methods accepted by FDEP.

Those portions of the previous application affected by these changes have been revised.

2.0 FACILITY HISTORY AND OPERATIONS OVERVIEW

The OLI facility is located in Okeechobee County of south central Florida. The landfill was established at 10800 N.E. 128th Avenue in 1981 under a solid waste operating permit. The permit allowed for the construction and operation of a MSW landfill called the Berman Road landfill. Today, the Facility has a second solid waste permit for another phase in construction. The landfill phase currently under construction is designated as the Berman Road Landfill and the future landfill phase is designated as the Clay Farms Landfill. The Facility is a single stationary source consisting of a single emission unit; the MSW landfill.

The Facility receives waste from various parts of the State of Florida and is an integral part of the State's solid waste disposal capacity. The landfill receives municipal solid waste, construction and demolition material and special wastes over scales at the entrance to the landfill. Trucks are directed to the operating face of the landfill for the actual disposal. The waste is compacted and covered daily. Currently, liquids from the landfill are collected and disposed on site in LFG-fired evaporation units or trucked off site. LFG is collected in a system designed to capture gas from appropriate areas of the landfill, then the gas is flared. For a more general description of landfill construction and operation, please refer to Appendix A of the Application.

The facility operates odor control flare(s) under Settlement Agreement OGC File No. 04-0094 (Settlement Agreement) executed in March 2005 and amended in June 2006 (OGC File No. 04-0094A) and again in January 2007 (OGC File No. 04-0094B). The flaring portion of the project is an integral part of the continued odor control process.

2.1 Existing Operating Conditions

Two enclosed landfill gas flares with Evap® systems and an open, utility flare as a backup are used to control potential landfill emissions, which are operated in accordance with the landfill's current Title V permit. . There is currently an odor control flare that is operating under a First Amended Order to the Settlement Agreement executed between Florida Department of Environmental Protection (FDEP) and OLI on June 28, 2006. A Second Amended Order was implemented on January 7, 2007 and allows for up to five flares to be operated at the facility (the four flares currently present and one additional odor control flare). The two new odor control flares were incorporated into the current Title V operation permit.

2.2 Permit History

The following updated table summarizes the facility's air permitting history under Subtitle D of the Clean Air Act.

EU ID No.	Description	Permit No.	Effective Date	Expiration Date	Project Type[1]
001	Landfill	0930104-001-AC	05/13/1997	05/12/1998	Construction
001	Landfill	0930104-002-AV	12/16/1997	12/15/2002	Initial Title V
002	Enclosed Flare (1500 SCFM)	0930104-003-AC	05/01/1998	05/12/1999	Construction Extension

002 & 003	1500 scfm enclosed flare 3000 scfm enclosed flare	0930104-004-AC	07/23/2001	07/22/2002	Construction
002 & 003	1500 scfm enclosed flare 3000 scfm enclosed flare	0930104-005-AC	05/22/2002	11/19/2002	Construction Extension
001, 002, 003, 004	Landfill, 1500 scfm enclosed flare, 3000 scfm enclosed flare, 3000 scfm open flare	0930104-006-AV	08/08/03	08/02/2008	Title V Renewal
004	3000 scfm open flare	0930104-007-AC	04/15/2003	04/14/2004	Construction
002 & 003	1500 scfm enclosed flare 3000 scfm enclosed flare	0930104-008-AC	09/24/2002	02/17/2003	Construction (Ext.)
002 & 003	1500 scfm enclosed flare 3000 scfm enclosed flare	0930104-009-AC	01/28/2003	03/19/2003	Construction (Ext.)
005	3000 scfm enclosed flare	0930104-010-AC	09/29/2003	09/28/2004	Construction
001, 003, 004 & 005	Landfill, 3000 scfm enclosed flare, 3000 scfm open flare (backup), & 3000 scfm enclosed flare	0930104-011-AV	01/16/2004	08/02/2008	Title V Revision
001	PSD: LFGTE Project	0930104-014-AV	N.A.	N.A.	Application 1270-2 03/07/2007
001, 003, 004, 005, CD-04 & CD-05	Landfill, 3000 scfm enclosed flare, 3000 scfm open flare (backup), 3000 scfm enclosed flare, two 3,300 scfm open flare (odor control flares)	0930104-016-AV	08/22/2008	08/21/2013	Title V Renewal

The following is the facility description from the most recent Title V permit issued by FDEP:

This facility consists of a municipal solid waste landfill with a 3,000 scfm Enclosed flare manufactured by LFG Specialties, Inc model Unit # 1776 with an EVAP Unit # 3016, a 3,000 scfm Enclosed flare Unit #1698 with a leachate EVAP Unit 30041M a 3,000 scfm open flare Unit 1495, as a back-up unit and odor control a 3,300 cfm open flare for odor control designated as CD-04 and a 3,300 scfm open flare for odor control designated as CD-05. The CD-04 and CD-05 flares are operating under Settlement Agreement (Amended Orders OGC File No.: 04-0094A and 04-0094B), Flare CD05 is not present at the facility. The back-up flare operates when one or more enclosed flares are not operating due to malfunction or maintenance and it will operate at the same capacity of the flare that is shut down.

The facility does not operate a bioreactor.

Also included in this permit are miscellaneous unregulated/insignificant emissions units and/or activities.

Based on the Title V Air Operation Permit Renewal application received February 1, 2008, this facility is a major source of hazardous air pollutants (HAPs).

The current operation permit lists the following emission units:

Existing EU ID No.	Brief Description
001	A Municipal Solid Waste Landfill
003	A 3,000 scfm Enclosed flare Unit # 1776 with EVAP Unit #3016
004	A 3,000 scfm Unenclosed Flare Unit # 1495, used as a back-up unit
005	A 3,000 scfm Enclosed flare Unit # 1698 with a leachate EVAP© Unit # 3004IM.
CD-04	A 3,300 scfm open odor control flare
CD-05	A 3,300 scfm open odor control flare (Not currently present at the facility)

As discussed in Sections 1.0 and 3.2, emission units 003, 004, 005, CD-04 and CD-05 would be designated as control devices for EU-001. **Figure 2A** presents a schematic of the current process flow diagram and emission units.

2.3 Current Compliance Status

For the purposes of this section that addresses compliance demonstration with the current Title V operating permit, the five existing EU designations are used.

<u>EU-001 – Municipal Waste Landfill</u>: Semi-annual compliance reports for this facility are filed in accordance with FDEP and Federal air rules. The Facility has been the subject of discussions about compliance with FDEP. The Facility saw a significant jump in LFG generation in 2003 and 2004 that outpaced the flare capacity. The Settlement Agreement of March 2005 was implemented to control odors. In June 2006, a First Amended Order addressed control of landfill gas through the use of a temporary flare and odor control wells. A Second Amended Order was issued in January 2007 that allows operation of up to five flares for odor control and NSPS control. At the time of this filing, the Facility operates four flares. There is no issue of noncompliance at the time of this filing.

<u>EU-003 and EU-005 - Enclosed 3,000-scfm flare with EVAP® systems (renamed as a control device, CD-001 and CD-002 in the Amendment)</u>: The enclosed flares were tested in August 2008 for CO and demonstrated that the flares are in compliance. There is no issue of non-compliance at the time of this filing. The most recent performance test for NMOCs was conducted in October 2007 in advance of the Title V permit renewal. There is no issue of noncompliance at the time of this filing.

The following flares are operating under the terms of the Compliance Plan.

<u>EU-004 Utility Backup 3,000-scfm flare (renamed as a control device, CD-003 in the Amendment)</u>: EU-004 is an existing landfill gas open flare currently operated as a backup flare. Under the recent Second Amended Order to the Settlement Agreement, the flare may be operated as an odor control flare or as a backup control device for the collected LFG. There is no issue of non-compliance at the time of this filing. The most recent performance test for visible emissions was conducted in October 2007 in advance of the Title V permit renewal and the flare was found to be in compliance. Per the existing Title V permit, the flare will be tested for visible emissions once annually. *This Addendum corrects the maximum throughput from 3,000-scfm in the current Title V permit (EU-004) to 2,800 scfm.*

Pb
effective
date
for
standard
in '09

CD-04 3,300-scfm open flare (renamed as a control device, CD-004 in the Amendment): CD-04 is an existing landfill gas utility flare currently operating as an odor control flare. Under the first Amended Order to the Settlement Agreement, the open flare is operated as an odor control flare. There is no issue of non-compliance at the time of this filing. Per the existing Title V permit, the flare will be tested for visible emissions annually.

CD-05 3,300-scfm open flare (renamed as a control device, CD-005 in the Amendment): CD-05 has not been installed but may be installed and operated under the first Amended Order to the Settlement Agreement. Per the existing Title V permit, the flare will be tested for visible emissions annually. *This Addendum corrects the maximum throughput from 3,300-scfm in the current Title V permit (EU-004) to 3,300 scfm.*

2.4 Baseline Actual Emissions

The baseline action emissions are unchanged from Application 1270-2 and, for convenience, are summarized in Table 1. Baseline data and the supporting calculations are presented in **Appendix B** for the four existing air emission control devices: two enclosed flares with Evap® units, one open flare used as a backup, and an odor control flare. The baseline actual emissions uses the higher H_2S testing data and have not been revised, however, the air impact modeling (Section III) uses more recent and average H_2S data.

Table 1 – Estimated Actual Emissions

Pollutant	Baseline Actual Emissions
Sulfur Dioxide (TPY)	1,209
Nitrogen Dioxide (TPY)	34
Carbon Monoxide (TPY)	120
NMOCs (TPY)	3.4
Volatile Organic Compounds (TPY)	1.4
Particulate Matter PM_{10} (TPY)	8.9
Hydrogen Sulfide (TPY)	0.7
HAPs (Total) (TPY)	5.7
HAPs (Single) (TPY)	5.0

3.0 DESCRIPTION OF THE CONSTRUCTION PROJECT

3.1 Proposed Project Permit Modifications

As presented in Section 2.1 of this Addendum, the current Title V operating permit is comprised of six emission units; the MSW landfill, two enclosed flares, the backup flare and two odor control flares. The Addendum seeks to modify the following previously-submitted construction permit applications:

- 0930104-001-AC related to the MSW landfill, and

- 0930104-003-AC, 0930104-004-AC 0930104-005-AC, 0930104-007-AC, 0930104-008-AC, 0930104-009-AC, 0930104-010-AC related to the three existing LFG flares

The Addendum also modifies the most recent Title V application that includes the two odor control flares regulated for installation and operation under Title V Air Operating Permit Renewal and Revision 0930104-AV (described in Section 2.2 of this document). The odor control flares were permitted to incorporate the terms contained in the Settlement Agreement (Amended Orders No.04-0094A & 04-0094B). As part of the construction permit, the Addendum would modify the existing designation of all flares, including the odor control flares, as emission units to control devices. The MSW landfill emission unit would state that the control device for the pollutant NMOC and HAPs is a flare. The construction project described in the next section would seek to further modify the landfill emission unit by proposing new control devices. The proposed construction and operating permit would have one emission unit as follows:

Revised Emission Units		
EU ID No.	**Brief Description**	***Control Device***
001	A Municipal Solid Waste Landfill ***with an active landfill gas collection system and associated control devices***	Destructive (Flaring or LFG Turbines) and Non-Destructive (Desulphurization LFG Pretreatment)

3.2 Construction Project Conditions

3.2.1 <u>Landfill Construction, Process Flow and Emission Control Devices</u>

The Application 1270-2 sought to permit the construction project with the following additional control devices.

- *up to seven LFG open flares (if turbines are not installed, then the backup flare would be operated as a regular control device)*
- *up to seven Mars 10-MW turbines*
- *a desulphurization process*

The enclosed flares would remain on site but be relocated to another area of the site. The estimated maximum throughput capacity for the project was 32,400 scfm of landfill gas. The operating scenarios included combustion of LFG through 1) as many as seven turbines and any additional gas would be flared and 2) flaring all the landfill gas through a combination of enclosed flares and open flares.

The Addendum revises the control devices proposed for the project and the operating scenarios. The project's maximum throughput capacity remains unchanged at 32,400 scfm of landfill gas. The enclosed flares will be replaced with open flares.

In brief, the project, will construct

- a LoCat® desulphurization process
- up to 16 Solar turbines
- up to ten LFG open flares

The two existing open flares (currently designated as emission units, EU-004 and CD-04) will continue to be used but will be relocated on site. The existing enclosed flares(currently designated as emission units, EU-003 and EU-005) will be deactivated. The flares would be operated as a regular control device for odor control, if any or all the turbines are not installed, as backup to the turbines, and to handle LFG greater than turbine capacity. **Figure 2B** presents the process flow diagram for the revised emission unit, EU-001, These control devices will be operated under the primary operating scenario as well as alternative operating scenarios. The paragraphs after the table below describe the various operating scenarios; the table summarizes each scenario.

Summary of the Proposed Control Devices Capacity

	Titan Turbine	Centaur Turbine	Utility (Open) Flares				Total PTE (scfm LFG)
Throughput (scfm)	5,000	1,500	3,300	3,000	2,800	1,500	—
Primary Operating Scenario	1	15	Number of operating flares varies = 4,900 scfm total				32,400
Alternative Operating Scenario A	0	0	1	9	1		32,400
Alternative Operating Scenario B	0	0	1	8	1	2	32,400
Other Alternative Scenarios	0 or 1	Varies (0 to 15)	Varies (0 to 1)	Varies (0 to 9)	Varies (0 to 1)	Varies (0 to 2)	Maximum 32,400

Primary Operating Scenario

- One LFG Titan Solar turbine (CD016) used as a control device rated at 5,000 scfm of LFG;
- Fifteen LFG Centaur Solar turbines (CD017 through CD031) used as control devices each rated at 1,500 scfm of LFG;
- Two open flares, either existing or proposed and rated at 2,800 to 3,300-scfm, used as control devices with a maximum throughput of 4,900 scfm

Figure 2C presents the process flow diagram for this operating scenario. The Titan 130 turbines have an estimated rating of 15 Megawatt (MW), which has been estimated to be a maximum fuel throughput of 5,000 scfm at 100 percent load. The Centaur 40 Turbines have an estimated rating of 3.5 MW at the maximum fuel throughput of 1,500 scfm of LFG at 100 percent load. The combined single Titan and fifteen (15) Centaur turbines theoretically provide a total maximum throughput capacity of 27,500 scfm producing an estimated 67.5 MW of electricity. The remaining 4,900 scfm of LFG generated by the landfill would be flared through two of the utility flares.

Alternative Operating Scenarios

There are three alternative operating scenarios for the maximum estimated LFG generation and throughput; two alternatives involve 100 percent flaring of LFG and one alternative involves a combination of turbine combustion and flaring but not to exceed 32,400 scfm. The rationale for the alternative operating scenarios is to allow flaring the LFG as a backup to the turbines if any or all should be off line. The Addendum replaces the enclosed flares with open flares. When operated intermittently as a back-up, open flares require less maintenance and have a longer life cycle than enclosed flares. This replacement is not considered in kind and has been included in the construction project and the project's emissions estimates. The control devices used for each alternative operating scenario are summarized below.

1. *Alternative Operating Scenario A* (if turbines are offline or have not been installed):
   - Existing 2,800-scfm open flare and 3,300-scfm open flare (designated as CD003 and CD004 in the Amendment) and nine (9) new 3,000-scfm open flares (CD005 through CD013) used as control devices.
   - Operated at a maximum LFG throughput of 32,400 scfm.

Figure 2D presents the process flow diagram for this scenario.

2. *Alternative Operating Scenario B* (Same as Alternative A with a construction option to install two 1,500-scfm for one of the proposed 3,000-scfm flares)

   All flares have lower operating limitations relative to flow rate and gas quality. Typically the design turndown rate is around 10 to 1. A 3,300-scfm flare has estimated lower operating capacity of 330 scfm and a 1,500-scfm would be 150 scfm. This is not to say it could not be slightly higher or lower. To address the possibility of handling lower flow, the 1,500-scfm flares are a construction option and operating alternative for the facility.

   - Existing 2,800-scfm open flare and 3,300-scfm open flare (designated as CD003 and CD004 in the Amendment), eight (8) new 3,000-scfm open flares (CD005 through CD013) and two (2) new open flares (CD014 and CD015) used as control devices.
   - Operated at a maximum LFG throughput of 32,400 scfm.

3. *Other Alternative Operating Scenarios:* Other alternative operating scenarios would be various combinations of turbines and flares. **Figure 2E** provides an example process flow diagram for this operating scenario. The primary operating scenario is the preferred scenario however, depending on the number of turbines on line; the number of flares that will be operated to handle the LFG not directed to the turbines will vary. The total maximum LFG throughput to any of the control devices would not exceed 32,400 scfm. To simplify the permitting, emissions and air impact analysis of every possible combination is not presented.

3.2.2 Project Operating Conditions

A. Post-BACT Operating Scenario

The post-BACT operating scenario is amended from the two operating scenarios (primary and alternative) presented in Application 1270-2 to the four presented in Section 3.2.1. As the LFG desulphurization system and turbines are brought on line, the LFG will be redirected to the turbines. Emissions and air modeling scenarios were developed for three operating scenarios were developed for in this Addendum. These three operating scenarios would present the maximum PTE and the associated pollutants for the two types of destructive control devices; turbines and flares. All scenarios would include the selected BACT. The preferred or primary operating scenario would direct all LFG to the power plant turbines for electricity production. The maximum LFG throughput of 32,400 scfm has not been amended from the previous application so that the air quality impact analysis and the Class I impact analysis would not have to be restarted. Therefore, the primary operating scenario would have the maximum potential to emit based on 16 turbines and two utility flares. Details on the proposed control devices and the emissions are presented in Section 3.4 and 5.2.

Two alternative operating scenarios A and B assume that all the turbines were not installed or were by-passed for maintenance, malfunction or another event and the LFG would be flared. At the completion of the Project, up to twelve flares could be in operation. As stated in Section 3.2.1, other alternative operating scenarios would be various combinations of turbines and flares but to simplify the permitting, emission and air quality impact analysis every possible combination is not presented.

B. Startup, Shutdown, Maintenance and Malfunctions

The SSM plan for the existing flares was submitted with the semi-annual reporting on July 26, 2008. A SSM Plan for the turbines and desulphurization equipment would be implemented following the installation.

3.3 Construction Schedule

The landfill construction schedule and sequence is based on waste acceptance rates, applicable solid waste permits, and any modifications or variances to those permits. The landfill construction schedule and sequence is not a condition of the air construction and operation permit because LFG generation will occur regardless of the construction procedures. The collection system is installed per the schedule required by 40 CFR 60 subpart www. The control devices are installed based on the actual LFG production rate and installation lead time for equipment.. The tentative control device installation schedule based on LFG generation modeling has been revised for the flares and turbines presented in this Addendum and is included in **Appendix E**.

3.4 Proposed Source Emissions and Site Layout

The Facility Site or Plot Plan has not changed.

Relative to the source emissions from the control devices, the proposed emissions with BACT have changed with the new control devices. The table below presents the maximum potential to emit for each pollutant for the project. The highest maximum for the PSD pollutants would be related to the following scenarios:

1. The maximum annual PTE for NO_2, CO and PM_{10} would be the operation of sixteen (16) turbines (27,500 scfm) and two flares (4,900 scfm).
2. The maximum annual PTE for SO_2, PM_{10}, NMOC, VOC and H_2S are estimated to be essentially equivalent for both operating scenarios.

Table 2 Proposed Emissions with BACT

Pollutant	Maximum Potential Emissions (TPY)	Maximum Emissions Control Device	Controls Applied?
Sulfur Dioxide	575	Both	Yes
Nitrogen Dioxide	765	Turbines	No
Carbon Monoxide	5043	Turbines	No
NMOCs	23	Both	Yes
Volatile Organic Compounds	9	Both	Yes
Particulate Matter PM_{10}	77	Turbines	No
Hydrogen Sulfide	6.3	Both	Yes

[1]The flares and turbines are the control devices. Emissions shown for NMOC and VOC are conservatively estimated at 2 percent uncontrolled. Additional controls are not proposed for these emissions.

3.5 Stack Parameters and Sampling Facilities

The stack sampling facilities for the open flares are not included in the application. Open flare compliance is demonstrated through observation for visible emissions. The stack sampling facilities presented in the Application 1270-2 in **Appendix G** apply only to the enclosed flares. Stack sampling facilities for the turbines will be submitted after the equipment is installed.

The revised stack parameters used in air modeling are presented in **Appendix G.**

4.0 RULE APPLICABILITY ANALYSIS

This Section has not been revised or amended.

5.0 PRECONSTRUCTION REVIEW [F.A.C. 62-212]

5.1 Prevention of Significant Deterioration (PSD) Process [F.A.C. 62-212.400]

5.1.1 Applicability and Exemptions

In February 2008, the Air Quality Impact Analysis for Proposed Modification Construction for Okeechobee Landfill was submitted to FDEP. In May 2008, the Class I Area Impact Analysis was submitted to the FDEP. The Air Quality Analysis and Class I area impact analysis include the Big Cypress Nature Preserve which is a sensitive Class II area.

5.1.2 Source Emissions and PSD Emission Rate Triggers

The increases from the actual emission rate to the potential emission rate for the project before BACT is considered is compared in the table below. A more detailed summary table for each control device is presented in **Appendix B**, Support Calculations.

Table 3 – Significant Emissions Increase Levels for Actual Emissions

Pollutant	Baseline Actual Emissions	Significant Emission Increase	Actual to Potential Net Increase for Proposed Project	Exceeds PSD trigger level? (Note 1)
Sulfur Dioxide (TPY)	*1,209*	40	1,941	Yes
Nitrogen Dioxide (TPY)	34	40	731	Yes
Carbon Monoxide (TPY)	120	100	4,922	Yes
NMOCs (TPY)	3.4	50	20	No
Volatile Organic Compounds (TPY)	1.4	40	7.6	No
Particulate Matter PM_{10} (TPY)	9	15	68	Yes
Hydrogen Sulfide (TPY)	0.7	10	5.6	No

Note 1: A significant net increase occurs for the PSD pollutants, SO_2, NO_2, CO, and PM_{10} based on the Baseline Actual-to-Projected Potential PSD Applicability Test for the proposed modification for the landfill.

5.2 Control Technology Review [F.A.C. 62-212.400(4)(c) and (10)]

The section has not been revised.

5.3 Details of Proposed Control Technologies

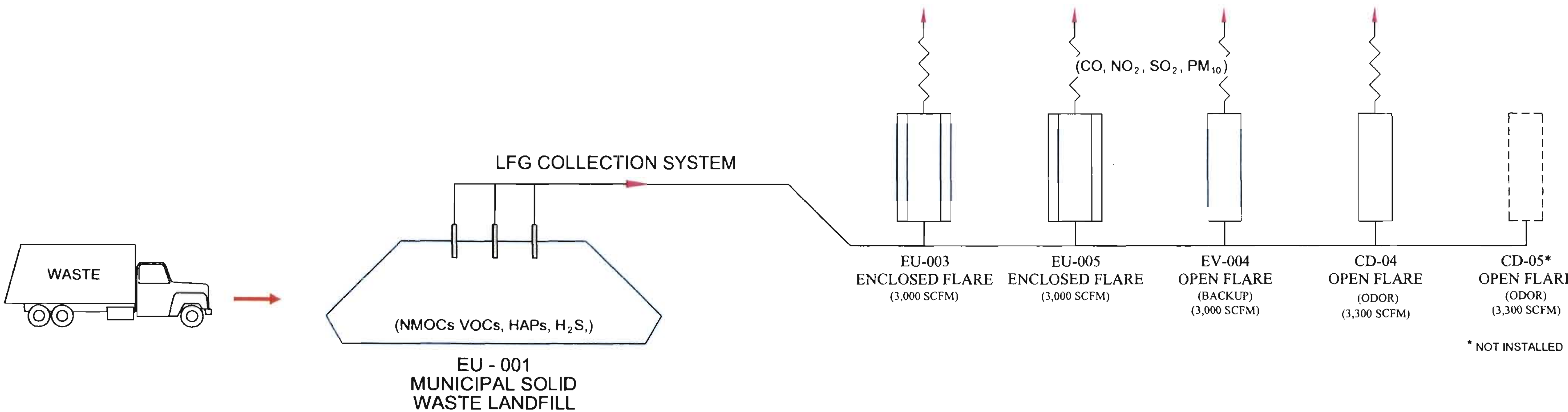
In the Application, the proposed control technology for the potential emissions are LO-CAT® for desulfurization and turbines and flares for NMOC and HAPs. The specific turbines to be used have been revised by this Addendum.. Copies of the manufacturer's general specifications for the Titan 130 and the Centaur 40 are included in **Appendix H.**

5.4 Summary of the Ambient Air Quality Impact Analysis

In February 2008, the Air Quality Impact Analysis for Proposed Modification Construction for Okeechobee Landfill was submitted to FDEP. In May 2008, the Class I Area Impact Analysis was submitted to the FDEP. This Addendum revises the operating scenarios that were analyzed in those reports. Two addenda, one for the Air Quality Impact Analysis and one for the Class I Area Impact Analysis, are included in Section III.

The technical approach and modeling procedure followed USEPA approved methodology and FDEP instructions where clarification was necessary. In all operating scenarios, the Class II PSD increments and AAQS were not exceeded for any regulated pollutant. No adverse impact was predicted on soil, vegetation, wildlife and visibility in the impact area from this project.

In the modeling scenarios considered, the results indicate that no significant impact on air quality at the Everglades NP, Biscayne Bay NP, or Big Cypress National Preserve will occur.



NOTE: FLARE CAPACITIES ARE THOSE LISTED IN THE CURRENT TITLE V PERMIT, ASSOCIATED CONSTRUCTION PERMIT, AND CONSENT DECREE. ACTUAL CAPACITIES ARE CORRECTED BY THE AMENDMENT (SEE FIGURE 2B)

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
HOPKINTON, MA	10/28/08	--	S. COLLIER	K. FAGAN	K. ALZHEIMER	121525-2A

Shaw Environmental, Inc.

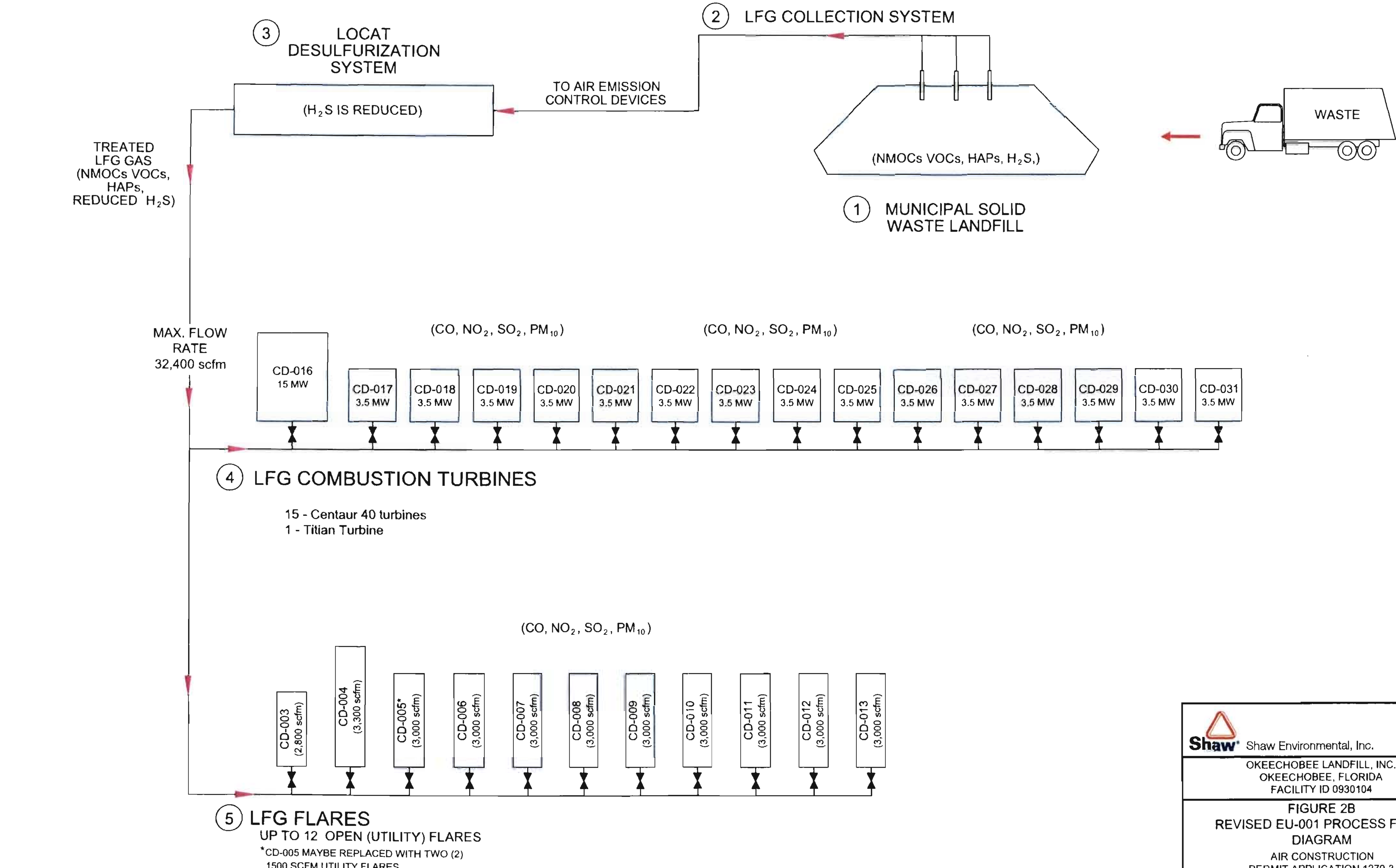
OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA
FACILITY ID 0930104

FIGURE 2A

EXISTING PROCESS FLOW DIAGRAM

AIR CONSTRUCTION
PERMIT APPLICATION 1270-3

REV-01 10/24/2008



Shaw Shaw Environmental, Inc.

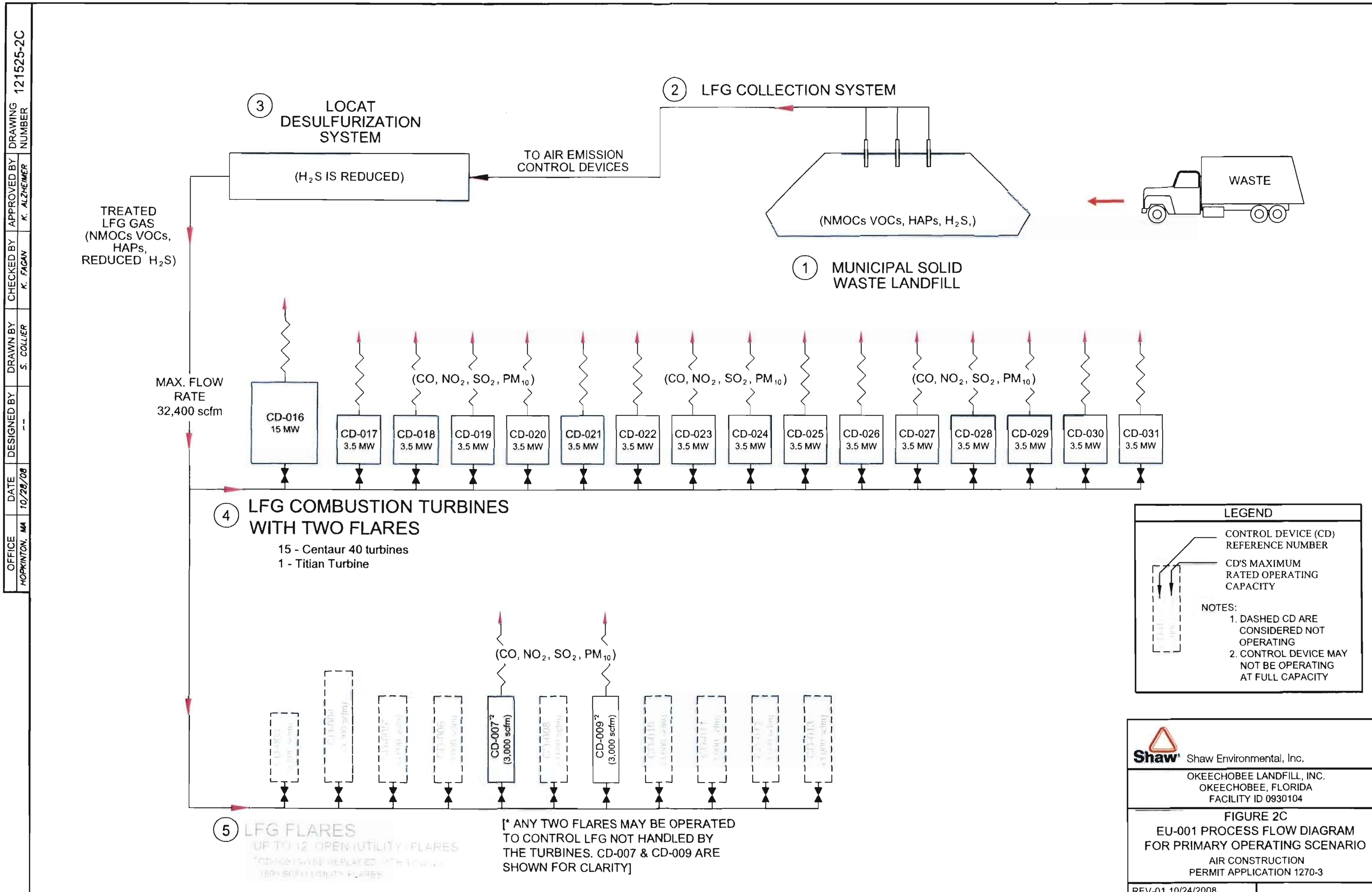
OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA
FACILITY ID 0930104

FIGURE 2B
REVISED EU-001 PROCESS FLOW DIAGRAM

AIR CONSTRUCTION PERMIT APPLICATION 1270-3

REV-01 10/24/2008

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
HOPKINTON, MA	10/28/08	--	S. COLLIER	K. FAGAN	K. ALZHEIMER	121525-2B



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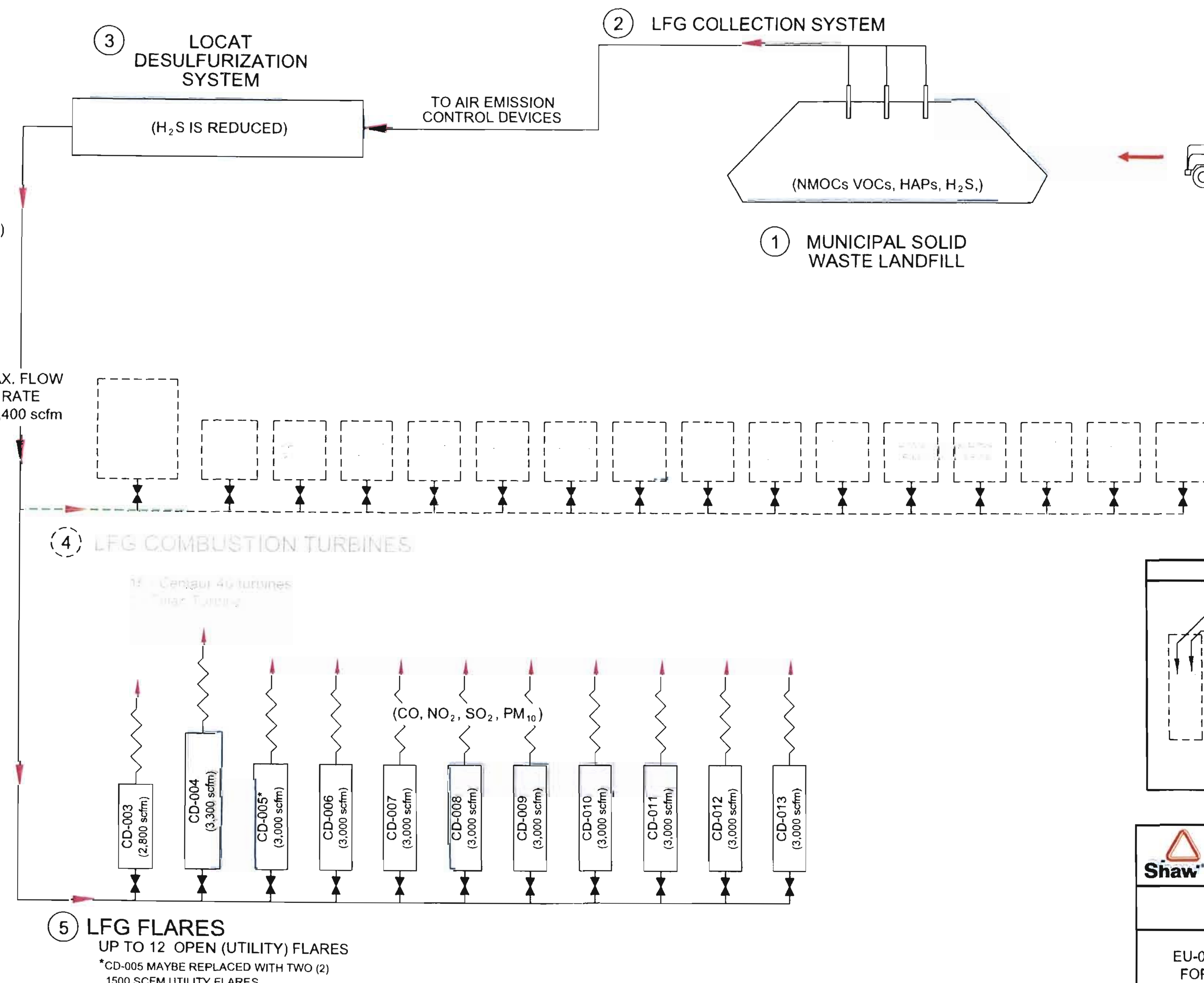
OKEECHOBEE, FLORIDA
FACILITY ID 0930104

FIGURE 2C
EU-001 PROCESS FLOW DIAGRAM FOR PRIMARY OPERATING SCENARIO
AIR CONSTRUCTION PERMIT APPLICATION 1270-3

REV-01 10/24/2008



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
HOPKINTON, MA	10/28/08	--	S. COLLIER	K. FAGAN	K. ALZHEIMER	121525-2D

LEGEND

CONTROL DEVICE (CD) REFERENCE NUMBER

CD'S MAXIMUM RATED OPERATING CAPACITY

NOTES:
1. DASHED CD ARE CONSIDERED NOT OPERATING
2. CONTROL DEVICE MAY NOT BE OPERATING AT FULL CAPACITY

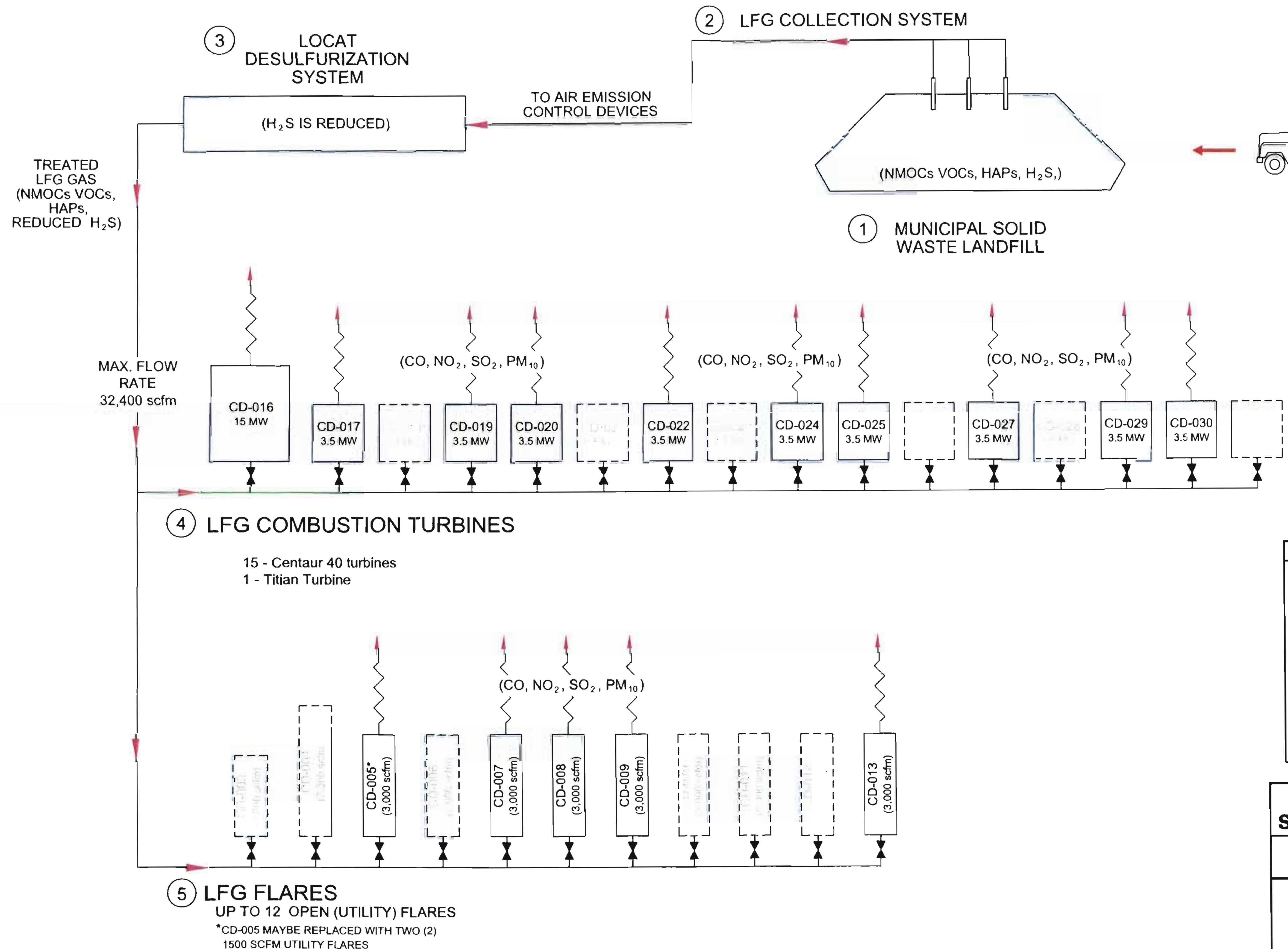
Shaw Environmental, Inc.

OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA
FACILITY ID 0930104

FIGURE 2D
EU-001 PROCESS FLOW DIAGRAM FOR ALTERNATIVE OPERATING SCENARIOS A & B
AIR CONSTRUCTION PERMIT APPLICATION 1270-3

REV-01 10/24/2008

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
HOPKINTON, MA	10/28/08	--	S. COLLIER	K. FAGAN	K. ALZHEIMER	121525-2E



LEGEND

CONTROL DEVICE (CD) REFERENCE NUMBER

CD'S MAXIMUM RATED OPERATING CAPACITY

NOTES:
1. DASHED CD ARE CONSIDERED NOT OPERATING
2. CONTROL DEVICE MAY NOT BE OPERATING AT FULL CAPACITY

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OKEECHOBEE, FLORIDA
FACILITY ID 0930104

FIGURE 2E
EU-001 PROCESS FLOW DIAGRAM FOR ADDITIONAL ALTERNATIVE OPERATING SCENARIOS
AIR CONSTRUCTION PERMIT APPLICATION 1270-3

REV-01 10/24/2008

Appendix B

Permit Application No. 1270-3
Facility ID No. 0930104

Revised Support Calculations

BASELINE ACTUAL EMISSIONS															
					Emissions										
EU NO.	**Description**	**Average 24-month flow rate (scfm)**	**24-month period Hours of Operation**	Units	**NO_x**	**CO**	**SO_2 w/o BACT [c]**	**SO_2 w/ BACT [c]**	**PM_{10}**	**NMOC**	**VOC**	**HAP (Total)**	**HAP (Single)**	**H2S w/o BACT**	**H2S with BACT**
003	Enclosed Flare Unit 1	2236.9	16902.2	lb/hr	4.03	13.4	131.3		1.0	0.4	0.1	0.6	0.5	0.07	
				tpy	17.0	56.7	555.0		4.4	1.5	0.6	2.6	2.3	0.3	
005	Enclosed Flare Unit 2	2246.5	17168.1	lb/hr	4.04	13.48	131.88		1.05	0.36	0.14	0.61	0.54	0.07	
				tpy	17.4	57.8	566.0		4.5	1.6	0.6	2.6	2.3	0.30	
004	Open Flare (Backup)	2239.8	846.6	lb/hr	4.57	24.87	131.89		1.06	0.37	0.15	0.61	0.54	0.08	
				tpy	1.0	5.3	27.9		0.2	0.1	0.0	0.1	0.1	0.0	
NA	Open Flare (Odor Control)	764.2	5149.7	lb/hr	1.56	8.49	45.00		0.36	0.13	0.05	0.21	0.19	0.03	
				tpy	2.0	10.9	57.9		0.5	0.2	0.1	0.3	0.2	0.0	
CURRENT ACTUAL BASELINE EMISSIONS		**7,487**		**lb/hr**	**14.2**	**60.3**	**440.2**		**3.6**	**1.3**	**0.5**	**2.1**	**1.9**	**0.3**	
				tpy	**37.4**	**130.8**	**1,207.0**	Not relevent	**9.7**	**3.4**	**1.4**	**5.7**	**5.0**	**0.7**	Not relevent

SUMMARY - PROPOSED POTENTIAL TO EMIT FOR TURBINE OPERATING CONDITIONS WITH BACT																
Control Device ID	**Description**	**Max. Potential LFG Flow (scfm)**	**Max. Annual Potential Operation (hours)**	**units**	**Emissions**											
					NO_x	**CO**	**SO_2 w/o BACT [c]**	**SO_2 w/ BACT [c]**	**PM_{10}**	**NMOC**	**VOC**	**HAP (Total)**	**HAP (Single)**	**H2S w/o BACT**	**H2S with BACT**
CD-016	Titan Turbine [a,b]	5,000	8760	lb/hr	46.36	196.0	252.5	20.2	2.8	0.8	0.3	1.4	1.2	0.13	0.01
				tpy	203	858	1,106	89	12	4	1	6	5.3	0.59	0.05
CD-017	Centaur Turbine 1 [a,b]	1,500	8760	lb/hr	7.89	60.1	75.7	6.1	0.8	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	35	263	332	27	4	1	0	2	1.6	0.18	0.01
CD-018	Centaur Turbine 2 [a,b]	1,500	8760	lb/hr	7.89	60.1	75.7	6.1	0.8	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	35	263	332	27	4	1	0	2	1.6	0.18	0.01
CD-019	Centaur Turbine 3 [a,b]	1,500	8760	lb/hr	7.89	60.1	75.7	6.1	0.8	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	35	263	332	27	4	1	0	2	1.6	0.18	0.01
CD-020	Centaur Turbine 4 [a,b]	1,500	8760	lb/hr	7.89	60.1	75.7	6.1	0.8	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	35	263	332	27	4	1	0	2	1.6	0.18	0.01
CD-021	Centaur Turbine 5 [a,b]	1,500	8760	lb/hr	7.89	60.1	75.7	6.1	0.8	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	35	263	332	27	4	1	0	2	1.6	0.18	0.01
CD-022	Centaur Turbine 6 [a,b]	1,500	8760	lb/hr	7.89	60.1	75.7	6.1	0.8	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	35	263	332	27	4	1	0	2	1.6	0.18	0.01
CD-023	Centaur Turbine 7 [a,b]	1,500	8760	lb/hr	7.89	60.1	75.7	6.1	0.8	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	35	263	332	27	4	1	0	2	1.6	0.18	0.01
CD-024	Centaur Turbine 8 [a,b]	1,500	8760	lb/hr	7.89	60.1	75.7	6.1	0.8	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	35	263	332	27	4	1	0	2	1.6	0.18	0.01
CD-025	Centaur Turbine 9 [a,b]	1,500	8760	lb/hr	7.89	60.1	75.7	6.1	0.8	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	35	263	332	27	4	1	0	2	1.6	0.18	0.01
CD-026	Centaur Turbine 10 [a,b]	1,500	8760	lb/hr	7.89	60.1	75.7	6.1	0.8	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	35	263	332	27	4	1	0	2	1.6	0.18	0.01
CD-027	Centaur Turbine 11 [a,b]	1,500	8760	lb/hr	7.89	60.1	75.7	6.1	0.8	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	35	263	332	27	4	1	0	2	1.6	0.18	0.01
CD-028	Centaur Turbine 12 [a,b]	1,500	8760	lb/hr	7.89	60.1	75.7	6.1	0.8	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	35	263	332	27	4	1	0	2	1.6	0.18	0.01
CD-029	Centaur Turbine 13 [a,b]	1,500	8760	lb/hr	7.89	60.1	75.7	6.1	0.8	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	35	263	332	27	4	1	0	2	1.6	0.18	0.01
CD-030	Centaur Turbine 14 [a,b]	1,500	8760	lb/hr	7.89	60.1	75.7	6.1	0.8	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	35	263	332	27	4	1	0	2	1.6	0.18	0.01
CD-031	Centaur Turbine 15 [a,b]	1,500	8760	lb/hr	7.89	60.1	75.7	6.1	0.8	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	35	263	332	27	4	1	0	2	1.6	0.18	0.01
CD-004	Open Flare	3,300	8760	lb/hr	6.7	36.6	166.6	13.36	1.5	0.53	0.21	0.9	0.8	0.10	0.007
				tpy	29	160	730	59	7	2	1	4	3.5	0.45	0.03
CD-003	Open Flare	1,600	8760	lb/hr	3.3	17.8	80.8	6.5	0.8	0.3	0.1	0.4	0.4	0.05	0.003
				tpy	14	78	354	28	3	1	0	2	1.7	0.22	0.01
TOTAL Proposed PTE with BACT		**32,400**		**lb/hr**	**174.8**	**1,151.3**	**1,636.0**	**131.3**	**17.5**	**5.3**	**2.1**	**8.9**	**7.9**	**0.9**	**0.1**
				tpy	**765.3**	**5,042.5**	**7,165.7**	**574.8**	**76.6**	**23.0**	**9.0**	**39.0**	**34.4**	**3.9**	**0.3**

SUMMARY - ALTERNATIVE OPERATING SCENARIO A - POTENTIAL TO EMIT FOR FLARE OPERATING CONDITIONS WITH BACT

Control Device ID	Description	Max. Potential LFG Flow (scfm)	Max. Annual Potential Operation (hours)	Units	Emissions										
					NO_x	CO	SO_2 w/o BACT [c]	SO_2 w/ BACT	PM_{10}	NMOC	VOC	HAP (Total)	HAP (Single)	H2S w/o BACT	H2S with BACT
CD-003	Open Unenclosed Flare (Backup) - 1	2,100	8760	lb/hr	4.3	23.3	106.0	8.5	1.0	0.3	0.1	0.6	0.5	0.07	0.004
				tpy	18.8	102.1	464.4	37.3	4.3	1.5	0.6	2.5	2.2	0.31	0.02
CD-004	Proposed Utility Flare (odor control) - 2	3,300	8760	lb/hr	6.7	36.6	166.6	13.4	1.5	0.5	0.2	0.9	0.8	0.09	0.007
				tpy	29.5	160.4	730	58.5	6.8	2.3	0.9	4.0	3.5	0.39	0.03
CD-005	Proposed Utility Flare - 3	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.006
				tpy	26.8	145.9	663	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
CD-006	Proposed Utility Flare - 4	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.006
				tpy	26.8	145.9	663	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
CD-007	Proposed Utility Flare - 5	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.006
				tpy	26.8	145.9	663	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
CD-008	Proposed Utility Flare - 6	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.006
				tpy	26.8	145.9	663.5	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
CD-009	Proposed Utility Flare - 7	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.006
				tpy	26.8	145.9	663	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
CD-010	Proposed Utility Flare - 8	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.006
				tpy	26.8	145.9	663.5	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
CD-011	Proposed Utility Flare - 9	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.006
				tpy	26.8	145.9	663	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
CD-012	Proposed Utility Flare - 10	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.006
				tpy	26.8	145.9	663.5	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
CD-013	Proposed Utility Flare - 11	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.006
				tpy	26.8	145.9	663	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
Total Proposed PTE Flaring with BACT		**32,400**	**8,760**	**lb/hr**	**66.1**	**359.7**	**1,636.0**	**131.3**	**15.3**	**5.3**	**2.1**	**8.9**	**7.9**	**0.9**	**0.1**
				tpy	**289.6**	**1,575.3**	**7,165.5**	**574.8**	**66.6**	**23.0**	**9.0**	**39.0**	**34.4**	**3.9**	**0.3**

SUMMARY - ALTERNATIVE OPERATING SCENARIO B - POTENTIAL TO EMIT FOR FLARE OPERATING CONDITIONS WITH BACT

Control Device ID	Description	Max. Potential LFG Flow (scfm)	Max. Annual Potential Operation (hours)	Units	Emissions										
					NO_x	CO	SO_2 w/o BACT [c]	SO_2 w/ BACT	PM_{10}	NMOC	VOC	HAP (Total)	HAP (Single)	H2S w/o BACT	H2S with BACT
CD-003	Open Unenclosed Flare (Backup)	2,100	8760	lb/hr	4.3	23.3	106.0	8.5	1.0	0.3	0.1	0.6	0.5	0.07	0.004
				tpy	18.8	102.1	464.4	37.3	4.3	1.5	0.6	2.5	2.2	0.31	0.02
CD-004	Proposed Utility Flare (odor control) - 2	3,300	8760	lb/hr	6.7	36.6	166.6	13.4	1.5	0.5	0.2	0.9	0.8	0.09	0.01
				tpy	29.5	160.4	730	58.5	6.8	2.3	0.9	4.0	3.5	0.39	0.03
CD-014	Proposed Utility Flare - 3A	1,500	8760	lb/hr	3.1	16.7	75.7	6.1	0.7	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	13.4	72.9	332	26.6	3.1	1.1	0.4	1.8	1.6	0.18	0.01
CD-015	Proposed Utility Flare - 3B	1,500	8760	lb/hr	3.1	16.7	75.7	6.1	0.7	0.2	0.1	0.4	0.4	0.04	0.003
				tpy	13.4	72.9	332	26.6	3.1	1.1	0.4	1.8	1.6	0.18	0.01
CD-006	Proposed Utility Flare - 4	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.0
				tpy	26.8	145.9	663	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
CD-007	Proposed Utility Flare - 5	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.01
				tpy	26.8	145.9	663.5	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
CD-008	Proposed Utility Flare - 6	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.01
				tpy	26.8	145.9	663	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
CD-009	Proposed Utility Flare - 7	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.01
				tpy	26.8	145.9	663.5	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
CD-010	Proposed Utility Flare - 8	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.01
				tpy	26.8	145.9	663	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
CD-011	Proposed Utility Flare - 9	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.01
				tpy	26.8	145.9	663.5	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
CD-012	Proposed Utility Flare - 10	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.01
				tpy	26.8	145.9	663	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
CD-013	Proposed Utility Flare - 11	3,000	8760	lb/hr	6.1	33.3	151.5	12.1	1.4	0.5	0.2	0.8	0.7	0.08	0.01
				tpy	26.8	145.9	663.5	53.2	6.2	2.1	0.8	3.6	3.2	0.35	0.03
Total Proposed PTE Flaring with BACT		**32,400**	**8,760**	**lb/hr**	**66.1**	**359.7**	**1,636.0**	**131.3**	**15.3**	**5.3**	**2.1**	**8.9**	**7.9**	**0.9**	**0.1**
				tpy	**289.6**	**1,575.3**	**7,165.5**	**574.8**	**66.6**	**23.0**	**9.0**	**39.0**	**34.4**	**3.9**	**0.3**

MAXIMUM POTENTIAL-TO-EMIT TO BASELINE ACTUAL NET INCREASE (highest rate used per pollutant)															
					Emissions										
Control Device ID	**Description**	**Max. Potential LFG Flow (scfm)**	**Max. Annual Potential Operation (hours)**	**Units**	**NO_x**	**CO**	**SO_2 w/o BACT**	**SO_2 w/ BACT**	**PM_{10}**	**NMOC**	**VOC**	**HAP (Total)**	**HAP (Single)**	**H2S w/o BACT**	**H2S with BACT**
Varies	Control Device with For each pollutant, the Max. PTE	32,400	8760	lb/lb	**166.2**	**1,121.4**	**1,360.4**	**(144.3)**	**15.3**	**4.5**	**1.7**	**7.6**	**6.7**	**0.7**	**(0.1)**
				tpy	727.9	4,911.7	5,958.7	(632.2)	66.9	19.6	7.6	33.3	29.4	3.2	(0.4)
Significant Emission Rates [62-210.200(264) F.A.C.]				tpy	40	100	40	40	15	50	40	25	10	10	10
Source for Highest Pollutant Rate					Turbines	Turbines	Both	Both	Turbines	Both	Both	Both	Both	Both	Both

Dear David,

As per your request, the following are the Solar Turbines gas turbine air emissions guarantees for your proposed landfill gas to power project in Lake Okeechobee, Florida. These values are based on the average ambient air temperature of 73 F and an elevation of 34 feet above sea level with an assumed 60% relative humidity.

Information provided by Solar Turbines September 17, 2008 letter

Turbine Model	Power Output (kW)	Gas Flow (lb/min.)	Exhaust Gas Temp. (F)	Exhaust Gas Temp. (F) 50% Load	NOx (ppmv) 15% O2	NOx (lb/h)	NOx (g/bhp)	CO (ppmv) 15% O2	CO (lb/h)	CO (g/bhp)	CO (lb/h) at 50% Load
Titan 130-20501	15185	6664.7	935	696	72	46.36	0.987	100	78.38	1.67	195.95
Centaur 40-4700	3337.4	2505.9	837	595	42	7.89	0.746	250	28.6	2.7	60.06

We suggested a minimum stack height of 30 feet to obtain the proper flue gas dispersion and draft away from the turbine air inlet, etc. However, each site is specific relative to stack height based on local ordinances, air permits, adjacent building heights, etc.

If any other data is required, please let us know.

Regards,
Chris Lyons

Titan 130

Parameter	Value	Units	Reference
Stack Height	35	ft	As per Sept. 17, 2008 letter from
Stack Interior Diameter	120	in	Solar Turbines
PM10 Rate	0.023	lb/MMBtu	AP-42, Table 3.1-2b
Turbine Inlet	5000	scfm	Solar Turbines
Exhaust Flow Rate 100% Load	236019	acfm	Solar Turbines
Exhaust Flow Rate 100% Load	50.08	ft/s	Calculated
Exhaust Flow Rate 50% Load	192937	acfm	Solar Turbines
Exhaust Flow Rate 50% Load	40.94	ft/s	Calculated
Average Landfill gas HHV	400	Btu/scf	AP-42, Table 3.1-2b
PM10 Rate	2.8	lb/hr	Calculated

Centaur 40

Parameter	Value	Units	Reference
Stack Height	35	ft	As per Sept. 17, 2008 letter from
Stack Interior Diameter	48	in	Solar Turbines
PM10 Rate	0.023	lb/MMBtu	AP-42, Table 3.1-2b
Turbine Inlet	1500	scfm	Solar Turbines
Exhaust Flow Rate 100% Load	82503	acfm	Solar Turbines
Exhaust Flow Rate 100% Load	109.42	ft/s	Calculated
Exhaust Flow Rate 50% Load	66741	acfm	Solar Turbines
Exhaust Flow Rate 50% Load	88.52	ft/s	Calculated
Average Landfill gas HHV	400	Btu/scf	AP-42, Table 3.1-2b
PM10 Rate	0.8	lb/hr	Calculated

Proposed operation of new Turbine

Criteria Pollutant Emissions - Turbine (Titan)

Operation Period	8,760	hr		
LFG inlet flow, standard	5,000	scfm		
Heat Input	150	MMBtu/hr	500	Btu/cf
Standard Temperature[a]	60	°F	520	°R

SO_2 Emission Rate w/o BACT

SO_2 concentration in exhaust gas	4987.58	ppmv		
SO_2 emission rate	252.46	lb/hr	1105.8	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.06
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.02
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.40
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.12
Hydrogen Sulfide	7783-06-4	34.08	**4973.34**	100.0%	1	4973.3	251.74
Methyl Mercaptan	74-93-1	48.11	2.49	100%	1	2.49	0.13
					Total Contribution to SO_2 :	4987.58	252.46

SO_2 Emission Rate with BACT

SO_2 concentration in exhaust gas	400.05	ppmv		
SO_2 emission rate	20.25	lb/hr	88.7	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.06
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.02
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.40
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.12
Hydrogen Sulfide	7783-06-4	34.08	**385.80**	100.0%	1	385.8	19.53
Methyl Mercaptan	74-93-1	48.11	2.49	100%	1	2.49	0.13
					Total Contribution to SO_2 :	400.05	20.25

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	40.5	lb/hr		
NMOC emission rate	0.81	lb/hr	3.55	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	15.8	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.32	lb/hr	1.38	tpy

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.

[b]AP-42 gives ranges for control efficiencies.

Proposed operation of new Turbine
Air Toxics Emissions from Turbine (Titan).

The turbine's inlet flow = 5,000 **scfm**

LFG Compound	HAP	CAS	MW (lb/lb-mol)	Compound Conc & Mass in Inlet Gas (ppmv)[a]	(lb/hr)	Control Eff[a,b]	turbine Exhaust (lb/hr)*	(tpy)*
1,1,1 - Trichloroethane (methyl chloroform)	x	71-55-6	133.41	0.48	5.06E-02	98.0%	1.01E-03	4.43E-03
1,1,2,2 - Tetrachloroethane	x	79-34-5	167.85	1.11	1.47E-01	98.0%	2.94E-03	1.29E-02
1,1,2 - Trichloroethane (1,1,2 TCA)	x	79-00-5	133.41	0.10	1.05E-02	98.0%	2.11E-04	9.23E-04
1,1 - Dichloroethane (ethylidene dichloride)	x	75-34-3	98.96	2.35	1.84E-01	98.0%	3.67E-03	1.61E-02
1,1 - Dichloroethene (vinylidene chloride)	x	75-35-4	96.94	0.20	1.54E-02	98.0%	3.08E-04	1.35E-03
1,2 - Dichloroethane (ethylene dichloride)	x	107-06-2	98.96	0.41	3.18E-02	98.0%	6.36E-04	2.79E-03
1,2 - Dichloropropane (propylene dichloride)	x	78-87-5	112.99	0.18	1.61E-02	98.0%	3.21E-04	1.41E-03
2-Propanol (isopropyl alcohol)	--	67-63-0	60.11	50.1	2.38E+00	98.0%	4.76E-02	2.08E-01
Acetone (2-propanone)	--	67-64-1	58.08	7.01	3.22E-01	98.0%	6.43E-03	2.82E-02
Acrylonitrile (Propenenitrile)	x	107-13-1	53.06	6.33	2.65E-01	98.0%	5.31E-03	2.32E-02
Benzene	x	71-43-2	78.12	1.91	1.18E-01	98.0%	2.36E-03	1.03E-02
Bromodichloromethane	--	75-27-4	163.83	3.13	4.05E-01	98.0%	8.10E-03	3.55E-02
Butane	--	106-97-8	58.12	5.03	2.31E-01	98.0%	4.62E-03	2.02E-02
Carbon Disulfide	x	75-15-0	76.14	0.58	3.51E-02	98.0%	7.01E-04	3.07E-03
Carbon Tetrachloride	x	56-23-5	153.84	0.004	4.86E-04	98.0%	9.72E-06	4.26E-05
Carbonyl Sulfide	x	463-58-1	60.07	0.49	2.33E-02	98.0%	4.65E-04	2.04E-03
Chlorobenzene (monochlorobenzene)	x	108-90-7	112.56	0.25	2.26E-02	98.0%	4.52E-04	1.98E-03
Chlorodifluoromethane (CFC-22, freon-22)	--	75-45-6	86.47	1.30	8.88E-02	98.0%	1.78E-03	7.78E-03
Chloroethane (ethyl chloride)	x	75-00-3	64.52	1.25	6.37E-02	98.0%	1.27E-03	5.58E-03
Chloroform (trichloromethane)	x	67-66-3	119.38	0.03	2.83E-03	98.0%	5.66E-05	2.48E-04
Chloromethane (methyl chloride)	x	74-87-3	50.49	1.21	4.83E-02	98.0%	9.65E-04	4.23E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	106-46-7	147	0.21	2.47E-02	98.0%	4.95E-04	2.17E-03
Dichlorodifluoromethane (CFC-12, freon-12)	--	75-71-8	120.91	15.7	1.50E+00	98.0%	3.00E-02	1.31E-01
Dichlorofluoromethane (freon-21)	--	75-43-4	102.92	2.62	2.13E-01	98.0%	4.26E-03	1.87E-02
Dichloromethane (methylene chloride)	x	75-09-2	84.93	14.3	9.60E-01	98.0%	1.92E-02	8.41E-02
Dimethyl Sulfide (methyl sulfide)	--	75-18-3	62.13	7.82	3.84E-01	98.0%	7.68E-03	3.36E-02
Ethane	--	74-84-0	30.07	889	2.11E+01	98.0%	4.22E-01	1.85E+00
Ethanol (ethyl alcohol)	--	64-17-5	46.08	27.2	9.90E-01	98.0%	1.98E-02	8.67E-02
Ethylbenzene	x	100-41-4	106.17	4.61	3.87E-01	98.0%	7.73E-03	3.39E-02
Ethyl Mercaptan (ethanethiol)	--	75-08-1	62.13	1.25	6.14E-02	98.0%	1.23E-03	5.38E-03
Ethylene dibromide (1,2 dibromoethane)	x	106-93-4	187.88	0.001	1.48E-04	98.0%	2.97E-06	1.30E-05
Fluorotrichloromethane (CFC-11, freon-11)	--	75-69-4	137.37	0.76	8.25E-02	98.0%	1.65E-03	7.23E-03
Hexane	x	110-54-3	86.18	6.57	4.47E-01	98.0%	8.95E-03	3.92E-02
Hydrogen Sulfide[e] With BACT	--	7783-06-4	34.08	385.8	1.04E+01	99.9%	1.04E-02	4.55E-02
Hydrogen Sulfide[e] without BACT	--	7783-06-4	34.08	4973.34	1.34E+02	99.9%	1.34E-01	5.87E-01
Mercury (total)	x	7439-97-6	200.61	2.92E-4	4.63E-05	0.0%	4.63E-05	2.03E-04
Methyl Ethyl Ketone (2-butanone)	--	78-93-3	72.11	7.09	4.04E-01	98.0%	8.08E-03	3.54E-02
Methyl Isobutyl Ketone (hexone)	x	108-10-1	100.16	1.87	1.48E-01	98.0%	2.96E-03	1.30E-02
Methyl Mercaptan	--	74-93-1	48.11	2.49	9.46E-02	98.0%	1.89E-03	8.29E-03
Pentane	--	109-66-0	72.15	3.29	1.88E-01	98.0%	3.75E-03	1.64E-02
ethene)	x	127-18-4	165.83	3.73	4.89E-01	98.0%	9.77E-03	4.28E-02
Propane	--	74-98-6	44.1	11.1	3.87E-01	98.0%	7.74E-03	3.39E-02
Toluene (methylbenzene)	x	108-88-3	92.14	39.3	2.86E+00	98.0%	5.72E-02	2.51E-01
Trichloroethylene (trichloroethene)	x	79-01-6	131.38	2.82	2.93E-01	98.0%	5.85E-03	2.56E-02
dichloroethylene)	--	156-60-5	96.94	2.84	2.18E-01	98.0%	4.35E-03	1.91E-02
Vinyl Chloride (chloroethylene, VCM)	x	75-01-4	62.50	7.34	3.62E-01	98.0%	7.25E-03	3.18E-02
Xylenes (m, o, p)	x	1330-20-7	106.17	12.1	1.01E+00	98.0%	2.03E-02	8.89E-02
Hydrogen Chloride[d]	x	7647-01-0	36.50	42.0	1.21E+00	0.0%	1.21E+00	5.31E+00
Total HAP							1.37	6.0
Maximum Single HAP							1.21	5.31
Hydrogen Sulfide							0.01	0.05

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,*

[b]AP-42 gives ranges for control efficiencies.

[c]Product of combustion

[d]Because HCl is a production of combustion, a default <u>outlet</u> concentration is listed; AP-42, Section 2.4.4.

[e]Control Efficiency based on various references including; Canadian Centre for Occupational Health and Safety: CCOHS Chemical Name hydrogen Sulfide; October 3, 2005

Proposed operation of new Turbine
Criteria Pollutant Emissions - Turbines (Centaur)

Operation Period	8,760	hr		
LFG inlet flow, standard	1,500	scfm		
Heat Input	45	MMBtu/hr	500	Btu/cf
Standard Temperature[a]	60	°F	520	°R

SO_2 Emission Rate with BACT

SO_2 concentration in exhaust gas	400.05	ppmv		
SO_2 emission rate	6.07	lb/hr	26.6	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.02
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.12
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.03
Hydrogen Sulfide	7783-06-4	34.08	**385.80**	100.0%	1	385.8	5.86
Methyl Mercaptan	74-93-1	48.11	2.49	100%	1	2.49	0.04
				Total Contribution to SO_2 :		400.05	6.07

SO_2 Emission Rate with BACT

SO_2 concentration in exhaust gas	400.05	ppmv		
SO_2 emission rate	6.07	lb/hr	26.6	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.02
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.12
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.03
Hydrogen Sulfide	7783-06-4	34.08	**385.80**	100.0%	1	385.8	5.86
Methyl Mercaptan	74-93-1	48.11	2.49	100%	1	2.49	0.04
				Total Contribution to SO_2 :		400.05	6.07

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	12.2	lb/hr		
NMOC emission rate	0.24	lb/hr	1.06	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	4.7	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.09	lb/hr	0.42	tpy

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.
[b]AP-42 gives ranges for control efficiencies.

Emissions Calculations

Proposed operation of new Turbine **Okeechobee (Berman Road) Landfill**

Air Toxics Emissions from Turbines (Centaur). Okeechobee, Fl

The turbine's inlet flow = **1,500** **scfm**

LFG Compound	HAP	VOC	CAS	MW (lb/lb-mol)	Compound Conc & Mass in Inlet Gas (ppmv)[a]	Compound Conc & Mass in Inlet Gas (lb/hr)	Control Eff[a,b]	turbine Exhaust (lb/hr)*	turbine Exhaust (tpy)*
1,1,1 - Trichloroethane (methyl chloroform)	x	--	71-55-6	133.41	0.48	1.52E-02	98.0%	3.04E-04	1.33E-03
1,1,2,2 - Tetrachloroethane	x	x	79-34-5	167.85	1.11	4.42E-02	98.0%	8.83E-04	3.87E-03
1,1,2 - Trichloroethane (1,1,2 TCA)	x	x	79-00-5	133.41	0.10	3.16E-03	98.0%	6.32E-05	2.77E-04
1,1 - Dichloroethane (ethylidene dichloride)	x	x	75-34-3	98.96	2.35	5.51E-02	98.0%	1.10E-03	4.83E-03
1,1 - Dichloroethene (vinylidene chloride)	x	x	75-35-4	96.94	0.20	4.62E-03	98.0%	9.24E-05	4.05E-04
1,2 - Dichloroethane (ethylene dichloride)	x	x	107-06-2	98.96	0.41	9.55E-03	98.0%	1.91E-04	8.36E-04
1,2 - Dichloropropane (propylene dichloride)	x	x	78-87-5	112.99	0.18	4.82E-03	98.0%	9.64E-05	4.22E-04
2-Propanol (isopropyl alcohol)	--	x	67-63-0	60.11	50.1	7.14E-01	98.0%	1.43E-02	6.25E-02
Acetone (2-propanone)	--	--	67-64-1	58.08	7.01	9.65E-02	98.0%	1.93E-03	8.45E-03
Acrylonitrile (Propenenitrile)	x	x	107-13-1	53.06	6.33	7.96E-02	98.0%	1.59E-03	6.97E-03
Benzene	x	x	71-43-2	78.12	1.91	3.54E-02	98.0%	7.07E-04	3.10E-03
Bromodichloromethane	--	x	75-27-4	163.83	3.13	1.22E-01	98.0%	2.43E-03	1.06E-02
Butane	--	x	106-97-8	58.12	5.03	6.93E-02	98.0%	1.39E-03	6.07E-03
Carbon Disulfide	x	x	75-15-0	76.14	0.58	1.05E-02	98.0%	2.10E-04	9.22E-04
Carbon Tetrachloride	x	x	56-23-5	153.84	0.004	1.46E-04	98.0%	2.92E-06	1.28E-05
Carbonyl Sulfide	x	x	463-58-1	60.07	0.49	6.98E-03	98.0%	1.40E-04	6.11E-04
Chlorobenzene (monochlorobenzene)	x	x	108-90-7	112.56	0.25	6.78E-03	98.0%	1.36E-04	5.94E-04
Chlorodifluoromethane (CFC-22, freon-22)	--	--	75-45-6	86.47	1.30	2.66E-02	98.0%	5.33E-04	2.33E-03
Chloroethane (ethyl chloride)	x	x	75-00-3	64.52	1.25	1.91E-02	98.0%	3.82E-04	1.67E-03
Chloroform (trichloromethane)	x	x	67-66-3	119.38	0.03	8.49E-04	98.0%	1.70E-05	7.44E-05
Chloromethane (methyl chloride)	x	x	74-87-3	50.49	1.21	1.45E-02	98.0%	2.90E-04	1.27E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	x	106-46-7	147	0.21	7.42E-03	98.0%	1.48E-04	6.50E-04
Dichlorodifluoromethane (CFC-12, freon-12)	--	--	75-71-8	120.91	15.7	4.50E-01	98.0%	9.00E-03	3.94E-02
Dichlorofluoromethane (freon-21)	--	--	75-43-4	102.92	2.62	6.39E-02	98.0%	1.28E-03	5.60E-03
Dichloromethane (methylene chloride)	x	--	75-09-2	84.93	14.3	2.88E-01	98.0%	5.76E-03	2.52E-02
Dimethyl Sulfide (methyl sulfide)	--	x	75-18-3	62.13	7.82	1.15E-01	98.0%	2.30E-03	1.01E-02
Ethane	--	--	74-84-0	30.07	889	6.34E+00	98.0%	1.27E-01	5.55E-01
Ethanol (ethyl alcohol)	--	x	64-17-5	46.08	27.2	2.97E-01	98.0%	5.94E-03	2.60E-02
Ethylbenzene	x	x	100-41-4	106.17	4.61	1.16E-01	98.0%	2.32E-03	1.02E-02
Ethyl Mercaptan (ethanethiol)	--	x	75-08-1	62.13	1.25	1.84E-02	98.0%	3.68E-04	1.61E-03
Ethylene dibromide (1,2 dibromoethane)	x	x	106-93-4	187.88	0.001	4.45E-05	98.0%	8.91E-07	3.90E-06
Fluorotrichloromethane (CFC-11, freon-11)	--	--	75-69-4	137.37	0.76	2.47E-02	98.0%	4.95E-04	2.17E-03
Hexane	x	x	110-54-3	86.18	6.57	1.34E-01	98.0%	2.68E-03	1.18E-02
Hydrogen Sulfide[e] With BACT	--	--	7783-06-4	34.08	385.8	3.12E+00	99.9%	3.12E-03	1.37E-02
Hydrogen Sulfide[e] without BACT	--	--	7783-06-4	34.08	**4973.34**	4.02E+01	99.9%	4.02E-02	1.76E-01
Mercury (total)	x	--	7439-97-6	200.61	2.92E-4	1.39E-05	0.0%	1.39E-05	6.08E-05
Methyl Ethyl Ketone (2-butanone)	--	--	78-93-3	72.11	7.09	1.21E-01	98.0%	2.42E-03	1.06E-02
Methyl Isobutyl Ketone (hexone)	x	x	108-10-1	100.16	1.87	4.44E-02	98.0%	8.88E-04	3.89E-03
Methyl Mercaptan	--	x	74-93-1	48.11	2.49	2.84E-02	98.0%	5.68E-04	2.49E-03
Pentane	--	x	109-66-0	72.15	3.29	5.63E-02	98.0%	1.13E-03	4.93E-03
ethene)	x	x	127-18-4	165.83	3.73	1.47E-01	98.0%	2.93E-03	1.28E-02
Propane	--	x	74-98-6	44.1	11.1	1.16E-01	98.0%	2.32E-03	1.02E-02
Toluene (methylbenzene)	x	x	108-88-3	92.14	39.3	8.58E-01	98.0%	1.72E-02	7.52E-02
Trichloroethylene (trichloroethene)	x	x	79-01-6	131.38	2.82	8.78E-02	98.0%	1.76E-03	7.69E-03
dichloroethylene)	--	--	156-60-5	96.94	2.84	6.53E-02	98.0%	1.31E-03	5.72E-03
Vinyl Chloride (chloroethylene, VCM)	x	x	75-01-4	62.50	7.34	1.09E-01	98.0%	2.17E-03	9.53E-03
Xylenes (m, o, p)	x	x	1330-20-7	106.17	12.1	3.04E-01	98.0%	6.09E-03	2.67E-02
Hydrogen Chloride[d]	x	--	7647-01-0	36.50	42.0	3.63E-01	0.0%	3.63E-01	1.59E+00
Total HAP								0.41	1.8
Maximum Single HAP								0.36	1.59
Hydrogen Sulfide								0.00	0.01

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,*

[b]AP-42 gives ranges for control efficiencies.

[c]Product of combustion

[d]Because HCl is a production of combustion, a default outlet concentration is listed; AP-42, Section 2.4.4.

[e]Control Efficiency based on various references including; Canadian Centre for Occupational Health and Safety: CCOHS Chemical Name hydrogen Sulfide; October 3, 2005

Proposed operation of new flares
Backup Flare

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft³/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft³	
LFG Methane Component[c]	50%		
LFG Typical Heating Value	500	Btu/ft³	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%		

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed
[d]*Professional Engineering Registration Program*, 23-9.

Fuel & Equipment - Enclosed Flare

Flare Information	Value		Equivalent
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[b]	2,800	scfm	
LFG Inlet Flow, dry standard	2,576	dscfm	
Heat Input	84	MMBtu/hr	
Design Flare Operating Temperature[c]	1,400	°F	1,860 °R
Excess Air for Combustion[c]	230%		
Flare Tip Flow, standard	2,800	scfm	
Flare Tip Flow, actual	3,015	acfm	
Flare Tip Diameter[b]	1.17	ft	
Flare Tip Exhaust Velocity	2,821	ft/min	47.0 ft/s
Flare Tip Height, above local grade[b]	30	ft	

[a]Permit Applicant

Proposed operation of new flares
Criteria Pollutant Emissions - Flare

Operation Period	8,760	hr
LFG inlet flow, standard	2,800	scfm
Heat Input	84	MMBtu/hr

SO_2 Emission Rate without BACT

SO_2 emission rate 141.38 lb/hr 619.2 tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.03
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.22
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.06
Hydrogen Sulfide	7783-06-4	34.08	**4973.34**	100.0%	1	4973.3	140.97
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.07
				Total Contribution to SO_2:		4987.58	141.38

SO_2 Emission Rate with BACT

Sulfur concentration in exhaust g 400.05 ppmv
SO_2 emission rate 11.34 lb/hr uncontrollec 49.7 tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.03
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.22
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.06
Hydrogen Sulfide	7783-06-4	34.08	**385.80**	100.0%	1	385.8	10.94
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.07
				Total Contribution to SO_2:		400.05	11.34

PM_{10} Emission Rate				
PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.31	lb/hr	5.75	tpy
NO_2 Emission Rate				
NO_2 emission factor[b]	0.068	lb/MMBtu		
NO_2 emission rate	5.7	lb/hr	25.0	tpy
CO Emission Rate				
CO emission factor[b]	0.37	lb/MMBtu		
CO emission rate	31.1	lb/hr	136	tpy
NMOC Emission Rate				
NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	22.7	lb/hr		
NMOC emission rate	0.45	lb/hr	1.99	tpy
VOC Emission Rate				
NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	8.8	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.18	lb/hr	0.78	tpy

[a]EPA 1998. "Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources" (AP-42), 5th Ed., November
[b]AP-42 gives ranges for control efficiencies.
[c]LFG Specialties Inc. (typical)

Proposed operation of new flares
EU 2,800-scfm Backup Flare
Air Toxics Emissions from Backup Flare.

The Flare's inlet flow = **2,800** **scfm**

LFG Compound	HAP	VOC	CAS	MW (lb/lb-mol)	Compound Conc & Mass in Inlet Gas (ppmv)[a]	Compound Conc & Mass in Inlet Gas (lb/hr)	Control Eff[a,b]	Flare Exhaust (lb/hr)*	Flare Exhaust (tpy)*
1,1,1 - Trichloroethane (methyl chloroform)	x	--	71-55-6	133.41	0.48	2.83E-02	98.0%	5.67E-04	2.48E-03
1,1,2,2 - Tetrachloroethane	x	x	79-34-5	167.85	1.11	8.24E-02	98.0%	1.65E-03	7.22E-03
1,1,2 - Trichloroethane (1,1,2 TCA)	x	x	79-00-5	133.41	0.10	5.90E-03	98.0%	1.18E-04	5.17E-04
1,1 - Dichloroethane (ethylidene dichloride)	x	x	75-34-3	98.96	2.35	1.03E-01	98.0%	2.06E-03	9.01E-03
1,1 - Dichloroethene (vinylidene chloride)	x	x	75-35-4	96.94	0.20	8.62E-03	98.0%	1.72E-04	7.55E-04
1,2 - Dichloroethane (ethylene dichloride)	x	x	107-06-2	98.96	0.41	1.78E-02	98.0%	3.56E-04	1.56E-03
1,2 - Dichloropropane (propylene dichloride)	x	x	78-87-5	112.99	0.18	9.00E-03	98.0%	1.80E-04	7.88E-04
2-Propanol (isopropyl alcohol)	--	x	67-63-0	60.11	50.1	1.33E+00	98.0%	2.66E-02	1.17E-01
Acetone (2-propanone)	--	--	67-64-1	58.08	7.01	1.80E-01	98.0%	3.60E-03	1.58E-02
Acrylonitrile (Propenenitrile)	x	x	107-13-1	53.06	6.33	1.49E-01	98.0%	2.97E-03	1.30E-02
Benzene	x	x	71-43-2	78.12	1.91	6.60E-02	98.0%	1.32E-03	5.78E-03
Bromodichloromethane	--	x	75-27-4	163.83	3.13	2.27E-01	98.0%	4.54E-03	1.99E-02
Butane	--	x	106-97-8	58.12	5.03	1.29E-01	98.0%	2.59E-03	1.13E-02
Carbon Disulfide	x	x	75-15-0	76.14	0.58	1.96E-02	98.0%	3.93E-04	1.72E-03
Carbon Tetrachloride	x	x	56-23-5	153.84	0.004	2.72E-04	98.0%	5.45E-06	2.39E-05
Carbonyl Sulfide	x	x	463-58-1	60.07	0.49	1.30E-02	98.0%	2.60E-04	1.14E-03
Chlorobenzene (monochlorobenzene)	x	x	108-90-7	112.56	0.25	1.26E-02	98.0%	2.53E-04	1.11E-03
Chlorodifluoromethane (CFC-22, freon-22)	--	--	75-45-6	86.47	1.30	4.97E-02	98.0%	9.95E-04	4.36E-03
Chloroethane (ethyl chloride)	x	x	75-00-3	64.52	1.25	3.57E-02	98.0%	7.14E-04	3.13E-03
Chloroform (trichloromethane)	x	x	67-66-3	119.38	0.03	1.58E-03	98.0%	3.17E-05	1.39E-04
Chloromethane (methyl chloride)	x	x	74-87-3	50.49	1.21	2.70E-02	98.0%	5.41E-04	2.37E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	x	106-46-7	147	0.21	1.39E-02	98.0%	2.77E-04	1.21E-03
Dichlorodifluoromethane (CFC-12, freon-12)	--	--	75-71-8	120.91	15.7	8.40E-01	98.0%	1.68E-02	7.36E-02
Dichlorofluoromethane (freon-21)	--	--	75-43-4	102.92	2.62	1.19E-01	98.0%	2.39E-03	1.05E-02
Dichloromethane (methylene chloride)	x	--	75-09-2	84.93	14.3	5.37E-01	98.0%	1.07E-02	4.71E-02
Dimethyl Sulfide (methyl sulfide)	--	x	75-18-3	62.13	7.82	2.15E-01	98.0%	4.30E-03	1.88E-02
Ethane	--	--	74-84-0	30.07	889	1.18E+01	98.0%	2.37E-01	1.04E+00
Ethanol (ethyl alcohol)	--	x	64-17-5	46.08	27.2	5.55E-01	98.0%	1.11E-02	4.86E-02
Ethylbenzene[g]	x	x	100-41-4	106.17	4.61	2.17E-01	98.0%	4.33E-03	1.90E-02
Ethyl Mercaptan (ethanethiol)	--	x	75-08-1	62.13	1.25	3.44E-02	98.0%	6.87E-04	3.01E-03
Ethylene dibromide (1,2 dibromoethane)	x	x	106-93-4	187.88	0.001	8.31E-05	98.0%	1.66E-06	7.28E-06
Fluorotrichloromethane (CFC-11, freon-11)	--	--	75-69-4	137.37	0.76	4.62E-02	98.0%	9.24E-04	4.05E-03
Hexane	x	x	110-54-3	86.18	6.57	2.51E-01	98.0%	5.01E-03	2.19E-02
Hydrogen Sulfide[e] With BACT	--	--	7783-06-4	34.08	385.8	5.82E+00	99.9%	5.82E-03	2.55E-02
Hydrogen Sulfide[e] without BACT	--	--	7783-06-4	34.08	4973.3	7.50E+01	99.9%	7.50E-02	3.28E-01
Mercury (total)	x	--	7439-97-6	200.61	2.92E-4	2.59E-05	0.0%	2.59E-05	1.14E-04
Methyl Ethyl Ketone (2-butanone)	--	--	78-93-3	72.11	7.09	2.26E-01	98.0%	4.52E-03	1.98E-02
Methyl Isobutyl Ketone (hexone)	x	x	108-10-1	100.16	1.87	8.29E-02	98.0%	1.66E-03	7.26E-03
Methyl Mercaptan	--	x	74-93-1	48.11	2.49	5.30E-02	98.0%	1.06E-03	4.64E-03
Pentane	--	x	109-66-0	72.15	3.29	1.05E-01	98.0%	2.10E-03	9.20E-03
ethene)	x	x	127-18-4	165.83	3.73	2.74E-01	98.0%	5.47E-03	2.40E-02
Propane	--	x	74-98-6	44.1	11.1	2.17E-01	98.0%	4.33E-03	1.90E-02
Toluene (methylbenzene)	x	x	108-88-3	92.14	39.3	1.60E+00	98.0%	3.20E-02	1.40E-01
Trichloroethylene (trichloroethene)	x	x	79-01-6	131.38	2.82	1.64E-01	98.0%	3.28E-03	1.44E-02
t - 1,2 - Dichloroethene (1,2 dichloroethylene)	--	--	156-60-5	96.94	2.84	1.22E-01	98.0%	2.44E-03	1.07E-02
Vinyl Chloride (chloroethylene, VCM)	x	x	75-01-4	62.50	7.34	2.03E-01	98.0%	4.06E-03	1.78E-02
Xylenes (m, o, p)	x	x	1330-20-7	106.17	12.1	5.68E-01	98.0%	1.14E-02	4.98E-02
Hydrogen Chloride[d]	x	--	7647-01-0	36.50	42.0	6.78E-01	0.0%	6.78E-01	2.97E+00
Total HAP[e]								0.77	3.4
Maximum Single HAP								0.68	2.97
Hydrogen Sulfide without BACT				34.08	5785.0	8.72E+01	99.9%	0.09	0.38

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.

[b]AP-42 gives ranges for control efficiencies.

[c]Product of combustion

[d]Because HCl is a production of combustion, a default outlet concentration is listed; AP-42, Section 2.4.4.

[e]Control Efficiency based on various references including; Canadian Centre for Occupational Health and Safety: CCOHS Chemical Name hydrogen Sulfide; October 3, 2005

Proposed operation of new flares
Odor Flare

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft³/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft³	
LFG Methane Component[c]	50%		
LFG Typical Heating Value	500	Btu/ft³	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%		
Methane Combustion Constant[d]	9.53	ft³ air/ft³ CH_4	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed
[d]*Professional Engineering Registration Program*, 23-9.

Fuel & Equipment - Enclosed Flare

Flare Information	Value		Equivalent
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[b]	3,300	scfm	
LFG Inlet Flow, dry standard	3,036	dscfm	
Heat Input	99	MMBtu/hr	
Design Flare Operating Temperature[c]	1,400	°F	1,860 °R
Excess Air for Combustion[c]	230%		
Flare Tip Flow, standard	55,191	scfm	
Flare Tip Flow, actual	197,413	acfm	
Flare Tip Diameter[b]	10.0	ft	
Flare Tip Exhaust Velocity	2,514	ft/min	41.9 ft/s
Flare Tip Height, above local grade[b]	45	ft	

[a]Permit Applicant

Proposed operation of new flares
Criteria Pollutant Emissions - Open Flare

Operation Period	8,760	hr
LFG inlet flow, standard	3,300	scfm
Heat Input	99	MMBtu/hr

SO_2 Emission Rate without BACT

SO_2 emission rate 13.36 lb/hr 58.5 tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.04
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.02
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.26
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.08
Hydrogen Sulfide	7783-06-4	34.08	**4973.34**	100.0%	1	4973.3	166.15
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.08
				Total Contribution to SO_2 :		4987.58	166.62

SO_2 Emission Rate with BACT

Sulfur concentration in exhaust ga 400.05 ppmv
SO_2 emission rate 13.36 lb/hr uncontrolled 58.5 tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.04
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.02
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.26
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.08
Hydrogen Sulfide	7783-06-4	34.08	**385.80**	100.0%	1	385.8	12.89
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.08
				Total Contribution to SO_2 :		400.05	13.36

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.55	lb/hr	6.8	tpy

NO_2 Emission Rate

NO_2 emission factor[b]	0.068	lb/MMBtu		
NO_2 emission rate	6.7	lb/hr	29.5	tpy

CO Emission Rate

CO emission factor[b]	0.37	lb/MMBtu		
CO emission rate	36.6	lb/hr	160	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	26.7	lb/hr		
NMOC emission rate	0.53	lb/hr	2.34	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	10.4	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.21	lb/hr	0.91	tpy

[a]EPA 1998. "Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources" (AP-42), 5th Ed., November
[b]AP-42 gives ranges for control efficiencies.
[c]LFG Specialties Inc. (typical)

Proposed operation of new flares
EU003 3,000-scfm enclosed flare w/evap
Air Toxics Emissions from Odor Flare.

The Flare's inlet flow = **3,300** **scfm**

LFG Compound	HAP	VOC	CAS	MW (lb/lb-mol)	Compound Conc & Mass in Inlet Gas (ppmv)[a]	(lb/hr)	Control Eff[a,b]	Flare Exhaust (lb/hr)*	(tpy)*
1,1,1 - Trichloroethane (methyl chloroform)	x	--	71-55-6	133.41	0.48	3.34E-02	98.0%	6.68E-04	2.93E-03
1,1,2,2 - Tetrachloroethane	x	x	79-34-5	167.85	1.11	9.72E-02	98.0%	1.94E-03	8.51E-03
1,1,2 - Trichloroethane (1,1,2 TCA)	x	x	79-00-5	133.41	0.10	6.96E-03	98.0%	1.39E-04	6.09E-04
1,1 - Dichloroethane (ethylidene dichloride)	x	x	75-34-3	98.96	2.35	1.21E-01	98.0%	2.43E-03	1.06E-02
1,1 - Dichloroethene (vinylidene chloride)	x	x	75-35-4	96.94	0.20	1.02E-02	98.0%	2.03E-04	8.90E-04
1,2 - Dichloroethane (ethylene dichloride)	x	x	107-06-2	98.96	0.41	2.10E-02	98.0%	4.20E-04	1.84E-03
1,2 - Dichloropropane (propylene dichloride)	x	x	78-87-5	112.99	0.18	1.06E-02	98.0%	2.12E-04	9.29E-04
2-Propanol (isopropyl alcohol)	--	x	67-63-0	60.11	50.1	1.57E+00	98.0%	3.14E-02	1.38E-01
Acetone (2-propanone)	--	--	67-64-1	58.08	7.01	2.12E-01	98.0%	4.25E-03	1.86E-02
Acrylonitrile (Propenenitrile)	x	x	107-13-1	53.06	6.33	1.75E-01	98.0%	3.50E-03	1.53E-02
Benzene	x	x	71-43-2	78.12	1.91	7.78E-02	98.0%	1.56E-03	6.82E-03
Bromodichloromethane	--	x	75-27-4	163.83	3.13	2.67E-01	98.0%	5.35E-03	2.34E-02
Butane	--	x	106-97-8	58.12	5.03	1.52E-01	98.0%	3.05E-03	1.34E-02
Carbon Disulfide	x	x	75-15-0	76.14	0.58	2.31E-02	98.0%	4.63E-04	2.03E-03
Carbon Tetrachloride	x	x	56-23-5	153.84	0.004	3.21E-04	98.0%	6.42E-06	2.81E-05
Carbonyl Sulfide	x	x	463-58-1	60.07	0.49	1.53E-02	98.0%	3.07E-04	1.34E-03
Chlorobenzene (monochlorobenzene)	x	x	108-90-7	112.56	0.25	1.49E-02	98.0%	2.98E-04	1.31E-03
Chlorodifluoromethane (CFC-22, freon-22)	--	--	75-45-6	86.47	1.30	5.86E-02	98.0%	1.17E-03	5.13E-03
Chloroethane (ethyl chloride)	x	x	75-00-3	64.52	1.25	4.21E-02	98.0%	8.41E-04	3.68E-03
Chloroform (trichloromethane)	x	x	67-66-3	119.38	0.03	1.87E-03	98.0%	3.74E-05	1.64E-04
Chloromethane (methyl chloride)	x	x	74-87-3	50.49	1.21	3.19E-02	98.0%	6.37E-04	2.79E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	x	106-46-7	147	0.21	1.63E-02	98.0%	3.27E-04	1.43E-03
Dichlorodifluoromethane (CFC-12, freon-12)	--	--	75-71-8	120.91	15.7	9.90E-01	98.0%	1.98E-02	8.67E-02
Dichlorofluoromethane (freon-21)	--	--	75-43-4	102.92	2.62	1.41E-01	98.0%	2.81E-03	1.23E-02
Dichloromethane (methylene chloride)	x	--	75-09-2	84.93	14.3	6.33E-01	98.0%	1.27E-02	5.55E-02
Dimethyl Sulfide (methyl sulfide)	--	x	75-18-3	62.13	7.82	2.53E-01	98.0%	5.07E-03	2.22E-02
Ethane	--	--	74-84-0	30.07	889	1.39E+01	98.0%	2.79E-01	1.22E+00
Ethanol (ethyl alcohol)	--	x	64-17-5	46.08	27.2	6.54E-01	98.0%	1.31E-02	5.73E-02
Ethylbenzene[g]	x	x	100-41-4	106.17	4.61	2.55E-01	98.0%	5.10E-03	2.24E-02
Ethyl Mercaptan (ethanethiol)	--	x	75-08-1	62.13	1.25	4.05E-02	98.0%	8.10E-04	3.55E-03
Ethylene dibromide (1,2 dibromoethane)	x	x	106-93-4	187.88	0.001	9.80E-05	98.0%	1.96E-06	8.58E-06
Fluorotrichloromethane (CFC-11, freon-11)	--	--	75-69-4	137.37	0.76	5.44E-02	98.0%	1.09E-03	4.77E-03
Hexane	x	x	110-54-3	86.18	6.57	2.95E-01	98.0%	5.91E-03	2.59E-02
Hydrogen Sulfidee With BACT	--	--	7783-06-4	34.08	385.8	6.86E+00	99.9%	6.86E-03	3.00E-02
Hydrogen Sulfidee without BACT	--	--	7783-06-4	34.08	4973.3	8.84E+01	99.9%	8.84E-02	3.87E-01
Mercury (total)	x	--	7439-97-6	200.61	2.92E-4	3.05E-05	0.0%	3.05E-05	1.34E-04
Methyl Ethyl Ketone (2-butanone)	--	--	78-93-3	72.11	7.09	2.67E-01	98.0%	5.33E-03	2.34E-02
Methyl Isobutyl Ketone (hexone)	x	x	108-10-1	100.16	1.87	9.77E-02	98.0%	1.95E-03	8.56E-03
Methyl Mercaptan	--	x	74-93-1	48.11	2.49	6.25E-02	98.0%	1.25E-03	5.47E-03
Pentane	--	x	109-66-0	72.15	3.29	1.24E-01	98.0%	2.48E-03	1.08E-02
ethene)	x	x	127-18-4	165.83	3.73	3.23E-01	98.0%	6.45E-03	2.83E-02
Propane	--	x	74-98-6	44.1	11.1	2.55E-01	98.0%	5.11E-03	2.24E-02
Toluene (methylbenzene)	x	x	108-88-3	92.14	39.3	1.89E+00	98.0%	3.78E-02	1.65E-01
Trichloroethylene (trichloroethene)	x	x	79-01-6	131.38	2.82	1.93E-01	98.0%	3.86E-03	1.69E-02
t - 1,2 - Dichloroethene (1,2 dichloroethylene)	--	--	156-60-5	96.94	2.84	1.44E-01	98.0%	2.87E-03	1.26E-02
Vinyl Chloride (chloroethylene, VCM)	x	x	75-01-4	62.50	7.34	2.39E-01	98.0%	4.78E-03	2.10E-02
Xylenes (m, o, p)	x	x	1330-20-7	106.17	12.1	6.70E-01	98.0%	1.34E-02	5.87E-02
Hydrogen Chloride[d]	x	--	7647-01-0	36.50	42.0	7.99E-01	0.0%	7.99E-01	3.50E+00
Total HAP[e]								0.91	4.0
Maximum Single HAP								0.80	3.50
Hydrogen Sulfide without BACT				34.08	5785.0	1.03E+02	99.9%	0.10	0.45

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.

[b]AP-42 gives ranges for control efficiencies.

[c]Product of combustion

[d]Because HCl is a production of combustion, a default outlet concentration is listed; AP-42, Section 2.4.4.

[e]Control Efficiency based on various references including; Canadian Centre for Occupational Health and Safety: CCOHS Chemical Name hydrogen Sulfide; October 3, 2005

Current open flare for interim scenario
EU NEW - Proposed 3,300-scfm utility flare

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft^3/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft^3	
LFG Methane Component[c]	50%	%	
LFG Typical Heating Value	500	Btu/ft^3	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%	%	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed

Fuel & Equipment - Open Flare

Flare Information	Value		Equivalent
No. of Hours of Operation Per Day[a]	24	hr	
No. of Days in Averaging Period[a]	365	day	
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[a]	2,300	scfm	
LFG Inlet Flow, dry standard	2,116	dscfm	
Heat Input	69.0	MMBtu/hr	
Design Flare Operating Temperature[b]	1,400	°F	1,860 °R
Flare Tip Flow, standard	2,300	scfm	
Flare Tip Flow, actual	2,477	acfm	
Flare Tip Diameter[b]	1.17	ft	
Flare Tip Exhaust Velocity	2,317	ft/min	38.6 ft/s
Flare Tip Height, above local grade[b]	35	ft	

[a]Permit Applicant

Current open flare for interim scenario

Criteria Pollutant Emissions - Open Flare

Operation Period	8,760	hr
LFG inlet flow, standard	2,300	scfm
Heat Input	69.0	MMBtu/hr

SO_2 Emission Rate

SO_2 concentration in exhaust gas	4987.58	ppmv		
SO_2 emission rate	116.13	lb/hr	508.66	ton/yr

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.03
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.18
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.05
Hydrogen Sulfide	7783-06-4	34.08	4973.34	100.0%	1	4973.3	115.80
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.06
				Total Contribution to SO_2 :		4987.58	116.13

SO_2 Emission Rate with BACT

SO_2 concentration in exhaust gas	400.05	ppmv		
SO_2 emission rate	9.31	lb/hr	40.80	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.03
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.18
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.05
Hydrogen Sulfide	7783-06-4	34.08	385.80	100.0%	1	385.8	8.98
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.06
				Total Contribution to SO_2 :		400.05	9.31

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.08	lb/hr	4.73	tpy

NO_2 Emission Rate

NO_2 emission factor[c]	0.068	lb/MMBtu		
NO_2 emission rate	4.69	lb/hr	20.55	tpy

CO Emission Rate

CO emission factor[c]	0.37	lb/MMBtu		
CO emission rate	25.5	lb/hr	111.8	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	18.64	lb/hr		
NMOC emission rate	0.37	lb/hr	1.63	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	7.27	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.15	lb/hr	0.64	tpy

[a]EPA 1998. "Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources" (AP-42), 5th Ed., November

[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end of the range is used here resulting in maximum calculated emissions of SO_2.

[c]LFG Specialties Inc. (typical)

Existing enclosed flare baseline
CD001 3,000-scfm enclosed flare w/evap
Air Toxics Emissions from Open Flare.

The Flare's inlet flow = **2,300 scfm**

LFG Compound	HAP	VOC	CAS	MW (lb/lb-mol)	Compound Conc & Mass in Inlet Gas (ppmv)[a]	(lb/hr)	Control Eff[a,b]	Flare Exhaust (lb/hr)*	(tpy)*
1,1,1 - Trichloroethane (methyl chloroform)	x	--	71-55-6	133.41	0.48	2.33E-02	98.0%	4.65E-04	2.04E-03
1,1,2,2 - Tetrachloroethane	x	x	79-34-5	167.85	1.11	6.77E-02	98.0%	1.35E-03	5.93E-03
1,1,2 - Trichloroethane (1,1,2 TCA)	x	x	79-00-5	133.41	0.10	4.85E-03	98.0%	9.70E-05	4.25E-04
1,1 - Dichloroethane (ethylidene dichloride)	x	x	75-34-3	98.96	2.35	8.45E-02	98.0%	1.69E-03	7.40E-03
1,1 - Dichloroethene (vinylidene chloride)	x	x	75-35-4	96.94	0.20	7.08E-03	98.0%	1.42E-04	6.20E-04
1,2 - Dichloroethane (ethylene dichloride)	x	x	107-06-2	98.96	0.41	1.46E-02	98.0%	2.93E-04	1.28E-03
1,2 - Dichloropropane (propylene dichloride)	x	x	78-87-5	112.99	0.18	7.39E-03	98.0%	1.48E-04	6.48E-04
2-Propanol (isopropyl alcohol)	--	x	67-63-0	60.11	50.1	1.09E+00	98.0%	2.19E-02	9.59E-02
Acetone (2-propanone)	--	--	67-64-1	58.08	7.01	1.48E-01	98.0%	2.96E-03	1.30E-02
Acrylonitrile (Propenenitrile)	x	x	107-13-1	53.06	6.33	1.22E-01	98.0%	2.44E-03	1.07E-02
Benzene	x	x	71-43-2	78.12	1.91	5.42E-02	98.0%	1.08E-03	4.75E-03
Bromodichloromethane	--	x	75-27-4	163.83	3.13	1.86E-01	98.0%	3.73E-03	1.63E-02
Butane	--	x	106-97-8	58.12	5.03	1.06E-01	98.0%	2.12E-03	9.31E-03
Carbon Disulfide	x	x	75-15-0	76.14	0.58	1.61E-02	98.0%	3.23E-04	1.41E-03
Carbon Tetrachloride	x	x	56-23-5	153.84	0.004	2.24E-04	98.0%	4.47E-06	1.96E-05
Carbonyl Sulfide	x	x	463-58-1	60.07	0.49	1.07E-02	98.0%	2.14E-04	9.37E-04
Chlorobenzene (monochlorobenzene)	x	x	108-90-7	112.56	0.25	1.04E-02	98.0%	2.08E-04	9.10E-04
Chlorodifluoromethane (CFC-22, freon-22)	--	--	75-45-6	86.47	1.30	4.09E-02	98.0%	8.17E-04	3.58E-03
Chloroethane (ethyl chloride)	x	x	75-00-3	64.52	1.25	2.93E-02	98.0%	5.86E-04	2.57E-03
Chloroform (trichloromethane)	x	x	67-66-3	119.38	0.03	1.30E-03	98.0%	2.60E-05	1.14E-04
Chloromethane (methyl chloride)	x	x	74-87-3	50.49	1.21	2.22E-02	98.0%	4.44E-04	1.95E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	x	106-46-7	147	0.21	1.14E-02	98.0%	2.28E-04	9.97E-04
Dichlorodifluoromethane (CFC-12, freon-12)	--	--	75-71-8	120.91	15.7	6.90E-01	98.0%	1.38E-02	6.04E-02
Dichlorofluoromethane (freon-21)	--	--	75-43-4	102.92	2.62	9.80E-02	98.0%	1.96E-03	8.58E-03
Dichloromethane (methylene chloride)	x	--	75-09-2	84.93	14.3	4.41E-01	98.0%	8.83E-03	3.87E-02
Dimethyl Sulfide (methyl sulfide)	--	x	75-18-3	62.13	7.82	1.77E-01	98.0%	3.53E-03	1.55E-02
Ethane	--	--	74-84-0	30.07	889	9.72E+00	98.0%	1.94E-01	8.51E-01
Ethanol (ethyl alcohol)	--	x	64-17-5	46.08	27.2	4.56E-01	98.0%	9.11E-03	3.99E-02
Ethylbenzene[g]	x	x	100-41-4	106.17	4.61	1.78E-01	98.0%	3.56E-03	1.56E-02
Ethyl Mercaptan (ethanethiol)	--	x	75-08-1	62.13	1.25	2.82E-02	98.0%	5.65E-04	2.47E-03
Ethylene dibromide (1,2 dibromoethane)	x	x	106-93-4	187.88	0.001	6.83E-05	98.0%	1.37E-06	5.98E-06
Fluorotrichloromethane (CFC-11, freon-11)	--	--	75-69-4	137.37	0.76	3.79E-02	98.0%	7.59E-04	3.32E-03
Hexane	x	x	110-54-3	86.18	6.57	2.06E-01	98.0%	4.12E-03	1.80E-02
Hydrogen Sulfidee With BACT	--	--	7783-06-4	34.08	385.8	4.78E+00	99.9%	4.78E-03	1.73E-06
Hydrogen Sulfidee without BACT	--	--	7783-06-4	34.08	4973.3	6.16E+01	99.9%	6.16E-02	2.70E-01
Mercury (total)	x	--	7439-97-6	200.61	2.92E-4	2.13E-05	0.0%	2.13E-05	9.32E-05
Methyl Ethyl Ketone (2-butanone)	--	--	78-93-3	72.11	7.09	1.86E-01	98.0%	3.72E-03	1.63E-02
Methyl Isobutyl Ketone (hexone)	x	x	108-10-1	100.16	1.87	6.81E-02	98.0%	1.36E-03	5.96E-03
Methyl Mercaptan	--	x	74-93-1	48.11	2.49	4.35E-02	98.0%	8.71E-04	3.81E-03
Pentane	--	x	109-66-0	72.15	3.29	8.63E-02	98.0%	1.73E-03	7.56E-03
ethene)	x	x	127-18-4	165.83	3.73	2.25E-01	98.0%	4.50E-03	1.97E-02
Propane	--	x	74-98-6	44.1	11.1	1.78E-01	98.0%	3.56E-03	1.56E-02
Toluene (methylbenzene)	x	x	108-88-3	92.14	39.3	1.32E+00	98.0%	2.63E-02	1.15E-01
Trichloroethylene (trichloroethene)	x	x	79-01-6	131.38	2.82	1.35E-01	98.0%	2.69E-03	1.18E-02
t - 1,2 - Dichloroethene (1,2 dichloroethylene)	--	--	156-60-5	96.94	2.84	1.00E-01	98.0%	2.00E-03	8.77E-03
Vinyl Chloride (chloroethylene, VCM)	x	x	75-01-4	62.50	7.34	1.67E-01	98.0%	3.33E-03	1.46E-02
Xylenes (m, o, p)	x	x	1330-20-7	106.17	12.1	4.67E-01	98.0%	9.34E-03	4.09E-02
Hydrogen Chloride[d]	x	--	7647-01-0	36.50	42.0	5.57E-01	0.0%	5.57E-01	2.44E+00
Total HAP[e]								0.63	2.8
Maximum Single HAP								0.56	2.44
Hydrogen Sulfide without BACT				34.08	5785.0	7.17E+01	99.9%	0.07	0.31

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.

[b]AP-42 gives ranges for control efficiencies.

[c]Product of combustion

[d]Because HCl is a production of combustion, a default outlet concentration is listed; AP-42, Section 2.4.4.

[e]Control Efficiency based on various references including; Canadian Centre for Occupational Health and Safety: CCOHS Chemical Name hydrogen Sulfide; October 3, 2005

Current enclosed flare for interim scenario

EU003 3,000-scfm enclosed flare w/evap

EU004 3,000-scfm enclosed flare w/evap

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft^3/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft^3	
LFG Methane Component[c]	50%		
LFG Typical Heating Value	500	Btu/ft^3	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%		
Methane Combustion Constant[d]	9.53	ft^3 air/ft^3 CH_4	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)

[b]Typical

[c]Assumed

[d]*Professional Engineering Registration Program*, 23-9.

Fuel & Equipment - Enclosed Flare

Flare Information	Value		Equivalent
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[b]	1,700	scfm	
LFG Inlet Flow, dry standard	1,564	dscfm	
Heat Input	51	MMBtu/hr	
Design Flare Operating Temperature[c]	1,400	°F	1,860 °R
Excess Air for Combustion[c]	230%		
Flare Tip Flow, standard	28,432	scfm	
Flare Tip Flow, actual	101,698	acfm	
Flare Tip Diameter[b]	10.0	ft	
Flare Tip Exhaust Velocity	1,295	ft/min	21.6 ft/s
Flare Tip Height, above local grade[b]	45	ft	

[a]Permit Applicant

[b]Flare manufacturer - based on LFG model EF1045I12

[c]Function of design flame temperature; values are typical and are provided for 1400°F, 1600°F, 1800°F, and 2000°Fby a flare manufactuer

Current enclosed flare for interim scenario

Criteria Pollutant Emissions - Enclosed Flare

EU003 and EU004 3,000-scfm enclosed flares w/evap

Operation Period	8,760	hr
LFG inlet flow, standard	1,700	scfm
Heat Input	51	MMBtu/hr

SO_2 Emission Rate without BACT

SO_2 concentration in exhaust gas	2990.58	ppmv		
SO_2 emission rate	51.47	lb/hr	225.4	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.02
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.13
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.04
Hydrogen Sulfide	7783-06-4	34.08	2976.34	100.0%	1	2976.3	51.22
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.04
					Total Contribution to SO_2 :	2990.58	51.47

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	0.80	lb/hr	3.5	tpy

NO_2 Emission Rate

NO_2 emission factor[c]	0.06	lb/MMBtu		
NO_2 emission rate	3.1	lb/hr	13.4	tpy

CO Emission Rate

CO emission factor[c]	0.20	lb/MMBtu		
CO emission rate	10.2	lb/hr	45	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	13.8	lb/hr		
NMOC emission rate	0.28	lb/hr	1.21	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	5.4	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.11	lb/hr	0.47	tpy

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.

[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end of the range is used here resulting in maximum calculated emissions of SO2.

[c]LFG Specialties Inc. (typical)

Existing enclosed flare baseline
CD001 3,000-scfm enclosed flare w/evap
Air Toxics Emissions from Open Flare.

The Flare's inlet flow = **1,700 scfm**

LFG Compound	HAP	VOC	CAS	MW (lb/lb-mol)	Compound Conc & Mass in Inlet Gas (ppmv)[a]	Compound Conc & Mass in Inlet Gas (lb/hr)	Control Eff[a,b]	Flare Exhaust (lb/hr)*	Flare Exhaust (tpy)*
1,1,1 - Trichloroethane (methyl chloroform)	x	--	71-55-6	133.41	0.48	1.72E-02	98.0%	3.44E-04	1.51E-03
1,1,2,2 - Tetrachloroethane	x	x	79-34-5	167.85	1.11	5.00E-02	98.0%	1.00E-03	4.38E-03
1,1,2 - Trichloroethane (1,1,2 TCA)	x	x	79-00-5	133.41	0.10	3.58E-03	98.0%	7.17E-05	3.14E-04
1,1 - Dichloroethane (ethylidene dichloride)	x	x	75-34-3	98.96	2.35	6.25E-02	98.0%	1.25E-03	5.47E-03
1,1 - Dichloroethene (vinylidene chloride)	x	x	75-35-4	96.94	0.20	5.23E-03	98.0%	1.05E-04	4.59E-04
1,2 - Dichloroethane (ethylene dichloride)	x	x	107-06-2	98.96	0.41	1.08E-02	98.0%	2.16E-04	9.48E-04
1,2 - Dichloropropane (propylene dichloride)	x	x	78-87-5	112.99	0.18	5.46E-03	98.0%	1.09E-04	4.79E-04
2-Propanol (isopropyl alcohol)	--	x	67-63-0	60.11	50.1	8.09E-01	98.0%	1.62E-02	7.09E-02
Acetone (2-propanone)	--	--	67-64-1	58.08	7.01	1.09E-01	98.0%	2.19E-03	9.58E-03
Acrylonitrile (Propenenitrile)	x	x	107-13-1	53.06	6.33	9.02E-02	98.0%	1.80E-03	7.90E-03
Benzene	x	x	71-43-2	78.12	1.91	4.01E-02	98.0%	8.02E-04	3.51E-03
Bromodichloromethane	--	x	75-27-4	163.83	3.13	1.38E-01	98.0%	2.76E-03	1.21E-02
Butane	--	x	106-97-8	58.12	5.03	7.85E-02	98.0%	1.57E-03	6.88E-03
Carbon Disulfide	x	x	75-15-0	76.14	0.58	1.19E-02	98.0%	2.38E-04	1.04E-03
Carbon Tetrachloride	x	x	56-23-5	153.84	0.004	1.65E-04	98.0%	3.31E-06	1.45E-05
Carbonyl Sulfide	x	x	463-58-1	60.07	0.49	7.91E-03	98.0%	1.58E-04	6.93E-04
Chlorobenzene (monochlorobenzene)	x	x	108-90-7	112.56	0.25	7.68E-03	98.0%	1.54E-04	6.73E-04
Chlorodifluoromethane (CFC-22, freon-22)	--	--	75-45-6	86.47	1.30	3.02E-02	98.0%	6.04E-04	2.65E-03
Chloroethane (ethyl chloride)	x	x	75-00-3	64.52	1.25	2.17E-02	98.0%	4.33E-04	1.90E-03
Chloroform (trichloromethane)	x	x	67-66-3	119.38	0.03	9.62E-04	98.0%	1.92E-05	8.43E-05
Chloromethane (methyl chloride)	x	x	74-87-3	50.49	1.21	1.64E-02	98.0%	3.28E-04	1.44E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	x	106-46-7	147	0.21	8.41E-03	98.0%	1.68E-04	7.37E-04
Dichlorodifluoromethane (CFC-12, freon-12)	--	--	75-71-8	120.91	15.7	5.10E-01	98.0%	1.02E-02	4.47E-02
Dichlorofluoromethane (freon-21)	--	--	75-43-4	102.92	2.62	7.24E-02	98.0%	1.45E-03	6.35E-03
Dichloromethane (methylene chloride)	x	--	75-09-2	84.93	14.3	3.26E-01	98.0%	6.53E-03	2.86E-02
Dimethyl Sulfide (methyl sulfide)	--	x	75-18-3	62.13	7.82	1.31E-01	98.0%	2.61E-03	1.14E-02
Ethane	--	--	74-84-0	30.07	889	7.18E+00	98.0%	1.44E-01	6.29E-01
Ethanol (ethyl alcohol)	--	x	64-17-5	46.08	27.2	3.37E-01	98.0%	6.73E-03	2.95E-02
Ethylbenzene[g]	x	x	100-41-4	106.17	4.61	1.31E-01	98.0%	2.63E-03	1.15E-02
Ethyl Mercaptan (ethanethiol)	--	x	75-08-1	62.13	1.25	2.09E-02	98.0%	4.17E-04	1.83E-03
Ethylene dibromide (1,2 dibromoethane)	x	x	106-93-4	187.88	0.001	5.05E-05	98.0%	1.01E-06	4.42E-06
Fluorotrichloromethane (CFC-11, freon-11)	--	--	75-69-4	137.37	0.76	2.80E-02	98.0%	5.61E-04	2.46E-03
Hexane	x	x	110-54-3	86.18	6.57	1.52E-01	98.0%	3.04E-03	1.33E-02
Hydrogen Sulfide[e]	--	--	7783-06-4	34.08	385.8	3.53E+00	99.9%	3.53E-03	1.55E-02
Mercury (total)	x	--	7439-97-6	200.61	2.92E-4	1.57E-05	0.0%	1.57E-05	6.89E-05
Methyl Ethyl Ketone (2-butanone)	--	--	78-93-3	72.11	7.09	1.37E-01	98.0%	2.75E-03	1.20E-02
Methyl Isobutyl Ketone (hexone)	x	x	108-10-1	100.16	1.87	5.03E-02	98.0%	1.01E-03	4.41E-03
Methyl Mercaptan	--	x	74-93-1	48.11	2.49	3.22E-02	98.0%	6.44E-04	2.82E-03
Pentane	--	x	109-66-0	72.15	3.29	6.38E-02	98.0%	1.28E-03	5.59E-03
ethene)	x	x	127-18-4	165.83	3.73	1.66E-01	98.0%	3.32E-03	1.46E-02
Propane	--	x	74-98-6	44.1	11.1	1.31E-01	98.0%	2.63E-03	1.15E-02
Toluene (methylbenzene)	x	x	108-88-3	92.14	39.3	9.73E-01	98.0%	1.95E-02	8.52E-02
Trichloroethylene (trichloroethene)	x	x	79-01-6	131.38	2.82	9.95E-02	98.0%	1.99E-03	8.72E-03
t - 1,2 - Dichloroethene (1,2 dichloroethylene)	--	--	156-60-5	96.94	2.84	7.40E-02	98.0%	1.48E-03	6.48E-03
Vinyl Chloride (chloroethylene, VCM)	x	x	75-01-4	62.50	7.34	1.23E-01	98.0%	2.46E-03	1.08E-02
Xylenes (m, o, p)	x	x	1330-20-7	106.17	12.1	3.45E-01	98.0%	6.90E-03	3.02E-02
Hydrogen Chloride[c]	x	--	7647-01-0	36.50	42.0	4.12E-01	0.0%	4.12E-01	1.80E+00
Total HAP[e]								0.47	2.0
Maximum Single HAP								0.41	1.80
Hydrogen Sulfide without BACT				34.08	5785.0	5.30E+01	99.9%	0.05	0.23

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.

[b]AP-42 gives ranges for control efficiencies.

[c]Product of combustion

[d]Because HCl is a production of combustion, a default outlet concentration is listed; AP-42, Section 2.4.4.

[e]Control Efficiency based on various references including; Canadian Centre for Occupational Health and Safety: CCOHS Chemical Name hydrogen Sulfide; October 3, 2005

Existing enclosed flare baseline
CD001 3,000-scfm enclosed flare w/evap

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent	
Standard Temperature[a]	60	°F	520	°R
Universal Gas Constant	0.7302	atm-ft^3/lb-mol°R		
Pressure[a]	1	atm		
Methane Heating Value[b]	1,000	Btu/ft^3		
LFG Methane Component[c]	50%			
LFG Typical Heating Value	500	Btu/ft^3		
LFG Temperature[c]	100	°F	560	°R
LFG Moisture[c]	8%			
Methane Combustion Constant[d]	9.53	ft^3 air/ft^3 CH_4		

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed
[d]*Professional Engineering Registration Program*, 23-9.

Fuel & Equipment - Enclosed Flare

Flare Information	Value		Equivalent	
Operation Period[a]	8,760	hr		
LFG inlet flow, standard[b]	2,237	scfm		
LFG Inlet Flow, dry standard	2,058	dscfm		
Heat Input	67	MMBtu/hr		
Design Flare Operating Temperature[c]	1,400	°F	1,860	°R
Excess Air for Combustion[c]	230%			
Flare Tip Flow, standard	37,413	scfm		
Flare Tip Flow, actual	133,822	acfm		
Flare Tip Diameter[b]	10.0	ft		
Flare Tip Exhaust Velocity	1,704	ft/min	28.4	ft/s
Flare Tip Height, above local grade[b]	45	ft		

[a]Permit Applicant
[b]Flare manufacturer - based on LFG model EF1045I12
[c]Function of design flame temperature; values are typical and are provided for 1400°F, 1600°F, 1800°F, and 2000°Fby a flare manufactuer

Existing enclosed flare baseline
Criteria Pollutant Emissions - Enclosed Flare
CD001 3,000-scfm enclosed flare w/evap

Operation Period	8,760	hr
LFG inlet flow, standard	2,237	scfm
Heat Input	67	MMBtu/hr

SO_2 Emission Rate without BACT

SO_2 emission rate 131.35 lb/hr 575.3 tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.03
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.18
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.05
Hydrogen Sulfide	7783-06-4	34.08	**5785.75**	100.0%	1	5785.8	131.03
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.06
				Total Contribution to SO_2:		5800.00	131.35

PM_{10} Emission Rate				
PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.05	lb/hr	4.6	tpy
NO_2 Emission Rate				
NO_2 emission factor[b]	0.06	lb/MMBtu		
NO_2 emission rate	4.0	lb/hr	17.6	tpy
CO Emission Rate				
CO emission factor[b]	0.20	lb/MMBtu		
CO emission rate	13.4	lb/hr	59	tpy
NMOC Emission Rate				
NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	18.1	lb/hr		
NMOC emission rate	0.36	lb/hr	1.59	tpy
VOC Emission Rate				
NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	7.1	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.14	lb/hr	0.62	tpy

[a]EPA 1998. "Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources" (AP-42), 5th Ed., November
[b]AP-42 gives ranges for control efficiencies.
[c]LFG Specialties Inc. (typical)

Existing enclosed flare baseline
CD001 3,000-scfm enclosed flare w/evap
Air Toxics Emissions from Open Flare.

The Flare's inlet flow = **2,237** **scfm**

LFG Compound	HAP	VOC	CAS	MW (lb/lb-mol)	Compound Conc & Mass in Inlet Gas (ppmv)[a]	(lb/hr)	Control Eff[a,b]	Flare Exhaust (lb/hr)*	(tpy)*
1,1,1 - Trichloroethane (methyl chloroform)	x	--	71-55-6	133.41	0.48	2.26E-02	98.0%	4.53E-04	1.98E-03
1,1,2,2 - Tetrachloroethane	x	x	79-34-5	167.85	1.11	6.59E-02	98.0%	1.32E-03	5.77E-03
1,1,2 - Trichloroethane (1,1,2 TCA)	x	x	79-00-5	133.41	0.10	4.72E-03	98.0%	9.43E-05	4.13E-04
1,1 - Dichloroethane (ethylidene dichloride)	x	x	75-34-3	98.96	2.35	8.22E-02	98.0%	1.64E-03	7.20E-03
1,1 - Dichloroethene (vinylidene chloride)	x	x	75-35-4	96.94	0.20	6.89E-03	98.0%	1.38E-04	6.03E-04
1,2 - Dichloroethane (ethylene dichloride)	x	x	107-06-2	98.96	0.41	1.42E-02	98.0%	2.85E-04	1.25E-03
1,2 - Dichloropropane (propylene dichloride)	x	x	78-87-5	112.99	0.18	7.19E-03	98.0%	1.44E-04	6.30E-04
2-Propanol (isopropyl alcohol)	--	x	67-63-0	60.11	50.1	1.06E+00	98.0%	2.13E-02	9.33E-02
Acetone (2-propanone)	--	--	67-64-1	58.08	7.01	1.44E-01	98.0%	2.88E-03	1.26E-02
Acrylonitrile (Propenenitrile)	x	x	107-13-1	53.06	6.33	1.19E-01	98.0%	2.37E-03	1.04E-02
Benzene	x	x	71-43-2	78.12	1.91	5.27E-02	98.0%	1.05E-03	4.62E-03
Bromodichloromethane	--	x	75-27-4	163.83	3.13	1.81E-01	98.0%	3.63E-03	1.59E-02
Butane	--	x	106-97-8	58.12	5.03	1.03E-01	98.0%	2.07E-03	9.05E-03
Carbon Disulfide	x	x	75-15-0	76.14	0.58	1.57E-02	98.0%	3.14E-04	1.37E-03
Carbon Tetrachloride	x	x	56-23-5	153.84	0.004	2.18E-04	98.0%	4.35E-06	1.91E-05
Carbonyl Sulfide	x	x	463-58-1	60.07	0.49	1.04E-02	98.0%	2.08E-04	9.11E-04
Chlorobenzene (monochlorobenzene)	x	x	108-90-7	112.56	0.25	1.01E-02	98.0%	2.02E-04	8.85E-04
Chlorodifluoromethane (CFC-22, freon-22)	--	--	75-45-6	86.47	1.30	3.97E-02	98.0%	7.95E-04	3.48E-03
Chloroethane (ethyl chloride)	x	x	75-00-3	64.52	1.25	2.85E-02	98.0%	5.70E-04	2.50E-03
Chloroform (trichloromethane)	x	x	67-66-3	119.38	0.03	1.27E-03	98.0%	2.53E-05	1.11E-04
Chloromethane (methyl chloride)	x	x	74-87-3	50.49	1.21	2.16E-02	98.0%	4.32E-04	1.89E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	x	106-46-7	147	0.21	1.11E-02	98.0%	2.21E-04	9.70E-04
Dichlorodifluoromethane (CFC-12, freon-12)	--	--	75-71-8	120.91	15.7	6.71E-01	98.0%	1.34E-02	5.88E-02
Dichlorofluoromethane (freon-21)	--	--	75-43-4	102.92	2.62	9.53E-02	98.0%	1.91E-03	8.35E-03
Dichloromethane (methylene chloride)	x	--	75-09-2	84.93	14.3	4.29E-01	98.0%	8.59E-03	3.76E-02
Dimethyl Sulfide (methyl sulfide)	--	x	75-18-3	62.13	7.82	1.72E-01	98.0%	3.43E-03	1.50E-02
Ethane	--	--	74-84-0	30.07	889	9.45E+00	98.0%	1.89E-01	8.28E-01
Ethanol (ethyl alcohol)	--	x	64-17-5	46.08	27.2	4.43E-01	98.0%	8.86E-03	3.88E-02
Ethylbenzene[g]	x	x	100-41-4	106.17	4.61	1.73E-01	98.0%	3.46E-03	1.52E-02
Ethyl Mercaptan (ethanethiol)	--	x	75-08-1	62.13	1.25	2.75E-02	98.0%	5.49E-04	2.40E-03
Ethylene dibromide (1,2 dibromoethane)	x	x	106-93-4	187.88	0.001	6.64E-05	98.0%	1.33E-06	5.82E-06
Fluorotrichloromethane (CFC-11, freon-11)	--	--	75-69-4	137.37	0.76	3.69E-02	98.0%	7.38E-04	3.23E-03
Hexane	x	x	110-54-3	86.18	6.57	2.00E-01	98.0%	4.00E-03	1.75E-02
Hydrogen Sulfide[e]	--	--	7783-06-4	34.08	5785.8	6.97E+01	99.9%	6.97E-02	3.05E-01
Mercury (total)	x	--	7439-97-6	200.61	2.92E-4	2.07E-05	0.0%	2.07E-05	9.07E-05
Methyl Ethyl Ketone (2-butanone)	--	--	78-93-3	72.11	7.09	1.81E-01	98.0%	3.61E-03	1.58E-02
Methyl Isobutyl Ketone (hexone)	x	x	108-10-1	100.16	1.87	6.62E-02	98.0%	1.32E-03	5.80E-03
Methyl Mercaptan	--	x	74-93-1	48.11	2.49	4.23E-02	98.0%	8.47E-04	3.71E-03
Pentane	--	x	109-66-0	72.15	3.29	8.39E-02	98.0%	1.68E-03	7.35E-03
ethene)	x	x	127-18-4	165.83	3.73	2.19E-01	98.0%	4.37E-03	1.92E-02
Propane	--	x	74-98-6	44.1	11.1	1.73E-01	98.0%	3.46E-03	1.52E-02
Toluene (methylbenzene)	x	x	108-88-3	92.14	39.3	1.28E+00	98.0%	2.56E-02	1.12E-01
Trichloroethylene (trichloroethene)	x	x	79-01-6	131.38	2.82	1.31E-01	98.0%	2.62E-03	1.15E-02
t - 1,2 - Dichloroethene (1,2 dichloroethylene)	--	--	156-60-5	96.94	2.84	9.73E-02	98.0%	1.95E-03	8.53E-03
Vinyl Chloride (chloroethylene, VCM)	x	x	75-01-4	62.50	7.34	1.62E-01	98.0%	3.24E-03	1.42E-02
Xylenes (m, o, p)	x	x	1330-20-7	106.17	12.1	4.54E-01	98.0%	9.08E-03	3.98E-02
Hydrogen Chloride[d]	x	--	7647-01-0	36.50	42.0	5.42E-01	0.0%	5.42E-01	2.37E+00
Total HAP[e]								0.61	2.7
Maximum Single HAP								0.54	2.37
Hydrogen Sulfide without BACT				34.08	5785.0	6.97E+01	99.9%	0.07	0.31

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.

[b]AP-42 gives ranges for control efficiencies.

[c]Product of combustion

[d]Because HCl is a production of combustion, a default outlet concentration is listed; AP-42, Section 2.4.4.

[e]Control Efficiency based on various references including; Canadian Centre for Occupational Health and Safety: CCOHS Chemical Name hydrogen Sulfide; October 3, 2005

Existing enclosed flare baseline

CD002 3,000-scfm enclosed flare w/evap

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft³/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft³	
LFG Methane Component[c]	50%		
LFG Typical Heating Value	500	Btu/ft³	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%		
Methane Combustion Constant[d]	9.53	ft³ air/ft³ CH_4	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)

[b]Typical

[c]Assumed

[d]*Professional Engineering Registration Program*, 23-9.

Fuel & Equipment - Enclosed Flare

Flare Information	Value		Equivalent
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[b]	2,246	scfm	
LFG Inlet Flow, dry standard	2,066	dscfm	
Heat Input	67	MMBtu/hr	
Design Flare Operating Temperature[c]	1,400	°F	1,860 °R
Excess Air for Combustion[c]	230%		
Flare Tip Flow, standard	37,563	scfm	
Flare Tip Flow, actual	134,361	acfm	
Flare Tip Diameter[b]	10.0	ft	
Flare Tip Exhaust Velocity	1,711	ft/min	28.5 ft/s
Flare Tip Height, above local grade[b]	45	ft	

Existing enclosed flare baseline
Criteria Pollutant Emissions - Enclosed Flare
CD002 3,000-scfm enclosed flare w/evap

Operation Period	8,760	hr
LFG inlet flow, standard	2,246	scfm
Heat Input	67	MMBtu/hr

SO_2 Emission Rate without BACT

SO_2 emission rate 9.10 lb/hr 39.8 tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.03
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.18
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.05
Hydrogen Sulfide	7783-06-4	34.08	**5786.00**	100.0%	1	5786.0	131.56
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.06
					Total Contribution to SO_2 :	5800.25	131.88

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.05	lb/hr	4.6	tpy

NO_2 Emission Rate

NO_2 emission factor[b]	0.06	lb/MMBtu		
NO_2 emission rate	4.0	lb/hr	17.7	tpy

CO Emission Rate

CO emission factor[b]	0.20	lb/MMBtu		
CO emission rate	13.5	lb/hr	59	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	18.2	lb/hr		
NMOC emission rate	0.36	lb/hr	1.59	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	7.1	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.14	lb/hr	0.62	tpy

[a]EPA 1998. "Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources" (AP-42), 5th Ed., November
[b]AP-42 gives ranges for control efficiencies.
[c]LFG Specialties Inc. (typical)

Existing enclosed flare baseline
CD002 3,000-scfm enclosed flare w/evap
Air Toxics Emissions from Open Flare.

The Flare's inlet flow = **2,237 scfm**

LFG Compound	HAP	VOC	CAS	MW (lb/lb-mol)	Compound Conc & Mass in Inlet Gas (ppmv)[a]	Compound Conc & Mass in Inlet Gas (lb/hr)	Control Eff[a,b]	Flare Exhaust (lb/hr)*	Flare Exhaust (tpy)*
1,1,1 - Trichloroethane (methyl chloroform)	x	--	71-55-6	133.41	0.48	2.26E-02	98.0%	4.53E-04	1.98E-03
1,1,2,2 - Tetrachloroethane	x	x	79-34-5	167.85	1.11	6.59E-02	98.0%	1.32E-03	5.77E-03
1,1,2 - Trichloroethane (1,1,2 TCA)	x	x	79-00-5	133.41	0.10	4.72E-03	98.0%	9.43E-05	4.13E-04
1,1 - Dichloroethane (ethylidene dichloride)	x	x	75-34-3	98.96	2.35	8.22E-02	98.0%	1.64E-03	7.20E-03
1,1 - Dichloroethene (vinylidene chloride)	x	x	75-35-4	96.94	0.20	6.89E-03	98.0%	1.38E-04	6.03E-04
1,2 - Dichloroethane (ethylene dichloride)	x	x	107-06-2	98.96	0.41	1.42E-02	98.0%	2.85E-04	1.25E-03
1,2 - Dichloropropane (propylene dichloride)	x	x	78-87-5	112.99	0.18	7.19E-03	98.0%	1.44E-04	6.30E-04
2-Propanol (isopropyl alcohol)	--	x	67-63-0	60.11	50.1	1.06E+00	98.0%	2.13E-02	9.33E-02
Acetone (2-propanone)	--	--	67-64-1	58.08	7.01	1.44E-01	98.0%	2.88E-03	1.26E-02
Acrylonitrile (Propenenitrile)	x	x	107-13-1	53.06	6.33	1.19E-01	98.0%	2.37E-03	1.04E-02
Benzene	x	x	71-43-2	78.12	1.91	5.27E-02	98.0%	1.05E-03	4.62E-03
Bromodichloromethane	--	x	75-27-4	163.83	3.13	1.81E-01	98.0%	3.63E-03	1.59E-02
Butane	--	x	106-97-8	58.12	5.03	1.03E-01	98.0%	2.07E-03	9.05E-03
Carbon Disulfide	x	x	75-15-0	76.14	0.58	1.57E-02	98.0%	3.14E-04	1.37E-03
Carbon Tetrachloride	x	x	56-23-5	153.84	0.004	2.18E-04	98.0%	4.35E-06	1.91E-05
Carbonyl Sulfide	x	x	463-58-1	60.07	0.49	1.04E-02	98.0%	2.08E-04	9.11E-04
Chlorobenzene (monochlorobenzene)	x	x	108-90-7	112.56	0.25	1.01E-02	98.0%	2.02E-04	8.85E-04
Chlorodifluoromethane (CFC-22, freon-22)	--	--	75-45-6	86.47	1.30	3.97E-02	98.0%	7.95E-04	3.48E-03
Chloroethane (ethyl chloride)	x	x	75-00-3	64.52	1.25	2.85E-02	98.0%	5.70E-04	2.50E-03
Chloroform (trichloromethane)	x	x	67-66-3	119.38	0.03	1.27E-03	98.0%	2.53E-05	1.11E-04
Chloromethane (methyl chloride)	x	x	74-87-3	50.49	1.21	2.16E-02	98.0%	4.32E-04	1.89E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	x	106-46-7	147	0.21	1.11E-02	98.0%	2.21E-04	9.70E-04
Dichlorodifluoromethane (CFC-12, freon-12)	--	--	75-71-8	120.91	15.7	6.71E-01	98.0%	1.34E-02	5.88E-02
Dichlorofluoromethane (freon-21)	--	--	75-43-4	102.92	2.62	9.53E-02	98.0%	1.91E-03	8.35E-03
Dichloromethane (methylene chloride)	x	--	75-09-2	84.93	14.3	4.29E-01	98.0%	8.59E-03	3.76E-02
Dimethyl Sulfide (methyl sulfide)	--	x	75-18-3	62.13	7.82	1.72E-01	98.0%	3.43E-03	1.50E-02
Ethane	--	--	74-84-0	30.07	889	9.45E+00	98.0%	1.89E-01	8.28E-01
Ethanol (ethyl alcohol)	--	x	64-17-5	46.08	27.2	4.43E-01	98.0%	8.86E-03	3.88E-02
Ethylbenzene[g]	x	x	100-41-4	106.17	4.61	1.73E-01	98.0%	3.46E-03	1.52E-02
Ethyl Mercaptan (ethanethiol)	--	x	75-08-1	62.13	1.25	2.75E-02	98.0%	5.49E-04	2.40E-03
Ethylene dibromide (1,2 dibromoethane)	x	x	106-93-4	187.88	0.001	6.64E-05	98.0%	1.33E-06	5.82E-06
Fluorotrichloromethane (CFC-11, freon-11)	--	--	75-69-4	137.37	0.76	3.69E-02	98.0%	7.38E-04	3.23E-03
Hexane	x	x	110-54-3	86.18	6.57	2.00E-01	98.0%	4.00E-03	1.75E-02
Hydrogen Sulfide[e]	--	--	7783-06-4	34.08	5786.0	6.97E+01	99.9%	6.97E-02	3.05E-01
Mercury (total)	x	--	7439-97-6	200.61	2.92E-4	2.07E-05	0.0%	2.07E-05	9.07E-05
Methyl Ethyl Ketone (2-butanone)	--	--	78-93-3	72.11	7.09	1.81E-01	98.0%	3.61E-03	1.58E-02
Methyl Isobutyl Ketone (hexone)	x	x	108-10-1	100.16	1.87	6.62E-02	98.0%	1.32E-03	5.80E-03
Methyl Mercaptan	--	x	74-93-1	48.11	2.49	4.23E-02	98.0%	8.47E-04	3.71E-03
Pentane	--	x	109-66-0	72.15	3.29	8.39E-02	98.0%	1.68E-03	7.35E-03
ethene)	x	x	127-18-4	165.83	3.73	2.19E-01	98.0%	4.37E-03	1.92E-02
Propane	--	x	74-98-6	44.1	11.1	1.73E-01	98.0%	3.46E-03	1.52E-02
Toluene (methylbenzene)	x	x	108-88-3	92.14	39.3	1.28E+00	98.0%	2.56E-02	1.12E-01
Trichloroethylene (trichloroethene)	x	x	79-01-6	131.38	2.82	1.31E-01	98.0%	2.62E-03	1.15E-02
t - 1,2 - Dichloroethene (1,2 dichloroethylene)	--	--	156-60-5	96.94	2.84	9.73E-02	98.0%	1.95E-03	8.53E-03
Vinyl Chloride (chloroethylene, VCM)	x	x	75-01-4	62.50	7.34	1.62E-01	98.0%	3.24E-03	1.42E-02
Xylenes (m, o, p)	x	x	1330-20-7	106.17	12.1	4.54E-01	98.0%	9.08E-03	3.98E-02
Hydrogen Chloride[d]	x	--	7647-01-0	36.50	42.0	5.42E-01	0.0%	5.42E-01	2.37E+00
Total HAP[e]								0.61	2.7
Maximum Single HAP								0.54	2.37
Hydrogen Sulfide without BACT				34.08	5785.0	6.97E+01	99.9%	0.07	0.31

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.

[b]AP-42 gives ranges for control efficiencies.

[c]Product of combustion

[d]Because HCl is a production of combustion, a default outlet concentration is listed; AP-42, Section 2.4.4.

[e]Control Efficiency based on various references including; Canadian Centre for Occupational Health and Safety: CCOHS Chemical Name hydrogen Sulfide; October 3, 2005

Proposed operation of new flares

CD NEW - Proposed 3,000-scfm utility flare

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft³/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft³	
LFG Methane Component[c]	50%	%	
LFG Typical Heating Value	500	Btu/ft³	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%	%	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed

Fuel & Equipment - Open Flare

Flare Information	Value		Equivalent
No. of Hours of Operation Per Day[a]	24	hr	
No. of Days in Averaging Period[a]	365	day	
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[a]	3,000	scfm	
LFG Inlet Flow, dry standard	2,760	dscfm	
Heat Input	90.0	MMBtu/hr	
Design Flare Operating Temperature[b]	1,400	°F	1,860 °R
Flare Tip Flow, standard	3,000	scfm	
Flare Tip Flow, actual	3,231	acfm	
Flare Tip Diameter[b]	1.17	ft	
Flare Tip Exhaust Velocity	3,022	ft/min	50.4 ft/s
Flare Tip Height, above local grade[b]	42	ft	

[a]Permit Applicant

Proposed operation of new flares

CD NEW - Proposed 3,000-scfm utility flare

Criteria Pollutant Emissions - Open Flare

Operation Period	8,760	hr
LFG inlet flow, standard	3,000	scfm
Heat Input	90.0	MMBtu/hr

SO_2 Emission Rate without BACT

SO_2 concentration in exhaust gas	4987.58	ppmv		
SO_2 emission rate	151.48	lb/hr	663.47	ton/yr

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.04
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.24
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.07
Hydrogen Sulfide	7783-06-4	34.08	**4973.34**	100.0%	1	4973.3	151.04
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.08
					Total Contribution to SO_2:	4987.58	151.48

SO_2 Emission Rate with BACT

SO_2 concentration in exhaust gas	400.05	ppmv		
SO_2 emission rate	12.15	lb/hr	53.22	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)	Control Eff	No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.04
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.24
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.07
Hydrogen Sulfide	7783-06-4	34.08	**385.80**	100.0%	1	385.8	11.72
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.08
					Total Contribution to SO_2:	400.05	12.15

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.41	lb/hr	6.17	tpy

NO_2 Emission Rate

NO_2 emission factor[b]	0.068	lb/MMBtu		
NO_2 emission rate	6.12	lb/hr	26.81	tpy

CO Emission Rate

CO emission factor[b]	0.37	lb/MMBtu		
CO emission rate	33.3	lb/hr	145.9	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	24.31	lb/hr		
NMOC emission rate	0.49	lb/hr	2.13	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	9.48	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.19	lb/hr	0.83	tpy

[a]EPA 1998. "Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources" (AP-42), 5th Ed., November

[b]AP-42 gives ranges for control efficiencies.

[c]Typical Manufacturer's data

Proposed operation of new flares
CD NEW - Proposed 3,000-scfm utility flare
Air Toxics Emissions from Open Flare.

The Flare's inlet flow = **3,000** *scfm*

LFG Compound	HAP	CAS	MW (lb/lb-mol)	Compound Conc & Mass in Inlet Gas (ppmv)[a]	Compound Conc & Mass in Inlet Gas (lb/hr)	Control Eff[a,b]	Flare Exhaust (lb/hr)	Flare Exhaust (tpy)
1,1,1 - Trichloroethane (methyl chloroform)	x	71-55-6	133.41	0.48	3.04E-02	98.0%	6.07E-04	2.66E-03
1,1,2,2 - Tetrachloroethane	x	79-34-5	167.85	1.11	8.83E-02	98.0%	1.77E-03	7.74E-03
1,1,2 - Trichloroethane (1,1,2 TCA)	x	79-00-5	133.41	0.10	6.32E-03	98.0%	1.26E-04	5.54E-04
1,1 - Dichloroethane (ethylidene dichloride)	x	75-34-3	98.96	2.35	1.10E-01	98.0%	2.20E-03	9.66E-03
1,1 - Dichloroethene (vinylidene chloride)	x	75-35-4	96.94	0.20	9.24E-03	98.0%	1.85E-04	8.09E-04
1,2 - Dichloroethane (ethylene dichloride)	x	107-06-2	98.96	0.41	1.91E-02	98.0%	3.82E-04	1.67E-03
1,2 - Dichloropropane (propylene dichloride)	x	78-87-5	112.99	0.18	9.64E-03	98.0%	1.93E-04	8.45E-04
2-Propanol (isopropyl alcohol)	--	67-63-0	60.11	50.1	1.43E+00	98.0%	2.86E-02	1.25E-01
Acetone (2-propanone)	--	67-64-1	58.08	7.01	1.93E-01	98.0%	3.86E-03	1.69E-02
Acrylonitrile (Propenenitrile)	x	107-13-1	53.06	6.33	1.59E-01	98.0%	3.18E-03	1.39E-02
Benzene	x	71-43-2	78.12	1.91	7.07E-02	98.0%	1.41E-03	6.20E-03
Bromodichloromethane	--	75-27-4	163.83	3.13	2.43E-01	98.0%	4.86E-03	2.13E-02
Butane	--	106-97-8	58.12	5.03	1.39E-01	98.0%	2.77E-03	1.21E-02
Carbon Disulfide	x	75-15-0	76.14	0.58	2.10E-02	98.0%	4.21E-04	1.84E-03
Carbon Tetrachloride	x	56-23-5	153.84	0.004	2.92E-04	98.0%	5.83E-06	2.56E-05
Carbonyl Sulfide	x	463-58-1	60.07	0.49	1.40E-02	98.0%	2.79E-04	1.22E-03
Chlorobenzene (monochlorobenzene)	x	108-90-7	112.56	0.25	1.36E-02	98.0%	2.71E-04	1.19E-03
Chlorodifluoromethane (CFC-22, freon-22)	--	75-45-6	86.47	1.30	5.33E-02	98.0%	1.07E-03	4.67E-03
Chloroethane (ethyl chloride)	x	75-00-3	64.52	1.25	3.82E-02	98.0%	7.65E-04	3.35E-03
Chloroform (trichloromethane)	x	67-66-3	119.38	0.03	1.70E-03	98.0%	3.40E-05	1.49E-04
Chloromethane (methyl chloride)	x	74-87-3	50.49	1.21	2.90E-02	98.0%	5.79E-04	2.54E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	106-46-7	147	0.21	1.48E-02	98.0%	2.97E-04	1.30E-03
Dichlorodifluoromethane (CFC-12, freon-12)	--	75-71-8	120.91	15.7	9.00E-01	98.0%	1.80E-02	7.88E-02
Dichlorofluoromethane (freon-21)	--	75-43-4	102.92	2.62	1.28E-01	98.0%	2.56E-03	1.12E-02
Dichloromethane (methylene chloride)	x	75-09-2	84.93	14.3	5.76E-01	98.0%	1.15E-02	5.04E-02
Dimethyl Sulfide (methyl sulfide)	--	75-18-3	62.13	7.82	2.30E-01	98.0%	4.61E-03	2.02E-02
Ethane	--	74-84-0	30.07	889	1.27E+01	98.0%	2.53E-01	1.11E+00
Ethanol (ethyl alcohol)	--	64-17-5	46.08	27.2	5.94E-01	98.0%	1.19E-02	5.20E-02
Ethylbenzene[g]	x	100-41-4	106.17	4.61	2.32E-01	98.0%	4.64E-03	2.03E-02
Ethyl Mercaptan (ethanethiol)	--	75-08-1	62.13	1.25	3.68E-02	98.0%	7.36E-04	3.23E-03
Ethylene dibromide (1,2 dibromoethane)	x	106-93-4	187.88	0.001	8.91E-05	98.0%	1.78E-06	7.80E-06
Fluorotrichloromethane (CFC-11, freon-11)	--	75-69-4	137.37	0.76	4.95E-02	98.0%	9.90E-04	4.34E-03
Hexane	x	110-54-3	86.18	6.57	2.68E-01	98.0%	5.37E-03	2.35E-02
Hydrogen Sulfidee With BACT	--	7783-06-4	34.08	385.8	6.23E+00	99.9%	6.23E-03	2.73E-02
Hydrogen Sulfidee without BACT	--	7783-06-4	34.08	4973.3	8.03E+01	99.9%	8.03E-02	3.52E-01
Mercury (total)	x	7439-97-6	200.61	2.92E-4	2.78E-05	0.0%	2.78E-05	1.22E-04
Methyl Ethyl Ketone (2-butanone)	--	78-93-3	72.11	7.09	2.42E-01	98.0%	4.85E-03	2.12E-02
Methyl Isobutyl Ketone (hexone)	x	108-10-1	100.16	1.87	8.88E-02	98.0%	1.78E-03	7.78E-03
Methyl Mercaptan	--	74-93-1	48.11	2.49	5.68E-02	98.0%	1.14E-03	4.97E-03
Pentane	--	109-66-0	72.15	3.29	1.13E-01	98.0%	2.25E-03	9.86E-03
ethene)	x	127-18-4	165.83	3.73	2.93E-01	98.0%	5.86E-03	2.57E-02
Propane	--	74-98-6	44.1	11.1	2.32E-01	98.0%	4.64E-03	2.03E-02
Toluene (methylbenzene)	x	108-88-3	92.14	39.3	1.72E+00	98.0%	3.43E-02	1.50E-01
Trichloroethylene (trichloroethene)	x	79-01-6	131.38	2.82	1.76E-01	98.0%	3.51E-03	1.54E-02
dichloroethylene)	--	156-60-5	96.94	2.84	1.31E-01	98.0%	2.61E-03	1.14E-02
Vinyl Chloride (chloroethylene, VCM)	x	75-01-4	62.50	7.34	2.17E-01	98.0%	4.35E-03	1.91E-02
Xylenes (m, o, p)	x	1330-20-7	106.17	12.1	6.09E-01	98.0%	1.22E-02	5.33E-02
Hydrogen Chloride[c]	x	7647-01-0	36.50	42.0	7.27E-01	0.0%	7.27E-01	3.18E+00
Total HAP							0.82	3.60
Maximum Single HAP							0.73	3.18
Hydrogen Sulfide without BACT			34.08	5785.0	9.35E+01	99.9%	0.09	0.41

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.

[b]AP-42 gives ranges for control efficiencies.

[c]Product of combustion

[d]Because HCl is a production of combustion, a default outlet concentration is listed; AP-42, Section 2.4.4.

[e]Control Efficiency based on various references including; Canadian Centre for Occupational Health and Safety: CCOHS Chemical Name hydrogen Sulfide; October 3, 2005

Note: "x" denotes a HAP only or a HAP and VOC; "y" denotes a VOC only

Proposed operation of new flares
CD NEW - Proposed 1,500-scfm utility flare

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft³/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft³	
LFG Methane Component[c]	50%	%	
LFG Typical Heating Value	500	Btu/ft³	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%	%	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed

Fuel & Equipment - Open Flare

Flare Information	Value		Equivalent
No. of Hours of Operation Per Day[a]	24	hr	
No. of Days in Averaging Period[a]	365	day	
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[a]	1,500	scfm	
LFG Inlet Flow, dry standard	1,380	dscfm	
Heat Input	45.0	MMBtu/hr	
Design Flare Operating Temperature[b]	1,400	°F	1,860 °R
Flare Tip Flow, standard	1,500	scfm	
Flare Tip Flow, actual	1,615	acfm	
Flare Tip Diameter[b]	0.83	ft	
Flare Tip Exhaust Velocity	2,986	ft/min	49.8 ft/s
Flare Tip Height, above local grade[b]	42	ft	

[a]Permit Applicant

Proposed operation of new flares

CD NEW - Proposed 1,500-scfm utility flare

Criteria Pollutant Emissions - Open Flare

Operation Period	8,760	hr
LFG inlet flow, standard	1,500	scfm
Heat Input	45.0	MMBtu/hr

SO_2 Emission Rate

SO_2 concentration in exhaust gas	4987.58	ppmv		
SO_2 emission rate	75.74	lb/hr	331.73	ton/yr

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.02
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.12
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.03
Hydrogen Sulfide	7783-06-4	34.08	**4973.34**	100.0%	1	4973.3	75.52
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.04
					Total Contribution to SO_2 :	4987.58	75.74

SO_2 Emission Rate with BACT

SO_2 concentration in exhaust gas	400.05	ppmv		
SO_2 emission rate	6.07	lb/hr	26.61	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)	Control Eff	No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.02
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.12
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.03
Hydrogen Sulfide	7783-06-4	34.08	**385.80**	100.0%	1	385.8	5.86
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.04
					Total Contribution to SO_2 :	400.05	6.07

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	0.70	lb/hr	3.08	tpy

NO_2 Emission Rate

NO_2 emission factor[b]	0.068	lb/MMBtu		
NO_2 emission rate	3.06	lb/hr	13.40	tpy

CO Emission Rate

CO emission factor[b]	0.37	lb/MMBtu		
CO emission rate	16.7	lb/hr	72.9	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	12.15	lb/hr		
NMOC emission rate	0.24	lb/hr	1.06	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	4.74	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.09	lb/hr	0.42	tpy

[a]EPA 1998. "Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources" (AP-42), 5th Ed., November

[b]AP-42 gives ranges for control efficiencies.

Proposed operation of new flares

CD NEW - Proposed 1,500-scfm utility flare

Air Toxics Emissions from Open Flare.

The Flare's inlet flow = **1,500** *scfm*

				Compound Conc & Mass in Inlet Gas			Flare Exhaust	
LFG Compound	HAP	CAS	MW (lb/lb-mol)	(ppmv)[a]	(lb/hr)	Control Eff[e,b]	(lb/hr)	(tpy)
1,1,1 - Trichloroethane (methyl chloroform)	x	71-55-6	133.41	0.48	1.52E-02	98.0%	3.04E-04	1.33E-03
1,1,2,2 - Tetrachloroethane	x	79-34-5	167.85	1.11	4.42E-02	98.0%	8.83E-04	3.87E-03
1,1,2 - Trichloroethane (1,1,2 TCA)	x	79-00-5	133.41	0.10	3.16E-03	98.0%	6.32E-05	2.77E-04
1,1 - Dichloroethane (ethylidene dichloride)	x	75-34-3	98.96	2.35	5.51E-02	98.0%	1.10E-03	4.83E-03
1,1 - Dichloroethene (vinylidene chloride)	x	75-35-4	96.94	0.20	4.62E-03	98.0%	9.24E-05	4.05E-04
1,2 - Dichloroethane (ethylene dichloride)	x	107-06-2	98.96	0.41	9.55E-03	98.0%	1.91E-04	8.36E-04
1,2 - Dichloropropane (propylene dichloride)	x	78-87-5	112.99	0.18	4.82E-03	98.0%	9.64E-05	4.22E-04
2-Propanol (isopropyl alcohol)	--	67-63-0	60.11	50.1	7.14E-01	98.0%	1.43E-02	6.25E-02
Acetone (2-propanone)	--	67-64-1	58.08	7.01	9.65E-02	98.0%	1.93E-03	8.45E-03
Acrylonitrile (Propenenitrile)	x	107-13-1	53.06	6.33	7.96E-02	98.0%	1.59E-03	6.97E-03
Benzene	x	71-43-2	78.12	1.91	3.54E-02	98.0%	7.07E-04	3.10E-03
Bromodichloromethane	--	75-27-4	163.83	3.13	1.22E-01	98.0%	2.43E-03	1.06E-02
Butane	--	106-97-8	58.12	5.03	6.93E-02	98.0%	1.39E-03	6.07E-03
Carbon Disulfide	x	75-15-0	76.14	0.58	1.05E-02	98.0%	2.10E-04	9.22E-04
Carbon Tetrachloride	x	56-23-5	153.84	0.004	1.46E-04	98.0%	2.92E-06	1.28E-05
Carbonyl Sulfide	x	463-58-1	60.07	0.49	6.98E-03	98.0%	1.40E-04	6.11E-04
Chlorobenzene (monochlorobenzene)	x	108-90-7	112.56	0.25	6.78E-03	98.0%	1.36E-04	5.94E-04
Chlorodifluoromethane (CFC-22, freon-22)	--	75-45-6	86.47	1.30	2.66E-02	98.0%	5.33E-04	2.33E-03
Chloroethane (ethyl chloride)	x	75-00-3	64.52	1.25	1.91E-02	98.0%	3.82E-04	1.67E-03
Chloroform (trichloromethane)	x	67-66-3	119.38	0.03	8.49E-04	98.0%	1.70E-05	7.44E-05
Chloromethane (methyl chloride)	x	74-87-3	50.49	1.21	1.45E-02	98.0%	2.90E-04	1.27E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	106-46-7	147	0.21	7.42E-03	98.0%	1.48E-04	6.50E-04
Dichlorodifluoromethane (CFC-12, freon-12)	--	75-71-8	120.91	15.7	4.50E-01	98.0%	9.00E-03	3.94E-02
Dichlorofluoromethane (freon-21)	--	75-43-4	102.92	2.62	6.39E-02	98.0%	1.28E-03	5.60E-03
Dichloromethane (methylene chloride)	x	75-09-2	84.93	14.3	2.88E-01	98.0%	5.76E-03	2.52E-02
Dimethyl Sulfide (methyl sulfide)	--	75-18-3	62.13	7.82	1.15E-01	98.0%	2.30E-03	1.01E-02
Ethane	--	74-84-0	30.07	889	6.34E+00	98.0%	1.27E-01	5.55E-01
Ethanol (ethyl alcohol)	--	64-17-5	46.08	27.2	2.97E-01	98.0%	5.94E-03	2.60E-02
Ethylbenzene[g]	x	100-41-4	106.17	4.61	1.16E-01	98.0%	2.32E-03	1.02E-02
Ethyl Mercaptan (ethanethiol)	--	75-08-1	62.13	1.25	1.84E-02	98.0%	3.68E-04	1.61E-03
Ethylene dibromide (1,2 dibromoethane)	x	106-93-4	187.88	0.001	4.45E-05	98.0%	8.91E-07	3.90E-06
Fluorotrichloromethane (CFC-11, freon-11)	--	75-69-4	137.37	0.76	2.47E-02	98.0%	4.95E-04	2.17E-03
Hexane	x	110-54-3	86.18	6.57	1.34E-01	98.0%	2.68E-03	1.18E-02
Hydrogen Sulfidee With BACT	--	7783-06-4	34.08	385.8	3.12E+00	99.9%	3.12E-03	1.37E-02
Hydrogen Sulfidee without BACT	--	7783-06-4	34.08	4973.3	4.02E+01	99.9%	4.02E-02	1.76E-01
Mercury (total)	x	7439-97-6	200.61	2.92E-4	1.39E-05	0.0%	1.39E-05	6.08E-05
Methyl Ethyl Ketone (2-butanone)	--	78-93-3	72.11	7.09	1.21E-01	98.0%	2.42E-03	1.06E-02
Methyl Isobutyl Ketone (hexone)	x	108-10-1	100.16	1.87	4.44E-02	98.0%	8.88E-04	3.89E-03
Methyl Mercaptan	--	74-93-1	48.11	2.49	2.84E-02	98.0%	5.68E-04	2.49E-03
Pentane	--	109-66-0	72.15	3.29	5.63E-02	98.0%	1.13E-03	4.93E-03
ethene)	x	127-18-4	165.83	3.73	1.47E-01	98.0%	2.93E-03	1.28E-02
Propane	--	74-98-6	44.1	11.1	1.16E-01	98.0%	2.32E-03	1.02E-02
Toluene (methylbenzene)	x	108-88-3	92.14	39.3	8.58E-01	98.0%	1.72E-02	7.52E-02
Trichloroethylene (trichloroethene)	x	79-01-6	131.38	2.82	8.78E-02	98.0%	1.76E-03	7.69E-03
dichloroethylene)	--	156-60-5	96.94	2.84	6.53E-02	98.0%	1.31E-03	5.72E-03
Vinyl Chloride (chloroethylene, VCM)	x	75-01-4	62.50	7.34	1.09E-01	98.0%	2.17E-03	9.53E-03
Xylenes (m, o, p)	x	1330-20-7	106.17	12.1	3.04E-01	98.0%	6.09E-03	2.67E-02
Hydrogen Chloride[d]	x	7647-01-0	36.50	42.0	3.63E-01	0.0%	3.63E-01	1.59E+00
Total HAP							0.41	1.80
Maximum Single HAP							0.36	1.59
Hydrogen Sulfide without BACT			34.08	5785.0	4.67E+01	99.9%	0.05	0.20

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.

[b]AP-42 gives ranges for control efficiencies.

[c]Product of combustion

[d]Because HCl is a production of combustion, a default outlet concentration is listed; AP-42, Section 2.4.4.

[e]Control Efficiency based on various references including; Canadian Centre for Occupational Health and Safety: CCOHS Chemical Name hydrogen Sulfide; October 3, 2005

Note: "x" denotes a HAP only or a HAP and VOC; "y" denotes a VOC only

EU003 - 3,000-scfm enclosed flare w/evap
E-VAP UNIT #3016
THEORETICAL ORGANIC/METAL/OTHER CONCENTRATIONS and EMISSIONS

Leachate input Rate (gallons/day) = 30,000 gpd 0.030 MGD

COMPOUND	HAP	8/19/1998 ppm [b] (mg/l)	4/29/1998 ppm [b] (mg/l)	2/5/1998 ppm [b] (mg/l)	11/5/1997 ppm [b] (mg/l)	11/5/97 (a) ppm [b] (mg/l)	11/5/97 (a) ppb [b] (ug/l)	Maximum ppm [b] (mg/l)	EPA Theoretical Median Conc[(1)] (mg/l)	EPA Theoretical Median Conc[(1)] (ug/l)	Number of Samples by EPA	Max Conc (mg/l)	Pounds per hour	Pounds per year
1,1 Dichloroethane	*					0.0000		0.000	0.165	165	34	0.165	1.72E-3	15.08
(ethylidene dichloride)						0.0000		0.000	0		0	0.0000	0.00E+0	-
1,1,1 Trichloroethane	*	5.00				0.0000		5.000	0.086	86	20	5.0000	5.22E-2	456.85
1,1,2 Trichloroethane	*					0.0000		0.000	0.426	426	4	0.4260	4.44E-3	38.92
1,1,2,2 Tetrachloroethane	*					0.0000		0.000	0.21	210	1	0.2100	2.19E-3	19.19
1,2 Dichloroethane (ethylene dichloride)	*					0.0000		0.000	0.01	10	6	0.0100	1.04E-4	0.91
1,2 Dichloropropane (propylene dichloride)	*					0.0000		0.000	0.009	9	12	0.0090	9.39E-5	0.82
1,2 trans dichloroethylene						0.0000		0.000	0.092	92	40	0.0920	9.60E-4	8.41
1,2,3 Trichloropropane						0.0000		0.000	0.23	230	1	0.2300	2.40E-3	21.02
1-Propanol						0.0000		0.000	11	11000	1	11.0000	1.15E-1	1,005.08
2,4-dimethylphenol						0.0000		0.000	0.019	19	2	0.0190	1.98E-4	1.74
2-Chloroethyl Vinyl Ether						0.0000		0.000	0.551	551	2	0.5510	5.75E-3	50.35
2-Hexanone						0.0000		0.000	0.088	88	11	0.0880	9.18E-4	8.04
Acetone						0.0880	88.00	0.088	0.43	430	23	0.4300	4.49E-3	39.29
Acrolein	*					0.0000		0.000	0.27	270	1	0.2700	2.82E-3	24.67
Acrylonitrile	*					0.0000		0.000	0		0	0.0000	0.00E+0	-
Benzene	*					0.0003	0.27	0.00027	0.037	37	35	0.0370	3.86E-4	3.38
Bis(Chloromethyl) Ether	*					0.0000		0.000	0.25	250	1	0.2500	2.61E-3	22.84
Butanol						0.0000		0.000	10	10000	1	10.0000	1.04E-1	913.71
Carbon tetrachloride	*					0.0000		0.000	0.202	202	2	0.2020	2.11E-3	18.46
Chlorobenzene	*					0.0000		0.000	0.007	7	12	0.0070	7.30E-5	0.64
Chloroform	*					0.0000		0.000	0.029	29	8	0.0290	3.02E-4	2.65
Chloromethane	*					0.0000		0.000	0.175	175	3	0.1750	1.83E-3	15.99
Cis- 1,2 Dichloroethylene						0.0000		0.000	0.33	330	2	0.3300	3.44E-3	30.15
Dichloromethane	*					0.0000		0.000	0.44	440	68	0.4400	4.59E-3	40.20
(methylene chloride)						0.0000		0.000	0		0	0.0000	0.00E+0	-
Diethyl phthalate						0.0000		0.000	0.083	83	27	0.0830	8.66E-4	7.58
Ethanol						0.0000		0.000	23	23000	1	23.0000	2.40E-1	2,101.53
Ethylbenzene	*	3.00				0.0010	1.00	3.000	0.058	58	41	3.0000	3.13E-2	274.11
Isophorone	*					0.0000		0.000	0.076	76	19	0.0760	7.93E-4	6.94
Methyl ethyl ketone	*					0.1900	190.00	0.190	1.55	1550	24	1.5500	1.62E-2	141.62
Methyl isobutyl ketone	*					0.0280	28	0.028	0.27	270	9	0.2700	2.82E-3	24.67
Naphthalene	*					0.0000		0.000	0.012	12	23	0.0120	1.25E-4	1.10
p-Cresol	*					0.0000		0.000	2.305	2305	10	2.3050	2.40E-2	210.61
Perchloroethylene (tetrachloroethylene)	*					0.0000		0.000	0.055	55	18	0.0550	5.74E-4	5.03
Phenols (total)	*					0.0000		0.000	0.378	378	45	0.3780	3.94E-3	34.54
Styrene	*					0.0000		0.000	0		0	0.0000	0.00E+0	-
Tetrahydrofuran						0.0000		0.000	0.26	260	7	0.2600	2.71E-3	23.76
Toluene	*	5.00		4.00	2.00	0.0026	2.60	5.000	0.413	413	69	5.0000	5.22E-2	456.85
Trichloroethylene	*					0.0000		0.000	0.043	43	28	0.0430	4.49E-4	3.93
Vinyl chloride	*					0.0000		0.000	0.04	40	10	0.0400	4.17E-4	3.65
Xylene	*	9.00				0.0022	2.20	9.000	0.071	71	7	9	9.39E-2	822.34
												Total HAPs	2.46E-1	2,156.07

Notes:
HAP = Clean Air Act Hazardous Air Pollutant
mgal = million gallons
Parts per billion = ug/l
Parts per million = mg/l

x - detected below method detection limit
(1) Using EPA "typical" leachate data (median value), Summary Of Data On Municipal Solid Waste Landfill Leachate Characteristics "Criteria For Municipal Solid Waste Landfills", EPA, July 1988 (NTIS PB88-242441).

	HAP	8/19/1998 ppm[b] (mg/l)	4/29/1998 ppm[b] (mg/l)	2/5/1998 ppm[b] (mg/l)	11/5/1997 ppm[b] (mg/l)	11/5/97 (a) ppm[b] (mg/l)	11/5/97 (a) ppb[b] (ug/l)	Maximum ppm[b] (mg/l)	EPA Theoretical Median Conc (mg/l)	EPA Theoretical Conc (ug/l)	Number of Samples by EPA	Max Conc (mg/l)	Pounds per hour	Pounds per year
Hydrogen Chloride[(d)]	•	660.00	320.00	260.00				660.000	695	695000	0	695.000	-	N/A
Hydrogen fluoride						200.00		200.000	0.4	400	0	200.000	-	N/A
Hydrogen sulfide[(e)]		96.00	8.00					96.000	108	108000	0	108.000	1.13E+0	9,868.04

Leachate HAPs & metals[c]	HAP	8/19/1998 ppm[b] (mg/l)	4/29/1998 ppm[b] (mg/l)	2/5/1998 ppm[b] (mg/l)	11/5/1997 ppm[b] (mg/l)	11/5/97 (a) ppm[b] (mg/l)	11/5/97 (a) ppb[b] (ug/l)	Maximum ppm[b] (mg/l)	EPA Theoretical Median Conc (mg/l)	EPA Theoretical Conc (ug/l)	Number of Samples by EPA	Max Conc (mg/l)	Pounds per hour	Pounds per year
Bis (Chloromethyl) ether	•					0.0000		0.000	0		0	0.000	0.00E+0	0.0
Isophorone	•					0.0000		0.000	0		0	0.000	0.00E+0	0.0
Naphthalene	•					0.0000		0.000	0		0	0.000	0.00E+0	0.0
p-cresol	•					0.0000		0.000	0		0	0.000	0.00E+0	0.0
phenols (total)	•					0.0000		0.000	0		0	0.000	0.00E+0	0.0
antimony	•					0.0000		0.000	0		0	0.000	0.00E+0	0.0
arsenic	•					0.0000		0.000	0.08		0	0.080	8.34E-7	0.0
barium		0.17	0.06	0.06	0.08	0.0000		0.170	0.383	383	0	0.383	3.99E-6	0.0
beryllium	•					0.0000		0.000	0.0065	7	0	0.007	6.78E-8	0.0
cadmium	•					0.0000		0.000	0.015	15	0	0.015	1.56E-7	0.0
calcium		135.00	21.00	25.00	27.00	0.0000		135.000	336	336000	0	336.000	3.50E-3	30.7
chromium	•	0.17				0.0000		0.170	0.06	60	0	0.170	1.77E-6	0.0
copper		0.10				0.0420	42.00	0.100	0.07	70	0	0.100	1.04E-6	0.0
lead	•					0.0000		0.000	0.08	80	0	0.080	8.34E-7	0.0
mercury	•					0.0000		0.000	0.0006	0.6	0	0.001	6.26E-9	0.0
nickel	•	0.20	0.03	0.02	0.02	0.0000		0.200	0.16	160	0	0.200	2.09E-6	0.0
selenium	•					0.0000		0.000		0	0	0.000	0.00E+0	0.0
sodium		510.00	260.00	330.00	440.00	0.0000		510.000		0	0	510.000	5.32E-3	46.6
thallium						0.0000		0.000		0	0	0.000	0.00E+0	0.0
iron		6.00				3.6000	3600.00	6.000	66.2	66200	0	66.200	6.90E-4	6.0
zinc		0.07				0.0750	75.00	0.075	1.35	1350	0	1.350	1.41E-5	0.1

TOTAL HAP EMISSIONS:

uncontrolled =	0.30 lb/hr	###### lbs/year
98% control =	0.006 lb/hr	52.92 lbs/year

a - HAPs in both LFG and in leachate
b - from EPA Characterization of MWC Ashes and Leachates from MSW Landfills, Monofills end Co-Disposal Sites, median concentration values
c - draft AP-42 (9/95), Tebles 2.4-3; unlisted control efficiencies assumed to be 80%
d - product of combustion
c - Additional HAPs found in leachate > 50 ppb/mgel per reference b
x - HAP present in leachate > 50 ppb
o - non-VOC HAP
Notes:
c - dreft AP-42 (9/95), Tables 2.4-1 and 2.4-2; concentretion in inlet gas
d - concentration of chloride in leachate; thermel conversion to hydrogen chloride in flare is presented in the "eir toxics" sheets
d - concentration of sulfate in leachete; thermal conversion to sulfur dioxides in flare is presented in the "criteria pollutants" sheets

EU005 3,000-scfm enclosed flare w/evap
E-VAP UNIT #PROPOSED on existing flare
THEORETICAL ORGANIC/METAL/OTHER CONCENTRATIONS and EMISSIONS

Leachate input Rate (gallons/day) = 30,000 gpd 0.030 MGD

COMPOUND	HAP	8/19/1998 ppm b (mg/l)	4/29/1998 ppm b (mg/l)	2/5/1998 ppm b (mg/l)	11/5/1997 ppm b (mg/l)	11/5/97 (a) ppm b (mg/l)	11/5/97 (a) ppb b (ug/l)	Maximum ppm b (mg/l)	EPA Theoretical Median Conc(1) (mg/l)	EPA Theoretical Median Conc(1) (ug/l)	Number of Samples by EPA	Max Conc (mg/l)	Pounds per hour	Pounds per year
1,1 Dichloroethane	*					0.0000		0.000	0.165	165	34	0.165	1.72E-3	15.08
(ethylidene dichloride)						0.0000		0.000	0		0	0.0000	0.00E+0	-
1,1,1 Trichloroethane	*	5.00				0.0000		5.000	0.086	86	20	5.0000	5.22E-2	456.85
1,1,2 Trichloroethane	*					0.0000		0.000	0.426	426	4	0.4260	4.44E-3	38.92
1,1,2,2 Tetrachloroethane	*					0.0000		0.000	0.21	210	1	0.2100	2.19E-3	19.19
1,2 Dichloroethane (ethylene dichloride)	*					0.0000		0.000	0.01	10	6	0.0100	1.04E-4	0.91
1,2 Dichloropropane (propylene dichloride)	*					0.0000		0.000	0.009	9	12	0.0090	9.39E-5	0.82
1,2 trans dichloroethylene						0.0000		0.000	0.092	92	40	0.0920	9.60E-4	8.41
1,2,3 Trichloropropane						0.0000		0.000	0.23	230	1	0.2300	2.40E-3	21.02
1-Propanol						0.0000		0.000	11	11000	1	11.0000	1.15E-1	1,005.08
2,4-dimethylphenol						0.0000		0.000	0.019	19	2	0.0190	1.98E-4	1.74
2-Chloroethyl Vinyl Ether						0.0000		0.000	0.551	551	2	0.5510	5.75E-3	50.35
2-Hexanone						0.0000		0.000	0.088	88	11	0.0880	9.18E-4	8.04
Acetone						0.0880	88.00	0.088	0.43	430	23	0.4300	4.49E-3	39.29
Acrolein	*					0.0000		0.000	0.27	270	1	0.2700	2.82E-3	24.67
Acrylonitrile	*					0.0000		0.000	0		0	0.0000	0.00E+0	-
Benzene	*					0.0003	0.27	0.00027	0.037	37	35	0.0370	3.86E-4	3.38
Bis(Chloromethyl) Ether	*					0.0000		0.000	0.25	250	1	0.2500	2.61E-3	22.84
Butanol						0.0000		0.000	10	10000	1	10.0000	1.04E-1	913.71
Carbon tetrachloride	*					0.0000		0.000	0.202	202	2	0.2020	2.11E-3	18.46
Chlorobenzene	*					0.0000		0.000	0.007	7	12	0.0070	7.30E-5	0.64
Chloroform	*					0.0000		0.000	0.029	29	8	0.0290	3.02E-4	2.65
Chloromethane	*					0.0000		0.000	0.175	175	3	0.1750	1.83E-3	15.99
Cis- 1,2 Dichloroethylene						0.0000		0.000	0.33	330	2	0.3300	3.44E-3	30.15
Dichloromethane	*					0.0000		0.000	0.44	440	68	0.4400	4.59E-3	40.20
(methylene chloride)						0.0000		0.000	0		0	0.0000	0.00E+0	-
Diethyl phthalate						0.0000		0.000	0.083	83	27	0.0830	8.66E-4	7.58
Ethanol						0.0000		0.000	23	23000	1	23.0000	2.40E-1	2,101.53
Ethylbenzene	*	3.00				0.0010	1.00	3.000	0.058	58	41	3.0000	3.13E-2	274.11
Isophorone	*					0.0000		0.000	0.076	76	19	0.0760	7.93E-4	6.94
Methyl ethyl ketone	*					0.1900	190.00	0.190	1.55	1550	24	1.5500	1.62E-2	141.62
Methyl isobutyl ketone	*					0.0280	28	0.028	0.27	270	9	0.2700	2.82E-3	24.67
Naphthalene	*					0.0000		0.000	0.012	12	23	0.0120	1.25E-4	1.10
p-Cresol	*					0.0000		0.000	2.305	2305	10	2.3050	2.40E-2	210.61
Perchloroethylene (tetrachloroethylene)	*					0.0000		0.000	0.055	55	18	0.0550	5.74E-4	5.03
Phenols (total)	*					0.0000		0.000	0.378	378	45	0.3780	3.94E-3	34.54
Styrene	*					0.0000		0.000	0		0	0.0000	0.00E+0	-
Tetrahydrofuran						0.0000		0.000	0.26	260	7	0.2600	2.71E-3	23.76
Toluene	*	5.00		4.00	2.00	0.0026	2.60	5.000	0.413	413	69	5.0000	5.22E-2	456.85
Trichloroethylene	*					0.0000		0.000	0.043	43	28	0.0430	4.49E-4	3.93
Vinyl chloride	*					0.0000		0.000	0.04	40	10	0.0400	4.17E-4	3.65
Xylene	*	9.00				0.0022	2.20	9.000	0.071	71	7	9	9.39E-2	822.34

Notes:
HAP = Clean Air Act Hazardous Air Pollutant
mgal = million gallons
Parts per billion = ug/l
Parts per million = mg/l

x - detected below method detection limit
(1) Using EPA "typical" leachate data (median value), Summary Of Data On Municipal Solid Waste Landfill Leachate Characteristics "Criteria For Municipal Solid Waste Landfills", EPA, July 1988 (NTIS PB88-242441).

	HAP	8/19/1998 ppm [b] (mg/l)	4/29/1998 ppm [b] (mg/l)	2/5/1998 ppm [b] (mg/l)	11/5/1997 ppm [b] (mg/l)	11/5/97 (a) ppm [b] (mg/l)	11/5/97 (a) ppb [b] (ug/l)	Maximum ppm [b] (mg/l)		EPA Theoretical Median Conc (mg/l)	EPA Theoretical Conc (ug/l)	Number of Samples by EPA	Max Conc (mg/l)	Pounds per hour	Pounds per year
Hydrogen Chloride[d]	*	660.00	320.00	260.00				660.000		695	695000	0	695.000	-	N/A
Hydrogen fluoride						200.00		200.000		0.4	400	0	200.000	-	N/A
Hydrogen sulfide[e]		96.00	8.00					96.000		108	108000	0	108.000	1.13E+0	9,868.04

Leachate HAPs & metals [c]	HAP	8/19/1998 ppm [b] (mg/l)	4/29/1998 ppm [b] (mg/l)	2/5/1998 ppm [b] (mg/l)	11/5/1997 ppm [b] (mg/l)	11/5/97 (a) ppm [b] (mg/l)	11/5/97 (a) ppb [b] (ug/l)	Maximum ppm [b] (mg/l)		EPA Theoretical Median Conc (mg/l)	EPA Theoretical Conc (ug/l)	Number of Samples by EPA	Max Conc (mg/l)	Pounds per hour	Pounds per year
Bis (Chloromethyl) ether	*					0.0000		0.000		0		0	0.000	0.00E+0	0.0
Isophorone	*					0.0000		0.000		0		0	0.000	0.00E+0	0.0
Naphthalene	*					0.0000		0.000		0		0	0.000	0.00E+0	0.0
p-cresol	*					0.0000		0.000		0		0	0.000	0.00E+0	0.0
phenols (total)	*					0.0000		0.000		0		0	0.000	0.00E+0	0.0
antimony	*					0.0000		0.000		0		0	0.000	0.00E+0	0.0
arsenic	*					0.0000		0.000		0.08		0	0.080	8.34E-7	0.0
barium		0.17	0.06	0.06	0.08	0.0000		0.170		0.383	383	0	0.383	3.99E-6	0.0
beryllium	*					0.0000		0.000		0.0065	7	0	0.007	6.78E-8	0.0
cadmium	*					0.0000		0.000		0.015	15	0	0.015	1.56E-7	0.0
calcium		135.00	21.00	25.00	27.00	0.0000		135.000		336	336000	0	336.000	3.50E-3	30.7
chromium	*	0.17				0.0000		0.170		0.06	60	0	0.170	1.77E-6	0.0
copper		0.10				0.0420	42.00	0.100		0.07	70	0	0.100	1.04E-6	0.0
lead	*					0.0000		0.000		0.08	80	0	0.080	8.34E-7	0.0
mercury	*					0.0000		0.000		0.0006	0.6	0	0.001	6.26E-9	0.0
nickel	*	0.20	0.03	0.02	0.02	0.0000		0.200		0.16	160	0	0.200	2.09E-6	0.0
selenium	*					0.0000		0.000			0	0	0.000	0.00E+0	0.0
sodium		510.00	260.00	330.00	440.00	0.0000		510.000			0	0	510.000	5.32E-3	46.6
thallium						0.0000		0.000			0	0	0.000	0.00E+0	0.0
iron		6.00				3.6000	3600.00	6.000		66.2	66200	0	66.200	6.90E-4	6.0
zinc		0.07				0.0750	75.00	0.075		1.35	1350	0	1.350	1.41E-5	0.1

TOTAL HAP EMISSIONS: uncontrolled = **0.30** lb/hr **2,646.05** lbs/year

98% control = **0.006** lb/hr **52.92** lbs/year

Note: Existing 20,000-gpd EVAP unit contributed 35.3 lb/yr. Increase for new unit = 35.3

a - HAPs in both LFG and in leachate
b - from EPA Characterization of MWC Ashes and Leachates from MSW Landfills, Monofills and Co-Disposal Sites, median concentration values
c - draft AP-42 (9/95), Tebles 2.4-3; unlisted control efficiencies essumed to be 80%
d - product of combustion
c - Additional HAPs found in leachate > 50 ppb/mgal per reference b
x - HAP present in leachate > 50 ppb
o - non-VOC HAP
Notes:
c - draft AP-42 (9/95), Tables 2.4-1 and 2.4-2; concentration in inlet gas
d - concentration of chloride in leachate; thermal conversion to hydrogen chloride in flare is presented in the "air toxics" sheets
d - concentration of sulfate in leachate; thermel conversion to sulfur dioxides in flare is presented in the "criteria pollutants" sheets

Letter Symbol	Definition
atm-ft^3/lb-mol^{o}R	atmosphere cubic foot per pound mole degree Rankine
acfm	actual cubic foot per minute
atm	atmosphere
bhp	brake horsepower
Btu	british thermal unit
cal/s	calorie per second
CO	carbon monoxide
ft^3	cubic foot
m^3	cubic meter
d	day
^{o}F	degree Fahrenheit
^{o}R	degree Rankine
dscfm	dry standard cubic foot, feet per minute
dsl/min	dry standard litre per minute
ft	foot
ft/min	foot per minute
ft/s	foot per second
g	gram
hr	hour
HAP	hazardous air pollutant
HV	heating value
HHV	higher heating value
in.	inch
kW	kilowatt
kWh	kilowatt hour
l	litre
LHV	lower heating value
m	meter
m/s	meter per second
CH_4	methane
Hg	mercury
μg	microgram
μg/dsl	microgram per dry standard litre
mg	milligram
MM	million
MMBtu	million british thermal units
min	minute
mol	mole
NO_2	nitrogen dioxide
Nox	nitrogen oxides
NMOC	non-methane organic compounds
PM_{10}	particulate matter less than or equal to 10 microns
Pb	lead
ppmv	parts per million by volume
ppmw	parts per million by weight
lb/hr	pound per hour
s	second
scf	standard cubic foot
scfm	standard cubic foot per minute
STP	standard temperature and pressure
SO_2	sulfur dioxide
ton	ton
ton/yr	ton per year
R	universal gas constant
VOC	volatile organic compound

Sample Calculations

Standard Conditions and Constants

$^oR = ^oF + 460$
standard temperature = 60 ^oF
standard pressure = 1 atm
Universal gas constant (R) = 0.7302 atm-ft^3/lb-mol^{o}R

Flow
dscfm= scfm*(1-%moisture)
acfm = scfm*(actual temp[^{o}R])/(standard temp[^{o}R])*{(standard press[atm])/(actual press [atm])}

CO and NO_x Emissions
(lb/MMbtu)*(MMbtu/hr)= lb/hr

SO_2 Emissions
typically, 86% to 99.7% of sulfur compounds convert to SO_2 during combustion
{(scfm)*(60 min/hr)*(total sulfur concentration [ppmv])*(1-control efficiency)*(MW SO_2)}/{(R)*(T)} = lb/hr

PM_{10} Emissions
(dscfm)*(CH_4 component)*(1E-6 MMscf/scf)* (lb PM/MMscf CH_4)*(60 min/hr) = lb/hr

VOC Emissions
{(scfm*60 min/hr*concentration$_{compound}$[ppmv]*MW$_{compound}$)/(R)*(T)}*(1-control efficiency) = lb/hr
OR
VOCs are 39 percent of NMOC, as prescribed in AP-42
VOC concentration[ppmv] = NMOC concentration[as hexane]*39%
flare and/or engines typically combust 98% of VOCs
{(scfm*60 min/hr*concentration$_{hexane}$[ppmv]*MW$_{hexane}$)/(R)*(T)}*(0.39) = lb/hr

LFG Compound Emissions
{(scfm*60 min/hr*concentration$_{compound}$[ppmv]*MW$_{compound}$)/(R)*(T)}*(1-control efficiency)

HCl Emissions
typically, 86% to 99.7% of chlorine compounds convert to HCl during combustion
(concentration$_{compound}$ [ppm])*(control efficiency)*(no. of chlorine atoms) = HCl concentration [ppm] in outlet gas from each compound
{HCl conconcentration$_{each\ compound}$ [ppm]*scfm*MW$_{HCl}$}/{(R)*(T)}*(60 min/hr) = lb/hr
OR
{(scfm)*(60 min/hr)*(HCl outlet concentration per AP-42 [ppmv])*(1-control efficiency)*(MW)}/{(R)*(T)} = lb/hr

Sample Calculations

Standard Conditions and Constants

$^oR = ^oF + 460$
standard temperature = 60 ^oF
standard pressure = 1 atm
Universal gas constant (R) = 0.7302 atm-ft^3/lb-mol^{o}R

Flow
dscfm= scfm*(1-%moisture)
acfm = scfm*(actual temp[^{o}R])/(standard temp[^{o}R])*{(standard press[atm])/(actual press [atm])}

CO and NO_x Emissions
(lb/MMbtu)*(MMbtu/hr)= lb/hr

SO_2 Emissions
typically, 86% to 99.7% of sulfur compounds convert to SO_2 during combustion
{(scfm)*(60 min/hr)*(total sulfur concentration [ppmv])*(1-control efficiency)*(MW SO_2)}/{(R)*(T)} = lb/hr

PM_{10} Emissions
(dscfm)*(CH_4 component)*(1E-6 MMscf/scf)* (lb PM/MMscf CH_4)*(60 min/hr) = lb/hr

VOC Emissions
{(scfm*60 min/hr*concentration$_{compound}$[ppmv]*MW$_{compound}$)/(R)*(T)}*(1-control efficiency) = lb/hr
OR
VOCs are 39 percent of NMOC, as prescribed in AP-42
VOC concentration[ppmv] = NMOC concentration[as hexane]*39%
flare and/or engines typically combust 98% of VOCs
{(scfm*60 min/hr*concentration$_{hexane}$[ppmv]*MW$_{hexane}$)/(R)*(T)}*(0.39) = lb/hr

LFG Compound Emissions
{(scfm*60 min/hr*concentration$_{compound}$[ppmv]*MW$_{compound}$)/(R)*(T)}*(1-control efficiency)

HCl Emissions
typically, 86% to 99.7% of chlorine compounds convert to HCl during combustion
(concentration$_{compound}$ [ppm])*(control efficiency)*(no. of chlorine atoms) = HCl concentration [ppm] in outlet gas from each compound
{HCl conconcentration$_{each\ compound}$ [ppm]*scfm*MW$_{HCl}$}/{(R)*(T)}*(60 min/hr) = lb/hr
OR

{(scfm)*(60 min/hr)*(HCl outlet concentration per AP-42 [ppmv])*(1-control efficiency)*(MW}/{(R)*(T)} = lb/hr

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Solar Turbines

A Caterpillar Company

Solar Turbines Incorporated

Chris Lyons
9330 Sky Park Court
San Diego, CA 92123
Tel: (858) 694-6586 Direct

September 17, 2008

Mr. David Unger
Waste Management
1001 Fannin Suite 400
Houston, Texas 77002

Subject; Lake Okeechobee, Florida Landfill Project

Dear David,

As per your request, the following are the Solar Turbines gas turbine air emissions guarantees for your proposed landfill gas to power project in Lake Okeechobee, Florida. These values are based on the average ambient air temperature of 73 F and an elevation of 34 feet above sea level with an assumed 60% relative humidity.

Turbine Model	Power Output kW	Gas Flow lb/min.	Exhaust Gas Temp.	NOx ppmv 15% O2	NOx lb/h	NOx g/bhp	CO ppmv 15% O2	CO lb/h	CO g/bhp
Titan 130-20501	15185	6664.7	935 F	72	46.36	0.987	100	78.38	1.67
Centaur 50-6200	4561	2523.7	956 F	42	9.8	0.696	200	35.5	2.52
Centaur 40-4700	3337.4	2505.9	837 F	42	7.89	0.746	250	28.6	2.70

We suggested a minimum stack height of 30 feet to obtain the proper flue gas dispersion and draft away from the turbine air inlet, etc. However, each site is specific relative to stack height based on local ordinances, air permits, adjacent building heights, etc.

If any other data is required, please let us know.

Regards,
Chris Lyons

Appendix E

Permit Application No. 1270-3
Facility ID No. 0930104

Revised Construction Schedule

INSTALLATION SCHEDULE FOR CONTROL DEVICES (STANDARD OPERATING SCENARIO)

				Primary Operating Condition								
Year	Refuse In-Place (tons)	Estimated LFG Recovery, Existing and Planned LFG System (scfm) *	Enclosed Flare (3000 scfm)	Odor Control Flare (3300 scfm)	Open Backup Flare (2,800 scfm)	Turbines (5,000 scfm)	Turbines (1,500 scfm)	Open Flares (3,000 scfm)	BACT	Potential to Emit (scfm)	Excess Potential (scfm)	Notes
2007	15,526,195	7,494	2	1	1				No	12,100	*4,606*	1
2008	17,533,695	8,434	2	1	1				No	12,100	*3,666*	1
2009	19,541,195	9,302	2	1	1				No	12,100	*2,798*	1
2010	21,548,695	10,104		1	1	1	1		Yes	12,600	*2,496*	1
2011	23,556,195	10,843				1	4		Yes	11,000	*157*	
2012	26,111,195	12,967				1	6		Yes	14,000	*1,033*	
2013	28,666,195	14,141				1	7		Yes	15,500	*1,359*	
2014	31,221,195	15,225				1	7		Yes	15,500	*275*	
2015	33,776,195	16,225				1	8		Yes	17,000	*775*	
2016	36,331,195	17,149				1	9		Yes	18,500	*1,351*	
2017	38,886,195	18,002				1	9		Yes	18,500	*498*	
2018	41,441,195	18,789				1	10		Yes	20,000	*1,211*	
2019	43,996,195	19,516				1	10		Yes	20,000	*484*	
2020	46,551,195	20,186				1	11		Yes	21,500	*1,314*	
2021	49,106,195	20,805				1	11		Yes	21,500	*695*	
2022	51,661,195	21,377				1	11		Yes	21,500	*123*	
2023	54,216,195	21,905				1	12		Yes	23,000	*1,095*	
2024	56,771,195	22,392				1	12		Yes	23,000	*608*	
2025	59,326,195	22,841				1	12		Yes	23,000	*159*	
2026	61,881,195	23,256				1	13		Yes	24,500	*1,244*	
2027	64,436,195	23,639				1	13		Yes	24,500	*861*	
2028	66,991,195	23,993				1	13		Yes	24,500	*507*	
2029	69,546,195	24,320				1	13		Yes	24,500	*180*	
2030	72,101,195	24,621				1	14		Yes	26,000	*1,379*	
2031	74,656,195	24,899				1	14		Yes	26,000	*1,101*	
2032	77,211,195	25,156				1	14		Yes	26,000	*844*	
2033	79,766,195	25,393				1	14		Yes	26,000	*607*	
2034	82,321,195	25,612				1	14		Yes	26,000	*388*	
2035	84,876,195	25,814				1	14		Yes	26,000	*186*	
2036	87,431,195	26,001				1	15		Yes	27,500	*1,499*	
2037	89,986,195	26,173				1	15		Yes	27,500	*1,327*	
2038	92,541,195	26,332				1	15		Yes	27,500	*1,168*	
2039	95,096,195	26,478				1	15		Yes	27,500	*1,022*	
2040	97,651,195	26,614				1	15		Yes	27,500	*886*	
2041	100,206,195	26,739				1	15		Yes	27,500	*761*	
2042	102,761,195	26,854				1	15		Yes	27,500	*646*	

INSTALLATION SCHEDULE FOR CONTROL DEVICES (STANDARD OPERATING SCENARIO)

				Primary Operating Condition								
Year	Refuse In-Place (tons)	Estimated LFG Recovery, Existing and Planned LFG System (scfm)*	Enclosed Flare (3000 scfm)	Odor Control Flare (3300 scfm)	Open Backup Flare (2,800 scfm)	Turbines (5,000 scfm)	Turbines (1,500 scfm)	Open Flares (3,000 scfm)	BACT	Potential to Emit (scfm)	Excess Potential (scfm)	Notes
2043	105,316,195	26,961				1	15		Yes	27,500	*539*	
2044	107,871,195	27,059				1	15		Yes	27,500	*441*	
2045	110,426,195	27,150				1	15		Yes	27,500	*350*	
2046	112,981,195	27,234				1	15		Yes	27,500	*266*	
2047	115,536,195	27,311				1	15		Yes	27,500	*189*	
2048	118,091,195	27,382				1	15		Yes	27,500	*118*	
2049	120,646,195	27,448				1	15		Yes	27,500	*52*	
2050	123,201,195	27,509			1	1	15		Yes	30,300	*2,791*	
2051	125,756,195	27,565			1	1	15		Yes	30,300	*2,735*	
2052	128,311,195	27,617			1	1	15		Yes	30,300	*2,683*	
2053	130,866,195	27,665			1	1	15		Yes	30,300	*2,635*	
2054	133,421,195	27,709			1	1	15		Yes	30,300	*2,591*	
2055	135,976,195	27,750			1	1	15		Yes	30,300	*2,550*	
2056	138,531,195	27,788			1	1	15		Yes	30,300	*2,512*	
2057	141,086,195	27,822			1	1	15		Yes	30,300	*2,478*	
2058	142,755,440	27,854			1	1	15		Yes	30,300	*2,446*	
2059	142,755,440	30,146			1	1	15		Yes	30,300	*154*	2
2060	142,755,440	27,828			1	1	15		Yes	30,300	*2,472*	
2061	142,755,440	25,689				1	14		Yes	26,000	*311*	
2062	142,755,440	23,714				1	13		Yes	24,500	*786*	
2063	142,755,440	21,890				1	12		Yes	23,000	*1,110*	
2064	142,755,440	20,207				1	11		Yes	21,500	*1,293*	
2065	142,755,440	18,654				1	10		Yes	20,000	*1,346*	
2066	142,755,440	17,220				1	9		Yes	18,500	*1,280*	
2067	142,755,440	15,896				1	8		Yes	17,000	*1,104*	
2068	142,755,440	14,674				1	7		Yes	15,500	*826*	
2069	142,755,440	13,545				1	6		Yes	14,000	*455*	
2070	142,755,440	12,504				1	6		Yes	14,000	*1,496*	
2071	142,755,440	11,543				1	5		Yes	12,500	*957*	
2072	142,755,440	10,655				1	4		Yes	11,000	*345*	

NOTE 1: Existing Enclosed Flares will be removed once turbines are in place

NOTE 2: Maximum potential to emit

NOTE 3: This control device installation schedule is based on the landfill construction (waste deposition rate) and the landfill gas generation rates. The schedule will vary based on the need for additional control devices which is related to the actual waste deposition and landfill gas generation rate, and facility operations related to procurement and budgeting.

NOTE 4: This schedule does not show the 1,500-flares however, they may be installed at any point and ultimately may replace the installation and operation of one 3000 scfm flare.

OKEECHOBEE LANDFILL
AIR CONSTRUCTION PERMIT APPLICATION 1270-3

INSTALLATION SCHEDULE FOR CONTROL DEVICES (ALTERNATIVE OPERATING SCENARIO - FLARING ONLY)

Year	Refuse In-Place (tons)	Estimated LFG Recovery, Existing and Planned LFG System (scfm) *	Alternative Operating Scenario					Potential to Emit (scfm)	Excess Potential (scfm)	Notes
			Enclosed Flares (3,000scfm)	Open Backup Flares (2,800 scfm)	Odor Control Flare (3300-scfm)	Open Flares (3,000 scfm)	BACT			
2007	15,526,195	7,494	2	1	1		No	12,100	4,606	
2008	17,533,695	8,434	2	1	1		No	12,100	3,666	
2009	19,541,195	9,302	2	2	1		No	14,900	5,598	
2010	21,548,695	10,104		2	1	1	Yes	11,900	1,796	1
2011	23,556,195	10,843		2	1	1	Yes	11,900	1,057	
2012	26,111,195	12,967		1	1	3	Yes	15,100	2,133	
2013	28,666,195	14,141		1	1	3	Yes	15,100	959	
2014	31,221,195	15,225		1	1	4	Yes	18,100	2,875	
2015	33,776,195	16,225		1	1	4	Yes	18,100	1,875	
2016	36,331,195	17,149		1	1	4	Yes	18,100	951	
2017	38,886,195	18,002		1	1	5	Yes	21,100	3,098	
2018	41,441,195	18,789		1	1	5	Yes	21,100	2,311	
2019	43,996,195	19,516		1	1	5	Yes	21,100	1,584	
2020	46,551,195	20,186		1	1	5	Yes	21,100	914	
2021	49,106,195	20,805		1	1	5	Yes	21,100	295	
2022	51,661,195	21,377		1	1	6	Yes	24,100	2,723	
2023	54,216,195	21,905		1	1	6	Yes	24,100	2,195	
2024	56,771,195	22,392		1	1	6	Yes	24,100	1,708	
2025	59,326,195	22,841		1	1	6	Yes	24,100	1,259	
2026	61,881,195	23,256		1	1	6	Yes	24,100	844	
2027	64,436,195	23,639		1	1	6	Yes	24,100	461	
2028	66,991,195	23,993		1	1	6	Yes	24,100	107	
2029	69,546,195	24,320		1	1	7	Yes	27,100	2,780	
2030	72,101,195	24,621		1	1	7	Yes	27,100	2,479	
2031	74,656,195	24,899		1	1	7	Yes	27,100	2,201	
2032	77,211,195	25,156		1	1	7	Yes	27,100	1,944	
2033	79,766,195	25,393		1	1	7	Yes	27,100	1,707	
2034	82,321,195	25,612		1	1	7	Yes	27,100	1,488	
2035	84,876,195	25,814		1	1	7	Yes	27,100	1,286	
2036	87,431,195	26,001		1	1	7	Yes	27,100	1,099	
2037	89,986,195	26,173		1	1	7	Yes	27,100	927	
2038	92,541,195	26,332		1	1	7	Yes	27,100	768	
2039	95,096,195	26,478		1	1	7	Yes	27,100	622	
2040	97,651,195	26,614		1	1	7	Yes	27,100	486	
2041	100,206,195	26,739		1	1	7	Yes	27,100	361	
2042	102,761,195	26,854		1	1	7	Yes	27,100	246	
2043	105,316,195	26,961		1	1	7	Yes	27,100	139	
2044	107,871,195	27,059		1	1	8	Yes	30,100	3,041	
2045	110,426,195	27,150		1	1	8	Yes	30,100	2,950	
2046	112,981,195	27,234		1	1	8	Yes	30,100	2,866	
2047	115,536,195	27,311		1	1	8	Yes	30,100	2,789	
2048	118,091,195	27,382		1	1	8	Yes	30,100	2,718	
2049	120,646,195	27,448		1	1	8	Yes	30,100	2,652	

OKEECHOBEE LANDFILL

AIR CONSTRUCTION PERMIT APPLICATION 1270-3

INSTALLATION SCHEDULE FOR CONTROL DEVICES (ALTERNATIVE OPERATING SCENARIO - FLARING ONLY)

Year	Refuse In-Place (tons)	Estimated LFG Recovery, Existing and Planned LFG System (scfm) *	Alternative Operating Scenario					Potential to Emit (scfm)	Excess Potential (scfm)	Notes
			Enclosed Flares (3,000scfm)	Open Backup Flares (2,800 scfm)	Odor Control Flare (3300-scfm)	Open Flares (3,000 scfm)	BACT			
2050	123,201,195	27,509		1	1	8	Yes	30,100	2,591	
2051	125,756,195	27,565		1	1	8	Yes	30,100	2,535	
2052	128,311,195	27,617		1	1	8	Yes	30,100	2,483	
2053	130,866,195	27,665		1	1	8	Yes	30,100	2,435	
2054	133,421,195	27,709		1	1	8	Yes	30,100	2,391	
2055	135,976,195	27,750		1	1	8	Yes	30,100	2,350	
2056	138,531,195	27,788		1	1	8	Yes	30,100	2,312	
2057	141,086,195	27,822		1	1	8	Yes	30,100	2,278	
2058	142,755,440	27,854		1	1	8	Yes	30,100	2,246	
2059	142,755,440	30,146		1	1	9	Yes	33,100	2,954	2
2060	142,755,440	27,828		1	1	8	Yes	30,100	2,272	
2061	142,755,440	25,689		1	1	7	Yes	27,100	1,411	
2062	142,755,440	23,714		1	1	6	Yes	24,100	386	
2063	142,755,440	21,890		1	1	6	Yes	24,100	2,210	
2064	142,755,440	20,207		1	1	5	Yes	21,100	893	
2065	142,755,440	18,654		1	1	5	Yes	21,100	2,446	
2066	142,755,440	17,220		1	1	4	Yes	18,100	880	
2067	142,755,440	15,896		1	1	4	Yes	18,100	2,204	
2068	142,755,440	14,674		1	1	3	Yes	15,100	426	
2069	142,755,440	13,545		1	1	3	Yes	15,100	1,555	
2070	142,755,440	12,504		1	1	3	Yes	15,100	2,596	
2071	142,755,440	11,543		1	1	2	Yes	12,100	557	
2072	142,755,440	10,655		1	1	2	Yes	12,100	1,445	

NOTE 1: Existing Enclosed Flares will be removed once turbines are in place

NOTE 2: Maximum potential to emit

NOTE 3: This control device installation schedule is based on the landfill construction (waste deposition rate) and the landfill gas generation rates. The schedule will vary based on the need for additional control devices which is related to the actual waste deposition and landfill gas generation rate, and facility operations related to procurement and budgeting.

NOTE 4: This schedule does not show the 1,500-flares however, they may be installed at any point and ultimately may replace the installation and operation of one 3000 scfm flare.

10/13/2008

Appendix G

Permit Application No. 1270-3
Facility ID No. 0930104

Revised Stack Parameters

Appendix G
EU Point (Stack/Vent) Information – Rev. 01

Identification of Point on Plot Plan or Flow Diagram	**Control Devices**
Emission Point Type Code:	3 – A configuration of multiple emission points serving a single EU

Control Devices 1 and 2: Existing Enclosed Flares

Discharge Type Code:	V – A stack with an unobstructed opening discharging in a vertical or nearly vertical direction	
Stack Height	45	Feet
Exit Diameter	10	Feet
Exit Temperature	1400	Fahrenheit
Actual Volumetric Flow	179,467	acfm
Water Vapor	8	%
Max. Dry Standard Flow Rate	2,760	dscfm
Emission Point UTM Coordinates (Zone 17) Proposed Location:		
Control Device	X (m)	Y (m)
CD001	530433.068	3023829.915
CD002	530433.068	3023836.011
Comment: None		

Control Devices 003 and 004: Existing Backup and Odor Control Utility Flares

Discharge Type Code:	V – A stack with an unobstructed opening discharging in a vertical or nearly vertical direction	
Stack Height	35	Feet
Exit Diameter	1.17	Feet
Exit Temperature[1]	1400	Fahrenheit
Actual Volumetric Flow	3,554	acfm
Water Vapor	8	%
Max. Dry Standard Flow Rate	3,036	dscfm
Emission Point UTM Coordinates (Zone 17) Proposed Location:		
Control Device	X (m)	Y (m)
CD003	530433.068	3023842.107
CD004	530433.068	3023848.203
Comment: None		

Control Device 005 through 013: Utility Flare

Discharge Type Code:	V – A stack with an unobstructed opening discharging in a vertical or nearly vertical direction	
Stack Height	Minimum 42	Feet
Exit Diameter	Maximum 1.17	Feet
Exit Temperature[1]	1400	Fahrenheit
Actual Volumetric Flow	3,554	acfm
Water Vapor	8	%
Max. Dry Standard Flow Rate	3,036	dscfm
Emission Point UTM Coordinates (Zone 17) Proposed Location:		
Control Device	X (m)	Y (m)
CD005	530433.068	3023854.299
CD006	530433.068	3023860.395
CD007	530433.068	3023866.491
CD008	530433.068	3023872.587
CD009	530433.068	3023878.683
CD010	530433.068	3023884.779
CD011	530433.068	3023890.875
CD012	530433.068	3023896.971
CD013	530433.068	3023903.067
Comment: These proposed control devices would be installed as gas production increases.		

Control Device 014 through 015: Utility Flare

Discharge Type Code:	V – A stack with an unobstructed opening discharging in a vertical or nearly vertical direction	
Stack Height	Minimum 28	Feet
Exit Diameter	Maximum 0.83	Feet
Exit Temperature[1]	1400	Fahrenheit
Actual Volumetric Flow	1,500	acfm
Water Vapor	8	%
Max. Dry Standard Flow Rate	1,380	dscfm
Emission Point UTM Coordinates (Zone 17) Proposed Location:		
Control Device	X (m)	Y (m)
CD014	530433.068	3023909.163
CD015	530433.068	3023915.259
Comment: These proposed control devices would be installed as gas production increases.		

Appendix G
EU Point (Stack/Vent) Information – Rev. 01

Control Device 016: LFG Turbine[2]

Discharge Type Code:	V – A stack with an unobstructed opening discharging in a vertical or nearly vertical direction	
Stack Height	Minimum 35	Feet
Exit Diameter	Maximum 10	Feet
Exit Temperature[1]	495 (100% load)	Fahrenheit
Actual Volumetric Flow	236,019 (100% load)	acfm
Water Vapor	8	%
Max. Dry Standard Flow Rate	4,600	dscfm
Emission Point UTM Coordinates (Zone 17) Proposed Location:		
Control Device	X (m)	Y (m)
CD016	530470.478	3023713.238
Comment: These proposed control devices would be installed as gas production increases.		

Control Device 017 through 030: LFG Turbine[3]

Discharge Type Code:	V – A stack with an unobstructed opening discharging in a vertical or nearly vertical direction	
Stack Height	Minimum 35	Feet
Exit Diameter	Maximum 4	Feet
Exit Temperature[1]	445 (100% load)	Fahrenheit
Actual Volumetric Flow	82,503 (100% load)	acfm
Water Vapor	8	%
Max. Dry Standard Flow Rate	1,380	dscfm
Emission Point UTM Coordinates (Zone 17) Proposed Location:		
Control Device	X (m)	Y (m)
CD017	530470.478	3023719.334
CD018	530470.478	3023725.430
CD019	530470.478	3023731.526
CD020	530470.478	3023737.622
CD021	530470.478	3023743.718
CD022	530470.478	3023749.814
CD023	530470.478	3023755.910
CD024	530470.478	3023762.006
CD025	530470.478	3023768.102
CD026	530470.478	3023774.198
CD027	530470.478	3023780.294
CD028	530470.478	3023786.390
CD029	530470.478	3023792.486
CD030	530470.478	3023804.678
CD031	530470.478	3023810.774
Comment: These proposed control devices would be installed as gas production increases.		

[1] The Exit Temperature is based on manufacturer's information. The actual operating temperature cannot be measured for an open flare, The thermocouple provided by the manufacturer is to assure flame presence only.
[2] Turbine data based on Titian 130 Turbine manufactured by Solar Turbines. Another turbine may be implemented if the emissions parameters are equal or less than the Titian 130.
[3] Turbine data based on Centaur 40 Turbine manufactured by Solar Turbines. Another turbine may be implemented if the emissions parameters are equal or less than the Centaur 40.

APPENDIX H

Permit Application No. 1270-3
Facility ID No. 0930104

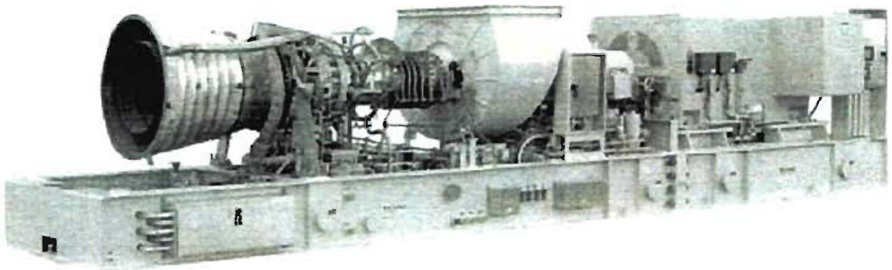
Revised Description of Control Equipment for the Solar Combustion Turbines

(The following manufacturer's specifications are representative of the proposed equipment. It is expected that this equipment will be used; however, if through the procurement process, another manufacturer provides similar equipment that meets or exceeds the performance parameters used to develop the air emissions and air quality modeling in this AC permit application, a substitution may be made. The FDEP will be notified of any change at least 30 days prior to construction.)

Solar Turbines
A Caterpillar Company

TITAN 130
Gas Turbine Generator Set

Oil & Gas Applications



Package Features
- *Offshore Marine Duty or Onshore Duty in High-Specification Applications*
- *NEC Class 1, Division 2 or CENELEC/ATEX Zone 2 Area Classification*
- *Axial or Space Saving Radial Exhaust Configuration*
- *Standard Onshore Configuration Available (Axial Exhaust Only)*

General Specifications

Gas Turbine
- Industrial, Single-Shaft, Simple-Cycle
- Compressor:
  - 14-Stage, Axial
  - Variable Inlet Guide Vanes, 5 Stators
  - Compression Ratio: 17.1:1
  - Inlet Airflow: 49.8 kg/sec (109.7 lb/sec)
  - Max. Speed: 11,220 rpm
  - Vertically Split Case
- Combustion Chamber:
  - Single, Annular-Type
  - Conventional: 21 Fuel Injectors or *SoLoNOx*™ Lean-Premixed, Dry, Low Emission: 14 Fuel Injectors
  - Torch Igniter System
- Power Turbine
  - 3-Stage, Axial-Flow
  - Max. Speed: 11,220 rpm
- Bearings:
  - 3 Tilt-Pad Radial Bearings
  - 1 Tilt-Pad Thrust Bearing
- Coatings
  - Compressor: Inorganic Aluminum
  - Turbine Blades and Nozzles: Precious Metal Diffusion Aluminide

Reduction Drive
- Epicyclic Type
  - 1500 rpm (50 Hz) or 1800 rpm (60 Hz)
  - Accessory Power Take-Off

Generator
- Salient Pole, 3 Phase, 6 Wire, Wye Connected, Synchronous, with Permanent Magnet Generator Exciter
- Available Construction Types:
  - Open Drip Proof
  - Totally Enclosed Air-to-Air Cooled *
  - Totally Enclosed Water-to-Air Cooled *
- Sleeve Bearings
- NEMA Class F Insulation
- Class B Temperature Rise
- Voltages: 6600 to 13,800 VAC
- Frequency: 50 or 60 Hz

Package
- Mechanical Construction
  - Steel Base Frame with Drip Pans
  - 316L Stainless Steel Piping ≤4" dia.
  - Compression-Type Tube Fittings
  - Suitable for 3-Point Mounting *
  - FPSO Modifications (Option) *
- Electrical System
  - NEC, Class 1, Group D, Div 2
  - CENELEC/ATEX Zone 2 *
  - Cable Tray Wiring
  - 120VDC Battery/Charger System
- Direct-Drive AC Start System
- Fuel Systems
  - Conventional Combustion or Dry Low Emission (*SoLoNOx*)
- Fuel Types
  - Natural Gas or Dual (Gas/Distillate)
- Integrated Lube Oil System
  - Turbine-Driven Main Pump
  - AC Motor-Driven Pre/Post Pump
  - DC (120V) Motor-Driven Backup Pump
  - Oil Cooler and Oil Heater (Options)
  - Tank Vent Separator and Flame Trap
  - Lube Oil Filter
- On-Crank or On-Crank/On-Line Turbine Compressor Cleaning System (Options) *
  - Portable Cleaning Tank (Option)
- Air Inlet and Exhaust System
  - Carbon Steel
  - Stainless Steel *
  - Marine-Type Filters *
- Enclosure (Driver Only or Complete)
  - Fire Detection and Suppression
- Factory Testing of Turbine and Package
- Documentation
  - Electrical Drawings
  - Mechanical Drawings
  - Quality Control Data Book
  - Inspection and Test Plan
  - Test Reports
  - Operation and Maintenance Manuals
- Digital Onskid Display Panel

Turbotronic™ Control System
- Onskid Control System (Optional Offskid System)
  - 24 VDC Control Power (120VDC Input)
  - Serial Link Supervisory Interface
  - Field Programmable
- Vibration Monitoring
  - Turbine Bearings and Shaft
  - Gearbox
  - Generator Bearings
- Temperature Monitoring
  - Turbine Combustion Process
  - Turbine Bearings and Lube Oil
  - Generator Bearings and Windings
- Generator Control
  - Selectable Control Modes
  - Solid-State Voltage Regulation
  - Automatic Synchronization
  - Metering Panel with Manual Synchronization (Option)
  - KW Control (Option)
- *TT4000* Display and Monitoring System
  - Multiple Operator Display Screens
  - Data Collection and Playback
  - Turbine Performance Map (Option)
  - Printer/Logger (Option)
  - Predictive Emissions Monitoring (Option)

* *Not available on Standard Onshore Configuration*

Solar Turbines
A Caterpillar Company

TITAN 130
Gas Turbine Generator Set

Oil & Gas Applications

Nominal Performance

Output Power	15 000 kWe
Heat Rate	10 230 kJ/kWe-hr (9695 Btu/kWe-hr)
Exhaust Flow	179 250 kg/hr (395,180 lb/hr)
Exhaust Temp.	495°C (925°F)

Nominal rating – per ISO
At 15°C (59°F), at sea level

No inlet/exhaust losses

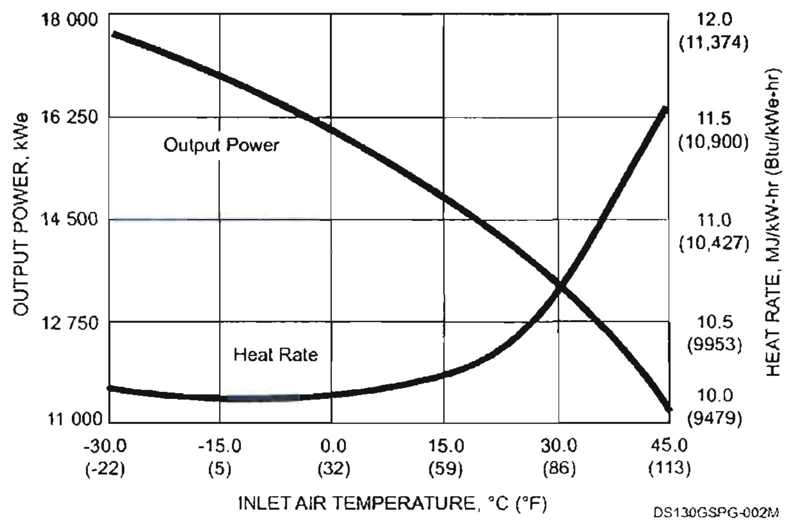
Relative humidity 60%

Natural gas fuel with
LHV = 35 MJ/nm³ (940 Btu/scf)

No accessory losses

Engine efficiency: 35.2%

Available Power



Package Dimensions

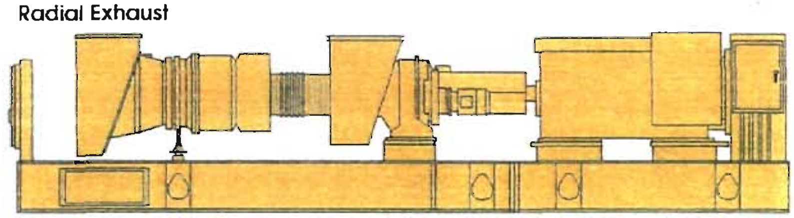
Length: 15.9 m (52' 0")

Width: 3.2 m (10' 5")

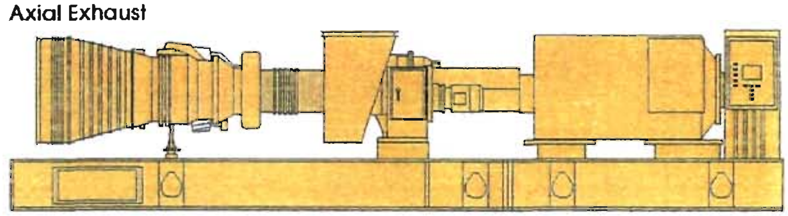
Height: 3.1 m (10' 3")

Typical
Weight: 77 100 kg (170,000 lb)

Radial Exhaust



Axial Exhaust



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DNV

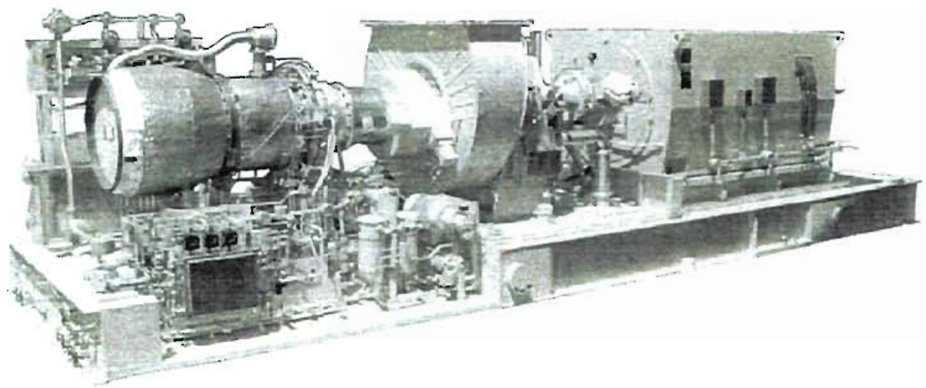
Solar Turbines

A Caterpillar Company

CENTAUR 40

Gas Turbine Generator Set

Oil & Gas Applications



General Specifications

***Centaur*® 40 Gas Turbine**

• Industrial, Single Shaft

- Axial Compressor
  - 11 Stage
  - Variable Inlet Guide Vanes
  - Compression Ratio: 9.7:1
  - Inlet Airflow: 18.4 kg/sec (40.5 lb/sec)
  - Max. Speed:
    14,944 rpm (50 Hz)
    14,951 rpm (60 Hz)
- Combustion Chamber
  - Annular Type
  - Conventional or Lean-Premixed, Dry,Low Emission (*SoLoNOx*™)
  - Fuel Injectors: 10 for Conventional; 12 for *SoLoNOx*
  - Torch Ignitor System
- Turbine
  - 3 Stage, Reaction
  - Max. Speed: 15,500
- Bearings
  - Journal: Tilting Pad
  - Thrust: Fixed Tapered Land
- Compressor Coating
  - Stators and Drums: Inorganic Aluminum
- Turbine Coatings (Optional)
  - Stage 1 and 2 Nozzles: Diffusion Aluminum
  - Stage 1 Blades: Platinum Aluminide
- Velocity Vibration Transducer and RTDs

Main Reduction Drive

- Epicyclic Type
- 1500 rpm (50 Hz) or
  1800 rpm (60 Hz)
- Acceleration Vibration Transducer

Generator

- Type: Salient Pole, 3 Phase, 6 Wire, Wye Connected, Synchronous, with Brushless Exciter
- Construction Options
  - Open Drip Proof
  - Weather Protected II (WPII)
  - Totally Enclosed Water/Air Cooled
- Sleeve Bearings
- Voltage Regulation
  - Solid-State Regulation with Permanent Magnet Generator
- NEMA Class F Insulation with B Temperature Rise
- Voltages: 3300 to 13,800 Volt
- Frequency: 50 or 60 Hz

Key Package Features

- Base Frame with Drip Pans
- 316L Stainless Steel Piping ≤4" dia
- Compression-Type Tube Fittings
- Digital Display Panel
- Electrical System Options
  - NEC Class I, Group D, Div 2
  - CENELEC Zone 2
- *Turbotronic*™ Microprocessor Control System
  - Freestanding Control Console (with offskid controls)
  - Video Display Unit
  - Temperature and Vibration Monitoring
  - Historical Displays
- Control System Options
  - Auxiliary Control Interface or Auxiliary Control Console (with onskid controls)
  - Remote Control and Display
  - 120-Vdc Control Battery/Charger
  - Supervisory Communications Interface
  - Turbine Performance Map
  - Printer/Logger
  - Field Programming
  - Predictive Emissions Monitoring
- Start System: Direct Drive AC
- Fuel Systems
  - Natural Gas
  - Dual (Gas/Liquid)
  - Alternate Fuels
- Integrated Lube Oil System
  - Turbine-Driven Accessories
  - Oil Tank Vent Separator
  - Oil Tank Vent Flame Trap
- Lube Oil System Options
  - Oil Cooler
  - Oil Heater
- Axial Compressor Cleaning Systems
  - On-Crank
  - On-Crank/On-Line
  - Certified Cleaning Tank
- Air Inlet and Exhaust System Options
- Enclosure and Associated Options
- Factory Testing of Turbine and Package
- Documentation
  - Drawings
  - Quality Control Data Book
  - Inspection and Test Plan
  - Test Reports
  - Operation and Maintenance Instruction Manual

Solar Turbines
A Caterpillar Company

CENTAUR 40
Gas Turbine Generator Set

Oil & Gas Applications

Performance

Output Power	3515 kWe
Heat Rate	12 920 kJ/kWe-hr (12,245 Btu/kWe-hr)
Exhaust Flow	68 365 kg/hr (150,715 lb/hr)
Exhaust Temp	445°C (830°F)

Nominal Rating – per ISO
At 15°C (59°F), at sea level

No inlet/exhaust losses

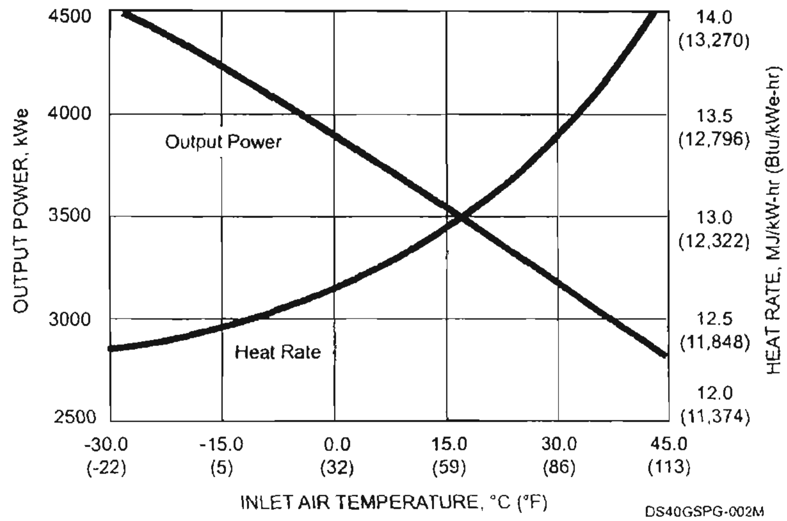
Relative humidity 60%

Natural gas fuel with
LHV = 35 MJ/nm³ (940 Btu/scf)

No Accessory losses

Engine efficiency: 27.9%

Available Power



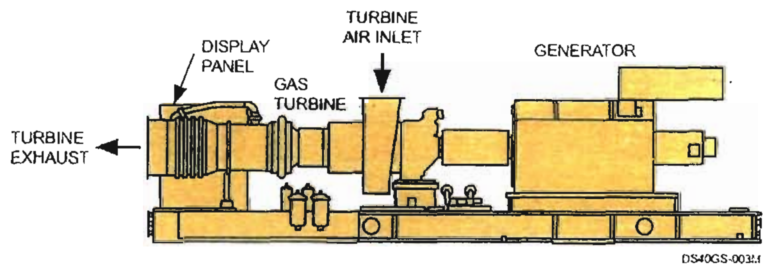
Package Dimensions

Length: 9.8 m (32' 0")

Width: 2.4 m (8' 0")

Height: 2.8 m (9' 4")

Typical
Weight: 23 755 kg (52,370 lb)



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3.0

Section III

Addenda to Air Quality Impact Analysis

SECTION III AIR CONSTRUCTION PERMIT APPLICATION 1270-3

ADDENDUM
AIR QUALITY IMPACT ANALYSIS FOR PROPOSED MODIFICATION CONSTRUCTION FOR OKEECHOBEE LANDFILL, FACILITY ID NO. 0930104

Prepared for:

Okeechobee Landfill, Inc.
Okeechobee, Florida

Prepared by:

Shaw® Shaw Environmental, Inc.

Shaw Environmental, Inc.
Monroeville, Pennsylvania

Project No. 121525
October 2008

Table of Contents

List of Tables

List of Figures

List of Appendices

List of Acronyms and Abbreviations

AAQS	Ambient air quality standard
AQRV	Air quality related values
BACT	Best Available Control Technology
BPIP	building profile Input program
CD	Control device
CO	Carbon monoxide
DEM	Digital elevation maps
F.A.C	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FLM	Federal land manager
GEP	Good engineering practice
H2SO4	Sulfuric acid
HAP	Hazardous air pollutant
K	Kelvin
Kw	kilowatt
LFG	Landfill gas
LFGTE	Landfill gas to energy
m/s	meters per second
NAAQS	National ambient air quality standard
NAD	North American datum
NMOC	Non methane organic compounds
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides
NPS	National park service
NSR	New Source Review
NWS	National weather service
OEPA	Ohio Environmental protection Agency
OLI	Okeechobee Landfill Incorporated
PBL	Planetary
PM10	Particulate matter with aerodynamic diameter less than or equal to 10 microns
PSD	Prevention of significant deterioration
PTE	Potential to emit
Scfm	standard cubic feet per minute
SIP	State implementation plan
SO_2	Sulfur dioxide
TCEQ	Texas Commission on Environmental Quality
USEPA	United States Environmental Protection Agency
USGS	United States Geological Service
UTM	Universal transverse mercaptor
VOC	Volatile organic compounds

1.0 Introduction

In February 2008, Shaw Environmental, Inc. (Shaw) submitted the Air Quality Impact Analysis for Proposed Modification Construction for Okeechobee Landfill, Facility ID No. 0930104 on behalf of Okeechobee Landfill, Inc. (OLI). Since the submission of the Air Quality Impact Analysis report, OLI has modified the operating scenarios in their permit application. This addendum to the Air Quality Impact Analysis includes the analyses of the revised operating scenarios.

2.0 Background Information

2.1 Description of Emission Sources

The revised future operations have been described in detail in Section 2.0 and 3.0 of Section II of this Air Permit Addenda (1270-3). In the previous air quality analysis submitted in February 2008 (Air Permit 1270-2), the following LFG combustion emission sources were considered:

Previously Submitted Existing Operation (prior to BACT):

i) Interim Scenario:

- Two existing enclosed flares (CD001 and CD002) used as control devices rated at 3,000 scfm but operating at 1,700 scfm of LFG each; and
- One new open flare (CD004) used as a control device rated at 3,300 scfm but operating at 2,300 scfm of LFG.
- Total flow of 5,700 scfm.

Previously Submitted Future Operation:

Future operations require installation of gas turbines and flares in stages based on the increase rate of landfill gas generation over the life or construction duration of the landfill. At the completion of the project, the following emission sources are considered for the air quality analysis:

ii) Routine Operating Scenario (BACT Scenario):

- Seven LFG Mars Solar turbines (CD011 to CD017) used as control devices each rated at 4,000 scfm of LFG;
- One open flare (CD003) used as a control device rated at 3,300 scfm of LFG; and
- One open flare (CD004) used as a control device rated at 3,300 scfm LFG, but only operating at one third capacity (1,100 scfm).
- Total potential flow of 32,400 scfm

iii) Alternative BACT Operating Scenario 1 (in case gas turbines are unavailable)

- Eight new open flares (CD003 through CD010) used as control devices each rated at 3,300 scfm of LFG
- Two existing enclosed flares (CD001 and CD002) used as control devices each rated at 3,000 scfm of LFG
- Total potential flow of 32,400 scfm

2 or V. 16 turbines, 2 open flares
2800-
3300

2a or Vi. 2800 open flare
3300 open flare
9 - 3000 open flares

2B or Vii. 2800 open flare
8 - 3000 open flares
3300 open flare
2 new open flares
1500

iv) Alternative BACT Operating Scenario 2 (in case gas turbines are unavailable)

- Eight new open flares (CD003 through CD010) used as control devices each rated at 3,300 scfm of LFG
- One new open flare (CD018) used as a control device replacing the existing enclosed flare (CD001) rated at 3,300 scfm of LFG
- One new open flare (CD019) used as a control device replacing the existing enclosed flare (CD002) rated at 3,300 scfm of LFG, but only operating at 2,700 scfm.
- Total potential flow of 32,400 scfm

Future Operation:

Operating scenarios ii, iii and iv have been replaced by the following operating scenarios v, vi and vii included in this addendum. The project's maximum throughput capacity remains unchanged at 32,400 scfm of landfill gas. The enclosed flares will be replaced with open flares. The landfill operating scenarios when construction is completed include the routine (primary) operating scenario:

v) Routine Operating Scenario (BACT Scenario) 2 – to replace previous Routine Operating Scenario:

- One LFG Titan Solar turbine (CD016) used as a control device each rated at 5,000 scfm of LFG;
- Fifteen LFG Centaur Solar turbines (CD017 through CD031) used as control devices each rated at 1,500 scfm of LFG;
- Two open flares (rated at 2,800 to 3,300 scfm) used as a control devices with a maximum throughput of 4,900 scfm;

The primary (routine) operating scenario is the preferred scenario; however, depending on the number of turbines on line, the number of flares that will be operated to handle the LFG not directed to the turbines will vary. The total maximum LFG throughput to any of the control devices would not exceed 32,400 scfm.

There are three operating scenarios for the maximum estimated LFG generation and throughput; two alternatives involve 100 percent flaring of LFG and one alternative involves a combination of turbine combustion and flaring but not to exceed 32,400 scfm. The rationale for the alternative operating scenarios is to allow flaring the LFG as a backup to the turbines if any or all should be off line. The Addendum replaces the enclosed flares with open flares. Open flares tend to require less maintenance and have a longer life cycle as intermittently operated back-up flare, than enclosed flares. This replacement is not considered in kind and has been included in the construction project and the project's emissions estimates. The control devices used for each alternative operating scenario are summarized below.

vi) Alternative BACT Operating Scenario 2A (if turbines are off line or if turbines are not installed) – to replace previous Alternative Operating Scenario 2:

- One 2,800-scfm open flare and one 3,300-scfm open flare (designated as CD003 and CD004 in the Application) and nine new 3,000-scfm open flares (CD005 through CD013) used as control devices.
- Operated at a maximum LFG throughput of 32,400 scfm.

Alternative Operating Scenario B (Same as Alternative A with a construction option to install two 1,500-scfm flares for one of the proposed 3,000-scfm flares.)

All flares have lower operating limitations relative to flow rate. The smaller capacity 1,500-scfm flares are a construction option for the facility. They will be used as back-up devices to the turbines when more landfill gas is collected than the turbines can use. Another use for the smaller flares would be at the end of the construction project when LFG generation rate and quality wanes.

vii) Alternative BACT Operating Scenario 2B (if turbines are off line or if turbines are not installed) – to replace previous Alternative Operating Scenario 2:

- One 2,800-scfm open flare and one 3,300-scfm open flare (designated as CD003 and CD004 in the Application), eight new 3,000-scfm open flares (CD005 through CD013) and two new open flares (CD014 and CD015) used as control devices.
- Operated at a maximum LFG throughput of 32,400 scfm.

Other Alternative Operating Scenarios would be various combinations of turbines and flares. To simplify the permitting, emission and air impact analysis every possible combination is not presented and only the worst-case scenarios are modeled.

All scenarios under the future conditions will have BACT installed for SO_2 as described in the Air Quality Impact Analysis Report.

The emission rates used for the air quality analysis from these control devices are described in Section 3.1.

2.2 Elements of Air Quality Analysis

In order to demonstrate that the revised operating scenarios would not affect the results of the February 2008 previously submitted Air Quality Impact Analysis, the significant impact analysis was modeled for SO_2, NOx, CO and PM_{10} and compared with the previously reported impacts from the original proposed operating scenarios. If the impacts from the revised operating scenarios were greater than the previously reported impacts, then a refined impact analysis was completed for those scenarios.

3.0 Technical Approach and Methodology

The air dispersion model and references used for this addendum are identical with those reported in the February 2008 Air Quality Impact Analysis.

3.1 Source Parameters

The emission points considered under various operating scenarios in the air dispersion modeling have been listed in Section 2.1. All of the proposed emission points were point sources with identified stacks venting the emissions to the atmosphere. This section describes the parameters required in AERMOD for the revised operating scenarios.

Emission Rates: Emission rates were calculated using manufacturer's data where available. If not available, then USEPA's AP-42 emission factor database was used. For SO_2, a mass balance was used considering all sulfur bearing compounds converted 100 percent to SO_2. The details of the calculations are included in Appendix A. Tables 3-1a-c summarize the emission rates of modeled pollutants used in the analyses. For both gas turbines and flares, the short-term and annual average emission rates were the same.

Table 3-1a: Routine BACT 2 Modeled Emission Rates

Pollutant	Averaging Period	1,600 scfm Open Flare (lb/hr)	3,300 scfm Open Flares (lb/hr)	LFG Titan Turbine (lb/hr)	LFG Centaur Turbines (lb/hr)
NOx	Annual	3.3	6.7	46.4	7.9
CO	1-Hour	17.8	36.6	196.0	60.1
	8-Hour	17.8	36.6	196.0	60.1
SO_2	3-Hour	6.5	13.4	20.2	6.1
	24-Hour	6.5	13.4	20.2	6.1
	Annual	6.5	13.4	20.2	6.1
PM_{10}	24-Hour	0.8	1.5	2.8	0.8
	Annual	0.8	1.5	2.8	0.8

Table 3-1b: Alternative BACT 2A Modeled Emission Rates

Pollutant	Averaging Period	2,100 scfm Open Flare (lb/hr)	3,300 scfm Open Flare (lb/hr)	3,000 scfm Open Flares (lb/hr)
NOx	Annual	4.3	6.7	6.1
CO	1-Hour	23.3	36.6	33.3
	8-Hour	23.3	36.6	33.3
SO_2	3-Hour	8.5	13.4	12.1
	24-Hour	8.5	13.4	12.1
	Annual	8.5	13.4	12.1
PM_{10}	24-Hour	1.0	1.5	1.4
	Annual	1.0	1.5	1.4

Table 3-1c: Alternative BACT 2B Modeled Emission Rates

Pollutant	Averaging Period	2,100 scfm Open Flare (lb/hr)	3,300 scfm Open Flare (lb/hr)	1,500 scfm Open Flares (lb/hr)	3,000 scfm Open Flares (lb/hr)
NOx	Annual	4.3	6.7	3.1	6.1
CO	1-Hour	23.3	36.6	16.7	33.3
	8-Hour	23.3	36.6	16.7	33.3
SO_2	3-Hour	8.5	13.4	6.1	12.1
	24-Hour	8.5	13.4	6.1	12.1
	Annual	8.5	13.4	6.1	12.1
PM_{10}	24-Hour	1.0	1.5	0.7	1.4
	Annual	1.0	1.5	0.7	1.4

Stack Gas Parameters: Stack gas parameters used in the analysis are: i) stack gas exit temperature, and ii) stack gas exit velocity.

Stack gas exit temperatures for the enclosed flares and the turbines were obtained from manufacturer's information. For open flares, stack gas exit temperature can not be accurately measured and is a function of the degree and rate of entrainment of ambient air in the flared gases. Ohio Environmental Protection Agency (OEPA) and Texas Commission on Environmental Quality (TCEQ) have guidelines for estimating stack gas temperature and flow rate from open industrial flares. Upon review, it was determined that the OEPA guidelines were more conservative and therefore it was used for the estimation of stack gas temperature. A copy of the guideline (Engineering Guide #69) was included in Appendix A of the February 2008 Air Quality Impact Analysis. The guide assumed a stack gas temperature of 1273 degrees Kelvin (K) for industrial (open) flares.

Stack exit velocities for enclosed flares were calculated from the maximum gas flow rates and stack diameters. Stack gas flowrates for enclosed flares were obtained from combustion calculations of landfill gas flow rate through the flares and approximately at 230% excess air conditions, typical of enclosed landfill gas flares. Stack gas velocity for turbines was obtained from manufacturer's data. As per OEPA guide on flares, the stack exit velocities of all open flares were considered to be 20 meters per second (m/s) for modeling purposes.

Physical Stack Parameters: Physical stack parameters used in the analyses include: i) stack height, stack diameter; and stack location (coordinates). For enclosed flares and combustion turbines, the stack height and diameters were obtained from the manufacturer's information.

The physical stack diameter and height of the open flares were not considered for the air dispersion modeling, as per the OEPA guide. Instead a virtual stack diameter and stack height are calculated and used. The virtual stack diameter was calculated from a buoyant flux based on the default stack temperature of 1273 K, a stack gas flow rate based on the buoyant flux, and the stack diameter based on the default stack exit velocity of 20 m/s. The virtual stack height was calculated as a function of total heat release in combustion of the gas. Details of the calculations are in Appendix A.

Stack coordinates for all flares and turbines were obtained from the equipment layout on a digitized map of the facility. The stack locations were converted to NAD83 UTM coordinates for

530035.91

3025349.6

93.2

530038.59
3025256.4

consistency with receptor coordinates. Table 3-2a-c shows the stack parameters used in the air dispersion modeling analysis.

Table 3-2a: Routine BACT Modeled Stack Parameters

Control Device ID	Description	Location (UTM) Easting (m)	Location (UTM) Northing (m)	Stack Height (ft)	Stack Exit Gas Temperature (F)	Stack Velocity (ft/s)	Stack Diameter (ft)
CD016	Titan Turbine	530470.5	3023710.2	35	935	50.085	10.000
CD017	Centaur Turbine 1	530470.5	3023713.8	35	837	109.423	4.000
CD018	Centaur Turbine 2	530470.5	3023717.5	35	837	109.423	4.000
CD019	Centaur Turbine 3	530470.5	3023721.2	35	837	109.423	4.000
CD020	Centaur Turbine 4	530470.5	3023724.8	35	837	109.423	4.000
CD021	Centaur Turbine 5	530470.5	3023728.5	35	837	109.423	4.000
CD022	Centaur Turbine 6	530470.5	3023732.1	35	837	109.423	4.000
CD023	Centaur Turbine 7	530470.5	3023735.8	35	837	109.423	4.000
CD024	Centaur Turbine 8	530470.5	3023739.4	35	837	109.423	4.000
CD025	Centaur Turbine 9	530470.5	3023743.1	35	837	109.423	4.000
CD026	Centaur Turbine 10	530470.5	3023746.8	35	837	109.423	4.000
CD027	Centaur Turbine 11	530470.5	3023750.4	35	837	109.423	4.000
CD028	Centaur Turbine 12	530470.5	3023754.1	35	837	109.423	4.000
CD029	Centaur Turbine 13	530470.5	3023757.7	35	837	109.423	4.000
CD030	Centaur Turbine 14	530470.5	3023761.4	35	837	109.423	4.000
CD031	Centaur Turbine 15	530470.5	3023765.0	35	837	109.423	4.000
CD003	Utility Flare (backup) 2800 scfm 1*	530433.1	3023826.9	55.75	1831.73	65.616	5.277
CD004	Utility Flare(odor) 3300 scfm 2	530433.1	3023834.9	62.85	1831.73	65.616	5.729

*Note – flare modeled at 1600 scfm so not to exceed 32,400 scfm threshold

Table 3-2b: Alternative BACT 2A Modeled Stack Parameters

Control Device ID	Description	Location (UTM) Easting (m)	Location (UTM) Northing (m)	Stack Height (ft)	Stack Exit Gas Temperature (F)	Stack Velocity (ft/s)	Stack Diameter (ft)
CD003	Utility Flare (backup) 2800 scfm 1**	530433.1	3023826.9	55.75	1831.73	65.616	5.277
CD004	Utility Flare(odor) 3300 scfm 2	530433.1	3023834.9	62.85	1831.73	65.616	5.729
CD005	Utility Flare 3000 scfm 3	530433.1	3023842.9	68.61	1831.73	65.616	5.462
CD006	Utility Flare 3000 scfm 4	530433.1	3023850.9	68.61	1831.73	65.616	5.462
CD007	Utility Flare 3000 scfm 5	530433.1	3023858.9	68.61	1831.73	65.616	5.462
CD008	Utility Flare 3000 scfm 6	530433.1	3023866.9	68.61	1831.73	65.616	5.462
CD009	Utility Flare 3000 scfm 7	530433.1	3023874.9	68.61	1831.73	65.616	5.462
CD010	Utility Flare 3000 scfm 8	530433.1	3023882.9	68.61	1831.73	65.616	5.462
CD011	Utility Flare 3000 scfm 9	530433.1	3023890.9	68.61	1831.73	65.616	5.462

Control Device ID	Description	Location (UTM) Easting (m)	Location (UTM) Northing (m)	Stack Height (ft)	Stack Exit Gas Temperature (F)	Stack Velocity (ft/s)	Stack Diameter (ft)
CD012	Utility Flare 3000 scfm 10	530433.1	3023898.9	68.61	1831.73	65.616	5.462
CD013	Utility Flare 3000 scfm 11	530433.1	3023906.9	68.61	1831.73	65.616	5.462

**Note – flare modeled at 2100 scfm so not to exceed 32,400 scfm threshold

Table 3-2c: Alternative BACT 2B Modeled Stack Parameters

Control Device ID	Description	Location (UTM) Easting (m)	Location (UTM) Northing (m)	Stack Height (ft)	Stack Exit Gas Temperature (F)	Stack Velocity (ft/s)	Stack Diameter (ft)
CD003	Utility Flare (backup) 2800 scfm 1**	530433.1	3023826.9	55.75	1831.73	65.616	5.277
CD004	Utility Flare(odor) 3300 scfm 2	530433.1	3023834.2	62.85	1831.73	65.616	5.729
CD014	Utility Flare 1500 scfm 3A	530433.1	3023841.5	47.11	1831.73	65.616	3.862
CD015	Utility Flare 1500 scfm 3B	530433.1	3023848.9	47.11	1831.73	65.616	3.862
CD006	Utility Flare 3000 scfm 4	530433.1	3023856.2	68.61	1831.73	65.616	5.462
CD007	Utility Flare 3000 scfm 5	530433.1	3023863.5	68.61	1831.73	65.616	5.462
CD008	Utility Flare 3000 scfm 6	530433.1	3023870.9	68.61	1831.73	65.616	5.462
CD009	Utility Flare 3000 scfm 7	530433.1	3023878.2	68.61	1831.73	65.616	5.462
CD010	Utility Flare 3000 scfm 8	530433.1	3023885.5	68.61	1831.73	65.616	5.462
CD011	Utility Flare 3000 scfm 9	530433.1	3023892.9	68.61	1831.73	65.616	5.462
CD012	Utility Flare 3000 scfm 10	530433.1	3023900.2	68.61	1831.73	65.616	5.462
CD013	Utility Flare 3000 scfm 11	530433.1	3023907.5	68.61	1831.73	65.616	5.462

**Note – flare modeled at 2100 scfm so not to exceed 32,400 scfm threshold

4.0 Air Quality Analysis

This section presents the details and results of the significant ambient air quality impacts analyses for the revised operating scenarios. All modeling input and output files are included in electronic form on computer disks supplied as Appendix C in this report. In summary, results of this modeling analysis revealed no anticipated adverse effects resulting from this project.

4.1 Preliminary Analysis

In the preliminary analysis, the impact of the proposed emission points on ambient air quality was estimated to determine if these pollutants have "significance level" impact, which would require full impact analysis. The analysis was also used to determine if pre-application monitoring was required for the project.

The preliminary analysis includes emissions from the proposed modification only. The existing enclosed flares will not run under the BACT scenarios.

The net emission change (projected allowable or potential – baseline actual) is calculated as follows:

$$E_{net} = E_{BACT} - E_{existing}$$

Where

E_{net} = Net emission increase

E_{BACT} = Potential emissions from BACT scenario

$E_{existing}$ = Actual emissions from 2 existing flares, total 4,483 scfm LFG if they were higher

Thus, the new emissions are from additional 26,700 scfm (32,400 scfm – 4,483 scfm).

As described in the February 2008 Air Quality Impact Analysis, the existing actual emissions were modeled in AERMOD as negative emission points. Concurrence from FDEP was obtained for this approach.

Table 4-1a summarizes the maximum predicted ground level concentrations (H1H) for the Alternative BACT Scenario 2A and compares those results with the previous results for Alternative BACT Scenario 2 as reported in the February 2008 Air Quality Impact Analysis. Since the results from the Alternative BACT Scenario 2A are less than or equal to (± 5%) the previously reported results, no further analysis was conducted. It is assumed that the conclusion of any refined impact analyses from this scenario will remain the same as predicted in the February 2008 Air Quality Impact Analysis.

Table 4-1b summarizes the maximum predicted ground-level concentrations (H1H) and the corresponding PSD/AAQS significance concentration levels for all pollutants for the Routine BACT Scenario 2 and the Alternative BACT Scenario 2B. Since the results of these scenarios

8

2

10-3hr
10-24
5-Ah

529953, 3023687
529954, 3023785
529953 3023883
100m
fenceline

55.12
55.12 529951.8 3023835

eu 8+9

1050023
057-0119
Cutrale
eu 18 boiler

3/5 20

pmok.isc
RoutiuBACT2
2001-
PM10
6.14 24hr
0.93 Annual
2002- 5.87
.83
2003- 6.826
.697
2004- 6.32
0.997
2005- 5.9
0.796

were greater than those previously reported, a refined impact analysis was conducted where applicable.

Table 4-1a: Significance Impact Analysis Results for Alternative BACT Scenario 2A compared with Alternative BACT Scenario 2

Pollutant	Averaging Period	Alternative BACT 2 Maximum Predicted Concentration (H1H)	Alternative BACT 2A Maximum Predicted Concentration (H1H)	PSD/AAQS Signifiance Level
		µg/m³	µg/m³	µg/m³
NO_2	Annual	2.29	2.33	1
CO	1-Hour	210.67	204.09	2000
	8-Hour	171.17	169.82	500
PM10	24-Hour	4.89	4.96	5
	Annual	0.67	0.699	1
SO_2	3-Hour	65.02	63.00	25
	24-Hour	43.65	42.98	5
	Annual	5.98	6.05	1

Past now

Table 4-1b: Significance Analysis Results Routine BACT Scenario 2 and Alternative BACT Scenario 2B

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration (H1H)	PSD/AAQS Signifiance Level	Exceeds Significance Level Concentration?	Area of Significant Impact (AOI)
			µg/m³	µg/m³	Yes/No	km
Routine BACT 2	NO_2	Annual	7.75	1	Yes	2.1
	CO	1-Hour	1449.74	2000	No	NA
		8-Hour	741.15	500	Yes	0.8
	PM10	24-Hour	6.83	5	Yes	0.7
		Annual	0.997	1	No	NA
	SO_2	3-Hour	81.25	25	Yes	1.5
		24-Hour	52.00	5	Yes	3.2
		Annual	7.59	1	Yes	2.1
Alternative BACT 2B	NO_2	Annual	2.52	1	Yes	1.0
	CO	1-Hour	210.61	2000	No	NA
		8-Hour	173.20	500	No	NA
	PM10	24-Hour	5.20	5	Yes	0.5
		Annual	0.75	1	No	NA
	SO_2	3-Hour	66.16	25	Yes	1.2
		24-Hour	45.11	5	Yes	3.0
		Annual	6.52	1	Yes	1.9

Poor 0.1

4.2 *Pre-Application Monitoring Requirement Analysis*

The preliminary analysis results were also used to determine if pre-application monitoring was required for the pollutant which exceeded the significance level concentration. The monitoring data is used to develop background concentrations for determination of compliance with AAQS. Pre-application monitoring is required if: i) maximum off-site predicted concentration exceeds PSD monitoring significance concentration and ii) there are no monitoring data available in the modeling region.

Table 4-2 summarizes the maximum predicted ground-level concentrations (H1H) and compares them with the PSD monitoring significance levels for the Routine BACT Scenario 2 and the Alternative BACT Scenario 2B. The results indicated that only SO_2 (24-hour average) and CO 8-hr average was above the monitoring significance level for all operating scenarios. However, pre-application monitoring was not required for these pollutants because several monitoring sites were available in the modeling region and extensive monitoring data were available from these monitors.

Table 4-2: PSD Monitoring Requirement Analysis Results

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration (H1H)	PSD Monitoring Significance	Above Significance Level?
			μg/m³	μg/m³	Yes/No
Routine BACT 2	NO_2	Annual	7.75	14	No
	PM10	24-Hour	6.83	10	No
	CO	8-Hour	741.15	575	**Yes**
	SO_2	24-Hour	52.00	13	**Yes**
Alternative BACT 2B	NO_2	Annual	2.52	14	No
	PM10	24-Hour	5.20	10	No
	CO	8-Hour	173.20	575	No
	SO_2	24-Hour	45.11	13	**Yes**

The Facility is located in the federally designated Southeast Florida Intrastate Air Quality Control Region and is currently in attainment of all ambient air quality standards. Ambient air quality data for Florida are available from a monitoring network operated by the Florida Department of Environmental Protection (FDEP), Division of Air Resource Management. Monitoring data on the criteria pollutants are collected at many sites within the state. These monitoring data were obtained for the years 2004 through 2006 from the DEP "Quick Look Reports" web site.

The monitoring station in Riviera Beach, Palm Beach County was used for SO_2 background data because of its relative proximity to the Okeechobee Landfill compared to all other stations. The monitoring station in Fort Pierce, St. Lucie County was used for NO_2 background data. The CO background concentration used was from the higher value of the monitoring stations in Palm Beach or West Palm Beach, Palm Beach County. The PM_{10} background concentrations are from the Belle Grade, Palm Beach County monitor. These were the closest monitoring sites to Okeechobee.

The highest annual average and highest second highest short term average concentrations (i.e. 3, 8, and 24 hours) for the period 2004 through 2006 were used to obtain the necessary background pollutant concentrations for this analysis. These background concentrations are listed in Table 4-3.

Table 4-3: Background Concentrations Used for AAQS Analysis

Pollutant	Averaging Period	Background Concentration (µg/m³)
NO_2	Annual	20.95
CO	8-Hour	2.53
PM10	24-Hour	38.0
SO_2	3-Hour	8.57
SO_2	24-hour	8.57
SO_2	Annual	3.43

4.3 Full Impact Analysis

Guidance from the USEPA's *Guidance on Air Quality Models* (40 CFR 51, Appendix W) was followed in selecting the predicted concentrations used to determine compliance with the AAQS and PSD increment consumption limits. The guidelines state that "the design concentration based on the highest, second-highest short term concentration or the highest long term concentration...should be used to determine emission limitations to assess compliance with the AAQS and PSD increments" for SO_2, PM_{10}, CO, Pb, and NO_2 (§8.2.1.1). Therefore, the "2nd" highest output was selected for the short-term analysis and the "1st" highest output was selected for the annual analyses. Table 4-4 shows the design concentration used for the various analyses.

Table 4-4: Design Concentrations for Full Impact Analyses

Pollutant	Refined Model	Averaging Time	Design Concentration
SO_2	AAQS	3-hr	H2H$^{(1)}$
		24-hr	H2H$^{(1)}$
		Annual	H1H$^{(2)}$
SO_2	Increment	3-hr	H2H$^{(1)}$
		24-hr	H2H$^{(1)}$
		Annual	H1H$^{(2)}$
CO	AAQS	8-hr	H2H$^{(1)}$
NO_2	AAQS	Annual	H1H$^{(2)}$
	Increment	Annual	H1H$^{(2)}$

$^{(1)}$ H2H = Highest of 2nd high of each of 5 years of meteorological data
$^{(2)}$ H1H = Highest of 1st high of each of 5 years of meteorological data

4.3.1 Full Impact Analysis Receptors

The AAQS and PSD increment compliance demonstrations are required only at locations within the radius of impact area. In order to reduce computation time (for 3,600 receptors and five years of meteorological data), these significance level receptors identified during the preliminary impact analyses were separated in a receptor file and used for refined analyses for AAQS and PSD compliance demonstration. The separate receptor files were used for each pollutant since the significance levels and significance level area coverage were different for each pollutant. Figures 3-1a-f and Figures 3-2a-e show the significance level receptors used in the refined analysis.

4.3.2 PSD Class II Increment Compliance Demonstration

For the full impact analysis, the model included: i) the proposed emission sources; ii) the existing on-site sources; and iii) off-site PSD increment inventory sources. There are few small generators in the Facility with capacity ranging from 20 kilowatt (kW) to 360 kW, which are operated infrequently. The emissions of SO_2, NO_2, CO and PM_{10} from these generators are insignificant to the flares and LFG turbines. Per discussions with FDEP, these emission sources were not required to be included in the modeling.

The off-site PSD source inventory was obtained from FDEP and is included in Appendix B. Per guidance from FDEP, emission sources in this inventory with allowable source emissions in tons per year less than 20 times the distance in km (i.e. E <20D) were eliminated from the modeling, as long as they were not within the site's radius of impact area. FDEP guidance eliminates these sources because they would have insignificant impact in the modeling domain. The revised off-site PSD source inventory is also included in Appendix B. The FDEP database also provided the source parameter and location for these emission sources. The FDEP also provided actual SO_2 emissions from their Acid Rain database, which were used in the PSD Class II Increment analyses. These actual emissions are shown in Appendix B.

Table 4-5 shows the emission sources modeled for PSD Class II increment compliance for the various operating scenarios.

Table 4-5: Emission Sources Modeled for PSD Class II Increment Compliance

Scenario Modeled	New Emission Sources in Proposed modification	Existing On-site Emission Sources	Off-Site AAQS Inventory Emission Sources	Off-Site PSD Inventory Emission Sources
Routine BACT 2	16 LFG Turbines (CD017 to CD031); 2 open flares (CD003 and CD004)	None	8 SO_2, 8 NOx, 11 CO emission sources from FDEP inventory	3 SO_2 and 5 NOx emission sources from FDEP inventory
Alternative BACT 2B	12 proposed open flares (CD003 to CD004, CD006 to CD015)	None	8 SO_2 and 9 NOx emission sources from FDEP inventory	3 SO_2 and 5 NOx emission sources from FDEP inventory

The off-property source parameters that are included in the AAQS and PSD Increment modeling are shown in Table 4-6A through 4-6E. There were no off-property PM10 sources within the site's radius of impact area and there were no off-property PM10 sources with emissions greater than 20 times the distance to the site.

Table 4-6a: Off-Property SO_2 Sources Modeled for AAQS Analysis

Modeled Source ID	Description	Location (UTM) Easting (m)	Location (UTM) Northing (m)	Stack Height (ft)	Stack Exit Gas Temp (F)	Stack Velocity (ft/s)	Stack Diameter (ft)	3-hr SO2 Emission Rate (lb/hr)	24-hr SO2 Emission Rate (lb/hr)	Annual SO2 Emission Rate (lb/hr)
OP1	City of Vero Beach, Unit No.1	561400	3056500	200	289	105.5	3.5	230.2	230.2	230.2
OP2	Ft Pierce Utilities Authority, Unit #9	566120	3036350	68	426	59.8	11.2	319.51	319.51	319.51
OP3	City of Vero Beach, Unit No. 2	561400	3056500	200	347	137.2	3.5	399.5	399.5	399.5
OP4	City of Vero Beach, Unit No. 4	561400	3056500	200	283	77.7	7	548	548	548
OP5	Indiantown Cogeneration, L.P., Main Boiler	547650	2990700	213.25	140	93.2	16	582	582	582
OP6	City of Vero Beach, Unit No. 3	561400	3056500	200	342	68.6	6	1127.5	1127.5	1127.5
OP7	FPL Martin Power Plant, Unit #1	542680	2992650	213.25	338	43.1	36	6920	6920	6920
OP8	FPL Martin Power Plant, Unit #1	542680	2992650	213.25	338	43.1	36	6920	6920	6920

Table 4-6b: Off-Property SO_2 Sources Modeled for PSD Increment Analysis

Modeled Source ID	Description	Location (UTM) Easting (m)	Location (UTM) Northing (m)	Stack Height (ft)	Stack Exit Gas Temp. (F)	Stack Velocity (ft/s)	Stack Diameter (ft)	3-hr SO2 Emission Rate (lb/hr)	24-hr SO2 Emission Rate (lb/hr)	Annual SO2 Emission Rate (lb/hr)
OP5	Indiantown Cogeneration, L.P., Main Boiler	547650	2990700	213.25	140	93.2	16	586	586	586
OP7	FPL Martin Power Plant, Unit #1	542680	2992650	213.25	338	43.1	36	5980.0	4408.5	1699.9
OP8	FPL Martin Power Plant, Unit #1	542680	2992650	213.25	338	43.1	36	5980.0	4408.5	1699.9

Table 4-6c: Off-Property NOx Sources Modeled for AAQS Analysis

Modeled Source ID	Description	Location (UTM) Easting (m)	Location (UTM) Northing (m)	Stack Height (ft)	Stack Exit Gas Temp (F)	Stack Velocity (ft/s)	Stack Diameter (ft)	Annual NOx Emission Rate (lb/hr)
OP0[(1)]	City of Vero Beach, Unit 4	561400	3056500	200	283	77.7	7	205.5
OP1	City of Vero Beach, Unit 3	561400	3056500	200	342	68.6	6	222.7
OP2	Indiantown Cogeneration, L.P., Main Boiler	547650	2990700	213.25	140	93.2	16	582
OP3	FPL Martin Power Plant, CT3A	542680	2992650	213	280	128.4	20	461
OP4	FPL Martin Power Plant, CT3B	542680	2992650	213	280	128.4	20	461
OP5	FPL Martin Power Plant, CT4A	542680	2992650	213	280	128.4	20	461
OP6	FPL Martin Power Plant, CT4B	542680	2992650	213	280	128.4	20	461
OP7	FPL Martin Power Plant, Unit #1	542680	2992650	213.25	338	43.1	36	2595
OP8	FPL Martin Power Plant, Unit #2	542680	2992650	213.25	338	43.1	36	2595

(1) Source OP0 is only used in the Alternative BACT modeling scenarios. Source OP0 is not required for the Routine BACT scenario.

Table 4-6d: Off-Property NOx Sources Modeled for PSD Increment Analysis

Modeled Source ID	Description	Location (UTM) Easting (m)	Location (UTM) Northing (m)	Stack Height (ft)	Stack Exit Gas Temp (F)	Stack Velocity (ft/s)	Stack Diameter (ft)	Annual NOx Emission Rate (lb/hr)
OP2	Indiantown Cogeneration, L.P., Main Boiler	547650	2990700	213.25	140	93.2	16	582
OP3	FPL Martin Power Plant, CT3A	542680	2992650	213	280	128.4	20	461
OP4	FPL Martin Power Plant, CT3B	542680	2992650	213	280	128.4	20	461

Modeled Source ID	Description	Location (UTM) Easting (m)	Location (UTM) Northing (m)	Stack Height (ft)	Stack Exit Gas Temp. (F)	Stack Velocity (ft/s)	Stack Diameter (ft)	Annual NOx Emission Rate (lb/hr)
OP5	FPL Martin Power Plant, CT4A	542680	2992650	213	280	128.4	20	461
OP6	FPL Martin Power Plant, CT4B	542680	2992650	213	280	128.4	20	461

Table 4-6e: Off-Property CO Sources Modeled for AAQS and PSD Increment Analysis

Modeled Source ID	Description	Location (UTM) Easting (m)	Location (UTM) Northing (m)	Stack Height (ft)	Stack Exit Gas Temp. (F)	Stack Velocity (ft/s)	Stack Diameter (ft)	8-hr CO Emission Rate (lb/hr)
OP1	FPL Martin Power Plant, Unit #1	542680	2992650	499	338	43.1	36	286.5
OP2	FPL Martin Power Plant, Unit #2	542680	2992650	499	338	43.1	36	286.5
OP3	FPL Martin Power Plant, CT3A	542680	2992650	213	280	128.4	20	105.8
OP4	FPL Martin Power Plant, CT3B	542680	2992650	213	280	128.4	20	105.8
OP5	FPL Martin Power Plant, CT4A	542680	2992650	213	280	128.4	20	105.8
OP6	FPL Martin Power Plant, CT4B	542680	2992650	213	280	128.4	20	105.8
OP7	Indiantown Cogeneration, L.P., Main Boiler	547650	2990700	495	140	93.2	16	376

The results of the PSD Increment modeling are shown in Table 4-7 for the Routine BACT Scenario 2 and the Alternative BACT Scenario 2B. The details of the model runs are included in Appendix C. The results showed that PSD Class II increments were not exceeded for any pollutant for any averaging time in any scenario.

80-2
17-4

Table 4-7: PSD Increment Consumption Analysis Results

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration from Increment Consuming Project and Non-Project Sources	PSD Increment Consumption Limit	Percent of PSD Increment Consumed at Maximum Concentration	Exceed PSD Increment?
			μg/m³	μg/m³	%	Yes/No
Routine BACT 2	NO_2	Annual(1)	10.87	25	43.47%	No
	PM10	24-Hour(2)	6.49	37	17.53%	No
	SO_2	3-Hour(2)	80.97	512	15.81%	No
		24-Hour(2)	54.59	91	59.99%	No
		Annual(1)	8.68	20	43.41%	No
Alternative BACT 2B	NO_2	Annual(1)	3.93	25	15.71%	No
	PM10	24-Hour(2)	5.31	37	14.34%	No
	SO_2	3-Hour(2)	75.54	512	14.75%	No
		24-Hour(2)	46.01	91	50.56%	No
		Annual(1)	7.71	20	38.55%	No

(1) H1H annual results
(2) H2H results

4.3.3 AAQS Compliance Demonstration

The AAQS modeling was similar to the PSD increment modeling except that: i) AAQS inventory emission sources obtained from FDEP were used instead of PSD inventory emission sources; and ii) background concentration was added to modeled concentration for comparison with AAQS.

As explained in Section 4.2, pre-application monitoring was not conducted for the project since adequate data were available for background concentration. The background concentrations used for AAQS compliance demonstrations are shown in Table 4-3 above.

Table 4-8 shows the results of AAQS modeling for the Routine BACT Scenario 2 and the Alternative BACT Scenario 2B. The results show that the AAQS was not exceeded for any pollutant for any averaging time all scenarios.

Table 4-8: AAQS Analysis Results

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration from Project and Non-Project Sources	Background Concentration	Maximum Predicted Concentration from Project, Non-Project, and Background Sources	AAQS	Percent of AAQS at Location of Maximum Concentration	Exceed AAQS with Monitored Concentrations?
			µg/m³	µg/m³	µg/m³	µg/m³	%	Yes/No
Routine BACT 2	NO_2	Annual(1)	11.13	20.95	32.07	100	32.07%	No
	CO	8-Hour(2)	725.16	2.53	727.69	10000	7.28%	No
	PM10	24-Hour(2)	6.49	38.00	44.49	150	29.66%	No
	SO_2	3-Hour(2)	80.98	8.57	89.56	1300	6.89%	No
		24-Hour(2)	49.90	8.57	58.47	260	22.49%	No
		Annual(1)	9.32	3.43	12.74	60	21.24%	No
Alternative BACT 2B	NO_2	Annual(1)	4.19	20.95	25.13	100	25.13%	No
	PM10	24-Hour(2)	5.31	38.00	43.31	150	28.87%	No
	SO_2	3-Hour(2)	75.56	8.57	84.14	1300	6.47%	No
		24-Hour(2)	46.11	8.57	54.68	260	21.03%	No
		Annual(1)	8.34	3.43	11.77	60	19.62%	No

(1) H1H annual results
(2) H2H results

5.0 Additional Impact Analysis

The additional impact analyses were also revised for the Routine BACT Scenario 2 and the Alternative BACT Scenario 2B and include: i) Class I area impact analysis for visibility and AQRVs; ii) analysis of growth in the significant impact area and its effect on air quality; iii) impact of proposed modifications on soils, vegetation, and wildlife in the significant impact area; and iv) impact on visibility in the significant impact area. These analyses were preformed as described previously in the February 2008 Air Quality Impact Analysis.

As concluded in the February 2008 Air Quality Impact Analysis, no additional industrial, commercial or residential growth is expected from this project. Therefore, no air quality impact is predicted from the growth associated with the project. Similarly, no impact is expected on the vegetation in the significant impact area from the proposed modification. No adverse visibility impairment in the impact area is predicted for the proposed revised scenarios as well.

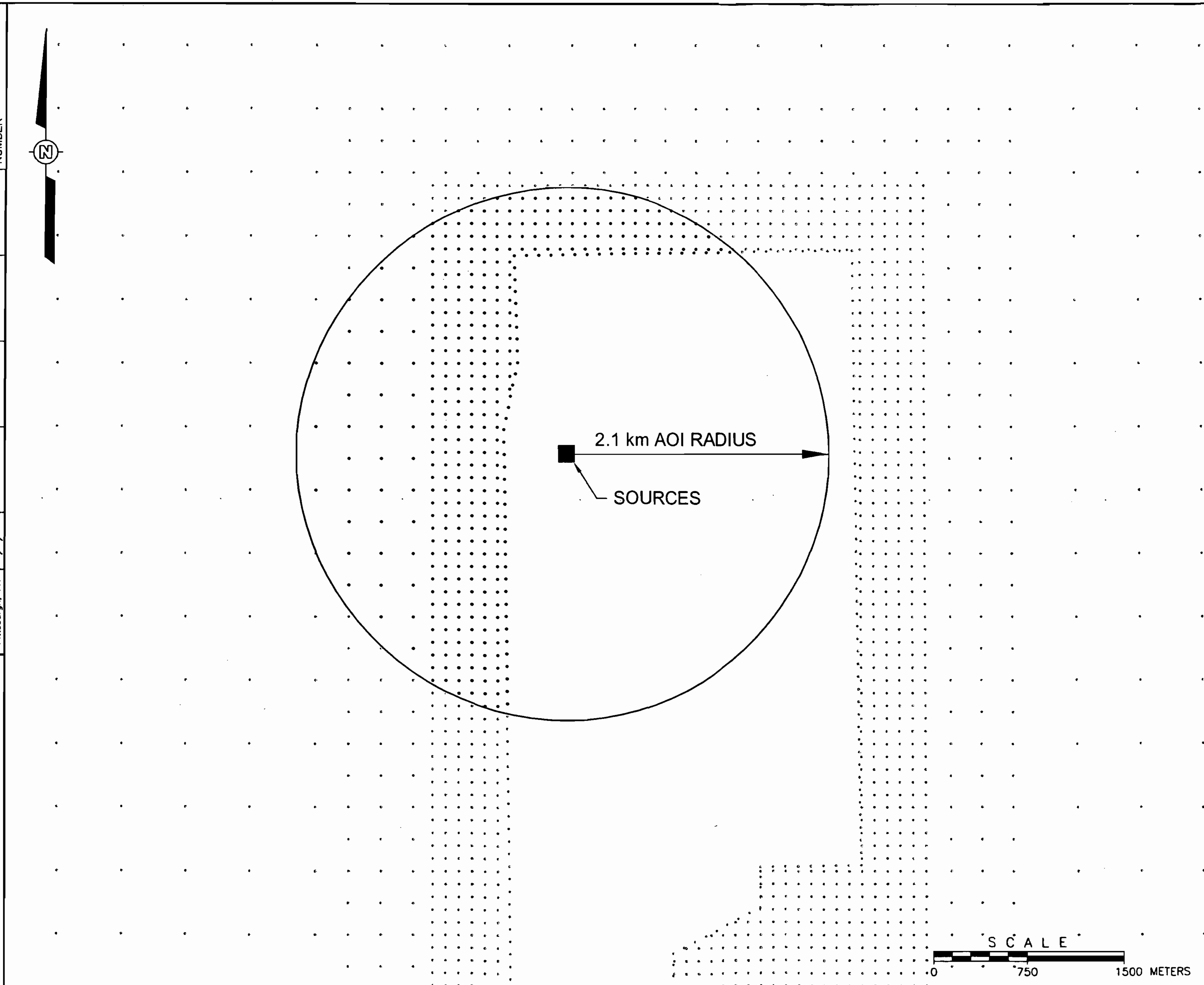
6.0 Conclusions

Air quality impact analysis was performed for the revised operating scenarios at the Okeechobee Landfill in Okeechobee County. The analysis included both PSD Class II increment and AAQS compliance demonstrations as well as additional impact analysis. Three revised operating scenarios were considered: i) Routine BACT Scenario 2; ii) Alternative BACT Scenario 2A; and iii) Alternative BACT Scenario 2B.

USEPA approved model AERMOD was used for the analysis. The technical approach and modeling procedure followed USEPA approved methodology and FDEP instructions as needed.

In all operating scenarios, the Class II PSD increments and AAQS were not exceeded for any regulated pollutant. No adverse impact was predicted on soil, vegetation, wildlife and visibility in the impact area from this project.

Figures



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Plotted By: greg.jones

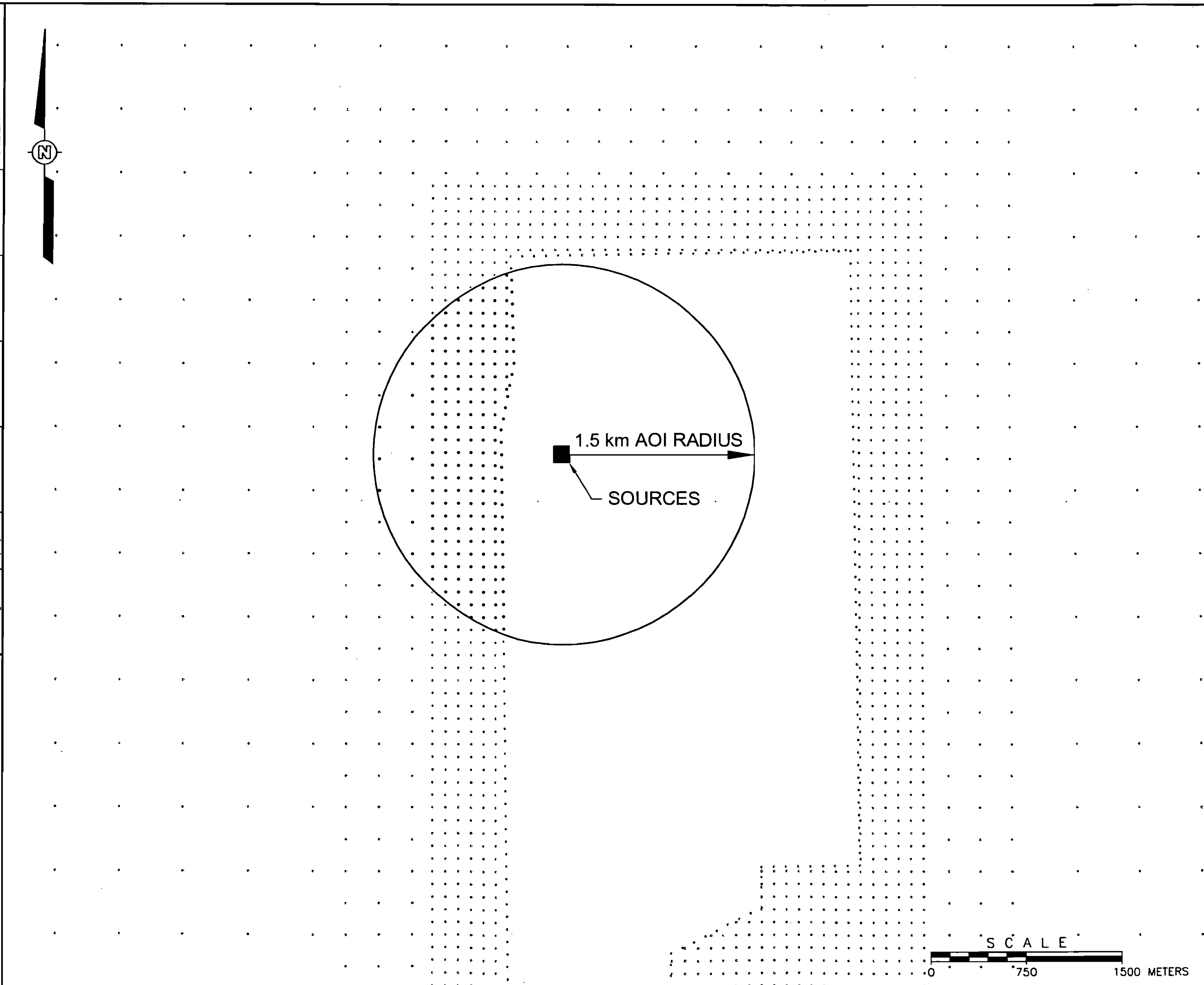
Shaw Environmental, Inc.

OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA

FIGURE 3-1a

ROUTINE BACT 2 REFINED RECEPTORS
ANNUAL SO_2

OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA



Shaw Environmental, Inc.

OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA

FIGURE 3-1b

ROUTINE BACT 2 REFINED RECEPTORS
3-hr. SO_2

OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA

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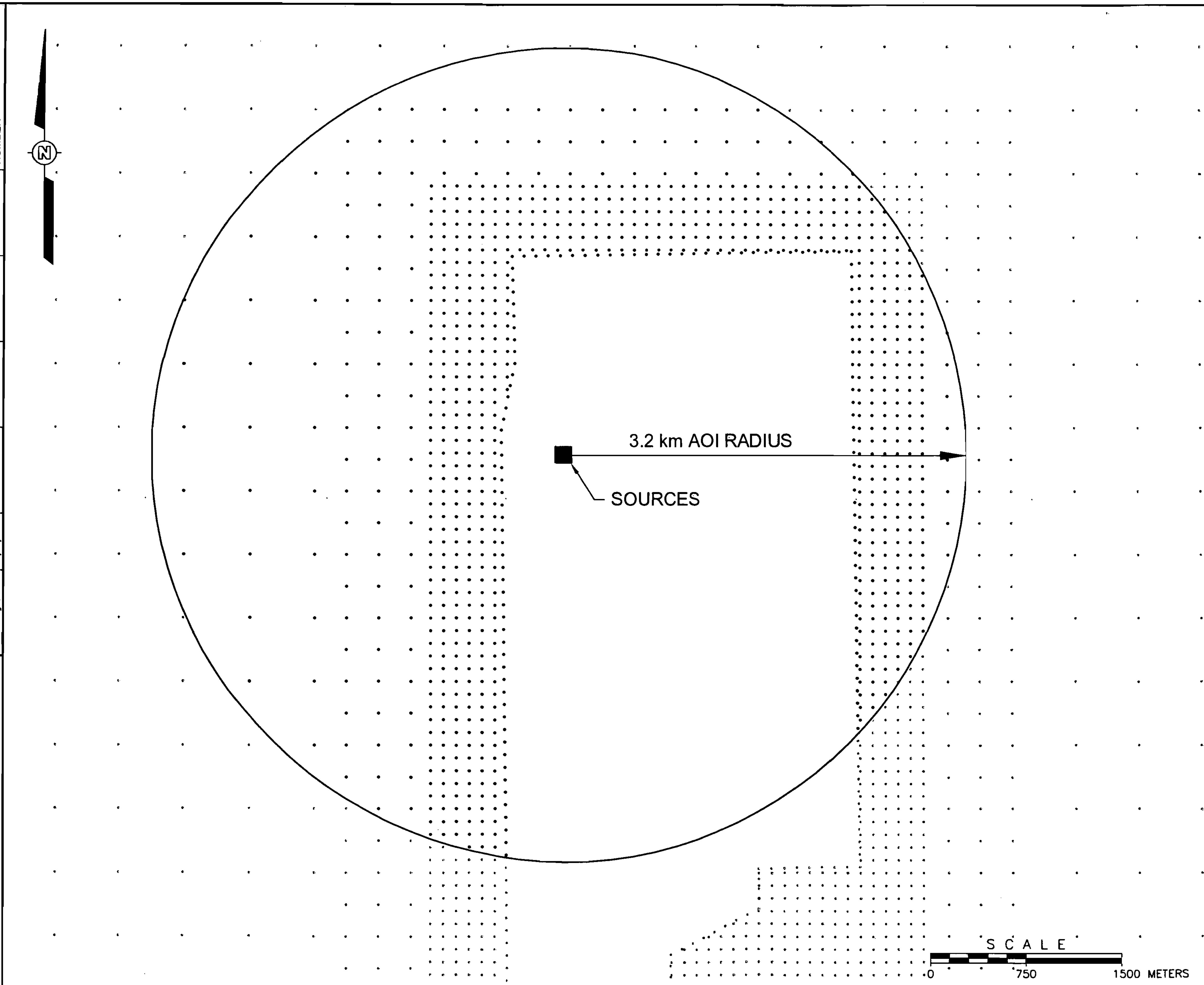

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FIGURE 3-1c

ROUTINE BACT 2 REFINED RECEPTORS
24-hr. SO_2

OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA

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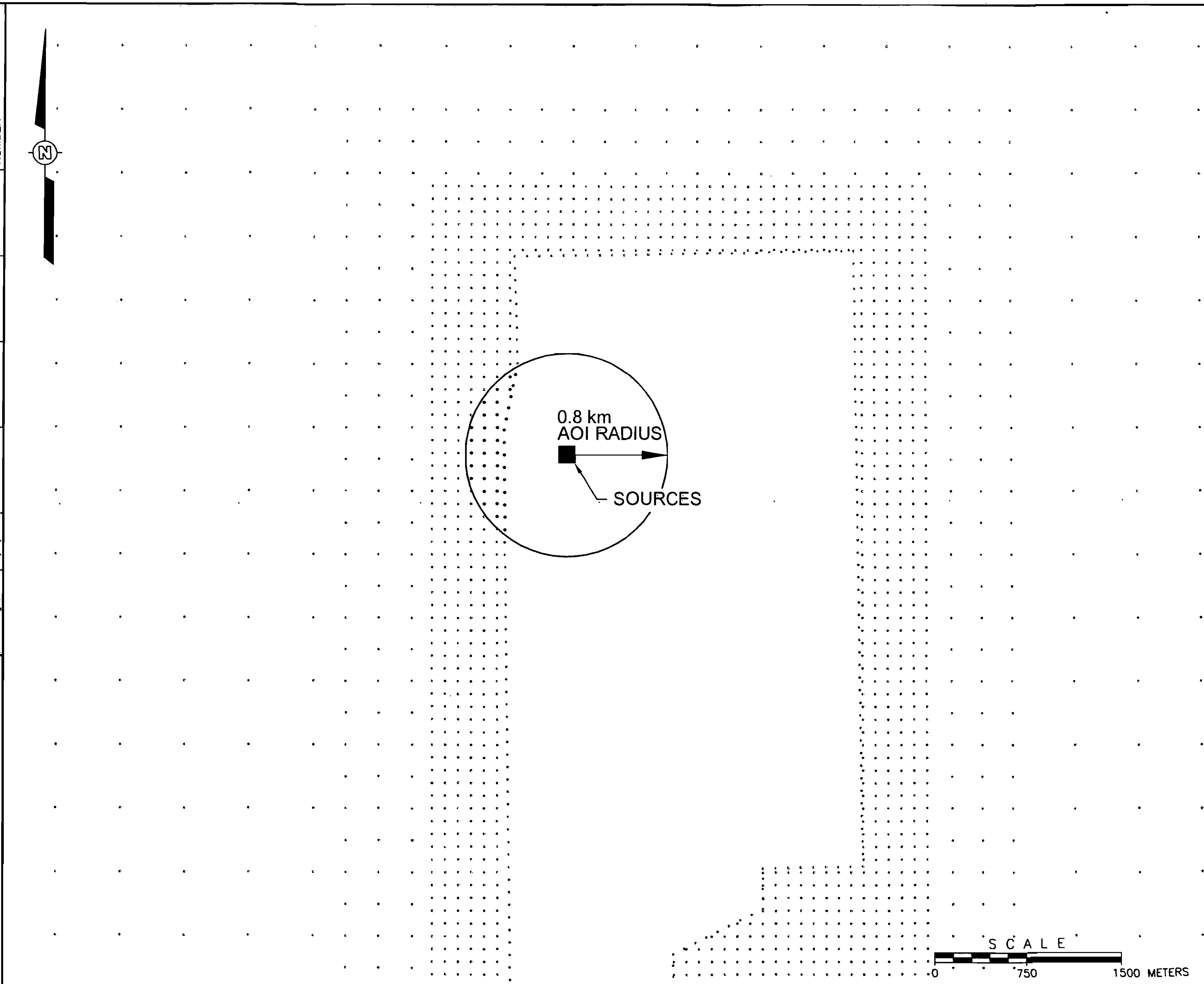

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Xref :
Image :

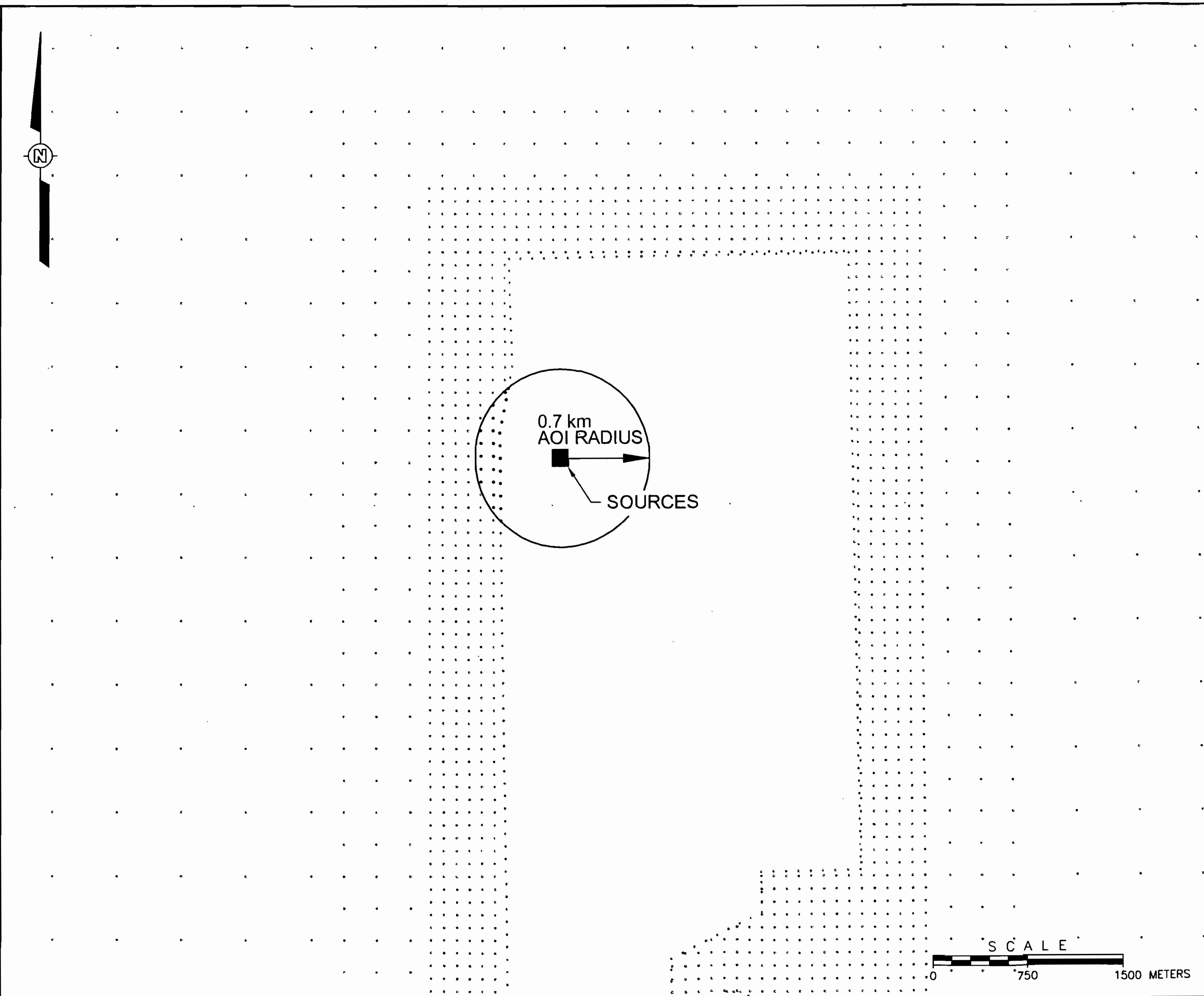
Shaw Environmental, Inc.

OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA

FIGURE 3-1e

BACT 2 REFINED RECEPTORS
8 Hr CO

OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA



Shaw Environmental, Inc.

OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA

FIGURE 3-1f

ROUTINE BACT 2 REFINED RECEPTORS
24 Hr PM 10

OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA

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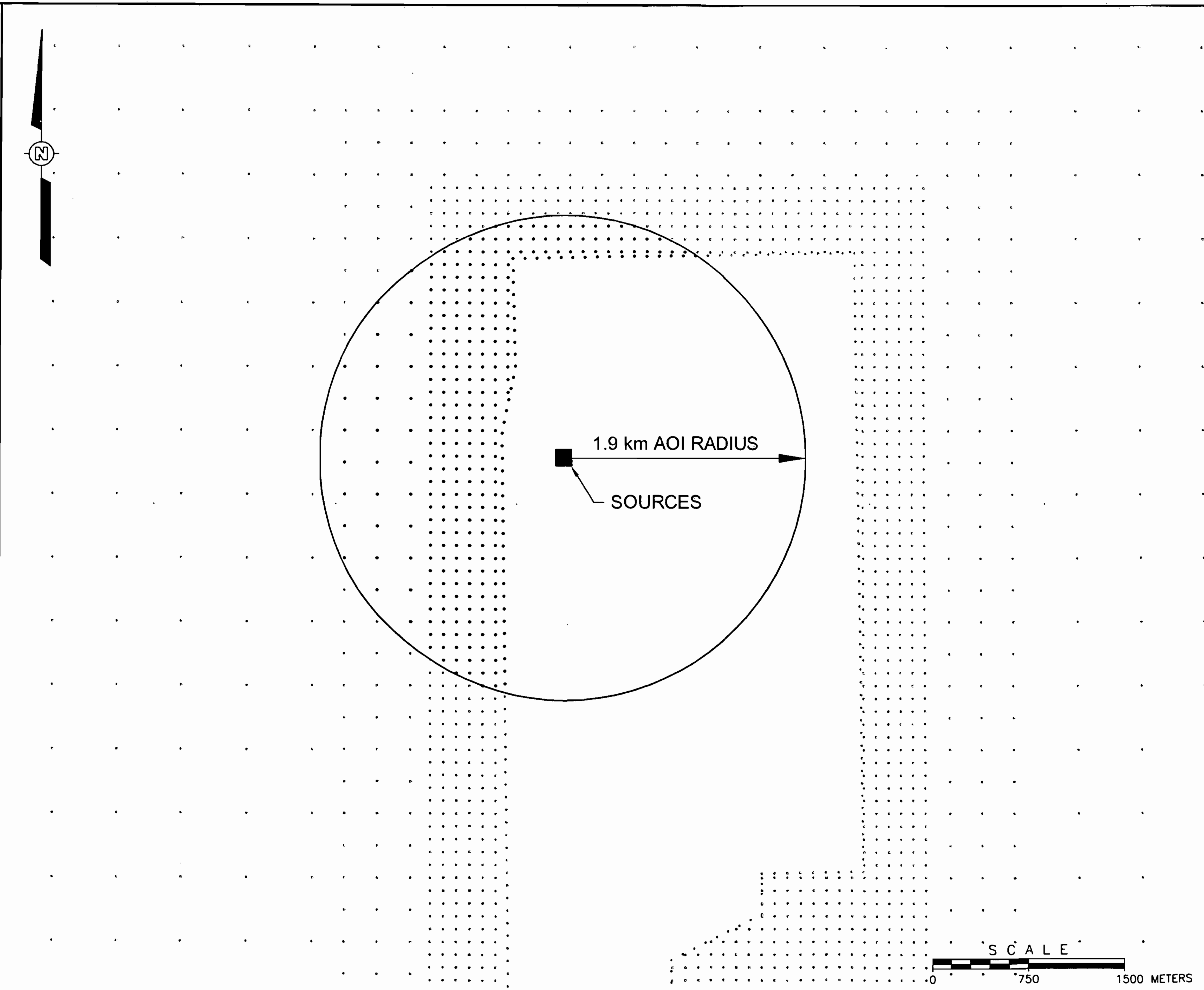

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OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA

FIGURE 3-2a
ALTERNATIVE BACT 2B REFINED
RECEPTORS
ANNUAL SO_2

OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA

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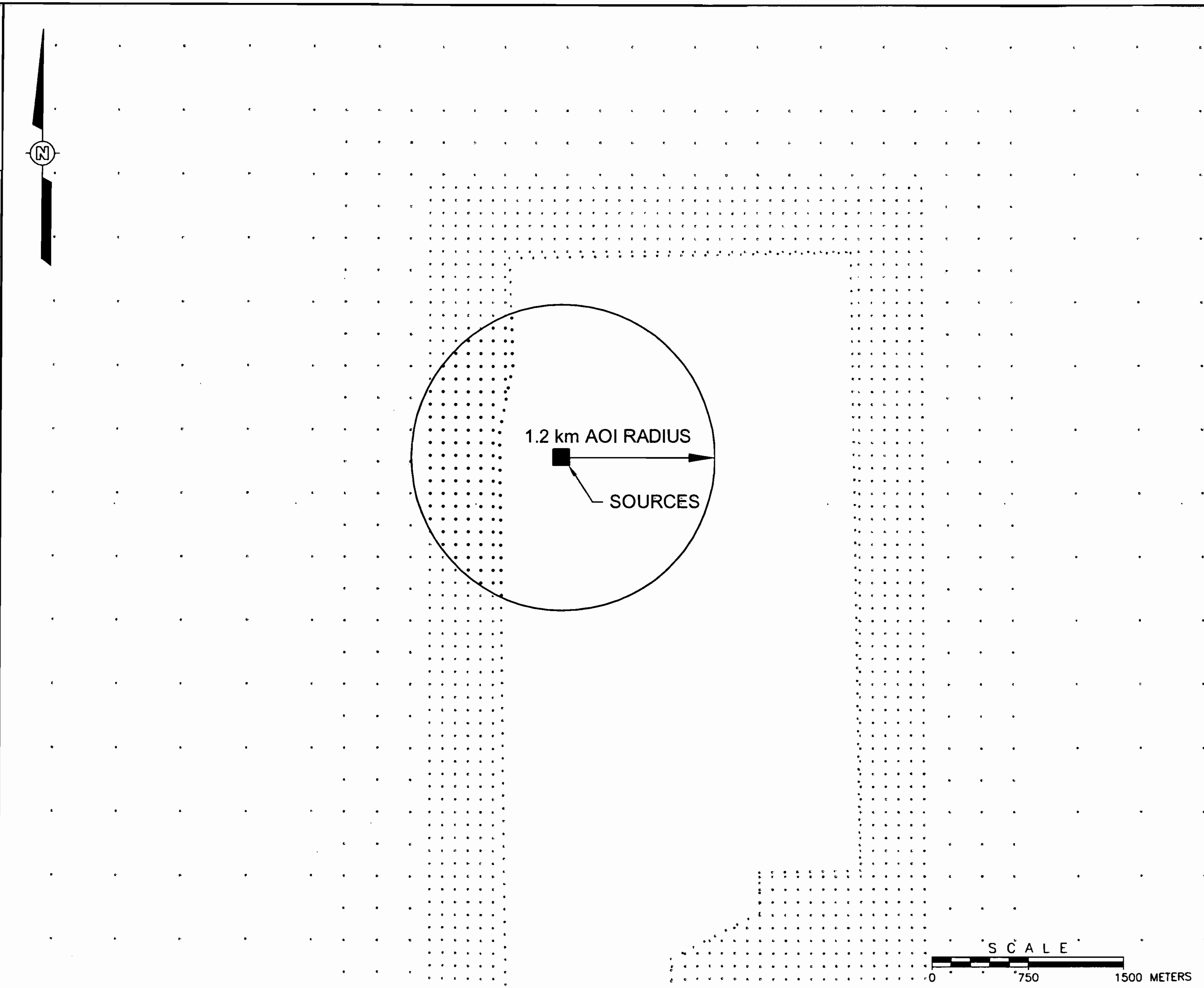

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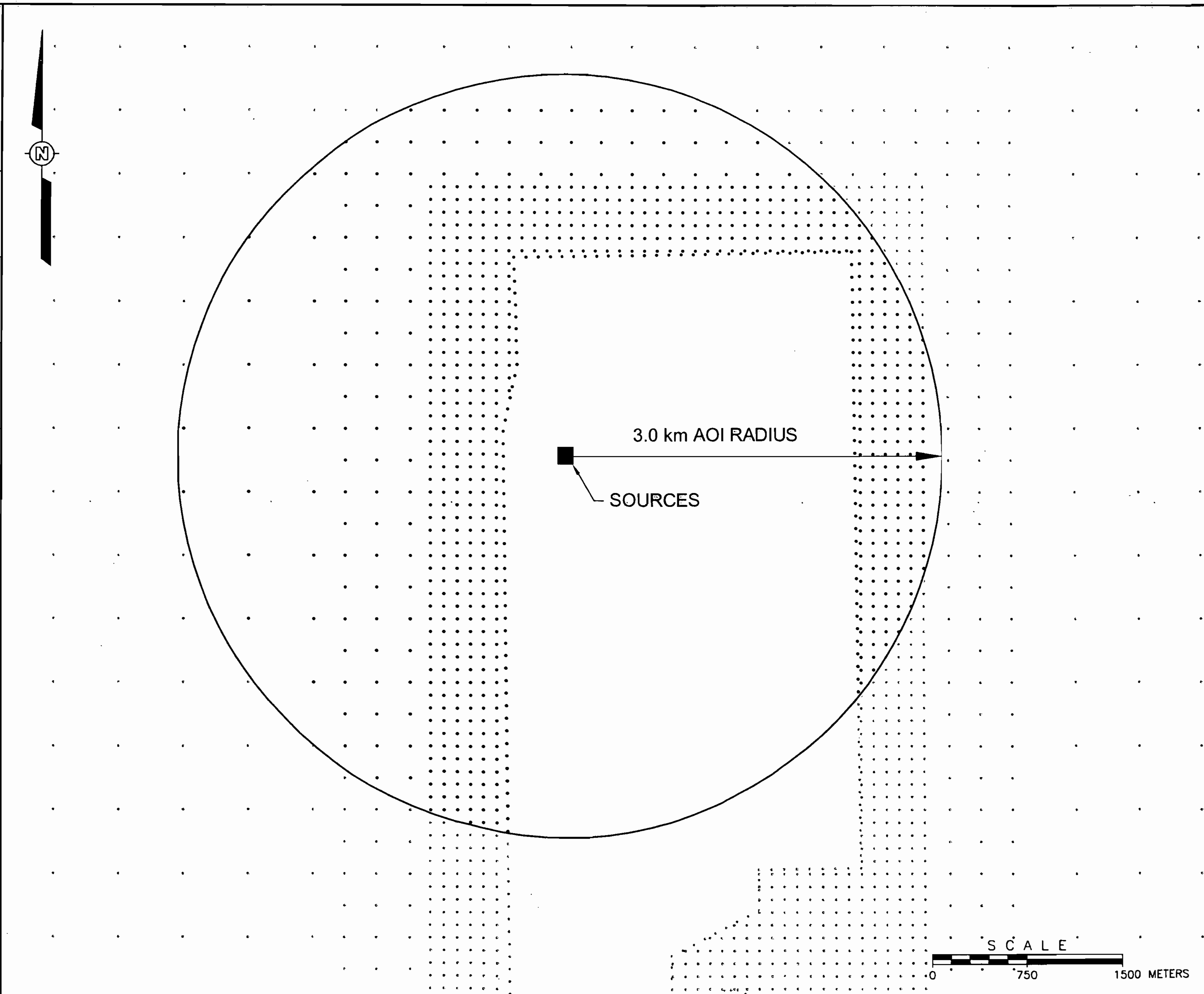
OKEECHOBEE, FLORIDA

FIGURE 3-2b
ALTERNATIVE BACT 2B REFINED RECEPTORS
3 Hr SO_2

OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA



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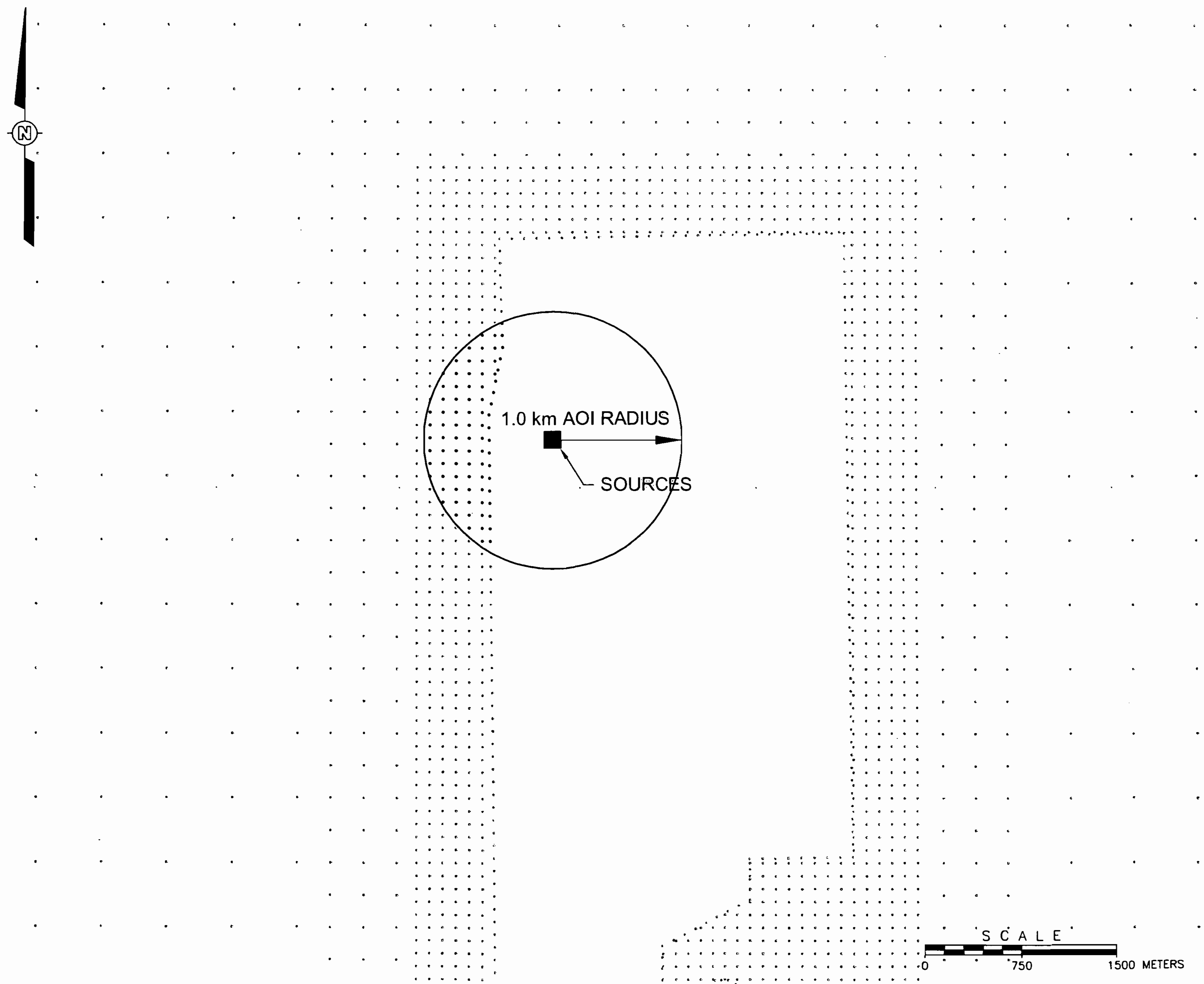
OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA

FIGURE 3-2c
ALTERNATIVE BACT 2B REFINED RECEPTORS
24 Hr SO_2
OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA



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OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA

FIGURE 3-2d
ALTERNATIVE BACT 2B REFINED
RECEPTORS
ANNUAL NOX

OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA

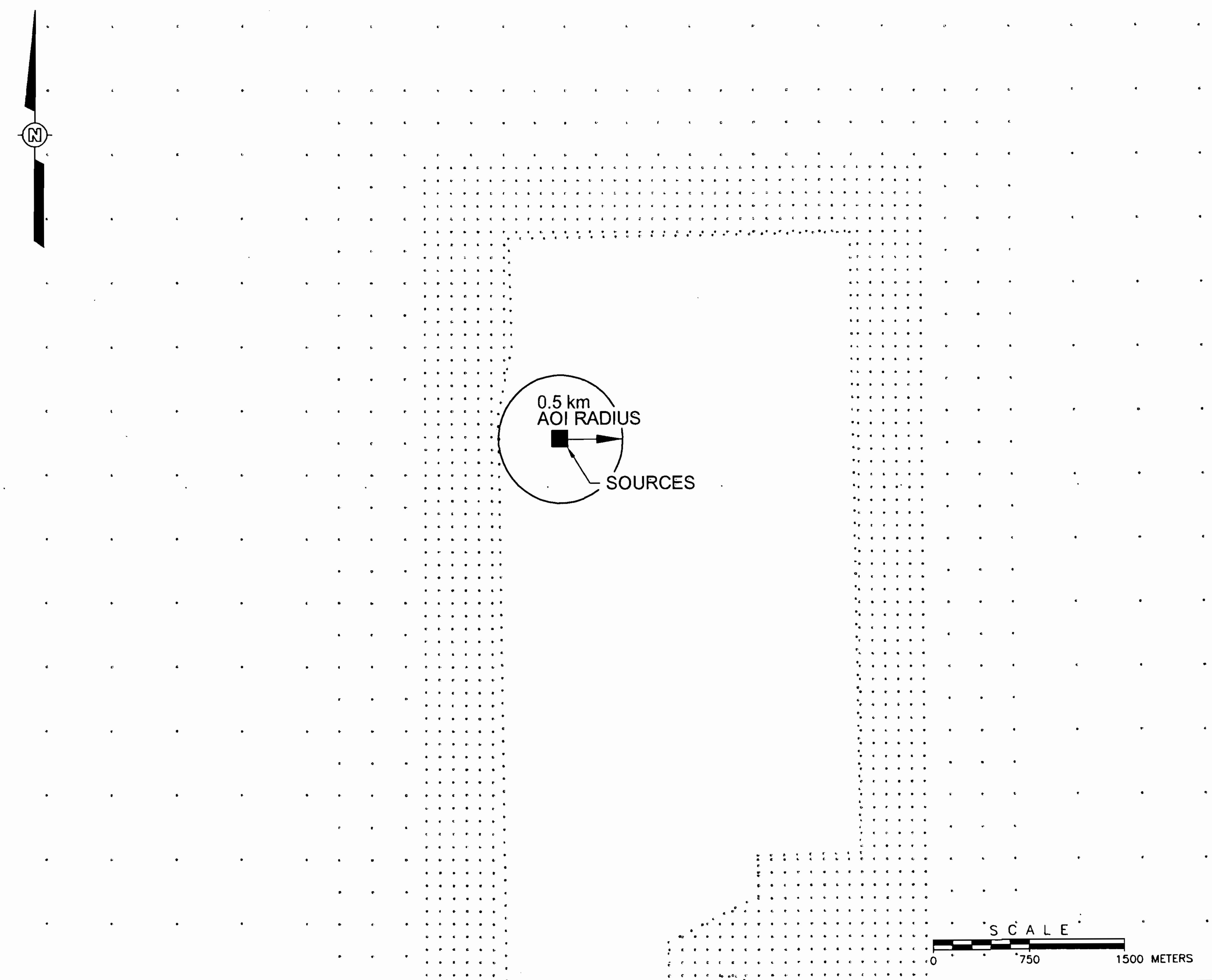

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FIGURE 3-2e
ALTERNATIVE BACT 2B REFINED RECEPTORS
24 Hr PM 10

OKEECHOBEE LANDFILL, INC.
OKEECHOBEE, FLORIDA

Okeechobee
Stack Parameter Adjustment

Original Data	3300 scfm Flare	3000 scfm Flare	1500 scfm Flare	Backup Flare	Odor Flare
Heat Rate (MMBtu/hr)	99	90	45	84	99
Heat Rate (cal/sec)	6,930,000	6,300,000	3,150,000	5,880,000	6,930,000
Height (m)	10.66812972	12.80175567	8.53450378	9.144111192	10.66812972
Diameter (m)	0.355604324	0.355604324	0.254003089	0.355604324	0.355604324

Guidance	Flare (scfm)	Exit Velocity (m/s)	Exit Temp (F)	Height (m)	Diameter (m)
OEPA	3,300	20	1831.73	19.158	1.746
OEPA	3,000	20	1831.73	20.913	1.665
OEPA	1,500	20	1831.73	14.358	1.177
OEPA	2,800	20	1831.73	16.992	1.608
OEPA	3,300	20	1831.73	19.158	1.746

See page 14 of OEPA guidance document

Ohio EPA Flare Guidance

Proposed operation of new flares
Backup Flare

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft³/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft³	
LFG Methane Component[c]	50%	%	
LFG Typical Heating Value	500	Btu/ft³	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%	%	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed

Fuel & Equipment - Open Flare

Flare Information	Value		Equivalent
No. of Hours of Operation Per Day[a]	24	hr	
No. of Days in Averaging Period[a]	365	day	
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[a]	2,800	scfm	
LFG Inlet Flow, dry standard	2,576	dscfm	
Heat Input	84.0	MMBtu/hr	
Design Flare Operating Temperature[b]	1,400	°F	1,860 °R
Flare Tip Flow, standard	2,800	scfm	
Flare Tip Flow, actual	3,015	acfm	
Flare Tip Diameter[b]	1.17	ft	
Flare Tip Exhaust Velocity	2,821	ft/min	47.0 ft/s
Flare Tip Height, above local grade[b]	30	ft	

[a]Permit Applicant

Proposed operation of new flares

Criteria Pollutant Emissions - Open Flare

Operation Period	8,760	hr
LFG inlet flow, standard	2,800	scfm
Heat Input	84.0	MMBtu/hr

SO_2 Emission Rate

SO_2 concentration in exhaust gas	4987.58	ppmv		
SO_2 emission rate	141.38	lb/hr	619.24	ton/yr

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.03
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.22
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.06
Hydrogen Sulfide	7783-06-4	34.08	4973.34	100.0%	1	4973.3	140.97
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.07
				Total Contribution to SO_2:		4987.58	141.38

SO_2 Emission Rate with BACT

SO_2 concentration in exhaust gas	400.05	ppmv		
SO_2 emission rate	11.34	lb/hr	49.67	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.03
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.22
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.06
Hydrogen Sulfide	7783-06-4	34.08	385.80	100.0%	1	385.8	10.94
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.07
				Total Contribution to SO_2:		400.05	11.34

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.314	lb/hr	5.75	tpy

NO_2 Emission Rate

NO_2 emission factor[c]	0.068	lb/MMBtu		
NO_2 emission rate	5.71	lb/hr	25.02	tpy

CO Emission Rate

CO emission factor[c]	0.37	lb/MMBtu		
CO emission rate	31.1	lb/hr	136.1	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	22.69	lb/hr		
NMOC emission rate	0.45	lb/hr	1.99	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	8.85	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.18	lb/hr	0.78	tpy

[a]EPA 1998. "Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources" (AP-42), 5th Ed., November
[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end range is used here resulting in maximum calculated emissions of SO
[c]LFG Specialties Inc. (typical)

Proposed operation of new flares
Odor Flare

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft^3/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft^3	
LFG Methane Component[c]	50%	%	
LFG Typical Heating Value	500	Btu/ft^3	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%	%	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed

Fuel & Equipment - Open Flare

Flare Information	Value		Equivalent
No. of Hours of Operation Per Day[a]	24	hr	
No. of Days in Averaging Period[a]	365	day	
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[a]	3,300	scfm	
LFG Inlet Flow, dry standard	3,036	dscfm	
Heat Input	99.0	MMBtu/hr	
Design Flare Operating Temperature[b]	1,400	°F	1,860 °R
Flare Tip Flow, standard	3,300	scfm	
Flare Tip Flow, actual	3,554	acfm	
Flare Tip Diameter[b]	1.17	ft	
Flare Tip Exhaust Velocity	3,324	ft/min	55.4 ft/s
Flare Tip Height, above local grade[b]	35	ft	

[a]Permit Applicant

Proposed operation of new flares

Criteria Pollutant Emissions - Open Flare

Operation Period	8,760	hr
LFG inlet flow, standard	3,300	scfm
Heat Input	99.0	MMBtu/hr

SO_2 Emission Rate

SO_2 concentration in exhaust gas	4987.58	ppmv		
SO_2 emission rate	166.62	lb/hr	729.81	ton/yr

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.04
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.02
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.26
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.08
Hydrogen Sulfide	7783-06-4	34.08	4973.34	100.0%	1	4973.3	166.15
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.08
					Total Contribution to SO_2:	4987.58	166.62

SO_2 Emission Rate with BACT

SO_2 concentration in exhaust gas	400.05	ppmv		
SO_2 emission rate	13.36	lb/hr	58.54	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.04
Carbonyl Sulfide	463-58-1	60.07	0.40	100.0%	1	0.49	0.02
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.26
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.08
Hydrogen Sulfide	7783-06-4	34.08	385.80	100.0%	1	385.8	12.89
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.08
					Total Contribution to SO_2:	400.05	13.36

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.55	lb/hr	6.78	tpy

NO_2 Emission Rate

NO_2 emission factor[c]	0.068	lb/MMBtu		
NO_2 emission rate	6.73	lb/hr	29.49	tpy

CO Emission Rate

CO emission factor[c]	0.37	lb/MMBtu		
CO emission rate	36.6	lb/hr	160.4	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	26.74	lb/hr		
NMOC emission rate	0.53	lb/hr	2.34	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	10.43	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.21	lb/hr	0.91	tpy

[a]EPA 1998. "Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources" (AP-42), 5th Ed., November

[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end range is used here resulting in maximum calculated emissions of SO

[c]LFG Specialties Inc. (typical)

Existing enclosed flare baseline

CD001 3,000-scfm enclosed flare w/evap

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft^3/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft^3	
LFG Methane Component[c]	50%		
LFG Typical Heating Value	500	Btu/ft^3	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%		
Methane Combustion Constant[d]	9.53	ft^3 air/ft^3 CH_4	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed
[d]*Professional Engineering Registration Program*, 23-9.

Fuel & Equipment - Enclosed Flare

Flare Information	Value		Equivalent
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[b]	2,287	scfm	
LFG Inlet Flow, dry standard	2,058	dscfm	
Heat Input	67	MMBtu/hr	
Design Flare Operating Temperature[c]	1,400	°F	1,860 °R
Excess Air for Combustion[c]	230%		
Flare Tip Flow, standard	37,413	scfm	
Flare Tip Flow, actual	133,822	acfm	
Flare Tip Diameter[b]	10.0	ft	
Flare Tip Exhaust Velocity	1,704	ft/min	28.4 ft/s
Flare Tip Height, above local grade[b]	45	ft	

[a]Permit Applicant
[b]Flare manufacturer - based on LFG model EF1045I12
[c]Function of design flame temperature; values are typical and are provided for 1400°F, 1600°F, 1800°F, and 2000°Fby a flare manufactuer

Emissions Calculations
Okeechobee (Berman Road) Landfill
Okeechobee, Fl

Existing enclosed flare baseline
Criteria Pollutant Emissions - Enclosed Flare
CD001 3,000-scfm enclosed flare w/evap

Operation Period	8,760	hr
LFG inlet flow, standard	2,237	scfm
Heat Input	67	MMBtu/hr

SO_2 Emission Rate with BACT

Sulfur concentration in exhaust gε	400.05	ppmv		
SO_2 emission rate	9.06	lb/hr uncontrolled	39.7	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.03
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.18
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.05
Hydrogen Sulfide	7783-06-4	34.08	385.80	100.0%	1	385.8	8.74
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.06
				Total Contribution to SO_2:		400.05	9.06

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.05	lb/hr	4.6	tpy

NO_2 Emission Rate

NO_2 emission factor[c]	0.06	lb/MMBtu		
NO_2 emission rate	4.0	lb/hr	17.6	tpy

CO Emission Rate

CO emission factor[c]	0.20	lb/MMBtu		
CO emission rate	13.4	lb/hr	59	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	18.1	lb/hr		
NMOC emission rate	0.36	lb/hr	1.59	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	7.1	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.14	lb/hr	0.62	tpy

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.*, November 1998.
[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end of the range is used here resulting in maximum calculated emissions of SO_2.
[c]LFG Specialties Inc. (typical)

Existing enclosed flare baseline

CD002 3,000-scfm enclosed flare w/evap

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft^3/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft^3	
LFG Methane Component[c]	50%		
LFG Typical Heating Value	500	Btu/ft^3	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%		
Methane Combustion Constant[d]	9.53	ft^3 air/ft^3 CH_4	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed
[d]*Professional Engineering Registration Program*, 23-9.

Fuel & Equipment - Enclosed Flare

Flare Information	Value		Equivalent
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[b]	2,246	scfm	
LFG Inlet Flow, dry standard	2,066	dscfm	
Heat Input	67	MMBtu/hr	
Design Flare Operating Temperature[c]	1,400	°F	1,860 °R
Excess Air for Combustion[c]	230%		
Flare Tip Flow, standard	37,563	scfm	
Flare Tip Flow, actual	134,361	acfm	
Flare Tip Diameter[b]	10.0	ft	
Flare Tip Exhaust Velocity	1,711	ft/min	28.5 ft/s
Flare Tip Height, above local grade[b]	45	ft	

[a]Permit Applicant
[b]Flare manufacturer - based on LFG model EF1045I12
[c]Function of design flame temperature; values are typical and are provided for 1400°F, 1600°F, 1800°F, and 2000°Fby a flare manufactuer

Existing enclosed flare baseline
Criteria Pollutant Emissions - Enclosed Flare
CD002 3,000-scfm enclosed flare w/evap

Operation Period	8,760	hr
LFG inlet flow, standard	2,246	scfm
Heat Input	67	MMBtu/hr

SO_2 Emission Rate with BACT

Sulfur concentration in exhaust ga	400.05	ppmv		
SO_2 emission rate	9.10	lb/hr uncontrolled	39.8	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.03
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.18
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.05
Hydrogen Sulfide	7783-06-4	34.08	385.80	100.0%	1	385.8	8.77
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.06
					Total Contribution to SO_2 :	400.05	9.10

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.05	lb/hr	4.6	tpy

NO_2 Emission Rate

NO_2 emission factor[c]	0.06	lb/MMBtu		
NO_2 emission rate	4.0	lb/hr	17.7	tpy

CO Emission Rate

CO emission factor[c]	0.20	lb/MMBtu		
CO emission rate	13.5	lb/hr	59	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	18.2	lb/hr		
NMOC emission rate	0.36	lb/hr	1.59	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	7.1	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.14	lb/hr	0.62	tpy

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.*, November 1998.
[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end of the range is used here resulting in maximum calculated emissions of SO_2.
[c]LFG Specialties Inc. (typical)

Turbine Data

Information provided by Solar Turbines September 17, 2008 letter

Turbine Model	PowerOutput kW	Gas Flow lb/min.	Exhaust Gas Temp. F	Exhaust Gas Temp. F 50% Load	NOx ppmv 15% O2	NOx lb/h	NOx g/bhp	CO ppmv 15% O2	CO lb/h	CO g/bhp	CO lb/h at 50% Load
Titan 130-20501	15185	6664.7	935	696	72	46.36	0.987	100	78.38	1.67	195.95
Centaur 40-4700	3337.4	2505.9	837	595	42	7.89	0.746	250	28.6	2.7	60.06

Titan 130

Parameter	Value	Units	Reference
Stack Height	35	ft	As per Sept. 17, 2008 letter from Solar turbines
Stack Interior Diameter	120	in	Solar Turbines
PM10 Rate	0.023	lb/MMBtu	AP-42, Table 3.1-2b
Turbine Inlet	5000	scfm	Solar Turbines
Exhaust Flow Rate 100% Load	236019	acfm	Solar Turbines
Exhaust Flow Rate 100% Load	50.08	ft/s	Calculated
Exhaust Flow Rate 50% Load	192937	acfm	Solar Turbines
Exhaust Flow Rate 50% Load	40.94	ft/s	Calculated
Average Landfill gas HHV	400	Btu/scf	AP-42, Table 3.1-2b
PM10 Rate	2.8	lb/hr	Calculated

Centaur 40

Parameter	Value	Units	Reference
Stack Height	35	ft	As per Sept. 17, 2008 letter from Solar turbines
Stack Interior Diameter	48	in	Solar Turbines
PM10 Rate	0.023	lb/MMBtu	AP-42, Table 3.1-2b
Turbine Inlet	1500	scfm	Solar Turbines
Exhaust Flow Rate 100% Load	82503	acfm	Solar Turbines
Exhaust Flow Rate 100% Load	109.42	ft/s	Calculated
Exhaust Flow Rate 50% Load	66741	acfm	Solar Turbines
Exhaust Flow Rate 50% Load	88.52	ft/s	Calculated
Average Landfill gas HHV	400	Btu/scf	AP-42, Table 3.1-2b
PM10 Rate	0.8	lb/hr	Calculated

Criteria Pollutant Emissions - Titan Turbine

Operation Period	8,760	hr
LFG inlet flow, standard	5,000	scfm
Heat Input	150	MMBtu/hr
Standard Temperature[a]	60	°F
	520	°R

500 Btu/cf

SO$_2$ Emission Rate

SO_2 concentration in exhaust gas	400.05	ppmv		
SO_2 emission rate	20.25	lb/hr	88.7	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.06
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.02
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.40
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.12
Hydrogen Sulfide	7783-06-4	34.08	385.80	100.0%	1	385.8	19.53
Methyl Mercaptan	74-93-1	48.11	2.49	100%	1	2.49	0.13
					Total Contribution to SO_2 :	400.05	20.25

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	40.5	lb/hr		
NMOC emission rate	0.81	lb/hr	3.55	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	15.8	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.32	lb/hr	1.38	tpy

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.*, November 1998.
[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end of the range is used here resulting in maximum calculated emissions of SO_2.
[c]LFG Specialties Inc. (typical)

Criteria Pollutant Emissions - Centaur Turbines

Operation Period	8,760 hr	
LFG inlet flow, standard	1,500 scfm	
Heat Input	45 MMBtu/hr	
Standard Temperature[a]	60 °F	500 Btu/cf
	520 °R	

SO₂ Emission Rate

SO_2 concentration in exhaust gas	400.05 ppmv	
SO_2 emission rate	6.07 lb/hr	26.6 tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.02
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.12
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.03
Hydrogen Sulfide	7783-06-4	34.08	385.80	100.0%	1	385.8	5.86
Methyl Mercaptan	74-93-1	48.11	2.49	100%	1	2.49	0.04
					Total Contribution to SO_2 :	400.05	6.07

NMOC Emission Rate

NMOC conc inlet gas[a]	595 ppmv	
MW hexane	86.18 lb/lb-mol	
destruction efficiency	98%	
mass NMOC inlet gas	12.2 lb/hr	
NMOC emission rate	0.24 lb/hr	1.06 tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595 ppmv	
VOC fraction of NMOC[a]	39%	
VOC concentration in inlet gas	232 ppmv	
MW hexane	86.18 lb/lb-mol	
mass VOC inlet gas	4.7 lb/hr	
destruction efficiency	98%	
VOC emission rate	0.09 lb/hr	0.42 tpy

[a] U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.*, November 1998.
[b] AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end of the range is used here resulting in maximum calculated emissions of SO_2.
[c] LFG Specialties Inc. (typical)

Proposed operation of new flares
CD NEW - Proposed 3,000-scfm utility flare

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft^3/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft^3	
LFG Methane Component[c]	50%	%	
LFG Typical Heating Value	500	Btu/ft^3	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%	%	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed

Fuel & Equipment - Open Flare

Flare Information	Value		Equivalent
No. of Hours of Operation Per Day[a]	24	hr	
No. of Days in Averaging Period[a]	365	day	
Operation Period[a]	8,760	hr	
LFG Inlet flow, standard[a]	3,000	scfm	
LFG Inlet Flow, dry standard	2,760	dscfm	
Heat Input	90.0	MMBtu/hr	
Design Flare Operating Temperature[b]	1,400	°F	1,860 °R
Flare Tip Flow, standard	3,000	scfm	
Flare Tip Flow, actual	3,231	acfm	
Flare Tip Diameter[b]	1.17	ft	
Flare Tip Exhaust Velocity	3,022	ft/min	50.4 ft/s
Flare Tip Height, above local grade[b]	42	ft	

[a]Permit Applicant

Proposed operation of new flares

Criteria Pollutant Emissions - Open Flare

Operation Period	8,760	hr
LFG inlet flow, standard	3,000	scfm
Heat Input	90.0	MMBtu/hr

SO_2 Emission Rate

SO_2 concentration in exhaust gas	4987.58	ppmv		
SO_2 emission rate	151.48	lb/hr	663.47	ton/yr

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.04
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.24
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.07
Hydrogen Sulfide	7783-06-4	34.08	4973.34	100.0%	1	4973.3	151.04
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.08
				Total Contribution to SO_2:		4987.58	151.48

<u>SO_2 Emission Rate with BACT</u>

SO_2 concentration in exhaust gas	400.05	ppmv		
SO_2 emission rate	12.15	lb/hr	53.22	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.04
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.24
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.07
Hydrogen Sulfide	7783-06-4	34.08	385.80	100.0%	1	385.8	11.72
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.08
				Total Contribution to SO_2:		400.05	12.15

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.41	lb/hr	6.17	tpy

NO_2 Emission Rate

NO_2 emission factor[c]	0.068	lb/MMBtu		
NO_2 emission rate	6.12	lb/hr	26.81	tpy

CO Emission Rate

CO emission factor[c]	0.37	lb/MMBtu		
CO emission rate	33.3	lb/hr	145.9	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	24.31	lb/hr		
NMOC emission rate	0.49	lb/hr	2.13	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	9.48	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.19	lb/hr	0.03	tpy

[a]EPA 1998. "Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources" (AP-42), 5th Ed., November

[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end range is used here resulting in maximum calculated emissions of SO

[c]LFG Specialties Inc. (typical)

Proposed operation of new flares

CD NEW - Proposed 1,500-scfm utility flare

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft^3/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft^3	
LFG Methane Component[c]	50%	%	
LFG Typical Heating Value	500	Btu/ft^3	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%	%	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed

Fuel & Equipment - Open Flare

Flare Information	Value		Equivalent
No. of Hours of Operation Per Day[a]	24	hr	
No. of Days in Averaging Period[a]	365	day	
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[a]	1,500	scfm	
LFG Inlet Flow, dry standard	1,380	dscfm	
Heat Input	45.0	MMBtu/hr	
Design Flare Operating Temperature[b]	1,400	°F	1,860 °R
Flare Tip Flow, standard	1,500	scfm	
Flare Tip Flow, actual	1,615	acfm	
Flare Tip Diameter[b]	0.83	ft	
Flare Tip Exhaust Velocity	2,962	ft/min	49.4 ft/s
Flare Tip Height, above local grade[b]	28	ft	

[a]Permit Applicant

Proposed operation of new flares

Criteria Pollutant Emissions - Open Flare

Operation Period	8,760	hr
LFG inlet flow, standard	1,500	scfm
Heat Input	45.0	MMBtu/hr

SO_2 Emission Rate

SO_2 concentration in exhaust gas	4987.58	ppmv		
SO_2 emission rate	75.74	lb/hr	331.73	ton/yr

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.02
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.12
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.03
Hydrogen Sulfide	7783-06-4	34.08	4973.34	100.0%	1	4973.3	75.52
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.04
				Total Contribution to SO_2:		4987.58	75.74

SO_2 Emission Rate with BACT

SO_2 concentration in exhaust gas	400.05	ppmv		
SO_2 emission rate	6.07	lb/hr	26.61	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.02
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.12
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.03
Hydrogen Sulfide	7783-06-4	34.08	385.80	100.0%	1	385.8	5.86
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.04
				Total Contribution to SO_2:		400.05	6.07

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	0.70	lb/hr	3.08	tpy

NO_2 Emission Rate

NO_2 emission factor[c]	0.068	lb/MMBtu		
NO_2 emission rate	3.06	lb/hr	13.40	tpy

CO Emission Rate

CO emission factor[c]	0.37	lb/MMBtu		
CO emission rate	16.7	lb/hr	72.9	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	12.15	lb/hr		
NMOC emission rate	0.24	lb/hr	1.06	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	4.74	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.09	lb/hr	0.42	tpy

[a]EPA 1998. "Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources" (AP-42), 5th Ed., November

[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end range is used here resulting in maximum calculated emissions of SO

[c]LFG Specialties Inc. (typical)

ADDENDUM
CLASS I AREA IMPACT ANALYSIS FOR PROPOSED EXPANSION IN OKEECHOBEE LANDFILL

Prepared for:

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Project No. 121525
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Table of Contents

List of Tables

List of Appendices

1.0 Introduction

In May 2008, Shaw Environmental, Inc. (Shaw) submitted the Class I Area Impact Analysis for the Proposed Expansion in Okeechobee Landfill for Okeechobee Landfill, Facility ID No. 0930104 on behalf of Okeechobee Landfill, Inc. (OLI). Since the submission of the Class I Area Impact Analysis report, OLI has modified the operating scenarios in their permit application. This addendum to the Class I Area Impact Analysis presents the analyses of the revised operating scenarios.

The revised Class I area impact analysis was conducted in the same manner as the May 2008 Class I Area Impact Analysis. Correspondence between OLI and FDEP, as well as communication with the National Park Service (NPS), provided guidance for the analysis. This addendum incorporates those recommendations and provides details of the analysis. The report is arranged as follows:

- Section 2.0: Background Information
- Section 3.0: Technical Approach and Methodology
- Section 4.0: Class I Area Impact Analysis
- Section 5.0: Conclusions.

2.0 Background Information

2.1 Description of the Emission Points

The revised future operations have been described in detail in Section 2.0 and 3.0 of Section II of this Air Permit Addenda (1270-3). In the previous air quality analysis submitted in February 2008 (Air Permit 1270-2), the following LFG combustion emission sources were considered:

Previously Submitted Existing Operation (prior to BACT):

i) Interim Scenario:

- Two existing enclosed flares (CD001 and CD002) used as control devices rated at 3,000 scfm but operating at 1,700 scfm of LFG each; and
- One new open flares (CD004) used as a control device rated at 3,300 scfm but operating at 2,300 scfm of LFG.
- Total flow of 5,700 scfm.

Previously Submitted Future Operation:

Future operations require installation of gas turbines and flares in stages based on the increase rate of landfill gas generation over the life or construction duration of the landfill. At the completion of the project, the following control devices were considered for the air quality analysis:

ii) Routine Operating Scenario (BACT Scenario):

- Seven LFG Mars Solar turbines (CD011 to CD017) used as control devices each rated at 4,000 scfm of LFG;
- One open flare (CD003) used as a control device rated at 3,300 scfm of LFG; and
- One open flare (CD004) used as a control device rated at 3,300 scfm LFG, but only operating at one third capacity (1,100 scfm).
- Total potential flow of 32,400 scfm

iii) Alternative BACT Operating Scenario 1 (in case gas turbines are unavailable)

- Eight new open flares (CD003 through CD010) used as control devices each rated at 3,300 scfm of LFG
- Two existing enclosed flares (CD001 and CD002) used as control devices each rated at 3,000 scfm of LFG

- Total potential flow of 32,400 scfm

iv) Alternative BACT Operating Scenario 2 (in case gas turbines are unavailable)

- Eight new open flares (CD003 through CD010) used as control devices each rated at 3,300 scfm of LFG
- One new open flare (CD018) used as a control device replacing the existing enclosed flare (CD001) rated at 3,300 scfm of LFG
- One new open flare (CD019) used as a control device replacing the existing enclosed flare (CD002) rated at 3,300 scfm of LFG, but only operating at 2,700 scfm.
- Total potential flow of 32,400 scfm

Future Operation:

Operating scenarios ii, iii and iv have been replaced by the following operating scenarios v, vi and vii included in this addendum. The project's maximum throughput capacity remains unchanged at 32,400 scfm of landfill gas. The enclosed flares will be replaced with open flares. The landfill operating scenarios when construction is completed include the routine (primary) operating scenario:

v) Routine Operating Scenario (BACT Scenario) 2 – to replace previous Routine Operating Scenario:

- One LFG Titan Solar turbine (CD016) used as a control device each rated at 5,000 scfm of LFG;
- Fifteen LFG Centaur Solar turbines (CD017 through CD031) used as control devices each rated at 1,500 scfm of LFG;
- Two open flares (rated at 2,800 to 3,300 scfm) used as a control devices with a maximum throughput of 4,900 scfm;

The primary (routine) operating scenario is the preferred scenario; however, depending on the number of turbines on line, the number of flares that will be operated to handle the LFG not directed to the turbines will vary. The total maximum LFG throughput to any of the control devices would not exceed 32,400 scfm.

There are three operating scenarios for the maximum estimated LFG generation and throughput; two alternatives involve 100 percent flaring of LFG and one alternative involves a combination of turbine combustion and flaring but not to exceed 32,400 scfm. The rationale for the alternative operating scenarios is to allow flaring the LFG as a backup to the turbines if any or all should be off line. The Addendum replaces the enclosed flares with open flares. Open flares tend to require less maintenance and have a longer life cycle as intermittently operated back-up flare, than enclosed flares. This replacement is not considered in kind and has been included in the construction project and the project's emissions estimates. The control devices used for each alternative operating scenario are summarized below.

vi) Alternative BACT Operating Scenario 2A (if turbines are off line or if turbines are not installed) – to replace previous Alternative Operating Scenario 2:

- One 2,800-scfm open flare and one 3,300-scfm open flare (designated as CD003 and CD004 in the Application) and nine new 3,000-scfm open flares (CD005 through CD013) used as control devices.
- Operated at a maximum LFG throughput of 32,400 scfm.

Alternative Operating Scenario B (Same as Alternative A with a construction option to install two 1,500-scfm flares for one of the proposed 3,000-scfm flares.)

All flares have lower operating limitations relative to flow rate. The smaller capacity 1,500-scfm flares are a construction option for the facility. They will be used as back-up devices to the turbines when more landfill gas is collected than the turbines can use. Another use for the smaller flares would be at the end of the construction project when LFG generation rate and quality wanes.

vii) Alternative BACT Operating Scenario 2B (if turbines are off line or if turbines are not installed) – to replace previous Alternative Operating Scenario 2:

- One 2,800-scfm open flare and one 3,300-scfm open flare (designated as CD003 and CD004 in the Application), eight new 3,000-scfm open flares (CD005 through CD013) and two new open flares (CD014 and CD015) used as control devices.
- Operated at a maximum LFG throughput of 32,400 scfm.

Other Alternative Operating Scenarios would be various combinations of turbines and flares. To simplify the permitting, emission and air impact analysis every possible combination is not presented and only the worst-case scenarios are modeled.

All scenarios under the future conditions will have BACT installed for SO_2 as described earlier.

The emission rates used for the air quality analysis from these control devices are described in Section 3.1.

The Class II significant impacts for Alternative BACT Scenario 2A were compared with the previous results for Alternative BACT Scenario 2 as reported in the February 2008 Air Quality Impact Analysis. Since the results from the Alternative BACT Scenario 2A are less than or equal to (± 5%) the previously reported results, no further analysis was conducted. It is assumed that the conclusion of any refined impact analyses from this scenario will remain the same as predicted in the February 2008 Air Quality Impact Analysis and the May 2008 Class I Area Impact Analysis. Therefore, the remainder of this report will focus on the Routine BACT Scenario 2 and the Alternative BACT Scenario 2B since those results are greater than what was previously report.

The pollutants considered for the Class I impact analyses were: i) NOx, ii) SO_2; and iii) PM10. Other pollutants such as sulfates, nitrates, ammonia, sulfuric acid mist, and nitric acid mist are not emitted from the emission source (landfill) in any appreciable amounts. The total emissions of these pollutants and distance of the emission point from the Everglades National Park (NP), Biscayne Bay NP, and Big Cypress National Preserve are shown in Table 2-2a, b and c.

Table 2-1a: Q/D Analysis for Emission Points for Everglades National Park

Operating Scenario	Distance to Everglades (km)	Total SO2 Emissions (tpy)	SO2 Q/D (tpy/km)	Total NOx Emissions (tpy)	NOx Q/D (tpy/km)	Total PM10 Emissions (tpy)	PM Q/D (tpy/km)
Routine BACT 2	174	444.8	2.6	765.2	4.4	76.6	0.4
Alternative BACT 2B	174	574.7	3.3	289.5	1.7	66.6	0.4

Table 2-1b: Q/D Analysis for Emission Points for Biscayne Bay National Park

Operating Scenario	Distance to Biscayne Bay (km)	Total SO2 Emissions (tpy)	SO2 Q/D (tpy/km)	Total NOx Emissions (tpy)	NOx Q/D (tpy/km)	Total PM10 Emissions (tpy)	PM Q/D (tpy/km)
Routine BACT 2	193.5	444.8	2.3	765.2	4.0	76.6	0.4
Alternative BACT 2B	193.5	574.7	3.0	289.5	1.5	66.6	0.3

Table 2-1c: Q/D Analysis for Emission Points for Big Cypress National Preserve

Operating Scenario	Distance to Big Cypress (km)	Total SO2 Emissions (tpy)	SO2 Q/D (tpy/km)	Total NOx Emissions (tpy)	NOx Q/D (tpy/km)	Total PM10 Emissions (tpy)	PM Q/D (tpy/km)
Routine BACT 2	121	444.8	3.7	765.2	6.3	76.6	0.6
Alternative BACT 2B	121	574.7	4.7	289.5	2.4	66.6	0.6

2.2 *Elements of Class I Area Impact Analysis*

The elements of this addendum are identical to the May 2008 Class I Area Impact Analysis.

The Federal Class I area nearest to the source is the Everglades NP in South Florida, located approximately 169 kilometers from the facility's southern most property line. The Biscayne Bay NP and Big Cypress National Preserve are Class II areas; however, they are considered important relative to air pollution impacts and are considered in the analysis.

The Class I area air quality analysis is conducted in phases as follows:

- Significant Impact Analysis: the net emissions increase from the project is used in determining the air quality impact in the Class I area and is then compared to the Class I area significance levels concentration. The Draft New Source Review Workshop Manual (1990) lists Class I significance level concentrations as 1 ug/m^3 for 24-hour average for all pollutants with NAAQS. USEPA has subsequently proposed lower significance level concentrations as shown in Table 2-2. These levels in Table 2-2 have not been officially promulgated as part of the PSD review process. However, FDEP has accepted the use of these significance level concentrations for Class I areas.

  If the project's air quality impact does not exceed the Class I significance level concentration, then no further air quality analyses is required.

- Class I area Increment Analysis: This analysis is required if the project's air quality impact exceeds the Class I area significance level concentration. Table 2-2 shows the applicable Class I area PSD increments.

- Air Quality Related Values (AQRV) Analysis: The AQRV analysis is required for submission to Federal land Managers (FLM) who are charged with affirmative responsibility to protect the AQRVs. In this case, the applicable FLM agency is the National Park Service (NPS). The AQRVs vary with the Class I area being considered. Based on discussions with the NPS, the AQRVs to be considered for the Everglades NP, Biscayne Bay NP, and Big Cypress National Preserve are: i) deposition of total nitrates and sulfates; ii) visibility degradation; and iii) impact of ozone on vegetations. The results of these analyses are submitted to NPS for AQRV analyses.

Table 2-2: Reference Concentrations of Regulated Pollutants for Class I Impact Analysis

Pollutant	Averaging Period	USEPA Class II Significance Level (ug/m3)	Current USEPA Class I Significance Level (ug/m3)	Proposed USEPA Class I Significance Level (ug/m3)	Class I PSD Increments (ug/m3)
NO_2	Annual	1	N/A	0.1	2.5
	24-hr	N/A	1	N/A	N/A
SO_2	3-Hour	25	N/A	1	25
	24-Hour	5	1	0.2	5
	Annual	1	N/A	0.1	2
PM_{10}	24-Hour	5	1	0.3	10
	Annual	1	N/A	0.2	5

Note: Proposed Class I significance levels are guidelines at this time and has not been adopted in PSD regulations.

2.3 Existing Environmental Conditions in Everglades National Park, Biscayne Bay National Park, and Big Cypress National Preserve.

The existing environmental conditions of the Everglades National Park, Biscayne Bay National Park, and Big Cypress National Preserve considered in the analysis are important to the analysis and have not changed since the May 2008 Class I Area Impact Analysis.

3.0 Technical Approach and Methodology

Air dispersion and deposition modeling was performed to determine ambient concentrations, deposition, and visibility impacts of the proposed modification on the Everglades NP, Biscayne Bay NP, and Big Cypress National Preserve identical to the modeling reported in the May 2008 Class I Area Impact Analysis.

A modeling protocol was submitted to NPS for review. Subsequently, a meeting was held with the NPS in Denver, CO on March 6, 2008 to discuss the Class I area impact analysis protocol. The protocol and comments received from NPS on the protocol were included in Appendix B of the May 2008 Class I Area Impact Analysis. The analysis described in this section was performed consistently with all modeling features discussed and agreed upon by the NPS.

The elements of the analysis have been described in Section 2.2. The methodology of the modeling is identical to that reported in the May 2008 Class I Area Impact Analysis.

3.1 Source Parameters

The emission points considered under various scenarios in the air dispersion modeling have been listed in Section 2.1. All of the proposed emission points are point sources with identified stacks venting the emissions to the atmosphere. This section describes the parameters required in CALPUFF for point sources and the procedure for estimating the parameters.

Emission Rates: Emission rates were calculated using manufacturer's data where available. If not available, then USEPA's AP-42 emission factor database was used. For SO_2, mass balance was used considering all sulfur bearing compounds converted 100% to SO_2 except for the Routine BACT scenario, where 28% of the SO_2 emissions were expected to be converted to SO_4 for the Titan turbine and 26% of the SO_2 emissions were expected to be converted to SO_4 for the Centaur turbines (as per NPS turbine profile spreadsheet). The details of the calculations are in Appendix A. Table 3-1a and 3-1b summarizes the emission rates of modeled pollutants to be considered in the analyses. The same emission rates were used in the Class II PSD increment and NAAQS analyses except that the particulate emissions are speciated in the CALPUFF analysis (see section 3.13).

For both gas turbines and flares, the short-term and annual average emission rates were the same at full capacity of the units.

Table 3-1a: Routine BACT 2 Modeled Emission Rates

Pollutant	Averaging Period	Enclosed Flares[1] (lb/hr)	Enclosed Flares[1] (lb/hr)	1,600 scfm Open Flares (lb/hr)	3,300 scfm Open Flares (lb/hr)	LFG Titan Turbine (lb/hr)	LFG Centaur Turbines (lb/hr)
NOx	Annual	4.0	4.0	3.3	6.7	46.4	7.9
SO_2	3-Hour	9.1	9.1	6.5	13.4	14.7	4.5
	24-Hour	9.1	9.1	6.5	13.4	14.7	4.5
	Annual	9.1	9.1	6.5	13.4	14.7	4.5
SO_4	3-Hour	-	-	-	-	8.4	2.4
	24-Hour	-	-	-	-	8.4	2.4
	Annual	-	-	-	-	8.4	2.4
PM_{10}[2]	24-Hour	1.0	1.1	0.8	1.5	2.8	0.8
	Annual	1.0	1.1	0.8	1.5	2.8	0.8

5. Existing enclosed flares were modeled and then impacts were subtracted out using CALSUM as described in May 2008 Class I Area Impact Analysis.
6. PM_{10} emissions were considered to be elemental carbon as per NPS.

Table 3-1b: Alternative BACT 2B Modeled Emission Rates

Pollutant	Averaging Period	Enclosed Flares[1] (lb/hr)	Enclosed Flares[1] (lb/hr)	2,100 scfm Open Flares (lb/hr)	3,300 scfm Open Flares (lb/hr)	1,500 scfm Open Flares (lb/hr)	3,000 scfm Open Flares (lb/hr)
NOx	Annual	4.0	4.0	4.3	6.7	3.1	6.1
SO_2	3-Hour	9.1	9.1	8.5	13.4	6.1	12.1
	24-Hour	9.1	9.1	8.5	13.4	6.1	12.1
	Annual	9.1	9.1	8.5	13.4	6.1	12.1
SO_4	3-Hour	-	-	-	-	-	-
	24-Hour	-	-	-	-	-	-
	Annual	-	-	-	-	-	-
PM_{10}[2]	24-Hour	1.0	1.1	1.0	1.5	0.7	1.4
	Annual	1.0	1.1	1.0	1.5	0.7	1.4

7. Existing enclosed flares were modeled and then impacts were subtracted out using CALSUM as described in May 2008 Class I Area Impact Analysis.
8. PM_{10} emissions were considered to be elemental carbon as per NPS.

The net emission change (projected allowable or potential – baseline actual) is calculated as follows:

$$E_{net} = E_{BACT} - E_{Existing}$$

Where

E_{net} = Net emission increase

E_{BACT} = Potential emissions from the BACT scenario

$E_{Existing}$ = Actual baseline emissions from 2 existing flares, total 4,483 scfm LFG

Thus, the new emissions for the project for both BACT operating scenarios are based on a flow rate of 29,717 $scfm_{net}$ (32,400 $scfm_{BACT}$ – 4,483 $scfm_{Existing}$).

CALSUM was used within the CALPUFF modeling to apply a negative emission rate for the existing sources.

Stack Gas Parameters: Stack gas parameters included: i) stack gas exit temperature, and ii) stack gas exit velocity. These are discussed separately.

Stack gas exit temperatures for the enclosed flares and the turbines were obtained from manufacturer's information. For open flares, stack gas exit temperature cannot be measured and is a function of the degree and rate of entrainment of ambient air in the flared gases. Ohio Environmental Protection Agency (OEPA) and Texas Commission on Environmental Quality (TCEQ) have guidelines for estimating stack gas temperature and flow rate from open industrial flares. Upon review, it was determined that the OEPA guidelines were more conservative and, therefore, were used for the estimation of stack gas temperature. A copy of the guideline (Engineering Guide #69) was included in Appendix A of the May 2008 Class I Area Impact Analysis. The guide assumes a stack gas temperature of 1273 degrees Kelvin for industrial flares.

Stack exit velocities for enclosed flares were obtained from stack gas flow rates and stack diameters. Stack gas flow rates for enclosed flares were obtained from combustion calculations of landfill gas flow rate through the flares and approximately at 230% excess air conditions, typical of enclosed landfill gas flares. Stack gas velocity for turbines were obtained from manufacturer's data. As per OEPA guide on flares described above, stack exit velocity of all open flares was considered as 20 meters per second (m/s).

Physical Stack Parameters: Physical stack parameters included: i) stack height, stack diameter; and stack location (coordinates). For enclosed flares and combustion turbines, the stack height and diameters were obtained from manufacturer's information.

The physical stack diameter and height were not considered (for air dispersion modeling purposes) for the open flares, as per the OEPA guide. Instead, virtual stack diameter and stack height were calculated for use in air dispersion modeling. The virtual stack diameter was calculated from a buoyant flux based on a default stack temperature of 1273 degrees Kelvin (K), a stack gas flow rate based on the buoyant flux, and the stack diameter based on a default stack exit velocity of 20 m/s. The virtual stack height was calculated as a function of total heat release in combustion of the gas. Details of the calculations are included in Appendix A.

Stack coordinates for all flares and turbines were obtained from equipment layout and a digitized map of the facility. The stack locations were converted to NAD83 UTM coordinates for consistency with receptor coordinates.

Table 3-2a and 3-2b shows the stack parameters used in the air dispersion modeling analysis.

Table 3-2a: Routine BACT Modeled Stack Parameters

Control Device ID	Description	Location (UTM) Easting (m)	Location (UTM) Northing (m)	Stack Height (ft)	Stack Exit Gas Temperature (F)	Stack Velocity (ft/s)	Stack Diameter (ft)
CD016	Titan Turbine	530470.5	3023710.2	35	935	50.085	10.000
CD017	Centaur Turbine 1	530470.5	3023713.8	35	837	109.423	4.000
CD018	Centaur Turbine 2	530470.5	3023717.5	35	837	109.423	4.000
CD019	Centaur Turbine 3	530470.5	3023721.2	35	837	109.423	4.000
CD020	Centaur Turbine 4	530470.5	3023724.8	35	837	109.423	4.000
CD021	Centaur Turbine 5	530470.5	3023728.5	35	837	109.423	4.000
CD022	Centaur Turbine 6	530470.5	3023732.1	35	837	109.423	4.000

Control Device ID	Description	Location (UTM) Easting (m)	Location (UTM) Northing (m)	Stack Height (ft)	Stack Exit Gas Temperature (F)	Stack Velocity (ft/s)	Stack Diameter (ft)
CD023	Centaur Turbine 7	530470.5	3023735.8	35	837	109.423	4.000
CD024	Centaur Turbine 8	530470.5	3023739.4	35	837	109.423	4.000
CD025	Centaur Turbine 9	530470.5	3023743.1	35	837	109.423	4.000
CD026	Centaur Turbine 10	530470.5	3023746.8	35	837	109.423	4.000
CD027	Centaur Turbine 11	530470.5	3023750.4	35	837	109.423	4.000
CD028	Centaur Turbine 12	530470.5	3023754.1	35	837	109.423	4.000
CD029	Centaur Turbine 13	530470.5	3023757.7	35	837	109.423	4.000
CD030	Centaur Turbine 14	530470.5	3023761.4	35	837	109.423	4.000
CD031	Centaur Turbine 15	530470.5	3023765.0	35	837	109.423	4.000
CD003	Utility Flare (backup) 2800 scfm 1	530433.1	3023826.9	55.75	1831.73	65.616	5.277
CD004	Utility Flare(odor) 3300 scfm 2	530433.1	3023834.9	62.85	1831.73	65.616	5.729

Table 3-2b: Alternative BACT 2B Modeled Stack Parameters

Control Device ID	Description	Location (UTM) Easting (m)	Location (UTM) Northing (m)	Stack Height (ft)	Stack Exit Gas Temperature (F)	Stack Velocity (ft/s)	Stack Diameter (ft)
CD003	Utility Flare (backup) 2800 scfm 1	530433.1	3023826.9	55.75	1831.73	65.616	5.277
CD004	Utility Flare(odor) 3300 scfm 2	530433.1	3023834.2	62.85	1831.73	65.616	5.729
CD014	Utility Flare 1500 scfm 3A	530433.1	3023841.5	47.11	1831.73	65.616	3.862
CD015	Utility Flare 1500 scfm 3B	530433.1	3023848.9	47.11	1831.73	65.616	3.862
CD006	Utility Flare 3000 scfm 4	530433.1	3023856.2	68.61	1831.73	65.616	5.462
CD007	Utility Flare 3000 scfm 5	530433.1	3023863.5	68.61	1831.73	65.616	5.462
CD008	Utility Flare 3000 scfm 6	530433.1	3023870.9	68.61	1831.73	65.616	5.462
CD009	Utility Flare 3000 scfm 7	530433.1	3023878.2	68.61	1831.73	65.616	5.462
CD010	Utility Flare 3000 scfm 8	530433.1	3023885.5	68.61	1831.73	65.616	5.462
CD011	Utility Flare 3000 scfm 9	530433.1	3023892.9	68.61	1831.73	65.616	5.462
CD012	Utility Flare 3000 scfm 10	530433.1	3023900.2	68.61	1831.73	65.616	5.462
CD013	Utility Flare 3000 scfm 11	530433.1	3023907.5	68.61	1831.73	65.616	5.462

Please note that it is planned to have both the flares and turbines installed to give the site backup control capacity in case the turbines are down for an extended time.

3.2 Short-term and Long-term Emission Rates

The flares and turbines are operated only with LFG from the landfill, which is generated in a consistent manner. LFG generation rate increases over time and installation of turbines or flares are staggered to match the flow. The turbines and flares are expected to run at full capacity except for a short period during deployment of a new flare or turbine.

The emissions of SO_2 and PM from turbines and flares depend on the LFG firing rate and decreases with reduced firing rate. Since full LFG firing rate has been considered in the emission rate calculations, this represented maximum emission rate for both short-term and long-term impacts for these two pollutants.

There is a possibility of higher NOx emissions from turbines at lower loads. Thus a load analysis was performed to ensure that the highest LFG flow corresponded to highest ambient NOx impact. The analysis and results are described in the May 2008 Class I Area Impact Analysis. The conclusion of the analysis does not change for the Routine BACT Scenario 2.

3.3 Building Downwash Analysis

Though building downwash was considered in the near field modeling, it was not considered in the long range transport modeling because the Big Cypress National Preserve is 121 km from the facility and the Everglades NP and Biscayne Bay NP are farther away. At this distance, there would be no appreciable impact of building downwash.

3.4 Meteorological Data

Meteorological data in MM5 format has been processed by FDEP with CALMET (version 5.8) to develop the meteorological data set for CALPUFF. The processed data was sent to Shaw for direct use with the CALPUFF. The data are for years 2001, 2002, and 2003. FLAG guidance requires that the modeling domain extend at least 50 km upwind of the emission source and 50 km on all sides of the Class I area being modeled. The data sent to Shaw fulfills this requirement.

Based on information from FDEP, the MM5 data was developed for 4 km grid areas and with 10 vertical layers as required by FLAG for refined analysis.

3.5 Receptor Layout

The NPS has predetermined locations of receptors in each Class I area. The receptors for the Everglades NP were obtained from the NPS website and were shown in Figure 3-1 of the May 2008 Class I Area Impact Analysis. These receptors were used in the analysis. Since no receptors were available for Biscayne Bay NP and Big Cypress National Preserve in the NPS website, receptor grids covering these areas were developed by Shaw and were shown in Figure

3-2 and Figure 3-3 of the May 2008 Class I Area Impact Analysis. These receptor grids were included in the protocol and were approved by NPS.

3.6 Background Concentrations of Ammonia and Ozone

CALPUFF/CALPOST requires background concentrations for ammonia and ozone to use the chemical transformation algorithms. The background concentrations were used as follows:

Ammonia background Concentration: There is no ammonia monitoring station in the Everglades NP or Biscayne Bay NP therefore, the NPS-recommended a value of 10 ppb as ammonia background for CALPUFF as per the "grasslands" value from IWAQM was used.

Ozone Background Concentration: One ozone monitoring station (CASTNet site) is located in the Everglades NP. USEPA's Clean Market website from the station for 2001, 2002, and 2003 showed an annual average concentration of 25.1 ppb, 25.7 ppb, and 27.4 ppb, respectively. Based on this data, a conservative value of 30 ppb was considered as the background in all three years. Appendix C in the May 2008 Class I Area Impact Analysis included the printouts from USEPA's "Quick Reports" for this site.

3.7 Background Light Extinction Coefficient

For visibility impact analysis, background light extinction coefficient data is required. The daily background light extinction coefficients was calculated on an hour by hour basis using hourly relative humidity data from the CALMET and hygroscopic and non-hygroscopic extinctions components of 0.9 Mm^{-1} and 8.5 Mm^{-1}, respectively, as specified in the FLAG 2000 document (i.e. MVISBK = 2). Hygroscopic particle growth was capped at relative humidity of 95% per NPS comments on the submitted protocol. The background concentrations for the visibility calculations were based on the current values in the FLAG 2000 document and were set to: BKSO4 = 0.3 and BKSOIL = 8.5.

3.8 Ammonia Limiting Method

CALPUFF normally considers that all background ammonia is available to all puffs at the same concentration at all times. While this may be reasonable for a single puff or multiple puffs separated from each other, it is not realistic for overlapping puffs, as is expected in this analysis. Additionally, CALPUFF does not take into consideration the preferential scavenging of ammonia by sulfates over nitrates. As a result, the nitrate deposition and hence overall visibility impact is overpredicted.

The post-processor POSTUTIL offers a method to correct this situation. An option called the Ammonia Limiting Method (ALM), when switched on, would preferentially scavenge the ammonia for sulfates prior to the nitrate chemistry. This option was used in the analysis as per discussion with NPS.

3.9 Relative Humidity Method

Relative humidity is required at the Class I area to estimate the deposition and visibility impacts. Two methods are currently used in CALPUFF for incorporating relative humidity:

- Method 2, which requires hourly relative humidity data to be used in CALMET
- Method 6, which requires monthly averaged relative humidity data.

Per FLAG guidance, Method 2 was used in the analysis.

3.10 Rayleigh Scattering Coefficient

CALPOST uses a default Rayleigh scattering coefficient of 10 Mm^{-1}, which was recommended by NPS. This value was used in the visibility analysis.

3.11 Size Fraction of Particulate Matter

Particle speciation was included in the analysis as per NPS comments to the protocol. Particulate emissions from the flares were considered to be all elemental carbon as a conservative estimate. A revised version of the NPS turbine profile (obtained from Don Shepherd of NPS) was used to determine the elemental carbon and SO_4 fraction of particulates for the LFG Turbines. This spreadsheet can be found in Appendix A.

3.12 Summary of CALPUFF Model Settings

The CALPUFF model settings used in the analysis were identical to those in the May 2008 Class I Area Impact Analysis.

4.0 Results of Analysis

This section contains the results of the Class I area impact analysis. All modeling input and output files are included in electronic form on DVDs supplied as Appendix B in this report.

The details of the analysis are included in following sections. In summary, results of this modeling analysis revealed no anticipated adverse effects resulting from this project. There were no exceedences of the Class I significant impact level or Class I PSD increment for any pollutant. The deposition flux for sulfates and nitrates were within the deposition analysis thresholds (DAT) of 0.01 kg/ha/yr. There was only 1 time in which the percent change in light extinction coefficient over the background was greater than 10% for all of the 24-hour periods modeled for the Big Cypress National Preserve, the closest of the three areas evaluated. The percent change in light extinction coefficient over the background was lower than 10% for all of the 24-hour periods modeled for the Everglades NP and the Biscayne Bay NP.

4.1 Class I Area Significance Analysis

In the analysis, the impact of the proposed emission points on ambient air quality in the Everglades NP, Biscayne Bay NP and Big Cypress National Preserve was estimated to determine if these pollutants has "significance level" impact, which would require full impact analysis.

Table 4-1a through 4-1c summarize the maximum predicted ground-level concentrations (H1H) and the corresponding PSD significance concentration levels for all pollutants for the Routine BACT Scenario 2, and the Alternative BACT Scenario 2B. In all cases, these concentrations were lower than the proposed Class I significance level concentrations.

Table 4-1a: Significance Analysis Results for the Everglades NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration (H1H)	Class I PSD/NAAQS Proposed Significance Level	Maximum Predicted Concentration as Percentage of Significance Level	Maximum Predicted Concentration Below Significance Level?
			μg/m³	μg/m³	%	Yes/No
Routine BACT 2	NO_2	Annual	1.62E-03	0.1	1.62%	Yes
	PM10	24-Hour	1.31E-02	0.3	4.38%	Yes
		Annual	4.32E-04	0.2	0.22%	Yes
	SO_2	3-Hour	1.22E-01	1	12.25%	Yes
		24-Hour	5.00E-02	0.2	24.98%	Yes
		Annual	1.54E-03	0.1	1.54%	Yes

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration (H1H)	Class I PSD/NAAQS Proposed Significance Level	Maximum Predicted Concentration as Percentage of Significance Level	Maximum Predicted Concentration Below Significance Level?
			μg/m³	μg/m³	%	Yes/No
Alternative BACT 2B	NO_2	Annual	6.00E-04	0.1	0.60%	Yes
	PM10	24-Hour	1.15E-02	0.3	3.85%	Yes
		Annual	3.85E-04	0.2	0.19%	Yes
	SO_2	3-Hour	1.65E-01	1	16.51%	Yes
		24-Hour	6.81E-02	0.2	34.04%	Yes
		Annual	2.13E-03	0.1	2.13%	Yes

Table 4-1b: Significance Analysis Results for the Biscayne Bay NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration (H1H)	Class I PSD/NAAQS Proposed Significance Level	Maximum Predicted Concentration as Percentage of Significance Level	Maximum Predicted Concentration Below Significance Level?
			μg/m³	μg/m³	%	Yes/No
Routine BACT 2	NO_2	Annual	9.62E-04	0.1	0.96%	Yes
	PM10	24-Hour	7.05E-03	0.3	2.35%	Yes
		Annual	2.77E-04	0.2	0.14%	Yes
	SO_2	3-Hour	9.09E-02	1	9.09%	Yes
		24-Hour	2.39E-02	0.2	11.95%	Yes
		Annual	1.04E-03	0.1	1.04%	Yes
Alternative BACT 2B	NO_2	Annual	3.45E-04	0.1	0.35%	Yes
	PM10	24-Hour	6.10E-03	0.3	2.03%	Yes
		Annual	2.41E-04	0.2	0.12%	Yes
	SO_2	3-Hour	1.21E-01	1	12.12%	Yes
		24-Hour	3.19E-02	0.2	15.95%	Yes
		Annual	1.42E-03	0.1	1.42%	Yes

Table 4-1c: Significance Analysis Results for the Big Cypress National Preserve

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration (H1H)	Class I PSD/NAAQS Proposed Significance Level	Maximum Predicted Concentration as Percentage of Significance Level	Maximum Predicted Concentration Below Significance Level?
			µg/m³	µg/m³	%	Yes/No
Routine BACT 2	NO_2	Annual	3.39E-03	0.1	3.39%	Yes
	PM10	24-Hour	1.82E-02	0.3	6.05%	Yes
		Annual	7.14E-04	0.2	0.36%	Yes
	SO_2	3-Hour	1.79E-01	1	17.94%	Yes
		24-Hour	7.90E-02	0.2	39.52%	Yes
		Annual	2.62E-03	0.1	2.62%	Yes
Alternative BACT 2B	NO_2	Annual	1.21E-03	0.1	1.21%	Yes
	PM10	24-Hour	1.60E-02	0.3	5.32%	Yes
		Annual	6.23E-04	0.2	0.31%	Yes
	SO_2	3-Hour	2.19E-01	1	21.93%	Yes
		24-Hour	8.36E-02	0.2	41.78%	Yes
		Annual	3.55E-03	0.1	3.55%	Yes

4.2 PSD Class I Increment Analysis

Since the impact of proposed modifications were less than the significant impact, PSD Class I increment analysis was not required. However, for informational purposes, Table 4-2a through 4-2c show the impact of the proposed modification as percent of Class I area increment.

Table 4-2a: PSD Class I Increment Analysis Results at the Everglades NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration (H1H)	PSD Class I Increment	Maximum Predicted Concentration as Percentage of Class I Increment
			µg/m³	µg/m³	%
Routine BACT 2	NO_2	Annual	1.62E-03	2.5	0.065%
	PM10	24-Hour	1.31E-02	10	0.131%
		Annual	4.32E-04	5	0.009%
	SO_2	3-Hour	1.22E-01	25	0.490%
		24-Hour	5.00E-02	5	0.999%
		Annual	1.54E-03	2	0.077%

Alternative BACT 2B	NO_2	Annual	6.00E-04	2.5	0.024%
	PM10	24-Hour	1.15E-02	10	0.115%
		Annual	3.85E-04	5	0.008%
	SO_2	3-Hour	1.65E-01	25	0.660%
		24-Hour	6.81E-02	5	1.361%
		Annual	2.13E-03	2	0.106%

Table 4-2b: PSD Class I Increment Analysis Results at the Biscayne Bay NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration (H1H)	PSD Class I Increment	Maximum Predicted Concentration as Percentage of Class I Increment
			µg/m³	µg/m³	%
Routine BACT 2	NO_2	Annual	9.62E-04	2.5	0.038%
	PM10	24-Hour	7.05E-03	10	0.070%
		Annual	2.77E-04	5	0.006%
	SO_2	3-Hour	9.09E-02	25	0.363%
		24-Hour	2.39E-02	5	0.478%
		Annual	1.04E-03	2	0.052%
Alternative BACT 2B	NO_2	Annual	3.45E-04	2.5	0.014%
	PM10	24-Hour	6.10E-03	10	0.061%
		Annual	2.41E-04	5	0.005%
	SO_2	3-Hour	1.21E-01	25	0.485%
		24-Hour	3.19E-02	5	0.638%
		Annual	1.42E-03	2	0.071%

Table 4-2c: PSD Class I Increment Analysis Results at the Big Cypress National Preserve

Scenario	Pollutant	Averaging Period	Maximum Predicted Concentration (H1H)	PSD Class I Increment	Maximum Predicted Concentration as Percentage of Class I Increment
			μg/m³	μg/m³	%
Routine BACT 2	NO_2	Annual	3.39E-03	2.5	0.135%
	PM10	24-Hour	1.82E-02	10	0.182%
		Annual	7.14E-04	5	0.014%
	SO_2	3-Hour	1.79E-01	25	0.718%
		24-Hour	7.90E-02	5	1.581%
		Annual	2.62E-03	2	0.131%
Alternative BACT 2B	NO_2	Annual	1.21E-03	2.5	0.048%
	PM10	24-Hour	1.60E-02	10	0.160%
		Annual	6.23E-04	5	0.012%
	SO_2	3-Hour	2.19E-01	25	0.877%
		24-Hour	8.36E-02	5	1.671%
		Annual	3.55E-03	2	0.178%

4.3 Deposition Analysis

Total nitrate (T-N) and total sulfate (T-S) depositions were estimated at the Everglades NP, Biscayne Bay NP and Big Cypress National Preserve from the proposed modification. For T-N deposition, the species included:

- Particulate ammonium nitrate wet and dry deposition;
- Nitric acid wet and dry deposition;
- NOx dry deposition; and
- Ammonium sulfate, wet and dry deposition.

For T-S deposition, the species included:

- SO_2 dry and wet deposition; and
- SO_4 dry and wet deposition.

The CALPUFF results were processed in CALPOST and POSTUTIL programs to develop deposition impacts. The impacts were then compared with the DAT values as shown in Tables 4-3a through 4-3c. A DAT is the incremental amount of deposition from proposed modification or source in a Class I area, below which the impacts are considered insignificant.

Table 4-3a: Deposition Impact Analysis Results for Everglades NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Deposition from CALPUFF	Maximum Predicted Deposition in DAT Units	DAT [1]	Maximum Predicted Deposition as Percentage of DAT	Maximum Predicted Deposition Less Than DAT?
			μg/m²-s	Kg/ha-yr[2]	Kg/ha-yr	%	Yes/No
Routine BACT 2	T-N	Annual	5.9230E-06	0.0019	0.01	18.7%	Yes
	T-S	Annual	7.6125E-06	0.0024	0.01	24.0%	Yes
Alternative BACT 2B	T-N	Annual	2.3429E-06	0.0007	0.01	7.4%	Yes
	T-S	Annual	7.4968E-06	0.0024	0.01	23.6%	Yes

Notes:

(1) Deposition analysis thresholds.

*(2) Conversion to DAT units: ug/m²-s * 3600 s/hr * 8760 hr/yr * 1E-6 g/ug * 1 kg/1000 g * 10000 m²/ha = kg/ha-yr.*

Table 4-3b: Deposition Impact Analysis Results for Biscayne Bay NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Deposition from CALPUFF	Maximum Predicted Deposition in DAT Units	DAT [1]	Maximum Predicted Deposition as Percentage of DAT	Maximum Predicted Deposition Less Than DAT?
			μg/m²-s	Kg/ha-yr[2]	Kg/ha-yr	%	Yes/No
Routine BACT 2	T-N	Annual	2.3891E-06	0.0008	0.01	7.5%	Yes
	T-S	Annual	3.7615E-06	0.0012	0.01	11.9%	Yes
Alternative BACT 2B	T-N	Annual	1.0082E-06	0.0003	0.01	3.2%	Yes
	T-S	Annual	3.8898E-06	0.0012	0.01	12.3%	Yes

Notes:

(1) Deposition analysis thresholds.

*(2) Conversion to DAT units: ug/m²-s * 3600 s/hr * 8760 hr/yr * 1E-6 g/ug * 1 kg/1000 g * 10000 m²/ha = kg/ha-yr.*

Table 4-3b: Deposition Impact Analysis Results for Big Cypress National Preserve

Scenario	Pollutant	Averaging Period	Maximum Predicted Deposition from CALPUFF	Maximum Predicted Deposition in DAT Units	DAT [1]	Maximum Predicted Deposition as Percentage of DAT	Maximum Predicted Deposition Less Than DAT?
			$\mu g/m^2$-s	Kg/ha-yr [2]	Kg/ha-yr	%	Yes/No
Routine BACT 2	T-N	Annual	7.9752E-06	0.0025	0.01	25.2%	Yes
	T-S	Annual	1.0422E-05	0.0033	0.01	32.9%	Yes
Alternative BACT 2B	T-N	Annual	3.0054E-06	0.0009	0.01	9.5%	Yes
	T-S	Annual	1.0255E-05	0.0032	0.01	32.3%	Yes

Notes:
(1) Deposition analysis thresholds.
*(2) Conversion to DAT units: ug/m²-s * 3600 s/hr * 8760 hr/yr * 1E-6 g/ug * 1 kg/1000 g * 10000 m²/ha = kg/ha-yr.*

4.4 Visibility Impact Analysis

The change in visibility is characterized by a change in light extinction coefficient (b_{ext}). The b_{ext} is the attenuation of light per unit distance due to scattering and absorption by gases and particulates in the atmosphere. The impact of the proposed modification is measured against the natural or background extinction coefficient to determine the percent change as follows:

$$\% \text{ Change} = (b_{ext\text{-}mod} / b_{ext\text{-}background})*100$$

CALPUFF and CALPOST were used to calculate the extinction at each Class I receptor for each day (24-hour period) due to the proposed modification. The analysis was conducted as per FLAG 2000 report and per recommendations from NPS. Daily background coefficients are calculated on an hour by hour basis using hourly relative humidity data and hygroscopic and non-hygroscopic extinction coefficients of 0.9 and 8.5 in Mm^{-1}. Background concentrations for visibility calculations were based on the current values in the FLAG 2000 report, which are 0.3 for BKSO4 and 8.5 for BKSOIL.

The results of the analysis are presented in Table 4-4a through 4-4c.

Table 4-4a: Visibility Impact Analysis Results at the Everglades NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Change in Visibility Impairment (%)	Date Julian Day	No. of Visibility Impairments Above 5%	No. of Visibility Impairments Above 10%
Routine BACT 2	2001	24-hour	5.66%	15	1	0
	2002	24-hour	7.49%	337	3	0
	2003	24-hour	6.80%	17	4	0
Alternative BACT 2B	2001	24-hour	1.90%	15	0	0
	2002	24-hour	2.18%	337	0	0
	2003	24-hour	2.35%	15	0	0

Table 4-4b: Visibility Impact Analysis Results at the Biscayne Bay NP

Scenario	Pollutant	Averaging Period	Maximum Predicted Change in Visibility Impairment (%)	Date Julian Day	No. of Visibility Impairments Above 5%	No. of Visibility Impairments Above 10%
Routine BACT 2	2001	24-hour	2.63%	260	0	0
	2002	24-hour	3.90%	88	0	0
	2003	24-hour	4.68%	261	0	0
Alternative BACT 2B	2001	24-hour	1.09%	260	0	0
	2002	24-hour	1.55%	88	0	0
	2003	24-hour	1.35%	261	0	0

Table 4-4c: Visibility Impact Analysis Results at the Big Cypress National Preserve

Scenario	Pollutant	Averaging Period	Maximum Predicted Change in Visibility Impairment	Date	No. of Visibility Impairments Above 5%	No. of Visibility Impairments Above 10%
			(%)	Julian Day		
Routine BACT 2	2001	24-hour	7.22%	319	3	0
	2002	24-hour	8.63%	337	7	0
	2003	24-hour	12.63%	17	10	1
Alternative BACT 2B	2001	24-hour	2.33%	15	0	0
	2002	24-hour	2.27%	337	0	0
	2003	24-hour	3.04%	17	0	0

5.0 Conclusions

A Class I Area impact analysis was performed for the revised operating scenarios for the Okeechobee Landfill in Okeechobee County. The Class I area evaluated was the Everglades NP located approximately 169 km from the Facility. A nearby Class II national park, the Biscayne Bay NP as well as Big Cypress National Preserve were also evaluated. The analysis was performed in accordance with guidance received from both FDEP and the NPS. Various assumptions were made to ensure a conservative, protective modeling effort.

The analyses included are: i) Class I area air quality impact; ii) deposition impact; and iii) visibility impairment impact. Four operating scenarios are considered: i) Current Interim Operating Scenario ii) Routine BACT Operating Scenario; iii) Alternative BACT 1 Operating Scenario; and iv) Alternative BACT Operating Scenario 2.

In the modeling scenarios considered, the results indicate that no significant impact on air quality at the Everglades NP, Biscayne Bay NP, or Big Cypress National Preserve will occur. There were no exceedences of the Class I significant impact level or Class I PSD increment for any pollutant. The deposition flux was estimated to be below significance threshold levels (i.e. DAT) for both nitrates and sulfates in all scenarios. The visibility impairment was measured in terms of light extinction coefficient. There was only 1 time in which the percent change in light extinction coefficient over the background was greater than 10% for all of the 24-hour periods modeled for the Big Cypress National Preserve, the closest of the three areas evaluated. The percent change in light extinction coefficient over the background was lower than 10% for all of the 24-hour periods modeled for the Everglades NP and the Biscayne Bay NP.

Given the results for the analyses, no adverse impact is predicted on soil, vegetation, wildlife and visibility in the Class I area from the project.

Okeechobee
Stack Parameter Adjustment

Original Data	3300 scfm Flare	3000 scfm Flare	1500 scfm Flare	Backup Flare	Odor Flare
Heat Rate (MMBtu/hr)	99	90	45	84	99
Heat Rate (cal/sec)	6,930,000	6,300,000	3,150,000	5,880,000	6,930,000
Height (m)	10.66812972	12.80175567	8.53450378	9.144111192	10.66812972
Diameter (m)	0.355604324	0.355604324	0.254003089	0.355604324	0.355604324

Guidance	Flare (scfm)	Exit Velocity (m/s)	Exit Temp (F)	Height (m)	Diameter (m)
OEPA	3,300	20	1831.73	19.158	1.746
OEPA	3,000	20	1831.73	20.913	1.665
OEPA	1,500	20	1831.73	14.358	1.177
OEPA	2,800	20	1831.73	16.992	1.608
OEPA	3,300	20	1831.73	19.158	1.746

See page 14 of OEPA guidance document

Ohio EPA Flare Guidance

Proposed operation of new flares
Backup Flare

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft³/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft³	
LFG Methane Component[c]	50%	%	
LFG Typical Heating Value	500	Btu/ft³	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%	%	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed

Fuel & Equipment - Open Flare

Flare Information	Value		Equivalent
No. of Hours of Operation Per Day[a]	24	hr	
No. of Days in Averaging Period[a]	365	day	
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[a]	2,800	scfm	
LFG Inlet Flow, dry standard	2,576	dscfm	
Heat Input	84.0	MMBtu/hr	
Design Flare Operating Temperature[b]	1,400	°F	1,860 °R
Flare Tip Flow, standard	2,800	scfm	
Flare Tip Flow, actual	3,015	acfm	
Flare Tip Diameter[b]	1.17	ft	
Flare Tip Exhaust Velocity	2,821	ft/min	47.0 ft/s
Flare Tip Height, above local grade[b]	30	ft	

[a]Permit Applicant

Proposed operation of new flares

Criteria Pollutant Emissions - Open Flare

Operation Period	8,760	hr
LFG inlet flow, standard	2,800	scfm
Heat Input	84.0	MMBtu/hr

SO_2 Emission Rate

SO_2 concentration in exhaust gas	4987.58	ppmv		
SO_2 emission rate	141.38	lb/hr	619.24	ton/yr

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.03
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.22
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.06
Hydrogen Sulfide	7783-06-4	34.08	4973.34	100.0%	1	4973.3	140.97
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.07
				Total Contribution to SO_2:		4987.58	141.38

SO_2 Emission Rate with BACT

SO_2 concentration in exhaust gas	400.05	ppmv		
SO_2 emission rate	11.34	lb/hr	49.67	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.03
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.22
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.06
Hydrogen Sulfide	7783-08-4	34.08	385.80	100.0%	1	385.8	10.94
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.07
				Total Contribution to SO_2:		400.05	11.34

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.314	lb/hr	5.75	tpy

NO_2 Emission Rate

NO_2 emission factor[c]	0.068	lb/MMBtu		
NO_2 emission rate	5.71	lb/hr	25.02	tpy

CO Emission Rate

CO emission factor[c]	0.37	lb/MMBtu		
CO emission rate	31.1	lb/hr	136.1	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	22.69	lb/hr		
NMOC emission rate	0.45	lb/hr	1.99	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	8.85	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.18	lb/hr	0.78	tpy

[a]EPA 1998. "Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources" (AP-42). 5th Ed., November
[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end range is used here resulting in maximum calculated emissions of SO
[c]LFG Specialties Inc. (typical)

Proposed operation of new flares
Odor Flare

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft^3/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft^3	
LFG Methane Component[c]	50%	%	
LFG Typical Heating Value	500	Btu/ft^3	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%	%	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed

Fuel & Equipment - Open Flare

Flare Information	Value		Equivalent
No. of Hours of Operation Per Day[a]	24	hr	
No. of Days in Averaging Period[a]	365	day	
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[a]	3,300	scfm	
LFG Inlet Flow, dry standard	3,036	dscfm	
Heat Input	99.0	MMBtu/hr	
Design Flare Operating Temperature[b]	1,400	°F	1,860 °R
Flare Tip Flow, standard	3,300	scfm	
Flare Tip Flow, actual	3,554	acfm	
Flare Tip Diameter[b]	1.17	ft	
Flare Tip Exhaust Velocity	3,324	ft/min	55.4 ft/s
Flare Tip Height, above local grade[b]	35	ft	

[a]Permit Applicant

Proposed operation of new flares

Criteria Pollutant Emissions - Open Flare

Operation Period	8,760	hr
LFG inlet flow, standard	3,300	scfm
Heat Input	99.0	MMBtu/hr

SO_2 Emission Rate

SO_2 concentration in exhaust gas	4987.58	ppmv		
SO_2 emission rate	166.62	lb/hr	729.81	ton/yr

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.04
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.02
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.26
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.08
Hydrogen Sulfide	7783-06-4	34.08	4973.34	100.0%	1	4973.3	166.15
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.08
				Total Contribution to SO_2:		4987.58	166.62

SO_2 Emission Rate with BACT

SO_2 concentration in exhaust gas	400.05	ppmv		
SO_2 emission rate	13.36	lb/hr	58.54	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.04
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.02
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.26
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.08
Hydrogen Sulfide	7783-06-4	34.08	385.80	100.0%	1	385.8	12.89
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.08
				Total Contribution to SO_2:		400.05	13.36

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.55	lb/hr	6.78	tpy

NO_2 Emission Rate

NO_2 emission factor[c]	0.068	lb/MMBtu		
NO_2 emission rate	6.73	lb/hr	29.49	tpy

CO Emission Rate

CO emission factor[c]	0.37	lb/MMBtu		
CO emission rate	36.6	lb/hr	160.4	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	26.74	lb/hr		
NMOC emission rate	0.53	lb/hr	2.34	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	10.43	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.21	lb/hr	0.91	tpy

[a]EPA 1998. "Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources" (AP-42). 5th Ed., November
[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end range is used here resulting in maximum calculated emissions of SO
[c]LFG Specialties Inc. (typical)

Existing enclosed flare baseline

CD001 3,000-scfm enclosed flare w/evap

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft^3/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft^3	
LFG Methane Component[c]	50%		
LFG Typical Heating Value	500	Btu/ft^3	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%		
Methane Combustion Constant[d]	9.53	ft^3 air/ft^3 CH_4	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed
[d]*Professional Engineering Registration Program*, 23-9.

Fuel & Equipment - Enclosed Flare

Flare Information	Value		Equivalent
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[b]	2,237	scfm	
LFG Inlet Flow, dry standard	2,058	dscfm	
Heat Input	67	MMBtu/hr	
Design Flare Operating Temperature[c]	1,400	°F	1,860 °R
Excess Air for Combustion[c]	230%		
Flare Tip Flow, standard	37,413	scfm	
Flare Tip Flow, actual	133,822	acfm	
Flare Tip Diameter[b]	10.0	ft	
Flare Tip Exhaust Velocity	1,704	ft/min	28.4 ft/s
Flare Tip Height, above local grade[b]	45	ft	

[a]Permit Applicant
[b]Flare manufacturer - based on LFG model EF1045I12
[c]Function of design flame temperature; values are typical and are provided for 1400°F, 1600°F, 1800°F, and 2000°Fby a flare manufactuer

Existing enclosed flare baseline

Criteria Pollutant Emissions - Enclosed Flare

CD001 3,000-scfm enclosed flare w/evap

Operation Period	8,760	hr
LFG inlet flow, standard	2,237	scfm
Heat Input	67	MMBtu/hr

SO_2 Emission Rate with BACT

Sulfur concentration in exhaust gɛ	400.05	ppmv		
SO_2 emission rate	9.06	lb/hr uncontrolled	39.7	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.03
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.18
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.05
Hydrogen Sulfide	7783-06-4	34.08	**385.80**	100.0%	1	385.8	8.74
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.06
				Total Contribution to SO_2 :		400.05	9.06

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.05	lb/hr	4.6	tpy

NO_2 Emission Rate

NO_2 emission factor[c]	0.06	lb/MMBtu		
NO_2 emission rate	4.0	lb/hr	17.6	tpy

CO Emission Rate

CO emission factor[c]	0.20	lb/MMBtu		
CO emission rate	13.4	lb/hr	59	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	18.1	lb/hr		
NMOC emission rate	0.36	lb/hr	1.59	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	7.1	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.14	lb/hr	0.62	tpy

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.*, November 1998.

[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end of the range is used here resulting in maximum calculated emissions of SO_2.

[c]LFG Specialties Inc. (typical)

Existing enclosed flare baseline

CD002 3,000-scfm enclosed flare w/evap

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft^3/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft^3	
LFG Methane Component[c]	50%		
LFG Typical Heating Value	500	Btu/ft^3	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%		
Methane Combustion Constant[d]	9.53	ft^3 air/ft^3 CH_4	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed
[d]*Professional Engineering Registration Program*, 23-9.

Fuel & Equipment - Enclosed Flare

Flare Information	Value		Equivalent
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[b]	2,246	scfm	
LFG Inlet Flow, dry standard	2,066	dscfm	
Heat Input	67	MMBtu/hr	
Design Flare Operating Temperature[c]	1,400	°F	1,860 °R
Excess Air for Combustion[c]	230%		
Flare Tip Flow, standard	37,563	scfm	
Flare Tip Flow, actual	134,361	acfm	
Flare Tip Diameter[b]	10.0	ft	
Flare Tip Exhaust Velocity	1,711	ft/min	28.5 ft/s
Flare Tip Height, above local grade[b]	45	ft	

[a]Permit Applicant
[b]Flare manufacturer - based on LFG model EF1045I12
[c]Function of design flame temperature; values are typical and are provided for 1400°F, 1600°F, 1800°F, and 2000°Fby a flare manufactuer

Emissions Calculations
Okeechobee (Berman Road) Landfill
Okeechobee, Fl

Existing enclosed flare baseline
Criteria Pollutant Emissions - Enclosed Flare
CD002 3,000-scfm enclosed flare w/evap

Operation Period	8,760	hr
LFG inlet flow, standard	2,246	scfm
Heat Input	67	MMBtu/hr

SO_2 Emission Rate with BACT

Sulfur concentration in exhaust ga	400.05	ppmv		
SO_2 emission rate	9.10	lb/hr uncontrolled	39.8	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.03
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.18
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.05
Hydrogen Sulfide	7783-06-4	34.08	385.80	100.0%	1	385.8	8.77
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.06
			Total Contribution to SO_2 :			400.05	9.10

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.05	lb/hr	4.6	tpy

NO_2 Emission Rate

NO_2 emission factor[c]	0.06	lb/MMBtu		
NO_2 emission rate	4.0	lb/hr	17.7	tpy

CO Emission Rate

CO emission factor[c]	0.20	lb/MMBtu		
CO emission rate	13.5	lb/hr	59	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	18.2	lb/hr		
NMOC emission rate	0.36	lb/hr	1.59	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	7.1	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.14	lb/hr	0.62	tpy

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.
[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end of the range is used here resulting in maximum calculated emissions of SO_2.
[c]LFG Specialties Inc. (typical)

Turbine Data

Information provided by Solar Turbines September 17, 2008 letter

Turbine Model	PowerOutput kW	Gas Flow lb/min.	Exhaust Gas Temp. F	Exhaust Gas Temp. F 50% Load	NOx ppmv 15% O2	NOx lb/h	NOx g/bhp	CO ppmv 15% O2	CO lb/h	CO g/bhp	CO lb/h at 50% Load
Titan 130-20501	15185	6664.7	935	696	72	46.36	0.987	100	78.38	1.67	195.95
Centaur 40-4700	3337.4	2505.9	837	595	42	7.89	0.746	250	28.6	2.7	60.06

Titan 130

Parameter	Value	Units	Reference
Stack Height	35	ft	As per Sept. 17, 2008 letter from Solar turbines
Stack Interior Diameter	120	in	Solar Turbines
PM10 Rate	0.023	lb/MMBtu	AP-42, Table 3.1-2b
Turbine Inlet	5000	scfm	Solar Turbines
Exhaust Flow Rate 100% Load	236019	acfm	Solar Turbines
Exhaust Flow Rate 100% Load	50.08	ft/s	Calculated
Exhaust Flow Rate 50% Load	192937	acfm	Solar Turbines
Exhaust Flow Rate 50% Load	40.94	ft/s	Calculated
Average Landfill gas HHV	400	Btu/scf	AP-42, Table 3.1-2b
PM10 Rate	2.8	lb/hr	Calculated

Centaur 40

Parameter	Value	Units	Reference
Stack Height	35	ft	As per Sept. 17, 2008 letter from Solar turbines
Stack Interior Diameter	48	in	Solar Turbines
PM10 Rate	0.023	lb/MMBtu	AP-42, Table 3.1-2b
Turbine Inlet	1500	scfm	Solar Turbines
Exhaust Flow Rate 100% Load	82503	acfm	Solar Turbines
Exhaust Flow Rate 100% Load	109.42	ft/s	Calculated
Exhaust Flow Rate 50% Load	66741	acfm	Solar Turbines
Exhaust Flow Rate 50% Load	88.52	ft/s	Calculated
Average Landfill gas HHV	400	Btu/scf	AP-42, Table 3.1-2b
PM10 Rate	0.8	lb/hr	Calculated

Criteria Pollutant Emissions - Titan Turbine

Operation Period	8,760	hr
LFG inlet flow, standard	5,000	scfm
Heat Input	150	MMBtu/hr
Standard Temperature[a]	60	°F
	520	°R

500 Btu/cf

SO_2 Emission Rate

SO_2 concentration in exhaust gas	400.05	ppmv	
SO_2 emission rate	20.25	lb/hr	88.7 tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.06
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.02
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.40
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.12
Hydrogen Sulfide	7783-06-4	34.08	**385.80**	100.0%	1	385.8	19.53
Methyl Mercaptan	74-93-1	48.11	2.49	100%	1	2.49	0.13
				Total Contribution to SO_2 :		400.05	20.25

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv	
MW hexane	86.18	lb/lb-mol	
destruction efficiency	98%		
mass NMOC inlet gas	40.5	lb/hr	
NMOC emission rate	0.81	lb/hr	3.55 tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv	
VOC fraction of NMOC[a]	39%		
VOC concentration in inlet gas	232	ppmv	
MW hexane	86.18	lb/lb-mol	
mass VOC inlet gas	15.8	lb/hr	
destruction efficiency	98%		
VOC emission rate	0.32	lb/hr	1.38 tpy

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.
[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end of the range is used here resulting in maximum calculated emissions of SO_2.
[c]LFG Specialties Inc. (typical)

Criteria Pollutant Emissions - Centaur Turbines

Operation Period	8,760 hr	
LFG inlet flow, standard	1,500 scfm	
Heat Input	45 MMBtu/hr	
Standard Temperature[a]	60 °F	500 Btu/cf
	520 °R	

SO_2 Emission Rate

SO_2 concentration in exhaust gas	400.05 ppmv	
SO_2 emission rate	6.07 lb/hr	26.6 tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.02
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.12
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.03
Hydrogen Sulfide	7783-06-4	34.08	**385.80**	100.0%	1	385.8	5.86
Methyl Mercaptan	74-93-1	48.11	2.49	100%	1	2.49	0.04
				Total Contribution to SO_2 :		400.05	6.07

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv	
MW hexane	86.18	lb/lb-mol	
destruction efficiency	98%		
mass NMOC inlet gas	12.2	lb/hr	
NMOC emission rate	0.24	lb/hr	1.06 tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv	
VOC fraction of NMOC[a]	39%		
VOC concentration in inlet gas	232	ppmv	
MW hexane	86.18	lb/lb-mol	
mass VOC inlet gas	4.7	lb/hr	
destruction efficiency	98%		
VOC emission rate	0.09	lb/hr	0.42 tpy

[a]U.S. E.P.A., *Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources* ("AP-42"), *5th Ed.,* November 1998.
[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end of the range is used here resulting in maximum calculated emissions of SO_2.
[c]LFG Specialties Inc. (typical)

Proposed operation of new flares
CD NEW - Proposed 3,000-scfm utility flare

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft^3/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft^3	
LFG Methane Component[c]	50%	%	
LFG Typical Heating Value	500	Btu/ft^3	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%	%	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed

Fuel & Equipment - Open Flare

Flare Information	Value		Equivalent
No. of Hours of Operation Per Day[a]	24	hr	
No. of Days in Averaging Period[a]	365	day	
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[a]	3,000	scfm	
LFG Inlet Flow, dry standard	2,760	dscfm	
Heat Input	90.0	MMBtu/hr	
Design Flare Operating Temperature[b]	1,400	°F	1,860 °R
Flare Tip Flow, standard	3,000	scfm	
Flare Tip Flow, actual	3,231	acfm	
Flare Tip Diameter[b]	1.17	ft	
Flare Tip Exhaust Velocity	3,022	ft/min	50.4 ft/s
Flare Tip Height, above local grade[b]	42	ft	

[a]Permit Applicant

Proposed operation of new flares

Criteria Pollutant Emissions - Open Flare

Operation Period	8,760	hr
LFG inlet flow, standard	3,000	scfm
Heat Input	90.0	MMBtu/hr

SO_2 Emission Rate

SO_2 concentration in exhaust gas	4987.58	ppmv		
SO_2 emission rate	151.48	lb/hr	663.47	ton/yr

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.04
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.24
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.07
Hydrogen Sulfide	7783-06-4	34.08	4973.34	100.0%	1	4973.3	151.04
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.08
					Total Contribution to SO_2:	4987.58	151.48

SO_2 Emission Rate with BACT

SO_2 concentration in exhaust gas	400.05	ppmv		
SO_2 emission rate	12.15	lb/hr	53.22	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.04
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.24
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.07
Hydrogen Sulfide	7783-06-4	34.08	385.80	100.0%	1	385.8	11.72
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.08
					Total Contribution to SO_2:	400.05	12.15

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	1.41	lb/hr	6.17	tpy

NO_2 Emission Rate

NO_2 emission factor[c]	0.068	lb/MMBtu		
NO_2 emission rate	6.12	lb/hr	26.81	tpy

CO Emission Rate

CO emission factor[c]	0.37	lb/MMBtu		
CO emission rate	33.3	lb/hr	145.9	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	24.31	lb/hr		
NMOC emission rate	0.49	lb/hr	2.13	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	9.48	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.19	lb/hr	0.83	tpy

[a]EPA 1998. "Compilation of Air Pollutant Emission Factors, Volume I. Stationary Point and Area Sources" (AP-42), 5th Ed., November

[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end range is used here resulting in maximum calculated emissions of SO

[c]LFG Specialties Inc. (typical)

Proposed operation of new flares
CD NEW - Proposed 1,500-scfm utility flare

Standard Conditions, Constants, and Typical Values

Category	Value		Equivalent
Standard Temperature[a]	60	°F	520 °R
Universal Gas Constant	0.7302	atm-ft³/lb-mol°R	
Pressure[a]	1	atm	
Methane Heating Value[b]	1,000	Btu/ft³	
LFG Methane Component[c]	50%	%	
LFG Typical Heating Value	500	Btu/ft³	
LFG Temperature[c]	100	°F	560 °R
LFG Moisture[c]	8%	%	

[a]Industrial STP (60°F, 30.00 in. Hg, 1 atm)
[b]Typical
[c]Assumed

Fuel & Equipment - Open Flare

Flare Information	Value		Equivalent
No. of Hours of Operation Per Day[a]	24	hr	
No. of Days in Averaging Period[a]	365	day	
Operation Period[a]	8,760	hr	
LFG inlet flow, standard[a]	1,500	scfm	
LFG Inlet Flow, dry standard	1,380	dscfm	
Heat Input	45.0	MMBtu/hr	
Design Flare Operating Temperature[b]	1,400	°F	1,860 °R
Flare Tip Flow, standard	1,500	scfm	
Flare Tip Flow, actual	1,615	acfm	
Flare Tip Diameter[b]	0.83	ft	
Flare Tip Exhaust Velocity	2,962	ft/min	49.4 ft/s
Flare Tip Height, above local grade[b]	28	ft	

[a]Permit Applicant

Proposed operation of new flares

Criteria Pollutant Emissions - Open Flare

Operation Period	8,760	hr
LFG inlet flow, standard	1,500	scfm
Heat Input	45.0	MMBtu/hr

SO_2 Emission Rate

SO_2 concentration in exhaust gas	4987.58	ppmv		
SO_2 emission rate	75.74	lb/hr	331.73	ton/yr

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.02
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.12
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.03
Hydrogen Sulfide	7783-06-4	34.08	4973.34	100.0%	1	4973.3	75.52
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.04
					Total Contribution to SO_2:	4987.58	75.74

SO_2 Emission Rate with BACT

SO_2 concentration in exhaust gas	400.05	ppmv		
SO_2 emission rate	6.07	lb/hr	26.61	tpy

LFG Compound	CAS	MW (lb/lb-mol)	Conc (ppmv)[a]	Control Eff[a,b]	Individual Compound Contribution to SO_2: No. of S Atoms	S Conc (ppmv)	SO_2 Emiss (lb/hr)
Carbon Disulfide	75-15-0	76.13	0.58	100.0%	2	1.17	0.02
Carbonyl Sulfide	463-58-1	60.07	0.49	100.0%	1	0.49	0.01
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82	100.0%	1	7.82	0.12
Ethyl Mercaptan (ethanethiol)	75-08-1	62.13	2.28	100.0%	1	2.28	0.03
Hydrogen Sulfide	7783-06-4	34.08	385.80	100.0%	1	385.8	5.86
Methyl Mercaptan	74-93-1	48.11	2.49	100.0%	1	2.49	0.04
					Total Contribution to SO_2:	400.05	6.07

PM_{10} Emission Rate

PM emission factor[a]	17	lb/MM dscf CH_4		
PM emission rate	0.70	lb/hr	3.08	tpy

NO_2 Emission Rate

NO_2 emission factor[c]	0.068	lb/MMBtu		
NO_2 emission rate	3.06	lb/hr	13.40	tpy

CO Emission Rate

CO emission factor[c]	0.37	lb/MMBtu		
CO emission rate	16.7	lb/hr	72.9	tpy

NMOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
MW hexane	86.18	lb/lb-mol		
destruction efficiency	98%			
mass NMOC inlet gas	12.15	lb/hr		
NMOC emission rate	0.24	lb/hr	1.06	tpy

VOC Emission Rate

NMOC conc inlet gas[a]	595	ppmv		
VOC fraction of NMOC[a]	39%			
VOC concentration in inlet gas	232	ppmv		
MW hexane	86.18	lb/lb-mol		
mass VOC inlet gas	4.74	lb/hr		
destruction efficiency	98%			
VOC emission rate	0.09	lb/hr	0.42	tpy

[a]EPA 1998. "Compilation of Air Pollutant Emission Factors, Volume I, Stationary Point and Area Sources" (AP-42), 5th Ed., November
[b]AP-42 gives ranges for control efficiencies. Control efficiencies for halogenated species range from 91 to 99.7 percent. The upper end range is used here resulting in maximum calculated emissions of SO
[c]LFG Specialties Inc. (typical)

Titan Turbine

Consensus Approach where H2SO4 emissions are not provided by applican
Applicant's estimates are in **BOLD**.

	Heat Input	Filterable PM (Applicant)		Condensible PM (75% Estimate)		Total PM (Estimate)		SO2 (Applicant)		
Turbine	(mmBtu/hr)	(lb/mmBtu)	(lb/hr)	(lb/mmBtu)	(lb/hr)	(lb/mmBtu)	(lb/hr)	(gr/100scf)		(lb/hr)
Titan	**147.2**		**2.80**		8.40		11.20	**2.0**		20.25

SO4
(lb/hr)
8.40

28%

SO2
(lb/hr)
14.65

Organic Carbon
(lb/hr)
0.00

Impact of Consensus Combined Cycle Turbine Example on Extinctio

Type		Name	Extinction Coef.	f(RH)*	Efficiency	Emissions (lb/hr)	Total Relative bext 1/Mm	
Filterable		EC	10		10	2.80	28.00	
Inorganic CPM		SOIL	1		1		0.00	
Inorganic CPM		SO4	3	2	6	8.40	50.40	* f(RH) will vary
Organic CPM		SOA	4		4	0.00	0.00	
							78.40	

comparison from AP-42

	Heat Input	Filterable PM (AP-42)		Condensible PM (AP-42)		Total PM (AP-42)		SO2 (AP-42)		
Turbine	(mmBtu/hr)	(lb/mmBtu)	(lb/hr)	(lb/mmBtu)	(lb/hr)	(lb/mmBtu)	(lb/hr)	(lb/mmBtu)	%S	(lb/hr)
Titan	147.2	0.0019	0.28	0.0047	0.69	0.0066	0.97	0.94	0.004	0.50

Centaur Turbine

Consensus Approach where H2SO4 emissions are not provided by applican
Applicant's estimates are in **BOLD**.

	Heat Input	Filterable PM (Applicant)		Condensible PM (75% Estimate)		Total PM (Estimate)		SO2 (Applicant)		
Turbine	(mmBtu/hr)	(lb/mmBtu)	(lb/hr)	(lb/mmBtu)	(lb/hr)	(lb/mmBtu)	(lb/hr)	(gr/100scf)		(lb/hr)
Centaur	**42.6**		**0.80**		2.40		3.20	**2.0**		**6.07**

SO4
(lb/hr)
2.40

26%

SO2
(lb/hr)
4.47

Organic Carbon
(lb/hr)
0.00

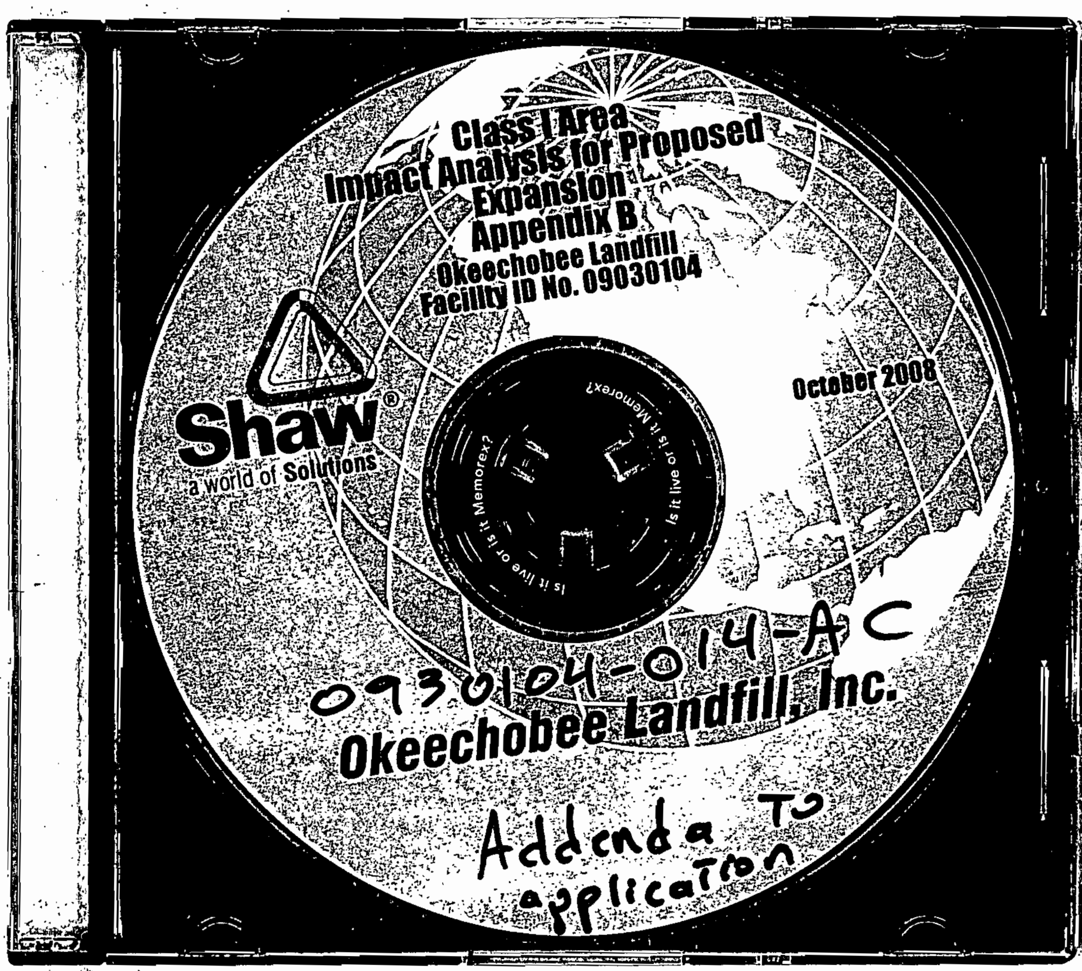
Impact of Consensus Combined Cycle Turbine Example on Extinctioi

Type		Name	Extinction Coef.	f(RH)*	Efficiency	Emissions (lb/hr)	Total Relative bext 1/Mm
Filterable		EC	10		10	0.80	8.00
Inorganic CPM		SOIL	1		1		0.00
Inorganic CPM		SO4	3	2	6	2.40	14.40
Organic CPM		SOA	4		4	0.00	0.00
							22.40

* f(RH) will vary

comparison from AP-42

	Heat Input	Filterable PM (AP-42)		Condensible PM (AP-42)		Total PM (AP-42)		SO2 (AP-42)		
Turbine	(mmBtu/hr)	(lb/mmBtu)	(lb/hr)	(lb/mmBtu)	(lb/hr)	(lb/mmBtu)	(lb/hr)	(lb/mmBtu)	%S	(lb/hr)
Centaur	42.6	0.0019	0.08	0.0047	0.20	0.0066	0.28	0.94	0.004	0.14


Class I Area
Impact Analysis for Proposed
Expansion
Appendix B
Okeechobee Landfill
Facility ID No. 09030104
October 2008
Shaw
a world of Solutions
Is it live or is it Memorex?
Is it live or is it Memorex?
0930104-014-AC
Okeechobee Landfill, Inc.
Addenda To application